

The distinctivities of the complexity

“The preservation of today’s theoretical model sits at the origin of the unprecedented prolonging of the state of crisis.”

The reflection on the fundamentals of economicity gathers arguments for a re-establishment as the theoretical acquisitions of the complexity are being internalized. The ideatic movement of this nature surprises through amplitude and profundity, announcing itself as an epistemic break with regard to the intellectual model of knowledge.

It is, essentially, the recharging of the guidelines of cognition and of the spheres of rational reflection with content and with sense. The representation of the world targets the completeness of universal knowledge, in all material and imaginary dimensions. The equation of Nature is thus solved by the human mind through the solutions offered by non-exclusive reasoning, which is a true co-integration of the forms of knowledge.

In the way in which the components of the human condition are manifested – through work, labour and action – the understanding is radically changed: α) the causality becomes multi-stratified, with non-linear genetics and sensitive to stochastic rules; β) time exhibits a dynamics which is increasingly imposed by the expectations; ω) space dematerializes its representation, with the world already experiencing a virtual geography.

For Economics the situation is only apparently similar to the great stages of synthesis which were covered in the experience of knowledge after the emergence of macroeconomics. As it is already known, its vision has generated the radical reconfiguration of the explicative models. This was all done with the perspective of including the inner workings of political arrangements and those of wealth creation. The challenges of methodology and principle faced by the complexity are found at the origin of a novel double movement: the more there is a careful interpretation of things as elements in a complex, multi-faceted web, the more visible becomes a differentiation between the spheres of meaning of the economical. This also happens at the various levels of aggregation, which further

complicates the understanding of reciprocal movements and even more so the rationalization of the results at the governance level.

In other words, in Economics the knowledge cumulates expressions on fusion into a cognitive entity structured on integrative organic principles and on functional segregation, in a somewhat non-complementary manner. The body of the economy is multi-formatted both on the horizontal and on the vertical, assimilating values and principles, and achieving symbiosis with all of the components of the global social system. These obviously include the political and the juridical but also nature in general, not just in the ecological sense. The trend toward unity is also influenced by the trend toward diversity, with the two being hard to reconcile conceptually. The two trends are not correctly defined anyway, as the theory proposes for now only a federalized cognitive entity – a shortened version for the understanding of the state of complexity.

In a surprising way, the trends seem to be in concordance with a unification of the perspectives of various social sciences, with Economics being ever more permissive to developments into the conceptual territory of anthropology when deciphering the grand evolutionary paths of a history constantly pushing towards the performance of progress, when incorporating the practices of establishing fairness in terms of freedom of action, when rationally accepting the behavioural aspects which exceed the legal or moral norms and when deciphering the biological determinants of economicity. The perception and interpretation of economic problems according to the vertical micro-macro complementarity has prevailed until recently, while today it seems natural for the explanations to follow the meanings of various spheres such as the natural economy, the underground economy, the behavioural economy, the institutional economy and the political economy, which are all relevant to the complex texture of the economic phenomenon.

The great epistemic challenge is that these spheres must be considered – from the perspective of the theory of complexity – as being parts of an organic whole, which exists inside the human phenomenon and which we label as economicity. The cognitive dependencies coagulate into a coherent formula when using the human phenomenon as a starting point. Its sphere becomes an object of study, which in Economics is focused on the human action. And even though Economics targets the explication of the randamental facets of the inter-subjective transactions, it also incorporates various spheres of meaning from all of the other spheres of the human action. For some time now we have been even able to talk about a holistic recuperation of the economic knowledge and a recrystallization of some compounds which until now have only been obtained from separate rational crucibles.

There may exist a possible acceleration of the cognitive restructuring of Economics due in part to the strain put by the global crisis on the limits of the standard explicative model. These are clear indicators of the depletion of the potential for understanding and for explaining which is available to Economics.

The epistemological key of the new synthesis is to consider the meanings relevant according to their degrees of complexity, which are marked as states of aggregation on the vertical – from elements to structures made up of them – and on the spheres of consistency, with regard to their functionality and finality. The difficulty in understanding comes from the slowness of the process for learning a certain route for the metamorphosis of principles. We usually deal with these principles separately in the complex horizon of complexity, among others which offer an explanation of the human nature provide us with its source in the integrated context, as a form of non-fragmentary finitude. If it is relatively common for us to accept that at a microeconomic level the source of the human action is the individual, or that at a macroeconomic level it is the constitution inter-individuality, when it comes to socio-economy, or political economy, or even the underground economy and the natural economy, the crystallization of the source remains a challenge with no clear answers, obscuring or deforming the perception of the principles of complexity. Furthermore, the understanding of the co-substantialization of the sources of action in stages of complexity and in spheres of functionality and meaning for economicity (which insure the fundamentals of the organic complexity), or in other words the correlation of principles, remains a challenge to economists.

There is no doubt that the scientific community's acceptance of the cognitive impasse is not the winning path. The preservation of today's theoretical model sits at the origin of the unprecedented prolonging of the state of crisis. In a more or less conclusive manner, the reality pushes toward a new theoretical positioning, where the only reasonable solution is the synthesis of economic knowledge within the guidelines of the theory of complexity.

Marin Dinu

Theoretical and Applied Economics – the third decade of publishing!

Following the tradition of changing the editorial regime after each decade, starting with the new decade's first issue – March 2015 – *TAE* will appear each trimester.

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Enhancing the capacity for innovation of public administration. An exploratory study on e-Governance, ICT, knowledge management in Romania

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Abstract. *Beyond the role of public sector as driver of innovation in the economy, for the time being, we witness the necessity of boosting innovation in the public sector itself, in view to improve productivity, efficiency, as well as to enhance the creation of public value.*

The new concept concerning the capacity for innovation of public administration reflects the synergy between the traditional instruments of administrative innovation (planning, strategy etc.) and the modern ones (ICT, e-governance, knowledge management in public administration).

The current paper is accomplishing an empirical analysis through operationalization of a conceptual model on the capacity for innovation of public administration. Thus, the paper analyses e-Governance, ICT and knowledge management in the Romanian Prefect institutions by identification, analysis and evaluation of the factors contributing to the improvement of public service quality, effectiveness, efficiency, transparency and citizen participation, strengthening trust and legality.

Keywords: e-Governance, ICT, knowledge management, innovation, public administration modernisation.

JEL Classification: O30, O35.

REL Classification: 13G.

1. Modernisation of public administration

The modernisation of public administration involves public service provision more efficiently, faster and at lower costs, as well as rethinking the processes and procedures associated to governance based on the use of ICT and knowledge management. It also refers to applying the Europe's Digital Agenda, national strategy and actions plans aimed at administration modernization in the knowledge society. The use of ICT applications triggers the change in public administration by valorising the opportunities and instruments determining important benefits for society and improving the public value.

Public administration has to face the fast and accelerating economic-social changes, to turn into account the opportunities provided by new technologies and to develop new services, focusing on openness, transparency and citizen participation. The administrative reforms should be achieved "during times when fiscal constraints and budget consolidation pressures become increasingly tighter" (OECD, 2011).

In view to enhance Europe's competitiveness, public administration modernisation in the EU Member States should focus on:

- "reforms of the institutional framework conditions under which private enterprises operate;
- implementation of internal measures in light to improve the quality of service provision by increasing the capacities and incentives of public administration in order to provide goods and services in an integrated, reliable, flexible, efficient and effective manner" (EC, 2012).

The field literature emphasises high quality institutions and governance structures, physical capital, human capital and knowledge as key drivers of economic growth (Knack, Keefer, 1995; Mauro, 1995; Olson et al., 2000; Acemoglu et al., 2001; St. Aubyn, 2008).

Thus, public administration modernisation should focus on improvement of efficiency, effectiveness and speed of service provision, and accomplishment of high standards of predictability, reliability and accountability.

The European Commission specifies the modernisation of the public sector as one of the five key priorities in the 2013 Annual Growth Survey.

The European Semester report highlighted that "modern public administration is an essential factor to underpin the design and delivery of policies promoting jobs, growth and competitiveness" (COM (2013) 350).

In this context, the European Union Member States should focus on "reforms aiming at facilitating internal and external administrative processes, such as

strengthening the capacity for strategic and budgetary planning; and encouraging innovation, by introducing new organisational and communication models, and by supporting public procurement of innovative solutions” (COM (2013) 350).

In the public administration “the innovative activities include new services or new methods of providing services in interaction with users, as well as re-organisation of work responsibilities, new support and logistics systems and new management systems” (DG Enterprise and Industry, 2011).

“The internal public sector excellence potentially benefits from ICT through several channels: public sector employees are relieved of routine tasks, several procedural steps can be outsourced, the quality of transmitted information increases while transaction costs decrease, and some tasks can be centralised, for example at shared service centres” (OECD, 2011). The electronic information exchange of administrative units may speed up decision-making, reduce internal processing times and thus improve regulatory management and policy enforcement.

By 2015, the European public administrations must be “recognised for being open, flexible and collaborative in their relations with citizens and businesses. They use e-Government in view to increase their efficiency and effectiveness and to constantly improve public services in a way that caters for user’s different needs and maximises public value, thus supporting the transition of Europe to a leading knowledge-based economy” (EC, 2012).

The Digital Agenda and the e-Commission strategy are aimed at making life easier for users, the effective and efficient use of resources, ensuring the security and privacy of citizens and businesses, based on the principles of subsidiarity and proportionality, user-centricity, inclusion and accessibility, security and privacy, multilingualism, administrative simplification, transparency, preservation of information, openness, reusability, technological neutrality and adaptability, effectiveness and efficiency (COM 2010 744 final).

2. Capacity of innovation of public administration

The public administration has an important role in boosting innovation in the economy and at the same time, it should trigger innovation itself in the public organisations in order to increase productivity, to improve efficiency, to enhance the creation of public value and thus to meet the society challenges.

In the knowledge society, the capacity of innovation and capacity to implement new innovations is very important for the public administration. „The public organizations should be able to incorporate information, knowledge, resources within the innovation processes and to harmonise the needs of citizens, businesses, NGOs” (Bekkers et al., 2011).

Innovation represents a prerequisite for administration's modernization. Innovation in public administration may be considered a learning process, a modality for new service development, new technology application, for changing the organisational structures as well as for implementing new managerial approaches in light to meet the citizens, businesses, society needs and requirements in facing the new challenges of knowledge society.

Public sector innovation research shows that new insights stem from taking into account the ideas, insights and experiences of citizens as end-users (Davenport, 1993; Oudshoorn, Pinch, 2003), of the middle management of public organizations (Borins, 2008; Fuglsang, Pedersen, 2011) and people who are engaged on a daily basis in rendering services to society (Von Hippel, 2007). In light to take account of insights from various groups, the field literature reveals the importance of seeing innovation as a process of co-creation (Oudshoorn, Pinch, 2003).

Most innovations in public administration have an ICT component. ICT is interconnected in many practices in administration as information, communication represent vital resources for public service provision, for implementing public policies and achieving projects and programmes. ICT innovative potential is determined by specific characteristics, for example „the ability to process big data and to communicate beyond the temporal, functional and geographic borders” (Bekkers, Homburg, 2005).

It is important to understand how public organizations are developing new ideas and new knowledge as part of innovation processes and how the organizations learn or fail to learn (Vera, Crossan, 2006). On the other hand, the adoption of external ideas and innovations depends on the characteristics of organizations (Lewin et al., 2011).

According to Osborne and Brown (2005), the capacity of innovation in public organisations represents “a function of organisational characteristics, but also of internal culture, external environment and institutional framework”.

As mentioned by Bason (2010), the capacity of innovation can be considered in a pyramid structure, “with overall structural, institutional and political contextual conditions at the top and daily practices – people and culture – at the bottom”.

Thus, the capacity of innovation should take into consideration the contextual level, the institutional environment, the strategic and organisational level as well as the human, financial and technical resources and organisational culture.

A long term clear vision and an adequate strategy can boost innovations in the public organisations, acknowledging the value of innovation which enables the employees to adapt to changing contexts. A working environment which

encompasses the culture of change boosts the generation of new ideas and the feedback loops.

The public organisations holding a high capacity of innovation create an organizational culture which enhances the generation and implementation of new ideas in view to generate public value for society, achieving new or improved processes and services. They focus also on implementation of modern technologies, valorising the activity of research and development.

Considering innovation as ongoing sustained process, the public organisations which are open to new ideas and processes involve in networks, share knowledge and cooperate with various partners. In view to collaborate with various networks of partners, beneficiaries, customers, the organizations can turn into account various instruments such as crowdsourcing, field officers, open-source databases, online community platforms.

Innovation in the public sector can be smarter procurement, citizen centric services, digital platforms, new health care systems, intelligent transport systems, embracing various other forms.

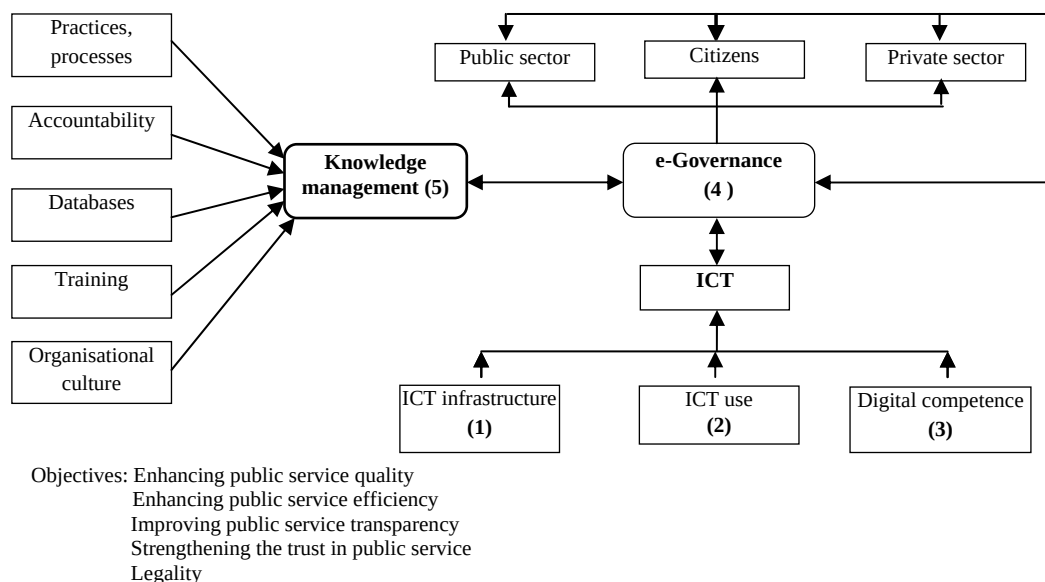
3. Conceptual model concerning the capacity for innovation of public administration related to e-Governance, ICT and knowledge management

The study aims at operationalizing a conceptual research model in view to analyse the key aspects of e-Governance, ICT, knowledge management in Prefect institutions in Romania by identifying, analysing and evaluating the factors contributing to the enhancement of e-service quality, efficiency, improvement of transparency and citizen participation, strengthening the users' trust and legality.

Concerning ICT, three components were evaluated: ICT infrastructure, ICT use and digital competences. ICT infrastructure comprises hardware, software, communication environment, and access to Internet. The ICT development strategic plan and the budget allocated to ICT are also relevant. ICT use refers to intensity of ICT use by employees, how it improves the outcomes of the institution, the internal and external communication, as well as the improvement of sharing information and knowledge. The evaluation of the digital competences refers to employees' experience in software, hardware, Internet use. The percentage of the employees holding ECDL is also important. For e-Governance, the following components are relevant: evaluating the key aspects of online service delivery by the public institution, evaluating the advantages of e-services, evaluating the concept of transparency and citizen participation, as reflected by the website of the respective public institution, the degree of improving the relationship with the citizens, businesses further e-service development.

Concerning knowledge management the focus is on the degree of using the most usual practices and processes on knowledge management, the advantages of the institution further their application, aspects holding potential in successful development of knowledge management systems, database with the employees' competences, database with useful presentations, documents, which is updated systematically, how the organisational culture encourages the knowledge sharing, organisation of interdisciplinary project teams, rewarding the employees for information and knowledge sharing, accountability for knowledge management, opportunities for (general, specific, IT) training programmes, number of training days, percentage of the total budget allocated to employees' training.

Figure 1. Systemics of the relationship between e-Governance, information and communication technology and knowledge management



Source: the authors.

4. Survey concerning the evaluation of the perception of Prefect institutions towards e-Governance, ICT and knowledge management

The pilot survey developed by the authors has aimed the identification, analysis and evaluation of the perception towards e-Governance, ICT and knowledge management of Prefect institutions, as main actors in digital administration development.

The research objectives focused on:

- Identifying relevant aspects for e-Governance development and knowledge management;

- Initiating a database containing information on e-service delivery and knowledge management in local public administration;
- Ensuring data comparability in time and possibility to create chronological series of averages and sampling dispersions;
- Identifying significant sampling variables and the structure of optimum statistic community, which is reproducing with accuracy the structure of the general population;
- Understanding the interactions between citizens and administration;
- Identifying the interest and attitude of Prefect institutions versus e-Governance, ICT, knowledge management;
- Identifying the actors who are holding the essential role for knowledge management in Prefect institutions;
- Enhancing the awareness of Prefect institutions on the importance of investments in the development of electronic, human resources, and for speeding up e-service development.
- Determining the factors which lead to speeding up e-Governance development.

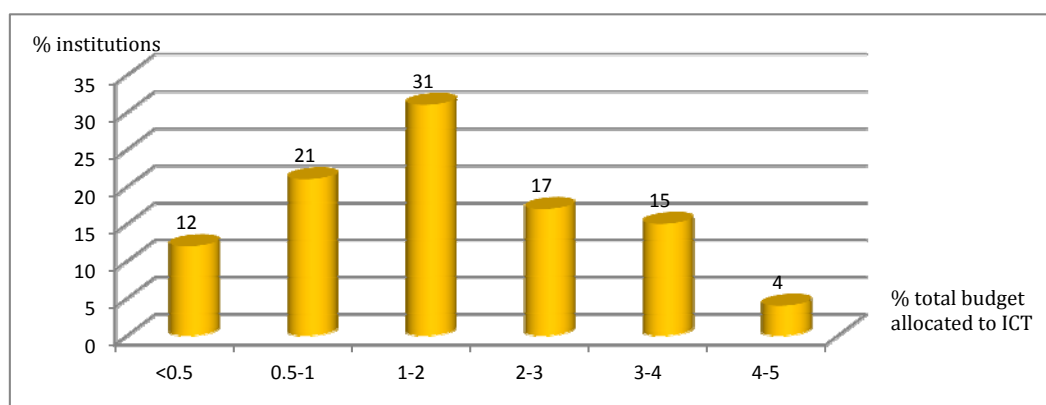
The pilot statistic community comprised all 42 Prefect institutions in Romania, sampled by authors in view to design a survey with several variables, aimed to ensure the best representativeness and minimisation of survey errors. The questionnaire was addressed to 42 Prefect institutions in terms of objectivity and privacy, under the authors' direct coordination. 37 questionnaires were received, of which 35 were valid.

A. ICT Infrastructure

1. Concerning the question ***“Does the institution own an integrated IT system for activity management?”***, the breakdown of responses is as follows: 67% Prefect institutions assert that they own an IT system for activity management, 22% provide a negative answer and 11% do not know/do not respond.
2. In terms of the question ***“Does the institution own specific IT applications?”***, the breakdown of responses is as follows: 82% Prefect institutions own IT system for Financial, and Human Resource Management, 13% own IT system for the Electronic Archive, 62% own e-mail system, 35% hold Document and Workflow Management System, 78% own Intranet, 47% have EDI, and 87 Prefect institutions own antivirus programmes.
3. In terms of the question ***“Does the institution own an ICT Development Strategic Plan?”***, the breakdown of responses is as follows: 72% Prefect institutions own an ICT Development Strategic Plan.
4. Concerning the question ***“Percentage of the total budget allocated to ICT”***, Figure 2 reveals the breakdown of responses. Thus, 10% of the studied Prefect institutions allocate below 0.5%, 13% allocate between 0.5-1%, 21% allocate

between 1-2%, 18% allocate between 2-3%, 23% allocate between 3-4%, and 15% allocate between 4-5%.

Figure 2. Evaluation of the percentage of the total budget allocated to ICT

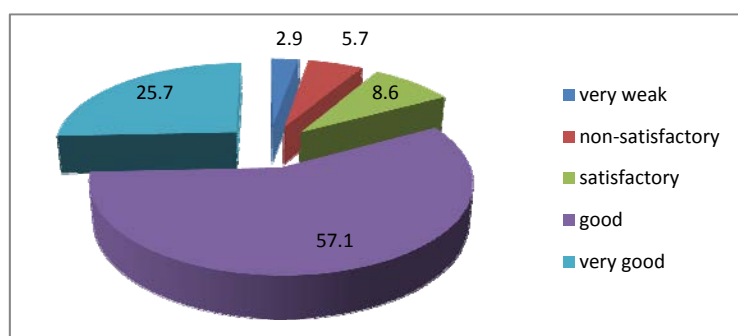


5. Concerning the question ***“Has the ICT budget increased during the last 5 years? If yes, how much?”***, the breakdown of responses is as follows: in 61.9% Prefect institutions, ICT budget has increased in the last 5 years from 3% to 8%.

B. ICT use

6. In terms of the question ***“How do you evaluate the intensity of ICT use by employees?”***, Figure 3 expresses the breakdown of responses: 2.9% Prefect institutions evaluate ICT use by employees as being very weak, 5.7% evaluate as being non-satisfactory, 8.6% consider to be satisfactory, 57.1% consider to be good, and 25.7% appreciate to be very good.

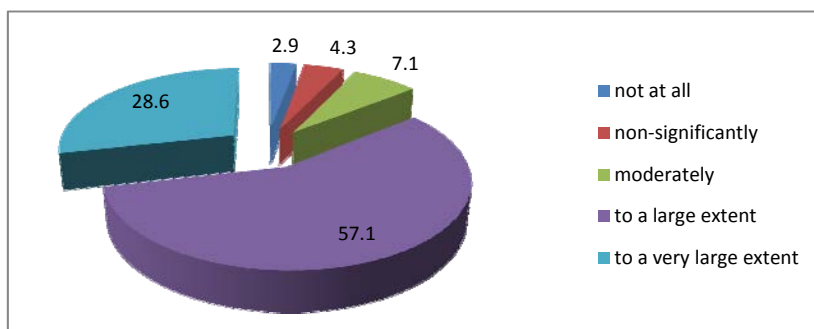
Figure 3. Evaluation of the intensity of ICT use by employees



7. Concerning the question ***“Do you consider that ICT use improves the outcomes of the activity in the institution?”***, the breakdown of responses is as follows: 2.9% Prefect institutions consider that ICT use by employees does not

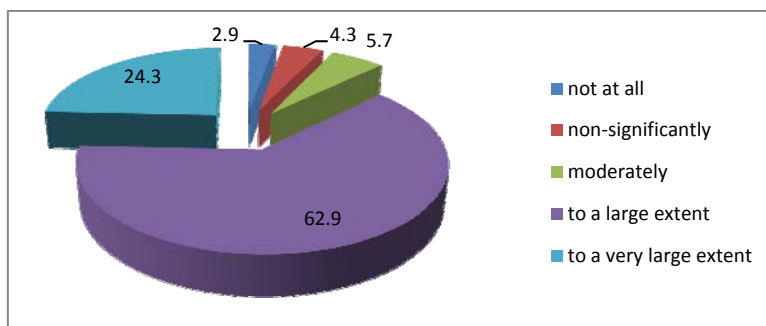
at all improve the outcomes of the activity in the institution, 4.3% appreciate that it improves non-significantly, 7.1% consider that it improves moderately, 57.1% appreciate that it improves to a large extent and 28.6% consider that it improves to a very large extent.

Figure 4. Analysis of how ICT use improves the outcomes of the activity in the institution



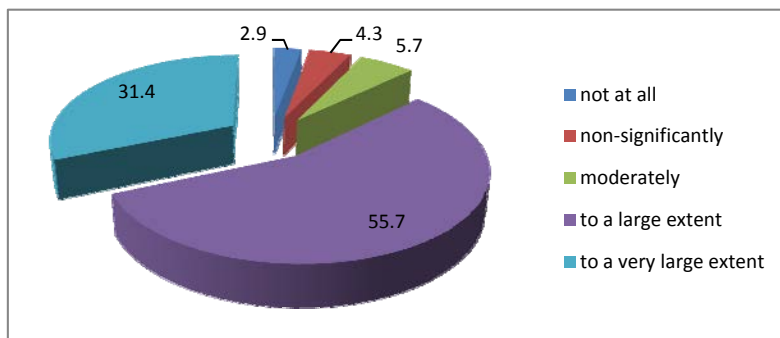
8. In terms of the question ***“Do you consider that ICT use improves the internal communication in the institution?”***, Figure 5 reflects the breakdown of respondents’ considerations. Thus, 2.9% Prefect institutions appreciate that ICT use by employees does not at all improve the internal communication, 4.3% consider that it improves non-significantly, 5.7% appreciate that it improves moderately, 62.9% appreciate that it improves to a large extent and 24.3% believe that it improves to a very large extent.

Figure 5. Analysis of how ICT use improves the internal communication in the institution



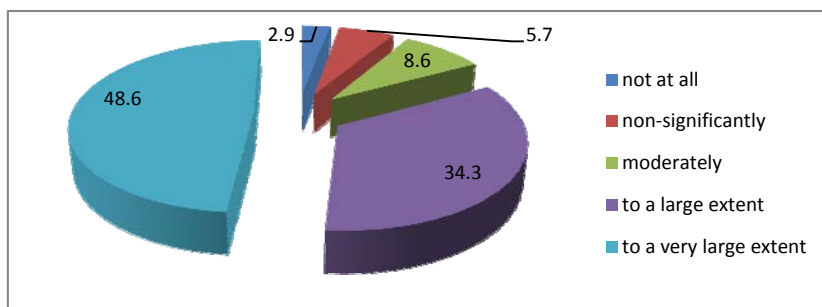
9. In terms of the question ***“Do you consider that ICT use improves the external communication of the institution?”***, Figure 6 reveals the following structure of responses: 2.9% Prefect institutions appreciate that ICT use by employees does not at all improve the external communication, 4.3% believe that it improves non-significantly, 5.7% appreciate that it improves moderately, 55.7% appreciate that it improves to a large extent and 31.4% believe that it improves to a very large extent.

Figure 6. Analysis of how ICT use improves the external communication of institution



10. Concerning the question ***“Do you consider that ICT use improves sharing of information, knowledge?”***, from Figure 7, the following assertions have resulted: 2.9% Prefect institutions consider that ICT use does not at all improve the sharing of information, knowledge, 5.7% appreciate that it improves non-significantly, 8.6% assert moderately, 34.3% appreciate “to a large extent” and 48.6% believe “to a very large extent”.

Figure 7. Analysis of how ICT use improves the sharing of information, knowledge



C. Digital competences

11. In terms of the question ***“How do you evaluate the employees’ experience in the field of software?”***, the respondents have assigned scores according to the scale: “-2”: inexistent, “-1”: weak, “0”: good, “+1”: very good, and “+2”: exceptional, to the sentences from Table 1, which contain positive and negative statements concerning the evaluation of employees’ experience in the field of software. An average score was calculated for each statement. Not all averages proved to be representative, as resulted from the calculation of the coefficients of variation of the individual scores assigned to each statement.

Table 1. *Analysis of the employees' experience in the field of software*

Software	Average score	Coefficient of variation
Word Processing	+1.59	0.22
Spreadsheets	+0.86	0.29
Presentation (PowerPoint)	+0.83	0.76
Using databases (Access)	-0.97	0.32
Others (please specify)	-1.28	0.63

The respondents have also identified the employees' skills to use other IT applications, such as those in the field of finance and accounting.

Analysing the average scores awarded to each statement, it is worth to note that the Prefect institutions have a clear perception concerning the following issues:

- Necessity of lifelong learning in the field of ICT, even if for the time being the employees have high competences, skills and knowledge;
- Improving the employees' efficiency and labour productivity, as immediate effects of ICT use.

12. In terms of the question ***“The percentage of employees holding ECDL (European Computer Driving Licence)?”***, Table 2 reflects the distribution.

Table 2. *Analysis of the percentage of employees holding ECDL*

Number of Prefect institutions	Number of respondents	Percentage of participation in the survey (%)	Percentage of employees holding ECDL (%)	Dispersion (%)
42	35	83.33	75.60	11.41

13. Concerning the question ***“How do you evaluate the employees' experience in the field of hardware?”***, scores have been assigned as follows: “-2”: inexistent, “-1”: weak, “0”: good, “+1”: very good and “+2”: exceptional, to the sentences from Table 3, which contain positive and negative statements concerning the evaluation of employees' experience in the field of hardware.

Table 3. *Analysis of the employees' experience in the field of hardware*

Hardware	Average score	Coefficient of variation
Using IT devices (printers, scanners, web cam)	+1.42	0.29
Configuring computers/networks	+0.23	0.36

Analysing the average scores, we remark the Prefect institutions' perception on the necessity to improve the employees' competences in this field.

14. In terms of the question ***“How do you evaluate the employees' experience in the field of Internet use?”***, scores have been assigned as follows: “-2”: inexistent, “-1”: weak, “0”: good, “+1”: very good and “+2”: exceptional, to the sentences from Table 4, which contain positive and negative statements concerning the evaluation of employees' experience in the field of Internet use.

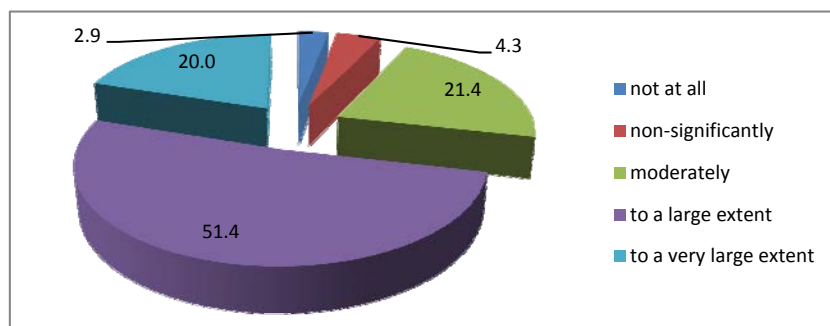
Table 4. Analysis of the employees' experience in the field of Internet use

Internet	Average score	Coefficient of variation
Web browsing	-1.19	0.29
Databases	- 1.48	0.18
Social networking (Facebook, LinkedIn, Twitter)	-1.76	0.27
Cloud computing	-0.54	0.72
Digital communication	+0.83	0.37

The employees have better experience in browsing, digital communication, social networking. The experience in databases and cloud computing is quite low, thus resulting the necessity of developing the employees' competences in this field.

D. Relevant aspects on e-services

15. In terms of the question ***“Evaluate to what extent the relationship with the citizens, businesses has improved further the online service development in the institution”***, the breakdown of responses is reflected by Figure 8. In 2.9% Prefect institutions, the relationship has not at all improved, in 4.3% it has improved non-significantly, in 21.4% it has improved moderately, in 51.4% it has improved to a large extent and in 20% it has improved to a very large extent.

Figure 8. Evaluation of the improvement of the relationship of Prefect institutions with the citizens, businesses further the e-service development

16. For the question ***“Evaluate the advantages of e-services provided by the institution, awarding a score from 1 to 5”***, the respondents assigned scores as follows: “1”: very weak, “2”: non-satisfactory, “3”: satisfactory, “4”: good and “5”: very good, to the sentences from Table 5, which contain positive and negative statements concerning the e-service advantages.

Analysing the average scores, we emphasise the following advantages in the order evaluated by respondents: enhancing the degree of transparency of online services; cutting down the public expenditure; enhancing the efficiency of the administrative activities; improving accessibility to public interest information and public services; decreasing the costs of public services; fighting against

corruption. The Prefect institutions have also identified another advantage, namely saving of time.

Table 5. *Evaluation of e-service advantages*

e-service advantages	Average score	Coefficient of variation
1. Cutting down the public expenditure	4.12	0.19
2. Improving accessibility to public interest information and public services	2.76	0.21
3. Enhancing the degree of transparency of online services	3.78	0.27
4. Fighting against corruption	0.97	0.17
5. Decreasing the costs of public services	1.34	0.28
6. Enhancing the efficiency of the administrative activities	2.98	0.27
7. Others	1.73	0.18

17. and 18. Concerning the website of the Prefect institution, the respondents awarded scores on a scale from 1 to 5 for evaluation of the concept of transparency and concept of citizen participation in Prefect institutions, as reflected by their websites. Table 6 reflects the breakdown of responses.

Table 6. *Evaluation of the concept of transparency and concept of citizen participation in institutions*

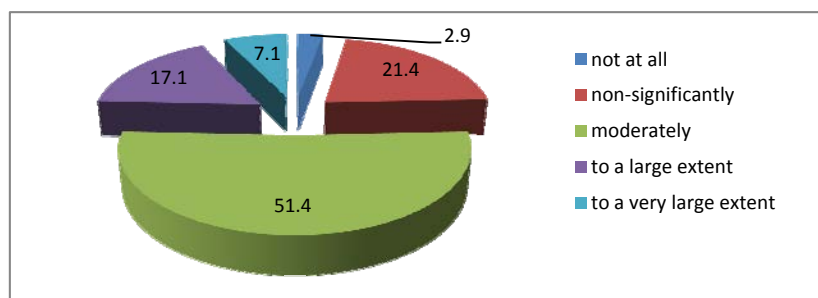
Website	Average score	Coefficient of variation
1. Reflecting the concept of transparency	4.14	0.17
2. Reflecting the concept of citizen participation	3.78	0.27

Analysing the average scores, it is worth to note that up-dated website, with coherent, useful content, attractive design leads to increasing the transparency degree as well as the citizen participation degree at the Prefect institution level.

E. Practices concerning knowledge management and learning organisations

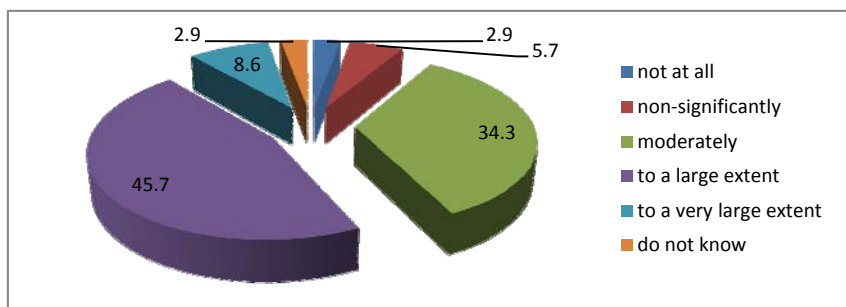
19. In terms of the question “***Does the institution use practices and processes on knowledge management?***”, Figure 9 reflects the graphic representation of the respondents’ statements. Thus, 2.9% Prefect institutions sustain that they do not use at all practices and processes on knowledge management, 21.4% use them non-significantly, 51.4% use them moderately, 17.1% use them to a large extent and 7.1% use them to a very large extent.

Figure 9. *Analysis of the use of practices and processes on knowledge management*



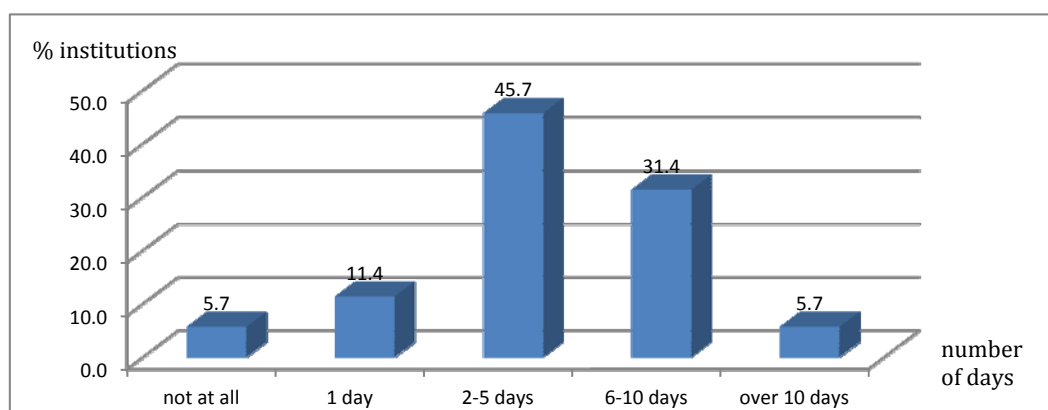
20. Concerning the question, ***“Which are the advantages of Prefect institutions further the application of practices on knowledge management?”***, the respondents had the possibility to provide multiple responses. Thus, further the Prefect institutions evaluation, the following results are relevant: improving the capacity to respond in due time to citizens’ needs (77.1%), enhancing the efficiency (65.7%), improving the service quality (68.6%), improving the decision-making (62.9%).
21. The question ***“Which aspects have potential in successful development of knowledge management systems?”*** has aimed to identify the main advantages with potential in successful development of knowledge management systems. According to the respondents’ opinion, the advantages may be expressed in the development of databases (94.3%), development of efficient methods for obtaining information and knowledge (88.6%), development of the organisational culture (40%), awarding financial incentives, career promotion, awarding prizes (22.9%), encouraging the civil servants and public employees to be creative, innovative (77.1%). Another advantage identified by respondents refers to promotion of the institution image (19.2%).
22. Concerning the question, ***“Does the institution own a database with employees’ competences?”***, the breakdown of responses reflects that only 77.1% Prefect institutions own such a database.
23. In terms of the question, ***“Does the institution own a database with useful presentations, documents, which is updated continuously?”***, 91.4% Prefect institutions own such a database.
24. The responses at the question, ***“In your opinion, the organisational culture encourages knowledge sharing?”*** are reflected by Figure 10. Thus, 2.9% Prefect institutions consider that a powerful and positive organisational culture does not at all encourage the knowledge sharing, 5.7% believe that it encourages non-significantly, 34.3% consider moderately, 45.7% appreciate to a large extent, 8.6% consider to a very large extent and 2.9% do not know.

Figure 10. Analysis on how the organizational culture encourages knowledge sharing

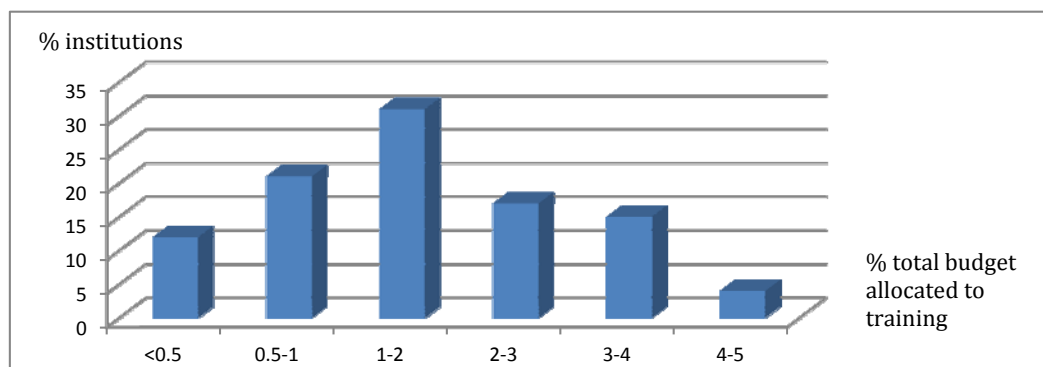


25. Concerning the question, ***“Do you organise interdisciplinary project teams?”***, 77.1% Prefect institutions sustain the organisation of interdisciplinary project teams.
26. For the question, ***“Are the employees rewarded for information and knowledge sharing?”***, the results show that the employees are rewarded for information and knowledge sharing by financial incentives (5.7%), career promotion (31.4%) and no prizes are rewarded.
27. The question on ***“Accountability for knowledge management in the institution”*** has aimed at identification of Prefect institutions’ opinion on the actor holding the greatest accountability for knowledge management. Thus, most affirmative answers were for Human Resource Management Department - 81%, IT Department - 8%, Prefect - 8%.
28. Concerning the question ***“Does the institution provide opportunities for (general, specific, IT) training programmes?”*** 94.3% Prefect institutions provide such opportunities.
29. In terms of the question ***“How many days of training/year does the institution provide?”***, 5.7% Prefect institutions assert that they do not provide training days, 11.4% assert that they provide one day/year, 45.7% award 2-5 days/year, 31.4% award 6-10 days/year while 5.7% provide over 10 days/year.

Figure 11. Training period



30. Concerning the question, ***“Percentage of the total budget allocated to training?”***, Figure 12 reflects the breakdown of responses. Thus, 12% Prefect institutions allocate below 0.5% of the total budget for employees’ training, 21% allocate between 0.5-1%, 31% allocate between 1-2%, 17% allocate between 2-3%, 15% allocate between 3-4%, 4% allocate between 4-5%.

Figure 12. Percentage of the total budget allocated to training

31. In terms of the question, ***“Has the budget allocated to training increased during the last 5 years? If yes, how much?”***, the breakdown of responses is as follows: in 22% Prefect institutions, it has increased in a range from 2% to 8%.

5. Conclusions of the survey

The pilot exploratory research provides significant outcomes concerning the Prefect institutions' perception on the evaluation of local e-governance development based on ICT and knowledge management:

- Enhancing the efficiency and labour productivity as immediate effects of ICT use;
- Necessity of improving the transfer of information among the employees;
- Reducing the citizens' waiting time for various problem-solving;
- Need of increasing the degree of communication between Prefect institutions and other institutions/organisations/companies;
- Necessity of employees' lifelong learning, even if for the time being they hold adequate competences, skills and knowledge.

The analysis of the Prefect institutions' responses validates what the public administration already knows, namely that e-Governance applications represent a reality and the citizens are prepared to use them. The administration should analyse the citizens' feedback on e-service delivery, which triggers the improvement of e-service quality and customisation.

The public administration progress depends on technological, organisational and especially human changes. The speed of the technological changes, the pace of developing new technologies requires the enhancement of the knowledge management role.

Thus, lifelong learning, transfer of knowledge, implementation of new technologies are of crucial importance. On the other hand, the organisational culture represents an essential element for the employees' attitude and behaviour.

The operationalisation of the conceptual model from Figure 1 contributes to better understanding the principles and practices of modern e-Governance.

The lack of the plans of ICT development at the level of some Prefect institutions contributes to un-coordinated ICT application in the institution. Some public institutions revealed the lack of understanding the importance of allocating funds for investments in ICT infrastructure, e-service development, employees' training.

The study outcomes might represent a milestone for all stakeholders, especially in the actual context of a modern, citizen-centred administration.

General conclusions

The current paper reiterates the general context of deepening the processes of modernization of national public administrations, the role of key factor for learning in the public administration. In fact, as shown by the paper, "innovation represents a prerequisite of public administration modernization", which is incorporating new organisational and communication models.

For most European states and especially Romania, it is important the distinction in the paper between the capacity to innovate and capacity to implement the new innovations.

In our opinion, it represents the major explanation of the sinuous evolutions of the public administration reforms, especially in the new EU Member States.

The capacity of innovation of public administration integrates in a systemic, complex manner internal learning processes in the public organisations, new modalities of service development, use of new technologies, change of the organisational structure etc. Simultaneously, the capacity of innovation has essential determinants in the external environment of public administration, being in systemic complex connection with the evolution of e-Government, implementation of new ICT and of course knowledge management in the contemporary knowledge society.

The current paper emphasises indirectly the perception of Romanian top civil servants concerning the capacity of innovation of public administration. The interface of this perception is ensured by the specificity of the e-Government, ICT or knowledge management in the Romanian society.

The conceptual model, operationalized by the pilot survey demonstrates that ICT infrastructure, digital competences, training, using modern practices of knowledge management represent key drivers for e-governance development as well as for boosting innovation.

This research aims to emphasise the importance of all the above mentioned factors for the successful e-governance development.

The feedback of the public institutions reflects the following conclusions:

- The public institutions are not enough centred on achieving the objectives set in the Digital Agenda.
- The lack of openness towards establishing new channels of communication with the citizens.
- The need to change the civil servants' and public employees' perception on the role of public administration in knowledge society.
- Integrating new channels of communication (intelligent television, smartphones);
- The necessity of investments in the public infrastructure and employees' digital competences development.
- Enhancing the citizens' awareness about the contents and range of online service provision.

Overall, the benefits of e-services have a significant added value, expressed in improving flexibility and adaptability, reducing the administrative burden, improving the effectiveness and efficiency, risk reducing, transparency, administrative simplification, improving the work conditions, acknowledging the achievements and competences of public administration. In view to develop efficient e-services, intensely used by citizens and businesses, the administrations should have a holistic approach, should evaluate the e-services and create new services in a systemic approach, which will valorise the whole spectrum of e-service advantages.

Taking into consideration the increase of the social media popularity, it is obvious that the dialogue between administration and citizens will develop in this direction and the administration task is to valorise at maximum the potential of this communication channel.

At the same time with the enlargement of the e-service range, the challenge for administration will be to find the most modalities of digital interaction with the citizens. The digital solutions of administration should be compatible with the citizens' needs who start to become digital citizens. But at the same time, the interaction of administration with the citizens should not be difficult and complex. The administration should solve the aspects related to the digital divide, should concern to improve the employees' digital competences and should incorporate EU best practices into a common service delivery architecture for local government.

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Exchange rates and foreign exchange reserves in Turkey: nonlinear and frequency domain causality approach

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Abstract. *In this paper aims to investigate the asymmetric relationship between nominal-real exchange rate and foreign exchange reserves of Central Bank in Turkey over the period of 2003:01-2014:01. The study benefits from the recent advance in the nonlinear time series econometric analysis and carries out nonlinear cointegration, causality and frequency domain causality tests. The results find strong evidence of nonlinear cointegration between real exchange rate and Central Bank foreign exchange reserves. Empirical results of both Hansen-Seo (2002) and frequency domain causality analyses imply that there is no relationship from foreign exchange reserves to nominal and real exchange rate, while there is a causal relationship running from nominal and real exchange rate to foreign exchange reserves in Turkey. Diks-Panchenko (2006) non-linear Granger causality test results indicate that there is a causality relationship from foreign exchange reserves to nominal and real exchange rate. By the way of conclusion that Central Bank of Turkish Republic uses the real exchange rate take into account in the context of inflation targeting regime.*

Keywords: Exchange Rate, Foreign Exchange Reserves, Nonlinear Causality, Frequency Domain Causality.

JEL Classification: E58, F31, O24.

REL Classification: 8N, 9E.

1. Introduction

Increasing popularity of floating exchange rate regime in especially inflation targeting countries makes the interaction between foreign exchange rate and the amount of exchange reserves hold by Central Bank important topic in the context of monetary policy intervention of Central Banks. Because, the exchange rate is determined due to market conditions in floating exchange rate regime. In this regard, excessive fluctuations in exchange rate could be occurred due to excess demand or decrease in exchange rate supply. In the case of excessive volatility in exchange rate, Central Bank could manage floating exchange rate in order to sustain price stability in the context of “fear of floating” hypothesis suggested by Calvo and Reinhart (2002). Central Bank interfere exchange market by buying the excess amount of foreign exchange in the market or by selling foreign exchange in order to reduce demand in the market, although their announcement emphasizing that the bank does not intervene the exchange market.

Intervention in the market brings up another necessary topic that is foreign exchange reserves hold by Central Banks. Financial integration of economies increases by the last half of the 1990s and Central Banks have to accumulate enough foreign exchange in order to stabilize exchange market against the capital inflows-outflows as a result of financial crises. The Tequila crisis in 1994-1995, the Asian crisis in 1997 and 1998, the Argentinian crisis in 2001 caused big foreign exchange losses of Central Banks in emerging markets especially. After the crises which have encountered two decades, the focus of the Central Banks has changed: Calvo and Reinhart’s (2002) “fear of floating” in exchange reserves substituted with Aizenman and Sun’s (2009) “fear of losing international reserves”. In this regard, many developing countries have begun to accumulate foreign exchange reserves more than before in order to interfere exchange market efficiently like Turkey (Balaylar, 2011, p. 19).

The Turkish economy also lived economic crisis in 1994, 1999, 2000 and 2001 which caused big foreign exchange outflows. The Central Bank of the Republic of Turkey (hereafter, CBRT) interfered the exchange market in order to maintain exchange rate stability. According to official report of the bank, the CBRT lost foreign exchange reserves more than three billion US dollar because of the crisis in 1994. Lastly, the CBRT lost close to five billion US dollar in 2001 as a result of financial market crisis which induced the collapse of a number of private banks (Ardic, 2004, pp. 271-272). By the beginning of inflation targeting in Turkey, the CBRT (2009) stated that the CBRT does not have any exchange rate target under the floating exchange rate regime, it continues to closely monitor exchange rate developments and may inject foreign liquidity into the market through foreign exchange selling auctions in case of any unhealthy price formations in the

exchange rate due to a decrease in market depth. Statement of the CBRT indicates that the foreign exchange reserve is an important issue for the bank.

All these information about the CBRT suggest the question whether “fear of losing international reserves” hypothesis is valid for the CBRT or not. Although there is a vast literature examining the relationship between foreign exchange reserves of the CBRT and the different measures of exchange rate in terms of exchange rate market pressure and sterilization (Kibritçioğlu, 2001; Balaylar and Ural, 2007; Şen, 2006; Parlaktuna, 2005; Alper and Ardic, 2006; Balaylar, 2011), the only study belongs to Kasman and Ayhan (2008) which examines the relationship between nominal and real exchange rate and foreign exchange reserves in the context of “fear of losing international reserves” hypothesis for the period 1982:01 - 2005:11 by employing Gregory and Hansen (1996) cointegration test with structural breaks and Granger (1986) causality tests. They find uni-directional causality running from foreign exchange rate to real exchange rate in the short and long term and causality running from nominal exchange rate to foreign exchange reserves.

Financial crises experienced in the Turkish economy and the exchange rate policy of the CBRT provide room to concentrate on the examining the nature of causal linkages between foreign exchange reserves of the CBRT and nominal-real exchange rate. In order to fill the gap in the literature, this study therefore examines the asymmetric relationship between foreign exchange reserves of the CBRT and nominal-real exchange rate in the Turkish economy by employing monthly data belonging nominal exchange rate from 1990:01 to 2011:12 and real exchange rate from 1990:01 to 2010:05. We analyze the interaction between variables in different time ranges because data absence belonging real exchange rate in the Turkish economy.

We analyze relationship by using nonlinear cointegration, non-linear causality and frequency domain causality methodologies. Initially, Dickey-Fuller (1979) linear unit root test and Hansen-Seo (2002) non-linear cointegration test are applied. Then the nonparametric causality test of Diks and Panchenko (2005, 2006) and frequency domain causality test of Breitung and Candelon (2006) are applied to in order to investigate causal relationship between foreign reserves and exchange rate. The novelty of this paper is twofold. First of all, different from previous studies for Turkey, this paper analyzes nonlinear cointegration and causal relationship between variables. Secondly short, medium and long term causalities are investigated with frequency domain causality test. Therefore, analyzing nonlinear cointegration and causality between the variables in Turkey provides important information in order to determine and implement monetary policies.

The rest of paper is organized as follows. The econometric methodology is outlined in section 2 and the data is described in section 3. Then the empirical findings are discussed in the following section. Finally some concluding remarks are offered in the last section.

2. Econometric methodology

2.1. Hansen-Seo (2002) Threshold Cointegration (Tvecm) Test

Non-linear studies for long run balance were laid down firstly by Balke and Fomby (1997), and later by Baum and Karasulu (1998), Enders and Falk (1998), Obstfeld and Taylor (1997), Taylor (2002), Lo and Zivot (2001). Traditional cointegration tests show adjustment of variables for the long term relation during whole period (Esteve and Prats, 2010: 406; Enders, 2009: 481). Balke and Fomby (1997) improved Hansen's (1996) tests for one variable for situations that cointegration vector is known, by using error correction term. On the other hand, Hansen and Seo (2002) improved these models for multi-variables and for the situations that cointegration vector is unknown. Moreover, Hansen and Seo (2002) improved threshold effect on error correction term by forming Threshold Vector Error Correction Model (TVECM). The main logic of the Hansen and Seo (2002) model is testing linear cointegration in null hypothesis and non-linear cointegration in alternative hypothesis by maximum likelihood estimation.

Assume that series X_t is first order stationary $I(1)$ for p and $p \times 1$ dimensional cointegration vector β . $w_t(\beta) = \beta'x_t$ stationary in their levels $I(0)$, error term $l+1$ degree linear error correction model (VECM) can be written as;

$$\Delta X_t = A'X_{t-1}(\beta) + u_t \quad (1)$$

where;

$$X_{t-1}(\beta) = \begin{pmatrix} 1 \\ w_{t-1}(\beta) \\ \Delta x_{t-1} \\ \Delta x_{t-2} \\ \cdot \\ \cdot \\ \cdot \\ \Delta x_{t-l} \end{pmatrix}$$

(Hansen, Seo, 2002: 295, Kapetanios, Shin, Snell, 2006:282). As $k = pl + 2$, estimator $X_{t-1}(\beta)$ is $k \times 1$ and estimator A is $k \times p$ dimensional. u_t error term is based on the assumption that $\Sigma = E(u_t u_t')$ vector martingale difference sequence with finite covariance matrix (Hansen, Seo, 2002:295). If biases from long term equilibrium are lower than or equal to threshold effect, X_t variables will not come to equilibrium and so will not be cointegrated. If biases are higher than threshold effect then equilibrium and so cointegration will be provided (Esteve et. al. 2006: 1035). Under the assumption that error term is distributed normally, parameters β, A and Σ are estimated with maximum likelihood method ($\tilde{\beta}, \tilde{A}, \tilde{\Sigma}$ and $\tilde{u}_t = \Delta x_t - \tilde{A}' X_{t-1}(\tilde{\beta})$) (Hansen and Seo, 2002: 295). As linear model mentioned above is taken into consideration, γ as threshold parameter, threshold cointegration model with two regimes can be written as;

$$\Delta x_t = \begin{cases} A_1' X_{t-1}(\beta) + u_t & \text{eğer } w_{t-1}(\beta) \leq \gamma \\ A_2' X_{t-1}(\beta) + u_t & \text{eğer } w_{t-1}(\beta) > \gamma \end{cases} \quad (2)$$

(Hansen and Seo, 2002: 295-296; Esteve and Prats, 2010: 406). As an alternative expression;

$$\Delta x_t = A_1' X_{t-1}(\beta) d_{1t}(\beta, \gamma) + A_2' X_{t-1}(\beta) d_{2t}(\beta, \gamma) + u_t \quad (3)$$

This expression can also be written with $I(\cdot)$ transition function as;

$$\begin{aligned} d_{1t}(\beta, \gamma) &= I(w_{t-1}(\beta) \leq \gamma) \\ d_{2t}(\beta, \gamma) &= I(w_{t-1}(\beta) > \gamma) \end{aligned} \quad (4)$$

(Hansen and Seo, 2002: 295-296). This threshold model with two regimes describes error correction term. A_1 and A_2 coefficients matrices shows dynamics of each regime. Furthermore this model, except for β cointegration matrix, allows all coefficients to change for each regime. Under the assumption of null hypothesis that claims linear cointegration, $A_1 = A_2$ is denoted (Dutt and Ghosh, 2005: 44). If $0 < P(w_{t-1} \leq \gamma) < 1$ then it shows non-linear cointegration, in other circumstances there is linear cointegration (Hansen and Seo, 2002: 295-296). Under these restrictions, $\pi_0 > 0$ as trimming parameter, tested as $\pi_0 \leq P(w_{t-1} \leq \gamma) \leq 1 - \pi_0$ (Ihle and Taubadel, 2008: 8). If $0 \leq P(w_{t-1} \leq \gamma) \leq 1$, threshold effect can be seen. In other circumstances it shows linear cointegration.

Under the assumption of independently and identically distributed parameter estimations shown as

$u_t(A_1, A_2, \beta, \gamma) = \Delta x_t - A_1' X_{t-1}(\beta) d_{1t}(\beta, \gamma) - A_2' X_{t-1}(\beta) d_{2t}(\beta, \gamma)$, using maximum likelihood method, Gaussians probability is:

$$\mathfrak{I}_n(A_1, A_2, \Sigma, \beta, \gamma) = -\frac{n}{2} \log |\Sigma| - \frac{1}{2} \sum_{t=1}^n u_t(A_1, A_2, \beta, \gamma)' u_t(A_1, A_2, \beta, \gamma) \quad (5)$$

Maximum likelihood estimators of parameters of $\mathfrak{I}_n(A_1, A_2, \Sigma, \beta, \gamma)$ generated as $MLE(\hat{A}_1, \hat{A}_2, \hat{\Sigma}, \hat{\beta}, \hat{\gamma})$ (Hansen and Seo, 2002, p. 196). In the progress of test procedure under the assumption that cointegration vector is unknown, in null hypothesis linear cointegration and in alternative hypothesis non-linear cointegration are tested (Hansen and Seo, 2002, p. 300). Two LM (Lagrange Multiplier) tests are used. First one, under the assumption that linear cointegration relation is known (a priori), is;

$$SupLM^0 = \sup_{\gamma_L \leq \gamma \leq \gamma_U} LM(\beta_0, \gamma) \quad (6)$$

β_0 is the known value of β . Second test, under the assumption that linear cointegration relation is unknown is;

$$SupLM = \sup_{\gamma_L \leq \gamma \leq \gamma_U} LM(\tilde{\beta}, \gamma) \quad (7)$$

In this expression, γ_L is π_0 % of $\tilde{w}_{t-1}$ and γ_U is $(1-\pi_0)$ % of $\tilde{w}_{t-1}$ (Hansen and Seo, 2002, p. 300; Esteve et al. 2006, p. 1035). If π_0 is a value approximate to zero, it will not be chosen, as it will decrease the power of the test (Hansen, Seo, 2002, p. 301). In analysis, like in Hansen and Seo (2002) test, it is assumed that $\pi_0 = 0.05$ for γ_L and $1-\pi_0 = 0.95$ for γ_U . In fact size and power of LM test which estimates threshold cointegration are satisfactory (Dutt and Ghosh, 2005, p. 44). Hansen and Seo (2002) developed two bootstrap methods for asymptotic critical values and probability values⁽¹⁾.

2.2. Diks-Panchenko (2005, 2006) Non-linear Granger causality analysis

In Diks and Panchenko (2005, 2006) Granger causality test, Hiemstra and Jones (1993, 1994) shows that if non-linear sample size increases, possibility of rejecting true null hypothesis increases. Diks and Panchenko (2006) clarified that whether bandwidth converges to zero or not it cannot be neutral. In non-linear null hypothesis that claims there is no Granger causality;

$$q_g \equiv E \left[\left(\frac{f_{X,Y,Z}(X,Y,Z)}{f_Y(Y)} - \frac{f_{X,Y}(X,Y)}{f_Y(Y)} \frac{f_{Y,Z}(Y,Z)}{f_Y(Y)} \right) g(X,Y,Z) \right] = 0 \quad (8)$$

$g(X,Y,Z)$ is a positive weighted function (Diks and Panchenko, 2006: 1655). As test statistic is one-way and even q_g is not specified as positive, when test statistic takes high values, the non-linear hypothesis will be rejected. Indicator function as $I_{i,j}^w = I(\|W_i - W_j\| < \varepsilon)$ and test statistic as T_n , depending on BDS test statistic improved by Brock et. al. (1987) and Brock, et. al. (1996), are shown as;

$$T_n(\varepsilon) = \frac{(2\varepsilon)^{-dx-2dy-dz}}{n(n-1)(n-2)} \sum_i \left[\sum_{k,k \neq i} \sum_{j,j \neq i} (I_{ik}^{XYZ} I_j^Y - I_{ik}^{XY} I_j^{YZ}) \right] \quad (9)$$

in a more simple expression,

$$T_n(\varepsilon) = \frac{(n-1)}{n(n-2)} \sum_i (\hat{f}_{X,Y,Z}(X_i, Y_i, Z_i) \hat{f}_{X,Y}(X_i, Y_i) \hat{f}_{X,Z}(Y_i, Z_i)) \quad (10)$$

(Diks and Panchenko, 2006, p. 1656). With the advice of Hiemstra and Jones (1994) that $Lx = Ly = 1, 2, 3$ or 4 and with the condition that ε value should often be 0.5, 1 or 1.5 and as S_n is an estimator of $T_n(\cdot)$ asymptotic variance, test statistic for $Lx = Ly = 1$ is distributed as:

$$\sqrt{n} \frac{(T_n(\varepsilon_n) - q)}{S_n} \xrightarrow{d} N(0,1) \quad (11)$$

(Diks and Panchenko, 2006, p. 1656).

2.3. Frequency domain causality test

Frequency domain causality may be used to explain short and long run causality between the variables. This approach were developed by Granger (1969), Geweke (1982), Hosoya (1991), Breitung and Candelon (2006). Frequency domain approach to causality thereby permits to investigate causality dynamics at different frequencies rather than relying on a single statistics as is the case with the conventional time domain analysis (Ciner, 2011). To test for causality based on frequency domain, Geweke (1982) and Hosoya (1991) defined two-dimensional vector of time series $z_t = [x_t, y_t]'$ and z_t has a finite-order VAR;

$$\Theta(L)z_t = \varepsilon_t \quad (12)$$

where $\Theta(L) = I - \Theta_1 L - \dots - \Theta_p L^p$ and lag polynomial with $L^k z_t = z_{t-k}$. Then Granger causality at different frequencies is defined as:

$$M_{y \rightarrow x}(\omega) = \log \left[\frac{2\pi f_x(\omega)}{|\psi_{11}(e^{-i\omega})|^2} \right] = \log \left[1 + \frac{|\psi_{12}(e^{-i\omega})|^2}{|\psi_{11}(e^{-i\omega})|^2} \right] \quad (13)$$

if $|\psi_{12}(e^{-i\omega})|^2 = 0$ that y does not cause x at frequency ω . If components of z_t are I(1) and cointegrated, then the autoregressive polynomial $\Theta(L)$ has a unit root. The remaining roots are outside the unit circle. Extracting z_{t-1} from both sides of equation 9 gives;

$$\Delta z_t = (\Theta_1 - I)z_{t-1} + \Theta_2 z_{t-2} + \dots + \Theta_p z_{t-p} + \varepsilon_t = \tilde{\Theta}(L)z_{t-1} + \varepsilon_t \quad (14)$$

where $\tilde{\Theta}(L) = \Theta_1 - I + \Theta_2 L + \dots + \Theta_p L^p$ (Breitung and Candelon, 2006). Geweke (1982) and Hosoya (1991) proposed a causality measure at a particular frequency based on a decomposition of the spectral density. Breitung and Candelon (2006) who has using a bivariate vector autoregressive model propose a simple test procedure that is based on a set of linear hypothesis on the autoregressive parameters. So that test procedure can be generalized to allow for cointegration relationships and higher-dimensional systems.

Breitung and Candelon (2006) assume that ε_t is white noise with $E(\varepsilon_t) = 0$ and $E(\varepsilon_t, \varepsilon_t') = \Sigma$, where Σ is positive definite. Let G be the lower triangular matrix of the Cholesky decomposition $G'G = \Sigma^{-1}$ such that $E(\eta_t \eta_t') = I$ and $\eta_t = G\varepsilon_t$. If the system is stationary, let $\phi(L) = \Theta(L)^{-1}$ and $\psi(L) = \phi(L)G^{-1}$ the MA representation;

$$z_t = \phi(L)\varepsilon_t = \begin{pmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{pmatrix} \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} = \begin{pmatrix} \psi_{11}(L) & \psi_{12}(L) \\ \psi_{21}(L) & \psi_{22}(L) \end{pmatrix} \begin{pmatrix} \eta_{1t} \\ \eta_{2t} \end{pmatrix} \quad (15)$$

Let we can use this representation for the spectral density of x_t ;

$$f_x(\omega) = \frac{1}{2\pi} \{ |\psi_{11}(e^{-i\omega})|^2 + |\psi_{12}(e^{-i\omega})|^2 \} \quad (16)$$

Breitung and Candelon (2006) investigate the causal effect of $M_{y \rightarrow x}(\omega) = 0$ if $|\psi_{12}(e^{-i\omega})|^2 = 0$. The null hypothesis is equivalent to a linear restriction on the

VAR coefficients. $\psi(L) = \Theta(L)^{-1}G^{-1}$ and $\psi_{12}(L) = -\frac{g^{22}\Theta_{12}(L)}{|\Theta(L)|}$, with g^{22} as the

lower diagonal element of G^{-1} and $|\Theta(L)|$ as the determinant of $\Theta(L)$, it follows y does not cause at frequency ω if;

$$|\Theta_{12}(e^{-i\omega})| = \left| \sum_{k=1}^p \theta_{12,k} \cos(k\omega) - \sum_{k=1}^p \theta_{12,k} \sin(k\omega)i \right| = 0 \quad (17)$$

with $\theta_{12,k}$ denoting the (1,2)-element of Θ_k . Thus for $|\Theta_{12}(e^{-i\omega})| = 0$,

$$\sum_{k=1}^p \theta_{12,k} \cos(k\omega) = 0 \quad (18)$$

$$\sum_{k=1}^p \theta_{12,k} \sin(k\omega) = 0 \quad (19)$$

Breitung and Condelon's (2006) applied to linear restrictions (17) and (18) for $\alpha_j = \theta_{11,j}$ and $\beta_j = \theta_{12,j}$. Then the VAR equation for x_t can be implied as;

$$x_t = \alpha_1 x_{t-1} + \dots + \alpha_p x_{t-p} + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p} + \varepsilon_{1t} \quad (20)$$

and the null hypothesis $M_{y \rightarrow x}(\omega) = 0$ is equivalent to the linear restriction with $\beta = [\beta_1, \dots, \beta_p]'$

$$H_0 : R(\omega)\beta = 0 \quad (21)$$

and

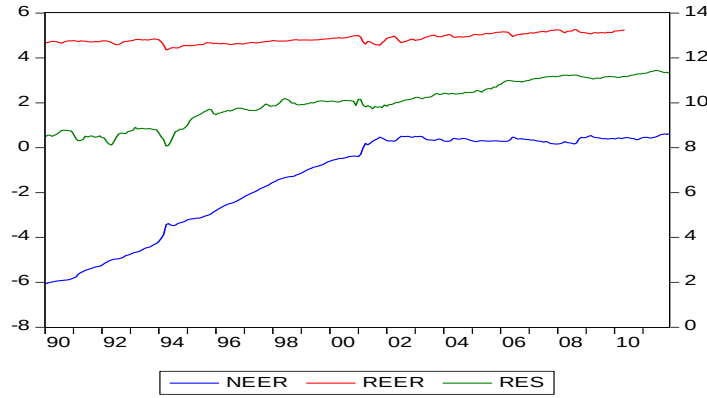
$$R(\omega) = \begin{bmatrix} \cos(\omega) & \cos(2\omega) & \dots & \cos(p\omega) \\ \sin(\omega) & \sin(2\omega) & \dots & \sin(p\omega) \end{bmatrix} \quad (22)$$

The causality measure for $\omega \in (0, \pi)$ can be tested with the conventional F-test for the linear restrictions imposed by Eq.(15) and Eq. (16). The test procedure follows an F- distribution with (2, T-2p) degrees of freedom.

3. Data

In this study, we employ monthly data spanning the period for foreign exchange reserves (RES) and nominal exchange rate (NEER) and for real exchange rate (REER) 2003:01-2014:01,. All the data are respectively obtained from the Turkey Central Bank Electronic Data Delivery System (EVDS). Relying on the existing literature, natural logarithms of the variables are used in the empirical analysis.

Figure 1. Plot of the Log of the Foreign Exchange Reserves and Real-Nominal Effective Exchange Rates



Plots of both foreign exchange reserves and real-nominal exchange rate are put in Figure 1. According to statistics, the CBRT attaches importance the accumulation of reserves by the floating exchange rate regime. It is clear from the figure that there is an upward trend in both series. However, the series tend to move and improve motivation for investigating cointegration and causal relation between the variables. According to preliminary analyses results, it is possible to talk about causality between the variables.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Coef. of Var.	Skewness	Kurtosis
NEER	1.522	0.216	0.141	0.676	2.989
REER	114.633	9.080	0.079	-0.324	2.983
RES	6.687	2.371	0.354	-0.018	2.198

Notes: Coefficient of variation is the ratio of standard deviation to mean. Descriptive statistics are for log series.

This table represents the descriptive statistics of the variables. It seems that data characteristics are slightly different in each series. First of all, as expected, the coefficient of variation, kurtosis, skewness and volatility in the nominal exchange rate is higher than real effective exchange rate and foreign exchange reserves.

4. Empirical Findings

Causality analysis requires investigation of unit root properties of the variables. In order to test stationary of variables, as well as known Dickey and Fuller (1979, henceforth ADF) unit root test is applied. Results are illustrated in the following table.

Table 2. *Results of ADF (1979) Unit Root Test⁽²⁾*

Variables	Level			First Differences		
	No Constant or Trend	Constant, no Trend	Constant and Trend	No Constant or Trend	Constant, no Trend	Constant and Trend
NEER	0.8765 (2)	0.2419 (2)	-1.9854 (2)	-7.9921 (1)	-8.0250 (1)	-8.4872 (1)
REER	-0.0617 (4)	-3.2215 (3)	-2.8889 (3)	-6.5270 (3)	-6.4918 (3)	-6.6905 (3)
RES	2.4686 (0)	-0.5563 (0)	-2.3404 (1)	-8.8206 (0)	-9.2576 (0)	-9.2067 (0)

Notes: In parenthesis shows Dickey-Fuller (1979) test results if lag-lengths chosen according to SIC criteria's are zero. For ADF test, at %5 confidence interval, Mac Kinnon (1996) critical value for model without constant term is -1.9425, for model with constant term is -2.876, for model with constant term and trend is -3.433. *denotes stationary level of the series.

Results of the unit root test in level and in first difference of the variables are put in Table 2. The ADF test do not reject the null hypothesis of unit root test for the levels of real-nominal exchange rate and Central Bank foreign exchange reserves of Turkey analyzed. When the ADF test is applied in the first differences of the variables, the results indicate that all variables are stationary. The unit root analysis implies that the variables are integrated of order one.

Table 3. *Results of Hansen-Seo (2002) TVECM Test*

Variables	supLM Statistics	Asymptotic %5 Critical Value	Bootstrap %5 Critical Value
NEER and RES	342.71	32.5144 [0.00]*	20.9906 [0.00]*
REER and RES	24.5911	25.1103[0.1]*	22.9863[0.00]*

Notes: *denotes probability values. Trimming percentage for threshold is 0.05. Number of Bootstrap replication is 10.000, lag-length according to SC is 3.

According to test results in Table 3, critical values obtained from both asymptotic and bootstrap, alternative hypothesis are accepted at % 5 significance level, except for asymptotic value of real exchange rate and Central Bank reserves. With the acceptance of alternative hypothesis that claims non-linear cointegration, regime change is appeared. For a variety of reasons exchange rate regimes have been used in Turkey. In the form of a “managed float” has been used between 1990 and 1999. The managed float was converted into a “dirty float” in 1994. A “crawling peg” regime, after currency board-like system was adopted under a standby agreement with the IMF in 1999 to control the chronic and high inflation rate. The system had a short life due to the financial crisis of 2001. Exchange rates have been determined under a “flexible exchange rate” regime since February 2001 with implemented inflation targeting system since 2003 (Kasman and Ayhan, 2008, p.84).

Table 4. *Diks-Panchenko (2006) Non-Linear Granger Causality Test*

Lx=Ly	RES to NEER				NEER to RES			
	Raw data ^a	p-value	Residuals ^b	p-value	Raw data ^a	p-value	Residuals ^b	p-value
1	0.699	0.242	0.673	0.250	-0.126	0.550	1.105	0.134
2	1.502	0.066*	0.081	0.467	0.660	0.745	-1.467	0.928
3	1.247	0.106	0.050	0.479	-1.150	0.875	-1.046	0.852
4	1.321	0.093*	-0.601	0.726	-1.320	0.906	-1.216	0.888
1	0.704	0.240	0.522	0.300	0.084	0.533	0.555	0.710
2	1.450	0.073*	0.956	0.169	0.760	0.776	0.411	0.659
3	0.602	0.273	0.727	0.233	1.307	0.904	0.982	0.837
4	0.846	0.198	1.289	0.098*	1.533	0.937	0.894	0.814

Notes: ^a the series in first differences; ^b the residuals of the VAR (p+d) models; *denote statistical significance at the 10% level of significance.

After determining the nonlinear cointegration of the nominal-real exchange rate and foreign exchange reserves, this study concentrate on investigating whether there is a asymmetric relationship between the variables. According to nonlinear causality test results in Table 4, there is no causality for both raw data and residuals between nominal-real exchange rate and foreign exchange reserves. But there is a causal relationship from foreign exchange reserves to nominal and real exchange rate for raw data. According to these test results causality in real exchange rate rather than nominal exchange rate shows that Central Bank considers volatility in inflation rate rather than volatility in exchange rate. So it can be concluded that the CBRT employs the exchange rate as a nominal anchor to control inflation. In this way, with the sterilized exchange rate intervention, inflation effect of saving reserves is tried to be minimized (Balaylar, 2011, p. 24).

Table 5. *Results for Frequency Domain Causality*

Reserves to Nominal Exchange Rates							Nominal Exchange Rates to Reserves					
	Long Term		Medium Term		Short Term		Long Term		Medium Term		Short Term	
ω_i	0.10	0.50	1.00	1.50	2.00	2.50	0.10	0.50	1.00	1.50	2.00	2.50
Wald	1.739	1.763	0.592	1.407	1.987	3.018	2.929	2.921	0.131	1.142	3.133	6.455*
ω_j	0.10	0.50	1.00	1.50	2.00	2.50	0.10	0.50	1.00	1.50	2.00	2.50
Wald	2.090	2.076	0.949	1.856	1.526	0.718	7.710*	7.738*	0.437	0.223	1.193	7.729*

Notes: The conventional Wald tests of Breitung and Candelon (2006) frequency domain causality tests between the variables in this table. The lag lengths for the VAR models are estimated with 3 lags, determined by SC. F- distribution with (2, T-2p) degrees of freedom equals 5.99; *denotes the significance level.

Finally, Breitung and Candelon (2006) frequency domain causality analysis which allows the causality test statistic decompose into different frequencies. The test statistics are calculated at high frequencies of $\omega_i=2.5$ and $\omega_j=2.0$ to examine

short term causality, $\omega_i = 1.00$ and $\omega_i = 1.50$ to examine medium term causality and finally $\omega_i = 0.01$ and $\omega_i = 0.05$ to examine long term causality. Different frequencies make it possible to learn both temporary and permanent relations between variables. According to the results of frequency domain causality test, foreign exchange reserves do not have any effect on nominal and real exchange rate in Turkey in any time period. On the other hand causality running from nominal exchange rate to foreign exchange reserves appears in short term. Another causality relationship running from real exchange rate to foreign exchange reserves appears in short and long term. Asymmetric effects of exchange rate shocks occur firstly in money supply variable. Existence of causality in real exchange rate rather than nominal exchange rate during transition period from short-term to mid-term shows that the main aim of Central Bank intervention in exchange rate market is to prevent high appreciation of real exchange rate and to control current account deficit. Because decreases in domestic interest rates caused by monetary expansion results in capital outflows. As a result of saving foreign exchange reserves by taking into consideration volatility in real exchange rate instead of nominal exchange rate, image of pressure on Turkish Lira to depreciate comes out as current account deficit. Taking into consideration that the main target of Central Bank is to sustain price stability, intervention with real exchange rate by using reserves does not contradict with monetary policies' results and even it shows that pressure of cash increases with capital inflows on exchange rate is controlled before causing reserve losses.

5. Conclusions

This paper investigates the relationship between real-nominal exchange rate and Central Banks foreign reserves in Turkey by employing monthly data. In order to determine the asymmetric causal linkages the variables, this paper employees nonlinear cointegration test developed by Hansen and Seo (2002) and nonlinear Granger causality test developed by Diks and Panchenko (2006). Finally, Breitung and Candelon (2006) analysis which permits to decompose the causality test statistic into different frequencies were employed. According to Hansen and Seo (2002) non-linear cointegration test results, alternative hypothesis which claims that there is a non-linear cointegration relationship for each variable group is accepted. Then according to Diks and Panchenko (2006) non-linear causality test which deals with asymmetric relationship between variables, there is no causality from nominal and real exchange rate to foreign exchange reserves. However, there are two causality relationships running from foreign exchange reserves to real and nominal exchange rate. Breitung and Candelon (2006) frequency domain causality test results are similar to and Seo (2002) non-linear cointegration test

results. So, there is no causality relationship from foreign exchange reserves to nominal and real exchange rate. On the other hand, there are two uni-directional causality relationships between the variables. First of all, from nominal exchange rate to foreign exchange reserves only short time and the other causality relationship from real exchange rate to foreign exchange reserves both short and long time, but not mid-term. These test results shows that the CBRT wants to sterilize cash increases caused by using foreign exchange reserves. In floating exchange rate system implemented till February 2001 in Turkey, effects of changes in nominal foreign exchange rate on inflation rate have not been evaluated, thus that means inflation target is much more important than volatility in nominal foreign exchange rate.

Notes

- ⁽¹⁾ For detailed information about theorems and proofs of Bootstrap look at Hansen and Seo (2002).
- ⁽²⁾ As non-linear cointegration test is applied for error terms, in order to find degree of stationary, Augmented Dickey-Fuller linear unit-root test is applied like Kapetanios et al. (2006) recommended in their studies.

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The challenges of accounting profession as generated by controlling

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Abstract. *Internationalization and globalization marked in Europe in the early '70s the development of controlling, in its role to complete the management and have influenced it to a great extent until present. In practice, controllers' responsibilities range from the extreme of performing only primary accounting tasks and up to the extreme of undertakings related to executive management. Controlling has undergone decades of evolution, and herewith the concept got standardized in theory and practice; however it cannot be claimed that a unitary definition for controlling has already been achieved. Same as a theatre spotlight shines on the stage from different angles, controlling should be viewed in the same way, as: mind-set, substance, work approach, process, tool and role. Only when all the lights are on and the object is viewed from all sides, it can be defined in its completeness. As a management function, controlling must be practiced in a professional manner, as the sustainable development is ensured only for those entities that act professionally. Without solid controlling know-how, managers are sentenced to being led rather than leading. If the manager does not have solid controlling know-how, he must rely on a team of specialists who have extensive knowledge of controlling.*

Keywords: modern management, management functions, professional controlling, normative management, strategic management, project controlling.

JEL Classification: M21.

REL Classification: 14B.

Despite the revolution of information technology, mankind is still far from being able to effortlessly satisfy its needs.

Information as a product of the human mind seems to defy economic theory models, as it is “mobile” and can be transmitted without any losses.

As far as information is concerned, the consumption process is in fact adding value by making use of its synergetic features. Information is valid for a long time span because it seized a piece of reality. Even though information does not disappear, from an economic perspective, its usage can be blocked. By blocking the circuit of the potential contained by the information, the consumption cancels its conversion into value, hence making it obsolete.

A well-founded and consumed piece of information can substitute substance, energy and particularly, another piece of information.

The error of mistaking value for cost, “contributed” to the discriminatory treatment of environment and of social services, as value creators (education, healthcare, art, etc.). Unfortunately, even today, the world’s „decisions factors” look at the expenses generated by schools, hospitals, research centers only from a value perspective and not also from the perspective of the social potential that these institutions generate for economy.

Business management cannot be achieved based on intuition and experience alone. Assimilation and learning from past experiences is essential but not sufficient; modern management is inconceivable without creativity. Creativity is a synergistic blend between intuition and, above all, hard work; without intuition, knowledge is lacking the means and thinking is lacking the content.

Wisdom gathered from all places and times is a unique product of civilization centered on asserting the value of each person. Science is sentenced to develop models with the aim of solving complex problems.

The complex phenomenon of macro-competence can be viewed as a strategic structure of the entity upon which systemic offers generating outstanding and hard to imitate value, can be build. Competence can be viewed as performing better than others, and especially as having the capacity to provide explanations. If analysed alone, competence has at any rate the following features: knowledge, skill and existence.

In practice, the engineer's work is focused on studying and implementing projects while the economist's work focuses on managing scarce resources for the production and distribution of goods and services. As resources are scarce, engineers and economists meet in the “cost arena”. Both engineers and

economists resort to models that imply concept, empirical data and reality validation.

Today, economists' models resemble those of engineers, because each has to consider systems' steering or control, to strive to obtain cheap solutions and to take actions which must have a strategic perspective.

The control of the resources implies ever more the control of the networks and herewith of their main nodes, including their human dimensions. Globalization and multiple ways of governance are attained through an overlap of powers and a gradual erasing of the borders as radical separation lines between states.

The acceleration of technical progress and the massive increase of interdependencies are factors which positively impact living conditions for most people today and tomorrow, but they create countless problems which must be clearly identified.

Interactions among national economies are a development factor for economies, at both country and global level. Although in recent decades interdependencies have increased, this did not diminish the role of national economies nor did it amputate the national sovereignty, as practice has proved that each solid national economy participates more effectively to the global exchange.

Each country, rich or poor, has something to offer and something to receive from the global circuit of values. Any modern nation, while preserving its specific character, its cultural originality, shows at the same time willingness to assimilate from other nations' civilization and cultural conquests, as these are universal and have the ability to overcome local or national boundaries.

Knowledge is essential for any economic culture, as it enables mankind to grasp as much as possible and to open new paths towards its hopes and desires.

Science and culture store millennial creations of human thinking and action, and help mankind turn simultaneously into social creation and causal factor in the evolutionary process of society.

The Institute for Business Administration of the Vienna University of Economics and Business and Controller Institut Austria, have been doing researches and have been providing courses in the field of controlling for more than 35 years and for the past 20 years the Universities of Applied Sciences have joined as well, emphasizing the practical approach and especially the advanced knowledge in controlling.

The launch of *Professional controlling. Concepts and Instruments*, second edition revised, published in 2011 by Schäffer-Poeschel Stuttgart Publishing, written by Professor Rolf Eschenbach, PhD - Vienna University of Economics and Business,

founder of Controller Institut Austria, partner at Contrast Management Consulting GmbH and by mag. doctor Helmut Siller, MSc - University of Applied Sciences Vienna, was an important moment to acknowledge how indispensable and essential this work is for the students and, in particular, for the specialists in Romania.

To be mentioned that from the accepted version of the Romanian translation and until the actual printing of the book, many specialists have contributed.

The translation from German and the selection of the most suitable terms in Romanian language was not at all an easy task.

Let's see why this work it is so valuable and, especially, what is controlling!

The professional controlling is no longer the classic, traditional controlling of the years 1960-1970. As a management function, controlling must be practiced in a professional manner, as the sustainable development is ensured only for the entities that act professionally. Professionalization means performing an activity, a profession with the mind-set of meeting goals at the highest level.

Among many other prerequisites for this profession, we stress vocational training which requires time, practical experience, scientifically grounded know-how, mastering of specialized terminology, high social and technical skills for solving challenges.

The authors tackle entities (companies, non-profit and public institutions) as being systems, from the perspective of the management-oriented entity.

Using a systemic approach has the following advantages in the case of controlling:

- the use of a language of systems with a high degree of generalization simplifies analysis, absorbing knowledge, interdisciplinary transfer of knowledge;
- its transparent language allows the systematization of knowledge, the separation of what is essential from nonessential, enables new solutions for problem-solving;
- holistic thinking, specific to the systemic approach, is multifactorial and multi-causal and takes into consideration retroactive, subsequent and delayed effects.

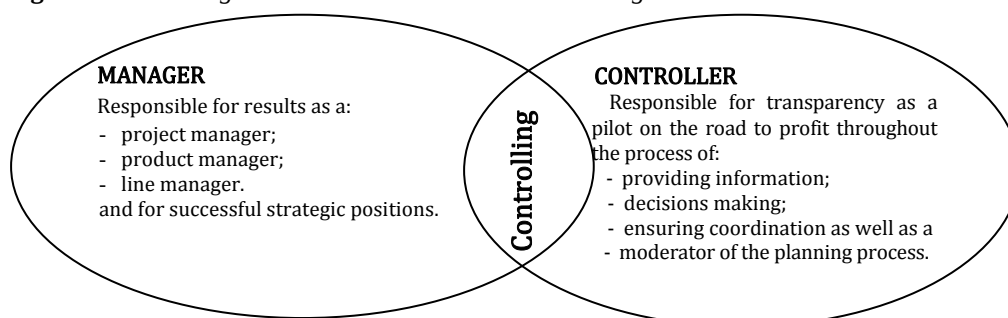
The book presents clearly how sustainable controlling can be successfully performed, thanks to its professionalization.

Without solid controlling know-how, managers are sentenced to being led rather than leading.

Controlling is a functional management concept with the role of coordinating the planning, the control and the information towards the desired end-result. The controller can be regarded as the “economic conscience” of the entity.

We must distinguish between controlling as a function in the organization and the controller as a person holding this function. In fact, controlling, in terms of steering the organization, is one of the central management activities. Each manager fulfils controlling functions within its duties. Controlling, as both process and mind-set, is thus generated by the manager and controller as a team and becomes a type of “interface”. The connection between the manager’s responsibilities, controlling and the controller’s responsibilities is illustrated in the figure below.

Figure1. *Controlling at the intersection between the manager and the controller*



Controlling does not target a position or a person, but rather a field of activities carried out by various employees or even managers who do not necessarily hold the “controller” position. In small and medium-sized entities, controlling function is taken over by the management of the entity or by the head of the financial-accounting department. Entities with over two hundred employees appoint more and more often a controller to take over controlling tasks.

The coordination responsibilities of the controller translate into making sure that the planning and control activities performed by management are goal-oriented and that all necessary information is available at any time. Controller’s role regarding planning is to coordinate the partial plans and to organize the entire planning process. Therefore, it is not the controller who normally plans and coordinates, but the manager. To define the limit, it has to be mentioned that in small and medium-sized entities, it might occur that controller’s role surpasses coordination responsibilities. Thus, in current practice, the controller often takes the responsibility of planning, which actually should be performed by specialized departments. In the recent years, it can be noticed that, at global level, the controller’s role has extended from a simple service provider to a consultant for the management.

The controller's tasks, identity and responsibility have been established in the controller model developed by the IGC (International Group of Controlling, former Society of interests in the field of controlling). In the version of September 2002 of this model, the responsibility of the controller for meeting the targets was acknowledged for the first time. On one hand, controller's liability results from his/her responsibility for the accuracy of the information collected and provided; on the other hand, it results from his/her responsibility for organizing and monitoring the process, which enables the management to take target-oriented decisions.

Controller's mission

Controllers design and accompany the management process of goal-finding, planning and controlling and thus are co-responsible for reaching the objectives.

This means:

- *Controllers ensure the transparency of business results, finance, processes and strategy and thus contribute to higher economic effectiveness.*
- *Controllers coordinate sub-targets and sub-plans in a holistic way and organise a reporting-system that is oriented towards the future and covers the enterprise as a whole.*
- *Controllers moderate and design the process of goal-finding, planning and management control so that every decision-maker can act in accordance with agreed objectives.*
- *Controllers provide all relevant controlling-information to managers.*
- *Controllers develop and maintain the controlling systems.*

The coordination activity of controlling consists in solving problems that have a strong effect over the entity as a result of environmental influences:

- the dynamics is increasing;
- the markets are stagnating;
- new technologies are issued very fast;
- the product life cycles are becoming shorter and shorter.

Controlling helps the management of the entity to withstand these problems by making use of innovative solutions rather than relying on old, obsolete methods.

Controlling is currently not achieved only through the controller, but often on the spot, through directly involved employees. Controlling becomes more and more an *integrated controlling*; the controlling as an institution and the controller act more and more often as a moderator for promoting the idea of controlling.

Controlling – main elements

A careful analysis of the literature allows us to emphasize six concepts outlined until today:

- controlling as an administrative record tracking (the '80s)
- controlling as an administrative information system (end of the '80s);
- controlling as planning and control (beginning of the '90s);
- controlling as coordination activity (the '90s);
- controlling as business administration (end of the '90s);
- controlling as a system for coordinating decision-making process (the 2000s).

Within each concept, controlling is regarded differently; later concepts develop previous ones, focusing on different aspects.

Tasks of the controlling system

According to the definition of controlling, the controller has responsibilities with regard to planning, control and information.

In order to explain the basic idea and the need for controlling, some classic questions might be useful, such as:

- Do you know precisely which products generate profit and from where losses are coming?
- Do know how various measures impact the outcome?
- Do you know how your result looks like without fiscal or balance sheet fragmentations?
- Are objective-oriented targets included in your planning and are resources allocated properly?
- How fast can you find out if you are performing according to your plan or you have lost control?
- Are decisions taken in due time and are proper measures put in place?
- Can you translate your company's strategy into concrete target-oriented plans?
- Do you know the factors that generate higher indirect costs?

Each entity follows a certain strategy whose achievement is guaranteed through proper structuring of the operational processes and through the configuration of an appropriate organizational structure.

The most important information source within the information system is accounting. Electronic data processing system has become an indispensable element. Budgeting is an important component of the planning and control processes. However, controller's work does not cover only short-term operational planning; taking into consideration also strategic aspects is increasingly defining the activity of the controller.

Basically, the controller has two different coordination tasks, with regard to both the planning system and the information system. On the one hand the controller deals with configuration and development and on the other hand with the permanent coordination of activities.

The purpose of controlling within the entity is to sort individual components that generally occur, check their utility, complete and organize them within a system. The most important components of the management system to which the controller directs his/her activity are:

- planning and control system;
- information system.

The objective of the controlling system of the entity is to increase transparency as a prerequisite for optimal management of the business. Controlling follows three main principles:

- plan-oriented actions;
- decentralized, individual responsibility;
- measurable KPIs.

It is enough to remember that controller's responsibilities and position are determined significantly by the size of the entity. Thus, for medium-sized entities, it is typical that the controller is seen as a "handyman" and is responsible for more than just controlling activities, while large companies split the activities within the financial department between the controller and the treasurer, with delimitations that can be more or less rigid.

The job description is the most suitable instrument to formalize the framework of the controller's activity. Below an example of job description for a controller:

Job description	
1 Job title	2 Level
Controlling coordinator	Field coordinator
3 Objectives	
<ul style="list-style-type: none"> - development and implementation of procedures which lead to required profit for the entity - supporting the company's management towards efficient control from the analyst and consultant position 	
4 Direct superior	
The CEO	
4.1 Job holder receives expert guidance from	
-	
5. Job holder provides expert guidance to	
<ul style="list-style-type: none"> - the coordinator of the cost calculation department - the coordinator of the planning and reporting department - the employees in the controlling department 	
6. Job holder is be deputised by	
<ul style="list-style-type: none"> - the director in charge with economic, financial and administrative matters - the coordinator of the administrative department 	
7. Job holder deputises	
The coordinator of the administrative department	
8. Special empowerment	
(here must be mentioned the special powers and rights that are not specific as per the hierarchical level and that exceed the general regulation)	
<ul style="list-style-type: none"> - general power of attorney - power of attorney for bank 	

<p>9. Description of the specialized activities that must be carried out especially by the person holding the position (independently)</p> <ul style="list-style-type: none"> - consultancy for the company's CEO - responsibility for reporting and information management systems - development of budgets and monthly results - deviations analysis and benchmarking - calculation, interpretation and comments of the comparison between forecasted and actual result - forecasting - development of product cost calculations and target pricing - consultancy for internal and external reporting - calculations of profitability and investment - financial planning - support / perform strategic planning - analysis of the processes and development of mitigations measure - standardisation and development of controlling tools - project management 			
<p>Note to job holder: The job description establishes your responsibilities and competences in a committed manner. You must act and decide accordingly. You must inform immediately your direct superior in case of any irregularities.</p>			
Date:	Date:	Date:	I received the job description
Direct Superior	Department coordinator	Human Resources Department	Date: Job holder's signature:

Controlling in commercial entities

In the meantime, efficient controlling systems have emerged within the commercial field as well. Among the particularities of trade is the increasingly important role given to:

- the location or locations – for subsidiary-based systems;
- life cycles of various types of operations/commercial transactions concepts (discounters, supermarkets, consumer markets, specialized markets, etc.);
- the range of products in its wideness and depth, against the importance of individual item;
- the high informational and coordination needs related to developing the product range, on behalf of the procurement and distribution department (buying and selling);
- the ordering of the physical flow of goods;
- the organization and usage of the display areas for goods presentation;
- the coordination of the involved factors: personnel and sales spaces.

Mohlenbruch and Meier (1998) show how a unitary consistent system of controlling for the commercial field should be in order to meet these specific elements. At the heart of the integrated controlling system for retail entities lays a central database that must support and improve the information transfer, as well as the management of the interfaces.

The significant elements of the system are the following:

- *overall controlling of the entity*: financial controlling, strategy and organization planning, investment controlling, subsidiaries coordination, development of the types of entities, overall clients management;
- *human resources controlling*: flexible planning of human resources allocation and productivity measurement based on the data from the “personnel qualification controlling”;
- *product range controlling*: product range planning (inclusion or exclusion of articles, as well as overall management of merchandise groups), product range coordination, product range control;
- *spaces/areas controlling*: the management of the commercial space using the analysis of sales data recorded by scanners, the sales integrated management of commercial space, the management of commercial space by means of management systems;
- *goods controlling*: ordering system, external logistics system, internal logistics system, goods reception and warehouse coordination, goods delivery.

Controlling in public administration

The introduction of controlling in the public administration was triggered at the beginning, on one hand by the high and increasing indebtedness, on the other hand by the faulty quality of services in public administration, strongly criticized by citizens.

Compared to private companies, public administration entities do not have services programs and the “products” are not clearly defined. The reporting, a significant communication tool within private companies was lacking almost entirely. Because of insufficient cost calculation, a thorough control of services is impossible or insufficient for most positions in the public administration. One of the reasons is that certain concepts related to information and communication technology are, at best, in an early stage of development. Gaps are identified mainly in the way the public administration presents itself towards its target audience, the citizens as well as in the personnel related area.

In this context, in order to simplify administration, the so-called New Public Management (NPM) was developed by communities in order to reform these entities.

With the help of the New Public Management, the introduction of controlling within public administration was initiated.

The elements of the New Public Management:

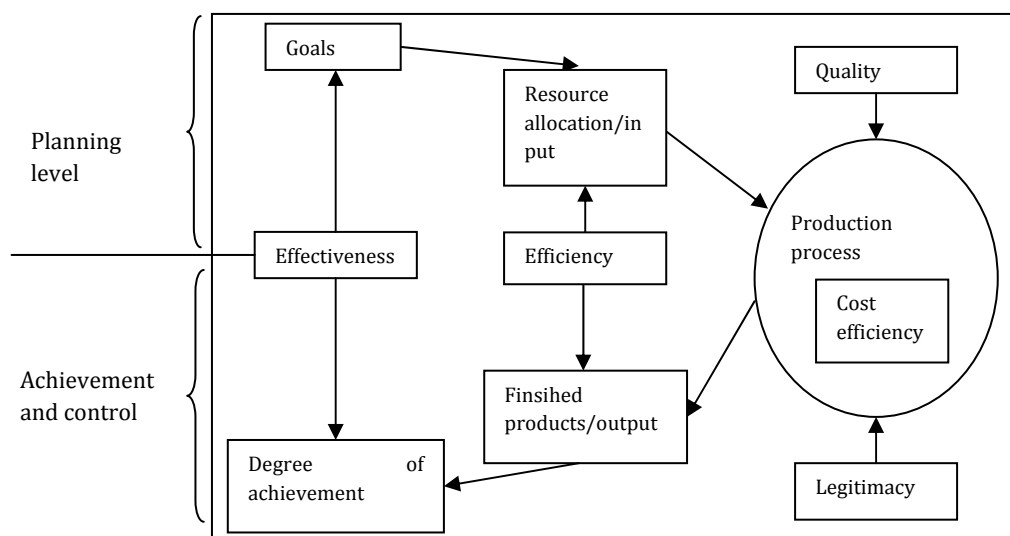
- clear delimitation of responsibilities between public administration and politics;
- reduction of the centralized control with better support for decentralized areas;
- contract management;
- decentralized responsibility for resources;

- development of the organization;
- actions oriented towards output (costs), respectively the product;
- staff training;
- introduction of economy- oriented management tools (cost calculation and profitability calculation, indicators, reporting).

The fundamentals of controlling can be very well transferred to the public administration; however certain peculiarities need to be considered. For controlling within the public sector, respectively for planning, management and controlling for public administration organizations, the “3E” model (effectiveness, efficiency, economy) according to Becker and Weise proved to be a suitable reference.

The focal point of controlling activities in terms of effective management consists in the strategic planning and the planning of the objectives, as well as the control of the goals achievement. Successful management is possible only when the objectives of the civil servants are set between political and public administration institutions involved in the structuring process and when there is a clearly articulated outlook in terms of objectives. To meet these objectives, a series of values under the format of indices and indicators, which should be subsequently anchored in the public administration entities’ internal and external reporting system, must be processed. To support the strategic planning process for objectives and resources, as well as for the monitoring of the achievement of the goals within the multidimensional target system of the civil servants, the Balanced Scorecard concept has proved to be the appropriate solution, being successfully used for many years in these entities

Figure 2. The “3E” model of public administration controlling



In terms of efficiency control, the main focus is on the planning and the control of the productivity and profitability of the services, also taking into account the correctitude and quality requirements of the service.

Within this operational area of controlling, we can find the annual planning and the budgeting, the cost management and the quality management. Within the New Public Management, a significant role in budgeting is represented by the consistent mix between the financial responsibility and the technical (expert) responsibility. The starting point for budgeting is represented by those expert services which can independently decide whether to provide the services while using more personnel or more capital. Taking a decision requires a clear concept of what: products, product range can be made available and their subsequent cost, as well as a proper costs and services calculation. On this basis, comparisons between planned and actual values can be made and deviations can be analysed.

In order to achieve continuous efficiency and effectiveness, the management of the public administration is trained to use an up-to-date, stepwise, clear and action-oriented reporting system.

Controlling in public administration is still at the beginning of a complex development process. In the past years, internal professionalization within public administration followed its course.

Controlling in healthcare institutions

Healthcare is another area where controlling penetrated.

Economic planning and services control within hospitals require a service and cost accounting which meets the following accounting objectives:

- transparency over individual activities/processes with the purpose of recording the services delivered to each patient from admission to release;
- subsequent calculation of total costs of the services performed with the purpose of control over the profitability against the revenues generated by the corresponding DRGs (Diagnosis Related Groups);
- making available information in order to ensure a minimum quality for each treatment with as little as possible consumption of resources: herein lies the influence of medical and administrative behaviour; at the same time, the comparison with other hospitals, respectively benchmarking should be possible.

As long as the specificities of the hospital are considered, the process cost calculation seems appropriate and represents a necessary prerequisite for economic planning, for the management and control of the hospital, as well as for negotiations with health insurance funds and authorities.

Other controlling tasks with regard to hospitals are related to conducting of market analysis for areas of interest, analysis of doctors who issue medical recommendations for further investigations, analysis of diagnoses and their frequency, as well as staff analysis in order to derive constructive proposals for future services and staff. The controller is also the moderator of the discussions between head physicians and management with regard to hospital budget.

Recently, the term medical controlling was chosen in order to designate topics which require special medical know-how regarding hospital management, for example checking of the codes assigned to diagnoses and services, processing of the treatment procedures and deviations analysis. Medical controlling implies a close cooperation between economic and medical staff and demonstrates that in healthcare units, controlling cannot be delegated to a single position, but it must be fulfilled jointly by several persons.

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A cross-country comparison of the personal income tax systems progressivity

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Abstract. *This paper focuses on four European Union member states: Romania, Italy, France and the United Kingdom to provide a cross-country comparison for the year 2012, regarding the progressivity of personal income tax systems. By making use of the information available in the OECD dataset and OECD's Taxing Wages framework and on the basis of the tax rules in place were computed average personal income tax rates, average tax wedges and marginal tax wedges in order to measure the tax progressivity of wage earners at different wage levels and for different families types. The analysis performed reveals the fact that for families with children the United Kingdom has the highest rate of progressivity while for a single taxpayer with no children who gets an average wage, the total tax burden as a percentage of the total cost of labor is the highest in France (50.2%), followed by Italy (47.6%), Romania (44.4%) and the United Kingdom (32.3%).*

Keywords: personal income tax, tax progressivity, average tax wedge, marginal tax wedge.

JEL Classification: H24.

REL Classification: 8K.

Introduction

Taxes have the capacity of equalizing the disposable income so they have a redistributive role by changing the income inequality. According to Pfingsten (1988) three properties are required to prove this result: each tax liability is less than the corresponding pre-tax income, taxation does not reverse ranks on the income scale, and inequality is reduced if a rich gives to a poor such that they do not interchange their ranks. The redistributive effect of taxes is given by the degree of progressivity and by the tax level measured through the average tax rate. A progressive tax system is defined by an increase in the average tax rate with income or by a marginal tax rate higher than the average tax rate at a particular income level. A proportional tax system is characterized by constant average tax rate while for a regressive tax system the average tax rate reduces with the income.

The progressivity of the taxes on wage earnings is determined by the personal income tax (PIT) system features such as the statutory PIT rate schedule (number and width of the tax brackets, the gap between the top and bottom tax rate), the PIT related tax advantages (deductions, allowances, exemptions and credits dependent on the level of income and/or specific family characteristics – the number of children, a dependent spouse, etc.) but also by social security contributions (SSCs) borne on both employee and employer.

Literature review

Tax progressivity of the income tax system was highly debated by policymakers in their discussions on tax reform proposals but also by researchers since was associated to income inequality considerations and behavioural distorting responses such as labor supply.

In the public finance literature (Mirrlees, 1971) it is mentioned that the personal income tax structures should be designed in a manner that balance efficiency (taxes that are not distorting people's decisions such as their productivity response, tax evasion/avoidance response or adjustments in terms of their in efforts, occupational mobility, job reallocation, investment etc.) with equity (vertical equity being done through some tax advantages which are distorting). But in such a case in which the concept of efficiency puts doubt on equity requirements was brought the tax evasion problem. Thus, even if a higher level of tax progressivity reduces income inequality, in the presence of tax evasion both efficiency and equity could be diminished as a result of increased progressivity.

Gorodnichenko, Martinez-Vazquez and Sabirianova Peter (2009) offered evidence on the taxpayers' response to tax changes and reported an increase in reported income due to an improvement in tax compliance of households in the upper tax brackets. Moreover, those taxpayers situated in the upper tail of the income distribution are more aggressive by engaging in tax avoidance/evasion activities (Feldstein, 1995), so they have a higher sensitivity to changes in the PIT schedule.

Furthermore, Ferede (2013) concluded that a reduction in the marginal personal income tax rate that lowers the degree of tax progressivity encourages self-employment.

Duncan and Sabirianova Peter (2012) reported that a change in progressivity at the top of the tax schedule is more effective in reducing income inequality than a change in progressivity at the bottom of the income scale.

Musgrave and Thin (1948) classified the progressivity indicators into two classes: structural progressivity indicators, computed according to the statutory tax rate schedule and effective progressivity indicators: Gini index which measures before- and after-tax inequality. The former category of indicators are considered to be biased because omit the non-standard allowances, assess progressivity of one tax in isolation without considering the influences of other taxes on it and do not account for the number of taxpayers who actually face the different tax rates (are based on information about before-tax income distribution) while the second category are requiring information on both the before- and after-tax income distribution, being most appropriate for calculating a tax system's overall progressivity (Paturot et al., 2013).

Research methodology

This study uses data collected from the OECD database which are computed using the OECD's Taxing Wages framework in order to estimate the progressivity of the wage income for the principal earner of the family for four family types (one earner without children, one earner with 2 children, one-earner married couple without children, one-earner married couple with 2 children) for which the wage income takes values between a range of 50% to 250% of the respective country's average wage. The analysed countries are: Romania, Italy, France and the United Kingdom and the year of reference is 2012.

Because the scope of the paper is to measure the progressivity of taxes on wage earnings along the income scale it was chosen a structural progressivity indicator to be computed.

The statutory progressivity of the personal income taxes paid by wage earners is reflected by the average rate of personal income tax (amount of income tax payable after accounting for any reliefs, divided by gross wage earning) and average tax wedges (the proportion of total labour costs that is taken in tax and social security contributions net of cash benefits).

In addition to the progressivity of the personal income tax system, the average tax wedge progression also takes into account the impact of employee and employer social security contributions.

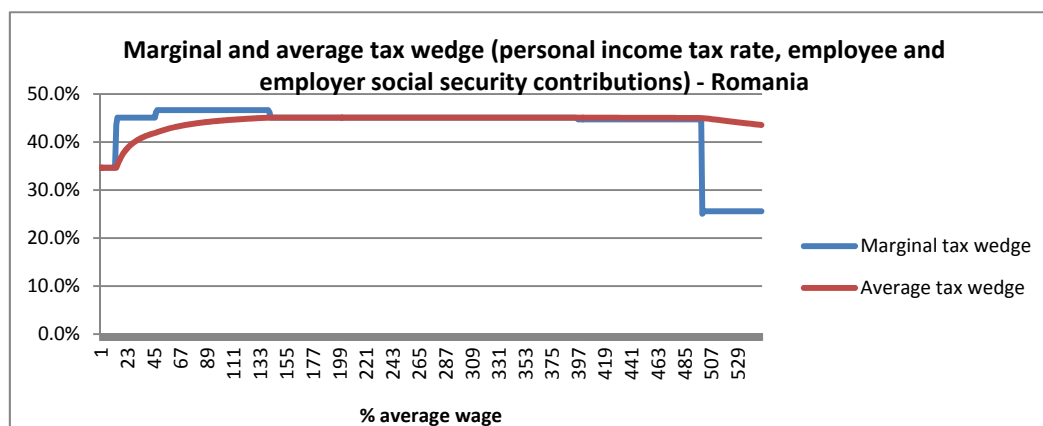
Besides the tax rate thresholds, the average rate of personal income tax was computed taking into account the standard deductions, basic personal allowances, tax credits, tax exemptions and other tax related provisions.

The average tax wedge progressivity is computed for 7 income intervals, which are defined as intervals between two multiples of the average wage, starting from the first (bottom) interval: 50-67% of the average wage until the seventh (top) interval: 233-250% of the average wage; each wage interval equals 33 per cent of the average wage with 2 exception for the bottom and the top interval.

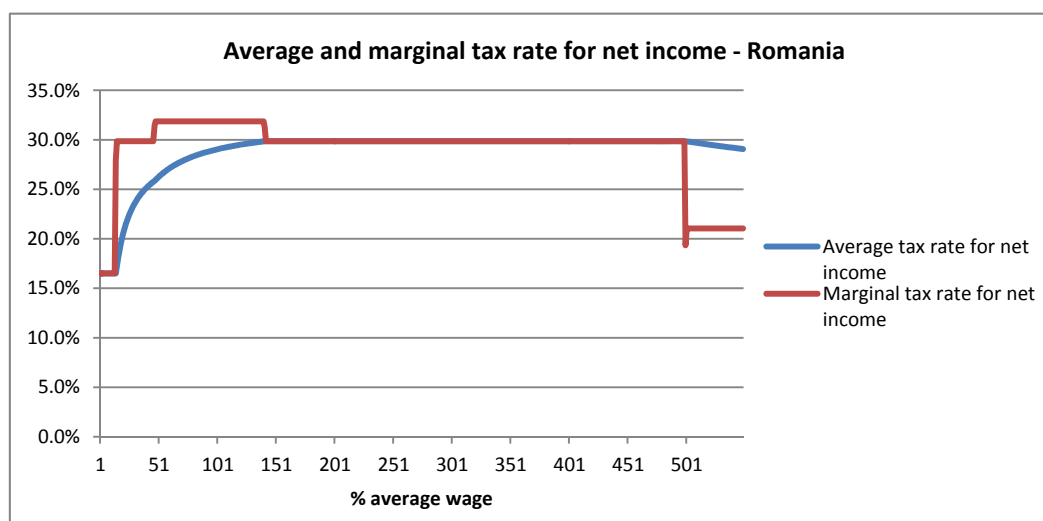
Results

The personal income tax (PIT) schedule is a complex mix of different components: the rate structure, deductions (social insurance contributions or earnings-related deductions, important in France and Romania), allowances (e.g. in the UK for old age and family policy), exemptions (social assistance and minimum income etc., more important in Italy, UK), tax credits (family policy and old age provisions).

In Romania the marginal and average tax rate for the total burden of labor (income tax, employee and employer contributions) (Figure 1) is the same, 44.7% for a wage between 150-500% of the average wage, then, after this value, the average rate reduces in a small extent while the marginal tax rate drops significantly to 25.6%. Up to 141% of the average wage the marginal tax rate is above the average tax rate. The same trend (Figure 2) is exhibited in the case of the average and marginal tax rate of net income but the percentages are much lower: from a minimum of 16.5% for low income up to a maximum of 31.9% for incomes between 50-150 % of the average wage, then to drop to 21% for income in excess of five times the average wage.

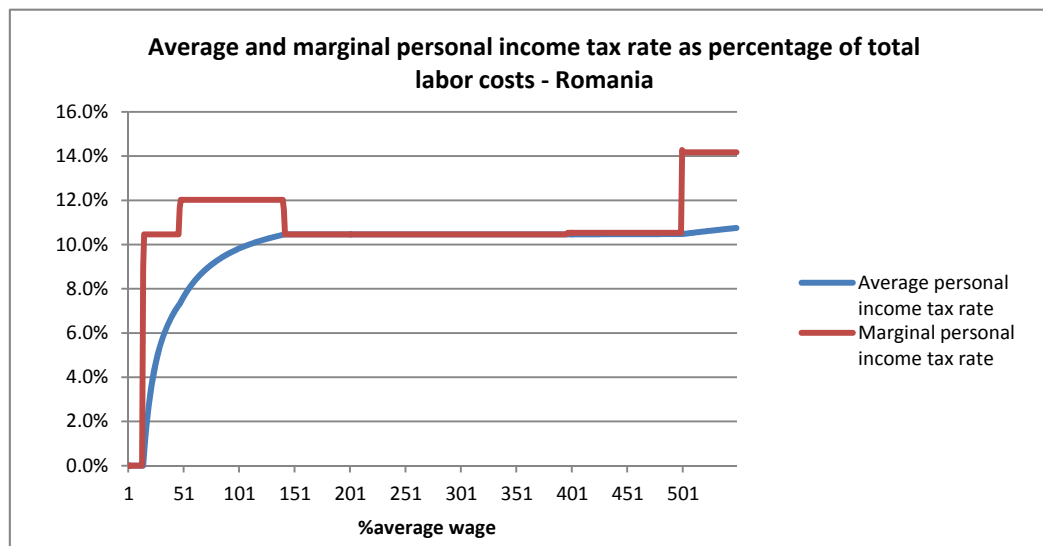
Figure 1

Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

Figure 2

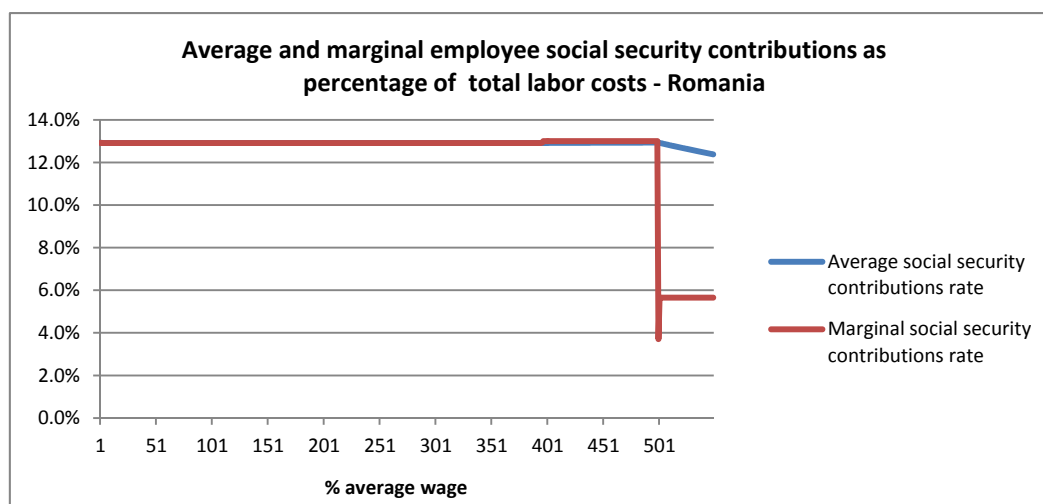
Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

In terms of the average personal income tax rate and marginal personal income tax rate as a percentage of total labor costs, the trend is similar to those rates mentioned above except for an income of more than five times the average wage for which the marginal personal income tax rate (14.2%) significantly exceeds the average tax rate of 10.5% (Figure 3).

Figure 3

Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

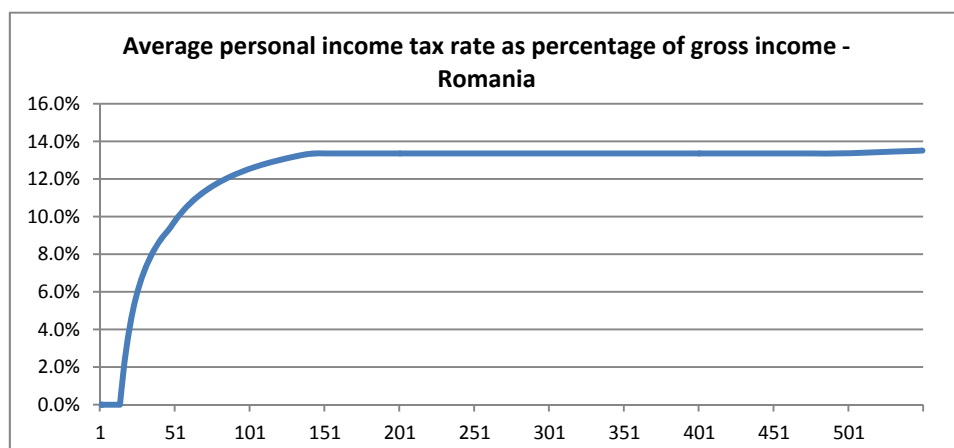
The average employee social security contributions rate as a percentage of total labor costs is the same to marginal employee social security contributions rate as a percentage of labor costs until the marginal employee social security contributions rate drops sharply for those wages above five times the average wage, reaching up to 3.7% due to the upper limit of the pension insurance contributions (Figure 4).

Figure 4

Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

The average rate of income tax as a percentage of gross income, the average and marginal personal income tax rate as a percentage of total labor costs are lower than the statutory personal income tax rate of 16% (Figure 3 and Figure 5).

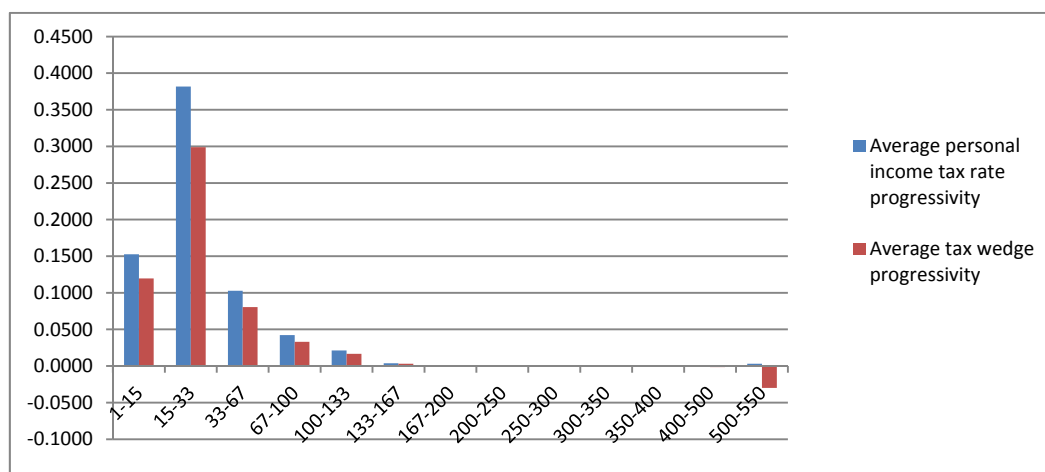
Figure 5



Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

The progressivity of the average personal income tax rate and average tax burden (Figure 6) is highest for the first level of income distribution, for those with incomes between 15-33% of the average wage and then decreases until it becomes 0 for wages between 167- 200% of the average wage. The progressivity of the average tax burden is negative for wages starting from 350% of the average wage.

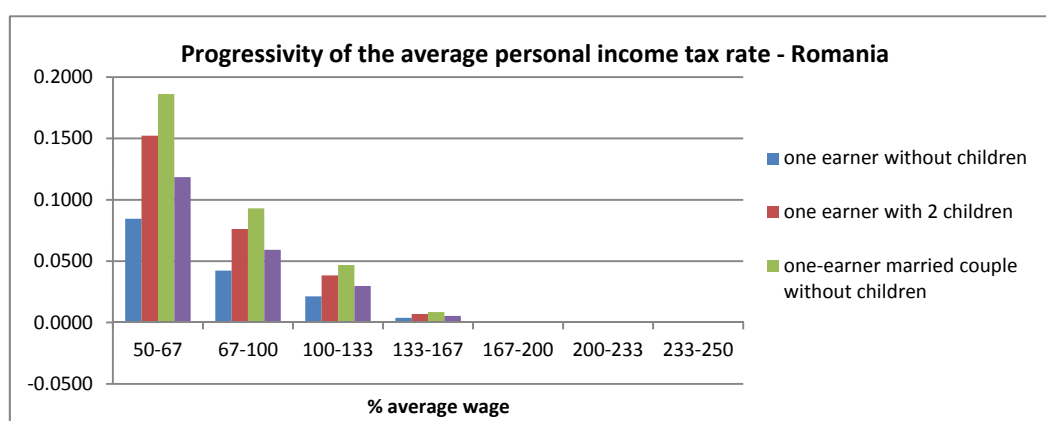
Figure 6



Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

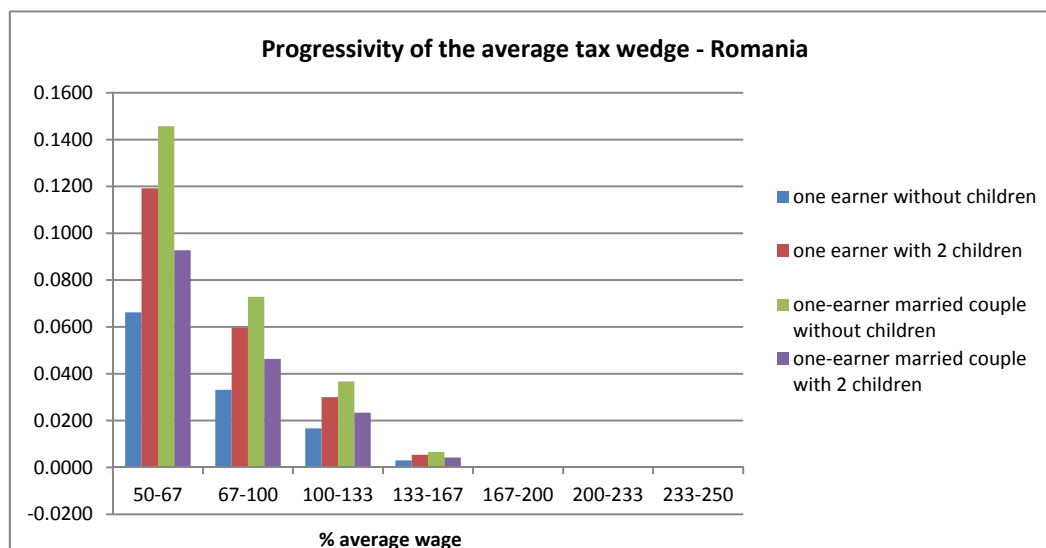
The average personal income tax rate progressivity (Figure 7) and the average tax burden progressivity (Figure 8) are highest for a one earner married couple without children who gets an income between 50-67% of the average wage (an increase in the average income tax rate of 3.16 percentage points for each percentage point of growth in the average wage for an income range between 50-67% of the average wage and an increase in the average tax burden of 2.47 percentage points) followed by single taxpayer with two children.

Figure 7



Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

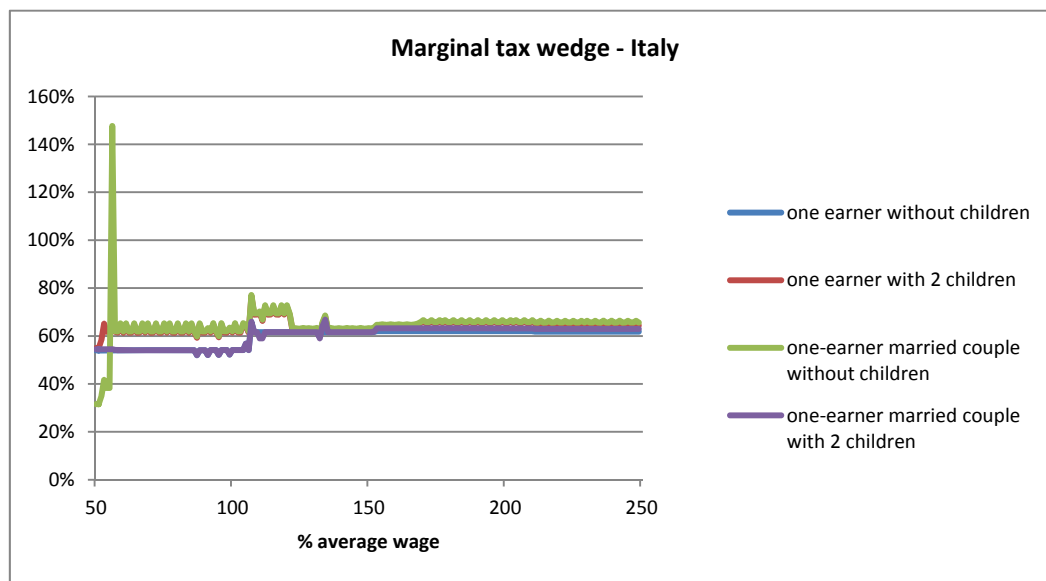
Figure 8



Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

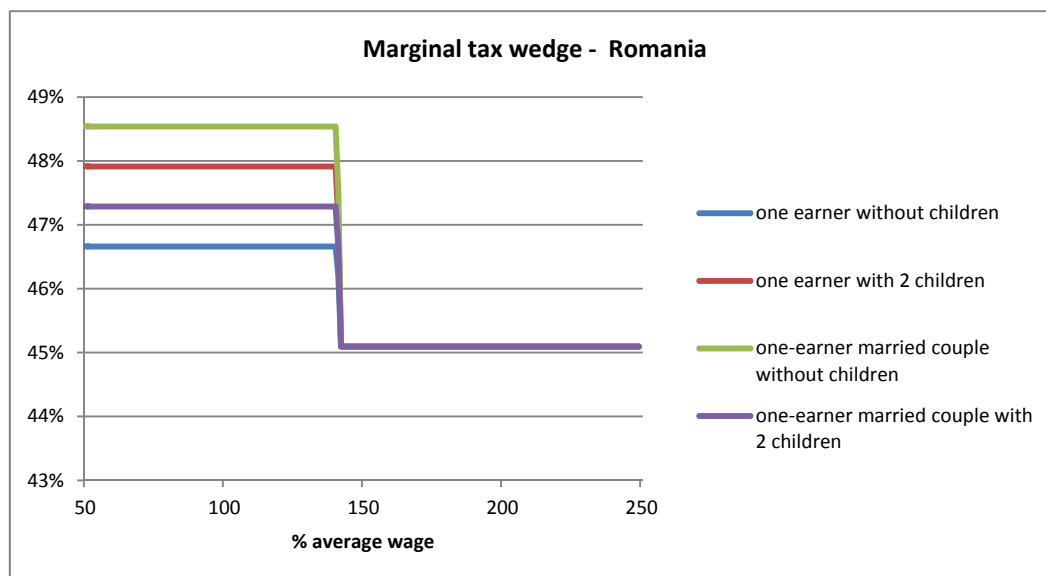
Regarding the marginal tax wedge for the analysed countries (Figures 9, 10, 11, 12), in Italy, the marginal tax wedge can reach 140% for one earner married couple without children with a low income (Figure 9).

Figure 9

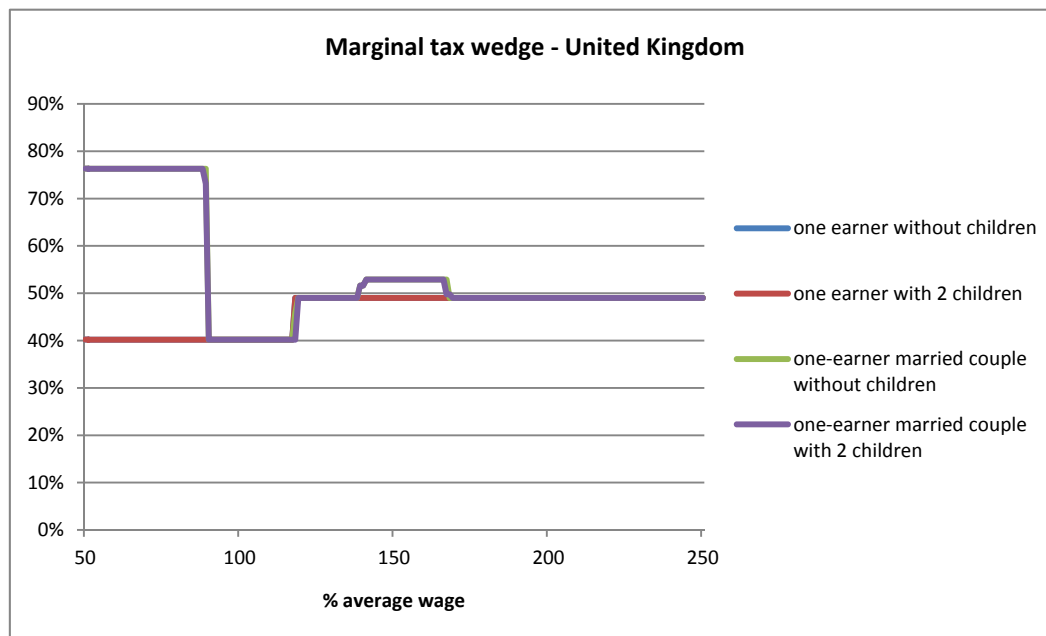


Source: OECD's Taxing Wages (2012).

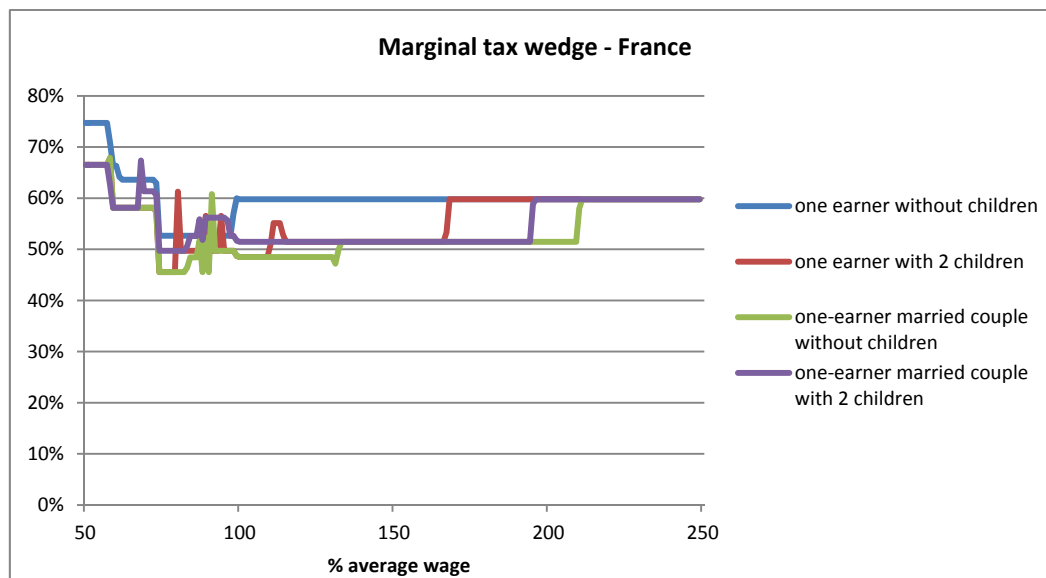
Figure 10



Source: own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

Figure 11

Source: OECD's Taxing Wages (2012).

Figure 12

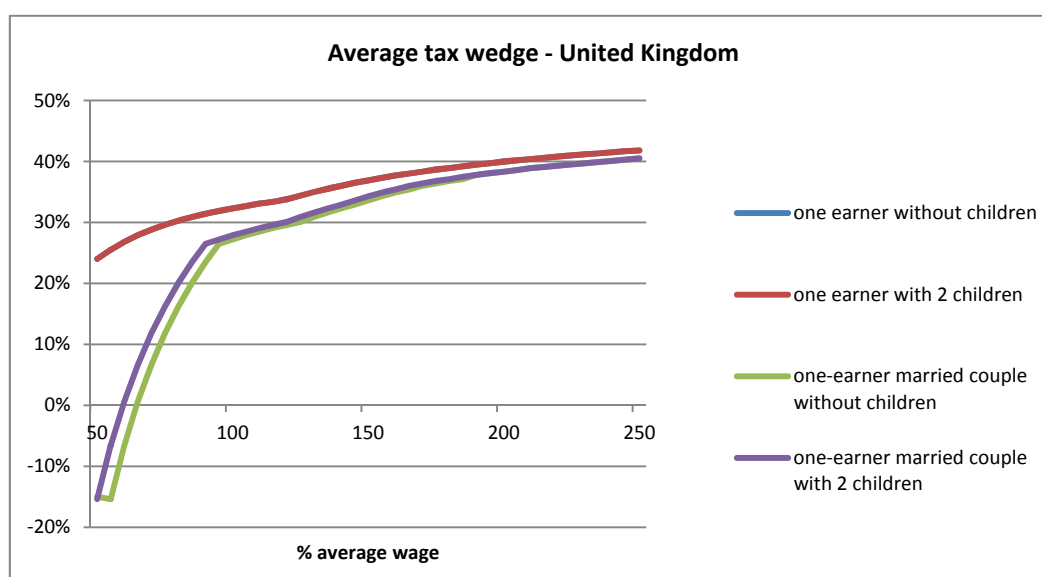
Source: OECD's Taxing Wages (2012).

Negative average tax wedge for some income brackets (low income) are exhibited by the United Kingdom due to work related tax credits and basic allowances. (Figure 13)

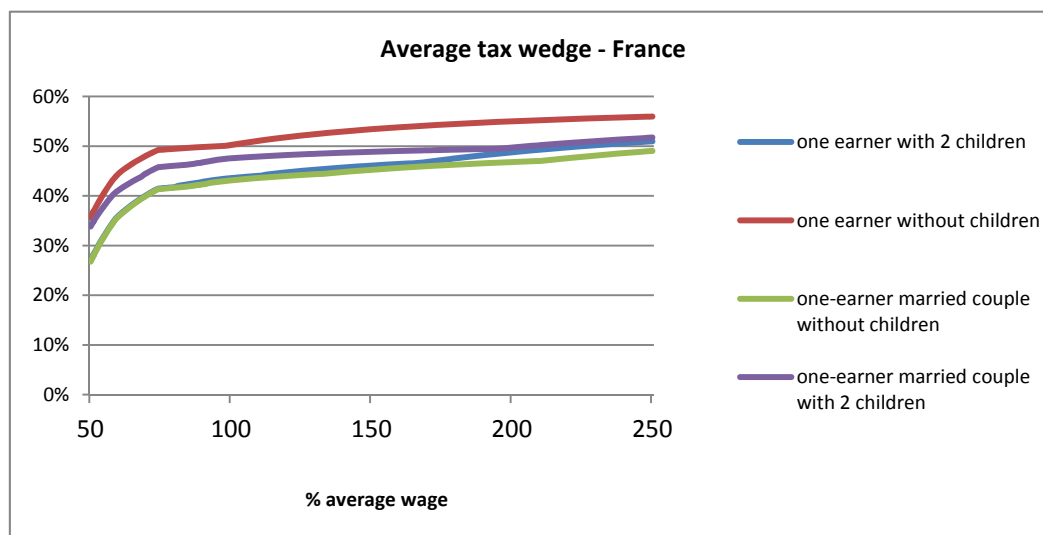
Also, for families with children, the United Kingdom has the highest rate of progressivity. Although progressivity tends to be the same for couples with one earner, sometimes the tax system is more progressive for married couples as a result of the deduction for dependent spouses (United Kingdom), but progressivity may decrease if the taxable income can be transferred from the earner to her/his husband/wife.

In conclusion, for a single taxpayer with no children who gets an average wage, the total tax burden as a percentage of the total cost of labor is the highest in France (50.2%) (Figure 14), followed by Italy (47.6%), Romania (44.4%) and the United Kingdom (32.3%) (Figure 13).

Figure 13



Source: OECD's Taxing Wages (2012).

Figure 14

Source: OECD's Taxing Wages (2012).

Conclusions

The analysis performed on four European Union member states: Romania, Italy, France and the United Kingdom, for the year 2012, sets out the scene on the level of tax progressivity for the income taxes paid by wage earners of these countries as it was reflected by the average effective income tax rates and tax wedges (which also include employers and employees' social security contributions) computed using the OECD's Taxing Wages framework.

While marginal rates may be higher, lower or equal to the statutory rates for different income levels, the average PIT rates are usually lower than the statutory PIT rates (for a single taxpayer with an average income) as a result of basic personal deductions or tax credits.

Thresholds with zero tax rates, personal deductions and tax credits contribute to the progressivity of the tax system as the value of the tax relief they provide as a percentage of income decreases as income increases which implies an increase in the average PIT rates.

The PIT systems exhibit a progressive structure even for flat tax systems, as is the case of Romania, as a fact that various tax advantages in the forms of deductions, allowances, exemptions or tax credits borne a gap between the taxable and gross income.

Even when the flat tax is levied at a low rate, the overall effective rate of tax on labor income may be quite high – and this needs to be a significant policy concern.

For families with children the United Kingdom has the highest rate of progressivity. Although progressivity tends to be the same for couples with one earner and one single earner without children, sometimes the tax system is more progressive for married couples as a result of the deduction for dependent spouses (United Kingdom).

A tax system that levies taxpayers at an individual level and not at household level (such is the case of France) can decrease the progressivity of the tax system.

Social security contributions diminish progressivity of the tax system because mostly they are applied at fixed rate or proportional rate and there are no exceptions for those with low incomes (or thresholds are lower than for income tax). Often are set caps for social security contributions which result in a higher tax burden for low-income taxpayers compared to those with high income. Moreover, the tax system could become regressive when the social security contributions ceiling has been reached.

There is no optimum regarding the progressivity level of income taxes because taxpayers present a high elasticity in terms of labour supply and achieving an equity-efficiency trade-off could threaten also the social welfare function.

But according to the Europe 2020 Strategy “Member States should seek to shift the tax burden from labour to energy and environmental taxes”, because those that support the highest degree of progressivity are low income and second income earners. Thus, lower income earners should be protected by limiting their wage tax burden through an increase in personal allowances/deductions.

Further research should take into consideration a broader interval of time and other types of families to measure their progressivity in order to establish if whether multi-earner families are any better off than single earner families after taxes.

Acknowledgements

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Covered bonds vs. assets securitization

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Abstract. *During the past few years, in the recent post-crisis global banking and capital markets context, financial institutions around the globe are exploring new options to better secure their financing and refinancing demands. We will exhibit herewith a comparison between covered bonds and asset securitizations as financial markets-based funding techniques, highlighting certain key structuring and implementation specifics on each of them.*

Keywords: covered bonds, assets securitization, capital and financial markets, financial institutions, funding and refinancing techniques.

JEL Classification: G15; G18; G21.

REL Classification: 11B.

1. Introduction

Covered bonds and assets securitizations are financial tools of integrating local asset markets with global financial and capital markets and they are employed as funding and refinancing techniques being used by any major financial institution to underpin its financial businesses and financing needs.

From global financial and capital markets perspective, when talking about the fixed income securities, investors are habitually seeking to invest in financial instruments that are asset-backed rather than corporate-backed.

Securitized asset-backed, mortgage-backed and collateralized-debt securities are structured financial instruments that seek to isolate themselves completely from the rating of the issuer and to rely entirely upon the quality of the underlying pool of assets and on the various structural credit and liquidity enhancements techniques involved in order to reach the highest ratings.

On the other hand, covered bonds are alternative investment instruments that could be identified as halfway between corporate bonds and mortgage-backed securities, since they are depending both on the quality of the issuer and on the quality of the pooled assets underlying the funding.

2. Covered bonds

As capital markets mortgages refinancing technique, covered bonds have existed in civil law continental European countries for more than 250 years, while in the recent past 10-20 years they had also becoming popular in the common law countries around the world. Covered bonds could be defined as a hybrid financial instrument, being a mixture of secured corporate bonds and mortgage-backed securities: they are an obligation of the issuer, and such they are matching of the secured bonds features, however, given that investors are also relying on the underlying pooled assets as a backup protection, covered bonds are featuring several asset-backed securities characteristics.

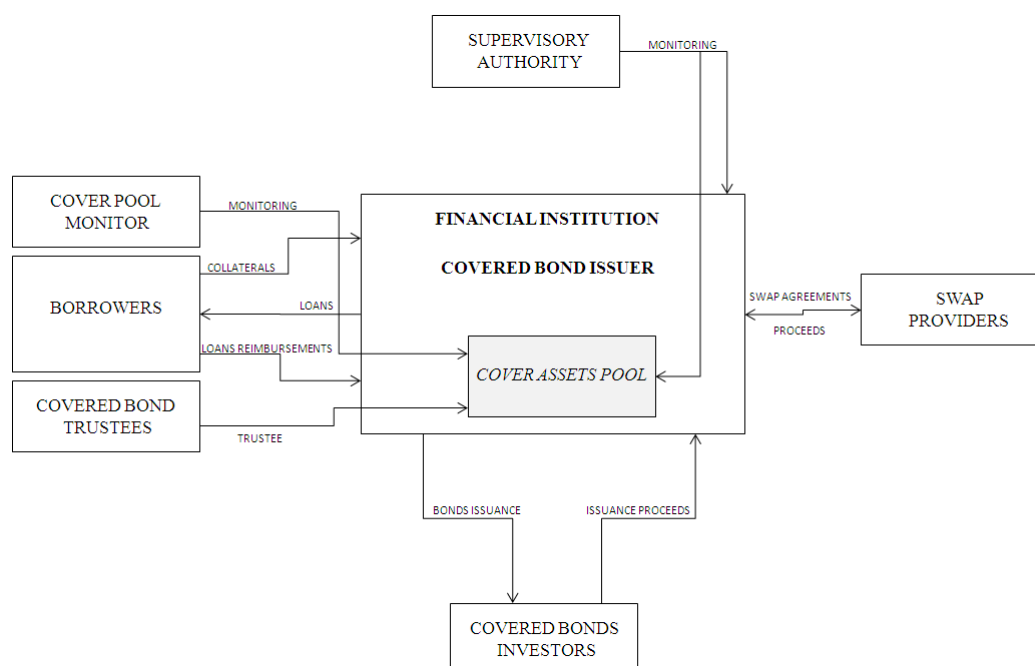
Covered bonds are securities issued by financial institutions, which are collateralized by cash flows derived from the underlying mortgages or public sector loans (the cover assets pool) as well as the general-business cash flows of the originator. Hence, covered bonds exhibit equally the recourse, both against the issuer and against the underlying collateral pool, and a simplified credit enhancement mechanism, which is employed to absorb any losses at a level suitable to reach improved ratings.

In the particular case of covered bonds, the asset-backing feature comes in the form of cover assets pool, which is providing bond investors a dual recourse, by

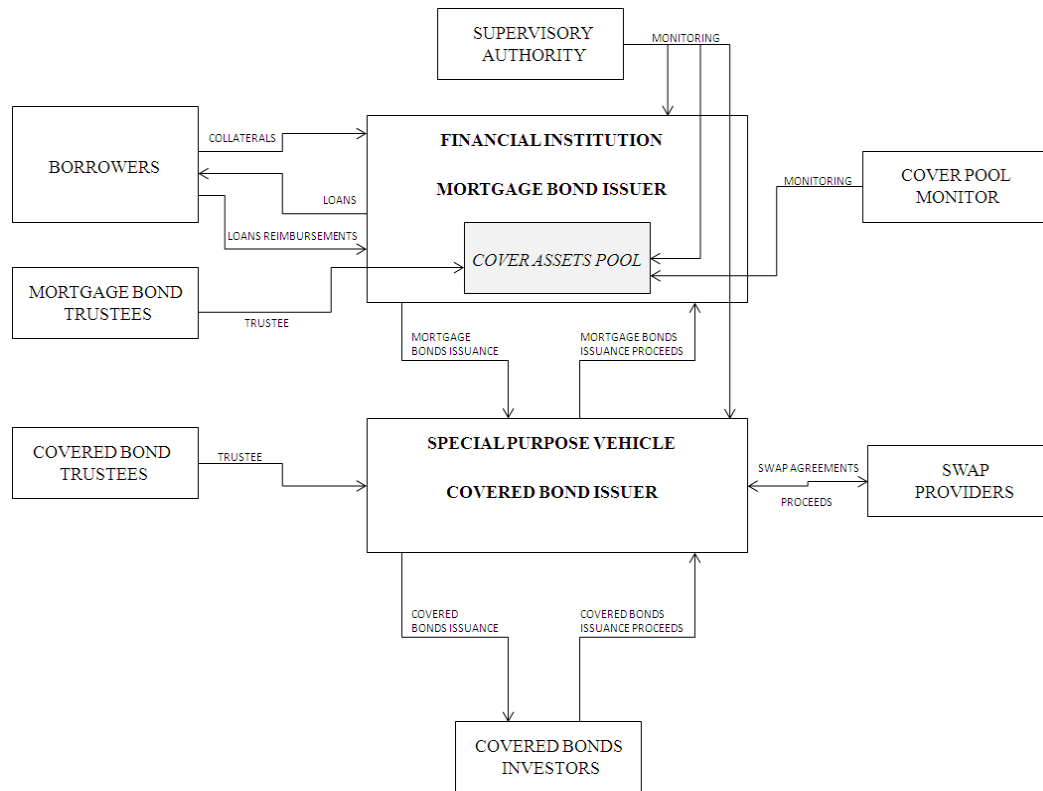
means of their capability to rely on the underlying pooled assets, which are virtually unaffected from the post-bankruptcy recourse and claims of the other creditors. However, this asset-backing facility is heavily dependent on the enforcing strengths of the local legislation (in case of the legislative/regulatory covered bonds) or on the effectiveness of transactions' legal structure (in case of the structured/private contractual covered bonds).

An important additional attribute of structured covered bonds sits on the fact that such transactions are involving the use of a special purpose vehicle (SPV) that agrees to buy the cover assets, even though with funding provided by the issuer and afterwards this SPV guarantees the repayments of the issued covered bonds. One of the main goals of structured covered bonds transactions is to provide a rating uplift, so that the covered bonds to be able to achieve a better rating than that of the issuer. However, the notches by which covered bonds ratings may go up above the issuer's rating are depending on numerous grounds: quality of the cover assets; extent and quality of credit enhancements (overcollateralization) employed; inherent transaction's asset-liability mismatches; transaction's liquidity risks, and so forth.

Figure 1. *Simplified covered bonds transaction structure (direct issuance)*



Source: Author's representation.

Figure 2. *Simplified covered bonds transaction structure (SPV issuance)*

Source: Author's representation.

A key feature of covered bonds transactions relates to the quality of the pooled assets. The underlying assets, which are forming the cover assets pool, involved in such transactions must satisfy certain attributes laid down in the local legislation and regulation provisions, while local regulators must carefully guard their quality at all times. A vital aspect of covered bonds assessment is the quality of the underlying mortgage loans. Since covered bonds transactions are structured based on a dynamic assets pool, the crucial issue here is the underwriting standards and the selection criteria for introducing new loans into the cover assets pool; this is where regulatory authorities' overseeing procedures are of a great importance.

Another essential structuring decision to be made with reference to cover assets is that it must ensure that the credit risk of the underlying assets pool is optimally absorbed by the credit enhancements mechanism employed. The traditional credit enhancement method involved in covered bonds transactions is the over-collateralization (i.e. the book value of the underlying pooled assets, after credit provisions, exceeds the notional value of the covered bonds). By applying this principle, the mortgage originator needs to secure that the cover assets is actually

over-collateralizing the outstanding covered bonds by the required minimum amount of over-collateralization ratio. The cover pool of collateral, which the issuer is required to maintain dynamically throughout the term of the issuance, must be replenished with new assets to maintain a specified credit quality. Thus, the over-collateralization principle must hold true not only at the issuance time, but also during the entire covered bonds program lifespan, as the covered bonds are amortizing over time, this over-collateralization ratio must be maintained at all times at the required minimum degree.

Since the covered bonds are repaying investors independently of the cash inflows arising from the cover assets pool, it means that the bondholders are actually repaid from the regular business-based cash flows of the originator. This is leading to an asset-liability mismatch of the covered bonds transactions. However, this mismatch does not imply that covered bonds repayments are duplicating the reimbursements processes of any other secured or unsecured bonds issued by the originator, even though they are all reflecting originator's transactions liquidity risks.

In the particular case of covered bonds, the originator's liquidity risk is shaped by the degree of how wide this asset-liability mismatch really is: if the mismatch is wide, then the covered bonds rely heavily on the inherent liquidity strengths of the bond issuer and then the covered bonds are actually corporate bonds biased; if this mismatch is narrow, then the covered bonds rely greatly on the cover assets liquidity strengths and then the covered bonds are in fact mortgage-backed inclined. In other words, in the case of covered bonds transactions this asset-liability mismatch is managed proactively by the originator/issuer itself, unlike in case of securitization transactions where the mismatch is transferred completely to the ABS investors.

On the other hand, this asset-liability mismatch is affecting deeply and directly the rating uplift that a covered bond would be looking to secure. The main goal of a covered bonds issuer is to raise new funding at reasonable lower costs by means of an instrument that boosts issuer's rating, and so this rating strengthening process is vital for the issuer. But, covered bonds ratings uplift are much harder to be secured compared to securitization transactions, due to the grounding fact that the covered bonds ratings cannot be entirely detached from the rating of the bonds issuer itself. In fact, in covered bonds transactions, the rating of the bonds issuer is actually greatly dominating the rating process of the covered bonds. However, rating agencies may go up to maximum six notches above the rating of the issuer in case of covered bonds.

Covered bonds help originators with the liquidity ratios but do not reduce risk-weighted assets or the leverage ratios. With a growing proportion of the balance

sheet encumbered, at some point, what may be a solution for liquidity can become a problem with leverage and/or capital regulatory levels. From accounting perspective, the underlying loans from the cover assets pools remain on the originator/issuer balance sheet at their pre-transaction values, meaning that if an accounting sale occurs in a depressed market this would lead to heavy losses being realized on originator's balance sheet. From regulatory perspective, covered bonds do not allow any de-leveraging or reduction to risk-weighted assets or any lowering of capital requirements, as cover assets remain on the issuer balance sheet. Furthermore, there is the need to maintain the origination pipeline active for the entire duration of issued covered bonds maturities, limiting thus issuers' ability to disengage from the market.

3. Assets securitization

Assets securitization represents an efficient alternative and a diversified financing and refinancing technique. Securitization transactions are based on the risks transfer from the issuers to the global financial and capital markets investors and there are carrying out at very competitive pricing terms.

Securitizations are used to finance and refinance any sort of qualifying asset classes: from simple self-liquidating loans (mortgages, corporate loans, consumer credit) to any other more intricate types of assets (lease receivables, trade receivables, project finance, sovereign loans, etc) that are all featuring a stable cash flow and which can be structured into a reference portfolio that supports securitized debt.

The asset-backed securities are securities whose value and income payments are derived from and collateralized by a specified pool of underlying assets. The valuations and risks involved in asset-backed securities are delinked from originator's assets. Generally, asset-backed securities are issued by special purpose vehicles.

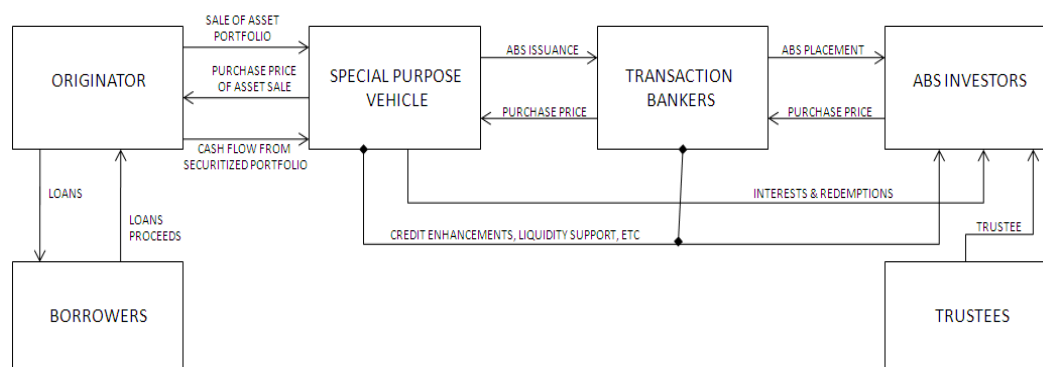
Securitization transactions allow originators to find new sources of funding (by moving the assets off-balance sheet) and new resources of refinancing (by borrowing against the assets to secure refinancing of their origination at a fair market rate). Other than facilitating the risks transfer, securitization is also reducing originators' borrowing costs and it supports financial institutions to lower their regulatory minimum capital obligations.

Furthermore, by means of securitization mechanics, the securitized assets are effectively detached from the originator's balance sheet as well as from its corporate credit rating notch. This unique securitization's characteristic is allowing the issuers to raise funds to finance the assets purchase more cheaply

than in the case the fundraising were based solely on the strength of the originator's balance sheet. Hence, unlike any other conventional debt transactions, securitization operations do not expand originator's liabilities, but they are in turn just supplying funds for any future investments without involving the originator's balance sheet growth.

Asset securitization is a two-step process. In the first step, a financial institution, the originator, holding virtually any type of income-generating assets, identifies the assets it wants to remove from its balance sheet and pools them into a reference portfolio. The originator then sells this assets pool to the issuer, which is a special purpose vehicle (SPV), which is an entity set up specifically to purchase the pooled assets, carrying out in this way their off-balance-sheet treatment for legal and accounting purposes. In the second step, the SPV issuer finances the acquisition of the pooled assets by issuing tradable interest-bearing asset-backed securities which are sold to institutional investors via global capital markets. The ABS investors receive fixed-rate or floating-rate payments, made from a securitization trustee account, which are funded by the cash inflows generated by the underlying reference portfolio incomes.

Figure 3. *Simplified assets securitization transaction structure*



Source: Author's representation.

Generally, the originator remains fully involved in the securitization transaction because it services the income-generating assets within the reference portfolio, it collects the cash inflows from the original debtors and it passes these payments (less its servicing fee) on either directly to the SPV or to the investors' trustee.

The underlying reference portfolio is divided into several tranches (generally designed as junior, mezzanine and senior tranches), each of which having a different level of risk associated with it and each being sold separately. Investment returns (principal and interest) and losses are both allocated among these tranches according to their seniority. The more senior tranches (and less

risky) have the first call on the incomes generated by the underlying assets pool, while the less senior tranches (and more risky) have the last claim on those underlying cash inflows.

This multiple tranches securitization structure is implemented such that to concentrate the expected portfolio losses in the junior tranche, which is the first loss position. The junior tranche is usually the smallest one, but it bears most of the credit exposure risks and thus it receives the highest returns. In this way, there are slight expectations of portfolio losses in the senior tranches, which are in turn very sensitive to any changes in the underlying assets pool quality. Additionally, the flexibility of tranching securitization transactions endows issuers with the extra ability to tailor-made the risk/return specifics of each of the tranches according to the risk appetite and tolerance of any group of ABS investors.

4. Covered bonds vs. assets securitization

While in an asset securitization transaction a pool of assets are transferred and transformed into asset-backed securities via a SPV, a covered bonds transaction is closer to the mimic of a secured corporate bonds issuance since there is no transfer of the cover assets pool to a SPV. Instead, the assets are identified, pooled, ring-fenced and then the collateral rights are created based on them according to local secured lending laws and only afterwards they are standing as a security for the bonds issuance. Hence, in a covered bonds transaction, in the event that the mortgage originator goes bankrupt, reference is made to the general secured local lending laws, or to some other local particular civil laws relating to the assets, which in turn grants the covered bondholders recourse against the underlying pool of mortgages over which the security interest had been created (thus, by way of legislative means). However, in practice, this venue leads to the secured assets to become more vulnerable to the bankruptcy risks of the covered bond issuer.

Asset securitization structures intend to remove the issuer bankruptcy risks by relying on the true-sale concept, whereby the underlying assets pool itself is sold out to a SPV by using a legally defendable sale structure. The SPV itself is a bankruptcy remote vehicle, which means that the issuer bankruptcy risk is removed completely from the transaction. Thus, in any asset securitization transaction the only risk to be concerned about remains the risk of credit losses within the underlying assets pool, which will be mitigated by means of credit enhancements techniques used to absorb any potential credit losses and hence the asset-backed securities issued by the securitization transaction are eligible to attain the highest ratings.

The isolation effect, achieved via the true-sale mechanics, is resulting into the pass-through nature of the securitization transactions (i.e. the correlation between cash inflows from the underlying assets pool and cash outflows to repay ABS investors), which in turn leads to several transactional implications: the maturity of the asset-backed securities is virtually the same as that of the underlying assets pool; if the underlying securitized loans prepay, so the ABS investors get prepaid as well; the repayment of the ABS liabilities are born from a static assets pool; the off-balance sheet transaction treatment of the underlying pooled assets.

Since covered bonds are considered as issuer's obligations it is not mandatory for them to exactly derive the cash inflows from the underlying cover assets pool with the cash outflows to repay the covered bonds investors, hence there are allowed limited mismatches in the cash flow structure of the transactions. Thus, covered bonds are not pass-through structures.

However, one should note that there are considerable differences between secured corporate bonds and covered bonds, even though both of them are considered issuers' obligations. In the case of covered bonds, the bondholders acquire a legal-based (legislative covered bonds) bankruptcy-proof (bankruptcy protection rights are granted to bondholders via special privileges) access to the underlying cover assets pool, whereas bond investors are allowed to get access and to use the collateral assets even when the issuer goes bankrupt. In the case of structured covered bonds, bondholders' rights are boosted additionally by means of transaction structuring particulars, whereby the incorporated SPV holds legal title over the pool of assets, it provides bankruptcy protection to covered bondholders and it acts as a guarantor for the mortgage originator/covered bonds issuer by providing a secondary recourse venue.

From accounting rules perspective: covered bonds are considered on-balance sheet transactions, hence their accounting treatment is similar to secured bonds; whereas asset securitizations are considered off-balance sheet transactions and they are benefiting from a particular accounting treatment in this regard. Securitization transactions allow the originators to shift the underlying loans off-balance sheet and thereby effectively recapture capital obtaining thus greater leverage. Covered bonds transactions do not provide such facilities to originators. Nevertheless, in case of synthetic securitizations, the securitization process involves the transfer of credit risks to third parties using credit derivatives or other similar securities, usually without actually removing the underlying portfolio of assets from the originators' balance sheet. Thus, synthetic securitizations are themselves a hybrid of covered bonds on-balance sheet securitizations.

Covered bonds transactions are structured typically as fixed-rate instruments with long-term maturities whereas ABS instruments are designed as fixed or floating-

rate securities with a medium and long-term maturities. Covered bonds are usually providing fixed-term maturities, while in the case of securitizations, where the return and maturity of the asset-backed securities depend directly upon the performances and respectively the prepayments of the underlying loans, ABS investors hold a security that could mature earlier than expected.

Securitization transactions are typically involving a variety of tranches of asset-backed securities offered to investors, each tranche having different payment features and different payment priorities or seniorities. In covered bonds transactions there are generally only a single tranche of bonds issued.

The securitization transactions are designed essentially as a static pool of assets, whereas in a covered bond structure the cover pool is dynamic and the bond issuer may move loans in and out of the cover pool.

Table 1. Comparison synopsis between covered bonds and assets securitization

Features	Covered bonds	Assets securitization
Accounting treatment	On-balance sheet.	Off-balance sheet.
Amortization	Bullet.	Various.
Classes of securities	Generally, covered bonds are issued as a single class of securities. In a covered bonds program, the originator may issue multiple time tranches, each tranche having hard or soft bullet maturities.	Usually, securitization transactions are structured with multiple different classes and tranches of securities, each class/tranche having different risks and returns specifics.
Collateral management	The originator dynamically manages the collateral pool. The originator directly settles any cash flow shortfalls and mismatches surfacing from the underlying cover assets pool, such that cover bonds investors bear no pass-through effects.	Collateral pool is typically static and the originator or an outsourced party services it. Any cash flow shortfalls and mismatches due to reference portfolio delinquencies and defaults are passed-through to the ABS investors upon exhaustion of all the credit enhancements buffers.
Collateral types	Generally formed of residential and commercial mortgage loans, public sector loans.	Virtually any type of income-generating assets.
Coupons	Flexible, predominantly fixed-rate.	Flexible, both floating-rate and fixed-rate.
Credit enhancement techniques	Over-collateralization.	Internal enhancements (over-collateralization, senior/subordinate tranching structure, first loss tranche, reserve funds, excess spread, etc) and external enhancements (bank guarantees, bank lines of credit, financial insurance policy covers, etc).
Funding sources and investor base	Global financial and capital markets funding, spread over a broad global investors base.	Global financial and capital markets funding, spread over a broad global investors base.
Interest and principal investors' disbursements treatment	Both interest and principal disbursements to covered bonds investors are derived and paid from originator/issuer's general cash flows.	Both interest and principal disbursements to asset-backed securities investors are derived and paid from the cover assets pool.
Investors base	Large base of eligible institutional global investors.	Large base of eligible institutional global investors.

Features	Covered bonds	Assets securitization
Investors cash flow allocations	Issuer-based cash flow allocations, which are not necessarily matching the cover assets pool cash flows.	Transaction-based cash flow waterfall specific allocations. They are matching exactly the reference pool cash flows, due to the pass-through nature of the transaction.
Investors claims treatment against the originator	If cover assets pool is exhausted, cover bonds investors retain full recourse claims against the originator.	ABS investors do not have any recourse claims whatsoever against both the originator and its assets, except if originator provides also credit enhancements to the transaction.
Investors demand	Large.	Large.
Issuance currency	Various, investors-base driven currency diversification.	Various, investors-base driven currency diversification.
Issuance size	Various (small to jumbo).	Various (small to jumbo).
Legal restrictions on originator or over the eligible collateral	Yes, according to local legislation provisions.	Generally none.
Legal structure	Covered bonds transactions represent a direct and unconditional obligation of the originator/issuer which is backed by the creation of security interests over the cover assets pool. Cover assets pool may or may not be parked with a distinct special purpose vehicle. Cover assets remain on originator's balance sheet, but they are identified as belonging to the cover pool. Transaction' bankruptcy remoteness is achieved either by legislative provisions or by operational structuring.	Securitization transactions are implemented by a true-sale of the underlying assets to a distinct special purpose vehicle. Securitized assets are effectively transferred to the SPV. Transaction' bankruptcy remoteness is achieved by complete isolation of the securitized assets from the originator. Nevertheless, in case of synthetic securitizations, the securitization process involves the transfer of credit risks to third parties using credit derivatives or other similar securities, usually without actually removing the underlying portfolio of assets from the originators' balance sheet. Thus, synthetic securitizations are themselves a hybrid of covered bonds on-balance sheet securitizations.
Maturities	Medium to long-term maturities, whereas maturing underlying assets are periodically replenished with new issuances.	Medium to long-term maturities, typically matching the maturities of the underlying assets.
Originator accounting treatment of sale on assets	The cover assets pool is not sold and therefore there is no gain to record.	Gain on sale is recorded when the assets are transferred to the SPV. However, this is not pertinent in case of synthetic securitizations.
Originator bankruptcy remoteness	Linked to originator.	Delinked from originator.
Originator bankruptcy treatment	Cover bondholders have full recourse on cover assets pool even if the originator is in insolvency proceedings.	Pooled assets from the reference portfolio are completely remote from the bankruptcy of the originator.
Originator/issuer	Originator financial institution (legislative covered bonds) or a special purpose vehicle (structured covered bonds).	A special purpose vehicle sponsored by a financial institution.
Originator/issuer motivations	Inexpensive funding, low-priced refinancing, to raise originator liquidity.	Inexpensive funding, low-priced refinancing, to raise originator liquidity, risk transferring and risk management, regulatory capital relief and arbitrage, active portfolio management, etc.

Features	Covered bonds	Assets securitization
Oversight and licensing	Originator/issuer is a supervised financial institution which is also licensed to issue the covered bonds. Both covered bond programs and the quality and management of cover assets pool are subject to special supervision from the local supervisory authority. Continuous due diligence is performed by local authorities, credit rating agencies as well as by the investors representatives (cover assets pool monitor).	SPV issuers are not subject to any regulatory oversight nor they need to be specially licensed to issue asset-backed securities. Continuous due diligence is performed by asset monitor, investors trustees, credit rating agencies, etc.
Payment acceleration terms	Terms are defined by covered bonds program statute. Typically it occurs following the originator/issuer default and/or covered bonds program default.	Terms are defined by the securitization prospectus where there are special clauses concerning performance triggers, covenants, etc.
Preferential claims treatment to collateral in the event of issuer's insolvency	Investors' preferential claims over transaction's collateral are provided by legislative provisions: segregation of the cover assets pool into a separate estate, apart of issuer's insolvency estate.	Investors' preferential claims over transaction's collateral are provided by inherent structuring provisions: preferential access to the collateral by ABS investors is granted as an integral part of the securitization financial contract.
Preferential rights treatment	Yes, investors are granted preferential rights.	Yes, investors are granted preferential rights.
Prepayment of assets treatment	Originator is typically bearing the prepayment risk. No investors prepayment is possible since this is not a pass-through structure, while cover assets are dynamically replaced within the collateral pool.	Investors are typically bearing the prepayment risk. Investors' prepayment is possible since this is generally a full pass-through structure.
Ratings	Limited linking to originator ratings. Rating uplifts relative to originator's senior debt rating are attainable. The uplifts are depending on various issues related to: covered bonds transaction particulars, local legislation provisions, the ratings of originator and all the rest of services providers, etc. Rating agencies must assess risks of cover assets pool but also the risks of the originator institutions as a whole.	Delinked to originator ratings. Rating uplifts relative to originator's rating are attainable. The uplifts are depending on various issues related to: overall credit and liquidity enhancements levels, specific tranches structure and waterfall characteristics, etc. Rating agencies must assess only the risks of pooled assets and transaction's credit and liquidity enhancements facilities.
Regulatory capital cost	Originators: According to Basel II risk weighting methodology which is applied in consideration to the entire cover assets pool. Investors: According to Basel II risk weighting methodology and depending on the invested covered bonds ratings.	Originators: According to Basel II risk weighting methodology which is applied only in consideration to originator's retained interest in the asset-backed securities. Investors: According to Basel II risk weighting methodology and depending on the invested asset-backed securities tranche ratings.
Regulatory capital relief	Originators: No capital relief whatsoever. It calls for regulatory capital provisions in consideration to the entire cover assets pool. Investors: Lower risk weighting according to Basel II methodology and depending on the invested covered bonds ratings.	Originators: Full capital relief, excepting for the residual holdings. It calls for regulatory capital provisions only in consideration to the retained risks of the originator. Investors: Lower risk weighting according to Basel II methodology and depending on the invested asset-backed securities tranche ratings.

Features	Covered bonds	Assets securitization
Relationship to the originator	Originator and issuer are typically the same, or they are both part of the same business group.	Originator and issuer are not necessarily the same, nor is the issuer necessarily part of the originator's business group.
Servicing the loan	No isolation of originator from mortgage assets, so servicing relationship unaffected.	Originators sold the loans, so servicing is an independent relationship, but originator can service loan under contract.
Tranching	No.	Yes.

Source: Author's representation.

5. Conclusions

Both covered bonds and asset-backed securities constitute the most efficient secured funding alternatives available to financial institutions in the global capital markets. The ability to raise more stable medium and long-term funding at very competitive terms, to access a broader pool of global investors, to increase the supply of liquidity to financial institutions are the main advantages to issuers involved in covered bonds and asset-backed securities programs.

In order to capture all the benefits emerging from covered bonds and assets securitizations, financial institutions should run in parallel, simultaneously both covered bonds financing programs, and assets securitizations funding programs, since they are complementing all together, allowing originators to effectively manage the fundraising and risk management aspects by optimally interconnecting local asset markets with global financial and capital markets.

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A mark-up model of inflation for Morocco

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Abstract. *We follow Brouwer and Ericsson (1998) approach in order to estimate a mark-up model of price over unit costs in Morocco from 1997q1 to 2013q2. This kind of models assumes that the equilibrium price level is set as a markup on some combination of input prices. Therefore, by estimating the short-run and long-run price elasticities with respect to unit labor costs and import prices, it's possible to calculate the impact of supply shocks related to production costs. This treatment of price dynamics is at the heart of the modern approach to modelling inflation, both for forecasting and for policy analysis. The mark-up model identified in this paper highlight the fact that unit labor costs and import prices are key factors in the price setting strategy of the Moroccan firms.*

Keywords: mark-up, inflation, import prices, production costs, price setting.

JEL Classification: E50, E52, E58.

REL Classification: 8F.

1. Introduction

The mark-up over marginal costs is a key factor in many macroeconomic models. Indeed, Rotemberg and Woodford (1999) conclude that the mark-up is rather countercyclical in the sense that it tends to decrease at the end of the upswing. Similarly, under the new Keynesian models, stating price rigidity and the marginal costs procyclicality, an expansionary monetary policy or a government positive spending shocks would weakened the mark-up (Goodfriend and King (1997). This result has been empirically verified by several empirical research: Smets and Wouters (2003, 2007) and Christiano et al. (2005). However, Christopher and Ramey (2010) found that most measures of the markup are procyclic1al or acyclical. In addition, the authors found that the mark-up increases in response to positive monetary shocks and is unresponsive to government spending shocks.

Based on empirical studies, the consensus about the mark-up cyclicity isn't obvious, although, several empirical studies agree with the fact that there is a negative relationship between the mark-up and inflation. Indeed, Bénabou (1992) argues within a price-taking model that higher inflation leads to greater competition and therefore a lower markup. Similarly, De Bandt et al. (2004) conclude that competition improves when the inflation rate is in very high levels, as companies decide to reduce their monopoly power to keep their market share.

The paper is organized as follows. In Section 2 we will set out the theoretical framework that we follow, the empirical results are discussed in section 3.

2. A framework for modelling inflation

2.1. Definition of mark-up

The theory of cost-push inflation assumes that the price level is set as a combination of the production costs (unit labor cost and imported prices) plus a mark-up set by firms operating in an imperfect competitive market. Indeed,

Banerjee et al. (2001) defined the mark-up as $mu = p - \sum_{i=1}^k \psi_i c_i$ where p is the

logarithm of prices, the c_i 's are the logarithm of the various costs of production

and $\sum_{i=1}^k \psi_i = 1$.

In order to investigate the behavior of the mark-up over the cycle and its contribution to inflation movements in the Euro Area, Bruneau et al. (2004)

defined the mark-up as $mu_{2t} = p_t - \frac{1}{1+\rho}(w_t - \pi_t) - \frac{\rho}{1+\rho}IPI_t$, in the Layard, Nickell and Jackman (1992) tradition, where w_t , π_t , p_t , IPI_t are wages, labour productivity, the price level and the imported price level, respectively.

2.2. Derivation of the mark-up equation

According to C  l  rier (2009), the mark-up equation was derived by considering firms operating in an imperfect competitive environment, in which the firm i determines its market share Y_i/Y by setting its price P_i relatively to the average price of its competitors price P on the basis of the demand function it faces:

$$P_i = P \cdot \left(\frac{Y}{Y_i}\right)^{\frac{1}{\varepsilon}}, \text{ where } \varepsilon \text{ is the price elasticity } (\varepsilon > 1).$$

The profit maximizing condition implies that, in equilibrium, the marginal revenue equals the marginal costs mc_i . The firm's revenue being $R_i = P_i \cdot Y_i$, its marginal revenue is:

$$\frac{dR_i}{dY_i} = \frac{dP_i}{dY_i} \cdot Y_i + P_i = P_i \cdot \left(1 - \frac{1}{\varepsilon}\right)$$

The equilibrium condition for the firm can hence be written:

$$P_i = \left(1 + \frac{1}{\varepsilon - 1}\right) \cdot mc_i$$

In the symmetric equilibrium ($P_i = P$ et $mc_i = mc$), this leads in the aggregate to the fundamental equation:

$$P = \left(1 + \frac{1}{\varepsilon - 1}\right) \cdot mc$$

The price level is thus defined by a mark-up ($\mu = \frac{1}{\varepsilon - 1}$) over the marginal cost.

According to this equation, if the mark-up is zero, we are in a perfect competition environment, however, if the mark-up is equal to unity, we are faced to monopoly.

In a Cobb-Douglas framework, the price function becomes:

$$\ln(P) = \ln(1 + \mu) + \beta \cdot \ln(\rho) + (1 - \beta) \cdot \ln\left(\frac{\varpi}{\Gamma}\right) + a, \text{ where } \omega, \rho, \Gamma, \mu \text{ are wages, cost of capital per unit, labour productivity and the mark-up, respectively.}$$

In the case where firms use imported inputs in their production process, the new form of the mark-up equation becomes:

$\ln(P) = \theta_0 \ln(1 + \mu) + \theta_1 \ln(\rho) + \theta_2 \ln\left(\frac{\bar{w}}{I}\right) + \theta_3 \ln(P_M) + \theta$, where P_M is the import price level.

2.3. The cyclicity of the mark-up

The mark-up over marginal costs is a key factor in several macroeconomic models. Indeed, Rotemberg and Woodford (1999) conclude that the mark-up is rather countercyclical in the sense that it tends to decrease at the end of the upswing. According to the authors, since the marginal costs (MC) rise faster than prices (P) in periods of economic expansion, this implies that the real marginal costs (MC/P) are procyclical. Therefore, the mark-up, which is the inverse of real marginal costs (P/Cm), is countercyclical. Similarly, under the new Keynesian models, stating price rigidity and the marginal costs procyclicality, an expansionary monetary policy or a government positive spending shocks would weakened the mark-up (Goodfriend and King (1997). This result has been empirically verified by several empirical research: Smets and Wouters (2003, 2007) and Christiano et al. (2005). However, Christopher and Ramey (2010) found that most measures of the markup are procyclical or acyclical. In addition, the authors found that the mark-up increases in response to positive monetary shocks and is unresponsive to government spending shocks.

Otherwise, several empirical studies have focused to understand the negative relationship that may exist between inflation and mark-up. The question is to understand the real effects of inflation in imperfectly competitive markets. Especially, if inflationary episodes times, when consumers are confused about real price, leads to raise monopoly power or to enhance competition.

Indeed, Banerjee and Russell (2001) found that higher inflation is associated with a lower mark-up in the long run. Particularly, the mark-up decrease as inflation increases and vice versa. This relationship was verified for the G7 economies and Australia. Therefore, according to the authors, one explanation of the negative long-run relationship in the data is that the 1970s were a period when supply shocks from the energy and labor market were very prevalent. The low mark-up, therefore, simply reflects the lags in price adjustment following the shocks.

Similarly, Bénabou (1992) showed that in the United States, periods of high inflation are associated with a low mark-up. Indeed, a very high inflation rate leads to greater competition and therefore a lower mark-up. In contrast, Russell, Evans and Preston (1997) focus on the difficulties that price-setting firms face when adjusting prices in an inflationary environment where there is missing

information. The authors found out that in this case, the lower mark-up with higher inflation is interpreted as higher cost of overcoming the missing information with higher inflation because firms would lose their market share if they set prices inappropriately.

3. Empirical results for Morocco

3.1. Stationarity tests

Before modeling the CPI, it is useful to determine the orders of integration for the variables considered. Table 1 lists the results of the augmented Dickey-Fuller (ADF(4)) and the Phillips-Perron (PP) tests for the CPI, the import price index (IPI) and the unit labor cost (ULC) from 1997Q1 to 2013Q2. Empirically, all variables appears to be I(1).

Table 1. Results of ADF and PP tests from 1997q1 to 2013q2

	Variable		
	CPI	IPI	ULC
ADF	I(1)+c	I(1)	I(1)
PP	I(1)+c	I(1)	I(1)+c+t

Figure 1. The consumer price index, unit labor costs and the import price index

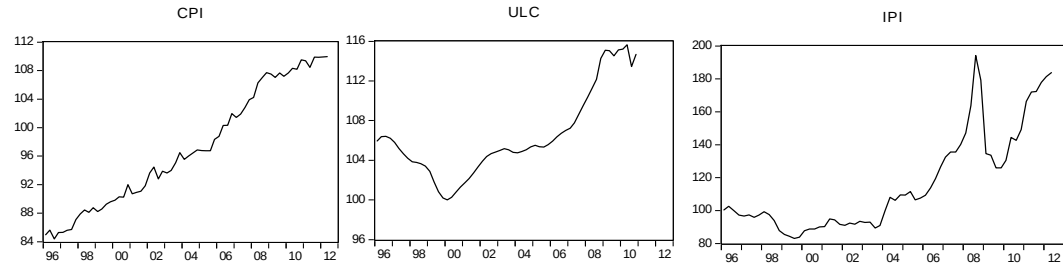
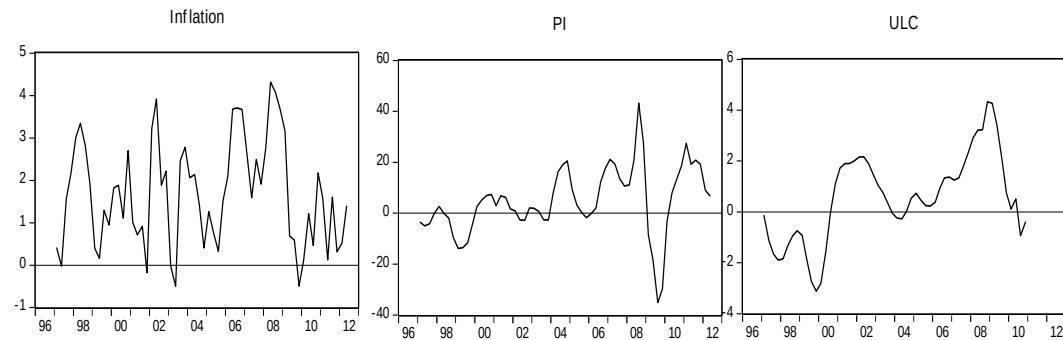


Figure 2. Year over year quarterly growth rate for the consumer price index, unit labor costs and the import price index



3.2. Cointegration tests

Cointegration analysis helps clarify the long-run relationships between integrated variables. Johansen's (1988, 1991) procedure is maximum likelihood for finite-order VAR is used here from 1997Q1 to 2013Q2. Table 2 reports the maximum eigenvalue and trace eigenvalue statistics. The latter reject the null of no cointegration in favour of at least one cointegrating relationship.

Table 2. Cointegration analysis conducted from 1997q1 to 2013q2

	No cointegration	At least one cointegrating relationship
Trace statistics	31.54	8.11
95% critical value	24.27	12.32
Maximum eigenvalue statistics	23.44	6.12
95% critical value	17.80	11.22

The long-run relationship identified through the Johansen's procedure from 1997Q1 to 2013Q2 is as follows:

$$\log(CPI_t) = 0.24 * \log(IPI_t) + 0.75 * \log(ULC_t) + \varepsilon_t \quad (1)$$

Numerically, the long-run price elasticities with respect to unit labor cost and import price are statistically significant, positive and less than unity. In addition, the coefficient related to ULC is higher than the one associated to IPI, showing that wages and import price are key factors for firms in their price setting strategy. Also, the sum of coefficients in (1) is equal to unity, and statistically the restriction of long-run unit homogeneity cannot be rejected.

3.3. Selected model

We used the Engle and Granger's approach for estimating a two steps cointegration model. In the first step, we estimate the long-run relationship between CPI, ULC and IPI from 1997Q1 to 2013Q2. We found out that the latter is quite similar to the one found by Johansen's (1988, 1991) procedure (equation 1):

$$\log(CPI_t) = 0.19 * \log(IPI_t) + 0.78 * \log(ULC_t) + \xi_t \quad (2)$$

The ADF test (Table 3) indicates that the residuals related to equation (2) are stationary. Also, the restriction of long-run unit homogeneity cannot be rejected.

Table 3. ADF test for the residuals of equation 2

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.54	0.01
Test critical values:		
1% level	-2.60	
5% level	-1.94	
10% level	-1.61	

In the second step of Engle and Granger's procedure, we estimate the short-run relationship over 1997Q1-2013Q2. To do so, we based our selection procedure by using step-wise method. Indeed, we first started by a more general model of lag 5, and then we removed the non significant parameters, until we found a final model where all parameters are significant and relevant to economic theory. Therefore, the selected model has the following form:

$$d(\log(CPI_t)) = -0.06 * \xi_{t-1} - 0.29 * d(\log(CPI_{t-1})) - 0.20 * d(\log(CPI_{t-5})) + 0.3 * d(\log(ULC_t)) + 0.03 * d(\log(IPI_t)) + \nu_t \quad (3)$$

Numerically, the parameters of equation (3) are statistically significant; the Durbin Watson statistic is close to 1.99. However, this statistic is not significant in the context of dynamic models. Therefore, the Breusch-Godfrey test was conducted and shows that residuals of equation (3) are not autocorrelated (p-value = 0.20). Also, the heteroskedasticity (Breusch-Pagan-Godfrey) test shows that the variance of the residuals is constant over time, which means that the errors are not heteroscedastic.

Empirically, the feedback effect of the lagged disequilibrium in the cointegrating relation onto the inflation rate is statistically significant and negative (-0.06), which implied that an excess mark-up induces a greater price rigidities. In addition, the short-run price elasticities with respect to unit labor cost and import price are 30% and 3%, respectively.

4. Conclusions

Following de Brouwer and Ericsson's (1998) approach for modelling Australian inflation, this paper investigates the short-run and long-run effects of production costs onto inflation rate in Morocco by estimating a mark-up model of price over unit costs. The latter shows that unit labor costs and import price are key factors for firms in their price setting strategy.

In fact, the importance of imported inflation comes mainly from: the fixed exchange rate regime, the structure of the consumption basket and the degree of economic openness. In addition, the unit labor costs play a major role for explaining inflation dynamics in Morocco. This result is confirmed by Mohanty and Klau (2001) analyses over 14 emerging economies during the 80s and 90s, which suggest that wages, exchange rate and inflation persistence affect both inflation and its volatility.

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Appendix

Figure 3. Adjustment of equation 2

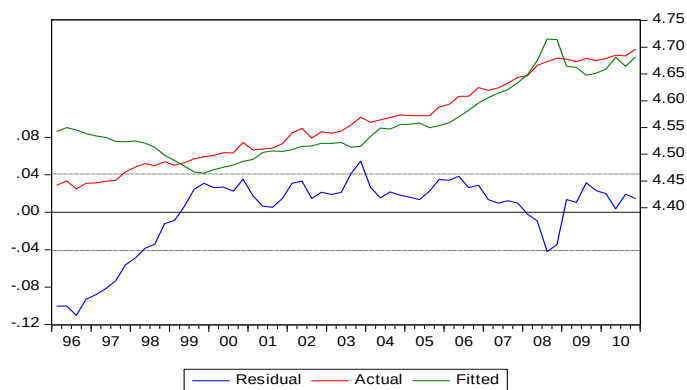


Figure 4. Adjustment of equation 3

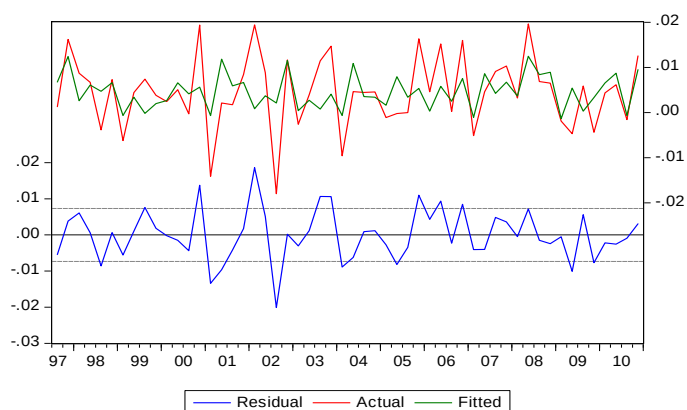
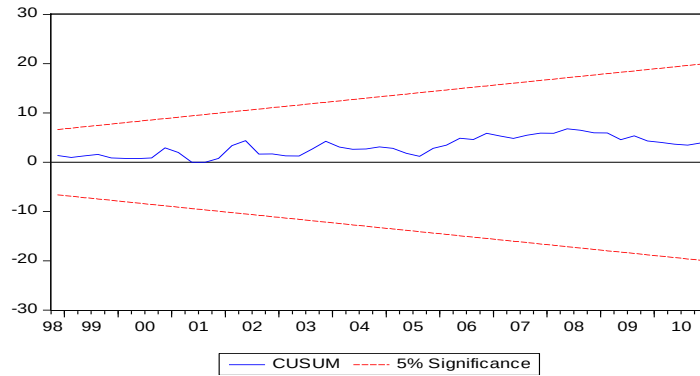
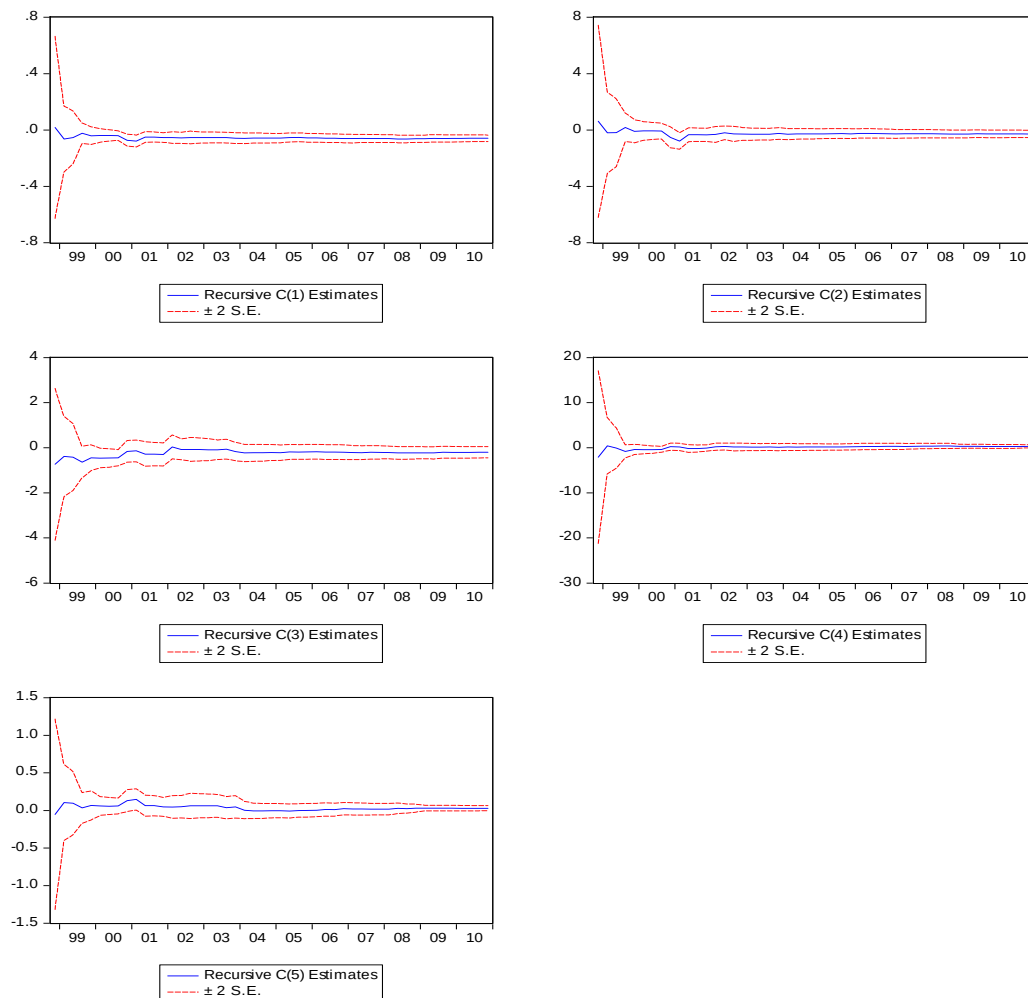


Figure 5. Residual correlogram of equation 3

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.006	-0.006	0.0020	0.964
		2 -0.228	-0.228	3.0189	0.221
		3 -0.195	-0.209	5.2701	0.153
		4 -0.182	-0.271	7.2696	0.122
		5 0.150	0.025	8.6663	0.123
		6 0.185	0.054	10.825	0.094
		7 -0.134	-0.182	11.979	0.101
		8 0.014	0.047	11.991	0.152
		9 -0.125	-0.129	13.046	0.161
		10 0.082	0.088	13.508	0.197
		11 0.182	0.087	15.847	0.147
		12 -0.024	0.022	15.888	0.196
		13 -0.267	-0.235	21.129	0.070
		14 -0.199	-0.226	24.125	0.044
		15 0.056	-0.023	24.370	0.059
		16 0.310	0.086	32.005	0.010
		17 0.058	-0.077	32.275	0.014
		18 -0.099	-0.071	33.095	0.016
		19 -0.047	0.116	33.285	0.022
		20 0.007	0.104	33.289	0.031
		21 -0.119	-0.243	34.584	0.031
		22 0.060	-0.064	34.925	0.039
		23 -0.043	-0.066	35.101	0.051
		24 0.066	0.110	35.537	0.061

Figure 6. *The CUSUM test related to of equation 3***Figure 7.** *Recursive estimates for the coefficients in equation 3*

Economic benefits of the infrastructure projects implemented in the Reservation of the Danube Delta Biosphere

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Abstract. *The objective of the research is the identification of the benefits related to infrastructure projects implemented in the Danube Delta Reservation Biosphere. The type of the research refers to a study that aims at the identification of economic benefits related to the systems for potable water supply and sewage/disposal of waste water. The result of the research shows the reduction of expenses with medical assistance and treatments for diseases affecting the digestive apparatus, hepatitis, TBC and also for skin diseases, whose occurrence is favored by the lack of proper hygiene conditions. Also, a series of social benefits will be recorded, such as the development of tourism, reduction of unemployment, facilitation of intervention in case of fire.*

Keywords: economic benefits, social benefits, infrastructure projects, Danube Delta Reservation Biosphere.

JEL Classification: Q56.

REL Classification: 15C.

1. Considerations regarding the Danube Delta Reservation Biosphere – RBDD

Form the geographical viewpoint, the Danube Delta Biosphere Reservation is bordered by the following coordinates: 28°10'50" (*Cotul Pisicii*) and 29°42'45" (*Sulina*) East longitude; 45°27' (*Chilia* Arm, km. 43) and 44°20'40" (*Midia* Cape) North latitude.

The reservation is placed in South-Eastern Romania, including the Danube Delta, the Razim-Sinoie Lake Complex, maritime Danube until Cat's bend (*Cotul Pisicii*), and also the floodable area of *Somova-Parcheș*, the *Sărături-Murighiol* lake and the marine area between the Black Sea shore and the 20 m. isobaths.

As the Danube Delta Biosphere Reservation is delimited, of its total surface, more than half (312.440 ha) is represented by the natural aquatic and terrestrial ecosystems included in the list of areas with universal patrimony value (UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage) and also the ones destined for ecological reconstruction, areas that form the public domain of national interest.

The difference until the 580.000 ha of the whole reservation is represented by areas that are dammed for fisheries, agriculture and forestry (some 80.000 ha), areas including terrain surfaces in private property or public property of local interest inside or outside villages (some 29.000 ha, that is 5% of the RBDD surface) and also a marine buffer area measuring some 103.000 hectares.

Inside the perimeter of RBDD are 25 villages, organized in seven communes integrally situated within the reservation: Ceatalchioi, Pardina, Maliuc, Crișan, C.A. Rosetti, Sfântu Gheorghe, Chilia Veche and the town of Sulina. Along with these villages, there are also some communes whose territory, in part, is placed inside the RBDD perimeter: Nufăru, Beștepe, Murighiol, and the Tudor Vladimirescu suburb of the Municipality of Tulcea.

In the last five years, the population of the Danube Delta Biosphere Reservation decreased from 13.694 inhabitants in 2009 to 12.038 people in 2013, due to economic and social considerations. Only in 2013 there can be observed a decrease of the population with approximately 600 inhabitants.

The implementation of the infrastructure projects in the Danube Delta Biosphere Reservation has into view the improvement of negative social, economic, and environmental effects existing in the present.

Keeping the population inside the Danube Delta Biosphere Reservation directly depends on the existence of adequate economic and social conditions. It is true that these conditions are tightly interlinked, and many times, the economic development of an area is strongly correlated with the social side.

We must take into account the fact that the social ecologic systems dominated by human population were always involved in a process of regional, macro-regional or global integration. In the case of the Danube Delta Biosphere Reservation, the social subsystem is influenced by the spatial, even regional isolation, with a non-uniform territorial distribution, which makes it hard to govern.

The socio-economic environment is strongly affected by the regional and local physical infrastructure (electricity, communications, water, drainage etc.), by telecommunications and transportation, which are essential for the production and distribution process, and also for the access of the labor force (employees) to the workplace (Manole et al., 2008). Labor force imposes the existence of decent living conditions.

2. Present situation regarding the potable water distribution and sewage for waste water systems

Inside the Danube Delta Biosphere Reservation, according to the *Report on the Environment Status in RBDD*, there are no fixed sources with determinant role in water pollution. In fact, the major sources of water pollution on the territory of the reservation are represented by economic entities situated in the area bordering the RBDD and by the naval transport activity developed on the navigable ways.

For all potable water supply systems existing in the Danube Delta, there was adopted the solution to collect water from surface sources in order to make it potable. These systems aim at the collection of water, water filtration station, transportation, storage and distribution of potable water. This system was used because in the Danube Delta, the groundwater is characterized by the existence of a layer of water at depths above 2 meters (that is 1.05–1.35 m) on the lower rises and less than 1.67 m on the lower dunes being influenced by the causal reports between the hydrostatic level and the fluctuations of the levels of Danube.

The lack of potable water supply systems is a major risk for the health of the population, because of the quality, sometimes improper, of the water from fountains. There must be emphasized the danger represented by the lack of units that can prepare potable water in most villages, making that, subsequently, a

significant number of inhabitants, some 25%, do not benefit from optimal conditions of potable water supply. Using water for house consumption directly from the Danube is a major risk for the population of the Danube Delta, when considering the quality of the water, which deteriorated greatly from the reference period in 1950-1960.

Decrease of water quality is due, among others, to:

- Industrial waste waters.
- House waste waters.
- Various substances used in agriculture.

And there's the quality of water issue directly depends on the existence of waste waters, and the lack of sewage and purge system is another problem in the Danube Delta Biosphere Reservation.

Most of villages on the territory of the Danube Delta Biosphere Reservation do not have centralized sewage systems that could collect residual water in the whole village. Only the purge station in Băltanii de Jos is in compliance with the current environmental normative. All other existing purge stations were designed to process only the mechanical pre-purge of house waste waters. In fact, of the four villages that have their own sewer systems two have stations for mechanical pre-purge of waste waters: Maliuc and Sulina. The villages of Sf. Gheorghe and Chilia Veche have each one station for pumping house waters, designed to serve only the blocks of flats, and do not have pre-purge systems.

There can be observed that the existing purge stations are insufficient, because the purge of waste waters, both house and industrial, is realized only by a mechanical step. Mechanical purge assumes the use of grids, de-sanders, septic tanks, grease separators and decantation bacteria. The mode of exploitation is improper, because the emptying tanks emplaced on the path of sewage networks are hard to maintain, and in most cases are manually cleaned, due to the lack of eductor-basin cleaners, which are to be found only in Chilia Veche and Sulina.

The further persistence of this situation leads to the deterioration of environment through uncontrolled infiltrations from the existing tanks. The lack of sewage systems for waste waters will not allow a proper future development of the villages in the Danube Delta Biosphere Reservation. In most villages, the comfort of the population and the environmental conditions are not favorable for a community so close the tourism area.

The uncontrollable spill of waste waters has negative influences on vegetation and animals. The increase of water acidity leads to the death of subaquatic fauna. Many species of amphibians depend on water, and the fall of water quality has direct correspondence in mortality increase, or indirectly, determining even the occurrence of some diseases. All these have repercussions on the health of the population living in these areas.

By implementing environmental problems in the Danube Delta Biosphere Reservation, it is aimed the improvement of negative social, economic and environmental effects existing in the present. The environment projects refer to the development of systems for sewers and waste water purge, systems for waste management and also projects aimed at preventing human disasters (Anica-Popa, Manole, 2008).

3. Identification of economic and social benefits related to potable water supply and sewage systems

The main economic and social benefits related to infrastructure projects referring potable water and sewage systems are:

Reduction of social costs related to hospitalization and treatment

Taking into account the fact that, in the Danube Delta area, there are medical facilities only in the main villages of the communes (human medical facility), stringent problems arise regarding the possibility to promptly answer to the medical necessities of the population. It can be observed the fact that the nearest hospital with treatment facilities for digestive system diseases is located at a distance of at least 25 km (Municipality of Tulcea). The starting value is the cost of treatments for various diseases related to breath, digestion, urinary systems and also skin, which, at the level of the year 2013 reach the approximate level of 144,522 euro/year per 1000 inhabitants (see the calculations presented in the table below). The decrease that can be taken into consideration is 60%, as medical cases cannot be eliminated (also due to the negligence of the population). Under these conditions, it can be considered that the cost economy could reach an amount of approximately 51,559 euro/year per 1000 inhabitants. This value adds with the similar costs for persons who transit the area (they are likely exposed to risk of getting sick, not being adapted to the conditions in the area).

Table 1. *Estimation of cost reduction for 1000 inhabitants*

Type of disease	Cases per 1000 inhabitants	Average cost of treatment per case (with/without hospitalization)	Annual value euro
Respiratory	73	180	13,140
Skin (mycoses)	42	180	7,560
Digestive and urinary	98	120	11,760
TBC	3	400	1,200
Chronic hepatitis	9	600	5,400
Frequency of occurrence of diseases per inhabitant		2,2	85,932
Cost reduction - %		60	51,559

The global frequency of diseases for kids below one year is over 580%, for young people (1 to 14 years) is 3.117%, and for old people (over 65 years) is approximately 1.132 %. It is known that the health status of the human population is determined by a series of factors, some of them were mentioned and have deep demographical implications, influencing both the nativity and mortality statuses. At the level of villages in the Danube Delta Biosphere Reservation, there is a high potential risk for occurrence and expansion of diseases due to lack of hygiene (hepatitis or other contagious diseases of the digestive system). In the analyzed area, there are children of school and pre-school age who present a high degree of disease exposure risk.

The great number of retired people living in the Danube Delta Biosphere Reservation, the disabled people and the persons with serious health issues present a high risk of mortality (considering the average life expectancy at regional level for the period 2009-2011 that is 70.1 years for men and 77.5 years for women (INS, 2013)).

For the entire population of the Danube Delta Biosphere Reservation, which accounts for 12.038 persons, the existence of centralized potable water supply and sewage systems, can lead in a first instance to an economy of costs with hospitalization and treatments of over 30%, which would mean the equivalent of 375.000 euro per year.

Development of tourism – development of the local economy

At the level of the year 2013, in the Danube Delta Biosphere Reservation there are 169 economic agents who were authorized to run tourism activities. They have offered a number of approximately 5000 places, 11 hotels, 104 pensions, 51 housing pontoons, 2 hydro-buses, 1 passenger ship, 4 camping areas, 1 youth camp; the tourism season 2013 had a period of maximum during the months May, June, August and September, in the other months, the number of tourists is reduced. We must take into account the fact that there is also tourism that is not

organized by authorized economic agents; this phenomenon knew in 2013 a slight increase from the previous years, especially in the localities with high tourism potential: Sf. Gheorghe, Sulina, Crișan, Mila 23. In 2013, a total of 58,212 tourists were recorded, of which 21,856 Romanians and 36,356 foreigners. There can be observed a slow development of housing structures and of recreational activities. The existence of minimum hygiene conditions, fresh water and sewers, can contribute to the stronger development of tourism.

Increase of comfort conditions (house water and sewage) can generate a plus of tourists by at least 10%, if taking into account the trend of the previous years. The increase of tourists' number, correlated with the average housing fee for a person and the minimum number of housing days in the Danube Delta Reservation Biosphere area, can generate in the first operation year in which the integrated systems of water supply and sewers operate, some 582 thousand euros.

In compliance with the development of tourism in the villages, the social and economic effects would be the increase of the occupation degree of the labor force (statistical data for the analyzed area show the existence of more than 18.5% unemployed) and the decrease of the weight of social categories with low income.

The development of tourism can increase the degree of labor force occupation implicitly contribute to the reduction of unemployment. The benefits generated by the existence of integrated water and sewage systems results in the decrease of the effort to support persons without jobs by the state and implicitly the assurance of a certain level at a family level. The decrease of the number of unemployed people by eight percentage points can be transposed, in the actual conditions of the unemployment subsidies, in an economy of some 1,040 thousand euro.

Around the reservation, there is a number of urban and rural activities, such as Isaccea, Babadag and the Municipality of Tulcea, which totalize a population of over 150,000 inhabitants. Inside the perimeter of RBDD, there are no urban conglomerates, as a single city exists, Sulina with a number of 4,156 inhabitants. The total number of inhabitants in the Danube Delta Biosphere Reservation at the end of the year 2013 is 12,038.

Firefighting

The execution of the water supply systems has incidence over fire events, because the projects' design on one hand, provides hydrants, and on the other hand, the population gains access to an uninterrupted water source. Facilitation of intervention in case of fire refers to the limitation of the possibility of

death/damage for persons affected by the event, the respective area is characterized by a „HIGH” degree of fire occurrence risk (if considering the existence of dwelling with warehouses and food supplies for animals, of houses made of wood and other easy flammable materials). The fires can be started or ignited because of negligence manifested by fishermen, animal breeders or tourists. The fires also are a factor of menace for the integrity of forestry fund. Many fires were stopped at the limit of the forest due to the fireproof strips created and maintained annually, through plowing and disk-processing, at the Tulcea and Rusca Forestry Offices.

Animal breeding

Also, the realization of the potable water supply systems will allow the development, under better conditions, of the animal breeding activity. Both the quality of the food and the quality of conditions in which livestock is raised have a direct influence on the products realized (milk, meat, eggs etc.) and on the final consumers (the population).

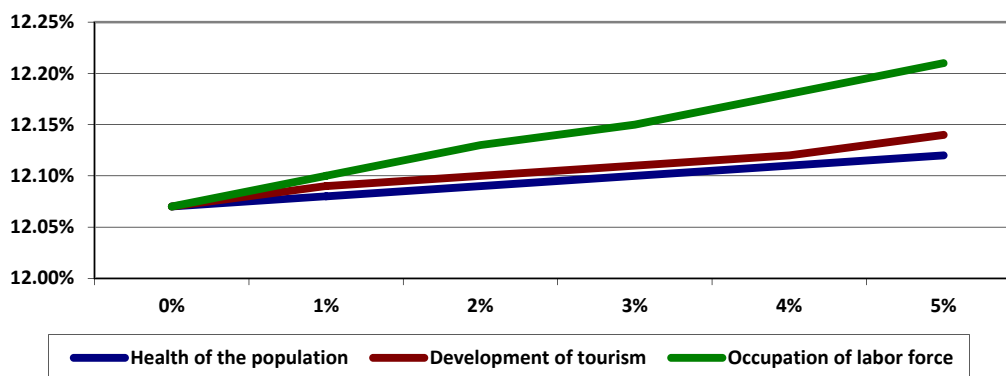
Starting from the previously measured benefits, related to the health of the population, development of tourism and occupation of the labor force, there can be tested the effect of the amplification of those benefits as time passes and the awareness of the population about the advantages of using potable water from safe sources, and also the elimination of uncontrolled release of waste waters.

Table 2. *Modification of economic internal profitability ratio at the modification, by 1-5% of the benefits generated by the project*

Indicator	1%	2%	3%	4%	5%
Health of the population	12.08%	12.09%	12.10%	12.11%	12.12%
Development of tourism	12.09%	12.10%	12.11%	12.12%	12.14%
Occupation of the labor force	12.10%	12.13%	12.15%	12.18%	12.21%

Normally, the economic internal profitability ratio for such projects is a value around 12.07%.

Figure 1. Modification of economic internal profitability ratio at the modification, by 1%-5% of the benefits generated by the project



The result of the simulation shows that, simultaneously with the increase of usage of a secure water source and controlled release of waste waters, a continuous increase of the economic internal profitability ratio will be recorded, compared to the initial situation.

Table 3. Percent ratio between NPV (net present value) and the value of the investment

Elements	1%	2%	3%	4%	5%
Health of the population	74.99%	75.09%	75.19%	75.29%	75.39%
Development of tourism	75.05%	75.20%	75.36%	75.51%	75.66%
Occupation of the labor force	75.23%	75.57%	75.91%	76.25%	76.60%

The net present values associated to the integrated systems for water supply and sewage, determined by the update of net incomes for a time horizon of 30 years, represent some 76% of the present value of projects, if we take into account economic, social and environmental benefits translated as much as possible in monetary units.

4. Conclusions

It can be appreciated that the existence and execution of the potable water supply and sewers systems in the villages of the Danube Delta Biosphere Reservation generates a multitude of advantages, both for local administration and for the population and economic agents inside the area, the advantages presented, especially the economic ones, will have a significant impact on the life standard of the population, considering that more than 50% inhabitants have a low, even very low living standard.

In time, the use of integrated systems for water supply and sewers will lead to the increase of economic internal profitability ratio.

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Ontological constraints on rational irrationality: the case of electoral preferences

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Abstract. *This paper is concerned with Caplan's (2000, 2001, 2006) rational irrationality model and its application on electoral preference formation. According to this model, individuals consume irrationality in a rational manner i.e. they maximize their total welfare through an exchange between their material and psychological welfare. Using the contributions of an important debate from the philosophy of economics regarding the imposition of ontological constraints on models, unrealistic assumptions and explanatory unification, two arguments are formulated: First, Caplan's model is ontologically bewildered – it contains opposed statements about the psychological descriptiveness of rational irrationality. Second, even though Caplan is apparently aware of the tension between ontological and tractability considerations he seems to privilege the latter.*

Keywords: rational irrationality, unrealistic assumptions, realism, ontological constraints, electoral preferences.

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1. Introduction

Caplan (2000, 2001a, 2006) formulated the rational irrationality model as the main vehicle of analyzing electoral preferences. Following the tradition started by Akerlof and Dickens (1989), the model introduces elements of irrationality in the neoclassical economics framework. Agents have preferences not only for available states of the world but also on their beliefs about those states of the world. As a result, Caplan argues, they maximize a combination of psychological welfare (from consuming irrationality) and material welfare. The methodological details of this model are a good argument for its selection for a thorough analysis of the ontological status of its unrealistic assumptions. For this purpose I focus on the relevance of the ontological constraints on defining local scientific realism (Mäki, 2005), building the Musgrave-Mäki-Hindriks typology of assumptions, defining models as surrogate systems (Mäki, 2009a) and on the ideal of explanatory unification. The debate started with Friedman's (1953) argument that a model should be judged only by the precision of its predictions regardless of its unrealistic assumptions. This position, later labeled as instrumentalist⁽¹⁾, generated a rich literature in the philosophy of economics containing the debate between realists and antirealists about the legitimacy of using unrealistic assumptions. It has been argued (Musgrave-Mäki-Hindriks) that the ontological status of assumptions is in fact relevant and the decision of their acceptability should be based on the functions they serve inside the models. Taking these statements as a starting point, this paper analyzes the ontological status of rational irrationality and formulates two important arguments: First Caplan's model is ontologically bewildered – it contains conflicting statements, some placing the model in Friedman's instrumentalist tradition, and others in a realist tradition, rather resembling the concerns of behavioral economics. Second, Caplan's choice of modeling 'belief change' in the utility maximization framework seems to be rather too methodologically constrained than necessary in order to unveil the underlying mechanism of the target world. Additionally (and related to the previous argument), Caplan insufficiently argued for the superiority of its rational irrationality model against its competitors in explaining observed behavior. These arguments are based on the main application⁽²⁾ of rational irrationality – electoral preference formation. The paper is structured in two parts. The first concerns the debate regarding scientific realism, the functions of unrealistic assumptions and their role in the attempts of explanatory unification. The second part presents and analyzes the rational irrationality model on the coordinates fixed in the first part.

2. Neoclassical ontology

A traditional attack against neoclassical economics was to accuse it of using unrealistic assumptions to model economic behavior.⁽³⁾ Friedman (1953) has provided economists with an important justification for using unrealistic assumptions. His argument is that the truth/realisticness of assumptions is irrelevant in accepting a theory, as long as its predictions are correct (Friedman, 1953: pp.8-9) Moreover, in Friedman's words: "the more significant the theory, the more unrealistic the assumptions [...] To be important, therefore, a hypothesis must be descriptively false in its assumptions" (Friedman, 1953: p. 14). To support this view, Friedman offers the example of Galileo's law of freely falling bodies ($s = 1/2gt^2$) and shows that one of its assumptions (i.e. the vacuum assumption) is certainly simplifying but this is not problematic per se: "bodies that fall in the actual atmosphere behave *as if* they were falling in a vacuum [...] The formula is accepted because it works, not because we live in an approximate vacuum"⁽⁴⁾ (Friedman, 1953: p. 18) Likewise, Friedman argues, the assumption of utility maximization (and other assumptions), although unrealistic, should be judged by the success of predictions derived with their help. This position has quickly become the standard justification of the simplifications used by economists. At the same time it received significant criticism regarding its lack of concern for the ontological status of the simplifications used in modeling.

2.1. Local realism, surrogate systems and explanatory unification in neoclassical economics

2.1a. Local realism and anti-realism

Friedman's position, but also its impact on economists produced substantial subsequent literature on the dispute between realists and instrumentalists. Friedman was labeled instrumentalist (Bear, Orr, 1967: pp. 192-193, Boland, 1979: p. 505, Caldwell, 1980: p. 366) and initiator of the formalist revolution in economics (Blaug, 2002: p. 30) and the ontology of its approach was often attacked as incompatible with a realist program of research. A classic definition of the realist tradition as "global doctrine about science" (Mäki, 2005: p. 231) is in terms of "mature and predictively successful scientific theories as well-confirmed and approximately true of the world."⁽⁵⁾ (Psillos, 2005: p. xvii). Realism also holds that "a full and just explication of theoretical discourse in science requires commitment to the existence of unobservable entities."⁽⁶⁾ (Psillos, 2005: p. 2) and that they are independent of our ability to collect direct evidence of their existence (Psillos, 2005: p. 44) resulting in postulating a mind-independent reality (i.e. from our sensory data or from the structure of our minds). Mäki (2009a: p. 74) argues, however, that some of the descriptions of scientific realism must be thought to be rather local. They vary from case to case – for example, references to

unobservable entities appear to be imposed by exclusive reference to one discipline i.e. Physics – (Mäki, 2005: p. 235) and therefore realism must be reformulated in more general terms. Such formulation would be consistent with its use in the social sciences, and thus with economics. Mäki argues that social reality cannot be mind-independent (Mäki, 2005: p. 243), and therefore a weaker condition should take its place – the science independence – the social world exists independently of theory – the social reality is not created by the social science (Mäki, 2005: p. 245). Also, social sciences do not generally use unobservable entities. They usually employ manifest images or commonsensibles (i.e. beliefs, norms, roles etc.). Moreover, social sciences should not be evaluated by their predictive success or by their maturity. All that is required is that they should be concerned about the ontological status of their theories (Mäki, 2005: p. 239). Hence, an anti-realist attitude would be one that is not concerned with the ontology of theories or models. In fact, as Mäki noted, realism is primarily an “ontological doctrine” (Mäki, 2005: p. 236) and it is to be expected that antirealism would not be concerned with the ontology of scientific theories.

2.1b. Ontological constraint on models and explanatory unification

In this view about realism, models must be understood as “representations of some target (such as a real world system, a set of data, or a theory” (Mäki, 2009a: p. 75). They are “surrogate systems [i.e. mediating vehicles in attempts to gain indirect epistemic access to the real world” (Mäki, 2009a: p. 77)], and economic research is directly concerned with the identification of the properties of these surrogate systems - rather than direct identification of the properties of real systems (Mäki, 2009a: p. 76). A realist intuition is that the model world and the target world should resemble each other, especially when considering that the use of unrealistic assumptions is unavoidable in the construction of economic models. These “strategic falsehoods” (Mäki, 2009a: p. 78) have the goal of “Isolating some important dependency relation or causal factor or mechanism from the involvement and influence of the rest of the universe”⁽⁷⁾ (Mäki, 2009a: p. 78). The same vision about the ontological constraint is used concerning explanatory unification: “Much of explanatory activity in economics is driven by the ideal of *unification*: the urge to explain much by little, to explain many kinds of phenomena in terms of the same parsimonious explanatory principles” (Mäki, 2009a: p. 86). Mäki (2001b) distinguishes between two kinds of explanatory unification, ontological and derivational. “Ontological unification is based on the representational capabilities of theories, while derivational unification is based on their inferential capabilities” (Mäki, 2001b: p. 491). In other words, “ontological as opposed to mere derivational unification gives priority to entities rather than sentences; reference and representation rather than inference and derivation; discovery rather than imposition.” (Mäki, 2001b: p. 499) Mäki therefore

distinguishes between “unification as formal constraint” and unification as factual discovery” (Mäki, 2001b: p. 503). These ideas are exemplified by the use of homo economicus in neoclassical economics. On one hand, this assumption can be used as a methodological constraint which prescribes that the results must be derived with its help; on the other hand, when utility maximization is used as discovery, unification is actually a matter of determining how the world really works, and the principle of utility maximization genuinely underlies a wide range of phenomena. (Mäki, 2001b: p. 503). While derivational unification seems rather peculiar to an antirealist perspective about science, ontological unification is specifically realist.

2.2. The ontology of unrealistic assumptions

The problem of the ontology of unrealistic assumptions, implied in the subsections above, was also directly addressed. Musgrave (1981) has made a major criticism against Friedman's position, arguing that although some simplifications are acceptable, Friedman's use of a universal sentence (implying the homogeneity of assumptions), is however illegitimate. Based on this observation, Musgrave suggested a distinction between negligibility assumptions (i.e. assumptions that some factor has no effect on the phenomenon under study, or at least no detectable effect), and domain assumptions (i.e. negligibility assumptions that are subsequently refuted and become assumptions about the applicability domain of a theory) and heuristic assumptions (i.e. negligibility assumptions used in a first stage of modeling, which are later discarded in order to determine the results by comparison). Musgrave argues that negligibility assumptions and domain assumptions should be realistic because (in the first case) neglecting a non-negligible factor will affect the quality of predictions, and (in the latter case) a false domain assumption will impede on testing the theory. Mäki (2000) builds on Musgrave's typology, strengthening its main conclusions. He argues that Musgrave's wording of negligibility assumptions is ambiguous and it rather allows a discussion about the detectability assumptions (i.e. an assumption that an F factor has no detectable effect) than one about negligibility. Further Mäki relabeled domain assumptions as 'applicability assumptions' and heuristic assumptions as “first step assumptions”, and then, starting from Machlup (1955), he presented the distinction between core assumptions⁽⁸⁾ (fundamental postulates e.g. utility maximization) and peripheral assumptions (assumptions of specific conditions e.g. Galilei's vacuum assumption). Mäki argues that although Musgrave does not directly address the issue of these types of assumptions, the examples offered are rather about peripheral assumptions. Musgrave's typology can also be applied to core assumptions (Mäki, 2000: p. 329). To these clarifications, Hindriks (2005, 2006) adds the distinction between first-order assumptions (i.e. setting, for example, the absence or lack of effect of a factor F) and second-order assumptions (i.e. explaining why the first order assumption was

imposed). Additionally, Hindriks argues for introducing tractability or manipulability assumptions: “a second-order assumption according to which a first-order assumption is imposed in order to make a particular problem tractable. It is argued that a realist will want to relax a first-order assumption imposed for reasons of tractability as such assumptions are not even approximately true”. (Hindriks, 2006: p. 401) e.g. Newton’s one planet assumption.⁽⁹⁾ These assumptions are useful fictions (Hindriks, 2006: p. 414) and as argued by Kuorikoski, Lehtinen and Marchionni (2010) they are rather peripheral assumptions (Kuorikoski, Lehtinen, Marchionni, 2010: p. 547) serving as means of mathematical implementation of fundamental assumptions (i.e. factors that are in the model’s central mechanism). Mäki (2009a) argues however that there is a tension between tractability conventions and ontological convictions. When “pressures of tractability override important ontological considerations, and the values of formal rigor take over in shaping the focus and strategies of research” (Mäki, 2009a: p. 82) an important problem arises – the impossibility of accommodating modeling practice with scientific realism.

3. The near-neoclassical model of rational irrationality

The introductory section took note that the purpose of this article is to analyze the assumptions used by the rational irrationality model. In what follows I present this model along with its genesis. Then, using the framework presented in the previous section, I analyze the ontological status of the rational irrationality model’s assumptions, discussing its compatibility with a realist scientific program.

3.1. Preferences on beliefs

Akerlof and Dickens (1989) presented a model that incorporated cognitive dissonance in a neoclassical model. Simply defined, cognitive dissonance designates the process of aligning peripheral beliefs with fundamental ones: “In practice most cognitive dissonance reactions stem from peoples’ view of themselves as ‘smart, nice people’. Information that conflicts with this image tends to be ignored, rejected, or accommodated by changes in other beliefs.” (Akerlof, Dickens, 1989: p. 308). In order to use this idea into an economic model (i.e. with the utility maximization assumption) Akerlof and Dickens (1989) operationalized it into three sentences: Individuals not only have preferences over states of the world, but also over their beliefs about the states of the world; they have some degree of control over their beliefs and they are able, to a certain point, to manipulate their beliefs by selecting sources of information likely to confirm desired beliefs; once chosen, beliefs persists over time (Akerlof, Dickens, 1989: p. 307)⁽¹⁰⁾. Starting from Akerlof and Dickens⁽¹¹⁾ idea of modeling some degree of rationality with neoclassical tools, Caplan (2000, 2001a, 2004, 2006) proposed the

rational irrationality model as the main means of explaining the electoral preferences of citizens. The model is based, as in the case of Akerlof-Dickens' cognitive dissonance, on the idea that individuals have preferences over their beliefs. Caplan argues that rationality is not just a tool to achieve certain purposes but becomes an object of consumption that individuals (near-neoclassical agents) acquire according to its price: individuals "are trading wealth for irrationality" (Caplan, 2000: p. 91). Here, welfare must be understood in a broad sense, including not only consumption and portfolio value but also human capital, health or leisure: "in fact, one could just partition all arguments in the utility function into 'beliefs' and 'everything else', and use wealth as a synonym for the latter" (Caplan, 2000: p.193). This exchange between material wealth and mental well-being takes place under two important assumptions. The first refers to the fact that individuals perceive the cost of irrationality without bias (Caplan, 2000: p. 191) – which is actually the assumption that separates purely irrational individuals from the rational-irrational. The second concerns the concept of bliss belief – an irrational belief which will be consumed until satiation when its purchase cost is zero. (Caplan, 2001a: p. 314). Depending on this bliss belief and the cost (in terms of loss of material wealth) of deviations from rationality, individuals will consume more or less of irrationality. In Caplan's terms, "It is dangerous to think that poisonous substances are candy. It is dangerous to reject the theory of gravity at the top of the stairs. It is dangerous to hold that sticking forks in electrical sockets is harmless fun" (Caplan, 2006: p.119); on the other hand, it is not dangerous to have certain religious beliefs or to vote according to some economic or political sophisms. (Caplan, 2004: p. 471). On this last issue Caplan argues that in certain circumstances – most of the political circumstances – the price of irrationality is low: "The institutional structure of politics tends to peg the price of irrationality at zero." (Caplan, 2001a: p. 314) because "In politics, there is no private benefit of learning from experience, so irrationality can persist over time" (Caplan, 2001a: p. 327). The reason that the private cost of irrationality is "effectively zero" (Caplan, 2001b: p. 20) or at least very small is a classic one in public choice theory: the probability of individual decisiveness in mass elections is insignificant. Since individuals do not have biases about their preferences over beliefs, it is expected that they are aware of the lack of personal impact on election results. The aggregate impact of these private irrationalities can be though quite high: "It is cheap for an individual to irrationally underestimate the costs of war, but if enough people buy this opinion the result could be a disaster." (Caplan, 2001b: p. 20). Based on such observation, Caplan deduced political failure. Because voters have systematic biases (e.g. anti-market bias, anti-foreign bias, make-work bias and pessimistic bias)⁽¹²⁾ and since voting is an act without individual consequences, democracy will promote ineffective public policy⁽¹³⁾.

3.2. The ontological status of rational irrationality

As mentioned in the previous section, the rational irrationality model is a near-neoclassical one. (Caplan, 2000): individuals are the fundamental units of analysis (methodological individualism), they maximize utility and they are selfish at least in what concerns the selection of beliefs. The assumptions underlying the model have the main feature of neoclassical methodology – they are unrealistic. Therefore the discussion about the ontology of this model, about scientific realism and the acceptable unrealisticness of these assumptions is legitimate. Based on these observations, the arguments mentioned in the paper's abstract and in the introductory section are formulated in the lines that follow.

3.2a. *The mixed-up ontology of rational irrationality*

Caplan's model provides conflicting information about the descriptiveness of the central assumption of the rational irrationality model – the unbiased perception of the costs of irrationality. On the one hand, Caplan presents numerous instances in which he seems to be concerned about the psychological content of his model and about the degree to which rational irrationality is descriptively valid (i.e. not only behaviorally but also psychologically). For example, Caplan (2006) notes that other authors did not follow a path similar to that of rational irrationality because of „its psychological implausibility” (Caplan, 2006: p. 125). He then argues that rational irrationality is a psychologically credible notion. Also, in cases where rational irrationality is behaviorally indistinguishable from other concepts⁽¹⁴⁾, Caplan argues that the difference must be however, made. For example, in the case of the difference between rational irrationality and rational ignorance, Caplan argues that “while rationally ignorant individuals admit they are ignorant, rationally irrational individuals believe that they know the truth” (Caplan: 2001a: p. 315). A similar argument is given for the distinction between rational irrational voters and expressive voters: “The parallels with rational irrationality are clear. [...] The key difference is the mechanism. In expressive voting theory voters know that feel-good policies are ineffective. [...] In contrast, rationally irrational voters believe that feel-good policies work” (Caplan, 2006: pp. 138-139). Furthermore, Caplan discusses an example of Brennan and Lomasky (1985). Expressive reasons, argue the two, can lead to disastrous results such as the declaration of war: the individual indecisiveness in mass elections cancels the cost of expression of national pride which, most likely, individuals would not express if their vote would be decisive. Caplan shows that while Brennan and Lomasky' ‘story’ is logically possible, it ‘comes off as odd’ unless we relax the rationality assumption: “How many vocal hawks would admit to themselves that war leads to devastation?” (Caplan, 2006: p. 139). All these distinctions seem to be less about agents' behavior⁽¹⁵⁾ and more about their psychological features. In the first case

(that of difference from rational ignorance) the differences are not just psychological⁽¹⁶⁾. In the second case the behaviors are the same, and the difference seems to lie only in the psychological characteristics of actors⁽¹⁷⁾. This concern for psychological descriptiveness of rational irrationality results also from the way Caplan writes about the importance of introspection⁽¹⁸⁾ – something very unlikely to have instrumentalist connotations. The concern for psychological descriptiveness is also visible in the description of rational irrationality as having tacit cognitive steps (2006: p. 126). Also, the mention of the cognitive process behind these steps reinforces the idea of Caplan's concern for the psychology of rational irrationality.

On the other hand, despite all the above examples, there are several instances where rational irrationality is actually presented as being rather behavioral than psychological. For instance, Caplan (2000) notes that “As with utility theory in general, one should not read too much psychological content into this choice model” (Caplan, 2000: p. 194). This idea is strengthened in (2001b): we should give no “specific psychological, anthropological, or sociological interpretation to choice over beliefs” (Caplan, 2001b: p. 10) and then in (2006): “The rational irrationality model is consistent with a much broader range of observations than standard neoclassical model” (Caplan, 2000: p.199). The lack of psychological content, and also the concept of compatibility with factual observations can be viewed as instrumentalist commitments. Therefore, Caplan seems to follow Friedman's tradition of relying on behavioral assumptions consistent with observable facts: individuals would behave *as if* they would be rational-irrational. The lack of conflict between observation and theory seems to be a condition of a rather instrumentalist origin. Moreover, the concern for the psychological descriptiveness of rational irrationality seems to conflict with Caplan's choice to introduce it into a neoclassical methodological framework. Complete, continuous, transitive preferences, or the idea of utility maximization are not psychologically descriptive⁽¹⁹⁾ and they seem to have a rather mathematical tractability function, which Caplan points at in several instances. A first example is the use of well-defined preferences: “Analyzing behavior without well-ordered preferences is quite difficult; but given well-ordered preferences, analyzing irrational beliefs is - it will be argued - a manageable task” (Caplan, 2000: p. 193). The reason behind their use appears to be linked to their tractability – a virtue for building deductive models. The distinction between cognitive and motivational bias seems to lead to the same idea: “The motivational depend on the emotions, but the cognitive do not. But the rational irrationality model treats them symmetrically for analytical purposes.” (Caplan, 2000: p. 194) Therefore, biases are artificially homogenized by reasons of modeling constraints and not by psychological fidelity reasons. Similar, but even more important, Caplan points out that giving up the rational

expectations methodological framework “provides only a semantic victory” because such a waiver has “a very high cost. So once you lower the threshold of rationality, you can no longer safely build on the standard rational actor theorems. You have to go back to square one to save a word” (Caplan, 2006: pp. 99-100). The reasons for modeling preferences over beliefs in this way are therefore not connected with an attempt to explain behavior as best it can be explained but rather with the attempt to explain it with some particular tools.

The picture that can be drawn from the ways in which Caplan presents the rational irrationality is mixed. On one hand, there is a significant concern for the psychological descriptiveness of the model’s assumptions. On the other hand, it is asserted that this is irrelevant. At the same time, Caplan offers reasons for modeling rational irrationality in the neoclassical methodological framework but then they are quickly opposed by statements such as the following: “Unlike ignorance, irrationality allows a wide range of outcomes. Many see the absence of a unique prediction as a defect, or sign of intellectual sloth. I do not. As Richard Thaler pointedly asks, ‘Would you rather be elegant and precisely wrong or messy and vaguely right?’” (Caplan, 2006: p. 113). This quote seems to put the consistency of Caplan’s claims about rational irrationality in a serious mess. If disorder is indeed justified, then Caplan’s arguments for adopting the neoclassical framework seem less explicable. If order and having unique predictions are not important, then why not go back “to square one”? (Caplan, 2006: p. 100), totally rejecting the psychologically undescriptive neoclassical framework? Why should we mix cognitive and motivational bias and why should we use well-defined preferences? To these questions it should be added the observation that rational irrationality seems to claim no more than the reactivity at the price of irrationality. It could be argued, therefore, that utility maximization is an unnecessary addition, and if Caplan’s concern would be purely realist, then rational irrationality could simply be reduced to the theory of origin – the cognitive dissonance – or could be accommodated with higher psychological content economic models⁽²⁰⁾.

3.2b. The functions and effects of rational irrationality unrealistic assumptions

In the previous section, I mentioned the tractability functions of some of the unrealistic assumptions used by Caplan. In section 3.2b the assumptions of the rational irrationality model will be carefully studied, examining the extent to which the simplifications made by Caplan are compatible with a realist scientific program. I begin by clarifying the logical structure of the model using the case of electoral preferences.

(a1): the individual decisiveness probability (p) in mass elections is very low (the model’s only structural assumption);

(a2a): individuals maximize utility of a mix made by mental and material welfare (their preferences are complete, reflexive, transitive, continuous, monotonous, and convex⁽²¹⁾);

(a2b): individuals accurately estimate the cost of irrationality in terms of loss of material welfare (implied by a2a);

(a2c): individuals accurately estimate the probability of being decisive in mass elections (implied by a2b);

(a2d): individuals are selfish in selecting their beliefs;

(a2e): individuals are altruists when they vote.

The first statement that can be made is that the Musgrave-Mäki-Hindriks typology of assumptions focuses on assumptions' functions, but they do not discuss the possibility that an assumption could have several simultaneous roles (Ungureanu, 2013). Starting from Hindriks' (2005, 2006) distinction between first order and second order assumptions it could be argued that assumptions are rarely accompanied by meta-statements the type of 'this assumption has the function of ...' For this reason we can only presume which functions an assumption fulfills in a given model and therefore it could be argued that what we can really observe are the effects of that assumption.⁽²²⁾ (Ungureanu, 2013) Once we accept that in the current modeling practice such meta-statements which specify the functions that assumptions have are rare and *once referring to their effects seems reasonable*, we can see that an assumption could have multiple simultaneous effects. For example, (a2d) can be read as 'in selecting beliefs, any reason other than selfishness can be neglected' – a negligibility effect. At the same time, however, this assumption has a tractability effect. It produces a uniform model world (i.e. actors do not have multiple motivations) allowing clear, unique predictions. (a2e has the same effects) Another observation that can be drawn is that the tractability effects cannot be limited to peripheral assumptions (Ungureanu, 2013). Core assumptions may have tractability effects as well. The best example is the very assumption of utility maximization. This is fundamental to neoclassical methodology for reasons not concerning ontological fidelity but mathematical tractability. Caplan even argues that to abandon this principle would make the analysis very difficult (Caplan, 2000: p. 193) and would send the researcher back to square one (Caplan, 2006: p. 100). So the reason Caplan has in mind when modeling rational irrationality in the utility maximization framework, is to enhance tractability effects. Admitting, however, that there may be simultaneous effects, we can rewrite the utility maximization assumption as a negligibility assumption: 'we can safely neglect actors who use other rational choice criteria (e.g. minimax regret) and actors that are purely irrational'. Starting from this interpretation of utility maximization but also from the mathematical tractability effect that this assumption has (including the uniformity effect), it has to be

recalled the tension between tractability and ontological considerations (Mäki, 2009). Here, this is not only an intra-model but also an intra-assumption tension. The question is of course that of deciding whether tractability considerations should override the ontological considerations in this case. If in the case of alternative rational choice criteria there is some empirical support for their negligibility⁽²³⁾, in the case of irrationality this is not as clear. Suppose, however, that tractability reasons are not interfering in this case with the causal mechanism of the target world, and we could safely turn our attention to another assumption of the model i.e. (a2c). This can also be rewritten as a negligibility assumption: ‘voters who do not know the value of p can be neglected’ and it also has tractability effects – it assumes uniformity in the model world. The problem with this unrealistic assumption is that it has questionable empirical support and, in this case, ontological considerations seem to be subordinated to those of tractability. (a2c) is also related to (a2b), which is related to (a2a). If individuals are not able to understand the concept of probability, or do not know the probability of an event (a2c) then they cannot accurately estimate the cost of irrationality (a2b) and in effect they cannot maximize expected utility (a2a) leading to the model’s failure to produce predictions. Beside the structural assumption (a1) which is unproblematic⁽²⁴⁾, all of the other assumptions are unrealistic and include tractability reasons. For instance, they all have the uniformity effect mentioned above. Of course, tractability assumptions are not problematic in themselves. They become so only when they are not only “strategic falsehoods” (Mäki, 2009: p. 78). In the case of a2a-a2e there are reasons to believe that tractability considerations interfere with ontological considerations making Caplan’s model suspect of having an instrumentalist approach.

4. Discussion and conclusion

Caplan's model seems to be torn apart between two worlds. On the one hand he insists on the psychological content of rational irrationality; on the other hand it reflects opposing motivations regarding modeling constraints in a particular methodological framework. At times Caplan seems more concerned about being ‘vaguely’ right than, being ‘precisely’ wrong (Caplan, 2006: p. 113). In others, however, the interest in the issues of tractability is more visible⁽²⁵⁾. This dissociated identity of the rational irrationality model makes it difficult to fit in a realist or anti-realist tradition. In addition, Caplan's view on the neoclassical-behavioral debate “as a disagreement within ‘normal science’ about parameter value.” (Caplan, 2000: p. 191) increases the confusion. The methodological foundations of the two approaches have little in common and the methodological distinction between fixing a type of rationality (neoclassical economics) and

discovering how individuals actually behave (behavioral economics) are fundamentally different strategies for generating knowledge. If in the first case, beginning with Friedman, economists have legitimized themselves from anti-realistic justifications, in the second, the ontological status of the assumptions used by neoclassical economics was the point of divergence. Additionally, Caplan fails to provide ontological grounds for using the neoclassical framework in explaining electoral behavior and not alternative methodological frameworks.

Notes

- (1) The reason for receiving this label was Popper's (1962) definition of instrumentalism as an attitude that theories are meant only to make predictions. Mäki (2009b) and Blaug (2009) did not though join the quasi-consensus in classifying Friedman as instrumentalist even though Friedman himself defined his position as such (Blaug, 2009: pp. 350-351).
- (2) Rational irrationality could be applied to other issues as well but Caplan heavily insisted on electoral preference formation.
- (3) Mäki (1989) argues that the term 'realism' is legitimately used when it designates a variety of philosophical theses. When we wish to refer to different properties of linguistic representations or economic theories and their parts it is preferable to use the term 'realisticness'. To avoid confusion between the two meanings of the term 'realism' I use Mäki's choice of words 'unrealisticness of assumptions'.
- (4) Likewise, the leaves of a tree move *as if* they maximize the light they receive, and pool players behave *as if* they knew the mathematics necessary for identifying the optimal paths and angles to hit the ball (Friedman, 1953: pp. 20-21).
- (5) The idea is first expressed by Putnam (1975).
- (6) i.e. electrons, quarks.
- (7) Mäki offers Galilei's law of free falling bodies which is based on the absence of air pressure or other forces. These assumptions are clearly unrealistic, but they are used to isolate the impact of gravity alone on the falling bodies. (Mäki, 2009a: p.79) They have a tractability function serving as "formal auxiliaries rather than as distortions of an actually held deeper worldview." (Mäki, 2009a: p. 82).
- (8) Another way is to determine the causal core of a model by using robustness analysis as developed by Ungureanu (forthcoming).
- (9) Hindriks explains that Newton lacked the necessary mathematical apparatus needed and therefore, for tractability reasons, he assumed the existence of just one planet.
- (10) For example, Akerlof and Dickens noted that in experiments (Gass, 1964), it was observed that students who accepted to apply electric shocks to some experimental victims, changed their views on these victims – they chose to resolve the conflict between self-image and their cruel behavior by having a bad opinion about the victims – a view that they previously did not have (changing of beliefs). Since the conflict between cruel behavior and self-image is relatively independent of time, it is expected that this will be a long-lasting effect (preferences stability over time).
- (11) The details of Caplan's model are irrelevant for my purposes here. It is only worth mentioning that the premises presented above were used to explain the necessity of adopting labor safety regulations.

- ⁽¹²⁾ Caplan (2006) identifies four systematic voter biases: anti-market bias (i.e. voters tend to believe in conspiracy rather than in the role of supply and demand forces when it comes to fixing the market price), the bias against foreigners (i.e. individuals tend to favor protectionist policies even if serious evidence that they are ineffective is available), the make-work bias (i.e. people tend to believe that employment is good for economy in itself) and the pessimistic bias (i.e. individuals systematically perceive that things in the economy are bad and will not get any better).
- ⁽¹³⁾ The details of Caplan's conclusions and extensive empirical research will be omitted here.
- ⁽¹⁴⁾ e.g. *X* behaves *as if* he is rational irrational but also *as if* he is an expressive voter.
- ⁽¹⁵⁾ Friedman's tradition is concerned with behaviors not with the psychological fidelity of assumptions.
- ⁽¹⁶⁾ Caplan shows that rational ignorant individuals have unbiased behaviors - their errors are not systematic - while the errors of rational-irrational individuals are systematically biased - the two concepts are both behaviorally and psychologically distinct.
- ⁽¹⁷⁾ In fact the two concepts are analytically indistinguishable, at least in terms of voting behavior.
- ⁽¹⁸⁾ "One thing my introspection tells me is that some beliefs are more emotionally appealing than their opposites. For example, I like to believe that I am right. It is worse to admit error, or lose money because of error, but error is disturbing all by itself [...] Introspection is a fine way to learn about your own preferences" (Caplan, 2006: p. 117).
- ⁽¹⁹⁾ And as shown by numerous experiments in behavioral economics (Tversky and Kahneman 1981, Kahneman, Slovic and Tversky, 1982), they are neither behaviorally descriptive.
- ⁽²⁰⁾ An alternative closer to economists' concerns could be the choice to model preferences over beliefs in Simon's (1995) bounded rationality framework or even in the behavioral economics framework. None of these options are though explored in this paper.
- ⁽²¹⁾ Caplan explicitly assumes only the existence of well-defined preferences (Caplan, 2001b, p. 7), but using arguments illustrated by indifference maps (Caplan, 2000: p. 193, 2001 p. 313) and evoking the methodological framework of "rational expectations" (Caplan, 2001a: p. 313) involves all these conditions imposed on preferences over beliefs.
- ⁽²²⁾ In other words, to discuss about functions (roles intended by the researcher) is not operable.
- ⁽²³⁾ The research conducted by Blais, Young, Fleury, Lapp (1995) shows that minimax regret "is a little more than a rationalization on the part of those having a strong sense of duty to vote" (Blais, Young, Fleury, Lapp, 1995: p. 827). It is also informative the anecdotal description that Dhillon and Peralta (2002) offer for this choice criteria: "a minimax agent should never cross the street." (Dhillon, Peralta, 2002: p. F338).
- ⁽²⁴⁾ Most democracies have a large enough demos, so the value of *p* is indeed very low.
- ⁽²⁵⁾ Indeed it can be even seen as a concern for explanatory unification "the application of the economic way of thinking to irrationality can also be seen as a striking vindication of economic imperialism." (Caplan: 2001b: p. 22).

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Relationship between the misalignment of the real exchange rate and capital flight in the developing countries

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Abstract. *The objective of this work is to determine the role of the misalignment of the real exchange rate in capital flight for a sample of developing countries over the period 1980-2010. Firstly, we calculated the degrees of misalignment for all countries of our sample, which degrees were introduced as a determinant of capital flight. Then, we examined the effect of the overvaluation and the undervaluation on capital flight. The results show that a strong undervaluation may discourage capital flight, while a strong overvaluation can stimulate it.*

Keywords: capital flight, equilibrium real exchange rate, overvaluation, undervaluation, cointegration.

JEL Classification: C21; C23; F31.

REL Classification: 8N, 9E.

1. Introduction

Capital outflow is usually manifested by an outside transfer of a portion of private savings leading to a decrease of the domestic savings. This phenomenon has long flowed a lot of link. Indeed, the concern was not only to define the term and set up the necessary measures to quantify it but especially to seek the main causes of the capital outflow and propose measures to remedy it.

In the economic literature, the concept of “capital flight” has been defined in different ways. The diversity of definitions reflects the complexity of this phenomenon. Actually, the nuances concern mainly the distinction between the normal outflow and the capital outflow due to some unfavorable factors characterizing the original countries such as the political instability, uncertainty about the government policy, the taxation system, the external debt, the budget deficit, the inflation rate etc.

In the developing countries, capital outflows have attracted much interest since the 80s because of the appearance of the debt crisis in these countries. Capital outflow generally leads to a loss of investment and growth because it is seen as a diversion of domestic savings outward (Deppler and Williamson, 1987).

Several variables are considered as determinants of capital outflows. These determinants include the real exchange rate. Its role is usually determined by its level of appreciation or depreciation. Many empirical studies have investigated this relationship and justified the important role played by the real exchange rate in the magnitude and the direction of the capital outflow especially in the indebted countries (Dornbusch, 1985; Cuddington, 1966; Lessard and Williamson, 1987; Pastor, 1989 and Pastor, 1990). In addition, it is generally accepted that the misalignment of the real exchange rate is a key determinant of the capital outflow. In this context, Fry (1993) states that the expectations of a devaluation of the exchange rate caused by the external debts of a country, is an incentive to hold assets abroad.

Mcleod (2002) states that the capital outflows are more frequent when the exchange rate is unstable. According this author, the anticipation of a devaluation of the national currency is a major cause of capital outflow in the sense that speculators can choose to withdraw their funds from domestic banks to outward. Moreover, according to Hermes, Lensink and Murinde (2002), the overvaluation of the real exchange rate gives rise to the capital outflow because it causes a strong expectation of a depreciation of the domestic currency. The economic agents choose to invest their money abroad. However, according to Vos (1992), it is rather the undervaluation of the real exchange rate that leads to a strong capital outflow.

Our contribution in this article is to study the impact of the misalignment of the real exchange rate on capital outflow. According to Edwards (1989), misalignment refers to the set of “sustained deviations of the real exchange rate observed in relation to the level of the long-term equilibrium”. The degree of misalignment leads to imbalances represented by the phenomena of over-or under-evaluation of the real exchange rate which is expressed by losses or gains in competitiveness. The misalignment of the exchange rate appears to be a key determinant of the FDI flows.

In this article, we try to determine the role of the misalignment of the real exchange rate in the capital outflow for a sample of 52 developing countries over the period 1980-2010. Thus, this paper will be composed of two sections. In the first section, we briefly recall the main determinants of the capital outflow. In the second, we will detect the role of overvaluation and undervaluation in the capital outflow.

2. Classical determinants of capital flight

The reasons behind the capital flight, as discussed in economic literature, are many. These reasons are mainly of economical origin related to macroeconomic stability. However, they can also have a political origin which concerns, in particular, the governance policy.

Various indicators provide information about the economic stability in one country such as the rate of the GDP growth, the inflation rate, the level of the external debt, the budget deficit, etc. Most of these factors contribute, in one way or another, to the capital outflow.

Rate growth of GD: A low growth rate of the GDP leads to capital flight (Morgan, 1988). This relationship seems indirect. Indeed, the weakness of the growth rate can be translated by a budget deficit and thus a reduction of the government incomes. This economic imbalance that characterizes most of the developing countries may also be a consequence of the deterioration of the trade terms which prevent the State from paying its external debts. In this situation, the government can increase the taxes to finance its expenditure. Thus, by anticipating an increase of the taxes, capitalists decide to invest their money abroad because the increase of the local taxes causes a decline in their expected profits. The relationship between tax and capital outflow was studied by Cardoso and Dornbusch (1989). Both authors suppose that the capital outflow results from the behavior of the residents seeking avoid local taxes. Moreover, if the government chooses to finance the budget deficit through money creation, the investors expect the rising

of the inflationary pressures and prefer to transfer their assets abroad. Therefore, the budget deficit is a cause of capital flight (Ajayi, 1992).

In addition to the budget deficit and taxation, inflation is also considered as a determinant of capital outflow (Dornbusch, 1985; Cuddington, 1986; Conesa, 1987). Considered as an indicator of the government inability to manage the economy (Fisher, 1993), inflation allows to reduce the real value of the domestic assets and obliges the residents to keep their assets abroad.

External *debt*: over-indebtedness may lead to the capital outflow. On the one hand, the increase of the debt level, by exercising a pressure on the increase of the national currency, leads individuals to transfer their funds abroad to protect themselves against an expected devaluation of the domestic currency (Conesa, 1987). On the other hand, according to Henry (1986), Cuddington (1987) and Duwendag (1989), external debt can cause capital outflow by providing the corrupt leaders the necessary resources to carry out this outflow.

The low growth rate of the GDP, the budget deficit, the increase of tax, inflation and external debt are variables which increase the risk and uncertainty relative to the profitability of domestic investment. Therefore, the risk aversion leads the investors to diversify their portfolios. The objective of the diversification obliges individuals to keep their assets abroad (Cuddington, 1986). Besides, the uncertainty characterizing the macroeconomic environment, the portfolio diversification, the main source of capital outflow, can result from the political instability and the interest rate gap (Hermes and Lensink, 1992; Lensink et al., 2000).

In addition to the economic factors, there are some determinants related to the political stability and the quality of institutions which constitute important causes of the capital flight, especially in the developing countries. Indeed, political instability and bad governance would be translated by an unfavorable macroeconomic environment in terms of economic performance and investment climate. This situation increases uncertainty, discourages domestic investment and leads to the capital outflow. According to Hermes, Lensink and Murinde (2002), the lack of confidence in the political environment of a country led residents to transfer their assets abroad. In addition, bad governance can be translated by an unequal distribution of the national wealth because of corruption. This is the case of several political leaders who use their power to appropriate a portion of the wealth and transfer it abroad. This argument refers to the strong relationship between governance and capital outflow. Indeed, a badly managed country cannot create a favorable investment climate causing capital outflows. In addition, corruption can allow the misappropriation of the help, for the poor countries. In

the same context, Ajayi (1992) and Awung (1996) confirmed the relationship between corruption and capital flight.

After recalling the main determinants of capital flight, we focus our analysis to the study of the relation between the capital flight and the misalignment of real exchange rate in developing countries. This is the purpose of the following work.

3. Misalignment and capital flight in the developing countries

The misalignment of the real exchange rate is generally considered as an important determinant of the capital flight. An overvaluation of the exchange rate leads to the capital outflow because it is at the origin of high anticipations of the national currency depreciation. The economic agents choose to place their money abroad. The misalignment of the real exchange rate can also favor speculation, which leads to massive capital flights abroad and a reduction of the property in the country (Cuddington, 1986). There are not many studies that took the role played by the misalignment in the capital flight into account. Among these studies, we can quote those of Pastor (1990), Hermes and Lensink (1992), Murinde, Hermes and Lensink (1996), Hermes, Lensink and Murinde (2002).

To examine the effect of the misalignment of the real exchange rate on the capital flight, we adopt an approach in two stages. First, we will determine the real degrees of the misalignment of the exchange rate for all the countries of the sample, which will be introduced as a determinant of capital outflow. Then, we will determine the effect of overvaluation and undervaluation on the capital outflow for a sample of developing countries (Appendix A) over the period 1980-2010.

3.1. Estimation of misalignment

▪ *The economic model*

The REER discussed above is widely used as an indicator of the “price competitiveness” of an economy. However, because of misconceived policies or imperfect functioning of the exchange market, it may be a poor indicator of the competitiveness of an economy. Misconceived economic policies can maintain exchange rate away from its equilibrium level but a country can also be willing to keep an over evaluated exchange rate in order to reduce the cost of importing machinery and other inputs for domestic firms. The resulting misalignment has been found to be damaging to economic performance (Edwards, 1988 and Cottani et al. 1990) implying that the REER should be maintained as close as possible to its equilibrium level (i.e. EREER).

Over the last thirty years, the economic literature on the exchange rate has developed in a way that allowed determining the influence of a limited range of

variables affecting the long run real value of a currency (e.g. Williamson, 1994; Edwards, 1998). These variables, called the “fundamentals”, include external (e.g. the international terms of trade) as well as internal factors (e.g. government expenditure). The impact of these determinants can be estimated through an econometric regression and are used to calculate the EREER and potential misalignment of the actual rate. Practically, the REER is decomposed into the EREER and misalignment. Edwards (1988) was the first to propose an approach that makes it possible to distinguish between the two sources of REER variations. The latter is regressed on external and domestic “fundamentals”, which bring about changes in the EREER if sustained over a long time period and do not create misalignment, unless price adjustment is extremely sluggish. In literature, the fundamental variables which can act on the internal and external balance are multiple. In this paper, after having tested ten of them, the six retained are namely: The bias of productivity (or the Balassa-Samuelson effect) (*Balassa*), the terms of international trade (*TOT*), the government consumption (*Gov*), the debt services (*Debtser*), the net capital inflow (*Capinf*).

So Edward's model can be represented under the following shape:

$$\text{Log}(\text{REER})_{it} = \alpha_{i0} + \alpha_1 \text{Log}(\text{Balassa})_{it} + \alpha_2 \text{Log}(\text{Open})_{it} + \alpha_3 \text{Log}(\text{Gov})_{it} + \alpha_4 (\text{Capinf})_{it} + \alpha_5 \text{Log}(\text{Debtser})_{it} + \alpha_6 \text{Log}(\text{TOT})_{it} + \varepsilon_{it} \quad (1)$$

The *Balassa* is the ratio between the country's real per capita GDP and the geometric mean (weighted in a similar way as the *REER*) of the same variable in trading partners. *Open* is the ratio of export plus imports to GDP. *Gov* is government consumption in percentage of the GDP. *Capinf* is the net capital inflow scaled by GDP. *Debtser* is the country debt services including interest payments and reimbursements as a share of GDP. *TOT* is the terms of trade (the ratio of export to import prices).

We expect a rise in the terms of trade (*TOT*) to appreciate the equilibrium REER to the extent that it improves the trade balance; the income effect dominating the substitution effect. It is expected that restricted trade openness (*Open*) will exert downward pressure on the relative price of tradable to non-tradable goods, thereby leading to an appreciation in the equilibrium REER. Higher capital inflows (*Capinf*) involve stronger demand for both tradables and non-tradables and lead to a higher relative price of non-tradables and REER appreciation. This is needed for domestic resources to be diverted toward production in the non-tradable sector in order to meet increased demand. Government consumption (*Gov*) has a similar effect: stronger demand for non-tradables increases their relative prices leading to an appreciation in the equilibrium REER. The higher the country debt services (*Debtser*) the higher will be the demand for foreign currencies inducing depreciation of exchange rate. The variable (*Balassa*) reflects a productivity gap

and aims at capturing the potential Balassa-Samuelson effect. Assume the prices for tradable sectors homogeneous across countries and their productivity higher than in non-tradable sectors. The increase in wages in the tradable sectors due to higher productivity spills over the wages in non-tradable sectors. The latter induce an increase in inflation and an appreciation of the REER.

▪ *The econometric analyses*

Equation (1) will be used to estimate the EREER and potential misalignment on a sample of 52 developing countries from Africa, Asia and Latin America over the period 1980-2010 (see Appendix B). However, as explained above, the EREER concerns the long term relationship between the REER and the fundamentals. In order to determine such relationship, one should use the co-integration methodology.

While co-integration analysis has been for a long time applied to “pure” time series (e.g. for a given country), in this paper we take advantage of the time series and the cross-section dimensions of the sample to study the relationship in Equation (1) using recent development of panel-data-co-integration analysis (e.g. Pesaran, 2007; Pedroni 2004). The model is estimated by considering a panel dataset. We combine information about 52 developing countries from Africa, Asia and Latin America over the period 1980-2010. The sample is determined according to the availability of data with the major source of information we used (e.g., the World Development indicators of the World Bank).

On the one hand, the combination of both time series and cross section information has the valuable advantage to provide a large the number of observations. Time series available are extremely short, making the country-by-country estimation of equation a procedure of limited interest (Edwards, 1994). Pooling the data potentially improves the robustness of estimations with misalignments being determined according to a “normal” behavior given by the average estimated coefficients over the sample. On the other hand, panel data analyses may suffer from hidden heterogeneity. This is the reason why country fixed effects have been introduced in empirical models while time fixed effects did not prove statistically significant over the period. The latter allows for more efficient estimation and testing; especially when the number of time periods is limited. However, in order to avoid too much technicality in the main text, the panel-data-co-integration analysis is presented in Appendix B.

To estimate this model, and given that all the variables of the model are I (1) and cointegrated in panel, the Within estimates of the parameter are convergent but not efficient (Kao, Chiang and Chen, 1999). To solve this problem, we used the FMOLS estimator (Fully Modified OLS) developed by Pedroni (2000). The

objective of this estimator is to eliminate the bias of the Within estimator. The FMOLS expression is:

$$\hat{\beta}_{FM} = [\sum_{i=1}^N \sum_{t=1}^T (x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)]^{-1} [\sum_{i=1}^N (\sum_{t=1}^T (x_{it} - \bar{x}_i) \hat{y}_{it}^+ - T \hat{\Delta}_{\eta\mu}^+)] \quad (2)$$

The resulting long term relationship between the REER and the explanatory variables is given in Table 1. It has a good overall quality of fit and all the coefficients are significant with the expected sign.

Table 1. Result of FMOLS estimator Estimation Results of Equation (1)

Variables	FMOLS
Capital Inflow / GDP	0.00
	6.9***
Openness	-0.42
	17.1***
Balassa Samuelson	0.28
	8.30***
Debt Services	-0.07
	-8.9***
Government Consumption / GDP	0.03
	3.31**
Terms of Trade	0.13
	6.53***
A-R ²	0.52

t-statistics are in bold.

* = Significant at 10%, ** = Significant at 5%, *** = Significant at 1%.

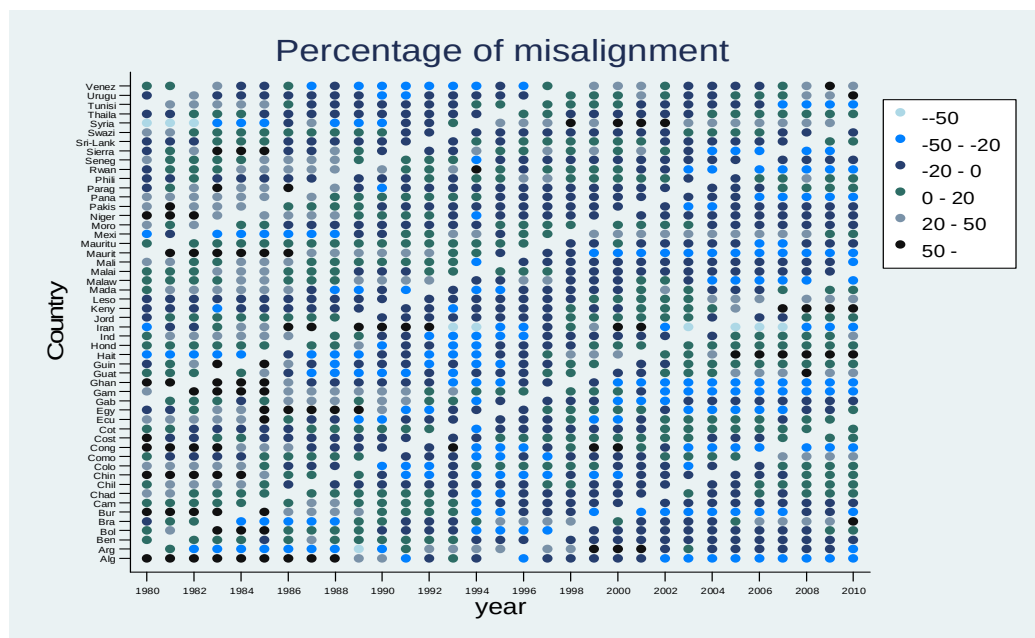
Using the coefficients in Table 1, we can compute the extent of the *REER* misalignment for the developing countries. We have to recall, however, that misalignment refers to the difference between the *REER* and its equilibrium level, the *EREER*. The latter is given by the fitted values using the estimates together in Table 1 and the long-run values of the explanatory variables. To get such long run values, we use the Hodrik-Precsott filter to separate the permanent and temporary components of each variable.

We define misalignment as:

$$Mis = (REER / EREER) - 1 \quad (3)$$

the positive values of which correspond to overvaluations.

Table 2 and Figure 1 describe the obtained misalignment series.

Figure 1. *The exchange rate misalignment during the periods 1980-2010*

This figure presents, the exchange rate misalignment during the periods 1980-2010. This period was characterized by light exchange rate overvaluation (0%; 20%) and light undervaluation (-20%; 0%). The figure shows that, in general, the percentage of years during which exchange rate were undervalued is higher during the 1991-2010 than during 1980-1990.

Table 2 provides the average of undervaluation and of overvaluation for countries and the percentage of years during which exchange rate was undervalued. Out of the 52 countries in the sample, 48 exhibit an overvalued currency over the period 1980-2010. Among these countries the overvaluation highly differs; ranging from about 41% in Iran to 0.3% in Gabon. In this table we also calculated the average overvaluation and the average undervaluation for every country. Ghana has the highest average overvaluation (198%) and Iran has the highest average undervaluation (-42%). From Table 2, we also notice that, out of the 52 countries in the sample, in 21 countries, the overvaluation occurred at least in 15 years (half of the period). However, in a majority of countries (50 out of 52) overvaluation occurred during at least 10 years (1/3 of the period). Only for Panama, overvaluation occurred during at least 20 years.

Table 2. *The percentage of Misalignment, Undervaluation and Overvaluation between 1980 and 2010*

Country	Average Misalignment	Average undervaluation	Average Overvaluation	Percentage of years of overvaluation
Algeria	13,66%	-27%	75%	36%
Argentina	5,56%	-21%	44%	42%
Benin	0,96%	-7%	13%	49%
Bolivia	2,18%	-14%	28%	39%
Brazil	4,63%	-18%	23%	49%
Burkina Faso	4,92%	-21%	37%	46%
Cameroon	0,81%	-9%	13%	42%
Chad	2,03%	-12%	12%	59%
Chile	1,78%	-8%	14%	33%
China	9,38%	-20%	51%	47%
Colombia	2,67%	-14%	16%	46%
Comoros	2,67%	-12%	18%	42%
Congo, Rep,	16,93%	-21%	71%	46%
Costa Rica	1,75%	-7%	10%	59%
Cote d'Ivoire	-0,63%	-8%	5%	42%
Ecuador	2,63%	-13%	17%	41%
Egypt, Arab Rep,	7,48%	-21%	36%	57%
Gabon	0,30%	-13%	19%	62%
Gambia, The	7,28%	-37%	30%	62%
Ghana	21,43%	-25%	198%	23%
Guatemala	3,69%	-19%	22%	55%
Guinea-Bissau	2,08%	-13%	16%	55%
Haiti	11,49%	-26%	57%	46%
Honduras	0,59%	-18%	9%	65%
India	0,96%	-16%	16%	49%
Iran, Islamic Rep,	41,76%	-42%	144%	46%
Jordan	1,97%	-6%	7%	58%
Kenya	3,32%	-14%	36%	46%
Lesotho	2,92%	-8%	21%	55%
Madagascar	2,64%	-14%	23%	52%
Malawi	2,98%	-20%	19%	59%
Malaysia	0,43%	-9%	11%	58%
Mali	3,04%	-13%	21%	46%
Mauritania	8,60%	-26%	46%	42%
Mauritius	0,02%	-12%	9%	55%
Mexico	4,74%	-25%	23%	58%
Morocco	0,00%	-6%	8%	49%
Niger	3,58%	-15%	30%	39%
Pakistan	1,92%	-10%	29%	36%
Panama	2,58%	-12%	19%	71%
Paraguay	3,45%	-12%	29%	39%
Philippines	2,23%	-9%	11%	52%
Rwanda	4,59%	-23%	21%	62%
Senegal	2,11%	-12%	19%	46%
Sierra Leone	9,53%	-19%	31%	49%
Sri Lanka	-0,42%	-4%	5%	52%
Swaziland	1,85%	-7%	10%	46%
Syrian Arab Republic	7,87%	-35%	38%	62%
Thailand	-0,02%	-5%	8%	49%
Tunisia	0,65%	-10%	15%	52%
Uruguay	2,88%	-10%	21%	39%
Venezuela, RB	1,65%	-16%	24%	49%

In the next section, focuses on whether countries having overvalued exchange rate, especially if overvaluation is maintained for some time, have an effect on capital flight. We will introduce the variable misalignment that we calculated as a determinant of the capital flight.

3.2. Empirical Relation between the misalignment and the capital flight

▪ *Data and methodology*

Ignored in the majority of the empirical studies, misalignment can be a determinant of capital outflow in the developing countries. To estimate the effect of misalignment on the capital flight, we will estimate a model of capital flight for a sample of developing countries over the period 1980-2010. In the economic literature, several methods in measuring of the capital flight are proposed. In the present study, and due to the lack of data, we are limited to the use of the method of the World Bank (1985). Hence, the variable capital flight used in this paper is calculated according to this method. In this method, the capital outflow for a country i in year t is measured as follows:

$$CF_{it} = [\Delta FD_{it} + NFDI_{it}] - [CA_{it} + \Delta FR_{it}] \quad (4)$$

Where CF is the capital flight; ΔFD is the variation of the foreign debt; NFDI is the net Foreign Direct Investment; CA is the balance of the current account and ΔFR the variation of the foreign reserves. All these data are obtained from the database of the World Bank 2012 (WDI).

The existing theory does not specify the independent variables which have to be included in an empirical model in analyzing the determinant of the capital outflow. In the case of our sample of developing countries, besides misalignment, we had retained the following explanatory variables: Capital flight delayed period, the ratio of foreign debt in the GDP, the rate of the GDP growth, the degree of opening of the economy, the debt service, the differential interest, corruption and the inflation rate. To determine empirically the relation between misalignment and the capital flight of the developing countries, three specifications were estimated. Every time, we introduce a new determinant of the capital flight in the estimated equation in order to determine the effect of the new variable on the significativity of the coefficients of the other determinants.

The effect of the misalignment variable on the capital flight depends on its sign as it is about an undervaluation (negative misalignment) or an overvaluation (positive misalignment). Indeed, following overvaluation, the investor anticipates a depreciation of the national currency which leads to strong capital outflows. It is thus necessary to distinguish between these two variables. For this reason, we created the two following variables “Overvaluation” and “Undervaluation”. The “Overvaluation” variable is going to take the positive values of the misalignment

while the variable “Undervaluation” is going to take the negative values. The data which helped us estimate the relation between misalignment and the scale of the capital flight from the countries of our sample generally cover the period between 1980 and 2010.

To estimate the effect of overvaluation and undervaluation on the capital outflow, we will estimate the three specifications by using three estimators: Within with fixed effects, Blundell-Bond and finally the PMG estimator. The estimation as well as the interpretations results constitutes the objective of the subsection which follows.

▪ Results and Interpretation

To examine the impact of overvaluation and undervaluation on the capital flight, we will highlight three specifications. We will estimate these specifications firstly by the Within estimator with fixed effects. Secondly, we will add the lagged capital flight as a determinant and we will estimate these specifications into the Blundell-Bond and the PMG estimators. The results of the estimations are summarized in Table 3.

Table 3. *Separate Effect of REER Undervaluation and Overvaluation on the capital flight*

	OLS with fixed effects			Dynamic estimator (Blundell-Bond)			Non-stationary estimator PMG		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Capital flight {1}	0.41 3.89	0.44 4.10	0.47 3.97	0.31 4.39	0.35 4.18	0.36 4.91	0.7 5.49	0.69 4.9	0.62 4.19
Ratio change debt/gdp	0.003 4.8	0.003 4.34	0.003 3.63	0.003 4.6	0.003 4.31	0.003 4.6	0.006 4.63	0.007 4.64	0.01 4.71
Growth	-0.004 -0.93	-0.009 -1.37	-0.002 -0.24	-0.002 -0.42	-0.008 -1.1	-0.001 -0.1	-0.00 -2.65	-0.00 -1.54	-0.001 -1.76
Open	0.004 2.45	0.004 1.94	0.019 2.87	0.006 1.36	0.008 1.42	0.012 2.05	0.00 2.27	-0.00 -0.98	-0.00 -1.5
Service dette	-0.016 -1.92	-0.012 -1.29	-0.02 -1.23	-0.03 -2.28	-0.02 -1.98	-0.03 -1.93	0.001 0.81	-0.001 -1.45	-0.002 -1.61
Differential interest	-	-0.00 -0.29	-0.003 -0.75	-	-0.00 -2.3	-0.00 -0.11	-	-0.001 -3.86	-0.002 -4.07
Corruption	-	-0.1 -2.33	-0.2 -2.9	-	-0.05 -0.51	-0.21 -2.26	-	-0.004 -1.93	-0.007 -2.14
Inflation	-	-	0.003 0.74	-	-	-0.003 -0.4	-	-	-0.00 -1.29
Undervaluation	-0.2 -0.76	-0.3 -0.89	-0.12 -0.17	-0.5 -0.71	-0.81 -0.84	-1.81 -0.97	-0.03 -2.1	-0.01 -0.76	-0.05 -0.7
Overvaluation	0.06 0.32	-0.003 -0.01	-0.12 -0.17	0.3 0.61	0.43 0.68	-0.2 -0.26	-0.04 -3.15	-0.05 -3.26	0.01 0.11
Number of Countries	48	38	20	48	38	20	48	38	20
Number of Observations	1056	836	440	1056	836	440	1056	836	440
Adjusted R ²	0.25	0.34	0.36						

This table shows that the ratio of foreign debt in the GDP, the degree of openness and the lagged capital outflow, have a positive and significant effect on the capital outflow in the developing countries. On the other hand, the debt service, the differential interest and corruption have a negative effect on the capital outflow in these countries. The results also show that the inflation rates and the GDP growth have no significant effect on the capital outflow in the developing countries.

Concerning the effect of overvaluation and undervaluation on the capital flight, this table shows that these two variables have generally no effect on the capital flight. This can be explained by the fact that the investors take into account factors such as corruption, the ratio of the foreign debt in the GDP other than the misalignment of the real exchange rate.

According to the economic theory, the investor decides to leave the country and invest abroad after a strong real overvaluation, where he anticipates local currency depreciation. To take into account this situation, we have created two new variables “HighUnder” and “HighOver”. The first variable takes the value of the misalignment lower than 20%, which indicates an undervaluation of more than 20%.

However, the variable “HighOver” will take the value of the misalignment superior to 20%, which indicates an overvaluation of more than 20%. Table 4 recapitulates the results of the estimation of the specifications by introducing lagged “HighUnder” and a lagged “HighOver” in the estimated models. It shows that a strong undervaluation can decrease the capital outflow whereas a strong overvaluation can stimulate it. Given that the countries of our sample generally present characteristics of an overvalued currency, this overvaluation makes the developing countries import more than they export. Such a situation exerts a pressure of depreciation on the currency of these countries. From then, we will have capital outflows and that the individuals will prefer to take these assets abroad. As a result, an overvaluation of the currency of the developing countries will doubtless incite a rational agent to avoid the shock by converting his currency in advance.

To take into account the persistence dimension, we construct two new variables: Persistent Undervaluation (PersistUnder) and Persistent Overvaluation (PersistOver). If during the past five years, the exchange rate was always undervalued (overvalued) “PersistUnder” (“PersistOver”) takes as a value of the average undervaluation (overvaluation) in the five years. Otherwise, the variable takes the value 0.

Table 4. *The Separate Effect of REER Persistent Undervaluation and Overvaluation on the capital flight*

	OLS with fixed effects			Dynamic estimator (Blundell-Bond)			Non-stationary estimator PMG		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Capital flight {1}	0.34 3.8	0.39 4.1	0.4 4.29	0.31 4.56	0.35 6.54	0.38 5.9	0.52 4.68	0.56 5.41	0.51 5.27
Ratio change debt/gdp	0.003 4.59	0.004 4.62	0.003 3.51	0.002 4.69	0.002 4.26	0.003 4.34	0.004 4.33	0.005 4.68	0.02 5.69
Growth	-0.006 -1.13	-0.01 -1.51	-0.008 -0.67	-0.001 -0.32	-0.007 -0.93	-0.004 -0.29	-0.002 -1.31	-0.003 -1.21	-0.004 -1.46
Open	0.005 2.98	0.006 2.63	0.01 2.78	0.009 1.73	0.008 1.69	0.013 1.68	0.001 2.02	0.003 1.67	0.004 1.71
Service dette	-0.11 -1.14	-0.07 -0.66	-0.01 -0.84	-0.03 -1.98	-0.02 -1.72	-0.02 -1.67	-0.02 -1.04	-0.04 -1.66	-0.03 -1.68
Differential interest	-	-0.00 -0.54	-0.005 -0.89	-	0.00 0.36	0.00 0.51	-	0.00 0.86	0.00 0.67
Corruption	-	-0.6 -1.83	-0.10 -1.76	-	-0.03 -0.43	-0.01 -1.3	-	-0.02 -1.98	-0.07 -2.71
Inflation	-	-	0.002 0.91	-	-	0.002 0.77	-	-	0.00 0.98
PersistUnder	-0.46 -1.57	-0.5 -1.4	-0.6 -1.13	-0.4 -1.15	-0.45 -1.48	-0.32 -0.94	-0.27 -1.24	-0.31 -1.43	-0.37 -1.51
PersistOver	0.4 1.68	0.41 1.66	0.3 1.65	0.28 2.28	0.39 2.15	0.41 1.81	0.38 2.03	0.41 1.78	0.47 1.81
Number of Countries	48	38	20	48	38	20	48	38	20
Number of Observations	1056	836	440	1056	836	440	1056	836	440
Adjusted R ²	0.41	0.38	0.4						

Table 4 summarizes the results of the estimation of the five specifications with variables “PersistOver” and “PersistUnder”. From this table, we can conclude that a persistent overvaluation can increase the capital flights into the developing countries. Indeed, the coefficient of the variable “PersistOver” is positive and significant for all the specifications. Thus, we can conclude that a persistent overvaluation can discourage the investors.

Conclusions

Since the debt crisis, which occurred at the beginning of 1980s, capital outflow has been a phenomenon which attracted the attention of several economists. It is an important characteristic of the developing economies. Therefore, we tried to examine the effect of misalignment of the real exchange rate on the capital flight for a sample of developing countries over the period 1980-2010.

Firstly, we estimated the impact of overvaluation and undervaluation on the capital flight. The results indicate that, for these developing countries, the misalignment of the real exchange rate is not the main determinant of capital outflow. Secondly, we determined only the impact of a strong overvaluation and a strong undervaluation on the capital flight. We considered that there is a strong overvaluation (undervaluation respectively) if the value of misalignment is superior to 20% (inferior to 20%). Our econometric results show that a strong undervaluation may discourage capital outflow, while a strong overvaluation can stimulate it.

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Appendix A

Table A1. *Countries in the Sample Used to Compute the EREER*

Africa	Latin America	Asia
Algeria	Argentina	China
Benin	Bolivia	Iran
Burkina-Faso	Brazil	Thailand
Cameroon	Columbia	Pakistan
Chad	Costa-Rica	India
Comoros	Ecuador	Philippines
Congo, Rep	Mexico	Malaysia
Cote d'Ivoire	Paraguay	Jordan
Egypt	Venezuela	Syria
Gabon	Haiti	
Gambia	Honduras	
Ghana	Panama	
Guatemala	Uruguay	
Guinea-Bissau	Chile	
Kenya		
Lesotho		
Madagascar		
Malawi		
Mali		
Mauritania		
Mauritius		
Morocco		
Niger		
Panama		
Rwanda		
Senegal		
Sierra-Leone		
Sri Lanka		
Swaziland		

Appendix B. Co-integration analysis

To present co-integration simply, consider two time series x and y that are integrated of order one; $I(1)$. This means that their first differences (i.e. Δx and Δy) are stationary; $I(0)$. If the regression of x on y (that are $I(1)$) gives a time series of residuals that is $I(0)$, the two series are called co-integrated. This means that there exists a long term relationship between them. The latter is given by the regression coefficients of x on y . However, the OLS estimate of the coefficient is convergent but not efficient and other estimation techniques need to be used. The methodology comprises 3 major steps. First, test whether the variables are $I(1)$. Second, test whether the variables are co-integrated. Third, estimate the long term relationship.

First developed in a “pure” time series context, co-integration analysis has been subsequently extended to data combining both the time series and the cross-section (commonly referred to as panel data) dimensions. The 3 steps for the analysis are the same as above except that the nature of the data (i.e. time series and the cross-section) involves a preliminary check regarding whether individuals (e.g. countries) are interdependent or not. This is important for the tests to be used in the co-integration analysis. This Appendix applies the panel-data-co-integration analysis to Equation (1).

To examine whether individuals are interdependent, we use a test suggested by Pesaran (2004). The test is based on the average of the correlations between the residuals from a regression on each individual separately. Practically, consider the variable y_i pertaining to the individual i . The variable is regressed on its first lag and the residuals are collected to compute ρ_{ij} which is the correlation coefficient between the residuals from individual i and j regressions. The statistics:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \quad (B.1)$$

is shown to have a $N(0,1)$ distribution under the null hypothesis of independence. Where N is the number of individuals and T is the number of years.

The results of the test applied to our sample are presented in Table B1. For all variables, the tests reject the null hypothesis of independence of individuals at the 1% level.

Table B1. *Tests of the independence of the variables across individuals*

Variables	Calculated statistics
REER	5.98
Balassa	13.17
Open	8.32
Gov	4.13
Capinf	3.71
Debtser	10.41
Tot	8.12

B.1. Stationarity tests

To examine stationarity, we should, therefore, use a test that incorporates the interdependence of individuals. Among the existing test, the one by Pesaran (2007) is the most adequate because it is targeted toward situation where N (the number of individuals) is higher than T (the number of years). In addition, the test allows analyzing non-stationarity within a heterogeneous panel framework, i.e. a panel in which each country is allowed to evolve according to its own dynamics.

The test builds on the well-known augmented Dickey-Fuller regressions. Practically, consider y_{it} pertaining to the individual i at time t . Run the regression:

$$\Delta y_{it} = \alpha_i + \rho_i y_{it-1} + \gamma_i \bar{y}_{t-1} + \delta_i \Delta \bar{y}_t + \vartheta_{it} \quad (\text{B.2})$$

and take the calculated Student statistics of ρ_i ; t_i . Where $\bar{y}_t$ is the average of y_{it} over all individuals at time t . The statistics:

$$CIPS(N, T) = \frac{1}{N} \sum_{i=1}^N t_i(N, T) \quad (\text{B.3})$$

is used to test for stationarity but it does not have a standard distribution. We follow Pesaran (2007) and simulate the critical values using the Monte Carlo approach. If the computed statistics ($CIPS$) is above the critical value, one can not reject the null hypothesis of stationarity.

Table B2. Test of the stationarity of the variables

Variable	Stationarity in	
	Level	First difference
Capital Inflow / GDP	-1.79	-5.93***
Openness	-2.01	-4.85***
Debt Services	-1.98	-5.39***
Government Consumption / GDP	-1.92	-4.52***
Terms of Trade	-1.53	-5.13***
REER	-2.06	-4.51***
Balassa Samuelson	-1.98	-4.21***
	Critical values: -2.11 (5%) -2.20 (1%)	

** = Significant at 5%, *** = Significant at 1%

Table B2 presents the results. The tests reveal that all variable are I (1). Hence, if we find a relationship among the variables which gives stationary residuals, these variables will be considered as co-integrated.

B.2. Co-integration tests

The best known tests are due to Pedroni (1995, 2004). They allow taking account of heterogeneity among individuals. The author proposed 7 versions of the co-integration test: 4 are suitable when studying the relationship of the variables within countries and 3 pertain to the relationship between variables of different countries. The former set of tests is the most suitable for our study.

Pedroni (1995, 1997) showed that, with a slight correction, the statistics converge toward a normal distribution. Actually:

$$\frac{x_{NT} - \mu\sqrt{N}}{\sqrt{v}} \sim N(0,1)$$

where x_{NT} is one of the 4 statistics and μ and ν are tabulated by Pedroni (1999). The results of the co-integration tests applied to Equation 1 are presented in Table B3. Two tests suggest that the variables are co-integrated but two others suggest the reverse. We follow Pedroni (2004) who being faced with the same type of results concluded that the variables are co-integrated.

Table B3. *Test of co-integration*

Statistics	Calculated value
Panel ν - statistic	-3.9***
Panel ρ - statistic	4.35***
Panel t- statistic	-0.83
Panel ADF statistic	-0.14
	Critical values: 1.65 (5%) 2.33 (1%)

** = Significant at 5%, *** = Significant at 1%.

The leadership role of a local public administration CIO: the case of Bucharest

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Abstract. *Today, the role of CIO in local government is becoming increasingly important. In the last 25 years there was among theorists and practitioners a significant increase in the volume of studies on the powers and role of the CIO in the public entities which are facing different challenges from those in the private sector.*

One of the major challenges of the implementation of e-local governance is the lack of a shared vision to lead to structural and functional changes necessary for an integrated management to ensure the progress of the local community.

This paper provides a successful model on how to overcome the problems and challenges derived from the implementation of IT strategy in the Municipality of Bucharest and the central role of the CIO (Chief Information Officer) or the person who is in a similar position.

Keywords: sustainable development, local authorities, Municipality of Bucharest, CIO, IT Strategy.

JEL Classification: H77.

REL Classification: 13G.

Introduction

Computers and information technology have been used by governments for more than 50 years to automate activities. The use of computers and networked communications is therefore not new, but the arrival of the Internet has enhanced communications and enabled the digital supply of government services. In many areas of government, the reforms have been facilitated by digital technologies, such as: Internet access through computers – desktop, laptop and palmtop – mobile phones, information kiosks and digital television. Through these modern technologies eGovernment⁽¹⁾ is widely perceived to be a fundamental tool to the reformation, modernization and improvement of the public administration system (Foley, Alfonso, 2009: pp. 371-396).

Today, the growing role of information and communication technology (ICT) is forcing the local authorities to overcome the challenges of managing complexity associated with the major transformations in order to fulfill their missions. New technologies have allowed local public administrations to expand their cooperation in both public and private sector or towards their citizens.

ICT is an essential tool in driving the modernization of public administration claimed by the sustainable development of our society. Sustainable development expresses the need to increase the potential of ICT and its application in public administration taking into consideration the problems, challenges and development strategies at the local government level.

This paper aims to explore the role of the CIO in the context of a sustainable administration by analyzing as case study, the need and the impact of the CIO position on the development of Bucharest.

The undertaken research answers the following question: *what role should the CIO (who is perceived as a key factor in the formulation of strategic organizational objectives) play so that the local administration in general - and that of Bucharest in particular - becomes flexible, collaborative, simplified, and sustainable at the same time?*

The research methodology used is mainly qualitative and it is based on the analysis of official documents, key information and the case study on the IT staff and department of the Bucharest City Hall

In this respect, the work will try to identify the main organizational problems related to IT governance. It will select indicators which refer to organizational goals and objectives, organizational culture and environment, the normative framework etc.

We expect as a result of the research, to understand what are the main reasons for creating the position of CIO in Bucharest, which is the profile of a CIO, what are the required skills and the area of managerial responsibilities with impact on the modernization of their work that wants to become collaborative, objective, oriented to added value and self-sustainable.

1. What is the CIO?

Regarding the meaning of the term CIO, there is now a common and agreed definition in the specialty literature which scholars use to define the CIO, starting from his attributions, or describing what he should do.

Starting from these premises, we can highlight a first understanding of the CIO, related to the management of the information technology. It describes that the CIOs are present to coordinate technology needs; to bridge statewide and agency plans; to optimize the use of the Internet for state web sites; and to ensure quick turnaround in technology replacement plans so that systems are current in a rapidly changing field (Rabin, 2005: p.148).

Another description of the CIO regards the attributes and skills needed, making it similar with a *chameleon* (Remenyi et al., 2005: pp. 1-11).

According to Lawry R. (2007: p. 584), there are four characteristics that could be identified as the attributes of the CIO and of the chameleon: ability to change; ability to see in multiple directions; to strike fast when required and the ability to hang on when the going gets tough.

These characteristics suggest that the role of the CIO requires the ability to (Lawry, 2007: p. 584):

- adapt to a constantly changing environment,
- able to envision the organization in a holistic manner,
- remain ahead of the game on technological development,
- endure the tough times when unrealistic expectations and failures occur.

For all these characteristics, we can draw some skills that the CIO must have and we can also identify his place in an organization (Table 1).

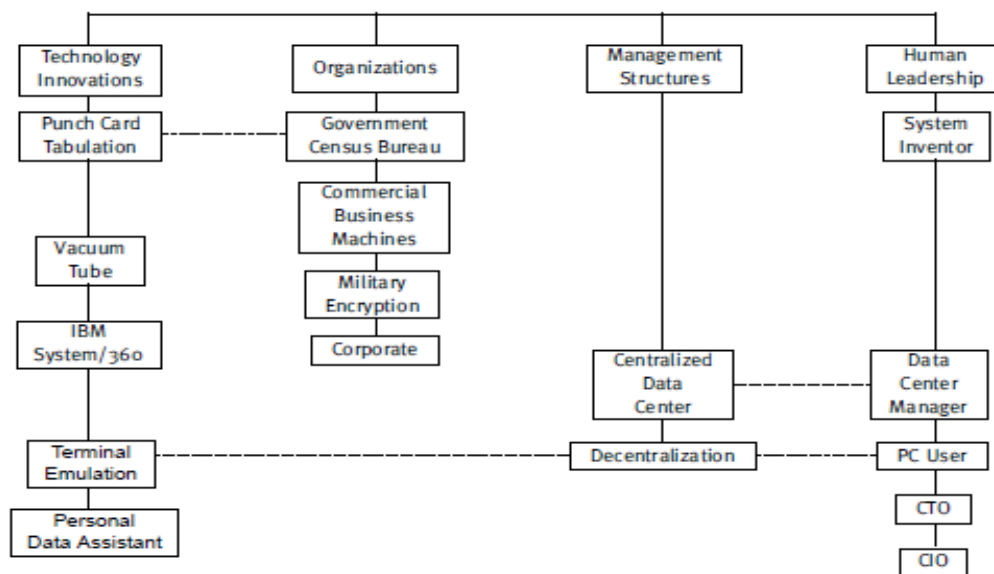
Table 1. *CIO skills*

Managerial skills and expertise	Technical skills and expertise
Strategic Planning	Computer Hardware Acquisition
Financial Planning	Database Design and Management
Human Resource Management	Telecommunications
Communication: Written and Oral	System Auditing
Project Management	System Analysis
Leadership	Information Service Management
	Application Development

Source: Adaptation after Gupta Y.H., 2001: p. 130.

From the discussion of the attributes and skills of the CIO it is apparent that the CIO, to successfully integrate with the organizations executive team, cannot purely be a technology expert, but must also have sufficient managerial skills and in some cases it is important to possess some leadership qualities. It is via these skills that the CIO can effectively exploit the information technology within an organization and gain credibility for further such investment (Figure 1).

Figure 1. *Genealogy of Information Technology*



Source: Schubert et al., 2004: p. 8.

The role of the CIO changed in concordance with the Citizens demands to have an improved access to tailored public services, greater accountability and transparency of public officials, increased confidence in how governments handle their personal data and greater efficiency in service delivery all at the same time.

Due to the fact that legislation, politics, and resources place very different demands on the public sector, there was the need to create a function similar with that from the private sector, whose role should be to fulfill the requisite knowledge and competence in the needed domains of public sector.

The importance of information and technology in government modernization and transformation were recognized by government and political leaders. This makes the CIO the important pillar in public administration transformation plans. These plans offer an opportunity for CIOs to redefine their role in order to fulfill these higher expectations (IBM, 2009: p. 1).

2. The evolution of the CIO in the public sector

In order to understand the place of the CIO in the public sector, it is important to understand what exactly the components of the public sector are.

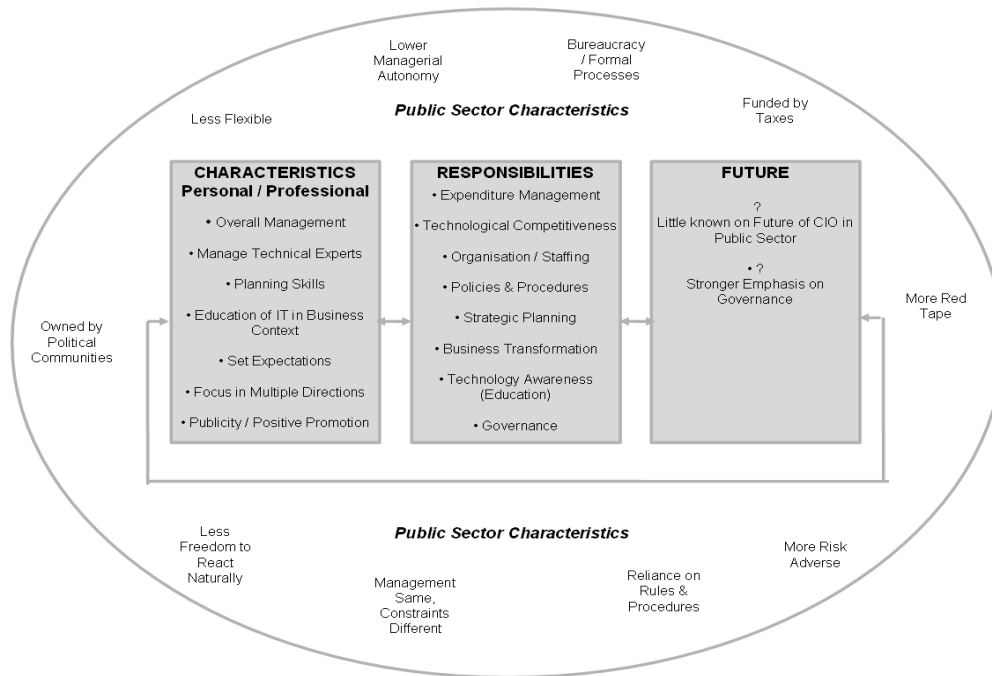
The term *public sector* is also used for analytical purposes, in particular, as a contrast to the private and third, or voluntary, sectors. This allows for the mapping of the scope of state activities within the wider economy and, also, it underlines distinctive patterns and operating procedures within the public sector. This relates to the contemporary interest in cross-sectorial learning, especially the learning of “private” management practices for application in the public sector.

The general definition of the public sector includes government ownership or control rather than mere function, thereby including, for example, the exercise of public authority or the implementation of public policy. When pictured as concentric circles, the core public service in central and infra-national government agencies defines the inner circle of the public sector. In this case, the distinction of the public from the private sector is relatively straightforward—it is evident in terms of employment relationships and the right of exercising public power. The next circle includes a number of different quasi-governmental agencies that are, however, placed outside the direct line of accountability within government (Bevir, 2007: p. 776).

By increasing government’s dependence on Information Technology for internal management, delivery of services to citizens and fulfill the requirements of the digital environment, the role of the CIO in the public sector has become more prominent, but its role within the public sector is still at a formative stage whereas in the private sector it is well developed (Lawry, 2007: p. 581).

Because of each bureaucracy’ file continuity requirement, the evolution of IT in a state can be understood from a historical perspective. At the end of the 1960s, 90% of all data processing systems were supported in nine major areas: finance, revenue, highways, motor vehicles, employment security, health and welfare, law enforcement, legislative and institutional functions (National Association for State Information Systems, 1970).

The public sector agencies are owned, funded and controlled collectively by members of political communities at different levels of government (Budhwar, Boyne, 2004: pp. 346-370).

Figure 2. Adapted model of CIO in the public sector

Source: Lawry et al., 2007: p. 587.

Even if the roles and responsibilities in the public sector of the Chief Information Officer are evolving fast due to the important role of ICT for government processes and electronic services, the importance of the CIO in the public sector is beyond that of the private sector, due to the restrictions in which it operates and the future of the position (Figure 2).

The CIO is evolving together with the evolution of the Public Sector. It evolves from a technology leader to a critical transformer of enterprise government services. This evolution implies new skills, experience, competency, and accountability.

For example, the baseline fundamental skills are a set of entry-level requirements for any CIO position. These entry-level requirements can be considered very important for any CIO from the public sector.

According to Schubert (2004: p. 69), the key basic technical fundamentals are:

- Computer systems architectures, implementations, and vendors;
- Computer networking architectures, implementations, and vendors;
- Application solution designs, implementations, and vendors;
- Outsourcing and in sourcing viability;
- Help Desk and problem management designs, implementations, and vendors.

These perspectives may differ based on specific environments, and they are not enough with the evolution role of the CIO. This evolution requires that the skills and professional experience of the role evolve from that of IT management specialist to that of a leader.

2.1. The leadership role of the CIO

The role of the CIO in both the public and private sectors is evolving, and a fundamental ingredient for this evolution is the leadership capability of the CIO. Leadership requires that a CIO develops key relationships that are important to delivering the mission of the IT organization.

For a CIO, we have seen an evolution in the expectations of the role to support the enterprise shift from infrastructure management to enterprise applications to governance to policy development to security to business transformation. This shift requires different skill sets and professional experiences of the CIO which place him in a leadership role in the organization (Figure 3).

Figure 3. Pathway to CIO leadership



Source: Behen D., Letchford J., Miller K., Nelson K., Decker B. (2011), *State CIO Leadership in Government Innovation and Transformation*, State CIO Leadership in Government Innovation and Transformation, NASCIO, p. 13

We can underline the following actions that can make the CIO to be viewed as a leader (Behen et al., 2011: p. 13):

- To be informed in all issues facing the state and Administration. The information should not be limited only to information technology issues;

- To communicate proactively regarding the status of issues and threats to delivery of government services (i.e., cyber security);
- To stay informed on how disruptive and enabling opportunities, technologies, solutions, and business models could help support and drive state priorities;
- To identify how IT can facilitate, enhance, or improve the core lines of the state's functions or processes;
- To develop personal relationships with critical decision makers in the Administration through visits, assistance to staff, sharing of information, and understanding their challenges;
- To encourage CIO staff to understand the critical issues of their peers and to give feedback on how IT could be of assistance;
- To assist with raising the awareness level of legislative staff with regard to technology;
- To know the budget, and the potential to deliver savings through efficiencies.
- To suggest how technology can drive efficiencies;
- To identify stakeholders, such as lobbyists, policy advisors, or agency chiefs of staff, who can help with education and awareness of the impact technology, can have within a state.

3. The CIO and the public administration

Public administrations, as a component of the public sector, are increasingly adopting Information Technology for internal processes and for the delivery of service to their citizens.

In a study of information system use in local public administration, it was estimated that computer support activities comprised more than 22% of full-time equivalent employees and consumed nearly 23% of total operating budgets. Across local public administrations, computers are used for more than 450 work applications (Brown, Brudney, 1998: pp. 421-442).

The most common applications supported by computers in local public administrations are related to housekeeping transactions such as utility billing, payroll, accounts payable, and accounts receivable. But administrative support systems (such as word processors and spreadsheets) are also widely used, and decision support systems are gaining in popularity (Brown, Brudney, 1998: pp. 421-442).

Public administrations throughout the world are facing issues relating to the modernization and reform of public management. Technology has underpinned reforms in many areas and eGovernment is widely perceived as fundamental to the reform, modernization and improvement of government.

The modernization in public administration does not stop with the functioning of the institutions of representative democracy. The modernization agenda of public administration goes deep in the way in which governments are able to respond to changing social, cultural and economic conditions and the ‘wicked’ policy problems which result from them (Bekkers et al., 2006: p. 9).

In these regards, the role of CIOs in local administrations is becoming increasingly important and more research about their actions and impacts is needed, not only from an academic perspective, but also for practical purposes. Currently, eGovernment initiatives require a high degree of specialization and knowledge about citizens’ needs and government procedures ⁽²⁾. A strong CIO, with well defined role and responsibilities, would help to make better decisions about the use of IT in public administration agencies (Figure 4).

Figure 4. Pairs of role of the CIO in public administration



Source: IBM, 2009: p. 3.

The IBM Institute for Business Value identified in a study three pairs of role that a CIO should have in public administration (IBM, 2009: p. 3):

- *Makes innovation real*

The innovation must have a strong foundation and it is not enough just to plan for innovation. To realize a real innovation the CIO should act as an Insightful Visionary, or as a Pragmatist.

- *Raises the ROI of IT*

The CIO must use IT to have an ongoing focus on efficiency, higher productivity, and working within budget. By doing this, it can act as a Savvy Value Creator, which finds new ways to help citizens, the organization, and government as a whole benefit from how data is used; or as the Relentless Cost Cutter, focused on managing budgets well, eliminate or reduce unnecessary costs.

- *Expands business impact*

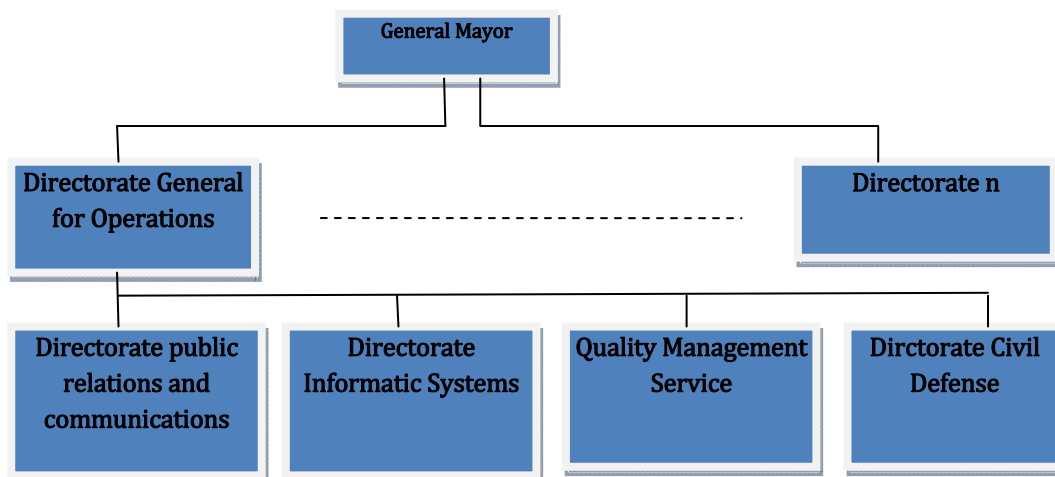
Government CIOs will engage with the enterprise as Collaborative Business Leaders, to drive new business initiatives and cultural shifts.

4. Case study: A CIO for the Municipality of Bucharest?

Currently the executive authorities of major European cities and not only these reconsider its organizational structure by creating the post of CIO in order to adopt a flexible behavior and open new mechanisms for implementing eGovernment initiatives.

Despite this trend, Bucharest City Hall (BCH) does not provide its own organizational chart with the position of CIO. They adopt a classic model in which the position is occupied by a director of a structural subdivision of the public administration mainly responsible with operational and not strategic attributions. Analyzing the Regulation of Organization and Functioning of the Bucharest City Hall, it can be observed that those powers are circumscribed to the Directorate General for Operations, so this area should ensure the implementation of the strategy of computerization of the local public administration of Bucharest, developed by the Information Systems Directorate subordinated to the DG Operations (Figure 5). Most tasks involved to DG Operations and to its subordinate structures are likely to provide technical support in the area of IT (IT procurement, hardware, software, training), but having the power to coordinate IT policies in the municipality of Bucharest

Figure 5. Extract from the Bucharest Organization City Hall



IT Background of the City of Bucharest

Bucharest City is Romania's first national urban center, this level being reached due to their status as state capital and by meeting certain conditions related to the number of inhabitants (over 2 million persons), land (approx. 365 sq km), services provided, etc.

This urban primacy is reflected in a number of indicators: the principal point of decision in the country; high concentration of the infrastructure of public services; it generates 20% of national GDP; best business city in Romania; about 10% of residents of the country are living in Bucharest etc.

▪ *IT Infrastructure*

In terms of IT, Bucharest has been continuously expanding its technological infrastructure since 1990, gradually causing a significant change in the information system of local government in Bucharest, especially after the launch of the Internet in 1995. Although it enjoyed a significant growth in terms of the IT infrastructure, the IT budget could not meet the needs of citizens, investors and other stakeholders. In addition, IT staff dedicated primarily to operational duties at the expense of strategic weakness reflected a weakening of the capacity of the city to keep up with innovations in IT.

▪ *Internet Presence and Internal Processes*

With regard to information resources, BCH has a large volume of data and information necessary to conduct their activities. Data and information of BCH, are now managed uniquely in the *IT Integrated System for Management Activities*, implemented by BCH between 2003-2005. It is a major information resource and the most efficient system implemented in the public administration in Romania. The main characteristics are:

- it contains 9 subsystems that integrate complex information;
- it covers all fields of BCH;
- it provides details for both BCH and employee activities to inform citizens;
- it includes 1100 workstations;
- it allows Internet access and electronic mail to all employees of BCH;
- it is filled constantly with new data and information from all areas of interest to local government of Bucharest.

The Website of the Municipality of Bucharest (Figure 6) was established in 1996 and contains relevant information about the activities of local authorities to ensure full transparency in decisions making process for the city. The database contains indexes and macroeconomic, social and infrastructure indicators, developed in the BCH and it provides statistical information compatible with European level, regarding the socio-economic situation and infrastructure Bucharest.

Figure 6. The official website of the Bucharest City Hall

Source: <http://www.pmb.ro/>

The first stage of the informatization strategy, conducted between 2003-2005, was to implement the IT Integrated System for Management Activities in BCH, an unique system that manages all types of data and information from the organization, that meet the requirements defined by any of the compartments of the city hall and provide correct, complete and timely information to decision makers. IT Integrated System for Management Activities coordinates and manages high volume and very diverse data and information, covering all fields of BCH and is used by all departments of the institution (General Mayor of Bucharest Report, 2013: p. 12).

During 2006, in the second phase, BCH began the implementation of the Strategy of *e-Bucharest – Integrated Information System for Public Administration and extended services for the citizens*.

Also in 2006, it started the implementation of the *Project Interactive Territorial System of citizen information*, whose main objectives targeted free access to a coherent information system, consistent and updated; active citizen participation in community activities; reduce the time for solving citizens' problems etc General Mayor of Bucharest Report, 2009: p. 9)

The adoption of the Law 544/2001 on free access to public information, to increase transparency of public institutions to strengthen democracy by

strengthening civil society control over their forced public authorities and institutions, local default publish on its website information about actions, processes undertaken and the resources employed. This development is particularly important in Bucharest whereas territorial internet access, in the year 2013 was more prevalent among households in the Bucharest-Ilfov (72.5% of households had Internet access at home), as well and connect to the Internet using devices (44.3%) (National Institute of Statistics, Press release, 2013: pp. 2-3).

The need to reduce the digital gap requires on the one hand, new online services and on the other hand, a flexible bureaucratic behavior of BCH.

In this regard, DG Operations was a key player in the development of on-line processes by promoting the use of international certifications, such as the Integrated Management System, re-certified by LRQA in 2010 (quality management system certification according to EN ISO 9001: 2008), (environmental management system certification new building according to EN ISO 14001: 2005) which contributed to the standardization of processes and development of these types of services. The impact of properly implementing the integrated management system was reflected in various organizational documents: plans, rules of organization and operation, regulatory documents, etc.

4.2. Leadership role of the local public administration CIO

The structured interviews with the IT staff and analysis of the responses obtained have clarified the main motivations for the creation of the CIO position in Bucharest, the CIO profile, skills required and scope of managerial responsibilities impact on the modernization work that authorities wishing to become collaborative, objective oriented to value and self-sustainable.

Related literature reveals the leadership that the CIO's need in order to coordinate the executive department IT staff, articulating solutions for different organizational structures (Almazan, Gil-Garcia, 2011: p. 3).

Faced with the challenges of a highly unstable socio-economic and political environment, with a significant decrease in resources, especially economic, BCH requires strong IT leadership goals, able to strengthen the link between authorities and citizens.

Understanding the role, importance and impact of ICT in the modernization of local government executives and political leaders, the municipality initiated a series of bilateral decentralized cooperations in which to launch joint initiatives (study tours, workshops, trainings, implementing IT programs etc.) thus providing opportunities to modernize the internal structures of BCH and thus redefining the role of IT departments⁽³⁾.

An analysis in various states of the different CIO models, shows that the fundamental ingredient for the introduction and evolution of the CIO in the organization is the leadership capability of the CIO. Leadership requires that a CIO develops key relationships that are important to delivering the mission of the IT organization (Relationship with Legislature/Legislators, Customers, Budget Officer, Secretary/Director) (National Association of State Chief Information Officers, 2013: p. 11).

CIOs need to be able to communicate the major view and mission, and effectively articulate what that means in terms of technology for stakeholders, and CIOs need to manage conflicts when they occur, while keeping to their core mission of operating an efficient and effective organization that supports the multitude of systems ensuring services continue to be provided to citizens (idem: p. 12).

Significant challenges of the future for the CIO could be the following: new responsibilities on strategic and management issues, IT portfolio management, IT investment management and risk assessment, Human capital management; a deeper understanding and intuitive grasp of corporate finance and accounting processes; a greater leadership role with a focus on shaping and creating a world economy fuelled by information (Lawry et al., 2007: pp. 58-2).

In the Municipality of Bucharest, along with the challenges mentioned above, it should be added:

- de-motivation of human resources and resistance to change;
- inconsistent IT vision between different levels of management, especially the lack of human and financial resources;
- change of the will of the deliberative General Council of the Municipality of Bucharest in accordance with political configuration change;
- the incomplete regulatory framework;
- the insufficient policy to eliminate the digital division;
- weak correlation of the municipal agenda with national agenda on eGovernment sphere.

Conclusions

Over time, the role of the IT function in local public administrations has been changing. Before the Internet era, the IT director was a technical staff member of the municipal government and her or his main function was to provide technical support and helpdesk services to users. Currently, the dynamic nature of the information economy has transformed the CIO into an important decision maker.

The role, responsibilities and importance of the CIO is directly linked with the public sector and with the difficult task to enact the required changes in this sector.

The importance of a CIO was also determinate by today's realities: the global economic crises and global issues have combined to compel unprecedented levels of change and collaboration.

This essential ingredient was related to the need for modernization in the public sector and the challenge to reform the public administration, in which the CIO was seen as a changing factor.

One of the important pillars of modernization of the Bucharest local public administration may be the introduction of the CIO position. Although that at the BCH level, there is an equivalent function of CIO, it has mostly operational and not strategic attributions.

The future CIOs must have responsibilities less focused on technical issues relating to technology improvement of BCH. The new responsibilities have to consider issues such as the development of innovative IT solutions, development of standards, promotion of regulatory framework, the implementation of new technologies, etc., in order to carry out the administrative mission in Bucharest.

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Notes

- ⁽¹⁾ Defined by the OECD as the use of information and communication technologies ICT (OECD 2003, p. 11).
- ⁽²⁾ The Planning Service, Strategy, Projects. It also sets out the objectives of computerization in service activities of the Municipality, together with decision makers in each of the other directions of BCH.
- ⁽³⁾ We underline the recent accession the Bucharest Municipality to the International Association *Major Cities of Europe- IT Users Group*.

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