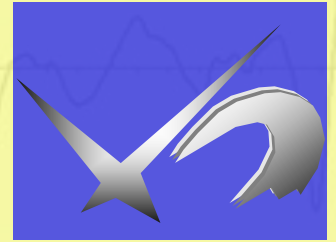
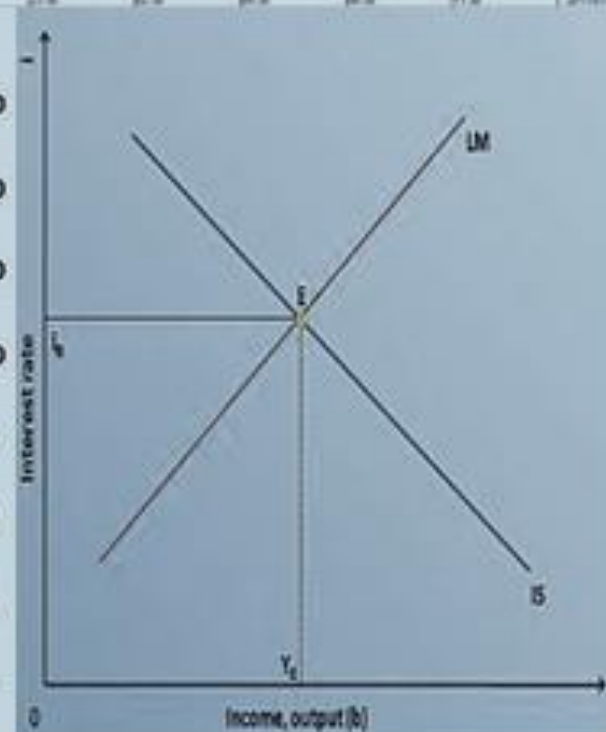


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Gender and Leadership: an Approach to the Differences between Women and Men in Management

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Abstract: When a group of persons begins to interact, various differences between the members begin to appear. The pattern of relationships change according to the nature of the task and the most influential person became to be the leader. The aim of the present work is study whether men and women leader are fundamentally different or similar, reviewing the different relationships that exist when a group agrees a division of labour, roles, and responsibilities. It is also important to explore how the way of leadership influences the evolution of the whole group. Leaders must be chosen because of the characteristics that they possess. They should be seen as best suited to lead in particular situations and when negotiation and diplomacy are needed, interpersonal skills may outweigh the value of a dominant leader. In line with these, traditional feminine behaviour could be favoured in new business scenarios.

Keywords: gender, leadership, management

JEL codes: J71, J16,

1. Introduction

Leadership is the process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task. Obviously, identifying different social interactions and its influence in the entire group is critical to understanding how behaviours spread (Ballet al. 2013; Broverman et al. 1972; Eagly, 2009; Eagly and Wood 1999; Hyde, 2006, 2013; Preacher and Hayes 2008; Rudman, 1998; Schader et al., 2008; Schein, 1973; Wood and Eagly 2012).

When a group of persons comes together, for any reason, and begins to interact, various differences between the members begin to appear (in status, influence etc.) Moreover this pattern of relationships change according to the nature of the task and the most influential person for one purpose may not be so for another (Archer, 2004; Costa et al.2001; Eccles and Wigfield, 2002; Else-Quest, 2012; Hyde, 2013; Lammers et al., 2009; Reilly, 2012; Stewart and McDermott, 2004; Su et al. 2009). In this way, the purpose of this review is try to understand what conditions are favourable for the development of leadership and explore is there is a feminine one versus a masculine one.

The question is whether, a man or a woman acting as a leader, work in different or similar way. To answer it is necessary reviewing the different relationships that exist when a group agrees a division of labour, roles, and responsibilities and how the way of leadership influences in the evolution of the whole group. Evidently, gender stereotypes do not influence only the way in which women and men behave in the workplace; such stereotypes can also influence which leadership positions women and men accept and occupy during organizational evolution (Archer, 2004; Costa et al.2001; Eccles and Wigfield, 2002; Else-Quest, 2012; Hyde, 2013; Lammers et al., 2009; Reilly, 2012; Stewart and McDermott, 2004; Su et al. 2009).

2. Methodology: Reviewing different theories about the origin of gender differences and similarities

There are a lot of questions about of behavioural gender differences for this reason research on gender differences and similarities are important. Indeed, stereotypes about psychological gender differences abound, influencing people's behaviour, and it is important to evaluate whether they are accurate (Archer, 2004; Costa et al., 2001; Eccles and Wigfield, 2002; Else-Quest, 2012; Hyde, 2013; Lammers et al., 2009; Reilly, 2012; Stewart and McDermott, 2004; Su et al., 2009). Historically sexual stereotypes have excluded women from professional fields. However, the fact is that biologically, sexual dimorphism is only a phenotypic difference between males and females of the same species but, in humans, has long been a subject of much controversy, especially when extended beyond physical differences to mental ability and psychological conditions (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al., 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002).

2.a. Psychobiology of difference

There are genders differences in the human neuroendocrine system or in physical health but, the question is how these differences affected the way are they behaviour (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al., 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002). Such undisputed sexual dimorphism includes differentiation among gonads, muscle mass, o height. For example, females are taller (on average) than males in early adolescence, but males (on average) surpass them in height in later adolescence and adulthood. Females typically have more white blood cells and produce more antibodies at a faster rate than males. Hence they develop fewer infectious diseases and succumb for shorter periods (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al. 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002). It is well-known that there are differences in their central nervous system because females (on average, again) have a higher percentage of gray matter (that includes regions of the brain involved in muscle control, sensory perception such as seeing and hearing, memory, emotions, speech or decision making) in comparison to males (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al., 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002). However, males have larger brains on average than females and, in fact, when adjusted for total brain volume, the gray matter differences between sexes are small or nonexistent (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al., 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002). These anatomic differences are in the origin of behavioural differences. In this way, several studies shown that depression and anxiety disorders are more common in women than men, but little is known about the neurobiological mechanisms that contribute to this disparity (Abramson et al., 1989; Hankin et al., 1998; Hyde, 2013 ; Hyde et al., 2008). On the other hand, has been found gender differences in visual characteristics, including facial appearance, are thought to play an important role in a variety of judgments and decisions. This fact has real occupational outcomes in many settings. Indeed, there is growing evidence suggesting that appearance influences hiring decisions and even election results (Hunt et al., 1999; Hyde, 2013; Woolley, 1914; Wincenciak et al., 2013). For example, attractive individuals are more likely to be hired, taller men earn more, and the facial appearance of candidates has been linked to real election outcomes. Judgements of facial trustworthiness can be influenced by this effect

especially to emotional expression and facial masculinity/femininity. (Hunt et al., 1999; Hyde, 2013; Woolley; 1914; Wincenciak et al., 2013). His/her appearance condition the election of a leader and, even more, his/her possibility of success. Leaders may be chosen because the characteristics they possess are seen as best suited to lead in particular situations. There are several data about how people choose a leader in different environments. For example, during a time of war, a dominant-appearing leader may inspire confidence and intimidate enemies while during peace-time, when negotiation and diplomacy are needed, interpersonal skills may outweigh the value of a dominant leader. In line with these ideas, masculine-faced leaders are favoured in war-time scenarios while feminine-faced leaders are favoured in peace-time scenarios (Eagly et al., 2003 ; Eisenback et al., 1999; Gaytan and Daily, 2013; Haslam et al., 2010; Hyde, 2013; Koenig et al., 2011; Reicher et al., 2005; Ryan et al., 2011; Ryan et al., 2007; Schmitt, 2005). From this it follows that within a group different characteristic for a male than for a female leader is identified.

2.b. Human Ethology and behavioural similarities

Because groups choose different leaders depending on the situations, it should try to determine whether these differences are "cultural", "social" or has a deeper origin: a "biological" one. In this way, Human Ethology (that is the scientific and objective study of behaviour under natural conditions) shown that females interacting with other females and multiple offspring in social groups. This fact could be very important to determinate if there is a female leadership style biologically designed. Moreover, evolutionary psychobiology has focused on how psychological gender differences are the product of evolutionary selection, based on an assumption that different behaviours are adaptive for males compared with females (Becker, et al., 2002; Carlson, 2013; Eagly et al., 1992; Galli et al., 2013; Greenberg et al., 2014; Hines, 2011; Hyde, 2013; Johnson et al., 2009; Lüders et al., 2002).

Originally proposed by Darwin (Hyde, 2013; Shields, 1975), sexual selection consists of two processes. One of them include the members of one gender (usually males) competing among themselves to gain mating privileges with members of the other gender (usually females). In the other hand the members of the other gender (usually females) have preferences for and exercise choice in mating with certain members of the first gender (usually males). The interesting idea for understanding the process of leadership is that this sexual selection could be invoked, for example, to explain gender differences in aggression (Hyde, 2013; Richardson and Hammock, 2007).

3. Results and interpretations: Deciding be a leader

In short, men and women have different patho-physiology and their behaviour is different too. Then, it is interesting determine how a person became a leader. Because there are less women as a leader than men it is necessary identify if women has more obstacles to exert leadership. One of these obstacles comes from psychological gender differences in self-efficacy (Else-Quest et al., 2012; Gibson and Lawrence, 2010; Hyde, 2013; Kling et al., 1999; Major, 1994; Oswald, 2008). It is another cognitive component, refers to a person's belief in her or his ability to accomplish a particular task. Self-efficacy may be important in explaining several gender effects because reinforces certain stereotypes. For example, although girls' math performance is equal to that of boys, generally there is a wider gender gap in math self-efficacy (Else-Quest et al., 2010; Hedges and Nowell, 1995; Hyde, 2013; Meece et al. 1982). This concept, obviously, is very dangerous when a woman want to start a career in business and economy because of its power in shaping people's decisions about whether to take on a challenging task.

Another way for exploring gender differences, in became a leader, is cognitive social learning theory formulated by Bussey and Bandura (1999). This theory holds that both

children's and adults' behaviour is shaped by reinforcements and punishments. People imitate or model others in their environment, particularly if the others are powerful. This fact could be the clue to become a leader. Women have fewer references just to follow as an example of female leadership (Costa et al., 2001; Durik et al., 2006; Carothers and Reis, 2013; Bussey and Bandura, 1999; Heilman et al., Wallen et al., 2004; Hyde, 2013; Jussim et al., 1996; Reicher et al., 2005).

There are also socio-cultural gender differences (Eagly et al., 2003; Eisenback et al., 1999; Gaytan and Daily, 2013; Haslam et al., 2010; Hyde, 2013; Koenig et al., 2011; Reicher et al., 2005; Ryan et al., 2011; Ryan et al., 2007; Schmitt, 2005). Society's division of labour by gender drives all other psychological gender differences because psychological gender differences result from individuals' accommodations or adaptations to the particular restrictions on or opportunities for their gender in their society. In this way gender similarities are expected in nations in which there is gender equality (Adams et al., 2009; Ashby et al., 2007; Bass et al., 1996; Brown et al., 2011; Cuadrado et al., 2008; Duehr and Bono, 2006; Eagly and Carli, 2007; Haslam and Ryan, 2008; Hyde, 2013; Little and Roberts, 2012; Mano-Negrin and Sheaffer, 2004; Oswald, 2008; Rink et al., 2012; Rosette and Plunkett, 2010; Rudman and Glick, 2001). For this reason gender policies are needed to improve the chances of success of women in their careers.

3.a. Gender difference in leadership

Then when women became leaders they have their own abilities and their own inheritance that define their way of work. However, exit data on gender and the effectiveness of leaders that shown that there was no gender difference in leadership effectiveness but women may be more effective than men in certain situations that requires dialogue and negotiation (Adams et al., 2009; Ashby et al., 2007; Bass et al., 1996; Brown et al., 2011; Cuadrado et al., 2008; Duehr and Bono, 2006; Eagly and Carli, 2007; Haslam and Ryan, 2008; Hyde, 2013; Little and Roberts, 2012; Mano-Negrin and Sheaffer, 2004; Oswald, 2008; Rink et al., 2012; Rosette and Plunkett, 2010; Rudman and Glick, 2001).

A separate question is whether women and men differ in their leadership styles (Eagly et al., 2003; Eisenback et al., 1999; Gaytan and Daily, 2013; Haslam et al., 2010; Hyde, 2013; Koenig et al., 2011; Reicher et al., 2005; Ryan et al., 2011; Ryan et al., 2007; Schmitt, 2005). In general the attitude of a leader can be grouped into any of the following leadership styles:

1. Transformational: innovative leadership in which the leader serves as a positive role model based on gaining the trust of the followers.
2. Transactional: leadership by administering rewards for good behaviours and punishments or corrections for poor performance.
3. Laissez-faire: the leader is neglectful and uninvolved.

Several studies shown that for transactional leadership, women have a slight edge in reward-based approaches, whereas men are more inclined to wait until problems crop up and then address them. Men are also somewhat more likely to engage in laissez-faire leadership (Eagly et al., 2003; Eisenback et al., 1999; Gaytan and Daily, 2013; Haslam et al., 2010; Hyde, 2013; Koenig et al., 2011; Reicher et al., 2005; Ryan et al., 2011; Ryan et al., 2007; Schmitt, 2005). In any case a good leader has to have personality, courage, and clear vision with ambition to succeed and encourages the team to perform to their optimum all the time and drives organisational success.

3.b. Be a leader: Having the ability to get people on board

In pursuit of achieving that which the leader has set out to do can if done right add to group social cohesion and coordinate group activities in the face of challenges (Becker et al., 2002; Carlson, 2013). Identifying social influence in networks is critical to understanding how

behaviours spread. To explore the gender differences in the capability of influence in other people, works made studying millions of social networks users (Aral and Walker, 2012) showed that men are more influential than women and women influence men more than they influence other women. Findings showed that this differences start in childhood. Social network cores consisted mainly of friends. Girl's social networks were more likely to be composed of friends and boys' networks contained friends and non-friends. Girls had more friends outside of the social network than boys. Stability of social network membership and internal network relations were higher for boys than girls (Baines and Blatchford, 2009).

3.c. Gender-stereotypic notions of leadership and its influence perceptions of women's and men's suitability for leadership positions

Now it is interesting see how women and men act in a specific situation. Given that social and financial resources facilitate effective leadership, it is likely that women and men consider these resources when evaluating glass-cliff positions, but they may do so in different ways. In this way, without social resources, women may feel unable to fulfill communal leadership roles. By contrast, in the absence of financial resources, men may feel unable to fulfill leadership roles (Costa et al., 2001; Durik et al., 2006; Carothers and Reis, 2013; Bussey and Bandura, 1999; Heilman et al., Wallen et al., 2004; Hyde, 2013; Jussim et al., 1996; Reicher et al., 2005). For example, several researchers opine that the recent financial crisis sparked debate about what is needed from organizational leaders. Some have argued that the crisis in part resulted from aggressive, risk-taking behaviours. Accordingly, a call has been made for leaders who are understanding, cooperative, and focused on long-term sustainability. This alternative leadership style moves away from the masculine norms of the "old boys' club" and instead embraces a more stereotypically feminine approach (Adams et al., 2009; Ashby et al., 2007; Bass et al., 1996; Brown et al., 2011; Cuadrado et al., 2008; Duehr and Bono, 2006; Eagly and Carli, 2007; Haslam and Ryan, 2008; Hyde, 2013; Little and Roberts, 2012; Mano-Negrin and Sheaffer, 2004; Oswald, 2008; Rink et al., 2012; Rosette and Plunkett, 2010; Rudman and Glick, 2001). Evidently, gender stereotypes do not influence only the way in which women and men behave in the workplace; such stereotypes can also influence which leadership positions women and men accept and occupy during organizational crises.

4. Concluding remarks: How confer advantage to top women leaders

It was found that, regardless of sex, the leaders were considered more competent and efficient, and were evaluated more favourably, when they adopted stereotypically feminine leadership styles. Implications of these findings for women's under representation as leaders in management top positions worldwide are discussed. Gender stereotypes have several biological bases. Women and men are different, but difference must not be and disadvantage and accepted this fact society in general, and in business management in particular confer to top women leaders will have the position they deserve.

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Baby-Boomers and the Romanian Financial System¹

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Abstract: This paper analyses the possible contribution of the over-represented “decree” generation of the 1960’s and 1970’s to the development of the Romanian financial system. Contrary to most other studies on the subject, the focus of this paper is on the financial impact this generation can have before reaching retirement age. Consequently, the analysis is centered on the interaction between the members of this generation and the local financial institutions in the next two decades. It is suggested that the time frame used for this study is better suited for the strategic analysis requirements of financial institutions. It is argued that this generation is maturing professionally and moving towards reaching its financial peak in terms of individual earnings. Therefore, one of the main conclusions of the paper is that financial institutions should adjust their strategies in order to benefit from a significant opportunity.

Keywords: financial institutions; financial markets; demographic change; financial assets, retirement.

JEL Classification: J11, D14, D53

1. The Romanian baby boomers

Romania experienced an atypical baby boom starting with the late 1960s. Therefore, the term baby boomer is not used in this paper with reference to a post-war generation, like it would be the case in other countries, but to an over-dimensioned generation that was born in Romania after 1967 (to put things into an international perspective, this roughly coincides with the period when the first cohort of US baby boomers reached the age of 20, as presented by Bergantino [1998]). The paper focuses on the *decree* generation which was born in Romania after the Decree 770 of October 1966 was issued, which imposed a ban on abortion. This ban was particularly effective on the shorter term, leading to a significant increase in births in the first few years after it was imposed. Therefore, from a demographic point of view, the most important effects of the ban can be seen (Fig. 1) at the cohort born between 1967-1971 (particularly due to the very high increase in birth rate in 1967 and 1968), which will reach the age of 50 between the years 2017-2021.

Locally, this cohort is known as *Decretei*, the Romanian term for “children of the decree”. This particular generation, due to its disproportionate size, had to face various problems in time. Firstly, the educational system, at all levels, was not prepared for such a

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high number of students, then there were problems when they had to enter the labor market and even, as Trebici (1991, p. 81-89) describes, in the “matrimonial market”. In a complete analysis, the psychological effects of the fact that many of the children from this generation were unwanted by their families should also be taken into account.

From Fig. 1 it can be seen that the cohort aged 40-44 in 2011 is about 60% larger than the previous one and is followed by two other cohorts (35-39 and 30-34 years) that, although of smaller size, are also significantly larger than the average. We consider this to be a demographic tidal wave, a large and also potentially dangerous ridge in the population that undulates throughout time.

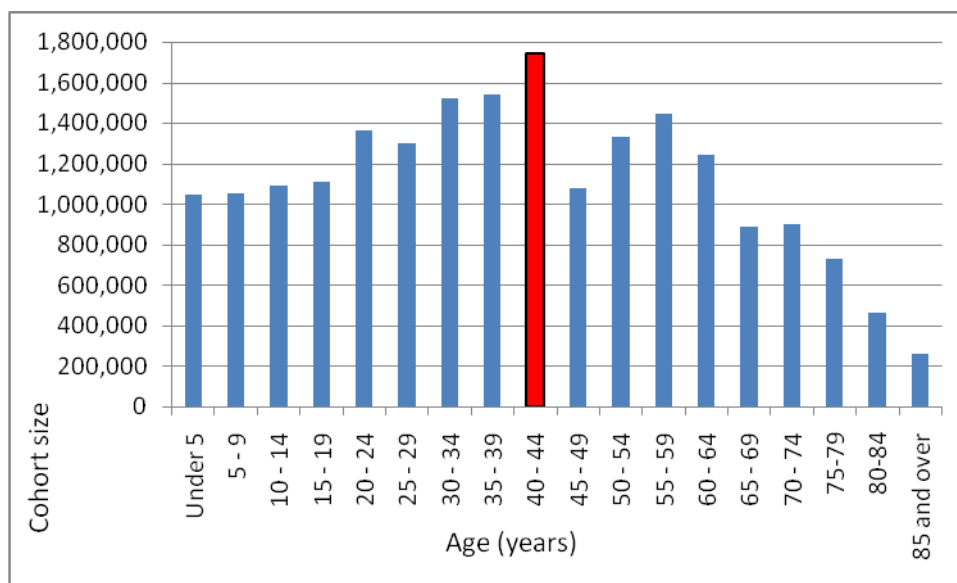


Fig. 1 The population of Romania – age distribution at the 2011 Census, based on official data (Institutul Național de Statistică, 2013).

2. Conceptual and theoretical context

Much of the current literature that refers to baby boomers focuses on their impact on the pension system (Shoven & Schieber, 1997; Lee & Skinner, 1999; Dobre et al, 2012; Șeitan et al, 2012) or on the financial markets (Shoven & Schieber, 1997; Brooks, 2000; Poterba, 2004) **when (after) they retire**. While some authors suggest that the problem of population ageing and its impact on the pension system should not be regarded as catastrophic (Brooks, 2006; Rotariu, 2009), others are less optimistic (Abel, 2001; Siegel, 1998). In any situation, the danger of a self-fulfilling crisis, as described by Lupu (2012), should be taken into account. Leaving that aside, what happens to this generation and the impact it will have on the economy while it is still economically active, therefore **before it retires**, is a question that received much less attention.

This paper is based on the hypothesis that the following 10-15 years represent the professional peak period for this generation. This also implies that this period will also be the one with the highest individual earnings. This hypothesis derives from the fact that most sources indicate the age of around 50 as the peak age in terms of professional achievement and earnings. The relationship between age and income has been previously discussed in the literature. Kreps (1977), for instance, observes that earnings peak around the age of 45-54, with a slight decrease in the last decade of work life. Kreps also refers to the differences in earnings between men and women in relation to age. For the particular case of Romania we do not have detailed information regarding this relationship but, according to NIS (2012), the

age bracket with the highest individual earnings was that of 55-64 years in Romania in 2010. This would place the period with the highest individual earnings for our cohort between the years 2026-2037. While estimating this period, we should also take into account the possibility of delayed retirement, both due to individual choice or to a rather probable more general expansion of working age, which might push forward both retirement age and the age of peaking in terms of individual earnings.

Some studies discussed the effect of cohort size on earnings. Welch (1979) indicates, based on US baby boom data, that especially at the beginning of the career, large cohorts have a depressant effect on earnings. For Europe, Brunello (2010) and Moffat and Roth (2013) find that the negative effects of cohort size on earnings increase with the level of education. These findings would imply that when our target generation will reach its peak in terms of earnings, the average would be lower than that of a smaller cohort.

Even considering the previously mentioned aspects, it appears to be quite clear that the life progression of this cohort has the potential to influence the local financial markets because of its disproportionate size and particular needs. Using life cycle analysis, we can expect certain changes in the saving and investment behavior, and generally in the demand for various types of financial products and services. An impact on the structure of financial markets can be expected, because significant percentages of the population will reach a stage in their lives when they tend to accumulate financial wealth (instead of borrowing, for example). Pension funds, for instance, may be favored while consumer and real estate credit may be negatively influenced.

The particularities of this generation should be taken into account. Ducatti Flister (2013) for example, indicates a lower education level for this cohort than from cohorts outside the Decree time frame (it should be noted, however, that Pop-Eleches (2006) indicated opposite effects for the cohort of 1967). Individuals from this generation are *used* to face particular problems, not experienced by those from previous generations. They faced particular conditions in their early family environment, during their schooling and employment (Trebici, 1991). Based on the results of a recent study (Dóczy, 2010) focused on those born between 1965-1967, it might be extrapolated that women from our cohort earn less than those born before, the chances of unemployment were higher for both men and women. The study also pointed to a higher proportion of handicapped individuals.

Bergantino (1998) looked at the relationship between the age distribution of the population and housing, stock and bond prices, in the US. His motivation for the study was much similar to the one of this paper: he noted that in US, the dramatic rise in housing prices in the 1970s and 1980s and the dramatic rise in stock prices in the late 1980s coincided with the entrance of the baby boomers in life stages typically associated with high demand for those assets (Bergantino, 1998, p. 9). In this paper we hypothesize that the real estate boom of the 2000s in Romania was, to a large extent, associated with the maturity of this country's baby boom generation and in the future years we could expect an associated boom in stock prices or other financial assets. At the relationship between the baby boom and the stock market boom also looked Lim and Weil (2003) and Geanakoplos et al. (2004).

3. Influences on the financial system

The very small cohort of individuals aged 45-49 in 2011 is followed by the largest cohort, of those aged 40-44 at that time. We hypothesize that this demographic tidal wave will bring significant changes in the amplitude of demand for financial services and products.

Due to the position on the individual life cycle which allows for a higher percentage of income to be saved or invested, among the possible effects we can expect baby boomers to have on the financial system we can briefly mention the following:

- Increase in the demand for financial assets (stocks, bonds, bank deposits);

- Rise in financial assets prices, due to the increased demand;
- Lowering the rate of return of financial assets, due to the rise in prices;
- Higher securities trading volumes, due to the increase in demand;
- Downward pressure on interest rates, due to the increase in supply of individual savings and decrease in demand for loans;
- Increased interest in innovative and diversified financial products and services;
- Increased interest in pension funds;
- Lower interest in housing loans, since smaller cohorts reach the life cycle stage when acquiring a house is necessary;
- Lower interest in consumer loans;
- Increased interest in international financial assets (to protect from a possible meltdown when baby boomers reach retirement age).

For a better understanding of the impact of baby boomers on the Romanian financial markets it would also be beneficial to conduct future research to clarify the stage of development of the local financial markets. This would help understand if Romania is moving from an initial bank phase in the financial system evolution towards a market or securities phase (as discussed in Davis [2006]). Such clarifications might shed more light on the parameters of the environment in which local financial institutions compete and would also be useful from a regulatory point of view.

4. Strategic implications for the financial institutions

Among the strategic priorities of financial institutions, just as would be the case for any other organization, we believe that a forward looking attitude should exist, which would allow the adjustment of activities according to changes in the market. Concerning the subject of this paper, such a forward looking attitude would imply a careful analysis of demographic changes and their implications. After all, the discussed demographic changes are highly foreseeable.

As mentioned at the beginning of the paper, the baby boom was delayed in Romania (also, it had fundamentally different causes). This means that the experience of peaking baby boomers from other countries can be incorporated in the strategies of financial institutions in Romania. A careful study of the way baby boomers impacted the financial system of the US or other countries that had such generations born after World War II, can be of real help in evaluating whether the hypotheses presented in this paper are of significant importance.

Another important factor to be considered in possible future analyses is the position of the local economy relative to the economic cycle, since this will influence the individual behavior. Such a behavioral influence would be based on psychological reasons and on availability of financial resources, both motives having durable effects. For example, if the current crisis will continue and become chronic, it will obviously have negative effects on the financial system, but its long lasting psychological impact should be taken into account irrespective of the position on the economic cycle at a later date.

To conclude, we should recall that recently, The Nielsen Company (2012) named the US baby boomers "Marketing's most valuable generation". In the light of what can be considered a significant industry opportunity it probably is the time for the Romanian financial system to consider the local baby boomers it's "most valuable generation" and make the necessary adjustments.

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Macrostabilization of the Migration Phenomenon

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Abstract: Labour migration is a present phenomenon in the European Union. This phenomenon takes over the entire European continent, but especially in the EU countries. The labor market in Europe is increasingly affected by population aging. Economic differences between European countries make workforce in developing countries to move to developed countries where they find it easier to work and receive higher remuneration than in their home countries. This article tracks labor migration from/to EU, employment in Romania and Romanian migration towards the countries of Western Europe. It also presents statistics on labor migration in the EU and its impact on the labor market.

Keywords: labor market, the phenomenon of migration, economic stability.

JEL codes: E44; J10.

1. Introduction

The European Union was the ideal destination for millions of immigrants over the years. The main destination countries have been and still remain highly developed countries where immigrants receive social protection, tolerance from authorities and relative understanding from resident citizens .

Due to the fact that the population of Member States recorded an aging and the birth rate is declining, legal immigrants are needed to fill certain gaps in the labor market in the EU. Most wanted are IT professionals, doctors, nurses and other health professions, as well as workers in the field of sanitation and other services that Europeans do not want to achieve and need workers from outside the borders . But labor coming from outside the EU is not always desired by some social circles of interest, such as right-wing extremists and Christian fundamentalists .

In recent years, state budgets in Europe are no longer able to care for the poor strata of society and provides fewer benefits and grants. The state does not invest much in education and quality health care. For example, in Greece, the government austerity measures arouse dissatisfaction of broad categories of citizens. Essentially the state restructuration occurs, where the big losers are the poorest Europeans. This restructuring, which emerged from the recent economic crisis, is growing the gap between rich and poor, but affects the poor most because their benefits and social assistance are reduced, while they are the less guilty of decline in the economic sphere .

Migration plays a decisive role in the development of the society but the negative effects are particularly severe for countries of origin where control and efficient management of migration are not even tried out.

Currently, the number of states that are at the same time countries of emigration and immigration is rising. Therefore, under the logic that states with large numbers of immigrants have become destination countries, the Czech Republic, Poland, Hungary and Romania will get themselves, some faster and some slower, states that receive immigrants, this time by sourcing from Asia, Middle East and Africa. Now the EU take a more restrictive policy on immigrants. This position is supported by several reasons: pressure from the population to the authorities of the Member States regarding the limitation of immigrants, particularly of unskilled labor, the problems of uncontrolled growth of illegal migration, destabilization of the labor market and more recently financial crisis that affected all states.

Migration of labor under market economy conditions has become one of the solutions for solving many problems we have in society under current circumstances. In the country of origin migration is determined by internal factors : *the desire of the citizen* who is in a downturn to live better, not having other choice but to sell their labor for a proper remuneration.

The labor force usually moves from countries with labor excess or unable to capitalize existing human resources to countries with insufficient manpower. The developed countries are in direct competition to attract qualified human capital, launching several programs and strategies attractive to these persons .

European Union labor mobility portal provides constantly about 1.2 million jobs, of which about 815,000 only in Germany and the UK. Most are looking for specialists in computer engineering and science, most jobs being found in Germany (31100), UK (8600) and Sweden (2500). Regarding the origin of those who sought jobs through EURES, the Spanish ranks first, followed by Italians and Poles. These immigrants prefer to find a job in Germany, Austria, Britain or Sweden - countries that have been less hit by the economic crisis.

The European Commission maintains a balance on the labor market, because with no migration of workers, both within the EU and outside it, the economies of the Member States can not maintain the level of development they currently have. On the other hand, migration means an important element in ensuring the development of any state due to remittances, access to new technologies and a society where work is really appreciated. A new mindset is achieved when work is decent and conscientious met, assessed and paid at fair value.

Germany and Austria are the countries most desired by migrants from the EU. However, one can not overlook that Germany recorded in 2010 the lowest unemployment rate in 18 years, a low unemployment rate meaning a high deficit of workers. However, the two countries will not give up strict rules for Eastern Europeans who want to work in these countries because a large influx of workers would destabilize the local labor market. It is downward pressures on wages and grievances of local people who would see their jobs filled by foreigners.

Development and wage gaps between economies in Eastern Europe and those in Central and Western Europe remain evident, which means that Germany and Austria are likely to attract labor from Eastern Europe. Companies in several sectors of the German economy are experiencing a shortage of labor. Telecommunications and information technology industry already needs skilled workers. Forecasts show that the most required services will be in hotels and staff to care for the elderly.

Therefore, the effects of labor migration in Europe are very complex, related both to the economic aspect, as well as demographics. We believe that the future will bring a new expansion and new Member States will still be the main suppliers of labor within the Community.

In the years ahead, migration will play a growing role, producing positive financial, economic, social, cultural and political effects. For this reason, the acceptance of new workers comes as a means of supporting economic growth and social security systems and pension schemes will be a perpetual concern for the European Union. Ensuring freedom of movement of persons, in particular workers, but also maintaining a good level of security at borders presents clear advantages for both EU Member States and a constant worry for the potential risks and threats that migrants may bring.

2. Migration activity

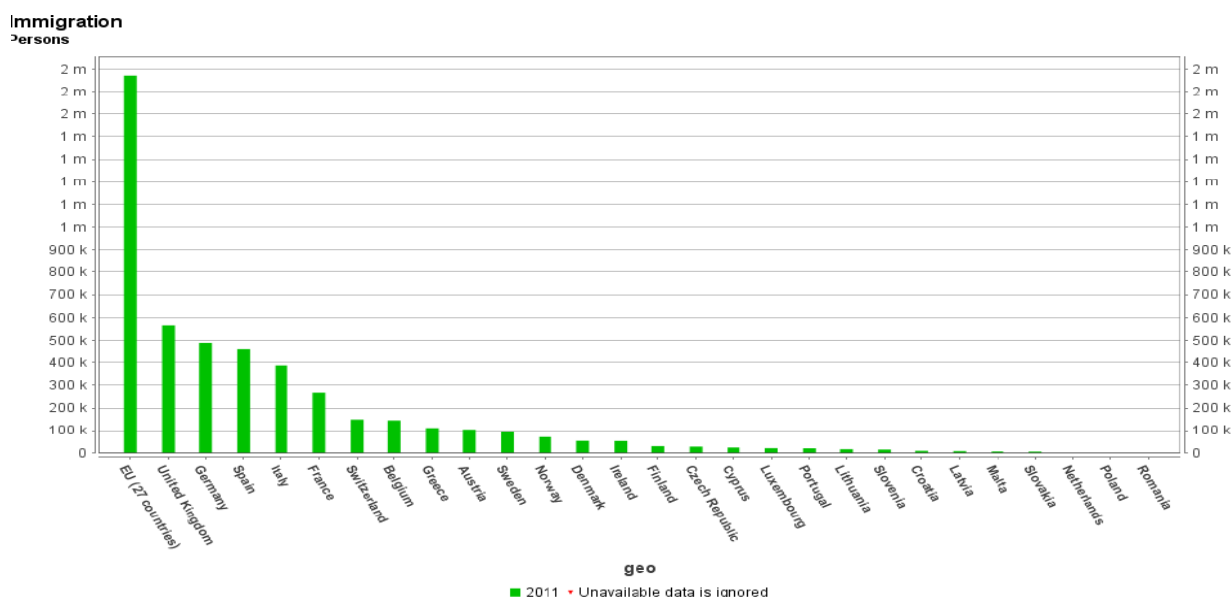
On January 1, 2007 in the EU27, there were about 27 million people resident without citizenship of host state. As a percentage, 92.5% were in the EU15 and 7.5% were in the 12 Member States that had joined the EU in 2004 and 2007. At that time, nearly 74.9% of all foreigners (20.8 million people) were in 5 EU countries: 7.3 million foreigners were registered in Germany, 4 million in Spain, 3, 5 million in France, about 3.4 million in the UK and 2.7 million in Italy.

In 2007, foreigners (immigrants from EU countries outside the EU) represented 5.64% of the total EU population. This average includes a variety of representation of foreigners in the EU27 Member States: 38.2% of the population in Luxembourg, 20% in Latvia, 18% in Estonia, 9.8% in Austria, 9% in Spain, 8.9 % in Germany, 8.5% in Belgium, 8% in Greece and 7.3% in Ireland, between 5.3% and 5.6% of their population in Sweden, France and the United Kingdom, Italy 4.5%. The new Member States had insignificant shares of foreign citizens. For example, the Slovak Republic has made 0.47% foreigners, Romania 0.12% or Bulgaria 0.34%. It should be noted that in a large number of countries the vast majority (over 50%) of non-citizens came from another EU country.

On 1 January 2012, in EU member states (EU-27) there were 20.2 million foreigners living, the figure representing 4.1% of the EU-27. In addition, at the same time, there were living in EU also 12.3 million people with citizenship of another Member State.

In 2011, about 3.0 million people have immigrated to one of the EU Member States and at least 1.9 million people have migrated from an EU Member State.

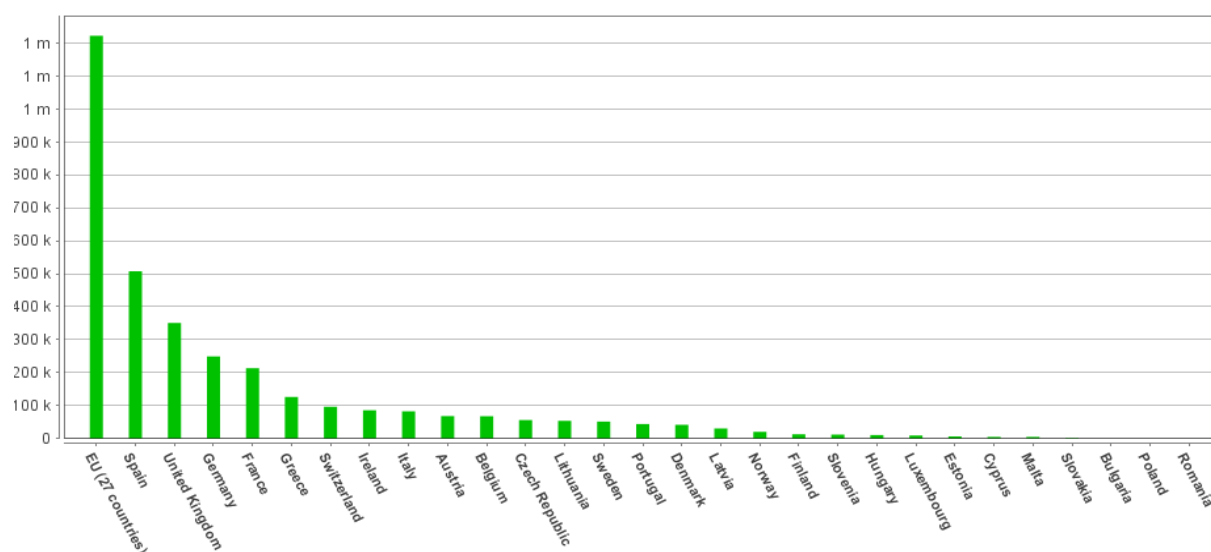
In the year 2011, immigration reached 1.7 million people in the EU. To these are added the 1.3 million people who were already within an EU state. UK reported the largest number of immigrants (566 044) in 2011, followed by Germany (489 422), Spain (457.649) and Italy (385.793), the four countries together representing 60.3% of all immigrants (see Figure 1).



Source: Eurostat

Figure 1. The total number of immigrants in 2011

Regarding migrants in the same year, Spain reported 507 742 people, England - 350 703, Germany - 249 045, and France 213 367 people. Other EU member states have rather reported immigration trends: Bulgaria, Czech Republic, Ireland, Greece, Poland and Romania.



Source: Eurostat

Figure 2. The total number of emigrants in 2011

In 2011, the majority of EU Member States recorded a greater number of immigrants than emigrants. Only in Ireland, Malta, Estonia, Lithuania and Latvia the number of emigrants exceeded the number of immigrants.

In relation to the size of the resident population in 2011 Luxembourg recorded the largest number of immigrants (immigrants 38 to 1000 inhabitants), followed by Cyprus (26), Slovenia (15) and Malta (13); also immigration was high in the EFTA countries, exceeding the EU average of 6.1 immigrants per 1 000 inhabitants.

Among the EU Member States in 2011 Luxembourg (20 emigrants per 1000 people), Lithuania (18 migrants per 1,000 people) and Malta (16 per 1000) reported the highest rate of emigration, these rates being exceeded by Iceland, where nearly 29 residents at 1000 inhabitants emigrated.

Of all immigrants in EU Member States in 2011, 18% were citizens of the country of destination, 31 % were citizens of another EU Member State, and 51% were citizens of countries outside the EU. The largest relative share of persons having the nationality of the country of destination in the total number of immigrants was recorded in Lithuania (74 %) and Portugal (56%). Meanwhile, Spain, Luxembourg, Slovakia, Italy, Hungary and Slovenia have reported relatively small shares, people with citizenship of the country of destination being less than 10% of the total number of immigrants.

Regarding gender distribution of immigrants, there was a slight prevalence of men towards women for immigration in the EU, 52% to 48%. Slovenia has the highest proportion of male immigrants, 76%, while the country where the highest proportion of female immigrants was 58% of Cyprus.

Immigrants in the EU Member States had an average age much lower than the population of the country of destination. On 1 January 2011, the median age of the population of the EU-27 was 40.9 years. The median age of immigrants vary from 24.9 years (in Portugal) and 33.7 years (Latvia).

3. Influences on labor market

Human capital (skilled labor force) is one of the main resources, developed countries facing excessive demand for skilled workers that can not be covered by domestic labor formed by the national education system .

Developing countries are highly competitive in terms of attracting highly skilled labor to cover the gap. Unlike North America, Australia and New Zealand , Europe does not have a specific position on the international labor market for highly skilled workers .

International migration can contribute to economic growth in the European Union as a whole, while ensuring resources to migrants and their countries of origin and thus participating in the development. This phenomenon can be a chance, because it is a factor of human and economic exchanges and also because it allows people to realize their aspirations. Migration management is required so as to take account of Europe's reception capacity in terms of labor market, housing facilities, health services, educational and social risk and protection of migrants against exploitation by criminal networks .

In many developed countries, migration growth exceeds natural increase, and this is causing intervention of policy makers, governments of the respective states to regulate and control the number of immigrants.

Projections for emigration of citizens from the new Member States are influenced by many factors: *economic needs* (low wages, high unemployment, declining industries, specific regulation of labor markets), the general desire to *improve the standard of living* and *ensure a better future* for family / kids. While economic motivations remain essential for most workers from the new Member States who emigrated to the EU-27, the importance of motivation to improve social or professional status vary significantly among them.

Regarding the impact on labor markets in countries of origin, the literature highlights the *negative effects* through changes in the size and structure of the labor force by education level, and *positive effects* by reducing pressure from high unemployment rates, respectively low employment.

Migration is a complex process with multiple and varied effects not only at Community level. One of the most visible effects, with great impact on migration flows is the evolution of the labor market.

Labour migration has not only negative effects; positive effects are beneficial for both countries of origin and those of destination. Between the two groups there is a dissemination of knowledge and modern methods of working. Experiences with positive effects on subsequent development of individuals are gained.

In the EU there were approximately 20.2 million third-country nationals in 2011, accounting for about 4% of the total EU population (502.5 million) and 9.4% of migrants around the world, estimated to as 214 million .

For countries of origin there are positive effects of migration on social protection primarily by reducing unemployment and creating a balance in the labor market resulting in increased wages. Labor deficit reduction is achieved by hiring workers from Moldova, Bulgaria, Pakistan ,India, China and Turkey, countries with low living standards, which get higher wages than in their home country, according to the education, skills and their respect for the work. Romanian employers get to even motivate acceptance of foreign workers instead of unemployed Romanian for their lower financial claims. They are content with salaries of up to 1000 lei, 50% less than required by Romanians. With these wages, plus other expenses (accommodation, medical care, transportation, food) an employer can gain compared to paying a Romanian worker.

Another advantage of hiring this category of workers is that, having contracts for periods longer than one year, they can not move to other companies or leave the country. Impediments to employment of foreign workers are to grant them legal status and the existence of strong cultural differences between nations.

An advantage for countries of origin is also the cash flow from foreign migrants (even if most of it is intended for immediate consumption), growth factor that contributes to reducing the pressure on the current account deficit and balance of payments thereof. Two thirds of the money sent home come from Romanians left to work in Italy and Spain.

Remittances from abroad have immediate effect of increasing the quality of life of households and migrant families. Romania ranks tenth in the world in a ranking of remittances by the World Bank, and in second place in the EU.

The positive effects of economic growth come from the fact that some of the revenue from emigrants is saved in the banking system.

Temporary exportation of labor has been shown to be more effective than foreign investment. In case of bankruptcy or downsizing firms, labor is oriented towards low-paid jobs, but stable, becoming "saviors" of the system and factors of economic stabilization.

Leadership experience and improved qualifications acquired by repatriated groups also contribute to economic growth of the country. These transfer know-how and high standards, being able to become employers for some of their peers. Companies have found that their experience is more useful than foreign employees who were transferred to the destination countries for a lot of money.

In order to prevent emigration of specialists, reducing effects on technological development, there are methods to motivate the creation of networks between them and those in other countries.

Wage increase moderation in recent years, evident not only in Romania, confirms the temptation of reducing labor costs. At lower population incomes, consumption also reduces and to the diminished demand the seller cheapens their products, either goods or services. The so-called "economies of scale" as the fixed costs are divided by a larger number of goods and services sold, the productivity increases.

For the economic development in the country of origin, migrants may use their skills by encouraging circular migration. Circular migration would reduce the outflow of "brains" because the absence would be temporary and would offer rewards for returning home when

no longer stay in the destination country. For destination countries there are favorable effects on economic growth.

Immigrants are a well-trained workforce capable of high performance. They will also cover well paid economy fields where there is no interest in domestic workers, even in a high unemployment or due to lack of qualified personnel in these areas. The existence of a diverse workforce offer determines employers to choose the most suitable people in terms of qualification and skills for positions. Also there is now the possibility of expanding their business by creating new jobs. Migrant workers can put into practice the knowledge acquired in the homeland, getting to be rewarded appropriately for their qualification. Many citizens who emigrated implement their business ideas establishing their companies and creating jobs for both countrymen and citizens of other states. In some countries, almost half of the growth is due to immigrants.

Destination countries often facilitate access to the labor market for highly qualified labor force with positive effects on economic efficiency, GDP growth and improving living standards.

The existence of circular migration in the destination country would respond to concerns about migrants who are permanently staying and provide an alternative to its complete liberalization.

In the current crisis situation migration could be a solution, its absence doing nothing but deepen further the economic deficit of the respective countries.

3. Conclusions

At international level, labor migration is an important phenomenon especially for countries in Eastern Europe, developing countries, where it can help to reduce poverty and may increase investment in human capital. Migration has a significant impact in developed countries, which are in constant competition to attract well trained immigrants, in order to cover their economic needs.

The current global crisis is creating difficulties for all countries, including EU countries and the unemployment registers significant increases. To overcome this challenge the EU needs to be united and strong. The measures adopted include the maintenance jobs for citizens of EU Member States

The migration of labor determines the unemployment rate for people with primary and secondary education to decrease. This may be due to additional investments in education made by remaining individuals to improve employment prospects, as well as the loss of part of this category of labor through migration, being willing to accept jobs rejected by the natives of the host country due to wage differences (possibility of obtaining a higher salary at the destination).

Investing in people, by increasing labor training, retraining and reorientation according to the existing demand and anticipated labor market plays an important role in the development of our country, but it is also important to correlate migration policies with demographic, educational, health, social and economical strategies.

Certainly Romania's economic development and improved quality of life in Romania is a prerequisite for transformation of permanent migration in temporary migration.

On the other hand, the demographic outlook of the phenomenon reveals a reality whose results we are going to feel strongly in the long run. Much of the population decline is due to migration and an overview of the future of the country's population shows that once fertile population is leaving Romania, accounting for over half of the population migrating, children that could have been born in the country are lost, in the context of a still extremely low natural growth in Romania, reaching an absolutely negative record last year.

Analyzing the long-term economy, we can correlate the massive migration of young people and especially those with higher education with a small economy, unable to generate enough jobs and adequate remuneration. Young people with the greatest potential in economic development, which could help create jobs through business development and could make significant contributions in all areas of public interest - health, education, engineering, business, public administration - choose to emigrate, thus losing all the benefits that might have an impact on the country of their work.

Losses are not only of economic but also of intellectual and scientific order, given the contributions they may have in research, innovation and increasing civic engagement and empowerment.

Romania is among the countries most affected by the phenomenon of population aging. In 2010 the median age of the Romanian population was 38.3 years, close to the EU average, which was estimated at 40.9 years.

It is expected that over the next 50 years there will be a strong demographic transformation of sustainability in European countries. Maintaining current demographic policies and migration will lead to a permanent transfer in young population migrations from Eastern Europe and beyond towards western Europe.

In other countries, amid negative migration balance and hence a negative natural increase, there is a transfer of demographic dependency towards eastern states located on the border of the European Union to the north (Latvia, Lithuania, Estonia), center (Poland, Slovakia, Romania) and to south (Bulgaria, Greece).

In 2060, the demographic dependency is expected to increase to 64.8%, Romania having the second highest rate of dependence, after Latvia (68%).

In conclusion, Romania should be to develop a strategy aimed at streamlining the entire working population, targeting population left to work abroad as well. The purpose of this strategy should be to stimulate active population (especially those well trained) to remain in the country or return to the country, given that many young people tend to leave the country.

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The Volatility of Market Risk In Viet Nam Listed Public Utilities Company Groups during and after the Financial Crisis 2007-2009

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Abstract: This study estimates market risk of total 45 listed companies in Viet Nam public utilities, natural gas and oil industry during the financial crisis period 2007-2009. Firstly, we found out in the research sample that there are 82% of firms, of total listed firms, with beta values lower than ($<$) 1, meaning with lower risk, and the systemic risk is acceptable. Secondly, there are 11% among total 45 listed firms, whose beta values higher than ($>$) 1, meaning having stock returns fluctuating more than the market benchmark. Thirdly, among three (3) groups, the systemic risk in the electric power industry is the smallest, shown by estimated values of equity and asset beta mean, and asset beta variance in this industry is also the smallest. Finally, this paper generates some analytical outcomes that enable companies and government to have more evidence in establishing their policies in investments and in governance.

Keywords: equity beta, financial structure, financial crisis, risk, asset beta, public utility industry

JEL classification : G010, G100, G390

1. Introduction

During the global crisis 2007-2009, Viet Nam stock market has difficulties and opportunities. In this study, we perform a market risk analysis based on asset and equity beta of 228 listed companies in the three (3) groups of water, electric power, natural gas and oil firms. The three (3) above industries faced many difficulties in previous years such as how to increase the number of customers, service quality and revenues; now, they have to deal with some problems from the global crisis. From 2009-2011, the local government and central bank have performed some effective macro policies to help the economy to recover. After the previous published article on estimated beta for listed construction company groups, here, this paper emphasizes on analyzing un-diversifiable risk in the 3 above industries in one of emerging markets: Vietnam stock market during and after the financial crisis 2007-2009. There is no research, so far, done on the same topic.

The structure of this paper is as follow. The research issues and literature review will be mentioned in next sessions 2 and 3, for a short summary. Then, methodology and conceptual theories are introduced in session 4 and 5. Session 6 describes the data in empirical analysis. Session 7 presents empirical results and findings. Next, session 8 gives analysis of risk. Lastly, session 9 will conclude with some policy suggestions. This paper also provides readers with references, exhibits and relevant web sources.

2. Research Issues

In this research, we mention several issues on the estimating of beta for listed water, electric power, natural gas and oil companies in Viet Nam stock exchange as following:

Hypothesis/Issue 1: Among the three (3) companies groups, under the financial crisis impact and high inflation, the beta or risk level of listed companies in gas and oil industries will relatively higher than those in the rest two (2) industries.

Hypothesis/Issue 2: Because Viet Nam is an emerging and immature financial market and the stock market still in the recovering stage, there will be a large disperse distribution in beta values estimated in the gas and oil industries.

Hypothesis/Issue 3: With the above reasons, the mean of equity and asset beta values of these listed gas and oil companies tend to impose a high risk level, i.e., beta should higher than ($>$) 1.

3. Literature review

William Sharpe., (1963) pointed in a simplified model of portfolio theory that each stock is correlated with each other stock because all are correlated with “the market”, and stock return depends on some factors such as a constant alpha and stock beta.

And Harry Markowitz developed diversification and modern portfolio theory using beta as one of key factors. Beta is used in CAPM model, which is developed by Jack Treynor, John Lintner, Jan Mossin and William Sharpe.

Black, *et al.* (1972) tested whether portfolios consisting of stocks with high betas generate higher returns. Myron Scholes, Michael Jensen, and Fischer Black (1972) conducted a study showing that returns and beta relationship are flat or negatively correlated. Banz (1981) found out that smaller NYSE capitalization firms tend to have higher CAPM beta risk-adjusted returns than larger firms. Next, Fama and French (1993) use CAPM beta, size and BE/ME or book to market ratio to build a three- factor model that capture the various dimensions of risk.

Last but not least, Jiri Nova (2007) concludes that some CAPM beta is very useful in predicting stock returns.

4. Conceptual theories

Generally speaking, beta can be estimated for an individual firm by using regression.

Beta is used in CAPM model, and it is a risk measure of a listed firm compared to the overall market risk. For example, if beta of a single listed firm equals to 2,5 it means that the firm risk is 2,5 times riskier than the overall risk of the market. Therefore, when an investor wants to make an investment in a financial market, beta is an overall risk measure in investing in a stock exchange market.

Beta can be negative or equal to 0 in special cases. Beta < 0 implies that the stock return moves in an opposite direction to the market benchmark. And beta equals to 0 means the stock return is uncorrelated with the movement of the market index. Asset is finance by debt and equity; so, beta can have 2 forms: equity and asset beta. Low beta stocks are supposed to have less risk but lower returns and vice versa. In short, knowing beta, people know the risk. In Viet Nam stock market, hardly we find out beta value higher than ($>$) 3.

5. Methodology

In order to estimate beta results, we use the input data from the live stock exchange market in Viet Nam during the four or five years of financial crisis 2007-2011. We select this period to do this research because Viet Nam stock market has shown the declining trend and this is the time highlighting financial crisis impacts.

Firstly, we use the market stock price of 45 listed companies in the public utilities (water and electric power), natural gas and oil industries in Viet Nam stock exchange market to calculate the variability in monthly stock price in the same period; secondly, we estimate the equity beta for these 3 listed groups of companies and make a comparative analysis.

Thirdly, from the equity beta values of these listed companies, we perform a comparative analysis between equity and asset beta values of these 3 companies groups in Viet Nam. Finally, we use the results to suggest policy for both these enterprises, financial institutions and relevant organizations.

The below table gives us the number of public utilities, natural gas and oil firms used in the research of estimating beta:

Market	Listed Water companies (1)	Listed Electric power companies (2)	Listed Natural Gas and Oil companies (4)	Note (4)
Viet Nam	0	13	9	Estimating by traditional method
	10	7	6	Estimating by comparative method
Total	10	20	15	Total firms in group: 45

(Note: The above data is at the December 12th, 2010, from Viet Nam stock exchange)

6. General Data Analysis

Through the analysis of 45 firms in categories of industries: public utilities, natural gas and oil companies groups, the mean of equity beta is about 0,69 and that of asset beta is about 0,42 (lower). This shows us the effectiveness of using financial leverage to reduce the overall riskiness of the 3 industries. And these data are acceptable values during the crisis. While there is bigger difference in beta max values (0,7), the difference in beta mean values is smaller (around 0,27).

In addition to, there is a difference in the sample variance of asset and equity beta values. The sample variance of asset beta is lower (0,23), while that of equity beta is a little bit higher (0,43), with a gap of 0,19. This shows us, once again, that the effectiveness of using financial leverage has decreased the systemic risk for the whole industry.

Beside, max equity beta value is up to 2,8 that is a little bit high, compared to max asset beta value is 2,1. The below table 2 shows us that a few companies still has larger risk exposure than most of the others.

And values of equity beta varies in a range from -0,138 (min) to 2,883 (max) and that of asset beta varies in a range from -0,049 (min) to 2,176 (max). There are 3 listed company with beta lower than ($<$) 0 showing the stock return moving opposite to the market index (see table 2 below). Therefore, if beta of debt is assumed to be zero (0), the company's financial leverage contributes to a decrease in the market risk level.

Last but not least, there is a smaller difference between equity and asset beta variance values which is just 0,19, compared to the relatively higher gap between average equity and average asset beta values, which is about 0,27. So, there is not quite big effect from financial leverage on the gap between company's beta variance values.

Generally speaking, there is 73% of listed firms in 3 industries with acceptable beta values lower than ($<$) 1 and higher than ($>$) 0 whereas there is 20% of these listed firms having beta higher than ($>$) 1 and having more market risks. This number is somewhat high. And 73% of firms with acceptable beta values uses more financial leverage than the 20% (45% compared to 36%).

Table 1 – Estimating beta results for Four (4) Viet Nam Listed Public utilities, Natural gas and Oil Companies Groups (as of Dec 2012) (*source: Viet Nam stock exchange data*)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,883	2,176	0,7073
MIN	-0,138	-0,049	-0,0887
MEAN	0,696	0,421	0,2745
VAR	0,4316	0,2330	0,1986
Note: Sample size : 45			

Table 2 – The number of companies in research sample with different beta values and financial leverage

Equity Beta	No. of firms	Financial leverage (average)	Ratio
<0	3	64,20%	7%
0<beta<1	33	45,58%	73%
Beta > 1	9	36,08%	20%
total	45	45,2%	100%
Asset Beta	No. of firms	Financial leverage (average)	Ratio
<0	3	64,20%	7%
0<beta<1	37	46,81%	82%
Beta > 1	5	22,16%	11%
total	45	45,2%	100%

7. Empirical Research Findings and Discussion

A- Water listed companies group

During the crisis 2007-2009, the market for these companies still exists, but has certain difficulties. The rising inflation and rising lending interest rates and higher opportunity costs makes input materials or production costs increasing. So, the market for these firms has been affected because selling prices increase.

The table 3 below shows us the research of 10 listed firms in this category during the above period. In general, the mean of equity beta and asset beta are 0,900 and 0,714, accordingly. These values are good numbers in term of indicating an acceptable un-diversifiable risk.

Besides, the variance of equity and asset beta of the sample group equals to **0,85 and 0,62 accordingly** which are higher than the variance of the entire sample equity and asset beta of **0,43 and 0,23**. This is one characteristic of this industry.

We might note that equity beta value of 10 firms in this material category (0,900) is the highest among those of firms in three (3) groups. This might be considered as another characteristic of these industries. Among three (3) industries, the systemic risk of water group companies is a bit higher than those of the rest groups.

Table 3 – Estimating beta results for Viet Nam Listed Water Companies (as of Dec 2012) (source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTW	2,272	1,951	PJS as comparable	14,1%
2	BWA	0,379	0,350	LKW as comparable	7,6%
3	CLW	0,452	0,293	NBW as comparable	35,0%
4	GDW	1,723	1,210	BTW as comparable	29,8%
5	LKW	0,402	0,345	NTW as comparable	14,3%
6	NBW	0,634	0,435	SFC as comparable	31,5%
7	NNT	0,090	0,014	PCG as comparable	84,0%
8	NTW	0,452	0,355	HFC as comparable	21,6%
9	PJS	2,552	2,176	VMG as comparable	14,7%
10	TDW	0,039	0,014	NNT as comparable	63,3%

Table 4 – Statistical results for Vietnam listed Water companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,552	2,176	0,3763
MIN	0,039	0,014	0,0248
MEAN	0,900	0,714	0,1853
VAR	0,8532	0,6161	0,2371
Note: Sample size : 10			

B- Electric power listed companies group

In an emerging market such as Viet Nam, the market for electric power firms is definitely established and potential because of the public need for such necessary products and though it may be affected by impacts from the financial crisis. And this is the industry with the biggest sample size in this study.

The Table 5 below shows us the equity and asset beta mean of 20 listed electric power companies, with values of 0,489 and 0,305, accordingly. This result, which means the risk is low and acceptable as the equity or asset beta value is the smallest. This partly, maintains the investor confidence of business operation of the whole industry and partly, indicates the good effect from using financial leverage.

Besides, the variance of beta values among these 6 firms is normal, from 0,28 to 0,24 for equity and asset beta, accordingly.

Please refer to Exhibit 2 for more information.

Table 5 – Statistical results for Vietnam listed Electric power companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,262	1,220	0,0425
MIN	-0,138	-0,029	-0,1084
MEAN	0,489	0,305	0,1841
VAR	0,1362	0,0936	0,0426
Note: Sample size : 20			

C- Natural gas and Oil listed companies group

Among 3 groups, this is the group with the medium number of listed firms (sample size = 15) and with the medium equity beta var value of about 0,512. Then, the asset beta mean of about 0,381 is a little higher than that of the electric power industry.

Different from firms in the electric power industry, 15 listed gas and oil firms has higher equity beta mean value and the higher equity beta var value, estimated at 0,835 and 0,512, which implies there is a less concentration in market risks among firms in this industry. The equity and asset beta values are distributed in a wider range, from -0,090 to 2,883, and from -0,049 to 1,444, compared to those of electric power group, esp., and asset beta value is quite acceptable, indicating the effectiveness of using financial leverage.

Please refer to Exhibit 3 for more information.

Table 6 – Statistical results for Vietnam listed Natural gas and oil companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,883	1,444	1,4396
MIN	-0,090	-0,049	-0,0406
MEAN	0,835	0,381	0,4543
VAR	0,5117	0,1268	0,3849
Note: Sample size : 15			

Comparison among 3 groups of public utilities, natural gas and oil companies

In the below chart, we can see among the 3 groups, equity beta value of the electric power group is the lowest (0,489) and asset beta value of this group is the lowest (0,305). Assuming debt beta is 0, financial leverage has helped many listed firms in these industries lower the un-diversifiable risk.

Additionally, we see the asset beta mean values of three groups have certain difference and acceptable.

Next, we can recognize from the chart that, the risk and its dispersion in the electric power industry lower than that in the rest industries.

Last but not least, from the calculated results, variance of asset beta in the natural gas and oil industries are low while that of water industry is much higher.

Chart 1 – Statistical results of three (3) groups of 45 listed VN public utilities, natural gas and oil firms during/after the crisis period 2007-2009

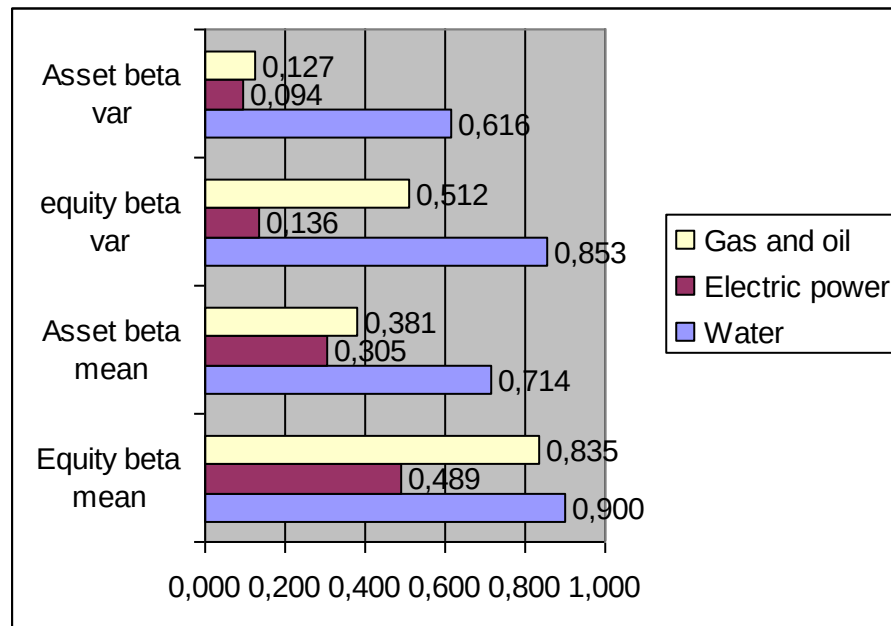
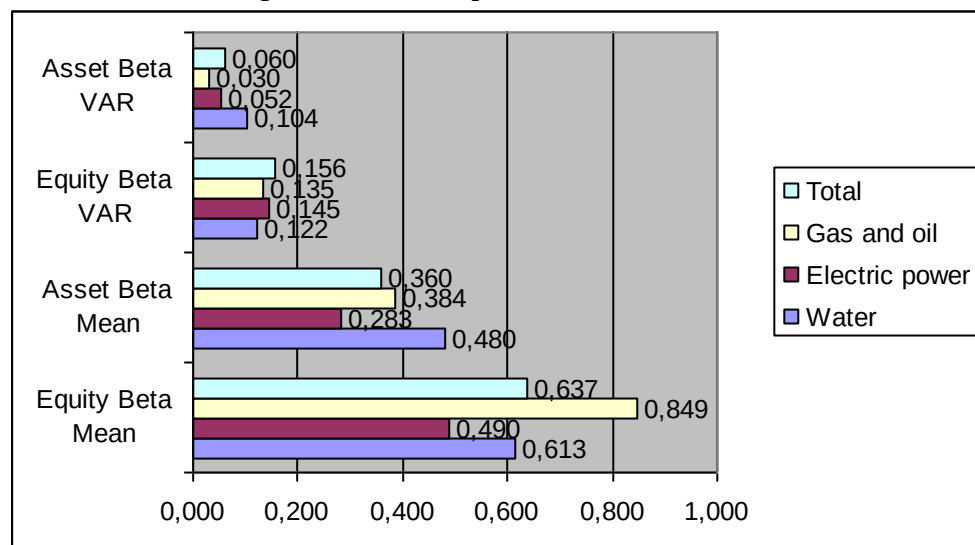


Chart 2 – Statistical results of three (3) groups of 45 listed VN public utilities, natural gas and oil firms during/after the crisis period 2007-2011



(source: Viet Nam stock exchange 2012)

9. Empirical results

In electric power industry, asset beta mean reach the lowest value (0,305) and asset beta var reaches minimum (0,094), compared to the rest 2 cases.

In water industry, asset beta mean reach the highest value (0,714) whereas asset beta var reaches maximum (0,616), compared to the rest 2 cases.

And finally, in gas and oil industry, equity beta mean reaches medium value (0,835) while asset beta var reaches the 2nd lowest value (0,127), compared to the rest 2 cases.

10. Risk analysis

In short, the more debt the firm uses, the more risk it takes. Beside, the increasing interest on loans might drive the earning per share (EPS) lower.

On the other hand, in the case of increasing leverage, the company will expect to get more returns. The financial leverage becomes worthwhile if the cost of additional financial leverage is lower than the additional earnings before taxes and interests (EBIT). FL has become a positive factor linking finance and growth in many companies. Beside, leverage choice could also become a determinant of firms' capital structure and financial risk.

11. Discussion

Looking at exhibit 4, it is noted that comparing to beta result of telecomm. industry in the period 2007-2011, asset beta mean of gas and oil industry group (0,381) during 2009-2011 is lower. And the risk dispersion in gas and oil industry during 2009-2011 (shown by asset beta var of 0,127) is also lower.

12. Conclusion and Policy suggestion

In general, the government has to consider the impacts on the mobility of capital in the markets when it changes the macro policies. Beside, it continues to increase the effectiveness of building the legal system and regulation supporting the plan of developing public utilities, natural gas and oil market. The Ministry of Finance continues to increase the effectiveness of fiscal policies and tax policies which are needed to combine with other macro policies at the same time. The State Bank of Viet Nam continues to increase the effectiveness of capital providing channels for public utilities, natural gas and oil companies as we could note that in this study when using leverage, the risk level decreases ($< 0,8$) much as well as the asset beta var ($< 0,7$).

Furthermore, the entire efforts among many different government bodies need to be coordinated.

Finally, this paper suggests implications for further research and policy suggestion for the Viet Nam government and relevant organizations, economists and investors from current market conditions.

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Exhibit 1 – Interest rates, Inflation, GDP growth and macroeconomics factors
(source: Viet Nam commercial banks and economic statistical bureau)

Year	Basic rates	Lending rates	Deposit rates	Inflation	GDP	USD/VND rate
2012	n/a	12% - 15%	9%	6,81%	5,03%	20.828
2011	9%	18%-22%	13%-14%	18%	5,89%	20.670
2010	8%-9%	19%-20%	13%-14%	11,75% (Estimated at Dec 2010)	6,5% (expected)	19.495
2009	7%	9%-12%	9%-10%	6,88%	5,2%	17.000
2008	8,75%-14%	19%-21%	15%-16,5%	22%	6,23%	17.700
2007	8,25%	12%-15%	9%-11%	12,63%	8,44%	16.132
2006	8,25%			6,6%	8,17%	
2005	7,8%			8,4%		
Note	Approximately (2007: required reserves ratio at SBV is changed from 5% to 10%) (2009: special supporting interest rate is 4%)					

Exhibit 2 – Estimating beta results for Viet Nam Listed Electric power Companies
(as of Dec 2012) (source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTP	0,720	0,306		57,5%
2	CHP	0,349	0,144	BTP comparable as	58,7%
3	DNC	-0,052	-0,016		68,8%
4	DRL	0,458	0,376	NLC comparable as	17,9%
5	DTV	0,511	0,483	NLC comparable as	5,4%
6	GHC	0,496	0,162	NBP comparable as	67,3%
7	HJS	0,407	0,117		71,3%
8	KHP	0,967	0,484		50,0%
9	NBP	1,262	0,835		33,9%
10	ND2	0,165	0,039	TBC comparable as	76,2%
11	NLC	0,532	0,494		7,2%
12	NT2	-0,138	-0,029		78,6%
13	PPC	0,792	0,227		71,3%

14	RHC	0,270	0,149		44,7%
15	SBA	0,146	0,052	SJD as comparable	64,8%
16	SEB	0,331	0,151		54,5%
17	SHP	0,415	0,210	BTP as comparable	49,4%
18	SJD	0,348	0,183		47,4%
19	TBC	0,563	0,522		7,3%
20	TIC	1,247	1,220		2,2%

Exhibit 3 – Estimating beta results for Viet Nam Listed Natural gas and oil Companies (as of Dec 2012) (source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	ASP	0,496	0,119	PGC as comparable	76,0%
2	CNG	0,147	0,086	ASP as comparable	41,7%
3	GAS	-0,090	-0,049	NT2 as comparable	45,2%
4	HFC	0,546	0,351		35,7%
5	HTC	0,546	0,225	MTG as comparable	58,7%
6	MTG	0,773	0,387		49,9%
7	PCG	0,443	0,278	MTG as comparable	37,1%
8	PGC	0,869	0,418		51,9%
9	PGD	1,171	0,691		41,0%
10	PTH	0,359	0,146	HFC as comparable	59,3%
11	SFC	0,853	0,650		23,8%
12	TMC	0,777	0,296		61,8%
13	VMG	2,883	1,444		49,9%
14	PGS	1,013	0,207		79,5%
15	PVG	1,743	0,465		73,3%

Exhibit 4 – Statistical results of four (4) groups of 64 listed VN computer and electrical firms during/after the crisis period 2007-2011

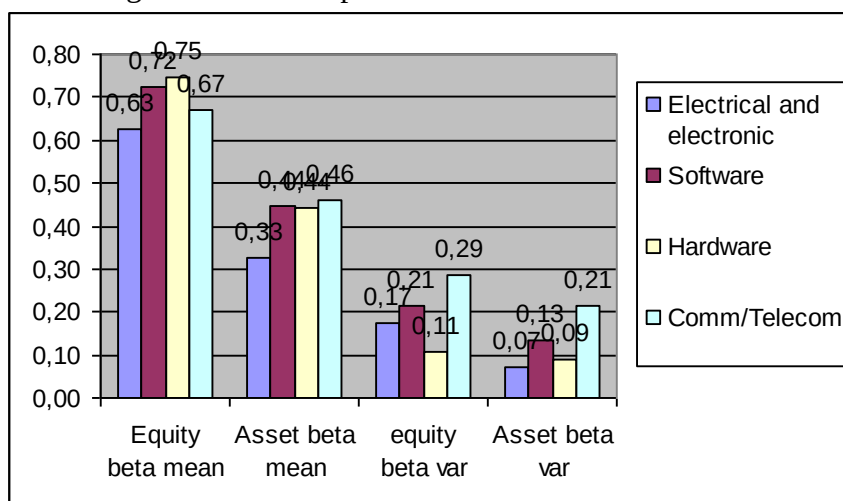
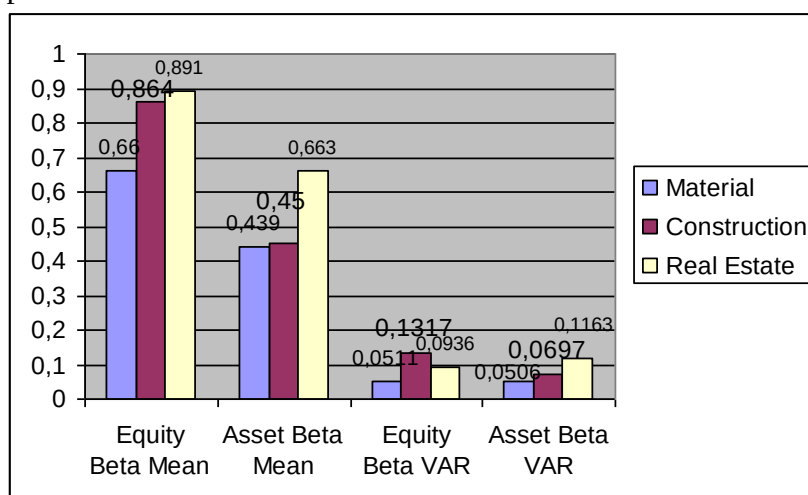
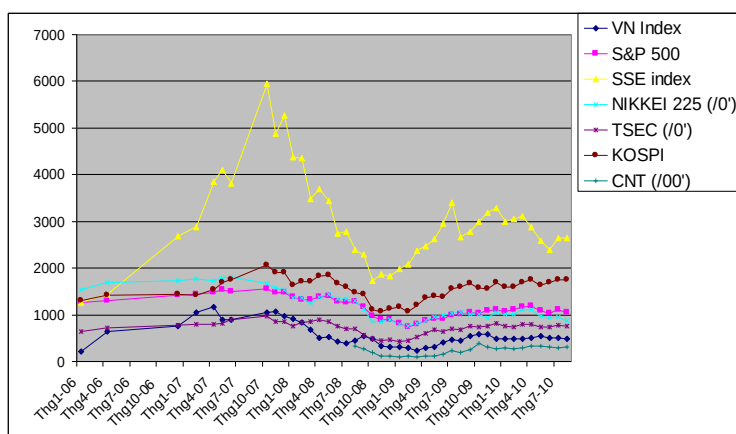


Exhibit 5 – Statistical results of three (3) groups of 103 listed construction firms during crisis period



(source: Viet Nam stock exchange 2012)

Exhibit 6- VNI Index and other stock market index during crisis 2006-2010



Author note: My sincere thanks are for the editorial office and Lecturers/Doctors at Banking University and International University of Japan, Aarhus Biz School, & Amos Tuck School of Biz. Through the qualitative analysis, please kindly email me if any error found.

Market Value, Book Value and Earnings: Is Bank Efficiency a Missing Link ?

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Abstract: *The purpose of this study is to examine that the earnings components and banking efficiency are relevant to the market value of the banks or not. Testing the relationship we used DEA for the banking efficiency and regression model is estimated because it is panel study we used Common effect, fixed effect and random effect on the Pakistani banks included in this study. Frequency of data is yearly and is started from year 2008 to year 2012. Findings of our study gives number of directions, first of all in analysis it is found that the components of earnings are related to market value of the banks, secondly cost efficiency adds the additional information to the market. It can be concluded that earning's components and operational efficiency both explain the market value further these results suggest that stock prices reflect both the information generated through market as well from the accounting System. This study helps to explain the market value of the shares through banking efficiency and accounting information. According to our best knowledge this study is unique among the studies because it is the first study in the emerging economy which explains the market value through earnings components and efficiency of the banks.*

Key Words: Efficiency, Earnings Components, Market Value, Book Value, Panel study, Banks

1. Introduction:

In the world, emerging economies provided an opportunity to analyze the effect of regulation and liberalization on the performance of banking efficiency. As both these measures i.e. liberalization and regulations have the effect on the performance of banking sector especially in emerging economies. With respect to Pakistan as it is included in the emerging economies, building their banks on market based institutions. Central bank which is state bank of Pakistan, introduced number of regulatory measures for example, export promotion, price stability and other stability measures of State Bank of Pakistan affect the performance of the banking sector. In Emerging economy as well as in the developed world banks are facing huge level of competition, due to this banks having lot of capacity to expand their lines of business and becomes more market oriented. Complexity in the banking sector increases when they move from traditional way of business to become more market based and providing non-banking product and services such as insurance and asset management. Therefore such big changes force the banks to rely on intangibles assets. According to Ang and Clark (1997), it is frequently observed that there is no more equivalency between banks book and market value.

There are different ways to evaluate the performance of the banks i.e. accountants take book to evaluate the performance whereas economist analyze the bank performance through their fair value or intrinsic value, but stakeholders are concerned only on market value. As it is mentioned that there is lot of difference between book and market value, and the book value actually do not reflect true picture of the security. Kothari (2001) said that if there is difference among fair value (intrinsic value), market value and current stock prices it produced signal to invest in security for expect return. If these securities will not provide sufficient return the investor is no more willing to hold it, then ultimately the company may face short of fund to finance their growing project. Investing in security whether it will provide sufficient return or not we have numbers of indicators, the basic and vital indicator is earnings. Researchers have tested number of models to find the relationship between earnings and firm fundamentals and market values.

According to Kothari (2001) it is observed that prices of the stocks generally do not reflect the true prices or do not reflect the variation in income or loss. Which means only accounting information are not sufficient to explain the current stock prices. Number of previously studies support the fact that only book value of banks are insufficient for example, according to Liedtka (2002) as well as another famous researcher Liang an Yao (2005) found in their study that only accounting information are insufficient and stock prices are better explained by the combination of economic information as well as the financial information.

In this arena where everything is facing lot of competition, banking sector is the one who is facing lot of competition, so to survive and succeed in the banking sector banks have to produce maximum level of outputs from the given level of inputs. According to Adenso-Diaz and Gascon (1997) banks are relative efficient when they are producing more output under the given levels of output from their competitors. Berger (2007) found that there is lot of literature on the banking efficiency but did not found any relationship about banking efficiency and stock performance. Only fewer studies which discussed the issue of banking efficiency and stock performance for example Lim (1998) and Fiordelisi (2007) analyzed the banking efficiency and stock performance.

Our study attempts to examine whether bank market value is affected by the cost minimization or not. The scope of our study is also to know the relationship between market value and income components. Our study is very important because it evaluates the earlier studies which describes the relationship between stock performance and banking efficiency and according to our best knowledge this is the first study on emerging economies especially with respect to Pakistani context. This study also helps the policy makers to assess the banking policies because it affects the banks performance.

The sequence of paper is adopted as, section 2 covers the literature review followed by the data and methodology which is in section 3. Results and discussion are in section 4 and finally conclusion is in the section 5.

2. Literature Review:

In this paper we examine whether there is any difference between book value and market value of shareholders equity when the participants of market have the information of banking efficiency that banking efficiency produce better profit. In this type of study we are concerned with two types of literature namely; market based accounting literature and banking efficiency literature. First we discuss the market based accounting literature or value relevance literature.

2.1. The Value Relevance Literature

According to Kothari (2001) relevant information means the information which carrying the financial statements impact the capital markets, on this issue number of studies

have been done and is an emerging area of research. Information is considered relevant if the movements in stock prices are associated with released information. According to Collins et al. (1997) as well as the another famous researcher Donto et al. (2004) said when we regress stock prices or stock returns on accounting information it gives us adjusted R^2 , this adjusted R^2 used for value relevance determination. There are numerous studies available in the literature which discussed that accounting number i.e. earnings gives key information in the context of stock returns. A great attention was started since the work of Ohlson (1995), as he said that determining the equity valuation earnings and book values are the major components. In his paper he used the model which helps to identify the necessary factors which affect the value of the firm. He provided strong theoretical justification for these two variables, he said that book value shows the stock measure and earnings which is flow variable takes increments in the book value. So according to Ohlson both these variables i.e. book value and earnings are very important for equity valuation.

According to Giner and Reverte (1999) and the most famous study of Chen and Wang (2004) said that investors are more concerned about earnings components rather than aggregate earnings. The reason behind this is, though earnings consider better indicator for evaluation but if it loses reliability in the stakeholder mind then they consider earnings components rather than earnings. When Lipe (1986) tested whether earnings' components and earnings provide different results or explain differently. He found interesting results those earnings components are providing statistically significant information rather only earnings components. This also supported by the researcher, e.g. Ohlson and Penman in 1992 when they found in their study that shares performance is different with earnings components in the short run while in the long run security returns reacts same over earnings and earnings components.

According to Donto et al. (2007) the information which is producing by the company through their published statements are not more valid to assess the market value of the firms especially those which are highly technology based. Quinn et al., (1996) confirmed in his seminal paper that information provided by the financial statements is not more relevant because of new economic era which is knowledge based economy. Kane and Unal (1990) found in their study that book value misleads the shareholder's equity in terms of market value because un-booked capital. As Kane and Unal said that unbooked capital is always present when firms net worth differs from the economic value.

Stakeholders are conscious about market and book values because they want to invest in those securities which give maximum returns. Though book value and market value affect the market return but according to Baele et al. (2007) return and diversification affect the security return. He also found in his paper that return will be slightly higher if there is higher level of diversification present in the portfolio.

The second part of the literature which is related to the bank efficiency and valuation of the security is discussed here. Efficiency or banking efficiency is considered as an intangible asset for banking sector which measures the performance of the banks, can be calculated using information collected from publicly or through updated techniques which can be either parametric or nonparametric.

2.2 Impact of bank efficiency on the bank valuation

The definition of efficiency is different with respect to different authors for example according to Mc Williams and Smart (1993) efficiency is seen in the industrial organizations as well as in the strategic management literature. It involves number of factors such as market share, cost control, innovation and management skill that determines the firm performance and its stability. According to Cebenoyan (2003) Efficiency is the relationship between ends and means, and it is suggested that it is the extent to which they are matched. Goddard et al.

(2007) said that banks are focusing on, to identify the ways which are beneficial to decrease cost. Cost can be decreased either by product mix or forming the optimal firm size or by maximizing operational and productive efficiency.

Productive or operational efficiency has two components one is the technical efficiency and other is the allocative efficiency. Achieving technical efficiency means under the given target of output one have to produce that output with minimum cost of inputs or it can be said that achieving maximum level of outputs under the given level of inputs. On the other hand allocative efficiency means ability of using the inputs in such optimal proportions with respect to their respective prices which give minimum cost. Allocative Efficiency (AE) also defined as mixing the inputs in such a way that produced the output at minimum level of cost.

Measuring efficiency is an important issue but this issued resolved by Davidson (1997) when he used in his paper a well-known cost income ratio. The basic theme behind this ratio is that it is intuitively acceptable and it is often said the efficiency ratio. As the valuable contribution by the Cocheo (2000) used this in his paper as an important bench mark. No doubt this ratio is meaning full but in literature evidence is presented that there is significant relationship between the security return and cost income ratio under sample of banks. Osborne (1995) found that there is no relationship between cost income ratio and return on the security. Fiordelisi (2007) creates a new measure of efficiency which he names it as shareholder value efficiency. According to Fiordelisi the banks which produced more economic value added are efficient banks rather those banks which do not produce Economic Value Added (EVA).

3. Data and Methodology:

In this study we have taken seventeen banks over the five year data starting from year 2008 to year 2012. The scope of this study is see the efficiency of banks on the basis of technical efficiency, cost efficiency and also to investigate whether technical efficiency explain the market value of the firm or not. In this paper we also analyzed the relationship between market value of the firm and information which are disclosed by financial statements and economic information. In our study we adopted the model which was given by Ohlson's (1995) in his paper he describes the relationship between market value of the firm and financial and nonfinancial information. Later on numerous studies also adopted this model in their paper for example Biddle et al. in year 1997, Myers in year 1999, Dochow et al. in year 1999, Trueman et al. in year 2000 and Callen and Morel in year 2001. On the basis of lot of evidence available in the literature about this model we also used this model in our analysis to find the relationship between return of the security and information (financial or nonfinancial). In this paper particularly we adopted the methodology which use by the Trueman's et al. (2001) which is the extension of methodology used by Ohlson's in 1995. The model is given below

$$MV_{jt} = \beta_0 + \beta_1 BV_{jt} + \beta_2 OI_{jt} + \beta_3 OTHER_{jt} + \beta_4 OEXP_{jt} + \beta_5 EFF_{jt} + \varepsilon_{jt}$$

In the above equation MV_{jt} is the market value of bank J and here t subscript stands for time period for each bank. β_0 is our constant or intercept slop, β_1 is slope coefficient of book value of equity, BV_{jt} is the book value of common stock of bank J at time period t, β_2 is coefficient of operating income, OI_{jt} is the operating income of banks j at the end of time period t. β_3 is the coefficient of expenses in which interest and noninterest expenses are not included, $OTHER_{jt}$ this is the expenses except interest and noninterest expenses banks J and time period t, β_4 is the coefficient of operating expenses, whereas $OEXP_{jt}$ is the operating

expenses of banks which are directly related to the interest expenses of banks j normally it is at the end of the accounting period, β_5 is the coefficient of efficiency which is the scale efficiency, EFF_{jt} is the cost efficiency of each banks j , showing efficiency at the end of the time period and ε_{jt} is the error term or the random term of the model.

4. Results and Discussions:

We did comprehensive analysis on the efficiency of banks, as well as the earning components and market value of the shares of banks. Cost efficiency of banks is calculated through the Data Envelopment Analysis (DEA). Table 1 shows the efficiency of banks included in this study.

Table 1. Mean values of variables used for efficiency

Year	CRSTE	VRSTE	Scale	TE	AE	CE
2008	0.745	0.826	0.911	0.967	0.964	0.934
2009	0.691	0.814	0.860	0.908	0.867	0.788
2010	0.242	0.365	0.611	0.957	0.959	0.920
2011	0.195	0.306	0.637	0.863	0.888	0.772
2012	0.815	0.861	0.947	0.975	0.860	0.839
Average	0.538	0.634	0.793	0.934	0.908	0.851

In the above table, CRSTE stands for constant return to scale, VRSTE stands for variable return to scale, Scale means scale efficiency, and TE stands for technical efficiency, AE stands for allocating efficiency, CE stands for Cost efficiency. In the above table efficiency is calculated especially cost efficiency which is the last column of the above table. Cost efficiency of Pakistani banks from year 2008 to year 2012 is 85 per cent which is the average of cost efficiency of banks but the interval of cost efficiency is from 77 percent to 93 percent. In year 2008 banks are showing 93 percent and in year 2010 banks are showing 92%.

It can be concluded that Pakistani banks will save fifteen percent (15%) from their total costs if they follow best practice. It means at the same level of outputs Pakistani banks can cut their costs to the extent of 15%. This also means that eighty five percent of the banks inputs are operating at their best efficient level. Under the scale efficiency Pakistani banks seventy nine percent efficient which means on average 21% improvement is remaining in their inputs. In year 2012 banks are efficiently using their products to the extent of 95% and only five percent improvement is there.

Table 2: Descriptive Statistics of Variables used in Regression

Variable	Mean	Std. Dev.	Minimum	Maximum
MV	16.840	1.693	14.308	25.238
BV	16.889	0.980	15.370	18.598
OI	17.115	1.074	14.718	18.703
OTHER	16.500	0.966	14.292	17.960
OEXP	16.367	0.972	14.124	17.893
EFF	0.7952	0.231	0.072	1

The above table represents the mean, minimum, maximum and standard deviation of those variables which we included for analysis in our model. The mean value of the market value of the share is 16.480 which are in log form, and the mean value of book value of share is 16.889 but this is in absolute form. The maximum value of market value of share is 25 and minimum value of share price is 14 which are again in log form. But the maximum book

value of share price is 18 and minimum book value of share price is 15, book value is measured in absolute terms.

Conclusion can be drawn that prices of shares of Pakistani banks are greater with respect to market value and are less with respect to book value. It is also noticeable that the gap between two requires some other relevant variables which explain the gap between the two. It is also noteworthy that standard deviation of market value of the share price is greater than the standard deviation of the book value of the share price. This is theoretically justified because market value of the share price is greater than the book value of the share price. Normally it is observed that higher the value, higher is standard deviation as well and lower the value brings lower standard deviation. The mean value of efficiency is 79% which means currently Pakistani banks seventy nine percent of their inputs using efficiently and the interval in which Pakistani banks efficiently using their inputs ranges from 7 percent to hundred percent and the standard deviation of efficiency is 23 percent.

Table 3. Regression Results:

	Coefficient	Std. Err	t-Statistics	Probability value
BV	0.743	0.253	2.93	0.005
OI	1.753	0.564	3.10	0.003
OTHER	-0.271	0.200	-1.36	0.180
OEXP	-1.181	0.475	-2.48	0.016
EFF	0.713	0.310	2.30	0.025
Constant	-2.531	1.504	-1.68	0.098

To know the market value of the banks, our model consists of five explanatory variables namely book value, operating income, other, which is the proxy of expenses other than interest and not interest expenses. Operating expenses which includes the interest and non-interest expenses and last variable is the scale efficiency which is the measure of to check whether banks are producing their output at cost efficient or not. In our model, book value, operating income and cost efficiency have positive significant relationship with market value. As per theory book value coefficient should be positive, our result fulfill the theory sign is positive and also it has significant relationship with market value at the 95% confidence interval. It is found that Operating income has positive coefficient sign and also has significant relationship market value which means operating income can explain the market value of the banks.

The coefficient of cost efficiency is positive and also is signification with market value under the hypothesis that it should affect positively to the market value of the banks. As this hypothesis is accepted under the five percent level of significant. As per theory and our claim, the result of cost efficiency fulfills our criteria. The main finding from this cost efficiency is that it explains the difference between market and book value of the banks. Our results support the conclusion of Beccalli et al., (2006) and another study which was analyzed by Kirkwood and Nahim (2006). This conclusion leads us that cost efficiency brings improvement in banks which is further reflected in banks market value.

According to theory and judgment expenses should have negative affect on the market value of the banks, because when expenses will be higher, ultimately income will be low when income is low it inversely affect the market value of the banks. Fortunately our results comes under this head are according to theory and fulfilled the conditions. As we have used two types of expenses one is the operating expenses and second one is the other expenses which we measured as that, those expenses other than interest expenses. Other expenses and operating expenses both have negative coefficient sign and also operating expenses is

significant at the five percent level of significant which means operating expenses affects the market value of the banks substantially, but on the other hand other expenses as per theory negatively affects the market value of the banks but is not significant at the five percent level of significance.

Table 4: Correlation Results:

	Lnmv	Equity	Operating Income	OTHER	OEXP	CE
Lnmv	1					
Equity	0.8507	1				
Operating Income	0.8088	0.4236	1			
OTHER	0.7741	0.3956	0.4370	1		
OEXP	0.7570	0.4750	0.4208	0.4214	1	
Cost Efficiency	0.2008	0.4126	0.1869	0.1521	0.1920	1

The above table shows the relationship among the avariables, for example market value of the banks and book value of the banks are highly correlated which is 85% in the same way market value of the banks and operating income are highly correlated which are 0.8088 or 81%. OTHER expenses are 77 percent correlated with market value of the banks and operating expense are 75 percent correlated and cost efficiency is only twenty percent correlated with market value of the banks. All other explanatory variables are also correlated with each other but they are less than 50 percent which is healthy sign because when explanatory variables are correlated with each other with higher than 50 % it is the sign of multicollinearity and our results can be biased. So we can conclude that in our sample all the explanatory variables are less than fifty percent correlated.

5. Conclusion

In this study we have developed and tested number of hypothesis about the market value of the firm and earnings components e.g. operating Income, Other expenses and operating expenses. We also seen the effects of book value and cost efficiency on the market value of the firm. This study is very important because it extend the literature with two respects. Normally in the literature it is found that market value of the bank is explain through the aggregate earnings but we did a unique thing and explain the market value through the earnings components rather than earnings. The second contribution in the literature is that we explain the difference between book and market value using the variables of relative cost efficiency of banks which is based on the production theory.

This study is very important because it has unique strength because it evaluates the banking efficiency with respect to shareholders perspective and it also contributes in the banking literature because our study analyzes the relationship between bank's stock performance and cost efficiency. This particular study also helps the shareholders as it advances literature by knowing whether cost efficient banks are creating value for investors or not. Evaluating the relationship between market value of the firm and earnings components we adopted the methodology of Trueman et al. which he adopted in his paper in year 2000 which was also based on Ohlson (1995).

Our study concludes that earnings components have significant relationship with the market value of the banks. Which means earnings components explain the market value of the banks whereas it is also found the cost efficiency which is another performance measure that provides information to explain the market value of the banks. Results of this study also support the conclusion of Dutta and Reichelstein (2005) which also observe that difference

between book and market value is the management's unobservable efforts which are ultimately trace out in earnings components rather than aggregate earnings. Market value and cost efficiency has the positive relationship which is according to theory and also support the conclusion of Eisenbeis et al. (1999) and Baccalli et al. (2006).

The implication of this study is that it is beneficial for the investor that market value reflects the better indication rather than the book value. It also helps executives that banking efficiency is important for the better market value.

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Fraud Risk in Audit Activities According to IAS 8

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Abstract: According to international auditing standards, fraud is an intentionally action realised by one or more persons as management, employees or third parties, action that generate erroneous interpretation of financial statements. The real intention is to cheat. However, there can be involved some erroneous calculus generated by creative accounting. The concept of “error” refers to unintentionally mistakes that could appear in financial statements. We think there could be mathematical or accounting mistakes, unintentionally omission, or wrong interpretation of certain facts, accounting policies wrong application. All these actions are unwittingly. It is very important to identify situations cause and take necessary measures to eliminate them.

Key-words: fraud, illegal behaviour, law enforcement, audit, auditing, auditor, double entry, risk, IAS 8

JEL Classification: K42, M41, M42

1. Introductory remarks

Fraud is a publicized concept in the context of the current economic environment. It is an intentional criminal offense generated by infringement of statutory rules in order to obtain wrongful material advantages. The real intention is to cheat because fraud is generate especially by intentional and bad faith elements that make possible to obtain personal profits at the expense of other persons or entities.

The risk assumed by fraudulent activities causes an inversely evolution of cost/profit report. Under the terms of legal operations, this mathematical report has a fixed value. In case of fraudulent activities, the report terms will divert in the favour of a much higher profits. Exactly this type of illegal actions generates these profits. When the assumed risks are greater, the profits are higher. This relationship generates a lower ratio of cost/profit report.

Legal vision on fraud classifies this offence according to fraudulent or not fraudulent means that generated the illegal act committing: fraud (bad faith) and complex fraud (fraudulent wills). Complex fraud is a criminal offense, being penalised, while simple fraud have only administratively sanction.

2. The fraud in the vision of the international auditing standards

According to international auditing standards, fraud is an intentionally action realised by one or more persons as management, employees or third parties, action that generate erroneous interpretation of financial statements.

The international auditing standards provide the following fraud manifestation ways:

- falsification or alteration of accounting records or reports;

- omission or partial reporting of the entire revenue in order to deliberately avoid taxation;
- hiding the real dimension of revenues using fictitious documents or false documents;
- organising ghost companies which are operating illegal commercial transactions – it is almost impossible to identify its managers, members or shareholders;
- erasing or omission of some illegal transactions in order to “clean” financial statements;
- assets hijacking or its theft;
- smuggling;
- Wrong intentionally and consciously utilisation of accounting policies in order to provide final erroneous situations for external use.

Some of the fraud manifestations presented above are generating by involuntary errors, having no intentionally character. The real intention is not to cheat. There can be involved some erroneous calculus generated by creative accounting. This innovating accounting procedures manipulates accounting numbers and chooses the methods that make possible to find a way to structure all transactions that generate the expected accounting results. Economic entities may plead for good faith and legal loopholes and such elements could remove the alleged criminal character of offence.

The concept of “error” refers to unintentionally mistakes that could appear in financial statements. We think there could be mathematical or accounting mistakes, unintentionally omission, or wrong interpretation of certain facts, accounting policies wrong application. All these actions are unwittingly.

According to IAS 8 “The net result for the period, fundamental errors and changes to the accounting policies”, errors refer to calculus mistakes, wrong methods implementation, facts erroneous interpretation, omissions and frauds.

IAS 8 associates notion of error to fraud because the need to solve such existing situations in accounting practice. If the error shows the financial statements reliability drawn up in previous years, we are dealing with a fundamental error, but it remains to auditor and/or manager discretion. The fundamental error is conferred only on the size of the financial effect, but also the nature of the error.

IAS 8 proposes two accounting processing types:

- A reference accounting scheme, according to which the error correction alter non distributed result when the financial exercise which correction is made. In this situation, the entity concerned must provide comparative data on the dashboard of capital and reserves and the profit and loss account.
- An alternative approved method according to which a correction may alter current financial exercise results that requires the client to submit an annex containing a pro-form image for the profit and loss account and for the capital variation, both for the current and previous year.

It is very hard to identify a fraud in accounting statements. It involves a process of legal appearance creation through false documents use, double accounting book, accountancy balance sheet falsification, all this with the aim of increasing expenditure and minimizing revenue received.

When tax and accounting legislation legally allow (legal paradoxes) handling the accounting figures of financial statements, we have to deal with creative accounting. Its role is to create its own companies an advantage through the financial-economic indicators.

Creative accounting is the process based on a flaw in the rules that handle the accounting figures and, taking the advantage of flexibility, choose those information and

practices that allow conversion of synthesis statements in order to respect managers will. Transactions are structure in such way to generate the desired accounting result.

Often such operations are finding in our country and they are a real challenge for accounting experts. Usually, they grow deductible tax expense through not actually performed expenses records but which relies on documentary evidence obtained through legal means, duly drawn up and appropriate accounting rules and regulations in force. Most often such costs relate to consulting, marketing and management services payments, which according to the provisions of the tax code, can be deducted if they are carried out for the purpose of earning income without the obligation to establish that they are quantified in obtaining additional income. Another method is false invoices use. The objects of these operations are not really selling. There is only a fictive documents movement concerning property rights. The real goal is to benefit from fiscal facilities generated by export operations.

Using fraudulent transactions, some entities succeed to obtain very consistent profits. Honest entities are disadvantaged because they have to face and felt an unfair distribution of incomes. It is very important to identify this situations cause and take necessary measures to eliminate them.

3. The Auditor Role

All auditors must evaluate fraud risk and voluntary mistakes frequency in their activities. They have to start from the beginning of their mission because fraud is cover by many fictive actions. This situation may generate errors in financial statement, not identified by auditor who would formulate erroneous opinions.

Fraud risk is stimulated by accounting system and internal controls high functional weaknesses. In addition, may doubt about the integrity or competence of the management team, unexplained pressure under or over an entity, unusual transactions, the difficulty in obtaining appropriate audit samples etc. Also the lack of transparency fosters fraud, and the best prevention means are internal control.

Fraud prevention and detection is manager responsibility, auditor having a positive role in preventing ways, but not the responsibility to identify and sample it.

Fraud become hardly to identify because of advances in information technology that diversified computer assisted implementation. Cyber attacks, but also poor operation of computer systems and information technologies can produce significant financial damage.

Significant damage is also generating by confidential information disclosure regarding accounting policies used to promote new products, financial information, customer information etc. We think it is necessary to ensure information systems security including stored data.

4. Conclusions

Using fraudulent transactions, some entities succeed to obtain very consistent profits. Honest entities are disadvantaged because they have to face and felt an unfair distribution of incomes. It is very hard to identify a fraud in accounting statements. It involves a process of legal appearance creation through false documents use, double accounting book, accountancy balance sheet falsification, all this with the aim of increasing expenditure and minimizing revenue received.

It is very important to identify this situations cause and take necessary measures to eliminate them. Fraud prevention and detection is manager responsibility, auditor having a positive role in preventing ways, but not the responsibility to identify and sample it.

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The Application of Fourier Residual Grey Verhulst and Grey Markov Model in Analyzing the Global ICT Development

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Abstract: Grey theory deals with systems with inadequate, poor and uncertain information. Modeling against insufficient sample and saturated sequence, Grey Verhulst model has its particular perfection. Its modeling process is easy and high prediction accuracy can be achieved. In this paper, the application of a Grey Verhulst model in studying the global ICT development was presented; Moreover a new Grey Verhulst model and Fourier residual Grey Verhulst model were suggested to improve the forecasting accuracy. Data of the world fixed-telephone subscriptions which is one of ICT indicator from 2001 to 2010 were used as a forecasted example. Finally we increased the precision by employing the Grey Markov model which is the mixture of the GM(1,1) and a Markov model.

Keywords: Grey Verhulst, Fourier Modification, Grey Markov, ICT Development

JEL codes: C02, C60

1.Introduction

Grey theory plays a part in the system of insufficient information. The incompleteness of the system information is about elements, structure boundary and behavior of the system, Liu S. et al.(2010). Grey predictions according to effectiveness can be classified as system, interval, disaster, seasonal disaster, stock-market-like predictions, Liu S.(2006). The grey model (GM) does not need data on the particular probability distribution. As superiority to statistical models, the grey theory devises a novel method of establishing a grey model to prevail over the weakness of probability and discover the rule among the limited and confused data. The accumulated generation operation is one of the most key characteristics of grey theory for reducing the randomness of data. Although the probability statistics, fuzzy mathematics and grey system are all based on some uncertainty of the objects, only the grey system concentrates on the problems of small sample and poor data uncertainty which probability statistics and fuzzy mathematics fail to solve; Moreover grey systems focus on objects that have unclear intension and obvious extension which is different from fuzzy mathematics. The grey model can be employed for equal and nonequal gaps while box Jenkins and simple exponential method only used for equal gaps; Furthermore the grey model

is applied for short , mid and long term predictions whereas the time series and regression models can be applied only for short and middle term predictions .

The grey Verhulst model is a distinguished kind of model within the grey system which describes processes like “S” curve which have saturation. This model only requires a few data with increasing of data, this model constantly be optimized. The grey Verhulst model can mostly be used to explain the processes with saturated states (or sigmoid processes) which increase slowly first, then speed up and at last stop growing or grow slowly. Xia J. et al.(2010) applied a grey Verhulst model to forecast the lightweight soil strength. Guo Z.et al.(2005) introduced the grey Verhulst model and its improved model for the port through put forecasting. Wang Z.et al.(2007) applied a traditional and new grey Verhulst model for forecasting the traffic volume. Hu W. et al.(2010) employed an improved grey Verhulst model to predict the network security situation. Ming J. et al.(2013) applied a modified grey Verhulst model to forecast the tendency of ultraviolet protection performance of aging B. mori Silk Fabric. Bin L. et al.(2010) forecasted the quantity of students taking entrance examination with a Verhulst model with remedy. Evans M.(2014) applied a generalization of the grey Verhulst model to UK steel intensity of use. Wang Z.et al.(2009) introduced the unbiased grey Verhulst model. Zhao W.(2008) applied an improved nonequal gap Verhulst grey model for dissolved gases in power transformer. Qiang Z.(2012) applied the grey Verhulst nonlinear differential dynamic prediction model to forecast the slop rock mass deformation. Chen Y.et al.(2009) established a grey Verhulst model to forecast the diffusion trend of Iso9000 certification in Guangxi.

Residual analysis is a frequently used correction method for time series forecasting. One of those residual correction methods is Fourier series. Because of the acceptable performance of Fourier correction method, it is approved to increase the precision of the modeling performance of grey models.

Another modified model from grey models is a grey Markov model which is the mixture of GM(1,1) and a Markov model. This model is employed to forecast the stochastic variations by the Markov model and to predict the trend of data sequence by GM. He Y.et al.(2005) presented a grey Markov model to forecast the electric power requirement in China. Dong S.,et al.(2012) proposed a grey Markov model to predict the maximum water levels at hydrological stations. Shuang L.,et al.(2012) used the grey Markov model to forecast the Cargo throughput. Wei Z. et al.(2009) forecasted the passenger traffic by the grey Markov chain model. Kumar U.et al.(2010) employed the grey Markov model to forecast the crude petroleum consumption. Juan L. et al.(2011) used a grey Markov model to forecast the number of population in China. Kordnoori & Mostafaei (2011) predicted the crude oil production and export of Iran by using the grey Markov model.

In this paper first we introduce a grey Verhulst, new grey Verhulst, Fourier residual grey Verhulst and grey Markov models. Next, we apply these methods in modeling the world fixed telephone subscriptions. We compare the results of these models and predict the future value of this Information and Communication Technologies (ICT) indicator. Finally conclusions are drawn.

2. The Mathematical Models

a) A Grey Verhulst Model

Supposing that the original data sequence $X^{(0)}(k) = \{X^{(0)}(1), X^{(0)}(2), \dots, X^{(0)}(n)\}$ be non-negative series and $X^{(1)}(k) = \sum_{i=1}^k X^{(0)}(i)$, $k = 1, 2, \dots, n$ is the 1-AGO sequence of $X^{(0)}$. let $Z^{(1)}$ be the mean generation of succeeding neighborse sequence of $X^{(1)}$ that is $Z^{(1)}(k) = 0.5(X^{(1)}(k) + X^{(1)}(k-1))$ Where $k = 2, 3, \dots, n$. We call

$$X^{(0)} + aZ^{(1)}(k) = b(Z^{(1)}(k))^2 \quad (1)$$

the grey differential equation of Grey Verhulst model and

$$\frac{dX^{(1)}}{dt} + aX^{(1)} = b(X^{(1)})^r \quad (2)$$

the whitenization differential equation of grey Verhulst model. Let

$$Y_n = \begin{bmatrix} X^{(0)}(2) \\ X^{(0)}(3) \\ \vdots \\ X^{(0)}(n) \end{bmatrix}, \quad B = \begin{bmatrix} -Z^{(1)}(2) & Z^{(1)}(2)^2 \\ -Z^{(1)}(3) & Z^{(1)}(3)^2 \\ \vdots & \vdots \\ -Z^{(1)}(n) & Z^{(1)}(n)^2 \end{bmatrix} \quad (3)$$

then the least square estimate of the parameter equation $\alpha = (a, b)^T$ is given by $\hat{\alpha} = (B^T B)^{-1} B^T Y_n$.

The time response sequence of the grey Verhulst model is

$$\hat{x}^{(1)}(k+1) = \frac{a \cdot X^{(1)}(0)}{b \cdot X^{(1)}(0) + [a - b \cdot X^{(1)}(0)] e^{ak}} \quad (4)$$

b) A New Grey Verhulst Model

Assume that $X^{(0)}$, $X^{(1)}$ and $Z^{(1)}$ are defined the same as in part (a). Here

$$Y_n = \begin{bmatrix} X^{(0)}(2) \\ X^{(0)}(3) \\ \vdots \\ X^{(0)}(n) \end{bmatrix}, \quad B = \begin{bmatrix} -\frac{1}{2}[X^{(1)}(1) + X^{(1)}(2)] & \frac{1}{2}[(X^{(1)}(1))^2 + (X^{(1)}(2))^2] \\ -\frac{1}{2}[X^{(1)}(2) + X^{(1)}(3)] & \frac{1}{2}[(X^{(1)}(2))^2 + (X^{(1)}(3))^2] \\ \vdots & \vdots \\ -\frac{1}{2}[X^{(1)}(n-1) + X^{(1)}(n)] & \frac{1}{2}[(X^{(1)}(n-1))^2 + (X^{(1)}(n))^2] \end{bmatrix} \quad (5)$$

The parameter estimations and time response sequence of the new grey Verhulst model are the same as part (a), Wang Z. et al.(2007).

c) Fourier Residual Modification Model

The main purpose of Fourier series is to increase the forecasting precision. The residual time series as the difference between the real time and the model fitted is obtained by

$$\varepsilon^{(0)} = \{\varepsilon_2^{(0)}, \varepsilon_3^{(0)}, \dots, \varepsilon_n^{(0)}\} \quad (6)$$

where $\varepsilon_k^{(0)} = X^{(0)}(k) - \hat{X}^{(0)}(k)$, $k = 2, \dots, n$. Equation (6) can be expressed in Fourier series as:

$$\varepsilon^{(0)}(k) = \frac{1}{2} a_0 + \sum_{i=1}^F \left[a_i \cos\left(\frac{2\pi i}{n-1} k\right) + b_i \sin\left(\frac{2\pi i}{n-1} k\right) \right] \quad (7)$$

where $F = \left[\left(\frac{n-1}{2}\right) - 1\right]$ named the minimum deployment frequently of Fourier series.

The above equation can be rewritten as:

$$\varepsilon^{(0)} = P \cdot C \quad (8)$$

where

$$P = \begin{bmatrix} \frac{1}{2} \cos\left(\frac{2\pi \times 1}{n-1} \times 2\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times 2\right) & \dots & \cos\left(\frac{2\pi \times 1}{n-1} \times 2\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times 2\right) \\ \frac{1}{2} \cos\left(\frac{2\pi \times 1}{n-1} \times 3\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times 3\right) & \dots & \cos\left(\frac{2\pi \times 1}{n-1} \times 3\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times 3\right) \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ \frac{1}{2} \cos\left(\frac{2\pi \times 1}{n-1} \times n\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times n\right) & \dots & \cos\left(\frac{2\pi \times 1}{n-1} \times n\right) & \sin\left(\frac{2\pi \times 1}{n-1} \times n\right) \end{bmatrix} \quad (9)$$

$$C = [a_0, a_1, b_1, a_2, b_2, \dots, a_F, b_F]^T \quad (10)$$

The matrix C can solve by using the least squares method which results in the equation of

$$C = (P^T P)^{-1} P^T [\varepsilon^{(0)}]^T \quad (11)$$

The predicted series residual $\hat{\varepsilon}_k^{(0)}$ is then obtained according to the following expression:

$$\hat{\varepsilon}_k^{(0)} = \frac{1}{2} a_0 + \sum_{i=1}^F \left[a_i \cos \left(\frac{2\pi i}{n-1} k \right) + b_i \sin \left(\frac{2\pi i}{n-1} k \right) \right] \quad (12)$$

as a result based on the forecasted series $\hat{X}^{(0)}$ achieved from grey Verhulst model. The predicted series $\tilde{X}^{(0)}$ of the modified model is identified by

$$\tilde{X}^{(0)}(k) = \{ \tilde{X}_1^{(0)}, \tilde{X}_2^{(0)}, \dots, \tilde{X}_k^{(0)}, \dots, \tilde{X}_n^{(0)} \} \quad (13)$$

where

$$\begin{cases} \tilde{X}_1^{(0)} = \hat{X}_1^{(0)} \\ \tilde{X}_k^{(0)} = \hat{X}_k^{(0)} + \hat{\varepsilon}_k^{(0)}, k = 2, \dots, n \end{cases} \quad (14)$$

To evaluate the precision of the model we can use the following criteria:

- The mean absolute percentage error(MAPE):

$$MAPE = \frac{1}{n} \sum_{k=1}^n \gamma_k, k = 1, \dots, n \quad (15)$$

where

$$\gamma_k = \frac{|X_k^{(0)} - f_k^{(0)}|}{X_k^{(0)}}, k = 1, \dots, n \quad (16)$$

and $f_k^{(0)}$ is the forecasted value at k^{th} Entry.

- The forecasting accuracy ρ :

$$\rho = 1 - MAPE \quad (17)$$

- The post-error ratio C :

$$C = S_1 / S_0 \quad (18)$$

Where S_0^2 and S_1^2 are a variation value of the original series and error, respectively.

The small error probability ρ :

$$\rho = P \left\{ \left| \varepsilon_k - \frac{1}{n} \sum_{k=1}^n \varepsilon_k \right| < 0.6745 S_0 \right\} \quad (19)$$

According to the above indices, there are four grades of precision as shown in Table 1.

Table 1. The grades of forecasting precision

ρ	Grade level	MAPE	C	p
> 0.95	Rank 1: (Very good)	< 0.01	< 0.35	> 0.95
> 0.90	Rank 2 :(Good)	< 0.05	< 0.50	> 0.80
> 0.85	Rank 3 (Qualified)	< 0.10	< 0.65	> 0.70
≤ 0.85	Rank 4:(unqualified)	≥ 0.10	≥ 0.65	≤ 0.70

d) Grey Markov Model

Suppose that $X^{(0)}$, $X^{(1)}$ and $Z^{(1)}$ are defined the same as part (a). Here the first – order differential equation of GM (1, 1) is as

$$\frac{dX^{(1)}(k)}{dk} + aX^{(1)}(k) = b \quad (20)$$

the solution of above equation is:

$$\hat{x}^{(1)}(k) = \left(x^{(0)}(1) - \frac{b}{a}\right) e^{-\hat{a}k} + \frac{b}{a} \quad (21)$$

where $\hat{a} = (B^T B)^{-1} B^T Y_n$ and

$$Y_n = \begin{bmatrix} X^{(0)}(2) \\ X^{(0)}(3) \\ \vdots \\ X^{(0)}(n) \end{bmatrix}, \quad B = \begin{bmatrix} -Z^{(1)}(2) & 1 \\ -Z^{(1)}(3) & 1 \\ \vdots & \vdots \\ -Z^{(1)}(n) & 1 \end{bmatrix} \quad (22)$$

by inverse accumulative generating operation, we can find the predicted equation as

$$\hat{X}^{(1)}(k) = \left(X^{(0)}(1) - \frac{b}{a}\right) (1 - e^a) e^{-ak} \quad (23)$$

by considering $\hat{Y}(k) = \hat{X}^{(0)}(k+1)$, we take the states of a Markov chain $\hat{Y}$ which are alongside the regulation curve as

$$H_i = [\hat{H}_{1i}, \hat{H}_{2i}] \quad i=1, 2, 3, \dots, n \quad (24)$$

where

$$\hat{H}_{1i} = \hat{X}^{(0)}(k+1) + A_i \quad i=1, 2, 3, \dots, n \quad (25)$$

$$\hat{H}_{2i} = \hat{X}^{(0)}(k+1) + B_i \quad i=1, 2, 3, \dots, n \quad (26)$$

and A_i, B_i are the differences between the original data and predicting curve. The borderlines of the zones under above the regulation curve are $\hat{X}^{(0)}(k+1) - B$ and $\hat{X}^{(0)}(k+1) + A$, respectively where A and B are achieved by applying the least square method as

$$A = \sum_H X^{(0)}(H+1) - \sum_H \hat{X}^{(0)}(H+1) / p \quad (27)$$

$$B = \sum_L X^{(0)}(L+1) - \sum_L \hat{X}^{(0)}(L+1) / q \quad (28)$$

in which $X^{(0)}(H+1)$ and $X^{(0)}(L+1)$ are the data above and below the predicting curve and p, q relate to the number of such data, respectively. Suppose $\hat{X}^{(0)}(k+1) + C$ and $\hat{X}^{(0)}(k+1) - D$ are the top and bottom borderlines, correspondingly where

$$C = \max \{ X^{(0)}(k+1) - \hat{X}^{(0)}(k+1) \} \quad (29)$$

$$D = \max \{ \hat{X}^{(0)}(k+1) - X^{(0)}(k+1) \} \quad (30)$$

The states of Markov model are calculated as follows:

$$H_1 = [\hat{X}^{(0)}(k+1) + A, \hat{X}^{(0)}(k+1) + C]$$

$$H_2 = [\hat{X}^{(0)}(k+1), \hat{X}^{(0)}(k+1) + A]$$

$$H_3 = [\hat{X}^{(0)}(k+1) - B, \hat{X}^{(0)}(k+1)]$$

$$H_4 = [\hat{X}^{(0)}(k+1) - D, \hat{X}^{(0)}(k+1) - B] \quad (31)$$

By the same token, each zone can be classified into more subzones. A Markov chain $\{X_t; t \geq 0\}$ is a stochastic process with the characteristic that given the value of X_t , the values of X_s ($s > t$) are not affected by the values X_k for $k < t$, namely any specific future behavior of the process is not changed by additional information about its past behavior

$$p_{ij} = P[x_{n+1} = j | X_n = i] = P[x_{n+1} = j | X_n = i, X_{n-1} = i_{n-1}, \dots, X_0 = i_0] \quad (32)$$

for all state $i_0, \dots, i_{n-1}, i, j$ and all time points n . All the transition probabilities p_{ij} satisfy in $p_{ij} \geq 0$ and $\sum_{j=0}^m p_{ij} = 1$, for all i, j in state space. We can forecast the future trend of system by the transition probability matrix in m th step as follows:

$$P(m) = \begin{bmatrix} p_{11}(m) & p_{12}(m) & \dots & p_{1n}(m) \\ p_{21}(m) & p_{22}(m) & \dots & p_{2n}(m) \\ \vdots & \vdots & \ddots & \vdots \\ p_{n1}(m) & p_{n2}(m) & \dots & p_{nn}(m) \end{bmatrix} \quad (33)$$

where

$$p_{ij} = \frac{N_{ij}(m)}{N_i}, i, j=1, 2, 3, \dots, n \quad (34)$$

and $N_{ij}(m)$ is the number of transition from state i to j and N_i is the total number of transition from state i . When we can not definitely identify the next path of the system, the matrix $P(m), m \geq 2$ must be calculated. Ultimately the final predicted value can be obtained as

$$\hat{Y}'(k) = \frac{1}{2}(\hat{H}_{1l} + \hat{H}_{2l}) \quad (35)$$

Employing (25), (26) and since the prediction is most likely in zone H_l , then $\hat{Y}'(k)$ can be stated as

$$\hat{Y}'(k) = \hat{X}^{(0)}(k+1) + \frac{1}{2}(A_l + B_l) \quad (36)$$

We compute (15) as the evaluation criteria for the accuracy of forecasting. If $(1-MAPE) \times 100$ is more than 90%, we can deduce that the model is proper and reliable.

3. Application

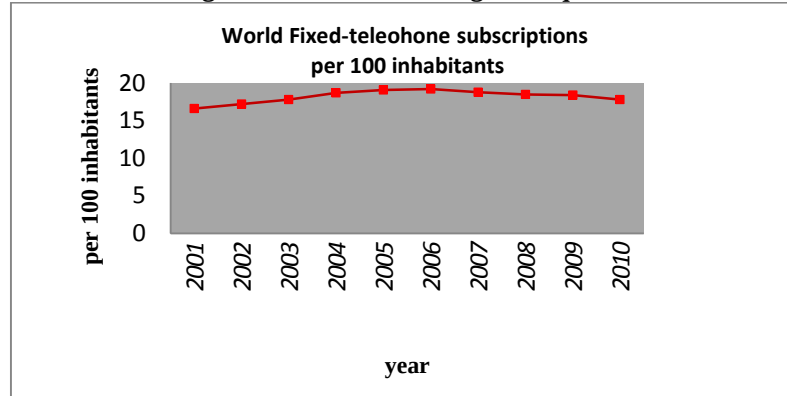
In this part we apply all the grey models introduced before to model and forecast the global ICT development. Fixed-telephone subscriptions relate to the sum of the active number of analogue fixed-telephone lines, Voice-Over-Ip (VOIP) subscriptions, fixed Wireless Local Loop (WLL) subscriptions, Integrated Services Digital Network (ISDN) voice –channel equivalents and fixed public payphones. ICT indicators are frequently applied in sustainable development frameworks (Stork C., 2007). The ICT indicators are: (i) ICT infrastructure and access (ii) access to and use of ICT by households and individuals (iii) use of ICT by business and (iv) ICT sector and trade in ICT goods. Although the number of fixed-telephone subscriptions worldwide has appeared to decrease, fixed-telephone subscriptions are yet a crucial infrastructure indicator. In spite of the prompt growth of mobile–cellular telephone subscriptions, broadly substituting fixed-telephony in an increasing number of countries, fixed-telephones persist fundamental for voice traffic besides in offering a basis for upgrading to fixed-broadband infrastructure. We can see that the world increment rate of fixed-telephone subscriptions increased until 2006 and after it reaches saturated, it decreased. Therefore clearly, the fixed-telephone subscription takes an “S” looks along with the development of time; Moreover this sample of data is small, hence we can employ the grey Verhulst model for forecasting. Now we take prediction with the grey Verhulst model. Data on the number of fixed-telephone subscriptions are administrative data and relates to telecommunication infrastructure. Data for global and regional monitoring of this indicator are produced by the International Telecommunication Union (ITU). The world fixed-telephone subscriptions per 100 inhabitants from 2001 to 2010 are shown in table 2.

Table 2. The world fixed-telephone subscriptions per 100 inhabitants in the past years [ITU]

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number	16.6	17.2	17.8	18.7	19.1	19.2	18.8	18.5	18.4	17.8

By investigating the curve of original sequence (Figure 1), we can see that the original sequence looks like part of curve “S”, therefore we can take $X^{(1)}$ as the original sequence, and then its 1-IAGO sequence is $X^{(0)}$.

Figure 1. The curve of original sequence



We form grey Verhulst model for simulating against $X^{(1)}$.

Take $X^{(1)} = (16.6, 17.2, 17.8, 18.7, 19.1, 19.2, 18.8, 18.5, 18.4, 17.8)$, then the 1-AGO sequence of $X^{(1)}$ is $X^{(0)}$, $X^{(0)} = \{X_k^{(0)}\} = (16.6, 0.6, 0.6, 0.9, 0.4, 0.1, -0.4, -0.3, -0.1, -0.6)$

The time response sequence of the Grey Verhulst model is obtained as

$$\hat{x}^{(1)}(k+1) = \frac{-5.479162}{-0.291994 - (0.038076)e^{-0.33007k}}$$

To form the new grey Verhulst model against $X^{(0)}$ the time response function is achieved as

$$\hat{x}^{(1)}(k+1) = \frac{-5.47219}{-0.291662 - (0.037988)e^{-0.32965k}}$$

Both of time response functions above yield a forecasting value with high precision which are approximately equal but a new grey Verhulst model produces a slightly higher predicting value than a traditional grey Verhulst model (table 3).

Table 3. The resulting forecasts and precisions by the grey Verhulst and new grey Verhulst model

Year	Actual Value	Grey Verhulst model		New Grey Verhulst model	
		Forecasted value	precision	Forecasted value	precision
2011	17.3	18.675	92.05%	18.672	92.07%

Now by applying a Fourier residual modification we improve our prediction precision. First residuals are obtained as $\varepsilon_k^{(0)} = \{0.1, 0.2, 0.9, 1, 0.9, 0.4, 0, -0.2, -0.8\}$. Next the coefficient matrix C is achieved as $C = [0.556, -0.680, -0.322, 0.021, 0.049, 0.022, -0.115]$. The forecasted values of our methods are calculated and given in table 4.

Table 4. Prediction and error values of world fixed-telephone subscriptions by The grey Verhulst and Fourier residual new grey Verhulst models

Year	Real value	Grey Verhulst model (GVM)		Fourier residual new Grey Verhulst model(FRNGVM)	
		Forecasted value	Relative error	Forecasted value	Relative error
2002	17.2	17.1	0.0058	17	0.0116
2003	17.8	17.6	0.0112	18	-0.0112
2004	18.7	17.8	0.0481	18.5	0.0106
2005	19.1	18.1	0.0523	19.2	0.0052
2006	19.2	18.3	0.0469	19.17	0
2007	18.8	18.4	0.0213	18.8	0
2008	18.5	18.5	0	18.6	-0.0054
2009	18.4	18.6	0.0109	18.3	0.0054
2010	17.8	18.6	0.045	18.2	-0.0225

From table 4 we conclude that the $MAPE_{GVM} = 0.0268$ and $MAPE_{FRNGVM} = 0.00799$. Therefore the Fourier residual new grey Verhulst model achieves a more precise model than the new grey Verhulst model; Moreover we deduce that $\rho_{FRNGVM} = 99.99$, $C_{FRNGVM} = 0.28$ and $\rho = P\left\{\left|\varepsilon_k - \frac{1}{n} \sum_{k=1}^n \varepsilon_k\right| < 0.6745 S_0\right\} = 1$. Hence by calculating the accuracy criteria we conclude that our forecasting precision by the Fourier residual grey Verhulst model is very good and the accuracy is improved; Furthermore we increase the forecasted precision of world fixed telephone subscriptions for year 2011(table 5) by this method.

Table 5. The resulting forecast and precision by Fourier Residual new Grey Verhulst model

Year	Actual	Fourier residual new Grey Verhulst model	
		Forecasted value	Precision
2011	17.3	18.57	92.65%

At last we forecast the world fixed-telephone subscriptions by the grey Markov model. According to our method we have

$$\hat{X}^{(0)}(k+1) = 18.10626686 e^{0.0030851k}$$

by (27) to (30) it follows that

$$A=0.5905, B=0.6438, C=0.8123, D=1.5063$$

as a result four zones are separated as follows:

$$H_1 = [\hat{X}^{(0)}(k+1) + 0.5905, \hat{X}^{(0)}(k+1) + 0.8123]$$

$$H_2 = [\hat{X}^{(0)}(k+1), \hat{X}^{(0)}(k+1) + 0.5905]$$

$$H_3 = [\hat{X}^{(0)}(k+1) - 0.6438, \hat{X}^{(0)}(k+1)]$$

$$H_4 = [\hat{X}^{(0)}(k+1) - 1.5063, \hat{X}^{(0)}(k+1) - 0.6438]$$

Figure 2 demonstrates these four zones H_1, H_2, H_3, H_4 from the top down and their borderline for the world fixed-telephone subscriptions. We come across that for these data $M_1=2, M_2=2, M_3=3$ and $M_4=2$ and the number of the original data by one step from H_4 to H_1, H_2, H_3 and H_4 Respectively is 0,0,1 and 1. Hence, the one step transition probability matrix is calculated as

$$P(1) = \begin{bmatrix} 1/2 & 1/2 & 0 & 0 \\ 1/2 & 0 & 1/2 & 0 \\ 0 & 1/3 & 1/3 & 1/3 \\ 0 & 0 & 1/2 & 1/2 \end{bmatrix}$$

as we cannot distinguish the next state from $P(1)$ and $P(2)$, we calculate the transition probability matrix in three steps.

$$P(2) = \begin{bmatrix} 0.5 & 0.25 & 0.25 & 0 \\ 0.25 & 0.417 & 0.167 & 0.167 \\ 0.167 & 0.111 & 0.444 & 0.278 \\ 0 & 0.167 & 0.417 & 0.417 \end{bmatrix}, \quad P(3) =$$

$$\begin{bmatrix} 0.375 & 0.333 & 0.208 & 0.083 \\ 0.333 & 0.181 & 0.347 & 0.139 \\ 0.139 & 0.231 & 0.343 & 0.287 \\ 0.083 & 0.139 & 0.431 & 0.347 \end{bmatrix}$$

We can see that the world fixed telephone a subscription of 2010 is in H_4 . Therefore by investigating the fourth line of $P(3)$ we deduce that p_{43} is the maximum probability. Consequently the most probable state which the system may displace is H_4 to H_3 . At last,

the world fixed-telephone subscriptions per 100 inhabitants projection for the 2011 can be obtained as follows:

$$\hat{Y}'(10) = \frac{1}{2}(\hat{H}_{13} + \hat{H}_{23}) = \hat{X}^{(0)}(11) - \frac{1}{2}B = 18.35$$

Figure 2. Four zones and forecasting regulation curve of the world fixed telephone Subscriptions during 2001 to 2010

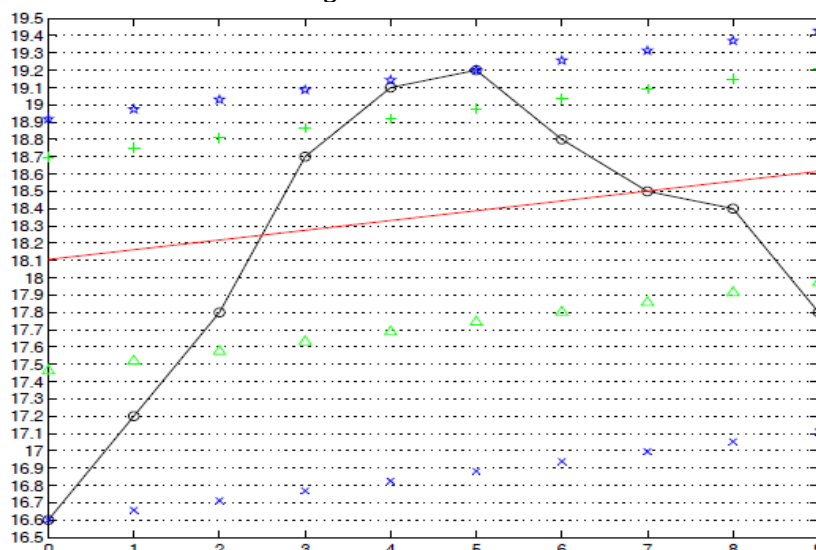


Table 6 demonstrates the forecast value and the precision of prediction for the world fixed –telephone subscriptions per 100 inhabitants by GM(1,1) and grey Markov model. by comparing the results we come across that the forecasting values obtained by the grey Markov model are more exact and certain than GM(1,1).

Table 6. The resulting prediction values and precisions by GM(1,1) and grey Markov model

Year	Actual Value	GM(1,1)		Grey Markov model	
		Forecasted value	precision	Forecasted value	precision
2011	17.3	18.675	92.06%	18.35	93.92%

All in all, we conclude that all the grey Verhulst, new grey Verhulst, Fourier residual new grey Verhulst and grey Markov models forecasted the values with high precision and they are reliable but in comparison the grey Markov model has the highest precision and can be chosen as the best prediction model. Thus the m step transition probability matrix identifies the next state of the system and all of the future fixed – telephone subscriptions can be forecasted by the grey Markov model.

4. Conclusion

Fixed-telephone subscription is as yet a critical infrastructure indicator. In this paper we applied a grey Verhulst, new grey Verhulst and Fourier residual grey Verhulst and grey Markov models for predicting this ICT indicator in worldwide. The traditional and grey Verhulst model resulted in high precision and only required a few data. By the Fourier residual grey Verhulst model we improved the accuracy. Finally the grey Markov model which is a compound of grey model and Markov chain gave the highest forecasting precision.

5. References

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