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RESEARCH ARTICLE



PERCEPTIONS OF WARMTH & COMPETENCE IN ONLINE NETWORKING: AN EXPERIMENTAL ANALYSIS OF A COMPANY LAUNCH

Andreia Gabriela ANDREI*, Adriana ZAIȚ**

Abstract: *Our interdisciplinary research examines consumer perceptions and behavioral tendencies generated by these perceptions. The study is placed in the context of online networking and it uses marketing, branding and psychology literature, especially the theory of warmth and competence from social cognition and Aaker et al.'s research results about firm stereotyping: 'for-profits' as high in competence vs. 'non-profits' as high in warmth. We used an experimental approach to investigate ways to attain the 'golden quadrant of consumer perceptions' (high warmth and high competence) that would jointly drive sales and brand advocacy in social networking sites. Offering a ready-to-use hint for companies, our results suggest people's proneness to support new market-comers and start-ups combining for-profit with social entrepreneurship. The effects of corporate communications on online user's perceptions are discussed.*

Keywords: *perceptions of warmth and competence, corporate communications, social media branding*

JEL Classification: *D03; D12; M13; M31; Z13;*

1. INTRODUCTION

Our research emerged from the need to integrate social networking in the daily brand management operations, in accordance with company mission and its performance goals.

Given the power of peer-to-peer influence in social networking sites, routed in the assumption that friends impact the behaviors of one another (Steinfeld et al.,2009; Wang and Cuddy, 2008), social networking sites are of particular interest for branding practitioners since individuals can engage in both direct and indirect

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marketing behaviors toward companies and their products (Bloomberg, 2010; Universal McCann, 2014).

Thus, we considered the communication and the interactions that might occur online, between companies and potential consumers, seen as Facebook users, since Facebook is the main social networking site with worldwide usage that plays an important role in disseminating information, attitudes and behaviors toward brands through digital signaling functions and automated recommendation systems.

Central to our interest was to study behaviors towards brands that would be driven by people's perception on two dimensions, namely warmth and competence, given their importance revealed by the recent studies of Fiske et al. (2002, 2007, 2012, 2013) and Aaker et al. (2010) results about firm stereotyping: 'for-profits' as high in competence vs. 'non-profits' as high in warmth.

We tested the effects of warmth and competence judgments in the relation between the corporate brand and Facebook users (seen as potential consumers), and we placed our research on the launching phase, for studying the beginnings of brand image formation as the unique place from consumer mind build on the perceptions projected by the company's behavior and actions, the unique meaning that consumers derive from all activities engaged by the company (Park, Jaworski, and MacInnis, 1986), including the online communications and interactions.

We used an experimental approach to study people's proneness of buying and voluntarily supporting a nascent brand by typical online actions such as recommendations and word of mouth, as an effect of the perceived levels of warmth and competence exhibited at launch, and we investigated the online launching to Romanian market of a foreign company combining for-profit with social entrepreneurship.

Since Facebook empowers people to spread opinions, and word of mouth proved to be a powerful influential tool for impacting awareness, expectations, perceptions, attitudes, intentions and behaviors (Buttle, 1998) that acts for or against brands (Lam & Mizerski, 2005), we were interested to find out if and how social networking sites should be used for launching such brands combining for-profit with social entrepreneurship, given their embodied warmth and competence potential. Also, we sought to find out how first perceptions would lead online users to support a previously unknown company.

2. LITERATURE REVIEW

2.1. Dimensions of warmth and competence

Social cognition theory states that warmth and competence stereotypes are the two central dimensions of human cognition (Fiske et al., 2002, 2007), their well-known universality (Cuddy, Fiske and Glick, 2007, 2008, 2009) indicating them as a meta-theoretical basis for the interdisciplinary research.

Previous research have shown that people judge each other on these two primary dimensions, the human behavior being driven by warmth and competence signals coming from the others (Judd et al., 2005).

Results from different studies revealed that warmth and competence stereotypes arise in all social contexts: instant evaluations of an individual person (Ybarra, Chan, 2001); liked vs. disliked groups (Cuddy, Fiske, and Glick, 2008); romantic partner selection (Sinclair and Fehr, 2005); decisions on staff employment (Casciaro and Lobo, 2008); leadership and management skills (Chemers, 2001).

Thus, central for human cognition, warmth and competence stereotypes are known to be the main source of bias and discrimination towards others: persons, groups, cultures (Fiske et al., 2002; Cuddy et al., 2007, 2008, 2009; Durante, Volpato and Fiske, 2009), organizations (Aaker, Vohs, and Mogilner, 2010) and brands (Kervyn, Fiske, and Malone, 2012; Malone and Fiske, 2013).

Competence and warmth dimensions, as they are currently used, trace their roots in the original notions of agency and communion introduced in psychology theory by Bakan (1956) to describe the two fundamentals of beings: agency – essential for individual survival, and communion – crucial for the integration and belonging to a higher body (collective structure).

Beyond the language differences and ethnic specificity of terms, it is known that regardless of culture, competence dimension refers to the effective capacity to achieve results (Cuddy et al., 2007, 2008, 2009) and reflects traits related to self-profitable ability, such as agency, intelligence and skill, while warmth dimension comprise traits related to other-profitable intent, such as communion, friendliness, morality, trustworthiness (Peeters, 2001) and good intentions towards others (Fiske et al, 2002, 2007; Abele, 2003; Abele and Wojciszke, 2007).

As Fiske et al (2002, 2007) concluded in their work, warmth is about intentions: good or bad, while competence is about the ability to enact those the intentions.

Warmth stereotype (evaluation of good or bad intentions) is of prime importance in social interaction, since it indicates a cooperative entity versus a competitor (a friend or a foe). Competence stereotype is closely related to the first, because intentions of others matter less, if they are not able to carry them out (Fiske et al, 2007).

Thus, perceptions of people are better predicted by warmth perceptions than competence ones (Fiske, 2002; Wojciszke, 2005; Wojciszke & Abele, 2008), and all active behaviors (all kinds of active facilitation or active prejudice) are driven by warmth, while competence generates only passive behaviors (Cuddy et al, 2007, 2008, 2009).

2.2. Warmth and competence stereotypes in the consumer – company relationship

Warmth and competence stereotypes are rooted in the evolutionary pressures (Fiske et al, 2007).

Although, at least apparently, the two stereotypes originating from evolutionary pressures should be irrelevant to the consumer – company relationship, recent research (Aaker et al., 2010, 2012; Kervyn et al., 2012) points out the opposite.

Aaker, Vohs, and Mogilner (2010) study was the first one stating that people perceive companies by the same two fundamental dimensions of social judgment: warmth and competence.

However, their result indicates a departure from the findings regarding warmth and competence perceptions of humans.

While perceptions of people (Wojciszke, 2005; Fiske, 2002; Wojciszke & Abele, 2008) and active behaviors – such as active facilitation and active prejudice - are better predicted by warmth (Fiske et al, 2007, Cuddy et al, 2007, 2008), in Aaker's study of companies, willingness to buy (seen by marketing and economic theories as an active behavior) – appears to be better predicted by the perceived competence. That is, the authors showed that “consumers perceive nonprofits as being warmer than for-profits but as less competent. Further, consumers are less willing to buy a product made by a nonprofit than a for-profit because of their perception that the firm lacks competence”(Aaker et al, 2010, p. 277). However, the same study revealed that competence boosting by endorsement from a highly credible source was possible, generating high levels of both warmth and competence

perceptions, the feel of admiration for the nonprofit company and an increased willingness to buy its product.

To conclude, Aaker et al. (2010) pointed out along three experiments, that consumers are more willing to buy products made by a for-profit than a nonprofit, but willingness to buy from one company or another is driven by competence-related perceptions, not by organizational frame. Although willingness to buy is driven by perceptions of competence, admiration and increased desire to buy are directed to those organizations that are perceived both warm and competent.

Moreover, in their BIAF model (*Brands as Intentional Agents Framework - dimensions, clusters and emotions*), Kervin et al. (2012) clearly indicate that active facilitation and uniform positive emotions are directed solely to the brands both warm and competent, while combinations of high perceptions on one dimension with low perceptions on the other induce only volatile behaviors and no admiration - but some other specific emotions, such as envy, generated by the combination of high competence with lack of warmth.

Works of Kervin et al. (2012) and Malone & Fiske (2013) show that popular brands are seen as both warm and competent, high levels of perceptions on both dimensions being required for obtaining consumer's admiration and loyalty.

Indeed, it is well known from marketing and management literature that willingness to buy is mandatory but not sufficient from the branding standpoint. At higher levels, branding seeks to consumer's loyalty, admiration, engagement, attachment, sense of belonging and supportive behavior (Aaker & Joachimsthaler, 2000; de Chernatony, 1999, 2001, 2009; Keller 2003, 2012; Hatch & Schultz, 2003; Blumental & Bergstrom, 2003; Urde, 2004; Aaker, 2004; Roberts, 2004, 2006; Anderson, 2008; MacInnis et al., 2009; Park et al. 2010).

2.3. Warmth and competence in social networking

We are interested to study how warmth and competence stereotypes would affect the consumer – company relationship in the context of social networking (i.e. Facebook), because of the deep social nature of the analytical framework on one hand, and because of the growth of social networking phenomenon on the other hand.

The exponential growth of social networking phenomenon - that signals the urge for overcoming the lack of attendance and the weaknesses that companies manifests in the online social environments - is known from both surveys and

statistics (Universal McCann, 2012, 2014) and social media literature (Loebman, 2010; Kaplan 2009; Hanjun et al, 2005; Steinfield et al. 2009, Ellison et al., 2007; Lampe et al, 2006).

The literature indicates that corporate reputation in the digital world is viewed as a growing challenge for many businesses (Universal McCann McCann, 2012, 2014), since social media empowers people to promote brands and to influence others, contributing to the brand creation (Qualmann, 2009; Dann, 2009; Bloomberg, 2010), while weaknesses that companies manifests in the online environments are not limited to marketing and communication, needing changes that cover the entire business approach (Anderson, 2008; Bloomberg, 2010).

Thus, there are plenty of evidence for the importance of studying online interactions between consumers and companies in all kind of the aspects relating with brand nurturing process, corporate image and users perceptions (including warmth and competence ones).

In social networking sites, the interactions between consumers and companies have a deep humane nature (Universal McCann, 2012, 2014), and that enables us to give an increased interest to the findings made by Fiske et al. (2007) and Cuddy et al. (2008, 2009) regarding the types of discrimination / bias arising from warmth and competence perceptions in social interaction.

We consider thus justified to question if can be extended to companies the typical bias of helping the warm ones and neglecting those competent, specific to the social interaction and known from the BIAS map developed by Fiske et al. (2007). Also, to study behaviors that online users would tend to adopt towards companies based on their perceived levels of warmth and competence.

Since previous studies of both Fiske and Aaker found that ambivalent judgment prevails (Fiske et al., 2002, 2007, 2012,2013), and organizations are seen as either warm either competent, not both, (Aaker et al, 2010) our research aims to find out how would be appropriate to act for inducing consumers' perceptions of high warmth and high competence regarding a new company first encountered online, in the specific context of online networking (i.e. Facebook). Moreover, we were interested to find out if and how social networking sites should be used for launching a particular type of brands that combines for-profit with social entrepreneurship. Also, we sought to find out out how first perceptions would lead online users to spread word of mouth and recommendations in favor of a previously unknown company.

3. METHOD

We developed a study to investigate the effects of a launch communication delivered to the potential consumers online, through Facebook.

Central to our interest was to study the occurrence of warmth and competence judgments and the behavioral tendencies of online users, as an effect of the launch communication carried out by a new-market comer company combining for-profit with social entrepreneurship.

We used an experimental approach and message-based stimuli to find out the first warmth and competence judgments fostered by the launch communication of such a for-profit social entrepreneur, and the connections between these perceptions and people's proneness to buy from the company and to voluntarily promote it by word of mouth.

3.1. Pretests and scales

To perform the experiment we developed a series of Facebook posts intended to be used as message-based stimuli that would foster high levels of perceptions either on the warmth, either on the competence dimension. We pretested them until we found a significant pair of message-based stimuli: a warmth oriented one and a competence other.

The two stimuli - messages were applied in Romanian language, and they were developed according with theory stating that, regardless of culture, competence refers to the effective capacity to achieve results and self-profitable ability (Cuddy et al., 2007, 2008), while warmth suggests good, other-profitable intentions (Abele, 2003; Abele and Wojciszke, 2007; Cuddy et al., 2007, 2008; Fiske et al, 2002).

Thus, the competence oriented message reminded about achieved results and self-profitable ability, presenting the newcomer's recent growth and success in the foreign markets, while the warmth oriented message emphasized other-profitable intents of the company, such as: social entrepreneurship, support of the local small producers, consumer health.

Stimuli – messages were pretested with Romanian students (N = 30, 50% female, ages 20-30) who rated their warmth and competence perceptions from 1 (not at all) to 7 (very much).

The warmth message was significant for perceived warmth ($M.mw = 4.85$, $SD = .84$ vs. $M.mc = 3.70$, $SD = .95$; $t(28) = 3.475$, $p = .002$).

The competence message was significant for perceived competence ($M.mw = 4.16$, $SD = .90$ vs. $M.mc = 5.16$, $SD = .51$; $t(28) = 3.706$, $p = .001$).

To measure perceptions on the warmth and competence dimensions, we used 4 items for *perceived warmth* (*honest; warm; kind; generous*; $\alpha = .886$) and 4 items for *perceived competence* (*capable, competent; effective; efficient*; $\alpha = .797$).

In fact, we adapted Aaker et al. (2010) scales used on U.S.A. samples (*warmth* measured with 3 items: *warm, kind, generous*, respectively *competence* measured with 3 items: *competent, effective, efficient*) by adding a 4th item into each of dimensions (*honest*, respectively *capable*) from Cuddy et al. scales (2007, 2008) in order to comply with Romanian language specifics revealed from our study and European specifics resulted from previous research made by Abele (2003); Abele and Wojciszke (2007); Abele et al. (2008); Wojciszke and Abele (2008); Wojciszke, Abele, and Barylă (2009); Wojciszke (2005); Wojciszke et al. (1997, 1998) with European participants.

To measure *willingness to buy* we used Aaker et al.'s (2010) scale comprising 3 items (*impressions about product, interest to buy, likelihood to purchase*). This scale was Romanian language adapted and used with a reliability score $\alpha = .847$.

WOM propensity was measured as the willingness to produce or spread the word of mouth through the usual WOM mechanisms available in online networking sites. We followed Word of Mouth Marketing Association's definition of WOM ("an act by consumers providing information to other consumers") and the opinion of Salzman, Matathia, and O'Reilly (2003) about the "transfer of information through social networks" and spontaneous WOM occurrence "without so much as a raised finger on the part of a marketing specialist or any other person" (Salzman et al., 2003).

Our WOM propensity construct (4 items: *Recommend, Share, Like, Negative comments*; $\alpha = .702$) used WOM valence dimensions of e-WOM scale developed by Goyette et al. (2010). WOM propensity was calculated as a mean of ratings from 1 to 7 for *Recommend, Share, Like*, and reversed scores for *Negative Comments* (ratings were scale reverted from the scale 1 = *not at all* to 7 = *to a very large extent* into 7 to 1 scale). We summed up constructive WOM (positive valence) and damaging WOM (negative valence) into the same construct (Andrei, 2012) to fit our situation of analyzing before-buying moment, when online users would share their personal opinions without product trial, and WOM propensity would be fueled by

perceptions towards company instead of real consumption experience, which is merely about advice giving that relates with a positive or a negative personal impression.

3.2. Experimental setup and data collection

A two-level single factor experiment was conducted with 50 participants (N = 50; 60% female; ages 20-30, M = 24; Romanian students), resulted by removing 2 from 52 participants after funneled debriefing.

Participants were invited to take part in a launch study for a foreign company coming to the local market. After exposing them to the information about the company, participants were asked to fulfill a 22 traits questionnaire (15 items for the dependent variables and 7 filler traits). We stated that their answers will be used to adjust the website features and offer. Aforementioned statement and the filler traits were introduced for moving participants' attention away from the truly purpose of the study, in order to capture their spontaneous perceptions and behavioral tendencies.

Participants got the information about the new company and its offer through 3 boards introduced one-by-one and displayed as 2 messages posted by company on its Facebook page, plus a 3rd board with references to the product's attribute information displayed on the website (i.e. product assortments and prices). All participants got the information about the company and its offer through the same three boards, but those displaying Facebook posts were offered in reversed order between groups, generating 2 opposite alternations of messages (warmth followed by competence vs. reversed) that represented the two levels of the experimental factor.

Thus, participants were exposed to the message-based stimuli introduced in reversed alternations between groups, and they were randomly assigned to one of our two experimental conditions.

Experiment tested for differences resulted between groups in effects regarding perceptions (warmth and competence) and behavioral tendencies (willingness to buy and WOM propensity) towards company.

The differences in effects were measured between groups with the 22 traits questionnaire applied to measure dependent variables: perceived warmth; perceived competence; WOM propensity; willingness to buy, and to introduce the filler traits for dissimulation purposes. We had 15 items for dependent variables according with each

scale shortly described above and detailed in the appendix. Twenty questions were applied in the end, and two questions were applied between the 1st and the 2nd board, in order to get participant's initial impressions on the the *honest* item from warmth dimension and *capable* item from competence dimension.

4. RESULTS

T-test was computed to compare perceptions and behavioral tendencies between our two experimental groups.

Significant differences in initial ratings were found between groups (*honest* item from *warmth* dimension: $M.group1 = 4.80$, $SD = .81$ vs. $M.group2 = 3.68$, $SD = .80$, $t(48) = 4.893$, $p < .001$; and *capable* item from *competence* dimension: $M.group1 = 4.20$, $SD = .91$ vs. $M.group2 = 5.48$, $SD = .77$, $t(48) = 5.358$, $p < .001$).

In the end of experiment, after participants' ratings were based on all information, we found again a significant difference in dependent variable *perceived warmth* between our two conditions: $M.group1 = 4.57$, $SD = .64$ vs. $M.group2 = 3.61$, $SD = .85$, $t(48) = 4.494$, $p < .001$, but no significant differences were found this time for the dependent variable *perceived competence* ($p > .05$).

Thus, in the end of experiment, only warmth perceptions remained significant between groups, while competence not.

We found also significant differences between groups on dependent variable *WOM propensity*: $M.group1 = 4.89$, $SD = .60$ vs. $M.group2 = 4.22$, $SD = .81$, $t(48) = 3.312$, $p = .002$. No significant differences were found on *willingness to buy* ($p > .05$).

Our result revealed that applying one or the other alternation of the stimuli - messages produced no significant differences on *perceived competence* (4.88 vs. 5.24, $t(48) = 1.876$, $p > .05$) or *willingness to buy* (4.93 vs. 4.76, $t(48) = .737$, $p > .05$) and both of them were ranked above average in each of the groups. Thus, good levels of *perceived competence* and *willingness to buy* resulted in both groups from messages content, with no influence coming from their alternation.

But the opposite alternations of the stimuli significantly influenced the levels of both *perceived warmth* and *WOM propensity* between groups. Dependent variables *perceived warmth* and *WOM propensity* were rated higher in the first experimental group, exposed to the warmth-competence alternation.

We can conclude that significantly better overall perceptions and behavioral intentions have been obtained in the first experimental group, when company was

introduced to participants as a social entrepreneur who successfully expanded its market in the recent years. The communication flow, driven from social entrepreneurship and intentions, to company's ability of being successful, induced higher warmth perceptions that those induced by the opposite flow, while similar levels of competence perceptions were induced regardless of the information flow.

Participants of the second group reported high levels of perceptions on a single dimension - company's competence - and high ranks for only one behavioral intention - the willingness to buy.

The golden quadrant of consumer perceptions (high warmth and high competence) has been reached only in the first experimental group, and both WOM propensity and willingness to buy were highly ranked by the participants of the first group.

Overall, our results suggests that online users tend to promote by WOM those companies they perceive both competent and warm, being clearly that perceptions of competence are not enough to make people to talk and spread recommendations.

Significant different effects resulted between our groups on the dependent variables *perceived warmth* and *WOM propensity* indicates that the tendency of online users to spread the word about a company is strongly related to their impressions about company's intentions.

Further studies are needed to find out if online users tendency to promote a company by WOM is driven solely by warmth perceptions, or only the combination of both warmth and competence-related perceptions makes people talk.

However, our result points out that social networking sites should be considered as first options for launching brands combining for-profit with social entrepreneurship, given their embodied potential of attaining high levels of consumer perceptions on both warmth and competence dimensions, but information flow should be driven from intentions to abilities in order to reach the golden quadrant of consumer perceptions.

5. CONCLUSIONS

5.1. Findings and further research

Our results shows that new market-comers and start-ups should exhibit both competence and warmth in order to attain high levels of perceptions on both

dimensions and active support from online users, including recommendations and positive word of mouth.

While competence-related perceptions of a company drives willingness to buy (Aaker, 2010), our result indicates that word of mouth propensity is better predicted by perceptions of warmth than those of competence.

We found that the amount and the valence (positive vs. negative) of WOM that a company can get from social networking is directly related with the level of warmth it emanates, because online users tend to spread word of mouth about those companies they perceive to be both competent and warm.

Although our results clearly show that perceptions of competence are not enough to make people to talk about a newly-launched company, further studies are needed to find out if online users' tendency to promote brands by WOM is driven solely by warmth perceptions, or high levels of perceptions for the combination - good intentions and ability to enact them - is needed to be attained.

Certainly, since WOM represents the most valuable resource of awareness and credibility in the brand nurturing process (Qualmann, 2009; Bloomberg, 2010; Universal McCann, 2012, 2014), our study indicates that social networks (i.e. Facebook) would be appropriate environments to launch a new company that combines for-profit with social entrepreneurship.

As our results indicate, launch communication should be driven to firstly inform about the social entrepreneurship aspects – such as company concern for consumer's health, community, local partners - issues belonging to the warmth dimension. This means that a company combining for-profit with social entrepreneurship should address warmth before competence, in order to reach the golden quadrant of consumer perceptions, and WOM support of online users.

Although this represents in fact a natural communication flow that would firstly provide information that allow online users to understand company's purpose, enabling them to anticipate what their relationship with company will be, we must notice that our result complies rather with social psychology theories about relations between humans (Wojciszke et al. 1998; Abele and Wojciszke, 2007, 2008, 2009; Cuddy et al., 2007, 2008, 2009), than with management and marketing ones.

Further studies are needed to find out if our result represents a departure, or just an exception from the general rule of management practice and marketing theories (Ries and Trout, 1981; Devine & Halpern, 2001; Kotler and Keller, 2006;

Grandey et al., 2005) - including Aaker et al. (2010) – that provide clues suggesting that for-profits should grant priority to establish competence before warmth, since competence relates with respect and it represents the main driver of the willingness to buy, indicating the quality of company's offer.

5.2. Contributions

Our study provides valuable insights for managers regarding brand nurturing process on social networking sites, especially useful for social entrepreneurs, start-ups and new-market comers targeting diverse, international markets.

Results indicate social networking sites as highly appropriate environments to launch a brand that combines for-profit with social entrepreneurship. Good intentions embodied by social entrepreneurship combined with for-profits ability of caring them out proved to be a solid foundation that allows a newly-launched company to attain the golden quadrant of consumer perceptions (high warmth and high competence) which would jointly drive consumer purchase intentions and brand advocacy in social networking sites.

We found that word of mouth propensity is better predicted by perceptions of warmth than those of competence, which adds empirical evidences and insights that better shape the current knowledge of warmth and competence theory concerning brands and organizations (Aaker et al., 2010, 2012; Kervyn, et al, 2012; Bennett and Hill, 2012; Fournier and Alvarez, 2012; MacInnis, 2012; Keller, 2012, Malone and Fiske, 2013).

Nevertheless, suggesting explanations for people's engagement in supporting a newly-launched company based on its perceived warmth, our results contribute to a better understanding of the consumer perspective – seen as a social networking user.

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APPENDIX

Table 1 Willingness to buy scale

Willingness to buy*	Items**	Rating scales
Impressions about product	What are your impressions about the company's products?	1 to 7 Likert scale (1 = very bad; 7 = very good)
Interest in buying	How interested are you in buying from this company?	1 to 7 Likert scale (1 = not at all; 7 = very much)

Willingness to buy*	Items**	Rating scales
Likelihood of purchasing	How likely are you to order from this company?	1 to 7 Likert scale (1 = not at all; 7 = very much)

* Willingness to buy scale: Reliability Statistics Cronbach's Alpha $\alpha = .847$

** English translation of the adapted items for Romanian. Study was applied in Romanian.

Table 2 WOM propensity scale

WOM propensity*	Items**	Rating scales
Reccomend	To what extent do you believe that people would recommend the company to their online networking peers?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Share	To what extend do you believe that people would SHARE the events and/or offers posted online by this company?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Like	To what extent do you believe that this company would receive 'LIKE' from online users?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Negative Comments	To what extent do you believe that the company launch would receive negative comments from Internet users?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent) Ratings were scale reverted into 7 to 1.

* WOM propensity scale: Reliability Statistics Cronbach's Alpha $\alpha = .702$.

** English translation of the adapted items for Romanian. Study was applied in Romanian.

Table 3 Perceived warmth scale

Perceived warmth*	Items**	Rating scales
Honest	To what extent do you believe in the honesty of company and its offer?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)

Perceived warmth*	Items**	Rating scales
Kind	To what extent do you believe that this company is having a kind attitude?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Warm	To what extent do you believe that this company is warm?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Generous	To what extent do you believe that this company is generous through its offer?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)

* Perceived warmth scale: Reliability Statistics Cronbach's Alpha $\alpha = .886$

** English translation of the adapted items for Romanian culture. Study was applied in Romanian.

Table 4: Perceived competence scale

Perceived competence*	Items**	Rating scales
Capable	Do you believe that this company would be capable to succeed?	1 to 7 Likert scale (1 = not at all; 7 = very much)
Competent	To what extent do you believe that this company is having a high level of competence in its product field?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)
Effective	Do you believe that this company would be effective enough to enter the market?	1 to 7 Likert scale (1 = not at all; 7 = very much)
Efficient	To what extent do you believe that this company is efficient?	1 to 7 Likert scale (1 = not at all; 7 = to a very large extent)

* Perceived competence scale: Reliability Statistics Cronbach's Alpha $\alpha = .797$

** English translation of the adapted items for Romanian culture. Study was applied in Romanian.



WHAT DETERMINES AN APPEALING WEBSITE? EXPLORING THE ROLE OF DESIGN PRINCIPLES IN CONSUMER DECISION MAKING

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Abstract: *Existing research in human-computer interaction suggests that visual perception critically influence the consumers' attitudes and expectations toward the website. Many websites fail to capture users' first impression and help them decide on which page they should stay. One of the reasons websites fail is the poor design, even though they are usable. In order to meet this challenge, our study provides recommendations regarding the most important factors that influence users' first impression: color, symmetry, typography. Moreover, this study analyses a number of websites, recording data from a service that generated important statistics about the websites' traffic. Next, the proposed factors are linked with the obtained data in order to explain and highlight the importance of the "best practices" in designing successful websites. Our study has a practical value for website designers and marketers concerning the effective use of various design principles in website development.*

Keywords: *web design, website aesthetics, user experience, user interface features*

JEL Classification: *M310*

1. INTRODUCTION

In the modern market economy, the value creation has shifted from production-centric to consumer-centric, where the user is the main factor in influencing the final product, from the initial concept till price. Moreover, researchers speak about the "feeling level" where the interactive functions of the system should convey feelings through visual sensory modalities (Bonnardel et al., 2010; Lee et al., 2011). At this level, aesthetics constitutes a crucial function, due to which users decide whether or not to continue their navigation. Lindgaard et al. (2006) stated that users' first impressions are determinant in their further navigation on the website. These impressions are constructed in the first 50ms users enter the website. At this stage, users form their aesthetic impressions about the site, and

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unconsciously decide if it is appealing or not. Thereby, the aesthetic features of the website construct the users' preferences. Bonnardel et al. (2010) argued the importance of color and the form of information presentation on users' impressions, on their time spent on websites and memorization; Ozcelik et al. (2009) argues that color coding facilitates users' learning.

In building stable customer relationships, web design is crucial as long as it is based on understanding the users' minds. Hausmann and Siekpe (2008) studied the cognitive and psychological factors involved in the understanding of consumers' motivations to shop online. According to them, one of the factors that motivate the consumer is the use of appealing graphics and 3D virtual models.

Although the past research focused on the logical design factors, such as fonts, site organization or the endeavor to meet the web standards, it is necessary to show how these standards can be integrated together in order to convey emotions and offer a unique experience. It is not sufficient to learn what font to use or how to choose a color, but how to carefully compose the virtual shop in order to facilitate the users' communication with the system and the vendor, to raise feelings and to increase the retention rate. Thus, sophistication can be achieved through minimalism; one simple object can convey types of scrolling or interaction.

In recent years, aesthetics research has been a surging interest in improving users' experience. This study responds to the recent trend, providing recommendations regarding the most important factors that influence users' aesthetic impressions, such as the use of color, symmetry or typography.

2. OVERVIEW OF CURRENT RESEARCH

In the online environment, the main elements included in website design are represented by color, fonts, shapes, images, photographs, graphics and others. All these elements influence the users' emotional appeal and make a positive or negative impression toward the entire site. Yet, the Cultural Relativism view suggests that culture influences people's preferences. Color perception is influenced by perceptual learning. Websites adapted to the users' culture tend to be easily accepted and preferred (Cyr et al., 2009). Thus, the first stage in website design is to take into consideration the cultural characteristics.

Studying the literature, we find elements that are both preferred by people from different cultures. For instance, Germans, Canadians and Japanese dislike the

yellow color scheme websites (Cyr et al., 2009, p. 14). Yet, Germans tend to like more the blue color scheme, meanwhile the Canadians like more the grey scheme. Different stimuli affect users' attention but their effects may vary from culture to culture.

Additionally, Noiwan and Norcio (2005) investigated the effects of animated graphics colors on attention and perceived usability. They focused their study on two cultural groups, American and Thai. The results show that blue color is the most effective when used for animated graphics for both cultural groups. Also, it is best used as a background color.

Through color, the object communicates meaning. Thus, it influences the perception of the site. Further, this perception affects the experience of the user and subsequently the satisfaction, trust or loyalty. Thereby, the study of color psychology and the cultural background of the targeted users help improve the experience. Cyr et al. (2010) found that yellow color scheme does not fit in a website which promotes electronics. The Color Theory argues that yellow color suggests energy, happiness and it is best suited for children websites.

In terms of interface design, other than color schemes, we find pictures, text and the search bar to be visually appealing. Djamasbi et al. (2010) suggests that websites with a main large image on the homepage are the most appealing to users. Moreover, pictures of people are most preferred, they being immediately fixated. The same amount of fixation received the top left side of the website, where the logo was placed. Users may expect to find important information in that area of the site. On the same line, users expect to find the search bar on the top right side of the website. For the studied group, users under thirty years, the textual information received low fixation, they preferring little and concise text.

Moreover, location is a crucial determinant of the website appeal. The theory of visual hierarchy (Faraday, 2000) asserts that objects placed at the top of the page are perceived by the users to be more important. Creating a visual hierarchy, the web designer will emphasize the most important elements, the objects that should be seen by users. If the top placed elements are perceived as being the most important, those with the same color are considered to be part of the same group. Visual hierarchy also means creating groups even if they are made according to color, dimension or location.

Through design we refer to visual communication. By grouping similar visual objects we communicate our message better and the brain will categorize the information we transmit. For instance, we may refer to typography. Through similar fonts, scale and text formatting we organize paragraphs, make the difference between one idea and other, we make the difference between explication and example. This visual hierarchy makes the textual information meaningful and makes it easier to be scanned by users. We can use different tools to create visual hierarchy. Size is an effective way to organize information. It is correlated with the importance of the object. Our eyes are naturally captured by the biggest elements. They follow a pattern traced from bigger to the smaller objects. In addition to size, color plays a double role. It is perceived both as an organizing tool and as a personality one.

Roth et al. (2012) study clearly indicates that location matter and placing an object at expected location increase the number of fixations. They confirm that users have expectations not only of object placement, but also of their shape, color or other elements. For instance, the log in icon has a specific image or the shopping cart, which is represented by the cart icon. All these characteristics make the objects more visually salient and thus it facilitate recognition. Not giving attention to these details may lead to user disorientation. Users do not have a second best estimates concerning the location if the objects are not placed as they expected (Roth et al., 2012). It is recommended to place the most commonly used objects as users expect, especially for decreasing the search time for those who land on page for the first time.

In the field of Human Computer Interaction (HCI) are significant studies which explore the various factors that affect the aesthetic design. Tuch et al. (2010) showed in a well-controlled study that symmetry plays an important role in forming a holistic perception, an overall impression of the site. Thus, the vertical symmetry of the websites is perceived more beautiful than asymmetrically designed websites. This result determines the participants' aesthetic judgments. An explication for this result may be the fact that symmetry reduces the visual complexity of the site. Thus, the given information is easily processed. As we know, even the Gestalt view asserts that symmetrically shapes are preferred. We can also apply the well-known expression "less is more", showing that we can create sophistication through minimalism. Keep it simple.

Tuch et al. (2010) also suggests that there are two types of aesthetic perceptions of the websites. The first one is the classical aesthetics which indicates

the traditional organization of the site, symmetry, a well presented site, clean and clear. Besides the classical aesthetics, the expressive one emphasizes the designer's creativity, his ability to express feelings through originality and innovative methods and effects.

It seems that symmetry has an important role in guiding the users' aesthetic judgments of beauty. Jacobsen, Hafel and Cramon (2006) used a functional MRI to show that during judgments of symmetry there was brain activity in the specific area for aesthetic judgments of beauty.

Apart of symmetry, graphics affect the users' feelings. Graphics have a major influence on the website's appearance they are used properly. Lin et al. (2012) suggests the best ratio of graphics to text. They affirm that the ratio to text should be between 3:1 and 1:1 to have an influence on users' feelings and to be easy to use and clear. This proportion suggested by this study gives an aesthetic consistency. Rosen and Puriton (2002) stated first that the importance of an equilibrate use of graphics is better, crating access, not abundance.

According to Wang et al. (2010), the perceived aesthetic appeal has also a negative influence on users' satisfaction, only when they make purchase tasks. Whereas a highly appealing website has a positive influence on satisfaction for users who only browse for information, web designers should be careful when designing for shopping websites. A highly appealing website will not be preferred by consumers who pursue purchase tasks.

All design elements should be considered when understanding the users' processing of information on a website. Noiwan and Norcio (2005) explored the effects resulted from the combination of text and different background colors of web animated graphics on attention and perceived usability. It is interesting how blue color was again proffered. It has a positive impact on perceived usability and it draws users' attention.

Even though they are an unnoticeable aspect of the website design elements, contrast, alignment, density, whitespace, style and texture constitute major details that make the difference between various areas of the website or they can change the overall impression that users have. Though the change of light of a color, the core content can be easily separated and thus, the essential information can be emphasized. It can even create or modify the hierarchy of information. Moreover, density and whitespace are hand in hand. In order to avoid cluttered "package" of

information one should consider that whitespace between the same categories of information make easier to users finding the searched content. Again, style and texture give personality to the entire site. On the one hand, style can change the overall look of the site. On the other hand, it may mislead the user and overemphasize certain elements.

Analyzing visual appeal

Visual appeal has been considered one of the most important factors in determining the websites` quality and one of the most relevant predictors of users` intention to purchase. Djamasbi et al. (2010) argues that there are two main approaches concerning the visual appeal. The first one is the Gestalt Theory and the second one is represented by the experimental aesthetics.

Gestalt Theory examines peoples` reactions to the whole object. It argues that “one`s perception of an object cannot be decomposed into its elementary parts” (Djamasbi et al., 2010, p.308). In order to evaluate the visual appeal, the user should evaluate the whole stimuli. Concerning the web pages, the visual aesthetic evaluation consists in a subjective understanding of the page, as a whole. In this situation, the website should not be evaluated to its separate components but to see rather the entire image it creates.

There are a number of Gestalt principles which help improve the design:

- Similarity, which refers to the above discussed issues of grouping. This principle argues that objects which have similar visual characteristics, such as color, size, font, shape, texture, will be perceived as belonging together;
- Proximity refers to the objects that are closer together;
- Continuity argues the preference for continuous figures;
- Closure refers to individuals` tendency to complete scenes where there are missing parts or where the information is not complete;
- Area explains that smaller figures are perceived as objects, meanwhile larger objects are perceived as backgrounds;
- Symmetry indicates that a figure is perceived as a whole and not its individual parts.

The process of human aesthetic impressions about a webpage is a very complex one, due to our judgments which is shaped by various factors, such as the involved stimuli (color, shape) or by our individual characteristics which incorporate the previous experiences we had. In the process of creating an appealing website, a

great importance in HCI is to understand how these aesthetic impressions about the site is formed, what does it transmits and how the experience is perceived.

On the other hand, the second approach analyses peoples` reactions to individual elements of an object. According to Djamasbi et al. (2010), the aesthetic preferences are influenced by mathematical rules, such as the golden ratio. Thus, users` preferences can be predicted through functions that depend on the inherent qualities of a stimulus (Djamasbi et al., 2010, pg.309). According to this view, when studying the webpages, we must investigate the users` responses to different elements of the page. Considering these approaches, we argue that each perspective reveals different patterns of the users` behavior. Both theories are useful in developing successful websites.

Data analysis

In order to emphasize the importance of the effective use of design principles, a heuristic evaluation was applied on four websites. These websites are: brilliantpublications.co.uk, returnjet.com, horses4homes.net and spanishhorsesuk.com. Two of these websites are trading horses` websites: horses4homes.net and spanishhorsesuk.com. Brilliantpublications.co.uk is an educational publisher website which creates various resources to make teaching and learning enjoyable. Returnjet.com is a cloud based software system, allowing users to search for the most appropriate plane, best prices, availability and to issue quote requests. Basically, returnjet.com allows users to transact directly with the operator. All four websites are commerce sites. Returnjet.com and spanishhorsesuk.com targets are international websites, meanwhile brilliantpublications.co.uk and horses4homes.net target users from Great Britain only.

In this study, we analyze the data obtained from Google Analytics for the above mentioned websites. We investigate the metrics` values obtained from 6th of June, 2014 to 6th of July, 2014.

Google Analytics allows us to track users` interactions and to measure conversions. The metrics we obtained for these websites are the following:

- the total number of unique users to our websites;
- the total number of sessions to our websites. It refers to the interactions a user has over a period of time. One session generally lasts 30 minutes. The interactions are also called hits;
- the number of viewed pages and the average number of pages viewed per session;
- the average length of session duration for all users;

- the bounce rate - indicates the percent of single-page sessions. This is an important metric because it shows if the landing page has a problem or not. It indicates the percentage of users who left the site from the entrance. In this case, users left without interacting with the other pages, than the homepage. Google Analytics indicates that there are different causes of a high bounce rate:
 - incorrect implementation of the website;
 - single page site;
 - poor website design;
 - user behavior.

Our analysis is focused only on site design.

Further, we have tracked the users' interactions for over a month. Our main interest is to identify poorly performing pages and subsequently to understand the underlying problems from an aesthetic point of view. The landing page report indicates the most visited entrance pages. For the landing page report, the bounce rate is the key metric. The rate also shows how was the visitor's engagement. If the visitors view the landing page and immediately leave it, this means a poor engagement. Otherwise, a high bounce rate (>50%) reveals that the page content or the page design did not met users' expectations. Thus, the referrals' details show us which the users' expectations are.

Figure 1, shows the total number of users, the percentage for the new visitors and the percentage for returning visitors for each website.

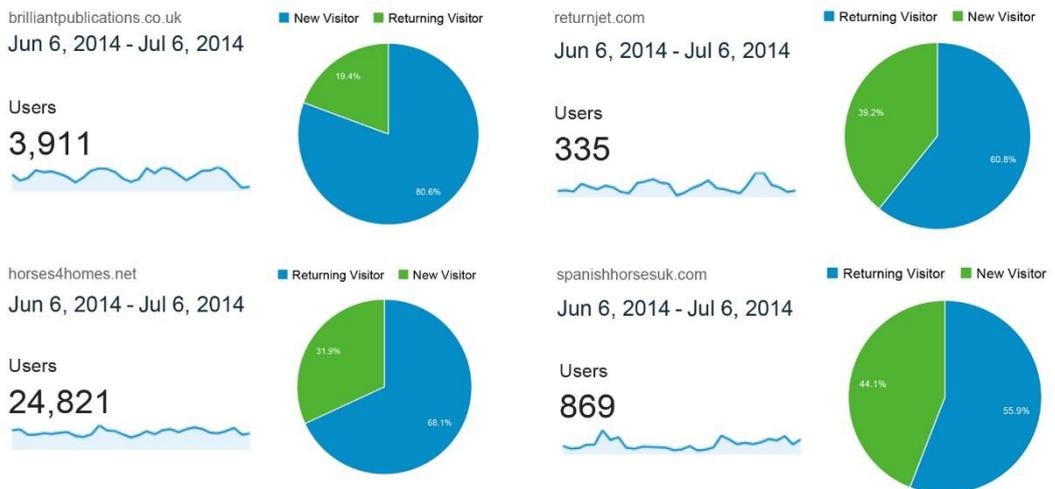


Figure 1 The total number of users, the percentage of new and returning visitors
Source Google Analytics, 6 iunie-6 iulie, 2014

In this report we observe that horses4homes.net has not only the greatest numbers of users, 24.821, but the largest number of returning visitors, 68.1%. This demonstrates that the website is of interest to them from the first page view. On the other hand, returnjet.com has the smallest number of users, 335, and a rate for returning visitors of 60.8%, almost the same as horses4homes.net. There are significant issues to be taken into consideration, given the results. Returnjet.com may be the most interesting for users but we will analyze it only from an aesthetic perspective.

In all our Landing Pages Reports we can see that visitors entered our websites through the homepage. This result means that this is a good fit because we targeted the homepages. We wanted homepages to be the first experience users have with the website. This is an important issue because homepages incorporate in our case the most significant information, the most important data we want to deliver and the chance we have to show users the offer. Depending on the homepage, the users decidewhether to leave or stay further on the website. The homepage offers users the first experience and in a very short amount of time they decide if the website delivers or not the needed information. Thus, if the homepage is filled with huge ads, a lot of text or in general poor design, the visitors will leave. The following tables reveal the data obtained from the Landing Page Reports for each website. In this report, we receive data concerning acquisition, user behavior and conversions. The most relevant data for our analysis are the bounce rate and average session duration.

Table 1 shows the Landing Page report for the brilliantpublications.co.uk. For the purpose of our analysis, we selected the metrics for the homepage only.

Table 1 Landing Page Report for the brilliantpublications.co.uk website - homepage

brilliantpublications.co.uk

Landing Page	Acquisition			Behavior			Conversions <input type="checkbox"/> eCommerce		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Transactions	Revenue	Ecommerce Conversion Rate
	4,518 % of Total: 100.00% (4,518)	80.63% Site Avg: 80.48% (0.19%)	3,643 % of Total: 100.19% (3,636)	57.48% Site Avg: 57.48% (0.00%)	3.95 Site Avg: 3.95 (0.00%)	00:02:35 Site Avg: 00:02:35 (0.00%)	0 % of Total: 0.00% (0)	£0.00 % of Total: 0.00% (£0.00)	0.00% Site Avg: 0.00% (0.00%)
1. /	757 (16.76%)	87.84%	512 (14.05%)	29.85%	8.15	00:05:41	0 (0.00%)	£0.00 (0.00%)	0.00%

Source: Google Analytics, brilliantpublications.co.uk

Brilliantpublications.co.uk indicates a total bounce rate average of 57.48% and 29.85% for the homepage. We remember that bounce rate indicates the percentage of visitors who leave the website after only one page visit. It tells us how useful or pertinent is our website. In this case, we observe that brilliantpublications.co.uk has a high bounce rate per total but a low bounce rate for the homepage. Thus, the visitor engagement is very high. Moreover, the average session duration is almost 6 minutes. One session includes a variety of interactions. We may assume that visitors find quickly what they want on the homepage, using the “search” function or the menu buttons. Besides this, they may have found the information needed on the first page.

Table 2 Landing Page Report for the returnjet.com website– homepage

ReturnJet.com

Landing Page	Acquisition			Behavior			Conversions		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Goal Conversion Rate	Goal Completions	Goal Value
	765 % of Total: 100.00% (765)	39.22% Site Avg: 39.22% (0.00%)	300 % of Total: 100.00% (300)	38.43% Site Avg: 38.43% (0.00%)	4.79 Site Avg: 4.79 (0.00%)	00:05:22 Site Avg: 00:05:22 (0.00%)	0.00% Site Avg: 0.00% (0.00%)	0 % of Total: 0.00% (0)	\$0.00 % of Total: 0.00% (\$0.00)
1. /	560 (73.20%)	35.54%	199 (66.33%)	35.36%	5.00	00:06:02	0.00%	0 (0.00%)	\$0.00 (0.00%)

Source: Google Analytics, returnjet.com

Table 2 indicates the Landing Page report for the returnjet.com website. The same as for the previous website, we analyze only the metrics for the homepage. Returnjet.com has a total rate average of 38.43% and 35.36% for the homepage with session duration average of 06:02 minutes. In this case, the bounce rate is higher than brilliantpublications.co.uk. Because returnjet.com is a website which helps users find their flights, than, they are redirected to another page. The bounce rate may not show always that something is wrong with the site. For instance, we found in the Landing Page report, for returnjet.com, that the search page with London location had the highest bounce rate average from all pages, respectively 82.35%. This shows that most users search for destinations departing from London and after receiving the answer for this request, they leave the page. This means that the search page is the most useful page. It offers an immediate response to users' requests.

Table 3 Landing Page Report for the horses4homes.net website – homepage

horses4homes.net

Landing Page	Acquisition			Behavior			Conversions		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Goal Conversion Rate	Goal Completions	Goal Value
	54,951 % of Total: 100.00% (54,951)	31.88% Site Avg: 31.84% (0.14%)	17,520 % of Total: 100.14% (17,496)	38.85% Site Avg: 38.65% (0.00%)	10.49 Site Avg: 10.49 (0.00%)	00:07:04 Site Avg: 00:07:04 (0.00%)	0.00% Site Avg: 0.00% (0.00%)	0 % of Total: 0.00% (0)	\$0.00 % of Total: 0.00% (\$0.00)
1. /	16,764 (30.51%)	40.21%	6,740 (38.47%)	8.09%	18.45	00:11:10	0.00%	0 (0.00%)	\$0.00 (0.00%)

Source: Google Analytics, horses4homes.net

Table 3 reveals a very good performance of horses4homes.com website. Its metrics reveal very low rates with good average session duration, in comparison with the previous websites. The total bounce rate average is 38.85% and 8.09% for the homepage. The Landing Page Report showed that the homepage had the lowest bounce rate average. This rate indicates that the homepage is speaking properly to the users. Moreover, the average session duration was 11:10 minutes. The average was the highest of all. We assume that on the homepage users find the most information they needed. This homepage provides a clear menu, a simple carousel with the most recent data, they clearly state the most important services they offer (“rehome help”; “provide a home” and “need to rehome?”) and a few testimonials.

Further, we can observe the data obtained for a similar website, spanishhorsesuk.com.

Table 4 Landing Page Report for the spanishhorsesuk.com website – homepage

spanishhorsesuk.com

Landing Page	Acquisition			Behavior			Conversions		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Goal Conversion Rate	Goal Completions	Goal Value
	1,447 % of Total: 100.00% (1,447)	44.09% Site Avg: 43.85% (0.31%)	638 % of Total: 100.31% (638)	46.16% Site Avg: 46.18% (0.00%)	5.93 Site Avg: 5.83 (0.00%)	00:04:19 Site Avg: 00:04:19 (0.00%)	0.00% Site Avg: 0.00% (0.00%)	0 % of Total: 0.00% (0)	\$0.00 % of Total: 0.00% (\$0.00)
1. /	506 (34.97%)	50.99%	258 (40.44%)	23.72%	8.70	00:06:22	0.00%	0 (0.00%)	\$0.00 (0.00%)

Source: Google Analytics, spanishhorsesuk.com

Table 4 shows the total bounce rate, 46.16% and the homepage average bounce rate of 23.72%. The average session duration for homepage is 06.22 minutes.

In comparison with the previous website, spanishhorsesuk.com website has a very high bounce rate. The difference between the two is of 15.63 minutes. This result indicates a few problems. Even though spanishhorsesuk.com has a clear design with a white background, it missed to emphasize the specific services the user searches. It only displays a few topics from the forum and a carousel which pictures a few horses and the prices.

Table 5 summarizes the results for a better comparison. It indicates the data for all websites, with the average bounce rates for homepages and the number of visitors.

Table 5 The average bounce rates, session duration and number of users for homepages

	Bounce Rate	Session duration	Users
Brilliantpublications.co.uk	29.85%	05:41%	3.911
Returnjet.com	35.36%	06:02	335
Horses4homes.net	8.09%	11:10	24.821
Spanishhorsesuk.com	23.72%	06:22	869

Source: Google Analytics

Horses4homes.net has the lowest average bounce rate, 8.09%. It is followed by spanishhorsesuk.com with an average bounce rate of 23.72%. First, horses4homes.net uses a very subtle background which does not entangle the layout. It uses blue color in diverse hues, combined with cherry-red color to enhance the logo, menu and important headlines. Colors stimulate senses. Red color makes people feel excited, powerful. Red and blue colors work well for such a website. On the other hand, spanishhorsesuk.com website combines a little bit of red with black and white color. Black is the dominant color for menu, logo and typography. The background they use is wood-like, maybe a little bit inappropriate for the elegance of the site.

With reference to color, it is important to make them interact through contrast, vibrancy and complementation. Through contrast, we succeed in drawing users' attention to specific elements of the site. Spanishhorsesuk.com uses contrast in typography. The background is very light, white and the text is black, even the contrast between the menu box and the background. Also, brilliantpublications.co.uk highlights the logo, using white for it and strong blue for the background. Returnjet.com has not such a big contrast as it uses very light colors, both for background and text. On the other hand, it highlights the logo, which is ok and the most important area in the site:

the searching box form for flights. Through contrast, we divide areas and elements in the site, thus helping users to a better orientation and to achieve the target, to highlight where users should look. As a rule, choose a light color for the background and a dark color for the text.

Depending on the emotional response you want to elicit, vibrancy is an effective option. Using brighter colors, make users feel energetic, meanwhile darker colors induce a relaxation mood and thus, helping users to focus. For example, brilliantpublications.co.uk uses a dark color for background and menu, to relax the users and help them focus on the products they offer. Instead, spanishhorsesuk.com uses the background to introduce users towards the center of the site. The pastel colors of horses4homes.net offer visual stimulation in order to keep users interested but in the same time it allows them to enjoy the navigation, due to its mental freedom it offers.

It is important to create a visual harmony inside the site, in order to emphasize the information we want and to keep visitors interested. Colors have to be used according to color theory. Thus, visual harmony is created by choosing the colors on opposite ends of the color spectrum and by creating a high contrast between elements (for readable text and emphasized important areas and elements).

As we observed, blue color is used in almost all our sites, except shanishhorsesuk.com. It is recommended in business and commerce websites, due to its capacity to offer a sense of security and trustworthiness. Black, white and grey are used for backgrounds because they allow colors to have an impact on users. It is interesting that shanishhorsesuk.com used a wood-like, brown color for their background. Brown offers a sense of coziness, calm, reassurance and it is in connection with the aim of site, to offer people the chance to shelter a horse.

Concerning the typefaces, there are some fonts designers should use more often. Some light typefaces can give a wonderful effect, clear and easy to read but when used wrong, they can overwhelm and burden the users' reading.

Different typefaces are useful when we use them to differentiate the headings from body text. The heading and body contrast not only in size and color. Using a lighter text to differentiate the body from heading is a good option. For example, horses4homes.com uses a lighter text for the content in their posts. They have a clear and clean display of their post. But this is not enough. Sometimes, the lighter text can overwhelm as for brilliantpublicationuk.com. They try to add contrast by mixing

colors and the font weight. There must be a clear delimitation. Besides this, returnjet.com uses color and lighter text to contrast but the information boxes are not enhanced very well. There is no contrast between the background and the center of the site. The user may not know where to look in the second half of the site and may also be a problem using light color text on light background.

3. CONCLUSION

Although we support the idea that we should implant emotional responses in the website design, it is difficult because each user`s personality differ. Besides this, we agree that appealing elements, such as the scroll activated animations, endless scrolling, big background videos or slide out menus have a significant influence on users` perceptions and willingness to navigate. All in all, it is important to determine what is appealing and efficient for users in your own context. It depends on your site type, your targeted audience or your goals. There are elements that have a certain impact on users.

This paper provided insights into the aesthetic issues concerning commerce websites. From a theoretical perspective, the study identified some major studies that focused on the analysis on visual appeal. From a practical perspective, our work highlighted the importance of using different analysis when reconsidering a website design. We emphasized the value of Google Analytics metrics when also linked with design principles.

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A DIAGNOSTICS APPROACH TO ECONOMIC GROWTH IN SMALL OPEN ECONOMIES: THE CASE OF THE REPUBLIC OF MACEDONIA

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Abstract: *Macedonia's economy is under-performing. The unemployment rate is constantly one of the largest in Europe; and, almost one third of the population lives below the poverty line. Reforms have been put in place, but they have not done enough to solve the key problems. The present paper applies the growth diagnostics' methodology, proposed by Hausmann et al. (2005), in order to identify the most binding constraints on economic activity. We emphasize institutional framework and distortions of the legal system and the rule of law as the key binding constraint for growth. Especially, we point out to: large informal economy, dependence of the judicial system on the political elite, political patronage and legal and regulatory uncertainties. In addition, we find infrastructure, human capital and information externalities as possible binding constraints in the near future.*

Keywords: *growth diagnostics, economic development, economic reform, Macedonia.*

JEL Classification: *E20, O11.*

1. INTRODUCTION

The economy of the Republic of Macedonia (hereafter Macedonia) has gone through a very difficult transition. The GDP per capita is still 65% lower than the EU average. The unemployment rate has persistently been above 30% in the last 20 years. The poverty rate reached 31% in 2009. Half of the people who live below the poverty line belong to the “working poor”. The economic infrastructure has been underdeveloped, the informal economy has constituted a significant part of the

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overall economy, and corruption has been seen as a serious impediment to economic progress of the country. Every government proclaims itself reformist and subsequently undertakes many reform steps. But the results are never there.

This paper aims to propose reform priorities for Macedonia's economy for the foreseeable future period. It employs the growth diagnostics methodology of Hausmann et al. (2005), which is an analytical tool to identify most binding constraints for formulating growth strategy of an under-performing economy. The methodology is opposite of much criticized Washington consensus approach to reforms ("laundry-list" approach – reform everything) and it is based on the observation that countries that implemented well-focused reforms in key areas saw their growth rates accelerate.

Felipe et al. (2011) point out two weaknesses of the growth diagnostics methodology. First, the model underlying the growth diagnostics methodology is strictly macroeconomic. Second, there are many different ways in which one can proceed and conceptualise the problems affecting each country. However, the growth diagnostics methodology achieved a relatively high acceptance due to its systematic approach in problem conceptualization. It is used by institutions and researchers for the identification of policy priorities in under-performing economies. Moreover, it became a key component of the toolkit for donor agencies to formulate their operational strategies. The conclusions of the studies done by the growth diagnostic methodology are provided in the Appendix. World Bank (2005), Enders (2007), Dube et al. (2007), World Bank (2007), World Bank (2008), Ulloa et al. (2009), Lea and Hanmer (2009), and Lundstrom and Garrido (2010) are the studies that analysed different African economies. South and Central American economies are analysed in Hausmann and Rodrick (2005), Hausmann and Klinger (2007), Calvo (2006), Hausmann et al. (2007), Hausmann (2008), Sanchez and Butler (2008), Melendez and Harker (2008), and Hausmann and Klinger (2008). Asian economies are analysed in Li et al. (2011), Ianchovichina and Gooptu (2007), Ulloa (2008), Lea et al. (2011), Qayyum et al. (2008), Rahman and Yusuf (2009), Asian Development Bank (2009), Asian Development Bank (2007), World Bank (2009a), World Bank (2009b), Hang (2011), Babych and Fuenfzig (2012), while selected European economies are analysed in Bozu et al. (2007), BenYishay and Wiebe (2009), Moore and Vamvakidis (2007) and Sen and Kirkpatrick (2011). The most

frequently mentioned binding constraints in these studies are: government failures and inefficient institutions.

Economies from the region of South Eastern Europe (SEE), where Macedonia belongs, are threatened only in two studies, as to the best knowledge of this paper's authors. Moore and Vamvakidis (2007) focus on Croatia in the period between 2001 and 2005. Their analysis highlights the critical need to improve the business environment through further measures aimed at reducing the administrative burden, the legal uncertainties, and the corruption. Their study also emphasizes the importance of attracting more green-field foreign direct investment (hereafter FDI), and reforms aimed at reducing the role of the state in the economy through fiscal consolidation and faster privatization. Sen and Kirkpatrick (2011) analyse Kosovo in the period between 2001 and 2006. They find the costs and access to finance, the poor provision of public goods, and the weaknesses in the rule of law as the binding constraints for growth. Their analysis also suggests that the policy options for job creation must focus on both increasing the rate of economic growth and providing for an employment-intensive growth.

The main conclusion of this paper is that the key binding constraint for growth in Macedonia is the weak and insufficiently credible institutional framework of the economy, which leads to distorting the system of rule of law in the country. We point out here to several aspects of the insufficiently efficient and credible institutional infrastructure, such as: a large informal economy, the dependence of the judicial system on the political elite, the political patronage and too frequent changes in laws and bylaws. In addition, we emphasize economic infrastructure, human capital and information externalities as possible binding constraints in the near future.

The paper is set as follows: Section 2 provides brief overview of the economic development of Macedonia. The growth diagnostics methodology is discussed in Section 3 and applied to Macedonia's economy in Section 4. The final section provides a short summary and conclusions.

2. ECONOMIC DEVELOPMENT OF THE REPUBLIC OF MACEDONIA: BRIEF OVERVIEW

Historically, Macedonia's economy was one of the least developed among the economies of republics in the former Yugoslavia. The production structure of the Macedonian economy had been such that it was mainly a supplier of raw materials

for the economies of the more developed republics within the Yugoslav federation. In the mid-1980, the economy of the former Yugoslavia descended into a deep recession associated with high international indebtedness, high inflation (which turned into hyperinflation), and high unemployment.

The economic development of the Republic of Macedonia in the period after its independence (1991) can be divided into four periods. The first period is from 1991 to 1995, characterized by a sharp economic decline, hyperinflation, and the presence of two external shocks. The real GDP was reduced by more than 25% in the period from 1991 to 1994. The fall of real GDP was accompanied by extremely high inflation rates: 1639% in 1992, 350% in 1993, and 122% in 1994 (Petrevski, 2005). At the same time, the UN sanctions against the northern neighbouring country, Serbia, during 1992-1995, and the trade embargo against Macedonia, imposed by Greece during 1994-1995, created significant international isolation of the Macedonia's economy. During this period, the macroeconomic stabilization has been the only priority of the economic policy. A stabilization program was introduced in 1992, characterized by a slowdown in monetary expansion, a tightening of fiscal policy, and the limiting of the credit expansion of the state enterprises. As a result of the program's successful implementation, Macedonia's achieved a satisfactory level of macroeconomic stability. The inflation rate decreased to 15.9% in 1995, and the decline in the real GDP slowed to -1.1% in 1995 (National bank of the Republic of Macedonia, 2013).

The policy of macroeconomic stabilization continued in the next period, from 1996 to 2001. The stable exchange rate and stable price levels were the basic objectives of the economic policy. Throughout this period, the rate of the real GDP grew, reaching 4.5% in 2000 (National bank of the Republic of Macedonia, 2013). The main sources of growth were industrial production and domestic consumption. Inflation continued to decline, and even a deflation of 1.1% occurred in 1999. The positive trend in Macedonia's economy ended in 2001 as a result of the internal war conflict. That conflict reduced the economic activity: the real GDP growth rate was -4.5% in 2001; and it also created a somewhat dramatic shift in the fiscal position of the government: the budget surplus of 2.5% of GDP in 2000 turned into budget deficit of 6.3% of GDP in 2001 (National Bank of the Republic of Macedonia, 2013), reflecting the impact of significant budgetary spending for security purposes and lower tax revenues. The crisis affected all the economic sectors.

The third period is from 2002 to 2008. In 2002, the first post-conflict year, the most important sector of Macedonia's economy – industry, continued to have negative growth due to cancelled contracts by foreign partners. However, things have changed starting from 2003. Industrial production growth of 4.5% was achieved in 2003 primarily due to the increase in production of basic metals, which translated into a significant increase in the exports of steel and iron. During this period, the growth rate of the real GDP generally trended upward: 3.4% in 2003, 4.6% in 2004, 4.4% in 2005, 5.0% in 2006, 6.1 % in 2007, and 5.0% in 2008 (State Statistical Office of the Republic of Macedonia, 2013). However, the growth of the economy in this period failed to make significant improvements with respect to the key problem of the country: high unemployment rate.

The last period is mostly determined by the influence of the last global financial crisis and the Great Recession in the developed economies. Macedonia's economy started to feel the consequences of the crisis in the last quarter of 2008. The economy entered in the recession in 2009, had low positive growth rate in 2010 and 2011 and again entered in recession in 2012. This period was also characterized by a slow-down of the country's integration process in NATO and the EU, and by the decision of the Government to undertake a massive project of building monuments, museums and administrative buildings.

3. METHODOLOGY: THE GROWTH DIAGNOSTICS

The theoretical background of the growth diagnostics can be found in Hausmann et al. (2005), Rodriguez (2005), Hausmann (2006), Hausmann et al. (2008), and Misch et al. (2010). The idea of growth diagnostics is to focus on those reforms that can alleviate the most binding of constraints, hence produce the biggest bang for the reform buck. Hausmann et al. (2005) argue that rather than utilize a spray-gun approach, in the hope that we will somehow hit the target, we should focus on the bottlenecks directly. The growth diagnostic methodology can be conceptualized as a decision tree (Figure 1). It starts by focusing not on specific distortions (the full list of which is unknowable), but on the proximate determinants on economic growth. A process of elimination can help identify the binding versus the nonbinding constraints (Moore and Vamvakidis, 2007).

The growth diagnostics methodology considers low level of private investment as the key element for unsatisfactory economic growth. The low level of private

investment depends from the cost of finance of the economic activity and the returns from economic activity. The first stage of the growth diagnostics methodology aims to uncover which of these two factors poses the greater impediment to a higher growth. The next stage is to uncover the specific distortions that lie behind the more severe factor. If a case of poor finance, the problems could be due to the domestic financial markets or the external ones. If a case of low returns, it could be due to low social returns (insufficient investment in the complementary factors of production, such as human capital or infrastructure) or poor appropriability, which could be due to problems in the public sector (high taxation, poor property rights and contract enforcement, corruption, financial, monetary and fiscal instability, etc.) or market failures (learning and coordination externalities).

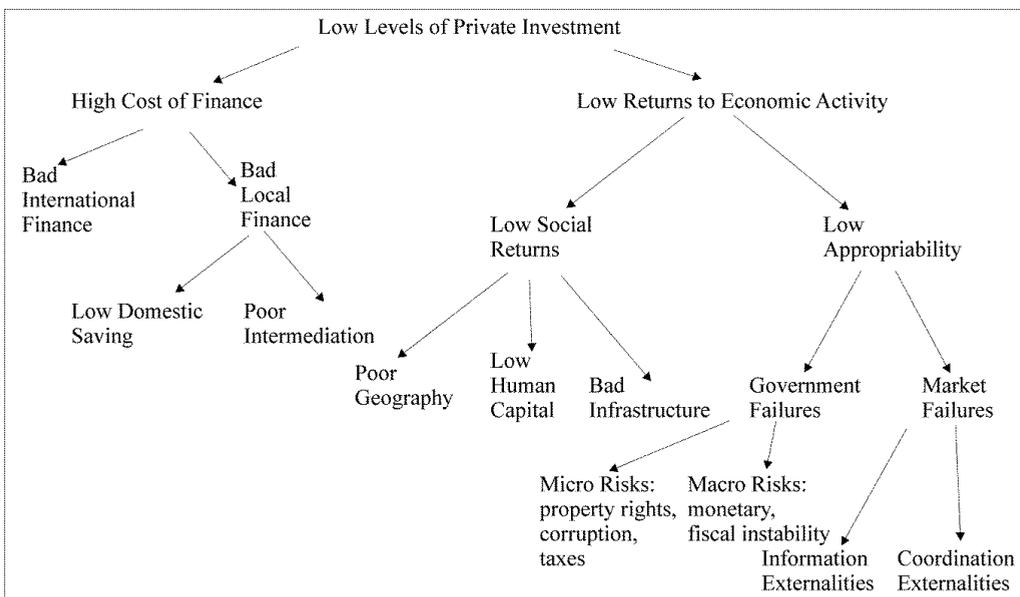


Figure 1 The Growth Diagnostics Decision Tree

Source: Adapted from Hausmann et al., 2005.

The advantages of this methodology are the following: (I) it offers the broad overview of the observed economy; (ii) systematic approach to identifying the most binding constraints and possibility for country comparisons; and (iii) more adequate prioritization of the reform efforts aimed at overcoming the key obstacles to economic growth.

We put much emphasis on the impact of the quality of institutions on creating on creating business environment conducive to economic growth. Here, the quality of institutions includes some difficult-to-quantify characteristics such as: a legal system based on maximum neutrality towards different interest groups and its relative stability, an autonomy of the judicial and regulatory institutions, and generally a very careful choice of areas of "market failures" which "justify" state intervention in business affairs. Also, we point out that the nature of the political system and the way political interests are arbitrated through it, may well influence credibility, stability and efficiency of the narrowly-defined economic institutions. All this is difficult to quantify as a growth factor or to account for as a "source of growth", as applied in the classical growth literature and the growth-accounting approach, not least because the quality and credibility of institutions have spill-over effects not only on the everyday activity of businesses, but also on the long-term type of decisions of economic actors related to the accumulation of capital: physical, human, organizational, social and etc. We think that putting the emphasis on all these aspects while being within the growth-diagnostic analytical framework, may be seen as a modest contribution to the way in which the constraints to growth could be ranked, i.e weighted based on their relative importance.

The growth diagnostics methodology is applied to Macedonian economy in Section 4 and the results are pointed out at the end of each analysed issue.

4. RESULTS: IDENTIFICATION OF THE BINDING CONSTRAINTS TO GROWTH IN MACEDONIA

In order to identify the constraints of growth in Macedonia, comparisons are made with other SEE countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Romania and Serbia. The sources of the determinants of growth data are reliable international institutions as: the World Bank's World Development Indicators, the World Bank's Enterprise Surveys, IMF's World Economic Outlook, EUROSTAT, the European Bank of Reconstruction and Development, and Economic Freedom Network. The time span is from 2004 to 2011, since 2011 is the last year where available data exists for all countries included. The time period is divided in two periods for the purposes of the analysis. The first, 2004-2007, represents the situation in the country before the influence of the global crisis, and the second, 2008-2011, the situation influenced by the global crisis.

The investment activity of Macedonia's economy (and that of the comparator countries from the region), for the two periods 2004-2007 and 2008-2011, is presented in Table 1. Macedonia achieved the lowest gross fixed capital formation, as percentage of the GDP, in comparison with the other SEE countries in the pre-crisis and post-crisis periods (in the post-crisis period Bosnia and Herzegovina joined Macedonia at the bottom, when considering the region). In both periods, Macedonia's private sector investment activity is the weakest of the SEE region.

The starting point of the growth diagnostic approach is to determine whether low levels of private investments are being inhibited by the high cost of finance or the low returns of activity. In other words, whether investment and growth are constrained due to entrepreneurs and investors who cannot get the capital they need to start a business or expand operations, or investors who do not want to invest as they do not expect to retain a sufficient share of the fruits of their efforts (Enders, 2007).

Table 1 Investment activity, Macedonia and comparator countries, 2004-2007 and 2008-2011

Country	Gross Fixed Capital Formation (% of the GDP)		Gross Fixed Capital Formation, the Private Sector (% of the GDP)	
	2004-2007	2008-2011	2004-2007	2008-2011
Macedonia	17.8	20.1	11.8	13.6
Albania	25.6	28.0	20.3	21.3
Bosnia	23.3	20.1	17.2	13.7
Bulgaria	25.6	26.7	20.7	21.4
Croatia	25.4	22.9	20.4	20.7
Montenegro	22.3	26.1	17.8	18.9
Romania	24.2	26.8	20.3	20.5
Serbia	20.9	24.1	17.3	20.5

Source: The authors' calculations based on the World Bank (2013a).

4.1. Cost and access to finance as constraints to growth in Macedonia

Are costs and access to finance the binding constraints to growth in Macedonia? The World Bank's Enterprise Surveys (World Bank, 2013b) finds out that 26.9% of Macedonian firms identify access to finance as a major business constraint (this is the most recent World Bank's Enterprise Survey for Macedonia). The results of the World Bank's Surveys for Macedonia and for the comparator

countries from the region are presented in Table 2. Access to finance is the second ranked business constraint for Macedonian firms, after the practices of the informal sector. Therefore, the importance of access to finance is analyzed in greater detail by examining the role of international finance and domestic finance as constraints to private investments in Macedonia.

Table 2 Main obstacles for business, % of surveyed firms

Country*	Practices of the Informal Sector	Access to Finance	Political Instability	The Courts	Business Licensing and Permits	Crime, Theft and Disorder	Tax Rates	Electricity
Macedonia (2009)	31.3	26.9	6.8	5.7	5.5	5.4	4.4	3.8
Albania (2007)	17.6	6.5	6.2	0.5	2.1	2.4	4.1	27.7
Bosnia (2009)	11.4	10.9	25.1	1.5	1.9	1.9	18.7	1.6
Bulgaria (2009)	15.3	17.2	13.3	2.1	2.1	3.2	12.8	1.2
Croatia (2007)	13.5	18.3	6.4	3.3	3.5	1.3	15.8	2.6
Montenegro (2009)	12.7	17.9	2.4	0.2	12.6	1.1	10.6	18.7
Romania (2009)	0.1	19.9	4.7	0.1	3.8	2.7	27.7	0.2
Serbia (2009)	19.9	17.8	20.7	3.5	4.2	3.7	4.8	2.0

Source: World Bank (2013b).

*The numbers in the brackets represent the year of the last available World Bank's Enterprise Survey for each country.

Note: The main obstacles are ordered according to their importance for Macedonia. The World Bank's Enterprise Survey reports 14 obstacles in total.

Access to international finance is not the most important constraint to growth at the present moment. Macedonia had enjoyed access to international finance. There was a significant increase in the external debt. The external debt was 51.7% of the GNI in 2004, and increased to 62.8% of the GNI in 2011 (World Bank, 2013a). As a comparison, the rate of the increase is almost the same as that of Bulgaria, higher than Bosnia and Serbia, and significantly lower than Albania and Romania (Table 3). The average interest on the new external debt commitments is 3.4%, slightly lower than the average of the observed countries (3.6%). However, the country's capability for attracting foreign direct investments is not satisfactory. The average level of foreign direct investment (4.3% of the GDP) in 2008-2011 period is almost two times lower than the average of SEE region (8.1% of the GDP). Also, in the period before global crisis, 2004-2007, the average level of the (foreign direct investment) FDI in Macedonia was significantly lower than the average of SEE countries (5.9% and 11.5%, respectively).

Table 3 External debt stocks and average interest on the new external debt commitment, for Macedonia and comparator countries

Country	External Debt Stocks (% of the GNI)			Average Interest on New External Debt Commitment (%) 2007 – 2010
	2004	2011	Increase	
Macedonia	51.7	62.8	21.5	3.4
Albania	21.0	46.0	119.0	4.6
Bosnia	52.9	58.6	10.7	2.2
Bulgaria	64.9	77.9	20.0	2.7
Montenegro	n.a	45.6	n.a	4.7
Romania	40.2	72.3	80.0	3.9
Serbia	62.0	71.8	15.8	3.6

Source: World Bank (2013a).

The problem of poor domestic finance could have emerged for two reasons: low domestic savings and poor financial intermediation. The gross domestic savings averaged 4.8% of the GDP through 2008-2011 (Table 4). It is higher than Albania, Bosnia and Montenegro. The financial deepening in Macedonia, measured as money and quasi money (M2), as percentage of the GDP, is below the average level of the SEE region for both periods. However, there is an upward trend in the M2 to the GDP ratio from 34.8% in 2004, to 56.0% in 2011. Almost the same is situation with the domestic credit to the private sector. While the level is lower than the region's average, there is continual annual growth, from 21.5% in 2004, to 47.5% in 2011. These two upward trends in M2 to the GDP, and the domestic credit to the private sector, exclude the volume of financial intermediation as the most important constraint to growth.

Table 4 Domestic savings and financial intermediation indicators

Country	Gross Domestic Savings as % of the GDP 2008-2011	Money and Quasi Money (M2) as % of the GDP		Domestic Credit to the Private Sector as % of the GDP		Interest Rate Spread (lending rate minus deposit rate, %)	
		2004	2011	2004	2011	2004	2011
Macedonia	4.8	34.8	56.0	21.5	47.5	5.9	3.0
Albania	4.2	65.7	81.8	9.4	38.3	5.2	6.6
Bosnia	-3.4	42.6	56.2	36.9	62.3	6.6	4.6
Bulgaria	20.1	51.2	75.6	35.4	71.9	5.8	7.3
Croatia	21.7	56.9	78.2	48.5	68.0	9.9	8.0
Montenegro	-8.0	13.3	47.4	14.6	52.7		6.6

Romania	19.7	32.8	38.8	15.7	45.0	14.1	5.8
Serbia	6.3	34.8	47.3	23.0	53.9	11.9	7.4

Source: World Bank (2013a).

The spread between lending and deposit rates is a reliable indicator of the efficiency of financial intermediation, with low spreads indicating a more efficient financial system (Sen and Kirkpatrick, 2011). Macedonia's interest rate spread was the second lowest in the region for the pre-crisis period, and the lowest in the post-crisis period. In 2011, the interest rate spread for Macedonia was 3.0% compared to the average 6.3% of the comparator countries. In addition, Macedonia's interest rate spread decreased with the time, starting with 5.9% in 2004, to 3.0% in 2011. Also, the lending rate in Macedonia was slightly lower than the average rate in the SEE region throughout said years. For example, in 2009, it was 10.1% in Macedonia and 11.7% in the SEE region, or in 2005, it was 12.1% in Macedonia, and 13.2% in the SEE region (World Bank, 2013a). These facts reject the possibility that financial intermediation is the key barrier to growth.

4.2. Institutional framework as constraint to growth in Macedonia

The analysis focuses in greater detail on low returns of economic activity, which could be due to low social returns, that is, low total economic returns on factor accumulation, regardless of their ultimate recipient or low "appropriability", i.e., low private returns even if social returns are high, because of, for example, taxes, corruption, market failures or other causes (Moore and Vamvakidis, 2007).

According to Hausmann et al. (2005), three factors can explain low social returns: geography, infrastructure and human capital. Regarding geography, Macedonia is a landlocked country, a geographic characteristic which has often seen as an obstacle to growth (Collier, 2007). The country's energy resources are poor, with modest hydro energy potential and low potential of fossil fuels (only lignite). However, Macedonia belongs to a temperate climate zone, a geographic characteristic favourable to growth (Sachs, 2003). Finally, the country's location, a major transportation corridor from Western and Central Europe to Southern Europe, and the Aegean Sea, and its proximity to the large European Union market, suggest that geography cannot be seen as a major obstacle to economic growth.

The second factor for low social returns is the lack of appropriate infrastructure. Infrastructure indicators of the EBRD (European Bank of

Reconstruction and Development, 2013) suggest that the country's infrastructure may be not be identified as the key binding constraint for growth (Table 5). According to these indexes, the level of development of Macedonia's infrastructure is around region's average. The index of road infrastructure of 2.7 is the same as Bosnia, Bulgaria and Serbia, while it is higher than Albania and Montenegro and lower than Croatia and Romania. The same is situation with the index of electric power infrastructure. Macedonian index of electric power of 3.0 it is the same as Albania, Bosnia and Croatia, while is higher than Montenegro and Serbia and lower than Bulgaria and Romania. Slightly worse is the situation in Macedonia in regard to railways infrastructure. The Macedonian index of railways of 2.7 is the same as Croatia, while it is higher than Albania and Montenegro and lower than Bosnia, Bulgaria, Romania and Serbia. However, it is important to note that the country faces a very uncertain future with respect to electric power provision, if the big energy sector projects are not undertaken in the future.

Table 5 The EBRD indexes of infrastructural reform (increasing from 1 to 5), 2010

Country	Roads		Railways		Electric Power	
	Index	Rank	Index	Rank	Index	Rank
Macedonia	2.7	3-6	2.7	5-6	3.0	3-6
Albania	2.3	7-8	2.0	7-8	3.0	3-6
Bosnia	2.7	3-6	3.3	3-3	3.0	3-6
Bulgaria	2.7	3-6	3.3	2-3	3.7	1-2
Croatia	3.0	1-2	2.7	5-6	3.0	3-6
Montenegro	2.3	7-8	2.0	7-8	2.7	7
Romania	3.0	1-2	4.0	1	3.7	1-2
Serbia	2.7	3-6	3.0	4	2.3	8

Source: European Bank of Reconstruction and Development (2013).

The third factor is human capital. Table 6 presents the labour force structure according to the educational level. According to this data, human capital is not a major obstacle for growth. The percentage of the labour force with tertiary education in 2011 is 20.7% of labour force, which is on par with Croatia, higher than Bosnia and Romania. However, the country has the highest percentage of a labour force with primary education among the observed countries (26.6% of labour force). The Macedonian government has tried to solve this problem by opening colleges (higher education facilities) in every town and city. The declarative goal is to increase the percentage of the people with higher education. However, this has been done by

opening university studies with questionable quality so as to improve the situation “pro forma”, while at the same time reducing the number of people needed for Macedonia’s economy, especially its industry. This, in turn, could open future problems for the economic growth of the country.

Table 6 The labour force educational structure, 2011

Country	The Labour Force with Primary Education (% of total)	The Labour Force with Secondary Education (% of total)	The Labour Force with Tertiary Education (% of total)
Macedonia	26.6	52.7	20.7
Bosnia	20.7	64.4	14.9
Bulgaria	13.8	60.3	25.8
Croatia	16.8	62.4	20.7
Romania	23.2	59.6	17.2

Source: World Bank (2013a).

Note: WDI do not report the data for the labour force educational structure for Albania, Montenegro and Serbia.

At the end, the focus is on factors that may have led to weaknesses in the appropriability of returns, and by doing so, weakened the incentive to invest, especially in high productivity activities. Weaknesses in appropriability of returns could be due to governmental failures or market failures. With respect to governmental failures, this could be due to macroeconomic risks, such as monetary and fiscal instability, which in turn increase the investors’ uncertainty about the future path of the economy, or due to microeconomic risks, such as the high rates of taxation, corruption, and regulatory and bureaucratic red tape, that may increase the costs of doing business. With respect to market failures, this could be due information externalities related to the inability of firms to diversify and export new products, or coordination failures that may arise from ineffective coordination between the government and the private sector, or between the national and the sub-national governments (Sen and Kirkpatrick, 2011).

Macroeconomic risks are not binding constraints for growth. The Macedonian Central Bank has successfully maintained exchange rate stability, and delivered consistently low inflation since the mid-1990s. The fiscal policy of the country meets the Maastricht deficit and debt criteria (the government has started to run a budget deficit higher than 3% of the GDP from 2012 – the first year outside the observation period). However, the quality of public spending is not at a satisfactory level. The

European Commission underlines that the overall macroeconomic policy mix has suffered from the low quality of governmental spending, with many measures geared more towards election-related promises rather than combating the crisis (The European Commission, 2009); or, while overall spending has remained largely unchanged, the quality of spending has deteriorated (The European Commission, 2010). Also, the public debt has increased without significant investments in the infrastructure. The present government has undertaken a huge project of erecting monuments and museums instead of building infrastructure, an obvious example of allocative inefficiency. In the literature available, similar mega projects that serve to increase the prestige of those who order their undertaking, are termed “white elephants” (The International Monetary Fund, 1991).

Microeconomic risks could be due to high rates taxation rates, an inefficient tax administration which increases the implicit rate of taxation (due to delays in refunds of VAT proceeds), bureaucratic red tape linked to business licensing or customs administration, corruption, a weak enforcement of contracts and property rights. In Macedonia, some elements of these micro-risks from the public sector are possible binding constraints for growth. The first element excluded from the above statement is the rate of taxation. Tax rates are generally low, with the VAT rate almost as average of the SEE region, and flat corporate and personal taxes (both corporate and personal taxes rates are 10%). However, the increasing problem in the recent period (staring with the global crisis) is the delay in refunds of VAT and payment of the obligations of the present Government to the private sector. Unfortunately, the government does not publish the total level of its obligations to the private sector, although the business community points this out as the significant problem for the liquidity of the firms.

The three aspects of the regulatory apparatus – business licensing, customs and trade regulations, and labour regulations – are not seen by firms as major constraints for growth. In the World Bank’s Enterprise Survey, 5.5% of Macedonia’s firms identify business licensing, 1.9% identify customs and trade regulations, and 1% identify labour regulations, as major constraints for growth (Table 2).

These findings could be confirmed by the World Banks Doing business report. However, the World Bank’s Enterprise Surveys put a light on the institutional framework of the country as the binding constraint for growth: 31.3% of Macedonian firms identified practices of the informal sector as major constraint for growth; 5.7% of firms identified courts as major constraints for growth; 5.4% identified crime,

theft and disorder and 6.8% identified political instability as major constraint for growth. These four constraints together present the institutional framework and functioning of the law system in the country and in total 47.4% of Macedonian firms identified them as the key binding constraint in Macedonia. Regarding this constraints several important remarks could be made:

- A) The Macedonian informal economy is larger than those in all of the EU28 countries according to Schneider (2011) data. He found that country's informal economy is equivalent to 34.9% of GDP. In addition, Williams et al. (2013) argue that in the country most affected by the practices of the informal sector are small and medium-sized businesses, and non-exporting and domestically owned businesses.
- B) The courts are not independent. Figure 2 presents the index of judicial independence of the Macedonia and other SEE countries, together with Germany as benchmark country. It is Economic Freedom of the World (2013) index, which can take a value from 1 to 10, where 1 means that the judiciary is strongly influenced by members of government, citizens or firms, and a value of 7 or more means that the judiciary is completely independent. Macedonia has the index value of 3.1, which is the second lowest index value in the region.

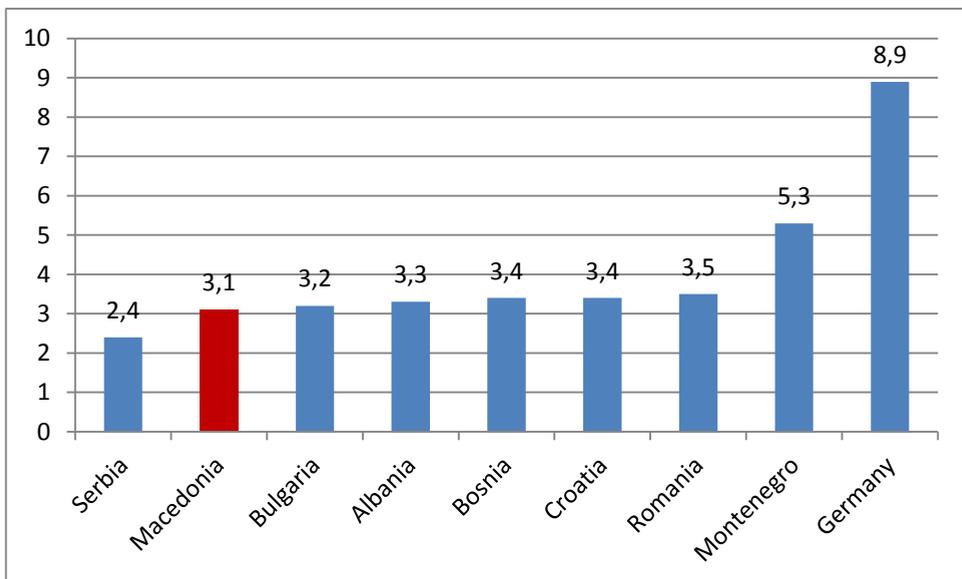


Figure 2 Index of judicial independence, 2010

Source: Economic Freedom of the World (2013).

- C) The crime theft and disorder could be seen through the prism of the political patronage. In the country exists specific system of political patronage, which divides the society on four irreconcilable parts represented by four major political parties (two Macedonian and two Albanian). One Macedonian party and one Albanian party usually take part in government and citizens expect to benefit from patronage when their party comes to power (from the misuse of state resources).
- D) The political instability has two different aspects. The first is too frequent changes in laws and bylaws. The law system is exercising significant changes every time with the shift in the Government. The examples of the frequency of amending the crucial economic laws demonstrate the unpredictability and uncertainty in the law system, which have negative influence for market economy: the Law for Value added tax was amended 15 times in 13 years, the Law on Income tax was changed 22 times in a period of 19 years and Profit Tax was amended 17 times in 20 years, the Law on energy faced 11 different versions for 16 years, as well as the reform of the capital financed pension system was followed by 12 law changes in 11 years.

The last analysed are the market failures. Regarding information externalities Macedonia's export structure is highly concentrated. Export of iron and steel, textiles, food, beverages and tobacco, all account for about 60% of the total (Gutierrez, 2007). The main characteristics of Macedonia's export are: (1) low level of products processing (mainly intermediate goods and raw materials); (2) big exporter work in traditional industries, with price as a primary driver of competitiveness; (3) dependency from the import of raw materials. Moreover, the share of Macedonia's exports has increased, for it has specialized, but these are sectors with a declining share in the world manufacturing trade (Gutierrez, 2007). The investment in research and development of Macedonian firms almost does not exist. With respect of a second failure, the recent global crisis shows serious coordination problems between small- and medium-sized enterprises and the government. Economic policy has lagged behind the needs of the SMEs sector. However, market failures could be in focus for the key binding constraint in the country when the functioning of the legal system will be solved.

5. CONCLUSIONS

The goal of this paper is to propose reform priorities for Macedonia's economy. The analysis is based on a growth diagnostic analytical framework proposed by Hausmann et al. (2005). The idea of that analytical framework is to identify the most binding constraints for growth. It starts by focusing not on specific distortions, but on the proximate determinants on economic growth. A process of elimination helps in identifying binding versus nonbinding constraints. The low level of private investment is considered as the key element for unsatisfactory economic growth. This approach to economic growth is contrary to the prevailing approach in the country today, which is a "laundry-list" approach ("any reform is good"; "the more areas reformed, the better"; and "the deeper the reform in any area, the better"). In order to identify the constraints of growth in Macedonia, comparisons have been made with other SEE countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Romania, and Serbia) and with the averages for the SEE, CEE and EU countries. The analysis covers the period from 2004 to 2011.

The level of private investment activity in Macedonia is found to be the lowest in the region. The growth diagnostics suggests that the distortions in the functioning of the legal and regulatory system are the key binding constraint for growth. It is abused by the ruling political elites. The majority of Macedonia's firms point out that the widespread practices of the informal sector, the insufficient independence of court system from political influence, as well as the presence of crime, theft and disorder, and political instability as the major constraints for growth. In addition, the country's infrastructure, human capital and information externalities, are found to be constraints for growth in the near future. However, any reform must focus on solving the problems in the functioning of the legal system. It does not matter if there is a plenitude of cheap credit for firms, or if the transport and energy infrastructure are improved significantly, because the political elite through its institutions will distort the functioning of the market, with economic activity remaining locked. It is not sufficient to adopt new laws and to change the existing ones; the key is the implementation of laws through independent courts and regulatory institutions. The independent and credible institutions may well be the precondition for fair market competition and for proper incentives for long-term investment in the private business sector. Investors dislike legal and regulatory uncertainties, as well as instability and insecurity. An open issue for future research may be an econometric investigation of the functioning of the legal system in the country and its influence on the economy.

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APPENDIX

Growth Diagnostics Studies: Main Binding Constraints

Country	Study	Main Binding Constraints
Africa		
Morocco	World Bank, 2005	Combination of specific government and market failures
Egypt	Enders, 2007	Inefficient bureaucracy
South Africa	Dube et al., 2007	Poor export performance; historic specialization in mining and location in the global product space; low competition; labour market regulations
Uganda	World Bank, 2007	Under-investment in infrastructure
Kenya	World Bank, 2008	Institutions are inefficient, do not deliver effectively
Congo	Ulloa et al. 2009	Institutions
Malawi	Lea and Hanmer, 2009	Regime of exchange rate management
Togo	Lundstrom and Garrido, 2010	Costly and cumbersome business procedures; political instability; corruption; poor budget execution and mismanagement of state enterprises

Country	Study	Main Binding Constraints
Ghana	Lejarraga, 2010	Burdensome regulations governing factors of production, notably the redundancy of workers
America		
El Salvador	Hausmann and Rodrick, 2005	Market failures
Belize	Hausmann and Klinger, 2007	Access to finance
Bolivia	Calvo, 2006	Macro and micro risks
Paraguay	Hausmann et al., 2007	The provision of infrastructure; a lack of appropriability due to corruption and a poor regulatory environment
Brazil	Hausmann, 2008	Domestic saving; it has a fiscal cause
Argentina	Sanchez and Butler, 2008	Governmental failures
Colombia	Melendez and Harker, 2008	Cessation of paramilitary violence; cost of financing
Peru	Hausmann and Klinger, 2008	Real exchange rate and coordination failures
Asia		
China and India	Li et al., 2011	China: access to finance and higher regulatory burden India: infrastructure and labour flexibility
Mongolia	Ianchovichina and Gooptu, 2007	Costly and unreliable transportation services; lengthy and complex transport procedures; distortionary taxes; coordination failures; corruption
Afghanistan	Ulloa, 2008	Property rights, taxation; corruption
Afghanistan	Lea et al., 2011	Insecurity
Pakistan	Qayyum et al., 2008	Governance failure; institutional shortcomings
Bangladesh	Rahman and Yusuf, 2009	Infrastructure; international trade and cumbersome regulations
Nepal	Asian Development Bank, 2009	Policy instability; corruption; crime and consequent insecurity; extortion from private business
The Philippines	Asian Development Bank, 2007	Tight fiscal situation; inadequate infrastructure; corruption and political instability; small industrial base
Aceh, Indonesia	World Bank, 2009a	Illegal extortion; security concerns of potential investors
Cambodia	World Bank, 2009b	Macroeconomic stability; trade facilitation; reducing labour disputes
Cambodia	Hang, 2011	Infrastructure
Georgia	Babych and Fuenfzig, 2012	Political and institutional stability; risks of reform reversal
Europe		
Moldova	Bozu et al., 2007	Roads' infrastructure; problematic legal and administrative environment for firms
Moldova	BenYishay and Wiebe, 2009	In addition, costs of finance
Croatia	Moore and Vamvakidis, 2007	Administrative burden; legal uncertainties; corruption
Kosovo	Sen and Kirkpatrick, 2011	Costs and access to finance; poor provision of public goods; weaknesses in the rule of law

Source: Authors' listing.



MODELING THE FREQUENCY OF CLAIMS IN AUTO INSURANCE WITH APPLICATION TO A FRENCH CASE

Mihaela DAVID*

Abstract: *The aim of this paper is to present the different models for count data used in the actuarial literature. In addition to the Poisson regression, Negative Binomial and Zero-Inflated models are applied to an auto insurance portfolio of a French insurance company. Statistical tests to evaluate the performance of the models are explained taking into consideration the difference between the nested and the non-nested models. The comparison between the nested models is performed using specification tests and the Vuong test is used to compare the fitting of non-nested models.*

Keywords: *Frequency of claims, count data models, over dispersion, zero inflation, models comparison, specification tests, Vuong test*

JEL Classification: G220

1. INTRODUCTION

In the context of a risk based civilization (Ladeg, 1981), the request of protection has become more pronounced, having as response the guarantee of financial security against possible losses. Thus, the emergence and development of insurance business are related to the urgent need to protect the individuals and their assets against a possible loss on a particular event.

The entire process of insurance consists in offering an equitable method of transferring the risk of a contingent or uncertain loss in exchange for payment. Considering that not all the risks are equal, an insurance company should not apply the same premium for all insured risks in the portfolio.

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The necessity of different charging tariffs is emphasized by the insurance portfolio heterogeneity that leads directly to the so-called concept of adverse selection that could undermine the solvency of the insurance company. This basically presumes charging same tariff for the entire portfolio, meaning that the unfavorable risks are also assured, at a lower price, and as an adverse effect, it discourages insuring medium risks. The idea behind non-life insurances pricing comes precisely in an attempt to combat the adverse selection. Therefore, it is extremely important for the insurer to divide the insurance portfolio in sub-portfolios based on certain influence factors. In this way, the policyholders with similar risk profile will pay the same reasonable insurance premium.

A usual method to calculate the premium is to multiply the conditional expectation of the claim frequency with the expected cost of claims or economic loss. Therefore, modeling frequency of claims, also known in theory as count data, represents an essential step of non-life insurance pricing. Count regression analysis allows identification of risk factors and prediction of the expected frequency of claims given the characteristics of policyholders (Boucher and Guillén, 2009).

The literature on count regression analysis has developed considerably in the past years. Within non-life insurance domain, it has been demonstrated that the techniques used to estimate the frequency of claims have an a priori Poisson structure. In actuarial literature, the Poisson model is presented as the modeling archetype of the “event counts” (Antonio and Valdez, 2012). In many papers (Denuit and Lang, 2004; Dionne and Vanasse, 1982, 1992; Gourieroux and Jasiak, 2004; Yip and Yau, 2005), the Poisson model is considered the main tool to model the claim frequency in non-life insurance.

Although it offers the favorable statistical support, the Poisson model presents significant constraints (Boucher et al., 2005) regarding the dependency between the explained variable (frequency of claims) and risk factors. The limit imposed by the Poisson regression is a particular form of heteroskedasticity (Cameron and Trivedi, 1998) caused by the equality between the conditional mean and the conditional variance of the dependent variable. This also highlights that the values of the estimated variances are superior to the estimated means, resulting a high level of dispersion, known as overdispersion. This can be caused by the omission of some explicative variables, a model specification errors or a heterogeneous analysis framework (Allain and Brenac, 2012).

The restrictive nature of the Poisson model has sustained the development of numerous techniques used to detect (Lee, 1986; Cameron and Trivedi, 1990; Gurmu, 1991; Charpentier and Denuit, 2005) and model (Hausman, Hall and Griliches, 1984; King, 1989; Cameron and Trivedi, 1998) the overdispersion. The alternative model used most frequently in order to correct the overdispersion is known as the Negative Binomial model. This model consists of a simple and efficient technique that overcomes the limits of the Poisson model and offers results qualitatively similar (Vasechko, Grun-Réhomme and Benlagha, 2009).

In auto insurance domain there are frequent the cases of policyholders who are not reporting any claim and therefore the insurance portfolio contains a large number of zero values. In order to respond to the importance of these values and the heterogeneity of the population comprising the policyholders without any accidents declared, the literature presents the Zero-Inflated Poisson model (ZIP) and Zero-Inflated Negative Binomial model (ZINB).

Some actuarial researches (Cameron and Trivedi, 1998; Charpentier and Denuit, 2005; Denuit et al., 2007) give a comprehensive image concerning the count regressions applied to model the claim frequency in auto insurance. In a paper analyzing cross-sectional insurance data (Boucher, Denuit and Guillén, 2007), the Poisson and ZIP models are compared, but the authors do not insist on determining the probability of risk occurrence considering the risk factors. In another study, the authors compare the fitting of Zero-Inflated models using the Vuong statistic and the selection procedures based on the information criteria. For longitudinal or panel data, there can be consulted some relevant papers (Boucher and Denuit, 2008a, 2008b; Antonio et al., 2010), in which the authors analyze and demonstrate the practical usefulness of Negative Binomial and Zero-Inflated models. Other study (Boucher, Denuit and Guillén, 2009) demonstrate that ZIP regression is a satisfactory alternative to determine the predictive frequency of claims taking into account the history of each insured.

Based on all these studies, it can be concluded that this type of claim frequency modeling depends on each insurance portfolio and on the risks factors included in the analysis. In other words, the best model that explains the variation of claim frequency may be different from an insurance portfolio to another and from one insurance company to another.

In consonance with this observation, the objective of this paper is to find the optimal model to estimate the claim frequency for a French auto insurance company. In order to select the model that provides the best fit for the auto insurance data, there are compared the count models proposed in actuarial literature by using some specification tests.

This empirical approach presents facts from a new perspective as it relates to a French auto insurance portfolio comprising more current data and also some different risk factors in comparison with other similar studies. In addition, this empirical exercise permits the adoption of an optimal insurance pricing policy in order to reach a balance between the price paid by insured and the risk faced by insurer.

In this purpose, the structure of the paper is as follows. Section 1 presents a brief literature review on count data models and describes the data used in the numerical applications of this paper. Sections 2 and 3 present some methodological aspects of count data models and explain the reasons why these regression models are used. Each of these sections includes a numerical application followed by discussion and results interpretation. In section 4 statistical tests to compare fitting of the count data models are explained. Concluding remarks are summarized in Section 5.

1.1. Data used

In this paper, the data used constitute a French auto insurance portfolio comprising 77088 policies registered during the period 2007-2009. An insurance policy corresponds to one insured and the elements included in the policies are the analysis factors presented in Table 1.

Except the explained variable, the *frequency of claims*, the other ones are known a priori by the insurer and are used to customize the profile of each insured. These exogenous variables are considered risk factors that reflect the characteristics of insured (*age, profession*), the features of vehicle (*type, category, purpose of vehicle usage*) and the characteristics of insurance contracts (*age, bonus-malus coefficient*).

Table 1 List of variables

Variable	Type	Description	Values
NSIN	Num	Frequency of claims	From 0 to 3 claims
CalYear	Num	Observation year	2007 2008 2009
Age	Num	Age of insured	From 18 to 75 years
Occup	Char	Occupation of insured	Employed Housewife Retired Self-employed Unemployed
Type	Char	Type of vehicle	A B C D E F
Categ	Char	Category of vehicle	Large Medium Small
Use	Char	Purpose of vehicle usage	Private Professional
BM	Num	Bonus-malus coefficient	From -50 to 150
Poldur	Num	Age of insurance contract	From 0 to 15 years

Among the explanatory variables introduced in the analysis, the *purpose of vehicle usage* and the *category of vehicle* represent risk factors that are not often found in similar studies. Beside these, the *bonus-malus coefficient* presents a particular interest. This coefficient assumes the increase or decrease of insurance premium depending on the number of claims registered by an insured during a reference period. Hence, if the policyholder does not cause any responsible accident, he receives a *bonus*, meaning that the insurance premium will be reduced. Otherwise, if the insured is responsible for the accident, he is penalized by applying a *malus*, which will have the consequence of a premium increase.

These increases and decreases are based on a standard tariff defined by the insurer, depending on which the premium is multiplied by a coefficient. The basic coefficient is 1 and it corresponds to the reference premium of the insurance company. If the bonus-malus coefficient is lower to this value, a bonus is applied, and if it is higher, a malus is considered. More specifically, the French bonus-malus system involves a malus of 25% for a claim declared and a bonus of 5% for the non-declaration of any claims in the reference period, usually a year. In this way, the system aims the encouragement of prudent insured drivers and the discouragement of those who, for various reasons, register sever losses.

In the studied portfolio, the calculations corresponding to the bonus-malus coefficient are already generated, registering negative and positive values respectively, which indicate a decrease or an increase of the insurance premium.

2. STANDARD COUNT DATA MODELS

2.1. Overview

Poisson Model

The statistical analysis of count data, known in the econometric literature as “rare events” (Cameron and Trivedi, 1998) has a long and rich history. The Poisson distribution was derived as a limiting case of the binomial distribution by Poisson (1837) and exemplified later by Bortkiewicz (1898) in the famous study regarding the annual number of deaths caused by the mules’ kicks in the Prussian army.

The discrete random variable Y (*frequency of claims* or *observed number of claims*), conditioned by the vector of explanatory variables X_i (the risk factors), is assumed to be Poisson distributed. Therefore, for the insured i , the probability that the random variable Y_i takes the value y_i ($y_i \in \mathbf{N}$), is given by the density:

$$f(Y_i = y_i | x_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!}. \quad (1)$$

The Poisson distribution implies a particular form of heteroskedasticity, leading to the equidispersion hypothesis or the equality between the mean and variance of claim frequency:

$$E(y_i | x_i) = V(y_i | x_i) = \lambda_i = e^{x_i' \beta}. \quad (2)$$

In insurance practice, due to the presence of some extreme values, the equidispersion assumption imposed by Poisson model is often violated. The estimated variance of claim frequency exceeds (overdispersion) or is less than the estimated mean (underdispersion). The first situation is the most frequent and it is being translated as a high level of dispersion of the dependent variable. This problem, inherent to the Poisson model, implies the underestimation of standard deviations of the estimated parameters, which leads to the rejection of the null hypothesis according to which the regression coefficients are not statistically relevant (Vasechko, Grun-Réhomme and Benlagha, 2009).

Negative-Binomial Model

The actuarial literature presents many studies that model the frequency of claims through the Negative Binomial regression (NB), being considered one of the most practical and effective alternative method in order to correct the overdispersion.

Many studies with a relevant impact in auto insurance domain showed that the NB model is more appropriate to analyze insurance count data.

This model assumes the introduction of a dispersion parameter (k) which allows the abstraction of the unobserved heterogeneity of the endogenous variable. For the NB model, the probability mass function is given by:

$$f(y_i|x_i) = \frac{\Gamma(y_i+1/k)}{\Gamma(y_i+1)\Gamma(1/k)} \left(\frac{1/k}{1/k+\lambda_i}\right)^{1/k} \left(\frac{\lambda_i}{1/k+\lambda_i}\right)^{y_i}. \quad (3)$$

The estimation of k parameter is performed by the iterative method introduced by Cameron and Trivedi (1996). The two first moments of the NB distribution are:

$$E(y_i|x_i) = \lambda_i = e^{x_i'\beta}; V(y_i|x_i) = \lambda_i(1 + k\lambda_i). \quad (4)$$

Clearly, in the case of NB distribution the conditional mean is lower than the conditional variance. The Poisson distribution is obtained with $k=0$, which means that the Poisson regression is a special case of the NB model. Therefore, the last one may be reduced to the standard Poisson regression when the dispersion parameter tends to zero (Molla and Muniswamy, 2012).

2.2. Numerical application

The variables described in subsection 1.1 are considered risk factors and the models are estimated using the SAS 9.3 system with GENMOD procedure. The Type 3 analysis, generated by using this procedure enables to evaluate the contribution of each variable taking into consideration all the others exogenous variables.

For Poisson model, the results of the Type 3 analysis are presented in Table 2. It can be observed that the variable denoting the *category of vehicle* is not statistically significant as it yields a *p-value* of 0.2644 greater than the risk α of 0.05. In consequence, this variable is excluded from the model and the analysis will continue in the same manner until it is obtained the optimal combination of factors (*p-value* < 0.05) which can explain the variation of claim frequency. After excluding from the regression model the non significant factors (*category of vehicle*) it is noticed that all the other explanatory variables are now statistically relevant, which clearly underline their influence on the frequency of claims.

Table 2 LR Statistics For Type 3 Analysis

	Poisson Regression ^(*)		Poisson Regression ^(**)	
	Chi-Square	Pr > ChiSq	Chi-Square	Pr > ChiSq
CalYear	10.00	0.0067	9.97	0.0068
Age	1014.41	<.0001	1048.77	<.0001
Occup	186.67	<.0001	187.01	<.0001
Type	116.67	<.0001	116.60	<.0001
Categ	3.32	0.1902	-	-
Use	36.54	<.0001	36.70	<.0001
BM	1081.72	<.0001	1081.24	<.0001
Poldur	79.86	<.0001	79.76	<.0001

(*) Poisson regression including all the explanatory variables

(**) Poisson regression including only the significant explanatory variables

The NB regression is based on the same explanatory variables of claim frequency, leading to similar results as the ones from the Poisson regression. Therefore, analyzing the results from Table 3, it can be observed that the estimated values are slightly different from those obtained for the Poisson model.

Table 3 Analysis Of Parameter Estimates

Parameter	Poisson	NB	ZIP		ZINB	
			Logit	Poisson	Logit	Poisson
Intercept	-0.3014	-0.3404	-1.2619	-0.0458	-1.9912	-0.3114
Calyear (2007)	-0.0956	-0.0928	-0.3427	-0.1441		-0.0926
Calyear (2008)	-0.0223	-0.0204	-0.0122	-0.0231		-0.0208
Age	-0.0433	-0.0424	-0.0332	-0.0241	-0.0272	-0.0405
Occup (employed)	-0.3361	-0.3337	0.2248	-0.3003	1.0923	
Occup (housewife)	-0.4112	-0.4102	0.2212	-0.3776	1.2288	
Occup (retired)	-0.0452	-0.0578	0.9238	0.0633	0.8749	
Occup (self-employed)	-0.0152	-0.0136	-0.0910	-0.0272	0.0181	
Type (A)	-0.3558	-0.3524		-0.3583		-0.3537
Type (B)	-0.3573	-0.3529		-0.3576		-0.3508
Type (C)	-0.3081	-0.3056		-0.3125		-0.3062
Type (D)	-0.1124	-0.1079		-0.1160		-0.1132
Type (E)	-0.0386	-0.0354		-0.0402		-0.0365
Use (private)	0.1792	0.1793		0.1521		0.1551
CRM	0.0074	0.0075	-0.0540	0.0040	-0.0499	0.0040
Poldur	-0.0254	-0.0255		-0.0255		-0.0255
Log Likelihood (LL)	-19910.6	-19876.1		-19796.9		-20227.6

3. ZERO-INFLATED MODELS

3.1. Overview

The Zero-Inflated models approach as alternative to treat the excess of zero values has presented a particular interest for the econometric research in the past years. Transposed in auto insurance domain, the approach of Zero-Inflated models consists in using, on one hand, the logistic regression to determine the probability that an insured does not report any claim, and on the other hand, the Poisson or NB model is used to establish the number of claims in case the insured declares all the accidents to his insurer. According to the reality of studied data, the insured population for which the number of claims observed is equal to zero can be divided into two sub-populations (Vasechko, Grun-Réhomme and Benlagha, 2009). The policyholders from the first category will report the risk occurrence to the insurance company. In this case, the zero values suggest that the insured has no accident recorded during the reference period. The insureds from the second category do not report the accidents, of which they are responsible, by trying to avoid the penalty imposed by the bonus-malus system,

Poisson and NB models do not allow the distinction between these two sub-populations. In contrast, ZIP (Lambert, 1992) and ZINB models (Green, 1991) generate two separate models, indicating that zero values and those strictly positive are not produced by the same process. In this regard, the observed random variable (Y) is the product of a binary distribution and the Poisson (ZIP model) or NB distribution (ZINB model): $Y = BY^*$.

The unobserved random variable B is modeled through a logistic regression in order to determine the probability that y_i takes the value zero. In this context, the interpretation of the result $b_i = 0$ implies that the insured did not declare any accident to the insurance company, and the result $b_i = 1$ indicates that the insured has reported one or more claims during the considered period. The random variable Y^* corresponds to Poisson or NB model and it is used to predict the value of Y for those policyholders who reported at least one claim (Vasechko, Grun-Réhomme and Benlagha, 2009). The both steps generated by the Zero-Inflated models can be explained by different risk factors.

Zero-Inflated Poisson Model

For the ZIP model, considering π_i the probability that $b_i = 0$ (no claim reported) and λ_i the parameter of the Poisson distribution for the claim frequency, which depends on a certain number of risk factors or independent variables, the density function of Y is given by:

$$P(Y_i = y_i | X_i) = \begin{cases} \pi_i + (1 - \pi_i)e^{-\lambda_i}, & y_i = 0 \\ (1 - \pi_i) \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!}, & y_i > 0 \end{cases}, \quad (1 - \pi_i) = P(Y_i \sim P(\lambda_i)). \quad (5)$$

The conditional mean and variance are defined through the relations:

$$E(Y_i | X_i) = (1 - \pi_i)\lambda_i; \quad V(Y_i | X_i) = (1 - \pi_i)(1 + \lambda_i \pi_i)\lambda_i. \quad (6)$$

Zero-Inflated Negative Binomial Model

The ZINB regression is another effective method to treat the overdispersed data. Similarly to ZIP regression, ZINB model is defined by a two-steps process, having the probability mass function:

$$P(Y_i = y_i | X_i) = \begin{cases} \pi_i + (1 - \pi_i) \left(\frac{1/k}{1/k + \lambda_i} \right)^{1/k}, & y_i = 0 \\ (1 - \pi_i) \frac{\Gamma(y_i + 1/k)}{\Gamma(y_i + 1)\Gamma(1/k)} \left(\frac{1/k}{1/k + \lambda_i} \right)^{1/k} \left(\frac{\lambda_i}{1/k + \lambda_i} \right)^{y_i}, & y_i > 0 \end{cases}. \quad (7)$$

The conditional mean and variance are given as follow:

$$E(Y_i | X_i) = (1 - \pi_i)\lambda_i; \quad V(Y_i | X_i) = (1 - \pi_i)(1 + \lambda_i(\pi_i + k))\lambda_i. \quad (8)$$

3.2. Numerical application

To respond to the importance of zero values inflation present within the analyzed portfolio, the study continues with the approach of ZIP and ZINB models described previously. The same GENMOD procedure is used and the results obtained are presented in Table 3.

For ZIP model, the probability that the insured does not declare any claim during the considered period is explained by the exogenous variables: *observation year*, *age* and *occupation of the insured* and the *bonus-malus coefficient*. On the other hand, the risk factors that influence the probability that the insured declares at least one accident coincide with the explanatory variables introduced in the Poisson regression. Similarly to ZIP model, it is noticed that the process steps generated through the ZINB model are not depending on the same explanatory variables. The first step, which allows predicting the probability that the claim frequency is zero, is

highlighted by the variables *age* and *occupation of insured*, *purpose of vehicle usage*, *bonus-malus coefficient* and *age of the insurance contract*. The approach of the NB model, which describes the second step of the ZINB model, suggests that *observation year*, *age of insured*, *type* and *purpose of vehicle usage* and *bonus-malus coefficient* are the influence factors of the probability that the claim frequency is greater than zero.

In both ZIP and ZINB models, the results for the logistic regression indicate that the probability that an insured does not report any claim increases with the *age of the insured* and decreases as the *bonus-malus coefficient* increases. For the policyholders who declared at least one accident, it is noticed that an increase in the *age of the insured* and also *of the insurance contract* determines a decrease in the probability of risk occurrence. This probability increases as *bonus-malus coefficient* increases. In other words, an insured with a higher *bonus-malus coefficient* will be tempted not to report the occurrence of an accident unlike those policyholders with a lower *bonus-malus coefficient*. These results confirm the reality of studied data, and for the last factor (*bonus-malus coefficient*) the interpretation is relevant because it reflects the past of the insured, penalizing those who reported one or more claims.

4. COMPARISON OF COUNT MODELS

4.1. Nested models

Classical hypothesis tests can be made to accept or reject some models. The three standard tests presented in the actuarial literature are the *log-likelihood ratio (LR)*, the *Cameron and Trivedi* and the *Lagrange Multiplier (LM)* tests.

Specification Tests

The literature presents numerous tests developed in order to verify the equidispersion hypothesis required by the Poisson model. In this context, Cameron and Trivedi test (Cameron and Trivedi, 1990) is based on the construction of a simple linear regression on $\hat{\lambda}_i$, excluding the intercept:

$$\frac{(y_i - \hat{\lambda}_i)^2 - y_i}{\hat{\lambda}_i} \quad (9)$$

The validation of this model implies the existence of overdispersion, meaning the rejection of Poisson regression.

Another test (Greene, 2002) for the detection of this phenomenon is based on Lagrange Multiplier test (*LM*). This statistics follows the χ^2 distribution with one degree of freedom and it is given by:

$$LM = \frac{(e' e - n\bar{Y})^2}{2u'u}, \quad (10)$$

where $u = e^{X_i'\beta}$ and $e = Y - u$.

In order to improve the Poisson model, the options that may be applied relate to the usage of a great number of variables, the reliability validation of the data or the study of a more homogeneous variable. If these improvements do not have a conclusive effect, the approach of NB model is recommended.

A standard method of comparing the two models is to use the likelihood ratio test, given by the expression: $LR = -2(LL_{Poisson} - LL_{NB})$. This statistics follows the asymptotic χ^2 distribution with one degree of freedom. A calculated value of the test higher than the theoretical value ($LR > \chi^2_{2\alpha;1}$) underlines that the NB model is chosen to the detriment of Poisson regression.

Numerical Application

In order to test the assumption imposed by the Poisson regression, the methods described above are used and the results obtained are shown in Table 4. Therefore, the validation of the regression model, built by using the method proposed by Cameron and Trivedi, leads to the rejection of the equidispersion hypothesis.

Table 4 Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	165.03808	165.03808	55.11	<.0001
Error	77087	230872	2.99495		
Uncorrected Total	77088	231037			

The overdispersion is confirm also by the *LM* statistics ($LM = 404.75$), which has a probability associated lower than the level of significance ($p\text{-value} < 0.05$). Both tests reach the same conclusions, namely the existence of overdispersion within the studied insurance portfolio. In other words, these results suggest clearly that the Poisson model must be rejected.

In order to compare the Poisson an NB models, the obtained value of the likelihood ratio test ($LR = 228.28$) is greater than the theoretical one ($LR = 1.96$). Therefore, the result highlights that NB model gives a better fit of the data in comparison with Poisson regression, being more appropriate to the observed reality.

4.2. Non-nested models tests

Information criteria

In the case of non-nested models (but also nested models) the literature proposes others adequate methods for the models comparison, namely the information criteria AIC and BIC given by:

$$AIC = -2LL + 2p \quad (11)$$

$$BIC = -2LL + p \ln(n), \quad (12)$$

Where p represents the number of parameters introduced in the regression model, n indicates the sample volum, and LL is the model log-likelihood function.

Vuong Test

The comparison between Poisson and ZIP models, NB and ZINB models respectively can be obtained by using the Vuong statistics (Vuong, 1989). This involves comparing the probabilities of observing the endogenous variable y_i that correspond to both ZIP (or ZINB) and Poisson (or NB binomial) models. Assuming that f_1 is the density function of ZIP model (or ZINB model) and f_2 is the density function of Poisson model (or NB model), the relationship between the likelihood ratios can be defined as follows:

$$m_i = \log \left[\frac{f_1(y_i)}{f_2(y_i)} \right] = \log \left[\frac{P(y_i, ZIP)}{P(y_i, Poisson)} \right]. \quad (13)$$

The Vuong statistic is based on the difference between the log-likelihood of the two models, adjusted by its standard deviation (Boucher, Denuit and Guillén, 2007). This statistic tests the hypothesis that the two models compared are equivalent ($H_0: E[m_i] = 0$) against the alternative hypothesis ($H_1: E[m_i] \neq 0$). Under the null hypothesis, the test follows a normal distribution and is given by:

$$V = \frac{\sqrt{n}\bar{m}}{s_m}, \quad \text{where } \bar{m} = \frac{1}{n} \sum_{i=1}^n m_i \quad \text{and} \quad s_m^2 = \frac{1}{n-1} \sum_{i=1}^n (m_i - \bar{m})^2. \quad (14)$$

If the absolute value of the statistic is less than 1.96, for a risk $\alpha = 0.05$, no decision can be taken concerning the choice between one of the two models. If the calculated value of the test is positive and high, the ZIP (or ZINB) model is preferred to the detriment of Poisson (or NB) model. Poisson or NB regression will be considered more adequate than the Zero-Inflated models if the calculated value of Vuong test is negative and less than 1.96.

Numerical Application

Table 5 shows the results of the distribution fit to the insurance data. Zero-Inflated Poisson distribution seems to offer the best fit using the information criteria.

Table 5 Comparison of models

Test	Poisson	NB	ZIP	ZINB
Log Likelihood (LL)	-19910.55	-19876.11	-19796.88	-20227.55
AIC	40646	40579	40437	40495
BIC	40794	40736	40668	40680
Vuong			(ZIP/POI) 7.63	(ZINB/BN) 2.78 (ZINB/ZIP) -3.08

The comparison between count models is performed through the Vuong statistic, detailed in the previous part. In the first case (Poisson and ZIP models), the calculated value of the Vuong test is greater than the theoretical one (1.96). This result shows that the ZIP regression is chosen to the detriment of Poisson model in order to estimate the frequency of claims. In the second case (NB and ZINB models), the calculated value of the test is 2.78, meaning that the ZINB model is also preferable to NB regression. Finally, comparing the ZIP and ZINB models using the same test, the result leads to the decision to reject the ZINB regression to the detriment of the ZIP regression. Hence, the results show clearly that the ZIP regression model provides the best fit to the insurance data considered in this study.

5. CONCLUSIONS

In auto insurance an accurate modeling of claim frequency is an essential part in determining the insurance premium. In this paper, it has been considered an analysis of count data models in order to estimate the frequency of claims given the observable risk characteristics.

The approach of Poisson, NB, ZIP and ZINB models is considered and it is noticed that the risk occurrence probability increases as the *bonus-malus coefficient* increases and it decreases as the *age of policyholders* and the *age of insurance contract* increase. These results show that the models are robust and, at the same time, they correspond with the reality of studied phenomenon. Concerning the other risk factors that influence the insured risk, it can be noticed that the *purpose of vehicle usage* is statically significant for all four models, while the *vehicle category* has no significant impact on the variation of claim frequency.

The performance of these models is evaluated by using the log-likelihood ratio, AIC, BIC and the Vuong statistic. Based on the obtained results of the study, the ZIP regression model improves the fit compared to the other count models. Therefore the comparative analysis of count data models suggests that ZIP model is the most appropriate to deal with the problem of overdispersion and, at the same time, to model the inflation of zero values.

From a methodological point of view, the results are particularly important because they evaluate how these methods work with real data. From a practical point of view, the results are considered representative and useful because they form a base point that can be used by the insurance company to determine a balance between the premium paid by policyholders and their corresponding degree of risk.

In other words, the econometric modeling allows to better control the risks and their impact on the insurance company business by providing a robust and reliable information to policy makers. Therefore, this econometrical illustration contributes to an accurate assessment of the insurance company liabilities leading to solvency and profitability.

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IMPROVING THE INFLATION RATE FORECASTS OF ROMANIAN EXPERTS USING A FIXED-EFFECTS MODELS APPROACH

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Abstract: *This article proposes an empirical econometric approach to improve the degree of accuracy for predictions made by Romanian experts in forecasting. Several fixed-effects models are constructed using the inflation and unemployment rate actual values and the forecasts provided by the European Commission, the National Commission for Prognosis and Dobrescu's model over 2001-2014. The predictions based on these fixed-effects models did not improve the forecasters' accuracy, but combined predictions of these models and naïve forecasts brought a statistically significant improvement for projections made by Romanian forecasters on the horizon 2011-2013. This assumption was proved by common accuracy measures and Diebold-Mariano test.*

Keywords: *accuracy, forecasts, fixed-effects model, random walk, forecast error*

JEL Classification: *E21, E27, C51, C53*

1. INTRODUCTION

The inflation rate is a key macroeconomic variable, each projection being very important for the central bank while considering the monetary policy and the decisional process in the national macroeconomic policy. The public is also very interested in inflation forecasts, the future trends influencing the inflationary expectations. The future inflation is an important anchor in the wage bargaining demarche or for nominally established contracts. The uncertainty affects the forecasts, the main purpose of the researcher being to find a suitable technique to improve the degree of forecasts accuracy.

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The main aim of this paper is to propose an econometrical approach to improve the accuracy of inflation rate forecasts in Romania by starting from the predictions that are provided by national and international experts like: European Commission (EC), National Commission for Prognosis (NCP) or Dobrescu's macro-model.

The monetary policy is based on inflation rate forecasts and the use in the decision making process of the most accurate inflation predictions will improve the quality of governmental decisions. In targeting the inflation rate the national bank should take into account the evaluation of their predictions' accuracy. With the exception of the combined predictions techniques, some proper methods proposed by Simionescu and the use of non-linear models recommended by Diebold and Mariano (Simionescu, 2013: 178, Diebold and Mariano, 2002: 138), the literature did not indicate the use of some econometric approach in order to increase the degree of accuracy for the forecasts based on it. The personal contribution in this paper is related by the proposal of an econometric technique that has not been used yet in literature in order to check the forecasts accuracy improvement. This technique is based on the panel data analysis of the experts' forecasts. The fixed-effects models are actually used to provide new forecasts. As alternative to the fixed-effects models, a panel VAR model is proposed but the forecasts based on it are outperformed by the previous models. It is interesting that the combined forecasts of these predictions and the naïve ones succeeded in improving the accuracy of the experts' forecasts.

After a short review in the literature regarding improvement of forecasts accuracy, especially for inflation rate predictions, some common accuracy measures are presented and the technique used in improving the inflation expectations in Romania. Several fixed-effects models were built starting from the actual values and from the forecasts provided by the here experts during 2001-2014.

2. THE ASSESSMENT AND IMPROVEMENT OF FORECASTS' ACCURACY

The forecasts accuracy is directly related to the process of generating forecasts more than the forecasting methods itself. There are many ways to obtain an improvement in accuracy by making judgmental adjustment or by applying statistical methods (Armstrong, 2001:13). Since 1979, Spyros Makridakis and Michèle Hibon organized several forecasting competitions (M-Competitions). The forecasting experts analyzed 1001 time series in M1-Competition, 29 in M2

Competition, and 3003 in the M3-Competition (Makridakis, Chatfield, Hibon, Lawrence, Mills, Ord, Simmons, 1993:46.).

The macroeconomic forecasts accuracy assessment has many advantages like: improvement of decision making process, improving the macro-economic policies, improvement of forecasting methods, the portfolio choice in finance. In this study the accuracy assessment is used to indicate the best institution/method that provided the most accurate predictions. The disadvantage is that we make the assumption that these accurate predictions will continue to be the best on short horizon.

In our study we start from forecasts provided by experts. These are institutions with recognized forecasting preoccupations and we make the assessment of their predictions' accuracy. The forecasts accuracy is usually assessed for the predictions provided by different international institutions like OECD (Ash et al. 1990:15; Koutsogeorgopoulou, 2000:80) or IMF (Barrionuevo, 1993:2; Artis, 1996:13; Loungani, 2001:56). The common approach in these studies is to compare the forecasts to those of other institutions to those based on other models.

Our approach continues with the comparisons of forecasts in terms of accuracy. A frequently issue analysed in literature refers to the comparison of the judgmental predictions accuracy with the model-based predictions accuracy. For IMF predictions of GDP the model-based ones are better than judgmental forecasts (Batista and Zalduendo, 2004:15). The same conclusion was obtained comparing IMF's prediction with forecasts based on time-series estimations for seven industrial countries in the period from 1971 to 1991. (Barionuevo, 1992:47).

The experts' forecasts and those based our econometric techniques are compared to naïve forecasts that uses random walk. Many authors have shown that the inflation forecasts based on simple method performed better than those based on complex forecasting methods. For short-run forecasts of inflation the ARIMA forecasts for inflation in Australia performed better than VAR predictions (Fritzer et al., 2002:5). The superiority of forecasts based on autoregressive model was also proved by other studies (Hubrich, 2005:78, Atkenson and Ohanian, 2001: 47, Stock and Watson, 1999: 89.)

Comparisons between forecasts based on different econometric models are frequently analysed in literature. The indirect predictions for inflation rate in Australia were more accurate than the direct ones, the forecasting models being: factor models, ARIMA and VAR models (Moser et al., 2004: 98). The indirect

approach gave better results also for Netherlands when the forecasting methods were: VECM, VAR and AR models (Den Reijer and Vlaar, 2006: 67). The indirect forecasts were more accurate also for euro zone monthly inflation predictions (Hubrich, 2005:55). For USA inflation the aggregation of inflation components forecasts generated more accurate predictions than the direct approach (Bermingham and D'Agostino, 2010:159). For volatility more alternative forecasts can be proposed if different models are used, but the accuracy criterion will indicate the best model (Asandului, 2012:180, Ksaier and Cristiani-D'Ornano, 2010: 146).

Actually, our main goal is to find a suitable empirical strategy to improve the inflation rate forecasts for Romania. Some strategies to improve the IMF forecasts by evaluating the directional accuracy and making suitable revisions for the predictions were proposed in literature (Timmermann , 2006: 74). Some recommendations were formulated by (Faust, 2013:175). He showed that it is very important to clarify the nature and main objectives of the forecasts. Moreover, he advised for the implementation of a standard system of on-going assessment.

We will employ in this study a very used technique in literature for constructing new forecasts that may have or not a higher degree of accuracy. The assumption should be check by assessing the accuracy. In many studies, combined forecasts are very common technique to improve the degree of accuracy in predicting. Combined forecasts that used VAR models brought an obvious improvement of forecasts' accuracy (Lack, 2006:13). Combined forecasts of recursive and rolling forecasts improved in many cases the accuracy by minimizing the mean squared error (Clark and McCracken, 2009:19). There were combined experts' point forecasts and for density forecasts the logarithmic method was better than the simple linear technique (Wallis, 2011:12). The combined predictions of SPF and ECB forecasts were made under performance-based weighting, trimmed averages, principal components analysis, Bayesian shrinkage, and least squares estimates of optimal weights. The accuracy of inflation rate forecasts was improved using equally weighted average prediction (Genrea, Kenny, Meylera and Timmermann, 2013: 33). A combination technique was proposed as method for improving the OECD forecasts made for GDP in the G7 countries. The accuracy assessment of these predictions supposed the application of qualitative and quantitative techniques (Allan, 2012: 38).

For the inflation rate studies there are many recent studies that assessed the predictions accuracy, like in our study. It was studied the forecasts accuracy of the predictions provided by European Commission before and during the recent economic crisis. These forecasts were compared with those provided by Consensus Economics, IMF and OECD. The Commission's forecasts errors have increased because of the low accuracy from 2009 for variables as GDP, inflation rate, government budget balance, and investment (González Cabanillas and Terzi, 2012: 45). The forecasts' accuracy for inflation and real GDP growth rate was analyzed in case of the Germany predictions made by OECD and 3 professional forecasters from Germany. In the last 10 years, the accuracy forecasts for Germany's inflation and GDP did not improved too much (Heilemann and Stekler, 2013: 237). Strategic behavior of the private forecasters that placed their expectations away from OECD's and IMF's ones was described, the duration of this event being 3 months (Frenkel, Rülke and Zimmermann, 2013: 222). Greenbook inflation forecasts are more accurate than those of the private forecasts, the authors making comparisons between the predictions provided by Survey of Professional Forecasters, Greenbook and other private forecasters (Liu and Smith, 2014: 134). It was analyzed the IMF forecasts' accuracy, concluding that there is a qualitative statistical analysis, but the researches were not too documented in some fields like: reference period, comparisons with previous studies, the review of changes, management response (Freedman, 2014: 48).

In Romania this field of research is almost inexistent, with the exception of several studies conducted by a researcher from the Institute for Economic Forecasting from Romania that proposed as methods of improving the Romanian forecasts accuracy: the historical errors method, the econometric filtering, the use of resampling technique (Simionescu, 2013:203). For example, the GDP deflator is predicted starting from econometric models of historical errors of forecasts based on Dobrescu macromodel. Econometric models were built for real errors, absolute ones and squared errors of Dobrescu predictions of 1997-2008. The forecasts errors of GDP deflator for 2009, 2010 and 2011 are lower in all cases than those based on Dobrescu macroeconometric model, the accuracy indicators being a proof of this. But, only the forecasts based on absolute errors are superior to naïve forecasts. This econometric approach for historical forecasts errors is a very good strategy for improving the experts predictions (Bratu (Simionescu), 2013: 72).

$\hat{X}_t(k)$ is the predicted value of the variable X after k time periods compared to the origin t. The forecast error corresponding to the moment (t+k) is: $e_t(t+k)$ being computed as the difference between the effective value and the predicted one.

Some accuracy indicators are evaluated for the proposed forecasts:

Root Mean Squared Error (RMSE)

$$RMSE = \sqrt{\frac{1}{n} \sum_{j=1}^n e_x^2(T_0 + j, k)} \quad (1)$$

Mean error

$$ME = \frac{1}{n} \sum_{j=1}^n e_x(T_0 + j, k) \quad (2)$$

A positive value of this indicator indicates that the predictions are in average lower than the real values, while a negative one supposes overestimated forecasts.

Mean absolute error (MAE)

$$MAE = \frac{1}{n} \sum_{j=1}^n |e_x(T_0 + j, k)| \quad (3)$$

Theil (1966) proposed the calculation of U statistic that considers the changes in the negative and positive sense of the variable:

U Theil's statistic can be computed in two variants.

The following notations are used:

- a- the actual values
- p- the predicted values
- t- time index
- e- error (e=a-p)
- n- horizon length

U1 Theil's coefficient is used to make the comparison of two forecasts based on the same forecasting method or based on different methods.

$$U_1 = \frac{\sqrt{\sum_{t=1}^n (a_t - p_t)^2}}{\sqrt{\sum_{t=1}^n a_t^2 + \sum_{t=1}^n p_t^2}} \tag{4}$$

A value close to zero for U_1 implies a higher accuracy.

U_2 Theil's coefficient used to make comparisons with the forecasts based on random walk (naïve predictions).

$$U_2 = \sqrt{\frac{\sum_{t=1}^{n-1} \left(\frac{p_{t+1} - a_{t+1}}{a_t}\right)^2}{\sum_{t=1}^{n-1} \left(\frac{a_{t+1} - a_t}{a_t}\right)^2}} \tag{5}$$

If $U_2 = 1 \Rightarrow$ no differences between forecasts

If $U_2 < 1 \Rightarrow$ the forecast to compare is better than the naïve one

If $U_2 > 1 \Rightarrow$ the forecast to compare is worse than the naïve one

The Diebold and Mariano (1995) test (DM test) has the null assumption that there are not differences between predictions degrees of accuracy.

Stage 1: The computation of the difference between squared errors of forecasts

(e^2) - squared errors of the first type of forecasts

(e^{*2}) -squared errors of the second type of forecasts

$$d_{t,t} = (e_{t,t}^2) - (e_{t,t}^{*2}) \tag{6}$$

Stage 2: The model

$$d_{t,t} = \alpha + \varepsilon_t \tag{7}$$

Stage 3: The intercept significance is checked using t test. A null intercept from statistical point of view implies differences between predictions.

3. IMPROVING THE EXPERTS' FORECASTS ACCURACY

The data are represented by the actual inflation and unemployment rates registered over the period from 2001 to 2013. In the period from 2001 to 2007, the inflation rate in Romania has known a continuous decrease. In 2008, when the crisis

effects begin to reveal, the inflation rate has increased with 62.19% compared to 2007. After 2008, the evolution of this indicator is marked by increases and decreases, a clear ascending or descending tendency could not be observed. For the unemployment rate in the period from 2001 to 2007, there is a clear tendency of decrease, but starting with 2008 on the basis of economic and financial crisis an irregular evolution is observed. The predictions used in this study for Romania are provided by: European Commission, National Commission for Prognosis and Dobrescu's macro-model. The predictions based on Dobrescu's model did not taken into account the effects of economic crisis, the degree of accuracy after 2009 being very low. The European Commission and the National Commission for Prognosis have anticipated quite well the effects of crisis beginning. Several fixed effects models were estimated in order to make predictions for inflation rate in Romania on the horizon 2011-2014.

Table 1 Modelling the evolution of actual inflation rate in Romania– Fixed-effect Model- Model 1(p-values in brackets)

Constant	0.0545 (0.358)
Actual Unemployment rate	-0.08524 (0.909)
Predicted inflation rate	0,6492 (0.00)
Predicted unemployment rate	-0.2574 (0.765)
Sigma (alfa)	0.2357
Sigma (eps)	0.0362
Rho	0.2977
F test that all $\alpha_i=0$	61.94 (0.0281)
R-squared within	0.8531
R-squared between	0.6869
R-squared overall	0.8067
Correlation (α_i , x beta)	-0.2044
Pesaran's test of cross sectional independence	0.690 (0.4899)
Breusch-Pagan LM test of independence	9.904 (0.0194)
Modified Wald test for group wise heteroskedasticity ($H_0: \sigma(i)^2 = \sigma^2$ for all I)	4.27 (0.2334)

Source: author's computations

According to F test, the first fixed effects model that was proposed is valid. According to the value of interclass correlation, 29.77% of the variance is due to differences across panels. The result of Pesaran's test indicates that there is no dependence between cross-sections. The errors' homoscedasticity is checked, but not the errors' independence. For making predictions using this model we considered

the actual unemployment rate value as being the value registered in the previous period. For the prediction corresponding to 2015 we will get the value registered in 2013.

Table 2 Modelling the evolution of predicted inflation rate in Romania– Fixed-effect Model- Model 2(p-values in brackets)

Constant	-0.04037 (0.419)
Predicted Unemployment rate	0.37941 (0.539)
Actual inflation rate in the previous period	0.75388 (0.00))
Actual unemployment rate in the previous period	0.26987 (0.419)
Sigma (alfa)	0.0205
Sigma (eps)	0.0287
Rho	0.3378
F test that all $\alpha_i=0$	68.33 (0.0078)
R-squared within	0.8650
R-squared between	0.9117
R-squared overall	0.8184
Correlation (α_i , x beta)	-0.0401
Pesaran's test of cross sectional independence	-0.508 (0.6113)
Breusch-Pagan LM test of independence	15.146 (0.0017)
Modified Wald test for group wise heteroskedasticity (H0: $\sigma(i)^2 = \sigma^2$ for all I)	1.70 (0.6366)

Source: author's computations

According to F test, the second fixed effects model that was proposed is valid. According to the value of interclass correlation, 33.78% of the variance is due to differences across panels. The result of Pesaran's test indicates that there is no dependence between cross-sections. The errors' homoscedasticity is checked, but not the errors' independence.

Table 3 Modelling the evolution of actual inflation rate in Romania– Fixed-effect Model- Model 3(p-values in brackets)

Constant	0.04762 (0.386)
Predicted Unemployment rate	-0.2501 (0.737)
Predicted inflation rate	0.6496 (0.00)
Sigma (alfa)	0.02174
Sigma (eps)	0.03571
Rho	0.2704
F test that all $\alpha_i=0$	97.06 (0.0172)
R-squared within	0.8510
R-squared between	0.0001
R-squared overall	0.8107

Correlation (alfa_i, x beta)	-0.2175
Pesaran's test of cross sectional independence	0.607 (0.5436)
Breusch-Pagan LM test of independence	10.451 (0.0151)
Modified Wald test for group wise heteroskedasticity (H0: $\sigma(i)^2 = \sigma^2$ for all I)	4.69 (0.1959)

Source: author's computations

The inflation rate is predicted using the proposed fixed-effects models on the horizon 2011-2014. Then, these values are compared to the predictions made by the experts.

A panel VAR model is built as alternative to these panel data models, the variables being the predicted inflation and the predicted unemployment rate. The Arelan–Bover GMM estimator and the information criteria are employed in order to select the best lag length. The lag is 2, the AIC registered the lowest value for this lag.

Table 4 Inflation rate forecasts (%) in Romania based on experts' anticipations and fixed effects models

Year	Inflation rate predicted using NCP forecasts and:			Inflation rate predicted using EC forecasts and:			Inflation rate predicted using Dobrescu's model forecasts and:			Inflation rate based on PVAR(2) model
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	
2011	5.53	5.26	5.35	6.64	5.64	6.46	6.45	5.15	6.27	6.34
2012	5.56	4.5	2.02	5.56	4.55	1.98	5.85	4.48	2.03	3.07
2013	6.3	7.73	6.49	6.4	7.72	6.49	6.3	7.73	6.5	7.22
2014	2.57	2.69	2.78	2.74	2.69	2.26	2.83	2.69	2.63	2.87

According to U1 Theil's coefficient, the forecasts based on fixed-effects models are less accurate than the predictions made by experts. However, the fixed-effects models outperformed the random walk in terms of forecasts accuracy. All the predictions are overestimated, fact that made us to conclude that our econometric models and the anticipations based on Dobrescu's model and EC forecasts did not take into account the economic shocks specific to this crisis period. Overall, the accuracy of all the forecasts is quite high, the U1 statistic being very close to 0. The forecasts based on PVAR(2) model have a quite high degree of accuracy, being superior to naïve forecasts, but they are outperformed by some fixed-effect models.

Table 5 Forecasts accuracy measures for predicted inflation rate in Romania (horizon: 2011-2013)

Accuracy measure	Inflation rate predicted using NCP forecasts and:			Inflation rate predicted using EC forecasts and:			Inflation rate predicted using Dobrescu's model forecasts and:			Inflation rate predicted using PVAR(2) model	Inflation rate predicted by:		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3		NCP	EC	Dobescu's model
ME	-1.630	-1.663	-0.453	-2.033	-1.803	-0.810	-2.033	-1.620	-0.767	-1.377	0.400	-0.067	-0.657
MAE	1.810	2.023	1.607	2.033	1.910	1.690	2.033	2.053	1.613	0.832	0.933	0.067	1.121
RMSE	2.128	2.613	1.948	2.222	2.598	1.977	2.261	2.618	1.953	2.231	1.225	0.082	1.166
U1 Theil's statistic	0.210	0.253	0.209	0.211	0.249	0.203	0.215	0.255	0.202	0.220	0.151	0.009	0.127
U2 Theil's statistic	0.452	0.327	0.451	0.435	0.328	0.448	0.440	0.326	0.449	0.374	1.111	18.258	0.863

The forecasts based on fixed-effects models are combined with naive predictions based on random walk for the horizon 2011-2014. This combination is made in order to reduce the forecast errors. The combination technique consists in the calculation of the two forecasts average.

Table 6 Inflation rate combined forecasts (%) in Romania based on fixed-effects models and random walk

Year	Inflation rate predicted using NCP forecasts and:			Inflation rate predicted using EC forecasts and:			Inflation rate predicted using Dobrescu's model forecasts and:		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
2011	5.81	5.675	5.72	6.365	5.865	6.275	6.27	5.62	6.18
2012	5.68	5.15	3.91	5.68	5.175	3.89	5.825	5.14	3.915
2013	4.8	5.515	4.895	4.85	5.51	4.895	4.8	5.515	4.9
2014	2.935	2.995	3.04	3.02	2.995	2.78	3.065	2.995	2.965

The EC forecasts were not outperformed, but this forecasts combination determined an obvious improvement of the predictions based on Dobrescu's model and of the NCP's forecasts. The forecasts based on the third fixed-effects model for NCP and random walk are more accurate than the NCP forecasts or those based on Dobrescu's model. The second and the third fixed-effects model based on Dobrescu's macro-model and naive forecasts generated in combination better forecasts than NCP and Dobrescu provided. However, all these combined predictions are still overestimated, but they are better than naive predictions.

Table 7 Forecasts accuracy measures for combined inflation rate in Romania (horizon: 2011-2013)

Accuracy measure	Combined inflation rate forecasts based on NCP fixed-effects model:			Combined inflation rate forecasts based on EC fixed-effects model:			Combined inflation rate forecasts based on NCP fixed-effects model for Dobrescu's model predictions:			Inflation rate predicted by:		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	NCP	EC	Dobescu's model
ME	-1.263	-1.280	-0.675	-1.465	-1.350	-0.853	-1.258	-0.832	-0.853	0.400	-0.067	-0.657
MAE	1.263	1.363	0.728	1.465	1.350	0.853	1.378	0.832	0.853	0.933	0.067	1.121
RMSE	1.594	1.624	0.933	1.642	1.630	0.968	1.622	0.961	0.968	1.225	0.082	1.166
U1 Theil's statistic	0.163	0.166	0.101	0.164	0.166	0.103	0.166	0.102	0.103	0.151	0.009	0.127
U2 Theil's statistic	0.737	0.607	0.934	0.715	0.607	0.923	0.607	0.923	0.923	1.111	18.258	0.863

The Diebold-Mariano test is applied to check if this improvement in accuracy is significant from statistical point of view. The p-values corresponding to t-statistics for the three DM tests are less than 0.05 (0.0154, 0.0224, respectively 0.0202), fact that implies that there are significant differences between forecasts and the improvements brought by the new technique is significant.

4. CONCLUSIONS

The econometric approach succeeded in improving the accuracy of forecasts that were provided by Romanian experts in forecasting from the National Commission for Prognosis and Institute for Economic Forecasting. The applied technique was the predictions' combination by making the average between the naïve forecasts and the projections based on some fixed-effects models. The forecasts based on the third fixed-effects model for NCP and random walk are more accurate than the NCP forecasts or those based on Dobrescu's model. The second and the third fixed-effects model based on Dobrescu's macro-model and naive forecasts generated in combination better forecasts than NCP and Dobrescu provided.

This econometric approach could be used for the next inflation rate predictions. These historical results may keep for the next forecast horizon. For example, the value of inflation for 2014 that seems to be the most accurate according to our econometric approach should be used effectively by government in establishing the macroeconomic policies. The decision making process could be improved in this way and the National Bank of Romania could also improve its monetary policy. The Central Bank presents in the inflation report some uncertainty intervals in order to provide a range of variation for this variable. However, the value of the most accurate inflation forecast could help the bank in revising the uncertainty intervals and improve the inflation targeting.

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THE DEPOSITS OF ROMANIAN CREDIT INSTITUTIONS IN TIMES OF CRISIS

Adina APĂTĂCHIOAE*

Abstract: *Deposits are an important element of bank liquidity, being the primary source of bank funds, consequently the main basis for bank financing. The aim of this article is to analyze the evolution of bank deposits for the Romanian banking sector during 2007-2013, and to observe the actions undertaken by individual banks and by the central bank to ensure a certain level of liquidity in accordance with the regulations imposed by the monetary authorities. In our study the empirical analysis focuses on the Romanian credit institutions, outlining the main determining factors of bank deposits creation. The results of our analysis indicates that the main determinants of deposit creation refer to the interest rate paid by the bank, and to the level of financial performance of a credit institution, aspect related to the comfort and safety offered by a better capitalized and more stable bank.*

Keywords: *financial crisis, liquidity, static panel regression.*

JEL Classification: *G21, G28, C33*

1. INTRODUCTION

In order to achieve a successful management of risks arising from international context and of the vulnerabilities that have continued to manifest internally, the National Bank of Romania has undertaken a series of measures for prudential regulation and banking supervision. These actions were correlated with the individual efforts of credit institutions, which resulted in maintaining a robust financial stability and some appropriate levels of solvency, liquidity and forecasting indicators at the system level.

Deposits are an important element of bank liquidity, being the primary source of bank funds, consequently the main basis for bank financing. The aim of this article is to analyze the evolution of bank deposits for the Romanian banking sector during

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2007-2013, and to observe the actions undertaken by individual banks and by the central bank to ensure a certain level of liquidity in accordance with the regulations imposed by the monetary authorities. In our study the empirical analysis focuses on the Romanian credit institutions, outlining the main determining factors of bank deposits creation.

In the speciality literature it was observed related studies like the paper of Demirguc-Kunt, Detragiache (2000:6), which specifies that explicit deposit insurance tends to increase the likelihood of banking crises; another paper which shows how government deposit guarantees and regulatory forbearance can lead to permanent declines in the growth rate of the economy (Dekle and Kletzer (2003:13); or the paper of Dewally and Shao (2013:7) where it shows that banks that relied more heavily on wholesale funding contracted lending more severely than banks that relied more on insured deposits. More than that, Levy-Yeyati, Martinez Peria and Schmukler (2010:9) specifies that macroeconomic risk affects deposits regardless of traditional bank-specific characteristics and Jiang and Zeng (2013:5) have shown that exist a negative relationship between bank loan ratios and investment for Chinese publicly listed firms; both short-term and long-term loans ratio are negatively correlated with investment and the reform of China's banking system in 2003 has not strengthened the negative relationship between bank loans and investment.

Our study was performed on the Romanian case whereas in the literature we haven't identified articles drafted on the evolution of deposits of the most important banks according the volume of the assets in the analyzed period. Moreover, in the period studied the Romanian banking sector continued to be well protected against various unfavourable developments that occurred locally and internationally, and in our paper there were highlighted certain aspects of deposits (which represent an important source of liquidity) that may be in the interest of researchers in this field.

The exposure of the actions undertaken at the local level by the National Bank of Romania and by the other banks operating in Romania reveals the maintenance of an appropriate level of liquidity in the Romanian banking sector therefore there are sufficient reserves to cope possible adverse situations which can appear at the micro or macro-economic level.

The National Bank of Romania had a crucial role in ensuring a stable banking system, therefore their efforts led to an increase in bank deposits in the period 2007-

2013. Furthermore, the relative decrease in the banking system's concentration, in the first half of 2013, revealed the tendency of increasing competition between credit institutions regarding the level of attracted deposits. The results of our analysis indicates that the main determinants of deposit creation refer to the interest rate paid by the bank, and to the level of financial performance of a credit institution, aspect related to the comfort and safety offered by a better capitalized and more stable bank.

Next, the article is structured as follows: in the second part is presented international and national measures regarding bank deposits in times of crisis; the third one presents the Deposits Guarantee Fund in the banking system in Romania; the fourth part which presents the analyze of the deposits in the romanian credit institutions and the fifth part presents the factors that determine the establishment of deposits by customers in romanian credit institutions. The work ends with several conclusions.

2. INTERNATIONAL AND NATIONAL MEASURES REGARDING BANK DEPOSITS IN TIMES OF CRISIS

Bank deposits have a significant importance for the activity developed by banks because they represent the main source from which credit institutions may grant loans. Bank deposits are a key element for bank liquidity; accordingly bank liquidity is measured using the ratio between loans granted to customers and deposits from customers, this indicator taking into account factors such as the level and stability of deposits, long-term financing and short-term use of resources (Țugui, 2003:3). In this respect, an appropriate level of liquidity can ensure a proper functioning of the banking sector and of the financial markets.

In the speciality literature it was observed a paper that focused on the evolution of banking system's liquidity, concluding with the following aspects: it's imminent to establish a tolerance level of the liquidity risk; a bank should maintain an adequate level of liquidity that includes the creation of a buffer of liquid assets; it's necessary to associate each segment of the business correlated with the overall costs and benefits, with the level of liquidity risk; a bank must identify and establish a dimension of a full range of liquidity risks, including contingent risks; it's essential to build a robust and operational plan of financing and to ensure the management of intraday liquidity risk and collaterals; it's recommended the use of stress tests and public dissemination of information to promote market discipline (BIS, 2013:117).

Another lesson highlights the importance that must be given to supervisors and their vital role in the management of liquidity risk and the development of measures to be taken in this regard.

The difficulties which banks have experienced in relation with liquidity were due to lagoons from basic principles of liquidity risk management. In response, Basel Committee has published new rules regarding the liquidity issue, establishing the last Basel Agreement (Basel III), and has introduced two additional minimum standards for liquidity. These two standards aimed at two distinct objectives but complementary: first to promote short-term resilience of a bank's liquidity risk by ensuring sufficiency of high quality liquid assets to overcome the tension observed for a month - for this purpose elaborating the liquidity coverage ratio (LSF). The second objective aims to long periods of time, creating ways for banks to use stable sources of funding their continuous work - net stable funding ratio (NSFR, 1 year) (Apătăchioae, 2013:3).

Furthermore, there will be adopted new models of asset management, in which the balance sheet' size will be determined by all financial resources that the bank may increase (liabilities), and the total assets will be adjusted to equalize the available liabilities (Dedu and Nițescu, 2012:4).

In times of financial strains, the major concerns of banks should be directed towards the increasing of loan portfolios and to the possibilities of accumulating a mix of funds. The experiences seen to date have pointed out that many banks have founded the loan portfolio increase on volatile funds; thus this situation is trying to be avoided through the rules imposed by the competent authorities.

The elements which led to the decline of the Romanian banking system in 2008 were exacerbated by the unsustainable trends from the private sector, namely: the growth in real wages was faster than the productivity gains; the predilection of companies and households for savings, have favoured less the banking sector in terms of income, bonuses and future income trends.

Banking risk is impending due to the discrepancy between the time of deposit and loan creation. Forcing banks' ability to obtain credit financing sources through debt led to the destruction of the banks' credibility because they are unable to achieve the essential condition of their existence - the maturity transformation (Țugui, 2003:7).

In the period preceding the global financial crisis, the Romanian economy was inundated by foreign capital. This tremendous amount of capital from the period 2004-2008 led to the increase of banks' foreign liabilities by about 6.5 times. The abundance of external financing resources determined from the beginning, the appearance of a clear trend of gradual reduction of interest rates on deposits and loans and of the average interest rate on the interbank market. After the crisis triggering in Romania, namely in October 2008, together with the increased volatility of the average interest rate on interbank transactions, the real interest rate caused a temporary redistribution of purchasing power from debtors to creditors, with effects on the recovery of economic activity (Croitoru, 2011:25).

In order to achieve a successful management of risks arising from international context and of the vulnerabilities that have continued to manifest internally, the National Bank of Romania has undertaken a series of measures for prudential regulation and banking supervision. These actions were correlated with the individual efforts of credit institutions, which resulted in maintaining a robust financial stability and some appropriate levels of solvency, liquidity and forecasting indicators at the system level.

Moreover, in 2012, there were introduced a series of stabilization measures aiming the total or partial transfer of assets and liabilities of a credit institution to one or more eligible institutions; the involvement of Deposit Guarantee Fund in the Banking System as delegated administrator and, where appropriate, as shareholder, and the transfer of assets and liabilities from a credit institution to a bridge - bank which is constituted for this purpose (NBR, 2012:47).

The liquidity of the Romanian banking system, from the perspective of a sensitive indicator regarding the confidence fluctuations of the internal depositors and of the foreign investors' confidence in domestic banks, recorded positive results in the recent years. In 2012, the economic background, namely some events produced in the origin countries of parent banks, determined the worsening of depositor perception, which correlated with the risk of non-extension at maturity of short-term deposits from local sources, had a limited impact on the banking market, thus the liquidity indicator was placed above the minimum in each maturity band (NBR, 2012:79).

The number of financial institutions in the domestic financial system has registered slight variations compared to the previous period. At the end of 2012 the

banking sector included 40 entities and 41 at the end of August, 2013. The top five banks from Romania, established by the amount of assets accounted in 2012 covered 54.9% of the total assets of the entire banking system.

In August 2013, the top five banks in the system have owned 53.5% of deposits. Compared to the end of 2011, in 2012 the total net assets increased with 3.3%, while deposits from non-bank customers with 5.2% (see Table 1). The relative decrease in the concentration of the banking system in the first half of 2013 reveals the tendency of increasing competition between credit institutions regarding the level of attracted deposits. The dynamics of these indicators were caused, in part, also by the new approaches imposed by IFRS (International Financial Reporting Standards).

The volume of internal liabilities recorded an ascending evolution throughout the analyzed period and from these the deposits of households hold the largest share. The positive trend of deposits attracted from the residents' non-governmental customers has significantly alleviated in the period August 2012 - August 2013, mainly on the component in domestic currency. Starting with December 2008 until June 2012, the deposits attracted from companies followed a downward trend, and later, in August 2012 they have begun to recover their ascending trend. Compared with deposits from companies, those attracted from the population have registered an increasing dynamics only in the analyzed period.

Table 1 The structure of the liabilities of Romanian credit institutions for the period 2008-2013 (percent of the total liabilities)

	Dec. 2008	Dec. 2009	Dec. 2010	Dec. 2011	Jun. 2012	Aug. 2012	Dec. 2012	Mar. 2013	Jun. 2013	Aug. 2013
Domestic Liabilities	69,3	73,6	73,2	73,5	75,2	76,1	76,8	77,8	78,0	78,6
Interbank Deposits	2,1	5,4	3,4	3,4	5,0	4,7	4,6	2,5	2,2	1,9
Government Deposits	3,1	2,1	1,7	1,4	1,5	1,4	1,3	1,3	1,3	1,4
Corporate Deposits	20,2	19,3	19,0	19,0	17,7	18,3	18,5	18,9	19,1	19,5
Deposits of Population	24,4	26,7	27,0	28,7	29,2	29,5	30,2	31,7	31,6	31,8
Capital and Reserves	10,6	12,0	14,2	16,2	16,9	17,3	18,0	18,8	19,3	19,7
Other Liabilities	8,9	8,1	7,9	4,8	4,9	4,9	4,2	4,6	4,4	4,3

	Dec. 2008	Dec. 2009	Dec. 2010	Dec. 2011	Jun. 2012	Aug. 2012	Dec. 2012	Mar. 2013	Jun. 2013	Aug. 2013
External Liabilities	30,7	26,4	26,8	26,5	24,8	23,9	23,2	22,2	22,0	21,4

Source: National Bank of Romania, Financial Stability Report 2013, p.38

The development of internal liabilities of credit institutions which are operating in Romania denotes the significant reduction of the interest rates associated with deposits in domestic currency and foreign currency operated by banks, both on the corporate segment or on the population segment. It was also observed a reduction in the amount available for savings in the context of declining the dynamics of the net average wage and of the relatively high level of indebtedness and the static effect of inflation rate annual growth (NBR, 2013:118). After the maturity, it was noted a preference, in the domestic investments, for periods longer than one year, and also an increase in the overnight deposits of non-financial corporations.

3. THE DEPOSITS GUARANTEE FUND IN THE BANKING SYSTEM IN ROMANIA

The Deposit Guarantee Fund in the Banking System (FGDB) was founded in 1996, and is the only deposit guarantee scheme in Romania. Starting with November 10, 2011 FGDB co-opted as a member institution of the National Committee for Financial Stability (CNSF). Through the purposes assumed, the Deposit Guarantee Fund in the Banking System is one of those institutions that help maintain and increase the confidence of depositors in the banking system.

Since the establishment of the Fund up to the present, the amount of covered deposits recorded a continuous growth, some of this being due to the enlargement of the sphere of the guarantee during this period. From the second semester of 2004, the guarantee ceiling was expressed in euros, and since January 1, 2011 the ceiling per depositor increased to Ron equivalent of 100.000 Euros. This is the maximum amount payable to a depositor in case of unavailability of deposits. Compared with 1997, the amount of covered deposits increased almost 97-fold in nominal terms.

FGDB is the only institution with the mission to guarantee the deposits of households and of corporate customers, particularly small and medium-sized entities, at the level of credit institutions participating in the Fund as well as to pay

compensations to guaranteed depositors, in the guarantee limits when the deposits become unavailable.

The main function of these institutions is to protect deposits placed at the credit institutions, Romanian legal entities. The Fund may also perform other responsibilities established in cooperation with the National Bank of Romania in order to ensure financial stability. The financial resources available to the FGDB derive mainly from the contributions of credit institutions, incomes from the investment of financial resources and from the recoveries of receivables from the credit institutions into bankruptcy.

At the end of the first quarter of 2014 the total guaranteed deposits amounted to 159.200,2 million RON, out of a total of 277.137,9 million RON. Of these, the largest share was owned by guaranteed deposits in RON, with a value of 99.434 million RON and the difference of 59.766 million RON were represented by the guaranteed deposit in foreign currency. This trend has been shown in the past, when the guaranteed deposits in RON have held more than 60% of total guaranteed deposits.



Figure 1 The guaranteed deposits of population and of corporate entities from credit institutions in Romania in 2014 (Millions Ron)

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

The higher percentage of guaranteed deposits at the end of the first quarter of 2014 was owned by the deposits of individuals (as we can observe in Figure 1), cumulating 122.651,8 million RON and the guaranteed deposits of legal entities totalled 23% of total guaranteed deposits at credit institutions in Romania, with a value of 36.54834 million RON.

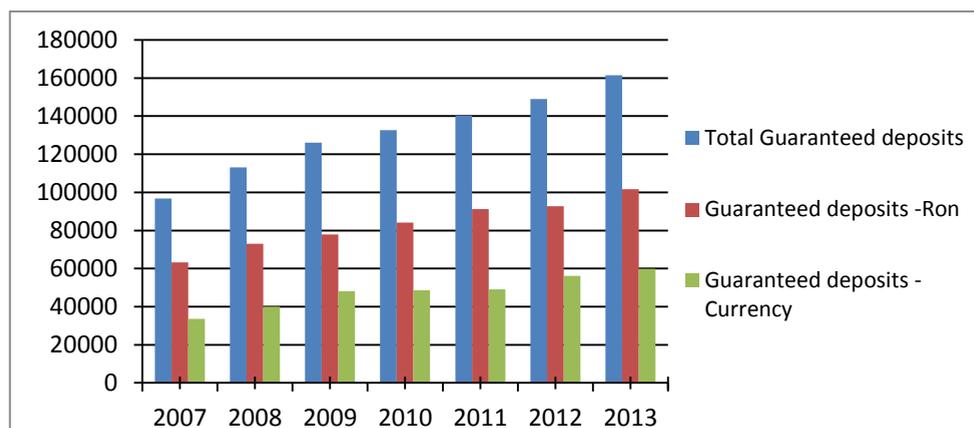


Figure 2 The evolution of the guaranteed deposits in Ron and foreign currency from Romanian credit institutions (Millions RON)

Source: Own processed data from The Deposit Guarantee Fund in the Banking Systemic

The guaranteed deposits registered a positive trend during the period 2007-2013, and the quarterly change is significant (as we can observe in Figure 2). After the first three months of 2014 the guaranteed deposits belonging to individuals totalled 122.651,8 million Ron, only 401.6 million Ron were not guaranteed. Of these 103.604,4 million Ron was within in the guarantee ceiling and 19.043,4 million Ron were over the guarantee ceiling. In the case of guaranteed deposits of corporates at the credit institutions in Romania at the end of the first quarter of 2014, 71% were denominated in national currency and the difference of 29% in foreign currency. The amount of deposits that were within the guarantee ceiling was 12.187,6 million Ron and those who have exceeded this limit reached the level of 24.360,7 million Ron. Compared with the last quarter of 2013, the volume of guaranteed deposits for both categories of customers of banking institutions (individuals and businesses) was increasing.

4. THE ANALYSIS OF DEPOSITS IN THE ROMANIAN CREDIT INSTITUTIONS

4.1. The total deposits of the Romanian credit institutions

The total deposits of credit institutions in Romania recorded an ascending trend in the period 2007-2012, (as we can observe in Figure 3) with a small decline in 2013, when they have decreased at 314 million RON. This positive trend in the volume of

deposits at credit institutions can be attributed to the desire of the population, but also of the companies to accumulate savings, in order to ensure a certain level of safety throughout the precarious conditions characteristics of the period.

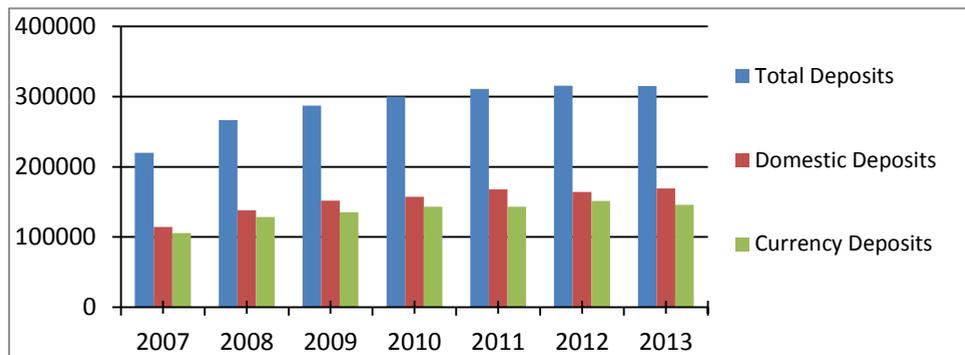


Figure 3 The evolution of deposits for Romanian credit institutions, during 2007-2013 (Millions RON)

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

From the total categories of liabilities, deposits denominated in national currency hold a higher proportion than the deposits denominated in foreign currency. Thus, as we can notice in Figure 4, the deposits denominated in national currency represent around 54% while the deposits denominated in foreign currency accumulate a percentage of 46%. The highest growth is localized on the deposits denominated in Ron and is located up to the interval of 100.000 Euros, equivalent in Ron. In the case of foreign currency deposits increases were recorded both on corporate segment (mainly deposits with value over 100.000 euro values placed at branches of foreign banks in Romania) and of individuals (deposits under 100,000 euro at the credit institutions participating in the Fund), but these increases were not able to offset the decline in deposits of the two categories of depositors in the others ranges of values.

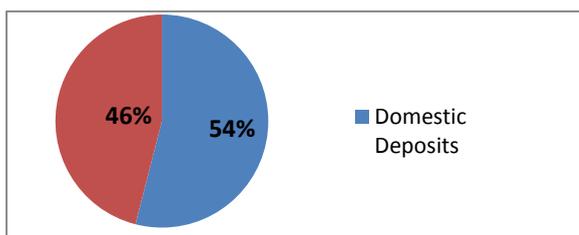


Figure 4 The percentage of the domestic deposits and of the foreign currency deposits in total deposits from Romanian banking system in 2013

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

The first quarter of 2012 was characterized by a modest increase in the total amount of deposits in the entire banking system in Romania, with just 0.3% reaching 310.4 billion Ron. Nevertheless in real terms there was a decline with a quarterly change of -1.1%. The total amount of deposits at the credit institutions participating in the Fund has compressed in the first quarter of 2012 because of the withdrawals made on corporate segment, with a more pronounced decline in small and medium enterprises and other groups assimilated to these. The sums withdrawn from the legal entities were of high values, corresponding mainly to the deposits over 100.000 euro denominated in Ron or foreign currency more pronounced in the latter case. Even though the household deposits followed an upward trajectory, the growth of this segment has countered about two thirds of the decrease in absolute value of the deposits of legal entities.

The deposits in Ron have been recorded a spurt in the fourth quarter of 2013, increasing by 8.9% (+ 8.2% in real terms) while the deposits denominated in foreign currency were found in the second quarter of decline, with a variation of -1.6% (-2.2% in real terms). What has led to an increase of the deposits denominated in national currency was the increase in the deposits of high values held by corporate entities (quarterly increase of 10.3 billion Ron). At December 31, 2013, deposits at the credit institutions in Romania totalled 169.1 billion Ron, representing the highest level in recent years, while the deposits denominated in foreign currency dropped to 145.9 billion equivalent Ron.

At the level of the entire year the deposits in national currency increased by 3% (+ 1.4% in real terms) and foreign currency deposits shrank by 3.5% (5% in real terms). The negative trend of the value of deposits also continued in the first quarter of 2014, when its value reached 304.161,6 million RON compared to 315.033,2 million Ron, as recorded in the last quarter of 2013. As for the deposits denominated in national currency, they decreased from 169.128,8 million Ron, as were recording in the fourth quarter of 2013 to 163.461,2 million Ron in the first quarter of 2014. Comparative, foreign currency deposits registered a reduced decrease comparative with the same period, decreasing only with 4.204 million Ron, reaching the value 141.700,4 mil.

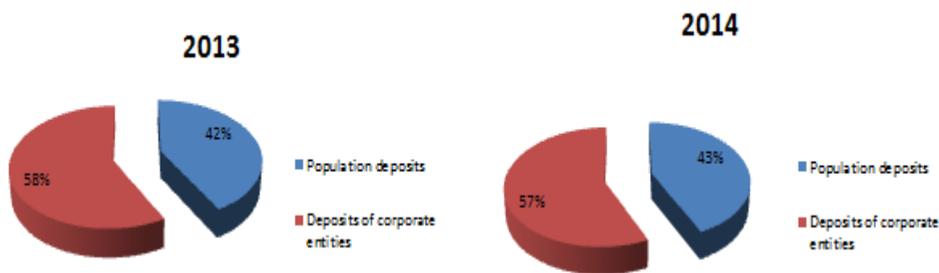


Figure 5 The percentage of the population deposits and of the corporate entities deposits in the total deposits of the Romanian credit institutions in 2013 and 2014

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

In Figure 5 we can observe that in the last quarter of 2013, the deposits of individual customers had cumulated a percentage of 42% in total deposits of credit institutions in Romania while the deposits of corporate customers has reached the percentage of 58%. In the first three months of 2014 the situation is similar; in this case the percentage cumulated by the customers' corporate entities is 57% and 43% for household deposits.

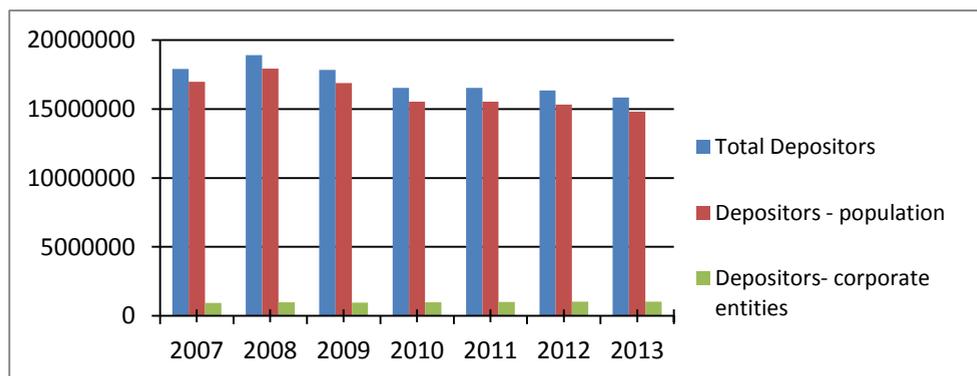


Figure 6 The number of depositors in the Romanian credit institutions, during 2007-2013

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

As for the number of depositors, they have continued to decrease since 2008, with some slight increases during the analyzed period. This situation can be attributed to the distrust of individuals in credit institutions in Romania, aspect motivated through the bankruptcy registered by some of them during the crisis, and the need for liquidity in some of the cases.

At the end of 2013, the number of depositors in credit institutions from Romania totalizes 15.829.077, decreasing with 513.837 depositors comparative with December 31, 2012. From the total number of depositors, the most representative depositors are individuals. In the first three months of 2014, the number of depositors amounted to 15.539.327 from which 14.547.727 was individual depositors, and the difference of 991.600 was represented by corporate depositors.

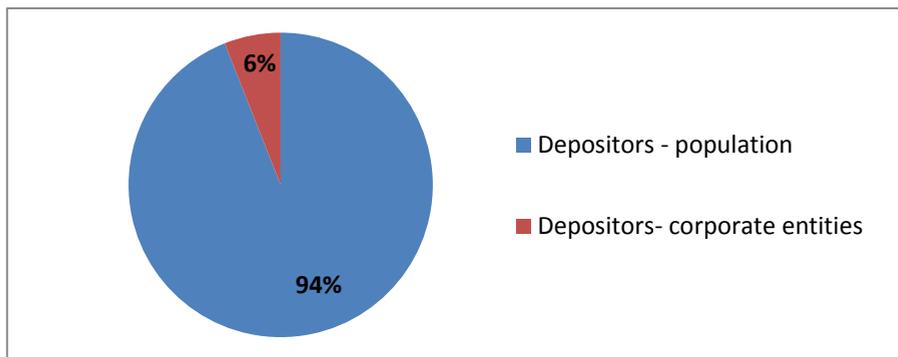


Figure 7 The percentage of depositors in the Romanian credit institutions in the first trimester of 2014

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

As we can noticed from Figure 6, the number of individual depositors holding in the first quarter of 2014, registered a percentage of 94% of total depositors of credit institutions from Romania while the depositors -corporate customers only 6%

4.2. The population deposits of Romanian credit institutions

The volume of individual deposits recorded an upward trend in the analysed period, so that they have reached a level of 130.885,8 million Ron in the last quarter of 2013. From the total value of the deposits, those denominated in national currency hold the highest percentage.

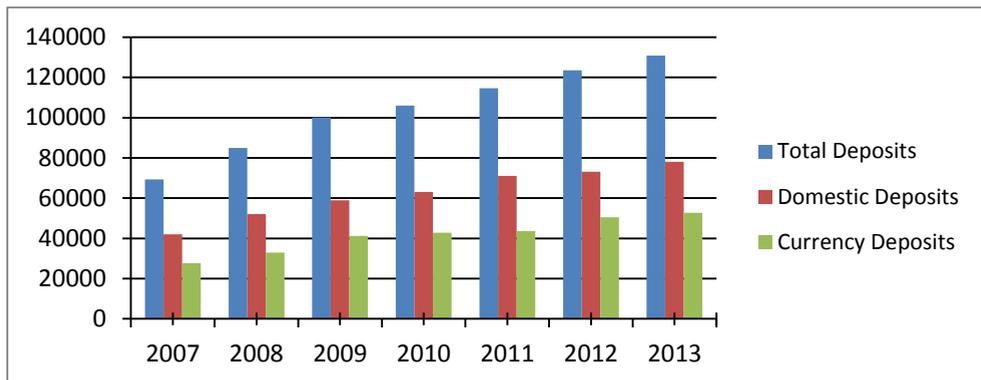


Figure 8 Population deposits at the level of credit institutions from Romania, during 2007-2013 (Million RON)

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

Compared with the last quarter of 2012, the value of individuals' deposits at the credit institutions in Romania have been increased with 3.1 billion, corresponding to a nominal quarterly variations of 2.4% (+ 1.8% in real terms). At the level of 2013, the deposits of individuals per whole banking system recorded an advance of 5.9% (+ 4.3% in real terms).

The deposits of resident individuals at the credit institutions in Romania have continued to increase in the fourth quarter of 2013 up to 235 billion Ron (quarterly change of 5.5%). Comparative, on the segment non-residents there were registered deposit withdrawals, while preserving the decreasing trajectory from previous quarters. On 31 December 2013, the non-residents individuals held, at credit institutions in Romania, deposits of 80 billion Ron (quarterly change of -0.9%). The credit institutions participating in the Deposit Guarantee Fund had at the end of 2013, 90.8% of the total deposits of the banking system (FGDB, 2014:59).

The Individual depositors have preferred the deposits in domestic currency, whose total value increased in the fourth quarter of 2013 with 3.3% until 78.2 billion Ron. The foreign currency deposits of individuals in credit institutions from Romania registered a slower increase than deposits in Ron both in the fourth quarter of 2013 as well this year, with quarterly variation by + 1.1% (+ 0.5% in real terms) and the annual variation +4.6% (+ 3% in real terms).

At the end of 2013, the value of deposits denominated in foreign currency on the populations segment in the entire banking system has been equivalent to 52.7 billion Ron, representing 40.3% of total deposits of individuals. Mostly, the increase

of the deposits denominated in domestic and foreign currency of individuals in credit institutions from Romania has been recorded on the segment of deposits with values below 100.000 euro, equivalent RON.

The Quarterly growth rate for this category of deposits was by 2.5 billion Ron, of which approximately 2 billion Ron represents the quarterly increase in domestic deposits of individuals with values less than 100.000 euros, equivalent Ron (FGDB, 2014:117).

The population continued to save in the first three months of 2014, their deposits increasing by 627.9 million Ron compared to December 31, 2013, reaching 131.513,7 million Ron. This upsurge is due to the increasing of the value of household deposits at the credit institutions participating in the Deposit Guarantee Fund under the conditions in which at the branches of foreign banks in Romania it was registered stagnation.

4.3. The deposits of legal entities in the Romanian banking institutions

The deposits of the legal entities in the Romanian banking institutions in 2007-2011 showed an increasing trend, and from 2012 their evolution was negative. If in the case of individuals the deposits denominated in national currency were prevalent than the deposits denominated in foreign currency in the case of corporate banking customers, the situation changes, the share of deposits into another currency prevails.

The deposits of legal entities from credit institutions in Romania have recorded at the end of the last quarter of 2013 the highest level compared with the other three quarters that have preceded it, reaching 184.1 billion Ron at December 31, 2013 (quarterly change of + 4.8% in nominal terms, 4.2% in real terms).

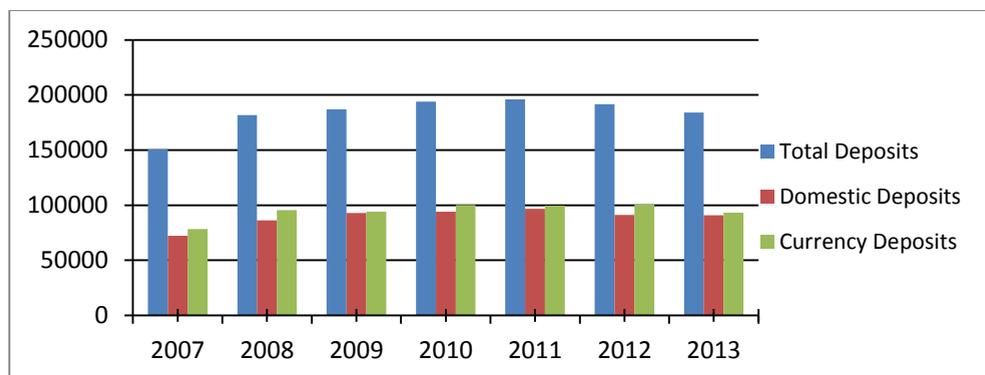


Figure 9 Deposits of corporate entities in the Romanian banking institutions during 2007-2013 (Million Ron)

Source: Own processed data from The Deposit Guarantee Fund in the Banking System

However, the deposits of legal entities at the end of 2013 were by 4% under the situation from the end of 2012. At December 31, 2013, the deposits denominated in national currency of this category of customers from Romania totalled approximately 91 billion Ron, with 14.2% more than at September 30, 2013 (quarterly change of 13.5% in real terms). The deposits in foreign exchange of legal entities in the whole banking system had an opposite dynamic; their regress was counterbalanced by the increase in deposits of individuals recorded on the segment of the deposits denominated in Ron. In the last quarter of 2013 foreign currency deposits were reduced by 3% (quarterly change by -3, 6% in real terms), to 93.2 equivalent billion Ron at December 31, 2013.

The withdrawals of foreign currency deposits were recorded on the segment of unsecured depositors, holders of deposits over \$ 100,000, of corporate resident customers and non-resident customers. Compared to December 31, 2012, the value of foreign currency deposits decreased by 7.5% (-8.9% in real terms) (FGDB, 2014:109).

In the first quarter of 2014 the total amount of deposits attracted by the credit institutions in Romania from corporate customers was 173.647,9 million Ron, decreasing with 10.499,5 million Ron comparative with the last quarter of the previous year. From these, the deposits denominated in national currency amounted to 84.291,5 million Ron and the deposits denominated in foreign currency 89.356,3 million equivalents Ron. Compared to the end of 2013, the deposits denominated in Ron decreased with 6.674 million Ron and the deposits denominated in foreign currency with 3.825,6 million equivalents Ron.

5. THE FACTORS THAT DETERMINE THE ESTABLISHMENT OF DEPOSITS BY CUSTOMERS IN ROMANIAN CREDIT INSTITUTIONS

5.1. Data and methodology

5.1.1. Data and selecting the variables

Bank specific data used in this study were obtained from financial and annual report of the individual banks from our sample, from annual reports of National Bank of Romania and of Deposit Guarantee Fund. Data relating to the largest banks operating in Romania according to the volume of assets were collected from BankScope database.

The analysis was performed for the period 2005-2012. We have focused on the ten largest banks from Romania according the volume of assets and who have remained in the top in the period studied. Our sample is composed of: *Alpha Bank Romania, Banca Comercială Română SA - Romanian Commercial Bank SA, CEC Bank SA, Credit Europe Bank (Romania) SA, Eximbank Romania - Banca de Export-Import a României, Intesa Sanpaolo Bank Romania SA, Bank Leumi Romania, Libra Internet Bank SA, OTP Bank Romania SA, Piraeus Bank Romania.*

A differentiation criterion used in the establishment of the database was the availability of data in the analysed period, respectively 2005-2012, so we outline the fact that this panel dataset is a strongly balanced one and we can observe the evolution of the variables before and after the onset of the recent crisis.

The study was performed on the Romanian case whereas in the literature we haven't identified articles drafted on the evolution of deposits of the most important banks according the volume of the assets in the analysed period. In the speciality literature it was observed related studies like the paper of Demirguc-Kunt, Detragiache (2000:6), which specifies that explicit deposit insurance tends to increase the likelihood of banking crises; another paper which shows how government deposit guarantees and regulatory forbearance can lead to permanent declines in the growth rate of the economy (Dekle and Kletzer (2003:13); or the paper of Dewally and Shao (2013:7) where it shows that banks that relied more heavily on wholesale funding contracted lending more severely than banks that relied more on insured deposits. More than that, Levy-Yeyati, Martinez Peria and Schmukler (2010:9) specifies that macroeconomic risk affects deposits regardless of traditional bank-specific characteristics and Jiang and Zeng (2013:5) have shown that exist a negative relationship between bank loan ratios and investment for Chinese publicly listed firms; both short-term and long-term loans ratio are negatively correlated with investment and the reform of China's banking system in 2003 has not strengthened the negative relationship between bank loans and investment.

The descriptive analysis and the econometric study conducted allow us to conclude that the stability of customer deposits depends on the level of remuneration of deposits, the bank's performance reflected through its income, but also on the guarantee of deposits.

Moreover, in the period studied the Romanian banking sector continued to be well protected against various unfavourable developments that occurred locally and internationally, and in our paper there were highlighted certain aspects of deposits (which represent an important source of liquidity) that may be in the interest of researchers in this field. The exposure of the actions undertaken at the local level by the National Bank of Romania and by the other banks operating in Romania reveals the maintenance of an appropriate level of liquidity in the Romanian banking sector therefore there are sufficient reserves to cope possible adverse situations which can appear at the micro or macro-economic level.

In this study the *dependent variable* is the value of **long-term deposits**, whereas the major objectives of our study are: to assess the determining factors of bank deposit creation; and to determine what element is influencing in a significant manner the establishment of deposits by customers. The long term deposits are those funds available to banks and which can be placed in long-term loans with the possibility of a more significant remuneration. Mainly, these funds constitute the basis in granting bank loans.

The set of *independent variables* used in this study is represented by several factors that can influence the establishment of deposits of customers at the level of a bank. In choosing these variables we have guided after the relevance of these factors in the study but also after the data availability.

In our study we use seven bank-specific factors, as following:

- **The volume of loans** - this variable is dependent on the amount of deposits collected by the bank and it has an important significance in terms of the results of the regression analysis performed. Furthermore, an efficient use of funds constituted by the bank through loans is reflected in the volume of loans granted by the bank; so the bank has the opportunity to earn more and possess a greater availability in a higher remuneration for deposits. A significant remuneration of deposits represents an attractive element to customers with surplus funds;
- **Current deposits of customers** - this variable represents the short-term funds of banks and it can be used in short-term loans and current payments;
- **Deposits from banks** - these deposits are from other banks and constitute another category of funds to banks;
- **Total funding** - this variable expresses the total amount of funds available to banks, constituted from deposits and from other sources. The importance of

this indicator in our analysis consists in that the volume of funds can provide safety for customers in deposits formation, while guaranteeing their recovery;

- **Interest income** - is another factor that can influence the establishment of deposits, since they reflect the income received by the bank from granting loans and the use of funds deposited by customers. It's an indicator which can reflect bank's rates on loans;
- **Interest expenses** - is a variable that reflects the level of remuneration of deposits. A high level of this indicator shows a higher level of remuneration of deposits and may be an encouraging factor in attracting deposits;
- **Net income** - is a variable that can reflect the performances of a bank.

5.1.2. Methodology

The scientific approach involves efforts sustained by a modern and comprehensive research models combining a rigorous scientific documentation with a quantitative research. In this sense, for the accuracy of the results we propose a static panel regression analysis performed using the statistical program EViews. The methodological approach is described in the following.

We first conducted a descriptive analysis of selected data. We continued by defining the mathematical model, and after that we have applied Hausman test, achieving a combination of fixed effects and random effects.

Continuing we are applying stationary test, namely Levin, Lin & Chu. The assumption of normality is tested with Jarque-Bera test. The test for heteroskedasticity is available for the Breusch-Pagan-Godfrey test. For serial correlation we applied Breusch-Godfrey Serial Correlations LM test.

Our paper is based on the studies of *Brown et al.(2013)*, *Croituru (2011)*, *Apăvăchioae (2013)*.

The general linear regression model is:

$$Y_{i,t} = \alpha_0 + \beta_{mit}X_{mit} + \varepsilon \quad (1)$$

Where i refers to an individual bank; t refers to year; $Y_{i,t}$ represents the dependent variable that refers to the term deposits and is the observation of a bank i in a particular year t ; X_m represents the determining factors for a bank, where $m = 1, \dots, 7$; and ε is an error term.

The hypotheses that we want to validate by realizing this study are: the variable that determines in a considerable manner the establishment of deposits is the level of interest rates paid; the stability of a bank and its performance level

reflected by the level of income determines an attraction of deposits; granting of credits determines the accumulation of deposits; deposits from other banks are an important source of lending.

5.2. Empirical Results

According to the methodological description, we have first conducted a descriptive statistics analysis of the variables taken into account, in order to define the main features of the data, using several standard methods for the measurement of central tendency, such as the average and some variability of the measurements, including standard deviation, minimum, and maximum values (see Table 2).

Table 2 Summary statistics

Variable	Mean	S.D.	Min	Max
Loans	6908,242	11875,61	51,7	47803,5
Customer Deposits - Current	1620,616	3497,397	18,5	24591,2
Customer Deposits - Term	4391,669	7666,772	5,8	31974,3
Deposits from Banks	3235,364	6125,797	2,1	22906,4
Total Funding	10150,59	16813,43	90,1	67851,8
Interest Income on Loans	711,1375	1293,359	11,8	6476
Interest Expense on Customer Deposits	291,1475	462,3870	0,7	103,8
Net Income	74,36625	2,608479	-1.229,6	2035,6

Source: author's calculations.

We continued the analysis by studying a regression in the panel selected. The value of R-square of 1 indicates that the selected variables significantly influence the decision of constitution of deposits by customers. In what follows we have defined the mathematical model, and after we proceeded to test the type of effects relevant, in this analysis the most suited effects being the fixed ones, according to Hausman test (see Table 3).

Table 3 The results of Hausman Test

	Fixed	Random
Coefficient Chi ²	32.78	31.59
Prob. >Chi ²	0.001	0.001

Source: author's calculations.

After deciding that the most appropriate are the fixed effects we have employed the regression analysis (see Table 4.) where we can see that all the independent variables are statistically significant; the variable which influence in a

significant manner the decision of establishment of deposits is the level of interest paid by the bank and which in our case is indicated by the Interest Expenses. Along with this variable, another element that influences the volume of deposits is the net income whereas this variable offers safety of depositors in the bank, having the certainty of recovery of funds.

We can also observe the level of R-squared close to 1, but also the high significance level of F-statistic, which means that all the independent variables influence the dependent variable. According to this analysis we conclude that an appropriate remuneration of deposits by the banks, but also its stability is the key factors in attracting depositors. As we could observe in the literature, deposits constitute an important part of the funds in the bank and can be recovered by placing into credits.

As stated by Brown et al. (2013:5), the recent financial crisis has shown how the risk of massive withdrawals of funds from depositors and the retail funds may jeopardize bank's liquidity and solvency. The importance of liquidity risk in the recent financial crisis determined the monetary authorities to react and to introduce new standards to ensure a certain level of liquidity of the banks.

The new standards bring an additional in liquidity management at the micro level, but combined with the improvement of supervisory rules can strengthen the stability of the banking and financial sector alike. If the rules are too restrictive, some banks may call for a relaxation of the rules which may lead to an increase in systemic risk. However, macro vision and the ability of central banks of intervention in the management of liquidity can reduce systemic risk and provide necessary liquidity for market operations (Global Financial Stability Report, 2011:255).

Table 4 Empirical results for panel data analysis

Independent variables	Dependent variable
	LT Deposits
c	-238.49** (117.10)
Deposits from Banks	-0.46*** (0.08)
Customer Deposits - Current	-0.25*** (0.05)
Total Funding	0.94*** (0.06)

Interest Expense on Customer Deposits	-1.81* (1.07)
Interest Income on Loans	3.27*** (0.71)
Loans	-0.67*** (0.11)
Net Income	-1.83*** (0.46)
R-sq.	0.99
F statistic	960.35
Obs.	80

Note: Absolute value of t statistics * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. In () we have standard deviations. R-sq. stands for R square and Obs. for the number of observations.

Source: author's calculations.

The new rules on liquidity, set by the Basel III require a precise delimitation between "stable" and "unstable" deposits of customers and therefore we have considered in our analysis these two variables: term deposits and current deposits. Moreover, the new rules specify that a closer relationship between a bank and a customer decreases the level of risk of that client and this is also found in the literature where it is stated that each client requires a cost from the bank (Brown et al., 2013:7).

The descriptive analysis and the econometric study conducted allow us to conclude that the stability of customer deposits depends on the level of remuneration of deposits, the bank's performance reflected through its income, but also on the guarantee of deposits. Brown et al. (2013:9) argues these determinants of deposits, by supplementing with the fact that depositors can be influenced by additional factors such as the information received from the bank, the communication of customers with the bank, bank specialization and the panic that may occur at the customers level.

6. CONCLUSIONS

Bank deposits are an important element for bank liquidity because an adequate level of liquidity ensures the proper functioning of the banking sector and financial markets. Deposits are an element that can be managed by credit institutions, thus ensuring a proper level of a loan portfolio based on stable and less volatile funds can guarantee a proper functioning of a bank and can help to achieve financial stability.

The importance of liquidity risk in the recent financial crisis determined the monetary authorities to react and to introduce new standards to ensure a certain level of liquidity of the banks. The new standards bring an additional in liquidity management at the micro level, but combined with the improvement of supervisory rules can strengthen the stability of the banking and financial sector alike.

The adverse economic environment has affected in a significant manner the banking system, especially the balance sheets of credit institutions, aspect that led to the adoption of prudential measures aiming for banking system stability. Moreover, these measures were taken by the National Bank of Romania in cooperation with credit institutions and these efforts have determined an increase of bank deposits in the period 2007-2012.

The aim of this article is to analyse the evolution of bank deposits for the Romanian banking sector during 2007-2013, and to observe the actions undertaken by individual banks and by the central bank to ensure a certain level of liquidity in accordance with the regulations imposed by the monetary authorities. In our study the empirical analysis focuses on the Romanian credit institutions, outlining the main determining factors of bank deposits creation.

The overall results of our study outline that an appropriate remuneration of bank deposits, but also individual bank stability and credibility are among the key factors in attracting depositors. Seen as an important component of bank liquidity, deposits are the main source from which banks can grant loans, thereby the accumulation of a wide variety and less volatile funds can ensure the stability of the banking sector and of the economy in general. The importance of liquidity risk in the recent financial crisis determined the monetary authorities to react and to introduce new standards to ensure a certain level of bank liquidity.

The limits of the paper are: the insufficient data available, not taking into account the new international financial pressures, not ensuring enough flexibility for the empirical model.

As new research directions, we propose the analysis of bank deposits in other countries similar to Romania such as Bulgaria, the Czech Republic, Hungary, etc. and also the analysis of the implications of the new Basel III requirements on liquidity on bank performance.

ACKNOWLEDGMENTS

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QUALITY OF BANKING GOVERNANCE AND FINANCIAL DEVELOPMENT IN AFRICA: THE CASE OF CAMEROON

Rodrigue NANA KUINDJA*

Abstract: *This study aims to determine how the quality of bank governance is seen as a key factor in the expansion of the banking system to Africa in general and Cameroon in particular. This highlights possible mechanisms of thresholds in the relationship studied using theoretical and empirical analysis. The results obtained from a Principal Component Analysis (PCA) and multiple regression on a quarterly 2000-2010 show that a good bank governance is a necessary but not sufficient for financial development in Cameroon. This result is mainly due to the direct and indirect impact of the correlation. Furthermore, we show that there are mechanisms thresholds in this relationship. This mechanism could be explained by addressing the problem of judicial delays, bad checks, bank secrecy, and corruption but also the socio-political environment. These results are robust to different econometric techniques.*

Keywords: *Mechanisms of thresholds, CPA, Financial Development, Banking Regulation, Quality of bank governance, Corruption, Socio-political environment.*

1. INTRODUCTION

The rise of financial instability is undoubtedly one of the highlights of the global economy, as emerging countries have been affected by very large bank malfunctions. This liberalization has revolutionized highly supervised by state structures. And the bank became the weak link of financial systems. Beyond a certain interest for the establishment of bank governance, the mechanisms address the problem of banking crisis (Noyer, 2005). Bank governance can be seen as a revival of the shareholder against-power management that ensures shareholder value and it

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is modeled by all legal and regulatory rules, case law and contractual terms that define the management of the firm (Woods, 2000). In other words, bank governance is no longer "statecraft", but summarizes the concept that encompasses the authority and control, in other words governance means exercising authority, direction, (prudential regulation) and ensure control (Charreaux 2004).

Functioning of the financial system in fact reduces the banking system where bank assets represent about 10% of GDP and 75 % of total financial system assets at the end of 2006 (IMF, 2007). Following the crisis of the banking system, the financial system has been the subject of extensive regulation, including banking and institutional levels. The growing interest in the quality of governance in the country developing and emerging economies that we see from about fifteen years has led to a dramatic increase the use of governance indicators. Following the maxim that one can't manage what you can quantify, many investor's international and national agencies and multilateral ODA development, as well as researchers and the media seek measuring the quality of governance in these countries.

Most popular among the hundreds that have appeared indicators in response to this growing demand is composite indicators (or "aggregate") based on perceptions. These indicators reduce single digit (by country and year) of large amounts of data provided by various sources and often many information. The data relates to the comparative perceptions of individuals of the quality governance, or this or that specific aspect of governance, in various countries. These individuals are usually "experts" and business leaders but also, in the case of some indicators people identified through surveys of households (Adams et al. 2003). Now, we see that even the most composite indicators carefully constructed suffer from limitations that their users often seem to ignore. Among the most important limitations is are: the hidden nature of the biases embedded in these indicators; their lack of usefulness as a tool to guide concrete actions of those who would act to improve the quality of governance in a country; and the weakness of their statistical basis as instruments for comparing the quality of governance across countries and / or in time (Barth et al. 2003).

The stated purpose of the credit policy in this period was the development financing. Therefore, higher credit levels were observed. But these loans were granted by "cronyism" and sometimes even without guarantees, and for most sectors of transport, transit, trade and services, agriculture (Fouda, 2009). The crisis has deeply affected banks; the priority for the authorities became clean financial environment. Cameroon's financial system, despite the regulation was not adapted to the great

challenges of globalization. It therefore remained sluggish and out of step with the needs of the economy. Prudential regulation aims to establish a trust institutional type.

Measuring governance is problematic. Absence sufficiently a credible theory to explain the cause-effect between specific quality of governance in a country and the development process in the country (theory that could constitute the analytical framework necessary for defining indicators objectives of the quality of governance) explains, in part, the use widespread composite indicators based on perceptions (Caprio et al. 2004). Their main quality of these indicators is their ability to reduce a number, country and year, the complex realities and often low included governance in many countries. This capability gives users the impression of these indicators can be comparisons of the quality of governance across countries and times.

Given the importance of banks, the governance of banks themselves assumes a central role (Levine, 2004). If bank managers face sound governance mechanisms, they will be more likely to allocate capital efficiently and exert effective corporate governance over the firms they fund. In contrast, if banks managers enjoy enormous discretion to act in their own interests rather than in the interests of shareholders and debt holders, then banks will be correspondingly less likely to allocate society's savings efficiently and exert sound governance over firms. Banking crises dramatically advertise the enormous consequences of poor governance of banks. Banking crises have crippled economies, destabilized governments, and intensified poverty. When bank insiders exploit the bank for their own purposes, this can increase the likelihood of bank failures and thereby curtail corporate finance and economic development (Macey, 2003).

Therefore, our objective is to determine how the quality of bank governance is seen as a key factor in the expansion of the Cameroonian banking system. Hence the main question of this research is whether bank governance is a necessary financial development in Cameroon provided? In other words, **what are the triggers for the expansion of the financial system and what is really banking governance?** To achieve this, we first present the rationale and mechanisms of bank governance in Cameroon, then we evaluate its performance compared to the level of financial development and finally we perform a quantification of the contribution of bank governance in the financial expansion in Cameroon. Research finds that banks are critically important for industrial expansion, the corporate governance of firms, and capital allocation. When banks efficiently mobilize and allocate funds, this lowers the cost of capital to firms, boosts capital formation, and stimulates

productivity growth. Thus, the functioning of banks has ramifications for the operations of firms and the prosperity of nations.

2. LITERATURE REVIEW

The growing involvement of financial and banking institutions in the real economy and the importance of externalities associated with banking services are at the origin of the appearance of an industrial approach to the bank, which impels us to speak of Finance and Banking. The traditional business of a bank is to collect deposits whatever their form and maturity and give credit in various forms to its customers. The common point of these activities is the risk that the bank must handle with caution. According Noyer (2005), the most essential tool for the banker is accorded by the trust (or is not) customers to the bank.

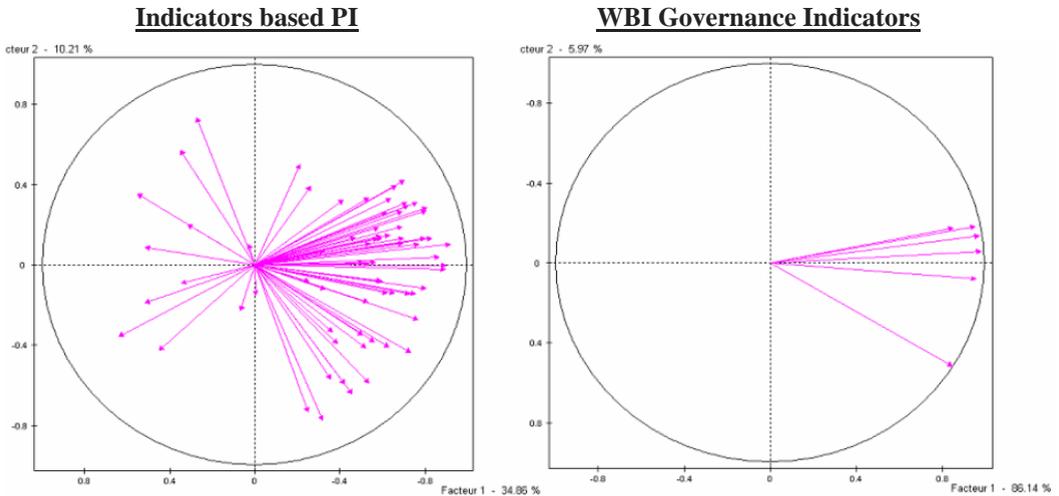


Figure 1 Projection of the two sets of indicators on the correlation circle¹

Source: "Institutional Profiles" and WBI SPAD software.

This leads to a very particular specificity to the bank since it must ensure the trust of its customers on an ongoing basis, but it is very difficult because banking is growing very volatile and risky than the bank cannot manipulate with the traditional tools of governance (Avom and Bobbo , 2013). That is why there is a consensus on the fact that the banking industry should be structured by strict rules to mitigate the

¹ In both ACP, we conduct analysis of the 85 countries in the database "Institutional Profiles". In the latter, we reduced the 110 indicators "stock" in 71 aggregated indicators. For the WBI database, we analyze six governance variables.

occurrence of the risks it incurs; because the bank is the main core of financing the economy (Anderson & Campbell 2004). Good banking governance induces health and sustainable growth of the economy (Mehram, 2004) and a efficient allocation of savings (Caprio et al. 2004).

Systems of social control, highly formalized, where the rules are generally followed (right on the horizontal axis in Figure 1), have in fact all the characteristics that define 'good bank governance': effective functioning rules formal ensuring respect for property and contracts, effective administration and little corrupt, efficient regulated markets, the rules of democracy respected (Nouri Chtourou 2004). We confirm this finding by conducting a PCA (Principal Component Analysis) on the two sets of indicators met: firstly the six indicators of bank governance World Bank Institute and the other set of indicators base "Institutional Profiles" (PI). This analysis ensures that the horizontal axis of figure 2, which shows from left to right degree of depersonalization / formalization of social control, is actually the exact expression of what the International Financial Institutions call "good governance bank" (figure 2).

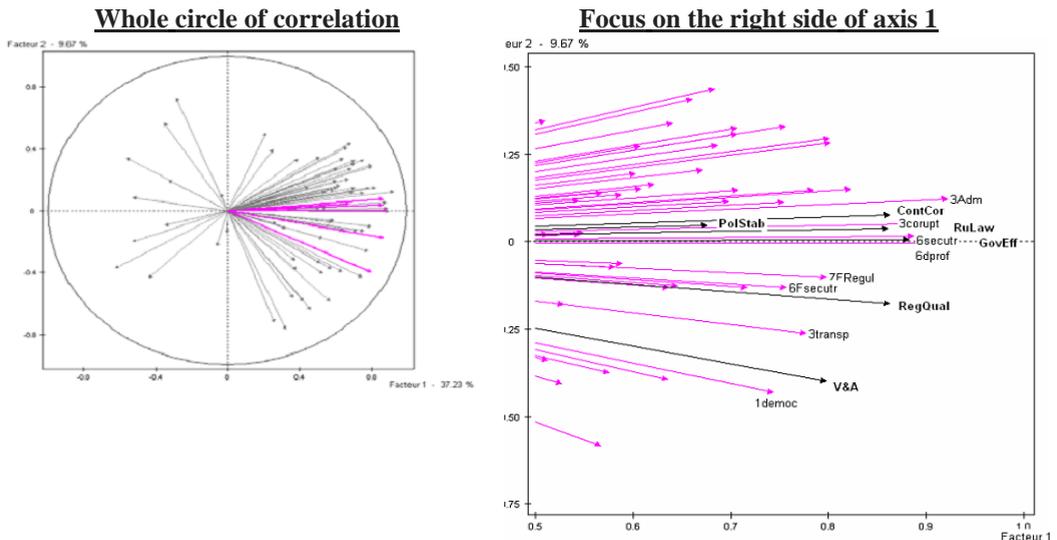


Figure 2 Projected indicators "Institutional Profiles" and WBI governance indicators on the same circle of correlations.

Source: "Institutional Profiles" and World Bank Institute, software SPAD.

The notion of national governance and the phrase "good bank governance" appear in the early 1990s in the work of major international institutions and especially the World Bank. In 1992, it defines governance as the manner in which

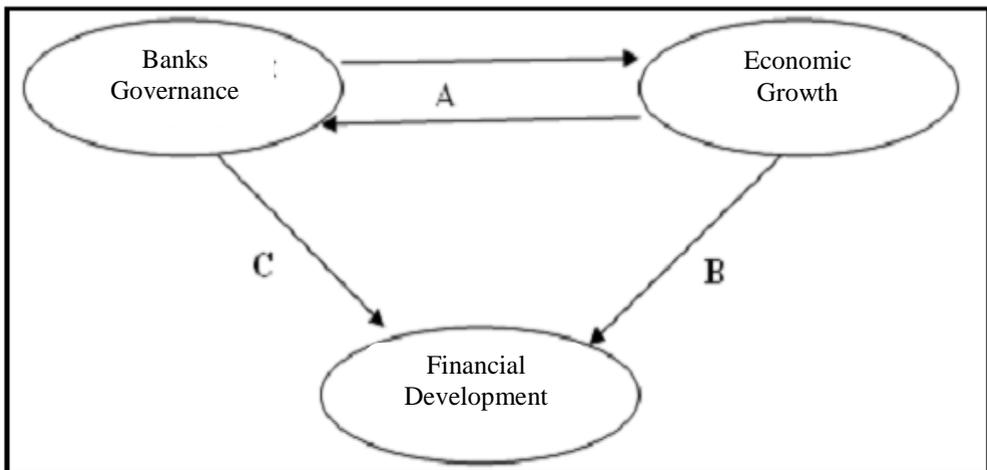
power is exercised in the management of economic and social structures of a country's resources. Good Governance for the World Bank is synonymous with a healthy development management. Today, this concept was taken up by development agencies, the various international and regional organizations. Each has developed its own definition of bank governance.

During the second half of the 19th century, economic crises often took a financial and banking dimension. The government then observed amplifier played by the banking crisis on general economic role. And bank governance is where it main foundation (Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi, 2008). According to Stuart & Gillan (2006), corporate governance recognizes two dimensions. As part of the banking firm, **the external dimension is manifested by prudential regulation**, while the inner dimension is the mode of administration of the bank. Applied to financial institutions, governance is even more important in countries where the banks are, as is the case in Africa in general and Cameroon in particular, the main source of funding. Bank governance then postulates that the mobilization and allocation of funds efficiently reduces the cost of capital for businesses to accelerate capital formation and boost productivity growth (Levine, 2004). However, this type of governance has a number of characteristics that complicate its application:

- Bank governance is broader than firms if in a narrow sense, governance is reduced to defending the interests of shareholders, the banks, it is necessary to adopt a more open approach to economic and financial realities. Levin (2004) distinguishes in this respect different governance by the shareholders and depositors are diffuse or concentrated. The main difficulty is to defend the interests of minority shareholders and depositors.
- Bank governance is highly regulated: face asymmetry (already made) requires resources that applicants can hardly meet. In this case, even if it may hinder the activity of banks' loan production or financial instruments, the intervention of the state or a regulatory authority may alleviate this problem.
- Bank governance is influenced by the high opacity of banks: in fact, an analysis of bank governance presupposes knowledge of the managers of these banks, their control mechanisms and incentive. This is rarely possible, and researchers or observers are forced to fall back on "proximal" indicators, which enable quantitative estimates to be closer to the reality of the exercise of power within and outside the upper echelons of the banking decision.

The relatively recent interest in bank governance and economic consequences accompanied the need to evaluate its various dimensions. Today, measuring governance is so important from the standpoint of national policy, as international economic relations or research in economics and political science. We distinguish different types of indicators: data from surveys of experts and those of the composite indicators polls. Private rating agency risk and Political Risk Services Group (PRS) to produce data base, which contains annual assessments on the quality of bank governance for the period 1984-2006. These are constructed from monthly data from International Country Risk Guide (ICRG), one of the products of the PRS.

The relationship between canonical "good bank governance" and income level allows to find the canonical relationship consistent results including the World Bank Institute (Kaufmann et al, 1999), showing that the good bank governance (the degree of formalization of rules) is strongly correlated with the level of development of countries, in a relationship of circular causality: creating an enabling environment for trade, the formalization of rules allows for increased production of wealth which, in turn, helps fund costly institutional arrangements ensuring the safety of transactions on a systemic scale. That the Bretton Woods institutions call "good governance bank 'ultimately means nothing other than a late stage in the formalization of prudential rules (Kauffman, Kraay and Mastruzzi 2008).



A+B=indirect effect through the growth C=direct effect

Figure 3 Direct and indirect impact of bank governance on financial development

Source: DFID (2004)

Despite a satisfactory state of the financial system, it is not able to finance development. Facing the health of the financial system, the question arises as to what the factors are explaining the low level of development finance (Hugon, 2007). Three main results can be presented as an illustration: the consolidation of the banking system, the expansion of the microfinance sector and the emergence of financial and monetary markets. Before examining these results, it is important to remember that financial development is in our view a process of transformation of the financial system to ensure efficient use of resources. It is for this reason that the consolidation of banking systems is an important result, because the viability of banks and their stability are essential for the development of financial intermediation conditions (Anderson and Tarp, 2003). It is the same with the expansion of microfinance, and the emergence of capital markets. It is financial innovation involved in the diversification of the funding arrangements and the development of financial institutions and instruments.

In general, there is preponderance in Cameroon short funding, margin cash transactions have increased. Clearly, it appears that the banking system has regained solvency and profitability, that is to say, a financial situation necessary for financial development. We will see that also saw a diversification of the supply of financial services with the expansion of the microfinance sector and outside of it all creating financial and monetary markets operating in embryo. Financial development can be understood as the process by which a financial system is gaining depth, efficiency, accessibility, efficiency, more stable, international openness and diversity (Meisel and al. 2007). This process can be greatly affected by the quality of bank governance (Ahlin and al. 2007). The economic literature shows that bank governance influences financial development indirectly (through its positive impact on economic growth) and directly through easier access to financial services companies (Figure 3).

Analysis shows a substantially higher for countries with poor governance in countries where governance was better experienced a banking crisis between 1984 and 2001 proportion. An observation that is true for a wide range of governance indicators. Thus, 86% of countries in which the principle of the rule of law was little recognition suffered banking crises during the period, while only 24 % of countries where this principle was highly respected experienced such crises. Interestingly, this relationship is true not only for measures that may be closely related to the protection of property rights, but also for other indicators, ranging from the absence of

corruption in the public service quality (effectiveness government) and the government's obligation to be accountable to the people.

Similarly, indicators of the quality of governance are useful to explain the volatility of the investment. Using data on the volatility of investment observed in a wide range of industrialized and developing countries from 1980 to 2000, finds that poor governance is generally associated with greater volatility of investment than the is effective governance. This is true for a wide variety of governance indicators and confirms the observations relating to banking crises outlined earlier. These results suggest, as we have seen above, a good banking governance helps to reduce the magnitude of the acceleration effects.

Data on legal origin and the level of financial development?

Research clearly shows that the level of financial development on average over the period 1966-2000 differs according to the legal origin countries (global sample). The three indicators of financial development (liquid assets, the assets of commercial banks and private sector credit as a share of GDP) resulting in nearly the same ranking. The German legal origin countries have on average a higher level of financial development, followed by the Scandinavian countries and Anglo-Saxon, and finally the French legal origin countries. For example, when considering the ratio of the volume of private sector credit to GDP as an indicator of financial development, the countries of Germanic law have an average ratio of 86%, 44% for the countries of Scandinavian law, 32% for the countries of Anglo-Saxon law and 25 % for countries of French law.

This classification does not fully correspond with the predictions of the theory of law and finance, as she says it is the Anglo-Saxon law that best protects creditors, and therefore these countries should have the levels of financial development greater. However, when limiting the sample to developing² countries , the predictions of the theory of law and finance , as countries are legal Anglo-Saxon origin have a higher average than the country level of financial development of French legal origin. We will show using two-dimensional figures that the theory of law and finance does not explain the variations in time of financial development between countries of different legal origins. To do this we will focus only on developing countries therefore

² Low-income countries and middle-income countries as classified by the World Bank (World Development Indicators 2003)

Cameroon. The advantage is that one can distinguish two groups of countries (legal Anglo-Saxon and French) which can compare the evolution over time of financial development indicators.

Study shows that the gap between the average levels of financial development from 1966 to 2000 was not consistent between the two groups of countries. In the second half of the 60s, the gap between the two groups of countries was important, but even in the first half of the 80s, the level of financial development in countries of French legal origin has grown faster than countries legal Anglo-Saxon origin leading to a similar level of financial development between the two groups of countries in 1986. It was not until the early 90s that the gap really began to widen to in 2000 higher than 1966. 43% of French legal origin countries including Cameroon and in sub-Saharan Africa and 29% are in Latin and Central America (against 22% and 26% for the country of legal origin level Anglo-Saxon). But it is actually those countries that have been most affected by the financial crises that have experienced failure of structural adjustment policy in the early 90s , which led to a contraction of GDP growth per capita and probably the level of financial development thereafter. This may explain why Levine, loayze and Beck (2000) find no significant relationship between legal origin and the level of financial development once it is controlled for the income level of each country (figure 4).

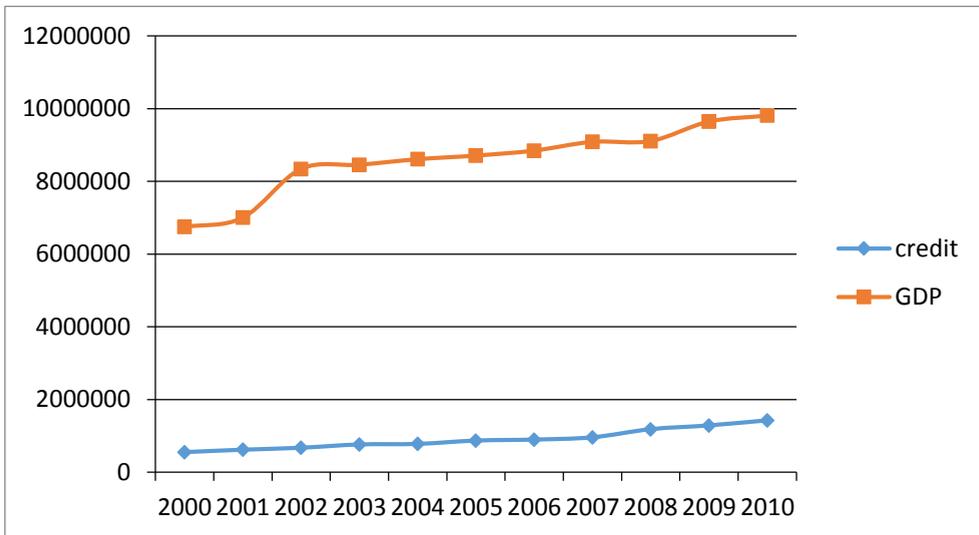


Figure 4 Evolution of the ratio of loans to the private sector / GDP (2000-2010)

Source: COBAC report

By cutting the period 2000 to 2010 in seven sub-periods of five years, and making a test of mean differences, we find that from 2000 to 2010 there was no significant difference between the average level of financial development in countries of Anglo-Saxon legal origin and those of French legal origin in Cameroon. In sum, although the predictions of the theory of law and finance are checked when reasoning in the long run for developing countries, this theory does not allow to explain the variations in the level of financial development across countries and time, hence the need for good governance banking (prudential regulation).

3. EMPIRICAL VALIDATION FOR EFFECT OF THE BANKING ON GOVERNANCE FINANCIAL DEVELOPMENT IN CAMEROON

The technique of principal component analysis is used for the construction the composite index of financial development proposed by the article. This is a technique widely used and one of the most used in the multivariate analysis data. Moreover, this methodology is one of the oldest of the analysis multivariate statistics, as originally introduced by Pearson (1901) and Hotelling (1933). The method enables description of the observations of a data set Multivariate using a reduced size, number non-correlated, and each of which is a linear combination of the original data. The choice of components is done so as to maximize the variance explained by the new variables, minimizing the loss of information. The analysis simplifies the reading of a mass data by reducing the number of dimensions used initially.

The analysis of the financial strength of banks illustrates the difficulty of using fully satisfactory ratios. In particular, they ignore the importance of off-balance sheet transactions and do not differentiate between operations based on actual risks they incorporate. There is therefore an unfortunate gap between the best ratios of assessment in theory, as solvency ratios, liquidity and those whose use is physically easy. Banks are in a substantially more favorable situation with regard calculated by weighting the risks (hedging ratio and liquidity ratio) ratios. They are on average above the standard and to meet the target set for the millennium in the required time. To calculate the banking development, we were inspired by the work of Demetriades and Law (2005) who to be assessed using three indicators.

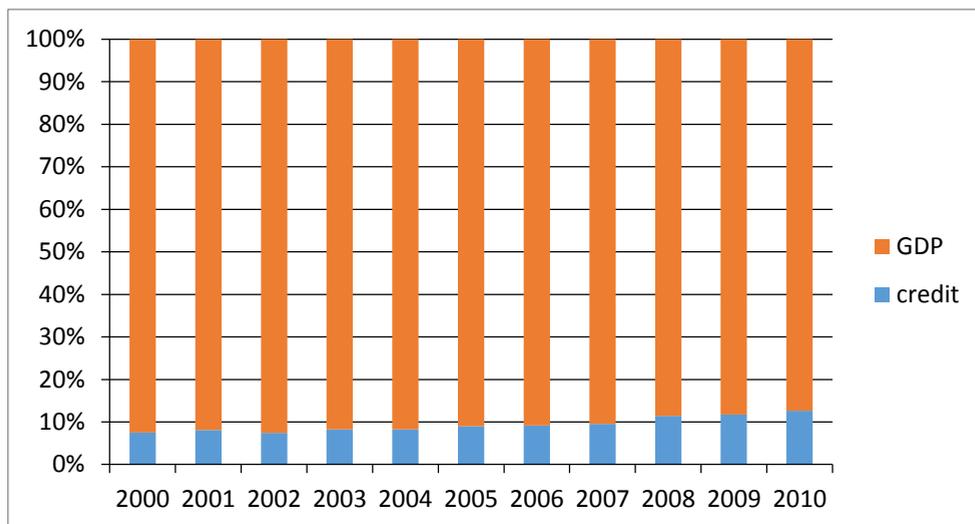


Figure 5 Ratio of loans to the private sector in Cameroon (2000-2010)

Source: COBAC report

These "domestic credit to the private sector," "domestic credit provided by the banking sector "and" liquid liabilities". They represent more precisely the role of financial intermediaries in financing the productive sector. All these indicators are expressed as a percentage of GDP from the World Development Indicators, activities COBAC and BEAC reports. The indicators are based on accounting data of Cameroon's banking system, included in the annual reports of the COBAC. Our study focuses on quarterly data for this better to have a clearer view of the participation of these indicators to the economic development of the country. The indicators used are as follows.

The objective is to test the direct and indirect role of the prudential framework on financial development of the entire Cameroonian banking system over the period 2000-2010 and this quarterly. As we have already explained, we have chosen to represent the development of the financial sector only by the development of the banking sector. This choice is explained by the relative importance and the major part of the banking sector relative to capital markets in the functioning of the entire financial sector in Cameroon. It is also explained by the scarcity of empirical studies on the development of the banking sector and its impact on economic growth. The other reason behind the consideration of the banking sector is linked to the desire to isolate the role of banking regulation on the banking sector in particular. We get 28

observations and we use the multiple regression models for the simple reason that better evaluates the evolution of a variable influenced by external phenomenon. Multivariates to using in this research for determine the level of financial development in Cameroon.

Variable:

- **(tof)** is Total assets (total assets) and measuring the equity of the banking system;
- **(dcf)** is Total deposits and credits and measuring the ability of the banking system to finance the economy and detect the degree of participation in economic development;
- **(pnf)** is Net banking income of the banking system measuring all margins on operations to capture the interest margin of the banking sector;
- **(pfm)** is Net banking income on the total overhead and depreciation and measuring the margin of participation of the banking sector in the economy;
- **(sof)** is The hedging ratio measuring the height of the banking system participation in economic development, avoiding credit risks;
- **(lif)** is Liquidity ratio measuring all less than one month must exceed the resources of the same duration credits;
- **(Crp)** is level of financial development is measured by the ratio of domestic credit to private sector banking domestic product, thereby detecting the ability of the financial system to provide a range of financial assets that would stimulate savings, a range of markets that would affect the financial savings to investment according to the rules of competition.

$$Crp_t = \beta_0 + \beta_1tof_t + \beta_2pnf_t + \beta_3dcf_t + \beta_4pfm_t + \beta_5lif_t + \beta_6sof_t + \varepsilon_t \quad (1)$$

With a constant β , the error term ε_t . The heteroscedasticity test error confirms the absence of heteroscedasticity problem in the data. Errors follow a normal distribution and are uncorrelated. Breusch-Pagan/Cook-Weisberg test for heteroskedasticity.

Ho: Constant variance Variables: fitted values of crepib $\chi^2(1) = 0.03$ Prob > $\chi^2 = 0.8738$. The probability here is over 5 %. The autocorrelation test errors Waston-Durbin, also confirms the non- correlation of 1% error.

This result shows that our model is globally significant (F = 37.85 Statistics). R2 and adjusted R2 are the coefficients of determination of the model, they tell us, respectively, from the variability of the endogenous variable explained by the

variability of the exogenous variables and the quality of the fit. Estimated above we see that: 91.53 % of the level of financial development is explained by the model (explanatory variables). Variables *pnf*, *pfm*, *sof* have a significant influence on the 5% variable *Crp* because their critical probabilities ($P > |t|$) are associated with less than 5% (or $t > 1.96$). Variables *tof*, *dcf*, *lif* have an insignificant influence on the 5% variable *Crp* because their critical probabilities ($P > |t|$) are associated with greater than 5%. The equation can be written as:

$$Crp_t = -140 - 0,48tof_t - 6,28pnf_t + 0,58dcf_t + 838pfm_t + 158,2lif_t + 53255,01sof_t + \varepsilon_t \quad (2)$$

- * Sktest residue Skewness / Kurtosis tests for normality. Normality test errors Variable | Pr (Skewness) Pr (Kurtosis) adj chi2 (2) Prob> chi2 is greater than 5%. Errors follow a normal distribution.
- * archlm lags (1). LM heteroscedasticity test errors and test for autoregressive conditional heteroskedasticity (ARCH) If Prob> chi2 is greater than 5%. Errors do not follow a lag (p) and df chi2 Prob> chi2, ARCH (1) model when errors are homoskedastic. H0: no ARCH effects vs. H1: ARCH (p) disturbance.
- * Durbin's alternative test for autocorrelation. Durbin Durbin-Waston waston d-statistic (10, 28) lags (p) and df chi2 Prob> chi2 = 1.308486. If Prob> chi2 is greater than 5% errors are uncorrelated and durbina, lags (1) H0: serial no correlation.

Parameter estimation by the method of least squares gives the following results. If total assets increased by 1% then the level of financial development reduces 0.485% because banks are reluctant to finance investments. When the net banking income increased by 1%, the level of financial development reduces 6.283% as banks set very high rates does not allow investors to make loans. We are witnessing an increase in the financing of the economy of 0.58% when banks find an increase in their premiums this because of the difference between interest rates.

To check the validity of the estimates by using the method of Analysis of the main component, and the relevance of the variables used, this session conducts robustness tests results withheld. First session reassesses the index with three different methods of analysis and calculates the coefficient correlation methodologies to control for possible differences methodological. Then sensitivity tests are performed to confirm the results of the previous session. The PCA method constrained Single the sum of squares of coefficients weighting of variables in each component. This is a standard agreement on the eigenvectors of the data matrix. However some authors and software uses a different standard: they multiply the

eigenvectors by root of the Eigen values. This normalization implies that equalizes the sum of squares variance explained by each component. This session reassesses the index with this Standardization non-standard. In a second estimate, we determine a value for each coefficient and equal build a third index. In this specification, the sum of the coefficients equalizes the unit (Stiglitz, 2005).

Table 1 Analysis of Robustness using good bank governance

Variable	Coef	Std.Err	t student	P>t	95% conf.	Interval
Tof	-0,4852303	0,371551	-1,31	0,206	-1,257926	0,2874649
pnf	-6,283707**	1,995696	-3,15	0,005	10,43398	2,133429
dcf	0,5846545	0,3584506	1,63	0,118	-0,160784	1,330093
pfm	838309,2*	239182,9	3,50	0,002	340901,1	1335717
lif	158,2614	398,1302	0,40	0,695	-669,6956	986,2185
sof	53255,01***	6511,958	8,18	0,000	39712,65	66797,36
Cons	-1405964	422878,1	-3,32	0,003	-2285388	-526541
F(10,253)=41,18 Prob>F=0,0000 R ² =0,5049 Obs=264						

(* Significance at 1% ** Significance at 5% *** Significance at 10%)

Banks find interest to finance the economy 838309.2% when they can take loads.

Compliance with the liquidity ratio by banks increased by 158.261% the level of financial development; at this level, respect the liquidity ratio better secures the financing of the economy.

4. ECONOMIC ANALYSIS AND PARADOX OF FINANCIAL DEVELOPMENT IN CAMEROON

Compliance risk coverage ratio increases 53255.01 % the level of financial development; by compliance with the ratio of hedging protects the banking system in their spot gives credit to the economy. In light of the results, we note that the selected model is significant at 10%. This explains why despite tough competition, and changes constantly in the economic environment, the Cameroonian banking system remains efficient. Compliance with prudential standards is an area likely to have a positive influence on the development of the financial sector, encouraging financial innovation and facilitating the completion of financial transactions both within and outside the borders of a country.

For the coefficients of the variable banking regulation, we can see that they are significantly positive, albeit at different confidence levels for the estimated equation. This teaches us that a policy of control and regulation of banking, described by the concept of "banking rigor" can be beneficial and favorable banking development in Cameroon. This result is not going along with the claims of theories "libéralisationnistes" financial activity, since according to the followers of these theories; openness to competition in the banking sector can be beneficial for the sector, including developing countries.

Indeed, these policies have triggered financial instability and weakening the banking system, due to a lack of banking supervision and discipline produces, among other things, the opening of bank competition without safety nets, to better facilitate this passage. This financial turmoil has caused, in turn, a series of systemic crises in other financial centers in other emerging countries. Recall also that the construction of the indicator of banking regulation, we can use other variables. This is the level of demand for entry of new banks in the banking market, the index of regulatory capital, the degree of restrictions on banking activity index monitoring banks and independent power Official bank supervision. This means that today, followed by a policy of restrictions on the entry of new foreign banks and restrictions on banking activity would favor the development bank.

This corroborates the theoretical claims of Anderson (2004), which considers that the prudential regulation has a positive effect on financial development, if only because of the fact that the increase in income is accompanied by an increase in savings and thus acquisition of financial assets. The work of the endogenous theory supported the idea of dual causality. Risk sharing that allows financial intermediation, and encourages investment in new technologies, there are costs and involves itself a certain level of per capita product. We can also explain the significantly positive coefficients of GDP per capita by the fact that the banking sector has, as well as other sectors of economic development.

Changes in the financial system after Cameroon regulatory reforms do not provide a real financial development because they are far from having solved the thorny problem of financing development. On the one hand, the regulation could not eradicate some dysfunctional financial systems, which constitute real obstacles to the financing of the economy. Regulation has brought noticeable changes neither in relation to the problem of access to financial services or in relation to the business

climate. Regarding the continued exclusion of access to financial services, the service offer specific funding has not recorded significant progress, due to the tightening of the collection of savings and access to credit. We see that the collection device resources have kept all its major handicaps like the concentration of the banking network of high transaction costs, etc. Credit rationing remains a major market characteristic. Some bank customers cannot obtain credit as much as they want, even though they are willing to pay high interest rates.

This exclusion is done through several obstacles, the most visible are the conditions imposed on them. Banks require for example the possession of a bank account, which is not the case of certain class of agents. Banks are thus at the center of a conflict that can be defined by the incompatibility between on the one hand the concern to solvency and profitability of customers, and other general economic interest, supposed to be determined by the investment financing. The exclusion of access to credit is more pronounced for investment loans or financing for development. Indeed, the share of short-term loans is higher than investment loans (medium and long term). Banks charge under intermediation services margin to cover their operating costs (overheads, depreciation and amortization) and a profit for the return on equity.

Regarding the bad business climate, it is important to note that the legislation has not changed the institutional environment. This is for example the monetary and financial policy. The business climate has deteriorated significantly. This follows from the fact that laws and regulations are not favorable to the development of access to credit, and in particular the judicial systems. The continued exclusion of access to financial services and the existence of a bad business climate in Cameroon are two important limitations of prudential regulation. Added to this are the paradoxes that currently characterize the financial systems.

On the other hand, is observed after the introduction of the aberrant regulation of economic phenomena, such as excess liquidity and the type of financial innovations. Regarding the excess liquidity, the starting point of his paradox lies in the concept of economy of debt, introduced by Hicks (1974) to distinguish between types of financial systems. You have the problem with economy of debt and the economy of the capital markets. This problem occurs when one finds oneself in a situation where they can't by banks hold a volume of idle well above what can be considered optimal (excess liquidity) cash.

On financial innovations, contrary to what one might imagine, that they are polarized on the supply of capital given the problems related to the financing of development, they put more on the supply of services generating commissions. Now it is well known that access to credit is the apple of discord banks and the private sector. At the institutional level, the regulation establishing microfinance institutions subjected to almost identical to those imposed on conventional banks constraints.

5. ECONOMIC POLICY RECOMMENDATIONS AND CONCLUSION

The completion of the restructuring of the financial system as noted Touna Mama (2002) should lead to a more aggressive policy of collecting savings and a more aggressive policy of distributing credit. There can be no reliable credit policy without sound banking system and enjoying the confidence of the public. However, it is surprising that banks are restructured as Amity bank shortly after forced to close despite monitoring COBAC. If commercial banks persist in the policy of distribution of credits is mainly focus on the short term to the detriment of medium and long term, then it is absolutely necessary to create specialized banks in the financing of development. The need to accelerate the implementation of the first quotes at the stock exchange in Douala remains urgent. Moreover, it is essential in the financial structures to recreate Cameroon to remember that the priority is the development and integration in the globalization movement is needed. Adjust the financial system globalization, as a consequence of globalization is in no doubt the formation of large banks through mergers, absorption, acquisition, strategic alliance; to benefit from economies of scale and dimension.

The consolidation of the macroeconomic environment ultimately comes down to purify not only the institutional environment, by addressing the problem of judicial delays, bad checks, bank secrecy, and corruption; but also the socio-political environment. Thus the State shall direct its action towards improving the legal framework by making it more effective legal remedies. In addition, missions COBAC, namely to ensure the control of banks and credit institutions should be strengthened. Also, COBAC should enjoy a coercive power to not refer ultimately to the national authorities to exercise his disciplinary powers. Strengthen banking regulation in Cameroon will be a priority. COBAC regulation should therefore have greater flexibility to apply specifically to each type of banking institutions. A simple way to ensure this flexibility would be to establish a flexible regulatory process in

which the type and degree of regulation depends on the associated activities of the banking system risk. Current regulations should change basic and based on the optimal prudential regulation that takes better account of the specific features related to information asymmetries that mark the activity of banks (Minsky, 2007).

Indeed, good governance has, in recent years, as a determinant of financial development. We have thus shown that the elements of good governance provides an environment conducive to financial development and consequently to economic growth. The use of governance indicators without taking into account their limitations may be a bias to the expected results. Indeed, governance indicators are based on perceptions and determined by subjective opinions. In addition, the absence of an underlying conceptual framework or theory of governance to identify the causes of governance outcomes reflected in the indicators, lack of clarity around the reasons for which this country gets such a result for such indicator. It is therefore paradoxical that donors and investors judge and sometimes punish developing countries like Cameroon to perceived transparent governance on the basis of indicators such complex absence.

Bank governance, from the perspective of prudential regulation has been the subject of much research. Menkhoff & Suwanaporn (2007) state that financial liberalization carried out in underdeveloped institutional environment enhances the proliferation of banking crises, which suggests that the ineffectiveness of bank governance mechanisms can be a source which can aggravate crises bank. Angkinand (2007) showed that adequate banking supervision mitigates banking crises. Horicuchi (2000) argues that the failure of bank governance is causing deep crises in Asian countries. Recently, Mehram (2004) shows that good banking governance induces health and sustainable growth of the economy. Similarly, Caprio et al (2004) concluded that good governance is the guarantor of efficient allocation of savings.

The policy implications of the analysis are clear. Financial development should be encouraged, but it is desirable that it be as regular as possible. This means that financial liberalization policy should not be conducted in no matter what conditions. According to our empirical results, the instability of financial development is favored by an inflationary environment, vulnerability to external shocks and poor rule of law. That is why financial development will be more conducive to growth and poverty reduction that macroeconomic policy will be

stable, the external opening, including financial, will be gradual and that the banks will be subject to surveillance. However, the question of what type of banks and banking regulations which are better able to ensure the regularity of financial development remains a largely unresolved issue (Severino, 2000).

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SURVEY ARTICLE



“DECIPHERING THE POLITICAL ENTREPRENEUR’S BLACK BOX”: ON THE INCOME FUNCTION OF THE ULTIMATE DECISION MAKER IN STATE AFFAIRS*

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Abstract: *The present analysis builds upon a research topic which has been extensively, unevenly though, scrutinized in both modern economics and business literature: the theory of the entrepreneur. The aim is to bring to the attention of the academic community a new line of research focusing on the role played by the ultimate decision maker that activates in the political arena, i.e. the political entrepreneur. Our analysis is going to elaborate on the component parts of the income received by the political entrepreneur, starting from the catallactic split of the different economic, in the broad sense, functions he performs. This Austrian School approach can help economists to fine-tune their understanding of public policy decisions, crux issue for both making economic sense and doing business.*

Keywords: *market entrepreneur, political entrepreneur, free market, State interventionism, praxeology, Austrian School of economics*

JEL Classification: *B53, D20, D33, D72, L26, P50*

1. INTRODUCTION

Austrian School scholars have dedicated a substantial part of their work to the *entrepreneur*, “the lost character” in neoclassical macroeconomics’ “big picture” or microeconomics’ “black boxes”. Basically, in Austrians’ view, there is an

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entrepreneurial function at work in each and every acting individual, although the irreplaceable role played in the functioning of economies by the “capitalist-entrepreneur” or by the “promoter-entrepreneur” deserves particular emphasis, since he is the very driving force of the modern capitalist system.

Without the entrepreneurs, production could not be conceived, as they master, by understanding and anticipation, the wants and needs of the population of consumers which reunites all of us. “They are merely superior to the masses in mental power and energy. They are the leaders on the way toward material progress” (Mises, 2008: 336). The essence of the role played by the entrepreneurs and the organizations they build based on economic calculation is part of the subject of *catallactics*, *praxeology*’s fine-tune decoding tool of the economic life.

While in the Austrian School epistemic tradition praxeology is the general logic of human action, catallactics is “[t]he analysis of those actions which are conducted on the basis of monetary calculation. Market exchange and monetary calculation are inseparably linked together [...] money and monetary calculation are conditioned by the existence of the market” (Mises, 2008: 235). As far as market transactions are concerned, *viz.* voluntarily exchange, and economic calculation is possible, catallactics can help explain the implications of calculated human action.

Through the lens of praxeology, and catallactics in particular, we are able to understand the role played by the entrepreneur, and defragment his income string along the catallactic functions he is engaged in (wage, interest/rent, profit). But what happens if one wants to analyse human action in the context of an abolished/distorted market, as it is the case when and where politics meets economics, or political means interfere with economic means, in Oppenheimer’s (1975) paradigmatic discrimination. The present article is centred on the political entrepreneur, the ultimate decision maker in matters concerning expropriation and policymaking. Thus it attempts to bring to the forefront the equivalent of the (economic) entrepreneur and to dehomogenize the State.

This approach, which is more compatible with methodological individualism, occupies a distinct position in the Austrian political economy literature, as it stresses the economic calculation aspects that underlie policy decisions. The political entrepreneurial function is analysed in accordance with the catallactic split of the ultimate decision maker’s income string. This allows us to address some potential objections that can be raised against the Austrian analysis of the State, *viz.* its

similarities and distinguishing characteristics that can be drawn between it, on one hand, and banditry or protection services providers, on the other. Also, this will enable a subtler understanding of the judgment which underlies political decision-making. By stressing the residual nature and the trade-off implied by *Political Profit*, we consider that political entrepreneurship will prove to be an important piece in furthering our grasp of what is factored in when political actors engage in action.

2. THE EXISTING AUSTRIAN SCHOOL THEORY OF FREE VS. HAMPERED MARKET

Before placing the entrepreneur within the political habitat, we will make a brief detour so as to view the comparative designs of the general economic systems.

Two cases we will recollect in this respect, opposing free market referential to its governmentally-coercive “alternatives”: *interventionism* and *socialism*.

- The first case is that in which a market emerges (there is a demand with an anticipated supply to be provided by willing entrepreneurs), but exchange and prices are distorted by a third-party using coercion – e.g. markets for high necessity or luxury goods. The implications of such a system have usually been treated under the guise of *interventionism*.

Most of the Austrian School literature written on the subject has usually focused on the implications of this distorted version of capitalism. Political measures are portrayed as ineffective and subject to spiralling expansion – interventionism begets interventionism. State involvement in the functioning of the free market always distorts the system, which is forced to readapt and this leads to the failure of such measures which never reach the sought after end.

When it comes to analysing the incentives that lead to the adoption of such a counteractive path, the Austrian scholars take two main opinions:

- The first one considers the policymaker’s motives as irrelevant as this would bring into question the scientific objectivity – value-free feature – of the analysis (this line of reasoning, characteristic of Mises, even gives the policymaker the benefit of the doubt, presenting him as benevolent and seeking the wellbeing of his fellow citizens), while the only important concern of the analysis should be on the futility of such measures (Mises, 1998).
- The second one calls into discussion the double talk of the policymaker as he is seen as favouring different stakeholders within society in order to obtain personal gains (re-election, personal benefits for himself or his benefactors).

Such a perspective is characteristic to Rothbard in his thymological works (Rothbard, 1994).

- The second case is that in which the market is simply abolished, *i.e. socialism*. Without delving into the debate, it suffices to say, for our present purpose, that in the absence of private property over the factors of production, market prices cannot form. Consequently, the rational allocation of resources is impossible and the planning board is left, in the long run, with economic collapse (Mises, 1990).

Both of the above lines of reasoning are part of the more general science of praxeology and are analysed under the aegis of catallactics (see below figure). As mentioned above, the common denominator that links them is the active involvement of the State, although the nature of the ingression upon property rights over the means of production makes the difference between a limited order and outright planned chaos.

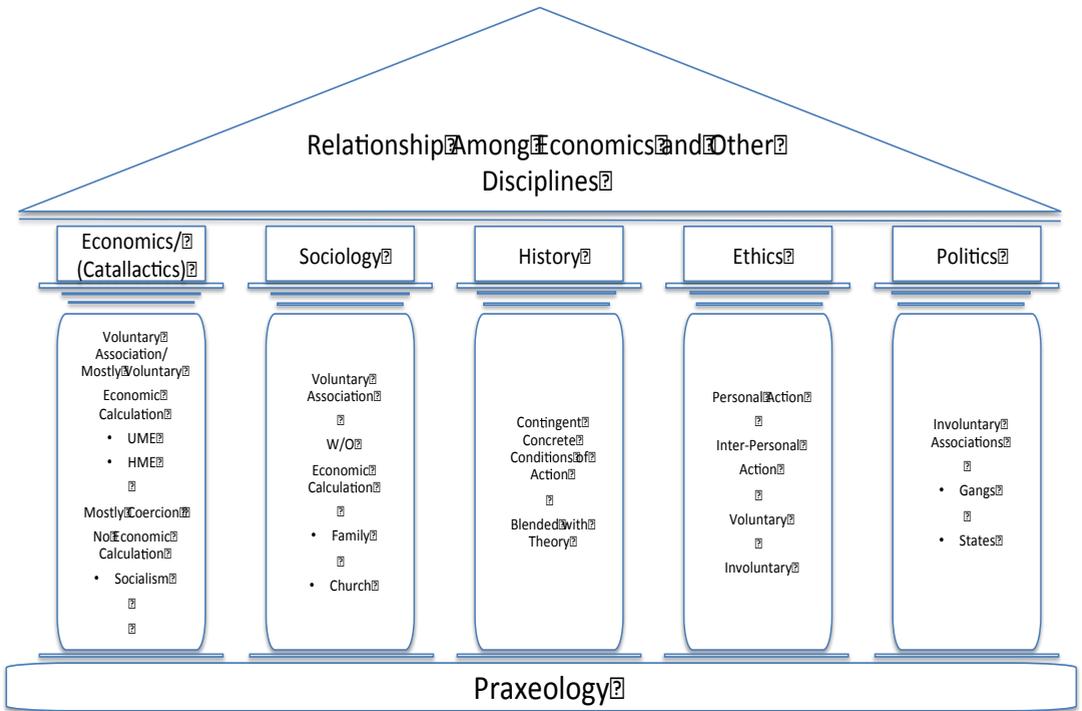


Figure 1 Relationship among economics and other disciplines (a perspective from the Austrian School)

Source: Authors' own representation.

In contrast to the subject matter of the Unhampered Market Economy (UME), under interventionism a competitive market for certain goods and services is not allowed to emerge. The corollary of a Hampered Market Economy (HME) is that resources are allocated toward different goals than the ones suggested by economic calculation, or the supply is monopolized, while the necessary resources for its functioning and expansion are ultimately coercively acquired³. As mentioned above, the implications of such measures have been widely analysed, but there seems to be one element missing: a general theory of the actor (and his means of rationalizing) that ultimately takes the decisions in matters concerning State involvement, *i.e.* the political entrepreneur. But, before praxeologically visiting this character, we will briefly take a look at his economic/business counterpart.

3. THE EXISTING AUSTRIAN SCHOOL THEORY OF BUSINESS ENTREPRENEURSHIP

In describing the entrepreneurial economic function, the Austrian literature is split into two lines of thought (Salerno, 2008):

- *The pure entrepreneur branch*, a path pioneered by Mises (ambiguously though) and further developed by Israel Kirzner, inspired also by Hayek’s accent to information dispersion and circulation in society. Kirzner’s entrepreneur simply possesses the “gene” of “alertness”, which facilitates for him the “discovery” of latent “opportunities”, amongst which he takes recourse to inter-temporal and inter-spatial prices arbitrage.
- *The realist approach*, which is mainly based on the resource ownership aspect of the entrepreneurial function – Menger, Böhm-Bawerk, Mises (under certain lines of reasoning), and Rothbard. Assuming and trying to overcome uncertainty, being owner-capitalist, the Rothbardian entrepreneur is the „brains” of his

³ A comment on State Owned Enterprises (SOE) and natural monopolies is in order. While the State’s core function consists in coercively extracting resources (*via* fiscal and monetary policy measures or by discriminating between economic actors), SOE and natural monopolies provide goods and services for consumers that must voluntarily purchase them. Ultimately, both SOE and natural monopolies rely on State coercion, but they are a step closer to meaningful economic calculation, taking into account that their financial situations clearly reveal how much of the bottom-line result is due to *ex post* validation by consumers and how much is due to on-going State involvement. The State can create such organizations or subsidize them, but it has to ultimately obtain these resources *ex ante* by using or threatening to use force.

firm/enterprise, by organically engaging owned resources towards which he takes the risk of (eventually) losing them.

Without entering this debate, it suffices to say that the entrepreneur plays the central role in Austrian economics, and that this article is going to be rooted in the realist approach, that stresses the property/ownership aspect of the entrepreneurial action.

In order to understand the firm/enterprise, the archetypical method of organizing production, and its numerous variations, Austrian theory reverts to the entrepreneur. In essence, the firm is “the capitalist-entrepreneur’s project which includes his owned or borrowed material resources (capitalists that play the part of creditors) that are configured and combined, as a result of economic calculation, with labour, under the guise of uncertainty, in order to obtain [...] profit” (Jora, 2013: 187).

The limits of the firm are set to the point in which the marginal transaction cost for acquiring a certain input (on the external market) equals the marginal cost of internalizing its production, together with the marginal cost of measuring the efficiency of this transaction, in a Rothbardian enlargement of the Coasian framework. This means that, in order to obtain the most efficient method of organizing production, the entrepreneur must base his decision on objective economic calculation. Thus, the prime requisite for computing divisional profit or loss is an economically meaningful transfer price for the various components that make the object of his decision. If an external market exists for each component, the entrepreneur can use it as transfer price; without it, another method must be employed, which reduces organizational efficiency (Klein 2010, 1ff.). When a firm expands to the point where an external price disappears (it becoming the sole producer and user of that input), a calculation problem appears. Hardships exacerbate as external markets fade away, and “islands of non-calculable chaos swell to the proportions of masses and continents” (Rothbard, 2004: 548).

In essence, the Austrian Theory of the firm is centred on the capitalist-entrepreneur, the teleologically-oriented actor that aims to maximize his profit. With this aim in mind, the entrepreneur organizes production in firms, entities based on economic calculation. The capacity of the entrepreneur to calculate in monetary terms the viability of his operations, by using market prices as benchmark, determine the external limits of a firm.

4. THE EXISTING AUSTRIAN SCHOOL THEORY OF STATESMANSHIP

What is the *State*? It is the generally recognized monopolist that can legitimately exercise force over a given territory. This entity decides the price its citizens must pay (the tax level) in order for it to perform the task of ultimate decision maker (Hoppe, 2013). According to van Creveld (1999), the State is an abstract entity, different from both its members and its rulers. Like a corporation, the State entity has a *legal persona*, which amounts to more than the sum of its parts.

Like the modern firm, the State has acting individuals behind it, the living and breathing actors that are the *de facto* owners of this complex machine: *the political entrepreneurs*. Although, at least in modern democracies, political entrepreneurs are elected and mandated by the people to govern in their name, the actual beneficiary of all State belongings and the ultimate decision maker is still an individual, or a group, that have the last say in the allocation of resources.

Nota bene. The political entrepreneur is a distinct figure from the public manager. The so-called “public servant” is an (more or less formal) employee of the political entrepreneur. The discretion he can exercise in the allocation of resources depends on the (again, more or less formal) mandate that is handed over to him by the political entrepreneur. A similar point is made by Mises (1944: 43) in his *Bureaucracy*: “Bureaucratic management means, under democracy, management in strict accordance with the law and budget. It is not for the personnel of the administration and for the judges to inquire what should be done for the public welfare and how the public funds should be spent. This is the task of the sovereign, the people and their representative. The courts, the various branches of the administration, the army and the navy execute what the law and the budget order them to do. Not they but the sovereign is policy making”.

Although a number of institutional frameworks can be imagined – monarchy, democracy, dictatorship, etc. – the essential role played by the political entrepreneur is immutable. His incentives do vary from one institution to the other, but fundamentally his function, namely the type of decision he must adopt, remains the same: handle uncertainty in order to maximize the amount of expropriated resources he ultimately controls and reallocate them in accordance to personal preferences, that is consumption (personal, *par excellence*), investment (forego present consumption in order to maximize future consumption *via* an expanded expropriated income), or give away.

4.1. De-homogenizing some Austrian-libertarian approaches of the State

The crux of the problem is whether the role played by the political entrepreneur as described above is totally arbitrary or it might be ascertainable in an economically relevant way, *i.e. via* economic calculation. From this point on, opinions begin diverging even among Austrian scholars. While the mainstream economics profession is concerned with the optimal institutional decision making arrangement that maximizes social welfare and shows how these objectives can be set astray by pressure groups (Buchanan, 2003), Austrian economists are preoccupied with “more fundamental” issues. They typically hold “private and public sector institutions to similar standards, but contrast these institutions accordingly to their greatest and most fundamental differences” (McKenzie, 2007: 2).

The prime divergence in opinion appears between Austrian *minarchists* and *anarcho-capitalists*.

- As the most illustrious representative of the first category, Mises presents the State as an indispensable institution. In its absence, a Hobbesian world would emerge that would ultimately impair the division of labour. For Mises, the best possible institutional arrangement presupposes that the State assumes the role of “night watchman”. This must be corroborated with classical liberalism, as ideology, and its political corollary, democracy (Mises, 2002). He does not call into discussion the State’s ability to engage in economic calculation, but views the government as dependent on the electorate’s will. Political competition, like its market correspondent, tends to eliminate governments that do not serve the will of the people. Although he does not explicitly name it, we can interpret that, in Mises’s idea, the sovereign (political entrepreneur) does engage in some kind of calculation that has to realize the desires and welfare of the general public, while keeping within legal and budgetary limits. In some way, he is calculated, even if he might have been distorting his own data (*i.e.* the market prices).
- The anarcho-capitalist branch of the School, led by Rothbard, perceives the State as parasitic. The State is a redundant institutional arrangement that breeds more conflict than it manages to abate, and thus inhibits the division of labour. Its only legitimacy is based on coercion, but it is worse than a robber because there is no way of protecting yourself from it (Hoppe, 1994). In Rothbard’s view, there is no rational and ethical argument that can support the idea of a State. Moreover, the State’s ability to engage in any kind of rational calculation is impossible. There

is no such thing as public investment, only government consumption⁴. Rothbard’s view that government spending is consumption *per se* is not entirely accurate. Is there no difference between the decision of building a summer palace and constructing a road? An observation in this spirit is made by Block and Barnett (2009: 187), as they write that “when the politician acts not for his own ‘direct satisfaction’ but rather for the sake of future goals of his, it is difficult to see why this cannot properly count as investment”.

4.2. De-homogenizing the incentives specific to different political regimes

In his comparison between monarchy and democracy, Hoppe agrees with Rothbard that the State negatively impacts the division of labour, but the main thesis of the book is focused on the differences that result from the institutional arrangement under which the State apparatus is organized. Thus, Hoppe draws a distinction between *privately owned* and *publicly owned* government. In the case of privately owned government, “expropriated resources and the monopoly privilege of future expropriation are individually owned. The appropriated resources are added to the ruler’s private estate and treated as if they were a part of it. [...] In contrast, with a publicly owned government, the control over the government apparatus lies in the hands of a trustee, or caretaker. The caretaker may use the apparatus to his personal advantage, but he does not own it [...] He owns the current use of government resources” (Hoppe, 2001: 46).

- The two main consequences of the private (monarchical) institutional arrangement and of the fact that the monopoly privileges can be transmitted to the heirs are: (1) a private government will tend to have a systematically longer planning horizon; (2) the subjects will act, in their turn, accordingly. The essential element for our present discussion can be found in the following paragraph: “He [the private government owner] will not want to increase his current income at the expense of a more than proportional drop in the present value of his assets, and because acts of current income acquisition invariably have repercussions on

⁴ “As for the transfer expenditures made by the government (including the salaries of bureaucrats and subsidies to privileged groups), it is true that some of this will be saved and invested. These investments, however, will not represent the voluntary desires of consumers, but rather investments in fields of production not desired by the producing consumers. They represent the desires, not of the producing consumers on the free market, but of exploiting consumers fed by the unilateral coercion of the State [...] The new investments called forth by the demands of the specially privileged will turn out to be malinvestments” (Rothbard, 2004: 1168).

present asset values [...] private ownership in and of itself leads to economic calculation and thus promotes farsightedness. In the case of the private ownership of government, this implies a distinct moderation” (Hoppe, 2001: 46).

- On the other hand, the caretaker will try to maximize current income, instead of total government wealth. “Indeed, even if the caretaker wishes to act differently, he cannot, for as public property government resources are unsalable, and without market prices economic calculation is impossible” (Hoppe, 2001: 48).

It becomes evident from the quotes above that Hoppe does not exclude the possibility of economic calculation by government. Unlike Rothbard, who perceives all government expenditure as pure consumption, Hoppe’s perspective consists of two distinct phases: first, taxation is wasteful *qua* institutionalized theft; second, after expropriation occurs, some calculation does take place, but due to institutional particularities, and this is possible only under the auspices of privately owned government.

4.3. De-homogenizing the “ex ante” and “ex post” State investment acts

A more recent work by McCaffrey and Salerno (2011) is dedicated exclusively to the subject matter concerning the political entrepreneur. As the authors point out: “[w]e will show that the idea of entrepreneurship in economic theory proper has an analogous function in the sphere of government operations; that is, in the sphere of socially organized, coercive economic exchanges” (McCaffrey and Salerno, 2011: 553). The economic function of the political entrepreneur is to direct “coercively obtained resources by the State toward processes of production which would not otherwise have taken place” (McCaffrey and Salerno, 2011: 553). Additionally, political entrepreneurship can yield “quasi-profit-and-loss”, depending on his ability to correctly anticipate future market conditions. The only distinguishing feature consists in the method of financing, *i.e.* compulsory (*vs.* voluntary).

From the role attributed to the political entrepreneur by McCaffrey and Salerno, it seems that their take on this particular economic function stands at the opposite end with respect to Rothbard’s view of the subject. This observation must be accepted *cum grano salis*, as the authors clearly state that: “If the term ‘investment’ is meant, as it is for Rothbard, to refer to consumer-driven-production, then government expenditure can never be considered investment *ex ante*, although *ex post* it might turn out to be used in a way which consumers find beneficial” (McCaffrey and Salerno, 2011: 555), continuing by holding that if the *ex ante* approach is emphasized, another term must

be agreed upon to replace “investment”, although “this does not contradict our argument however, which depends only on the ability of government to devote scarce resources to the time-consuming production process”.

McCaffrey and Salerno also clearly considers that “[t]he existence of a State as such does not necessarily imply the existence of political entrepreneurship. It is always necessary for a State to coercively obtain some revenue to support itself, but it is not necessary that it devote this revenue to production. Without this commitment of resources, no function meaningfully comparable to entrepreneurship can exist in government, because in this case all government revenue is consumption” (McCaffrey and Salerno, 2011: 558).

McCaffrey’s and Salerno’s approach might suffer from a blind spot. For them, calculation takes place in the very moment when the decision to redistribute taxed resources is adopted; until then, the authors mention only of the hindrance brought upon the private sector through taxation. Once this point is passed, the political entrepreneur’s decision to invest in profitable enterprise and that of the (economic) entrepreneur tend to become perfectly interchangeable, as both are profit maximizing. To address the political entrepreneur’s ability to calculate in this two-staged manner is confusing, tantamount to comparing economic calculation with “shoot now, ask questions later”. The political entrepreneur’s ability to calculate does not resume solely to “rational redistribution “, but to the tax decision *per se*. Besides this, if the only issue is an ethics based observation that the source of the investment fund is coercively extracted, what then is the difference between the State and the private defence services provider, *i.e.* the bodyguard? If the difference is only one of ethical nature, and the two actors are aiming at maximizing income, quasi-profit should equal (voluntarily got, economic) profit.

5. TOWARDS AN AUSTRIAN SCHOOL THEORY OF POLITICAL ENTREPRENEURSHIP

5.1. Short note on insights which comparative catallactics might provide

Even when coercion is in the scene, catallactics, the best developed branch of praxeology, can aid us in understanding the role of the *political entrepreneur* by contrasting him with his *business-oriented* counterpart. Although, ethically speaking, there is a verge between the (economic) entrepreneur and the political

entrepreneur, it cannot be ignored that both of them must tackle uncertainty and engage in action with economic consequences, which must be based on a decision-making rationale. And although the parallel with his economic peer becomes evident when the function is broken into pieces, one can observe that only the wage component (and depending on institutional arrangement, *i.e.* under monarchy, this also applies to the interest rate) finds its exact comparable counterpart in the market. *Political Profit* only resembles economic profits because it has to be conceived as residual.

- First of all, as in the case of the economic entrepreneur, profit can be collected only after all the factors of production that have gone into the perpetuation of the coercion monopoly have been remunerated. The fact that clear financial situations that emphasize such residual payments do not exist and the fact that some of the boon may not materialize in monetary benefits only show the difficulty in giving such an income objective dimensions, and the emergence of islands of non-calculable chaos.
- Second of all, *Political Profit* is residual in the sense that it depends on the private sector's market prices and viability in order to have an approximation of its present and anticipated future proportion and in order to make sense of the world around. The rationality of the political entrepreneur is derived and necessarily linked to the private sector, *viz.* the prices that result during the continuous bidding for factor of production. At the same time, the political entrepreneur is limited by the fact that he is a second hand dealer in information concerning the specifics of time, space, and the structure of capital, *ergo* a simplifier and a uniformitarian. But, his second handedness should not be interpreted as lack of initiative. He is not passive. He is ever expanding, ever calculating. What distinguishes the political entrepreneur from the interventionism (in the narrow sense) and the public choice literature is his ability to shift the paradigm. He is not only making the best out of the *status quo*, but he is also an institution builder. Like the business entrepreneur, he can create new organizations and institutions, thus changing the rules of the game.

5.2. Short note on “State-bandit”, “State-bodyguard” possible analogies

As previously mentioned, the issue is whether or not the political entrepreneur can engage in economic calculation, and what is the nature of this exercise. In order to clearly show the distinctive role played by the political entrepreneur, one must clearly distinguish him from the *stable bandit* (the warlord/mobster), who is different

in kind, and the *private supplier of defence services* (the bodyguard) who is different both in kind and in spirit. Starting from this delimitation of the three actors, we can then attempt to sketch the income function of the political entrepreneur.

We have seen that, for Mises, the calculation is simple. Politicians, as opposed to bureaucrats, serve the electorate. Their position is part of the division of labour, and their calculation tools are the number of votes. In response to this view, Rothbard argues that the State has only a negative influence on the division of labour. Even the basic role, that of a “night watchman”, is nothing but an ideological slippage of classical liberalism⁵. The State only consumes, *ergo* political entrepreneurs cannot exist.

But is there no difference between the State and a bandit? Is there no difference between the State, understood as corporation, the highway man, and the crime lord that rules in person, as it were? In trying to address these issues, while we agree with Rothbard in matters concerning the State’s impact on the division of labour, we consider that a difference between the State and the bandit does exist. Although similar in kind, the two factor in different inputs in their calculation.

Moreover, it is important to draw attention to the distinction of behaviour between the “roving” bandit and the “stable one” (Olson, 1982).

- The roving bandit is focused on stealing as much as possible in the shortest time possible. He does not engage in any sort of economic calculation whatsoever, or anything that can properly be called calculation. Some method of balancing risks and booty is factored in, but concern for tomorrow’s means of attaining the bare minimum, *i.e.* the welfare of the plundered, is ignored. This approach, focused on present consumption, is a direct consequence of the tragedy of the commons. As no monopoly over coercion exists over a given territory, the roving bandit will try to steal all he can, in order not to leave anything behind for the other fellow marauders.
- In contrast to this, the stable bandit does hold exclusiveness over theft in a given area. Because of this, he will become interested in finding the optimal level of resource expropriation, so as to avoid killing “the goose that lays the golden egg”. The stable bandit will be interested in leaving the private economy with the bare

⁵“The fatal error of classical liberals lies in their failure to realize that their ideal is theoretically impossible, as it contains the seed of its own destruction, precisely to the extent that it includes the necessary existence of a State (even a minimal one), understood as the sole agent of institutional coercion” (Huerta de Soto, 2009: 162).

minimum for survival and for another cycle of production in, in order to be able to steal “in the long run”. The stable bandit becomes interested not only in consumption, but also in future consumption, and in assuring some kind of predictability of his actions in order to offer the private economy as much stability as possible so as the pie gets expanded, *i.e.* grows and develops.

The difference between the stable and the roving bandit is, synthetically put, the following: one is interested in stealing all he can here and now, the other is interested in assuring his lot for tomorrow and maybe even expand his possessions once economic growth occurs. For this, the latter is institutionalizing his grasp over the territory, replacing booty with a tax system which offers some predictability. In essence, the stable bandit is interested in maximizing *Net Tax Income*. Depending on his time horizon (determined by his time preference, institutional constraints, and circumstantial imperatives), the stable bandit can choose to increase, hold constant or even decrease the tax rate, his final aim consisting in maximizing the *Net Tax Income*.

Now, with a clear image of the bandit in mind, let us turn to the State. The State possesses the monopoly of coercion over a given territory, but as opposed to the stable bandit, he also holds a kind of legitimacy. As long as people see the State as necessary (albeit necessary evil against which there is no use in fighting, as revealed by centuries of demonstrated action), the costs of extracting taxes (and thus the impact on the division of labour) is sensibly lower for the State than for the stable bandit (*e.g.* the mobster).

To reconcile Mises and Rothbard, the State negatively impacts the division of labour, but does so to a lesser extent than a stable bandit, just as long as it maintains its legitimacy. This difference should translate in a *Legitimacy Rent*. We want to stress the fact that, ethically speaking, there can be no doubt that taxation is equivalent to stealing, but economically speaking, there is a difference between these two wrongs. The higher the approval rate for a government, the higher the *Legitimacy Rent*, as tax evasion and the costs of enforcing arbitrary pieces of legislation become lower.

To this point, it might be objected that the impossibility of opposing the State, as one does with a thief, actually affects the division of labour *via* higher time preference. As Hoppe puts it: “[b]ecause of their legitimacy, then, government violations of property rights affect individual time preference in a systematically

different way and a much more profound way than crime [...] Crime, because it is illegitimate, occurs only intermittently” (Hoppe, 2001: 49). Protection measures can be put up against crime, but government violates property rights in a continual manner and thus the subjects “respond by associating a permanently higher risk with all future production and systematically adjusting their expectations concerning the rate of return on all future investments downwards” (Hoppe, 2001: 50).

Hoppe’s argument may suffer from one possible flaw: it does not compare the State with a permanently present, illegitimate bandit, but with a sporadic, one time highwayman. A more relevant parallel would be to compare the time preference impact of the “total State”, which does have popular backing (*e.g.* the Nazis climbed the ladder of power after a series of democratic elections), with a plutocracy, based solely on force.

Let us now turn to the difference between the political entrepreneur and the private provider of defence, *i.e.* the bodyguard. According to McCaffrey and Salerno (2011), the difference between the two is only in spirit (ethically speaking). The political entrepreneur maximizes quasi-profit, by channelling coercively obtained financing for projects. The (business/economic) entrepreneur maximizes profits with voluntary obtained resources (his own or third party financing).

McCaffrey and Salerno do not clearly state that we have any reason to believe that coarsely obtained resources are necessarily greater than voluntary obtained ones. Historically, one may argue that the monopoly over coercion enables the State to obtain financing at a lower cost, but what if we were to suppose that the resources available to both agents were equal, would there be any difference between the two agents’ incomes? If the answer is in the negative, it means that the difference between the two is solely “in spirit”.

The private defence provider, like any voluntary exchange based transaction, must abide by, or offer beyond any doubt guarantees that it will abide by, generally accepted laws. If the bodyguard will perceive himself above the law, considering that the freely negotiated rules of the game do not apply to him, he will shortly lose all of his clients. In contrast to this, the State, with its monopoly on coercion, dictates the rules of the game. It does not have a negotiated contract with his subjects (Block and DiLorenzo, 2000), therefore, the ordinary rules do not apply to it. It is clear that we can talk about two societal classes: *the government* and *the governed* (Raico,

1993). Hoppe calls this distinction “private” vs. “public” law, with the latter being characterized by functional privileges and privileged functions⁶.

5.3. Short note on the Law&Economics of the “public” vs. “private” law

This distinction between private and public law entitles the political entrepreneur, unlike his counterpart in the private sector, whether we are referring to defence services or any other economic activity in which the State chooses to engage *ad libitum*, to a kind of *Policy Making Rent*. Because the political entrepreneur can violently coerce individuals into surrendering funds without considering it stealing, and because he is the ultimate decision maker in matters concerning who is to continue his economic activity and who will go bankrupt, who can occupy a bureaucratic position and what privileges this implies, we should consider the string of benefits that flow from this as an addition to the normal income the private entrepreneurs would receive if they were allowed to compete on an equal footing.

The double standard implied by public law allows political entrepreneurs to adopt decisions in favour not only of State run enterprises, but also in favour of well-connected industries or individuals. The *Legitimacy Rent* and the *Policy Making Rent* should be thought of as differentiating factors from both a stable bandit and a private business. Like the stable bandit, the State is interested in maximizing *Net Tax Income*, but he does so at a lower cost, benefiting from his *Legitimacy Rent*; unlike the private supplier of protection services he is the one who makes the rules of the game, by elaborating legislation.

If a political entrepreneur has more to gain by favouring certain interest groups *via* a lower tax rate, he can choose to do so even at the expense of the *Net Tax Income* and of future political entrepreneurs who will take over the operation of the State apparatus. Unlike the private provider of defence services, his income is not bound by serving the consumer. The political entrepreneur differs from both in spirit (like the stable bandit he increases *Net Tax*) and in kind (the playing field is not equal, and his income is distinct to some extent from that of the organization he runs). Taxation

⁶ “As long as they act in an official capacity, public officials are governed and protected by public law and thereby occupy a privileged position vis-à-vis persons acting under the mere authority of private law, most fundamentally in being permitted to support their own activities by taxes imposed on private law subjects” (Hoppe, 2006).

is not something taken into consideration during a first step, followed by productive investment and quasi-profit/loss.

After distinguishing the political entrepreneur from the stable bandit and the private defence services provider, we are able to expand on the type of calculation implied in the actions of th(os)e individual(s) standing behind the State.

6. TOWARDS AN AUSTRIAN SCHOOL THEORY OF POLITICAL INCOME & CALCULUS

A synthetic rendition of the economic function of the political entrepreneur and the corresponding income strings takes the following general expression:

$$Y_{pol. \text{ entrep}} = W_L + (Interest) + Legitimacy \text{ Rent} + Political \text{ Profit}$$

$$Political \text{ Profit} = Net \text{ Tax Income} + Policy \text{ Making Rent}$$

W_L is the Wage Income that the political entrepreneur receives for occupying a political position. This remuneration comes as compensation for managing the State bureaucracy. But, as we have said, the political entrepreneur is more than that. Depending upon the institutional arrangement (under monarchy), the political entrepreneur could *de jure* own some form of property. Thus, a monarch would be expected to receive *Interest* as compensation for the capital goods he owns and employs in various enterprises. Both wage income and interest are the only components of the income function of the political entrepreneur that have a perfect correspondent in the private sector.

This catallactics framework allows drawing some conclusions:

- To the extent that the political entrepreneur must compete with (economic) entrepreneurs for labour input, it can be argued that wages are competitively established and are set in direct accordance with labour productivity.
- There is no stark difference between public and private sector employees in terms of determining their remuneration.
- As far as labour inputs are concerned, the political entrepreneur can take them into consideration at the relevant (objective) price, thus partially anchoring the political entrepreneurs’ calculation to the market economy.

The Legitimacy Rent is a virtual income, a cost abatement that the political entrepreneur gets, as long as the State *qua* institution is endowed with legitimacy:

- This income is not specific to the ultimate decision maker, but to all State employees as long as they face no opposition from the taxed because the latter live with the idea that the State is an indispensable institution.
- This rent springs from the fact that a State employee/political entrepreneur acts in the name of the State, an institution akin to a corporation, *viz.* representing more than the sum of its component parts.

The type of calculation that the political entrepreneur realizes is an income maximizing one. He can either increase his *Net Tax Income*, and thus benefit from a larger public budget, or increase his *Policy Making Rent*.

The result of this process is not simultaneous with the political entrepreneur's action, but, like any production process, implies the passing of time. In this sense, our grasp of the matter is in opposition to Rothbard's pure consumption view of the State. We can speak of government investment, but not in the sense in which McCaffrey and Salerno present the concept, because the final aim of the political entrepreneur is to maximize his income, which contains tax revenue. *Net Tax Income* can be traded off with *Policy Making Rent*, but the two enter the political entrepreneur's computation in one step. Economic calculation refers to both components, not only to investment of once expropriated (taxed) resources.

The difference becomes obvious when looking at things from a thymological perspective. It is widely accepted that the State is a poor resource manager when it comes to production. Nevertheless, a number of industries continue to be run by the State even at a persistent loss. This occurs even when analysing the situation from an accountant's point of view, *i.e.* written in red ink, not considering into this the opportunity cost of privatizing the activity and extracting tax revenue.

This thymological (historical) occurrence cannot be addressed with the quasi-profit approach, but it can be reconciled if we look at it from the perspective of a government investment that seeks to maximize future tax revenue or his *Policy Making Rent*. If we think of a State owned enterprise working at a loss, *e.g.* public railway, it becomes evident that it remains operable because the future *Net Tax Income* that the political entrepreneur can extract (the difference between tax revenue and the costs implied by running the railway) exceeds the present loss. Tax revenue can be maximized because the public believes that functioning (even at a loss) of the said State enterprise is a legitimate end. Another possible explanation can be that the

rent revenue that corresponds to policy decisions of keeping the company afloat is greater than the budget implied costs.

Income String	Roving Bandit	Stable Bandit	Bodyguard	Political Entrepreneur
Wage	X	X	X	X
Interest	X	X	X	X
Legitimacy Rent	One Time Off Plunder	0	0	X
Policy Making Rent	The only thing that is factored in is the rate of success of the raiding party	Only in a limited sense and under the constraints of proximity ⁷	0	X
Net Tax Income		X	Profit should Equal the Potential Net Tax Income that could be extracted by a stable bandit	X

Figure 2 A decomposition of incomes for different public space archetypical characters
Source: Authors’ own representation.

7. CONCLUSIONS

This article proposes a research direction centred on the parallel between entrepreneurs and political entrepreneurs (politicians). While crucial for business entrepreneur, for the political one, the economic viability of a State enterprise is a “nice thing to have”, but not the ultimate goal, for his calculation revolves around *Net Tax Income* and *Policy Making Rents*. *Net Tax Income* and the *Policy Making Rent* make up – for the political entrepreneur – the equivalent of profit for the economic entrepreneur. It is a residual income, to be collected after deducing all the

⁷ *Policy Making Rent* is the result of altering the rules of the game. For this to occur, and in order to use this prerogative to its full extent, a bureaucratic system is needed, i.e. a hierarchy able to obey orders that is not based in *kinship* relations. A bureaucracy is one of the necessary elements in order for an Early State to emerge. What is meant in the table above by ‘*Policy Making Rent* in a limited sense’ is the possibility of going through reorganization after a Stable Bandit becomes the overlord of a certain region or when a mobster extends his influence over another neighborhood. This is a one-time event and should not be confused with an organized bureaucracy able of reporting and implementing policy decisions, while avoiding fission. See also Apăvăloaei (2014).

costs entailed by running the State apparatus and after factoring in all the trade-offs (*Present vs. Future Tax Income, Tax Income vs. Policy Making Rent*). This revenue can be directed either to pure consumption on the part of the political entrepreneur or to investment. As is the case with economic profit, it is difficult to clearly identify its monetary expression⁸. Also, it can be argued that *Political Profit* is residual because it is dependent on input from the private sector. Public sector resources are obtained only *ex post*, *i.e.* after they have been produced by the private economy.

If the private sector would cease its activity, political entrepreneurs would have nothing. The political entrepreneur uses the resources and the information provided by the private sector economy in order to base his anticipations and calculate his present and expected future income, and in order to make sense of the world he lives in. And because of such “second handedness”, the political entrepreneur must rely on quite specific information (time, space, capital structure) from the private sector. This makes him subject to distortions and influence from private actors seeking State intervention. Lobby groups should take into account the trade-off between the two components of *Political Profit* and the time-dimension implied (some measures might prove more easy to adopt depending on the tenure left). But the second handedness of the political entrepreneurs should not be taken for granted. They are dynamic, anticipating and can change the rules of the game (create new institutions). For instance, “political cycles” and “cycle politics/policies” could be (re)assessed also through political entrepreneurs’ eyes.

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⁸ As Hülsmann synthetically explains: “Even on the market, though, evidence for success and failure is not absolutely clear cut. Even in the realm of money calculation, where the categories of wage rate, interest and profit and loss are especially precious tools, one must guess the entrepreneur’s value scales, as well as the alternatives he faced, to establish which part of his income is profit or loss” (Hülsmann, 2000: 23).

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EUROPE AND RUSSIA: A NECESSARY COOPERATION

Răzvan HAGIMĂ*, Delia Vasilica ROTARU**

Abstract: *This paper offers an overview of the cooperation between the European Union and Russia in the energy sector. The European Union has been dependent on the imports of gas from Russia and has been looking to find alternative resources being conscious that a conflict with Russia would lead to disastrous effects if the country would stop supplying gas to Europe. The article also offers a point of view for the major pipeline projects that involve Russia and the EU and that would influence their cooperation such as South Stream, Nabucco and Trans-Adriatic.*

Keywords: *energy security, gas resources, Nabucco, South Stream, Trans-Adriatic*

JEL Classification: *L12, L95, O13*

1. INTRODUCTION

The fall of the Soviet State has put Russia in the position to reassess its economic power and the only way to recover was by harnessing its rich natural resources, especially the natural gas. The situation remains unchanged until today as the prevailing Russian exports are based on the delivery of natural gas. Europe became dependent on the gas resources from Russia, as many European countries are unable to provide enough natural gas to cover their necessities, forcing them to rely on imports. The Russian state has speculated this dependence and turned Gazprom into a foreign policy tool, using it to obtain concessions in the relations with the European countries.

The relation between Russia and the European Union remains ruled by economic and political interests. Given the influence that Russia still holds in Europe, especially in its Eastern part, different partnerships between Moscow

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and the European Union has been put in place. Such bilateral strategic partnership of cooperation in economic and security areas was signed in 2005. The agreement was aiming to develop the relations between EU and Russia, including four areas of cooperation – economy, freedom, security and justice and external security (Ziarul Financiar, 2010). But besides this, the most important cooperation between Russia and the EU is given by the trade relations, as the EU energy imports from Russia are considerable. The European dependency on gas provided by Russia has led to many controversies over the years, especially as 27% of gas consumed in the European Union comes from Russia (Pearson et al., 2012). The latest conflict in Crimea has raised again some questions regarding the European energetic security in the event of a conflict with Moscow.

The European Union is aware of the risks given by this dependency and adopted an initiative called “Europe 2020” where they developed a strategy to ensure competitive and secure energy in the future. The plan put in place defines the energy priorities for a period of ten years and sets the actions to be undertaken in order to address a number of challenges, including achieving a market with competitive prices and reliable supply. For the diversification of the energy sources, the EU tried to find alternatives to the Russian projects such as North Stream and South Stream. An option is the gas from Azerbaijan, especially as the corporation Shah Deniz II decided to support the project called *Trans-Adriatic Pipeline* for the transport of the gas in Europe. TAP project was chosen in the detriment of the *Nabucco* project in which Romania was involved as well. The interdependence between Russia and the European Union is obvious and Europe should look for potential alternative supplies in order to avoid a crisis given by the lack of resources.

The literature has always given a special attention to the cooperation between European Union and Russia, as there were always tensions between the two actors in the international relations. The early studies put the accent on the economic cooperation between EU countries and Russia, mainly on the trade relations and foreign direct investments (Dezséri, 2000, Ögütçü, 2002, Mikerova, J., Rogacheva, E, 2003, Lynch, 2004). The more recent studies are emphasizing the importance of the cooperation on the energy security matter between the two actors (Bahgat, G., 2006, Smith, K., 2008, Seliverstov, S., 2009, Metais, R., 2013).

Through the current paper we are offering a better understanding on the European energy security matter and we are analysing the main effects of the Russian monopolist situation of the gas supply. Our main objectives are to

explain the importance of Russian energetic products for Europe, to emphasize the exploitation of the European dependence on these products and to analyse the European alternatives to the Russian gas resources.

The paper is organised as follows: the first section discusses the gas resources dependency relationship between the European Union and Russia, from the perspective of each European member. The second section explains the gas price politics applied by Russia with its partners. Gazprom was approached as the main Russian distributor of gas in Europe. The third section represents a debate between the two most important projects of supplying Europe with the necessary amount of gas: South Stream vs. Nabucco. In the fourth section presents an alternative choice that may exist for the Russian gas, one which can reduce the dependence on those products.

2. THE EUROPEAN DEPENDENCE ON RUSSIAN GAS RESOURCES

The exports of oil and natural gas made Russia the third most important trade partner of the European Union after The United States of America and China. Almost 2/3 of Russia’s exports to the European Union are represented by energetic products (European Commission, 2010).

The strong dependence of the European countries on those products it was proven by the numerous temporary suspensions of gas supplies which have been applied to Ukraine. The situation also affected the supplies in the whole Europe. For those facts, energy represents the most important item in the European relation with Russia.

The trade deficit of the European Union in the mentioned relation has experienced an upward trend in recent years. Russia exports in the European countries oil, gas uranium and coal importer. For example, in 2007, almost ½ of European Union’s gas imports (150bcm), 1/3 of the union’s crude oil imports and about ¼ of its coal imports came from Russia. The mentioned statistics means the following: the European dependency for Russia’s energetic products is strong but it varies significantly between different regions of the union or state members (European Commission, 2010).

But the dependency relation can be analysed backwards too. Because of its strong dependency on Russia’s energetic products, European Union is by far the most important and largest trade partner. Almost ½ of Russia imports came from EU while about 88% of its oil exports, 70% of gas exports and 50% of coal

exports are directed to the European Union. It is clear to see that the European Union represents a strategic trade partner for Russia, the one that absorbs most of its exports, not only energetic products (European Commission, 2010).

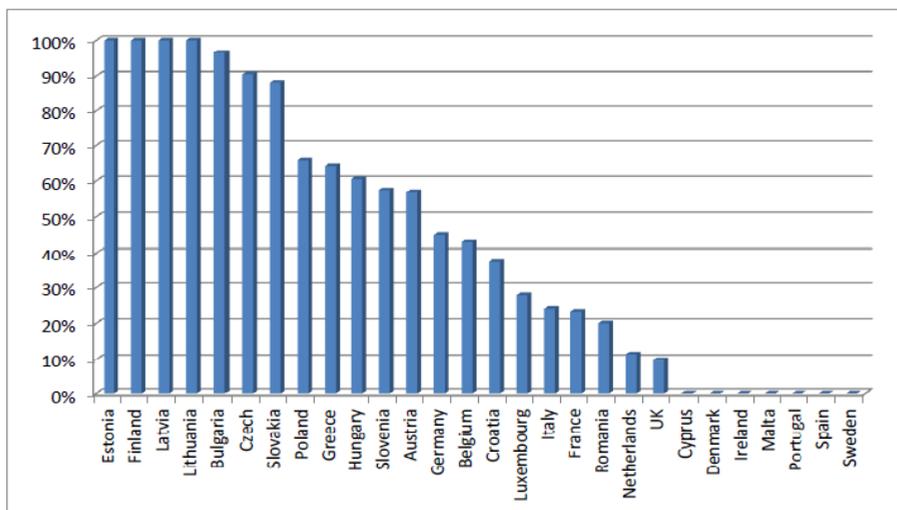


Figure 1 European countries imports of Russian natural gas (% of total consumption)

Source: <http://openeuropeblog.blogspot.ro/2014/03/eu-sanctions-on-russia-who-would-it.html>

As shown in the figure above, some of the European countries such as Estonia, Latvia, Lithuania and Finland are 100% dependent on the natural gas resources from Russia.

The situation in Romania is quite similar. This country is dependent on the energetic imports from Russia, the oil imports represents about 25% of the national consumption. But compared to the other European Union countries, Romania has a greater capacity of self-sufficiency. The European Union has looked into different possibilities to reduce this dependency, but no reasonable alternative to the Russian gas has been found.

3. GAS PRICE POLITICS

Taking advantage of the monopolist position that Gazprom has among the European buyers, the supply is based on a long term contract, providing resources on an annual basis using differential prices for the European countries. The prices are calculated using complicated formulae, based on the price of the oil on the world market. The conditions are very harsh, as the trade relations between sellers and buyers are out of the free market, not determined by the supply and demand. These are mostly the reasons why the European countries

have tried to find different alternatives for the Russian gas. The selling prices of natural gas to different European countries are presented in Figure 2.

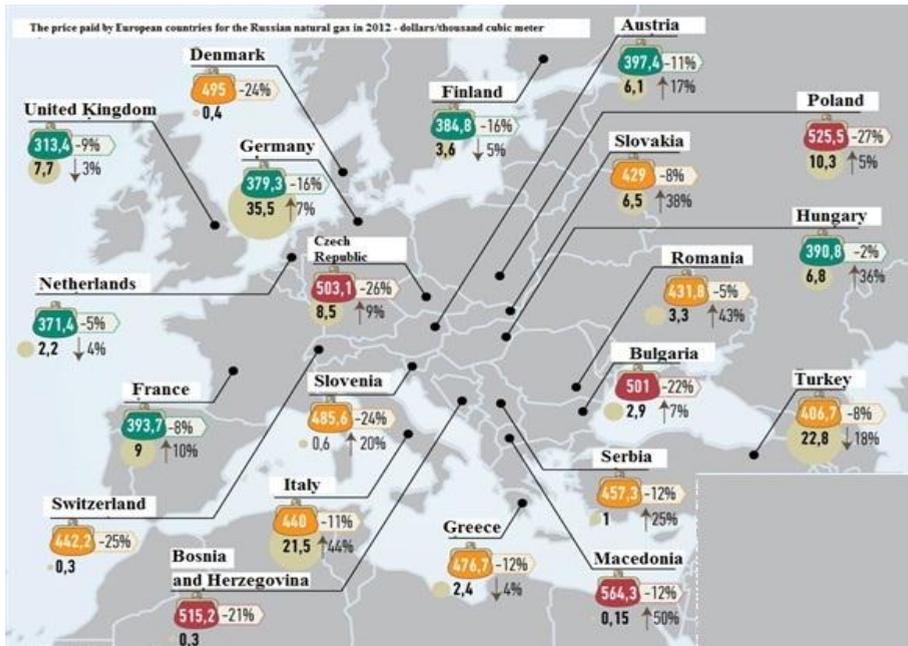


Figure 2 The price paid by the European countries for Russian natural gas in 2012 – dollars/thousand cubic meter

Source: <http://www.petrolsigaze.com/tarifele-la-gazele-naturale-practicade-gazprom-pentru-europa-au-fost-facute-publice/#>

The details of the arrangement, including the prices and gas volumes sold by Gazprom to the European countries were made public in a report showing that Great Britain, which imports 10% of their total gas consumption needs from Russia, pays the lowest price - \$314/thousand cubic meters, whilst Macedonia, a country that is 100% dependent of the Russian gas, pays the highest price - \$516/thousand cubic meters (petrolsigaze.com, 2013)

The biggest problem of Romania in this matter is represented by the gas price. Over the last decade, Romania has paid one of the highest prices for the energetic products from Europe: if in 2008 Romania paid about 390 dollars/thousand cubic meter, other European countries paid between 150 – 240 dollars/thousand cubic meter of natural gas. The situation didn’t change in the subsequent years. In 2012 Romania occupied 9th place in top of countries which are paying the highest price for the Russian natural gas, with a price of 431.8

dollars/thousand cubic meter even almost 70% of the consumption is covered by the internal production.

Romania occupies the 9th place in this top, paying a price of \$431.8/thousand cubic meters (petrolsigaze.com, 2013) for the gas imported from Russia. Though Romania is situated at a smallest geographical distance and covers 70% of the total gas consumption from the internal production, the country pays a higher price than Turkey.

The level of dependence on Russian gas is remarkably reflected by its price, according to the report. Bosnia and Herzegovina, which are completely dependent of Gazprom, pays a price of \$515.2, while Bulgaria, a country that depends 90% of the Russian gas pays \$501/thousand cubic meters. The lowest gas price is paid by Great Britain a country that has a gas market very well developed, where the share of the spot contracts is high (petrolsigaze.com, 2013).

There are multiple causes for these high prices like the political and economic relations between Romania and Russia. One reason for the level of prices is the high fees charged by intermediaries which add at least 55-62 dollars per thousand cubic meters in addition to the price of delivery. The supply with natural gas is made mainly through three companies agreed by Gazprom where the Russian importer is one of the main shareholders: Wintershall, Gazexport and Imex Oil. The only gas importer that is working directly with Gazprom is Conef Energy SRL, where the main shareholder is Conef, the company that owns Alro Slatina and which actually belongs to the Russian company Marco Investment and Industries (Chiriac, M., 2008).

But Romania has a high potential energy sources that can be used as an alternative to Russia's products. In that way the trade balance can be more equilibrated and the dependence of those products can decrease. Moreover, Romania can become a real energy hub if they will exploit efficiently the resources from the Black Sea. Only because of the continental reserves that Romania won at Hague the demand for this kind of products can be satisfied for a few years.

The dispute for the right to exploit these blocks began in 2010. Whilst Romgaz and Eon have announced their interests for the natural gas found there, Exxon Mobile, one of the largest oil companies in the world had already in 2010 a partnership with Petrom.

Romania's opening to the Black Sea can bring a liquefied gas terminal in Constanta. Moreover, near Romania's seaside will be built the largest wind farm

in Europe and at Cernavodă will function four nuclear reactors that will produce electricity. From the same place an offshore cable will go to Turkey and export electricity produced by Romania. In this way the mentioned dependence on Russian energy resources might know a downward trend with positive consequences in the trade balance of Romania.

4. SOUTH STREAM VS NABUCCO

Russia is in a tacit economic conflict with the EU and U.S. due to the energy resources. This is evidenced by the existence of two pipeline projects that are based in the Balkans: South Stream (which would carry natural gas from Siberia) and the Nabucco Pipeline (that should have brought natural gas from Central Asia).

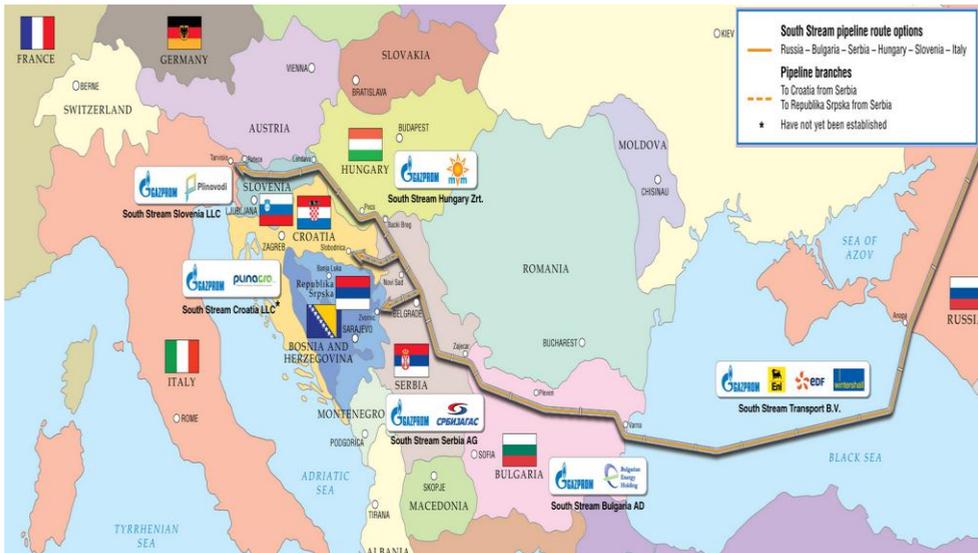


Figure 3 South Stream pipeline new route

Source: <http://www.gazprom.com/about/production/projects/pipelines/south-stream/>

The mentioned project represents Russia’s opportunity to bring under its influence the European countries and also it can increase the dependence on its products. Initially, it was supposed that a branch of the pipeline would have passed Romania, heading to Western Europe. One of the main goals was to deliver Russian gas to the European Union by bypassing Ukraine.



Figure 4 South Stream pipeline old route

Source: http://www.eni.com/eni/images_static/immagini/23_06_07/south_stream_map.jpg

The costs of this pipeline are very high. In first instance, the costs were estimated to be around 8-8.5 billion dollars but now the sum rose at around 16 billion dollars. A report made by Oxford Analytica estimated the total cost between 26.5 and 31.7 billion, money that Gazprom does not have after the earning reduction by a third due to the economic crisis. Just the offshore section of the pipeline which is planned to carry around 63 billion cubic meters of natural gas per year should cost around 10 billion dollars. The other section, the onshore one, is designed to carry about 10 billion cubic meters and its costs are expected to be 6 billion dollars (Baev, P., Overland, I., 2010).

Because of the Crimea dispute, the European Parliament gave some sanctioned against Russia, especially against its companies. Moreover, they have adopted a resolution in 17 April 2014 and recommended to search for an alternative gas supply. Furthermore, the Parliament suggested the pipeline constructed in Bulgaria should be dismantled and removed.

Nabucco project aimed to diversify the sources of energy supply of the European Union which is dependent on the Russian energy products by building a pipeline that should have start from the Caspian Sea. If the Russian project, South Stream was thought to bypass Ukraine, these one was projected to bypass Russia. The length of the pipeline should have been about 3300 kilometres and the construction works were scheduled to begin in 2010 and the finalization was initially planned to be around year 2012 (Erdogu, E., 2010).

Nabucco project was signed down by five companies from five different countries like Botas from Turkey, Bulgargaz from Bulgaria, Transgaz from

Romania, MOL from Hungary and OMV Erdgas from Austria with the purpose to connect and capitalize the potential natural gas reserves that could be found in the Caspian Sea and Middle Europe with the European Markets.



Figure 5 Nabucco pipeline route

Source: <http://www.capital.ro/177355.html>

The initial estimated cost of the project was approximately 4.5 billion euros but due to the increasing price of oil and steel, the estimated cost risen in the years that come, for example, in 2008, this was estimated to be around 7.9 billion euros. The natural gas should have come from Iran, Iraq, Azerbaijani, Turkmenistan and Kazakhstan. For Turkmenistan, the main problem was the transit beneath the Caspian Sea, because the maritime boundaries issues in the area were unresolved and it would have been necessary the consent of Russia (EvenimentulZilei, 2010).

The five mentioned companies have signed in October 212, in Vienna, a cooperation agreement for establishment of a “consortium” necessary to carry out a feasibility study on creating a completely new transport rout for the natural gas by building a pipeline across the five countries, with Turkey as a start point and Baumgartner from Austria as the end point. Moreover, at that meeting they considered the possibility to link the pipeline to other gas sources available in the area such as Syria, Iraq and Egypt.

The importance of Nabucco project was recognized by the community organizations by including it by the European Commission in the so called TEN (Trans-European Networks) as a priority project. This inclusion also required funding by the European Commission for about 50%of the value of the study,

the remaining funds should have been provided by the five participating companies.

Romania's contribution to the financing of this project was initially set at about 850 million Euro payable in four years. The pipeline was initially designed to transit Romania on a portion of 460 kilometres.

Nabucco pipeline project was supported by the United States, which was as important as it was the pipeline Baku - Ceyhan in '90 (EvenimentulZilei, 2010). In 2013 this project was cancelled. The length of Nabucco was already reduced in 2012 from 3900 km to about 1300 km. This project was unsuccessful because of the combination of geopolitical factors and business considerations (Weiss, C., 2013)

5. TRANS-ADRIATIC PIPELINE – AN ALTERNATIVE TO THE RUSSIAN GAS?

In the effort to find an alternative source of gas, the European Union has turned its attention to the Trans-Adriatic Pipeline project that would supply natural gas from Azerbaijan running through Greece, Albania and Italy, through the Adriatic Sea.

The Trans- Adriatic Pipeline has been developed back in 2003 by a Swiss Company called EGL Group and had as main purpose transport of natural gas resources from the Caspian Sea to Europe. Its length should be of 870km and the transport capacity of 10 billion cubic meters per year (Lussac, S., 2010).



Figure 6 Trans-Adriatic Pipeline route

Source: http://pipelinesinternational.com/news/trans_adriatic_pipeline_route_revised/043727/

However, the development of the Trans-Adriatic pipeline seemed to be in the detriment of the Nabucco pipeline, a project that was more expensive, but would have been more advantageous for the European Union as its transport capacity would have been up to more than 30 billion cubic meters.

The Trans-Adriatic pipeline is expected to be constructed between 2015 and 2018 and besides the benefit of access to new gas resources, the project should have a favorable impact on the economies of the countries involved as well. During its construction, several jobs will be created and the investments will lead to GDP growth (Oxford Economics, 2013).

The TAP project is not satisfying the objective of the European Union of finding an alternative to the gas import from Russia as TAP is not a competitor to Gazprom on the European Gas Market. The 10 billion cubic meters of gas from Azerbaijan represent only a 2% of the European demand, compared to the giant deliveries from Russia and is mostly in the favor of the members the pipeline will pass by – Greece and Italy. Romania, for example, will continue to depend on the natural gas from Russia, having to import the 20-30% of the total consumption that cannot be produced from its own resources.

6. CONCLUSIONS

Both the European Union and Russia are important international actors that have been the subject of numerous articles and studies over the years. But one of the most important areas of cooperation between the two is the energy matter. The strategic importance of this field and especially the way EU build its energy relationships – both at state member level and supranational level – makes it necessary to look into the detailed aspects of the cooperation between the two actors. Russia uses the energy problem as an instrument to threaten its former colonies when they show signs of independence and to reward them when they follow the policies approved by Moscow. For this reason, Europe has always been reserved to take position against Russia when it was needed, having a more reserved attitude.

The European energy dependency tool has been wisely used to weaken the unity of the EU and NATO. Amongst policy makers and other elites of Western Europe Russia has maintained the image of a reliable supplier, influencing these countries to reject denunciations from Ukraine, Poland and the Baltic states as an insecure partner. Moreover, because the European states themselves have an interest in maintaining a stable relationship with Russia, they are much less inclined to take a contrary position to the interests of Russian foreign policy. In order to keep using the gas tool, maintaining a monopoly on the transport of Caspian resources to Europe is an essential aspect of the Russian

strategy. At the same time, Europe became conscious that it needs to reduce the dependency on the gas resources from Russia in order to become a more powerful actor in the international relations. The Trans-Adriatic pipeline represents a step made in that direction but more ways need to be found and actioned.

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BOOK REVIEW



REVIEW OF JOOP J. HOX MULTILEVEL ANALYSIS – TECHNIQUES AND APPLICATIONS, Second Edition, Routledge (2010)

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Abstract: *Multilevel Analysis - Techniques and Applications is intended as an introduction to multilevel analysis for students and applied researchers, a book that can be used either in psychology, education, sociology, or business courses. Hox takes the reader step by step into the area of multilevel data analysis, starting out with basic information and getting to more advanced and complex issues along the way. Most of the chapters on multilevel regression analysis should be readable for social scientists who have a good general knowledge of analysis of variance and classical multiple regression analysis. Some of these chapters contain material that is more difficult but this can be skipped at first reading (e.g. longitudinal models).*

The Multilevel Analysis is structured in sixteen main chapters and treats two classes of multilevel models: multilevel regression models, and multilevel models for covariance structures. In addition to the basic information, the reader becomes acquainted with some advanced modelling techniques that might be used, such as bootstrapping and Bayesian estimation methods.

The applicability of the multilevel information is one of the strengths of this book: there are numerous examples and applications on various multilevel topics. The simpler examples are meant to help the novice. The basic models and examples are discussed in non-technical terms. The special applications, more complex examples combining more than one problem, can be useful to both researchers and methodologists.

Keywords: *multilevel analysis, multilevel models, estimation, hypothesis testing*

JEL Classification: *C1 (C10, C13, C15, C19), C2, C3*

Multilevel Analysis – Techniques and Applications by Joop J. Hox is a complex, but well-structured manual intended, just like the author states, as an introduction to multilevel analysis for students and applied researchers. It is a useful guide towards the basics of the multilevel regression model and the multilevel structural equation model.

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As there is a continuing surge of interest in multilevel analysis, this type of modelling has become a tool used not only by specialists, but also by any scholar working with grouped data, repeated measures and longitudinal data, performing sociometric modeling, twin studies, meta analysis and analysis of cluster randomized trials.

Joop J. Hox is a professor of social science methodology, whose research interests are data quality in surveys and analysis models for complex data, often multilevel or clustered data. The author's research experience is reflected through the many practical examples that use various sets of data from various areas of study. All examples have the data sets uploaded on the author's website at <http://www.joophox.net>, data sets that are formatted using the latest versions of SPSS, HLM, MlwiN, Lisrel, and Mplus, along with screen shots for each program and PowerPoint slides for instructors. The data sets relate to topics from various disciplines such as education, sociology, psychology, family studies, medicine, and nursing; these data sets are described in detail in Appendix A.

Hox's Multilevel Analysis takes the reader step by step into the area of multilevel data analysis, starting out with basic information and getting to more advanced and complex issues along the way. Most of the chapters on multilevel regression analysis should be readable for social scientists who have a good general knowledge of analysis of variance and classical multiple regression analysis. Some of these chapters contain material that is more difficult but this can be skipped at first reading, such as the chapter on longitudinal models. The discussion on techniques for modeling specific structures for the covariances between adjacent time points is not needed to understand the essentials of multilevel analysis of longitudinal data, but this may become important when one is actually analyzing such data. The chapters on multilevel structure equation modeling obviously require a strong background in multivariate statistics and some background in structural equation modelling, but not in advanced mathematical statistics. The overall impression though is that the balanced information presented by Hox makes this book an introduction in multilevel modeling that can be used either in psychology, education, sociology, or business courses.

As a result of the ongoing evolvement of the multilevel techniques and of the software developments, most of the chapters in the first edition were updated accordingly. The major changes in the second edition are the new and better

estimation methods for non-normal data that use numerical integration, the new chapter on multilevel ordered regression, the revision of the multilevel path analysis. In addition, the chapter on multilevel confirmatory factor analysis was completely rewritten due to the fast developments in multilevel structural equation modelling (MSEM). The new edition also discusses three-level models, an expanded treatment of longitudinal modelling, as well as multilevel models for ordinal and count data and multilevel survival analysis within two new different chapters. The second edition is also accompanied by an updated website together with appropriate instructions for the software developments.

The Multilevel Analysis is structured in sixteen main chapters, each divided in several subchapters. This book treats two classes of multilevel models: multilevel regression models, and multilevel models for covariance structures. The first four chapters introduce general basic issues that need to be considered when working with multilevel data, why use such models, some multilevel theories, the basic multilevel regression model (Chapter 2), estimation procedures and hypothesis testing (Chapter 3) and a number of important methodological and statistical issues (Chapter 4). The multilevel regression model for longitudinal data is presented in Chapter 5 as a straightforward extension of the standard multilevel regression model, but with certain specificities and issues. The generalized linear model for dichotomous data and proportions is discussed in Chapter 6: the multilevel logistic and probit regression models. When data are ordered categorical or are counts the generalized linear model introduced in Chapter 6 needs to be extended in order to properly analyze these data (Chapter 7). Chapter 8 introduces multilevel modeling of survival or event history data. Survival models are for data where the outcome is the occurrence or non-occurrence of a certain event, in a certain observation period. Chapter 9 discusses cross-classified models and the statistical and computational issues that come along when using such data. Two detailed examples of data are presented and the corresponding models are analyzed: longitudinal school research data (pupils nested within schools may switch to a different school in later measurements) and sociometric choice data.

Chapter 10 introduces multilevel regression models for multivariate outcomes: the general equations of this model and two solved examples of multivariate multilevel analysis, each structured in one subchapter (multiple response variables and measuring group characteristics). Meta-analysis can be

viewed as a special case of multilevel analysis. Chapter 11 describes a variant of the multilevel regression model that can be used in meta-analysis, along with some statistical and software issues. This section includes, as usual, a solved example with results from the classical and the multilevel meta-analysis and a comparison between the two sets of results. This analysis is a flexible tool and can also accommodate multivariate outcomes. Chapter 12 deals with the sample size needed for multilevel modeling and with the power estimation of an analysis given a specific sample size. In multilevel power analysis there are different sample sizes at the distinct levels and these should definitely be taken into account.

The last four sections contain very useful resources for the reader interested in further study on the topics discussed in the previous chapters. Thus, a different approach to multilevel confirmative factor analysis is treated in Chapter 13: the advanced methods of estimation are the profile likelihood method, robust standard errors for establishing confidence intervals, and multilevel bootstrap methods for estimating bias-corrected point-estimates and confidence intervals (bootstrapping and multilevel bootstrapping examples). This chapter also contains an introduction into Bayesian (MCMC) methods for estimation and inference supported by a solved example in MLwiN Software.

Factor analysis and path analysis models cannot be analyzed with multiple regression - the solution is multilevel models for covariance structures, or multilevel structural equation models (SEM). The general statistical model for multilevel covariance structure analysis is quite complicated. Chapter 14 in this book describes both a simplified statistical model for multilevel covariance structure analysis proposed by Muthén (1990, 1994), and more recent developments. The author also refers to some issues of calculating standardized coefficients and goodness-of-fit indices in multilevel structural models. Multilevel confirmatory factor models can be estimated with either conventional SEM software or using specialized programs. Chapter 15 extends the multilevel structural equation models (SEM) to path models, supported by a solved example, as usual and some statistical and software issues in these types of models. Structural models for latent curve analysis are described in Chapter 16. This is a SEM approach to analyzing longitudinal data, quite similar to the multilevel regression models discussed in Chapter 5.

Overall, this book is indeed an introduction to the world of multilevel analysis. In addition to the basic information, the reader becomes acquainted with some advanced modelling techniques that might be used, such as bootstrapping and Bayesian estimation methods. The reader is assumed to have a basic knowledge of social science statistics, including analysis of variance and multiple regression analysis; the section about multilevel structural equation models assumes a basic understanding of ordinary structural equation modeling. The basic models and examples are discussed in non-technical terms; the emphasis is on understanding the methodological and statistical issues involved in using these models.

One can surely state that the applicability of the multilevel information is one of the strengths of this work. This book resembles not as a strictly theoretical paper, but more as a guide or practical course, providing numerous and various examples and applications on the various multilevel topics. The simpler examples are meant to help the novice. The special applications, more complex examples combining more than one problem, can be useful to both researchers and methodologists. The reader is guided through the theoretical concepts by the multitude of solved examples. All in all, this book can be categorized as a multilevel analysis manual that explores this domain by passing through all the steps from the basic model to the more advanced ones.