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MANAGEMENT OF LABOR CONFLICTS IN PUBLIC HEALTH ORGANIZATIONS

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Abstract:

The paper treats a very important issue, of the present, with extensive and multiple implications for public health (Anderson, et al., 2005). The work can be considered as an interdisciplinary study justified by the following two arguments.

First, it is essential to applied research step, the knowledge and use of enshrined informational content in management literature, especially of models and mechanisms of managerial activity on the administration of human resources, managerial style, mobilization capacities, communication, coordination or decision ones and, not least the mechanisms characteristic to collective relations established between managers and employees. Second, it is required for the implementation phase of research findings, capitalization of an informational sphere of law field, specifically, labor law, because labor conflicts are based both on specific regulations of labor law and on a juridical literature, of great interest and of strict use for a concrete optimization of labor social relations.

Keywords: management, labor conflicts, public health organizations, manager, public health organizations.

JEL Classification: J40, J41, J50, J53, K31.

1. Introduction

The work highlights, as a work concentrating on labor conflicts management in public health organizations, the possibilities to improve the relations among the following three factors:

- management, understood as the formal ability of the leader to achieve performance in the organization's work with people;
- labor conflicts, i.e. conflicts between health professionals and public health organizations with which they concluded the individual employment contract, based on failure to resolve claims of professional, economic, social character or not giving rights that are based on labor law, labor collective contract or the individual employment contract;
- public healthcare organizations, defined as public institutions entirely financed from own revenues made under contracts with Social Health Insurance Houses. Without a doubt that the activity of all healthcare organizations is influenced by economic or social factors, but as resulting from the findings of this study, internal managerial factors have a determined role in preventing labor conflicts and, as a consequence, in optimizing psychological climate at work, thus ensuring a good quality of health services.

We found that healthcare organizations can feel a "management pressure" forcing inert systems and structures to become more flexible and to be concerned with the implementation of modern practices specific to management in healthcare organizations. In healthcare there must be exceeded the "necessity management" characterized by resorting to management only when crises or conflicts reach climax. It is true that we can learn something from crisis or conflicts, we draw conclusions, but the consequences of the unsolved crisis or failures of unsolved conflicts, in due time, are very costly (Bass and Avolio, 1990).

Organizational development and management in healthcare organizations is a productive orientation. Organizational development process requires common research approaches and particular needs of each health system hospital organizations. Research can provide decision-makers to materialize concrete conclusions and proposals which can ensure a better state of the system and a

psycho-socio-professional climate in hospitals that can prevent conflicts and optimize the relationship with beneficiaries.

Conclusions:

Knowing that the consolidation mechanism of an organizational culture, both managers and employees, react to internal or external events through the filter of some dominants crystallized in time, we decided the application of sociological survey made of written questions which will not disturb and will allow the same interpreting sense for all that there are questioned. The components of the culture that made the object of the present case study drawn from conclusions from other published researches by valuable authors and adapted to the realities of Romanian Healthcare Organizations, were the following: trusting climate, management of change, stressing environment, management of solving the claims and mentality doubled by daily behavior by which is characterized the working force in the hospitals.

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LOGISTIC OPTIMIZATION OF THE COMPLEX MANUFACTURING SYSTEM WITH PARALLEL PRODUCTION LINES

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Abstract:

The paper highlights the problem of mathematical modeling of a complex manufacturing system which is a potential synthetic representation of a real production environment. Production lines are parallel. Each production line consists of work stations which are placed serially along the predetermined trajectory. Each work station is equipped with the predefined tool used to manufacture the dedicated product. The system is controlled by means of heuristic algorithms to meet the manufacturing criteria. Equations of state illustrate the behavior of the system at every stage.

The paper shows basic characteristics of current manufacturing systems emphasizing models for further optimization and simulation processing. First of all, the general background related to this topic is given. The second part of the paper focuses on the specific manufacturing system and suggests the ways of optimizing it to meet the given criteria with the use of heuristic algorithms.

Keywords: manufacturing system, model, logistics, mathematical modelling, optimization, simulation, heuristic algorithms, manufacturing criteria.

JEL Classification: C20, C61, C63

1. Introduction

Manufacturing companies in the 21st century face unpredictable, high-frequency market changes driven by global competition. To stay competitive, companies must possess new types of manufacturing systems that are cost-effective and very responsive to all these market changes. In this context, increasing emphasis is put on the so called reconfigurable manufacturing systems (RMS) whose components are reconfigurable machines and reconfigurable controllers as well as methodologies for their systematic design and rapid ramp-up. They are the cornerstones of this new manufacturing paradigm (Koren, 1999). New manufacturing and production systems and requirements placed on them implement new approaches for their development, optimization and, in general, management. It is always necessary to take into account the purpose of the system to define its type and architecture. Other indispensable modeling elements to be considered are monitoring operations, optimization and simulation. The primary component of each model is, of course, its mathematical description enabling and facilitating the system optimization. In connection with the above, the main objective of the article is to present a concrete example of the optimization of the manufacturing system which consists of production lines which are arranged in a parallel way.

Conclusions

In fact, each manufacturing system must be modelled in an independent way based on autonomous assumptions. Software engineering is responsible for delivering the ready product in the form of a simulator imitating the discussed production activity. The specification is the first step and cannot fail the needs of the synthetic environment representing the real system. The following step is to carry out the modeling process. These two steps are mutually connected and lead to creating the software which, after a successful testing process, can be used to train operators of the potential manufacturing system.

The manufacturing system presented hereby requires the control approach which is based on heuristic algorithms to meet the stated criterion or criteria. The result of this publication is to lead to creating fully functional software which could ease a training process for operators of manufacturing systems similar in nature and minimize the period of time devoted to preparing the staff responsible for introducing a new set of products in a similar manufacturing environment.

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AN ANALYSIS OF INTERNAL MIGRATIONS ON THE BASIS OF PROVINCES IN TURKEY WITH THE PERFORMANCE INDICATORS: A SPATIAL PROBIT MODEL

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Abstract:

As a controversial topic in developed and developing countries, migration has been a dynamic field explained on the basis of cause and effect by economists. Migration is the movement of people from one settlement to another. In all countries, migration occurs as the result of economic, social, and political causes. In Turkey, the migration from east to the west mostly results from regional and provincial disparities. The advancement and industrialization of western provinces in comparison to the eastern provinces is deemed a critical factor in the rise of Turkey's internal wave of migration. As a result, it became necessary to analyze the migration-triggering factors on a provincial basis. In this study, determinants of the net migration level in the NUTS 3 level of 81 provinces in Turkey for the year 2000 have been estimated by using a spatial probit model. Findings demonstrate the positive and significant effects of industrialization, welfare, and human capital on the level of net migration. Another finding of this research is that there is spatial dependence between provinces.

Keywords: migration, internal migration, spatial econometrics, spatial probit models, Turkey, critical cut-off neighbourhood.

JEL: C31, C34, F22, R23

1. Introduction

Movement of people from one geographical territory to another is called migration. There are many causes of migration, including the economic, social, and cultural. Migrations are analyzed with respect to their causes in relevant literature, and there are some studies focusing on their effects.

In relevant literature, the migration phenomenon is treated within the framework of diversified approaches. A group of researchers has focused on migration decisions with respect to the return-costs approach; some have analyzed migration on the basis of push-pull approach, while others have concentrated on the qualifications of migrants by employing a selective approach.

In the present study, the first step has been to render a perspective on migration literature by providing information on internal migrations and migration approaches. Next, numerical analysis of migration figures between provinces in Turkey has been given, and determinants of internal migration have been tested by using a set of industrialization and development performance indicators. The empirical analysis for the 81 provinces at a NUTS 3 level by employing the Spatial Probit Model is provided.

Conclusion

Migration is described as the movement of people from one settlement to another, and migrations are studied under a set of classifications. Nonetheless, many literature studies dwell on causes and effects of internal and external migration. Labor is treated within the framework of different questions by regional and development economists. There is a wide scope of literature focusing on the triggering factors of migration, effects of push-pull factors, whether the qualifications of people affect their migration decisions, the way migration takes place, and effects of migration on the labor market. In the studies, these questions are treated according to return-costs, pull-push, and selective approaches. Contrary to the great number of studies on developed states and external migration, there are many studies focusing on the internal migration phenomenon in developing countries. Nonetheless, the internal migration phenomenon in Turkey has been the focal point of several studies.

In Turkey, the migration phenomenon started in the 1950s and gained impetus in the 1980s. The migration movement after the 1980s has mostly taken place from rural areas to the city and from city to city. Migration is bound to several factors including the economic, social, and cultural. Nevertheless, the intercity migration in Turkey is generally directed to developed and industrialized western provinces. It can thus reasonably be argued that one of the most salient economic causes of intercity migration is development disparities and inequalities between provinces.

In this paper, the determinants of interprovince migration have been analyzed with particular performance indicators by using the spatial probit model. These findings demonstrate that the variable IND indicating industrialization level, variable EDU indicating human capital, and variable ELEC indicating welfare level are positively effected by the level of net migration. Accordingly, industrialized provinces with high welfare levels that provide job opportunities for a qualified labor force, including higher numbers of small industry sites, receive higher levels of migration.

Parallel to the population rise in western provinces as a result of migration, there is an increased demand for public services, which inevitably introduces a set of problems. Within this vicious cycle, the spending directed to industrialized western provinces is also elevated. Toward the aim of mitigating migration and filling the disparity across provinces, it is necessary to turn unindustrialized and underdeveloped provinces into attraction centers. To achieve that objective, effects of push-pull factors causing intercity migration need to be removed and policies should be put into effect in a macro framework. The foremost objective in all envisaged state policies should consider the individual qualities of every single province, thus removing existing disparities between provinces.

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THE STUDY OF LOGISTIC PARKS IN THE CZECH REPUBLIC

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Abstract:

The article examines the representation and structure of logistic parks in the Czech Republic. Logistic parks in the article are complexes rented by park operators where more providers of logistics services perform their activities. A database of logistic parks has been created and analyzed by descriptive statistics and Pareto analysis methods. At the same time, two detailed case studies were carried out and information from secondary sources related to logistic real estate property was analyzed. It was found that there are many new logistic parks in the Czech Republic, whose launch was often facilitated by the state and more parks are under construction. The parks are exclusively privately owned and have a mixed structure of tenants (logistic firms and manufacturing companies). The providers of logistic services begin to prefer renting space in logistic parks to building and managing their own capacities. The following issues have been identified: the location of parks usually does not allow taking advantage of multimodality in transport, there are environmental constraints regarding the expansion of existing parks, and random method of tenant selection brings little support of synergy.

Key words: logistic park, logistic centre, supply chain, third party of logistics, logistic providers, multimodality.

JEL Classification: C83, D39, L87, L98, M19, O14, O18, R33, R58, R14

1. Introduction and objective of the article

This article was written as part of a research project focused on examining the trends of development of providers of complex logistic services. The development of activities of organizations providing complex logistic services is, among other things, dependent on the capacities and on the level of the logistic infrastructure in question, which also includes logistic parks.

The objective of this article is to map the character and representation of logistic parks in the Czech Republic, to assess the approaches to their building, to identify other anticipated trends and to formulate the questions for further research and practice.

When the topic of this article is elaborated, the initial part discusses the terminology regarding logistic parks and defines the theoretical requirements concerning the purpose of the parks. Once the research questions have been formulated, Paragraph 3 describes the methodology used for the conducted investigations, which combined the results of a statistical survey and two case studies with insights acquired from secondary sources. The results of the data analysis are presented in detail in Paragraph 4 and their synthesis is performed in the final part of this article, where the possible directions for further research are also formulated.

Conclusions

The conducted surveys lead to a conclusion that building numerous logistic parks in a relatively short period of time after 2000 has led to the creation of large capacities for logistic operations and has made the development of logistic service providers easier, including the introduction of modern logistics technologies. It is not insignificant that thousands of jobs have been created as well.

An important fact is that all the parks are private, although the start of many of them was facilitated by the state and territorial administration authorities. The occurrence of a public logistic park operating on the principle of Public-Private Partnership has not been recorded.

The discovered fact that both logistic and manufacturing companies are located in the parks, brings hope that there may be synergies in the supply chain, but research has indicated that the structure of the tenants in the same park is created quite randomly, which means the elements of synergy among the logistic companies, or between manufacturing and logistics firms are sporadic.

Uneven spatial distribution of the parks revealed by the analysis is partly due to limited available space in the densely populated Czech Republic. However, it can also be attributed to some misconceptions influenced by the actual needs of private investors. It seems that the needs to rationalize traffic flows in terms of larger areas were not sufficiently taken into account during the construction of parks. The construction of parks mainly in green fields has caused environmental burden to countryside.

Multimodal logistic parks are not represented in the Czech Republic. The park mentioned in case study no. 2 may become an exception. In some parks that are connected only to road transport, there is a possibility to consider the completion of a railway spur track; however, this solution may face significant territorial and financial limitations. For many supply chains, the absence of the connection of parks to railway transport may become a handicap if the pressure on the economic efficiency and the use of environmentally friendly types of transport is increasing. The question therefore is whether some tenants of existing parks won't leave in the future for that very reason.

The need to build more logistic parks in areas that will be carefully selected in order to support multimodality, to streamline the flows and to protect the inhabitants from the negative effects of traffic is expected to intensify. This is the reason why the challenge in such a situation is to join the forces of public resources and private investors so as to build public logistic parks funded and managed using the principle of Public-Private Partnership.

The authors of this article are aware of the limitations of the conclusions drawn from the study, as the range of logistic parks that have been identified was not complete and the depth of the analysis was limited by the available data. With regard to the dynamics of the business environment, it is also necessary to count with very limited validity of the findings in time. The interest in logistic parks and the tenant structure may change in the future, among other factors, depending on the overall economic development not only in the Czech Republic but also in the world.

It will be desirable to continue in the research of logistic parks. The directions we consider to be suitable for further research include searching for ways to enhance synergies in logistics through well-situated and well-occupied logistic parks. For this purpose, it would be appropriate to conduct a survey of public logistic parks abroad, and to identify good practices in this area.

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TECHNICAL EFFICIENCY OF TOP 50 WORLD BANKS

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Abstract:

This study investigated the relative technical efficiency of top 50 world banks in 2011. In particular, the overall technical efficiency, pure technical efficiency and scale inefficiency were estimated and the reasons of inefficiency were defined. We distinguished three main approaches in evaluating efficiency: production, intermediation and operational approach to find out, which banks were the most efficient. The average efficiency scores were evaluated separately on the “national” and “international” level. In case of “international” approach the average efficiency scores were calculated from data of all 50 banks. If “national” approach was applied the average efficiency scores were calculated from data of banks in four regions, determined by the world’s continents (America, Asia, Australia, and Europe).

The study concludes that almost all banks reported lower intermediation efficiency than the operating efficiency; the production efficiency was the lowest one. The results suggest that American and European banks were less efficient than Asian and Australian, which may be due to lingering financial crisis, which affected mainly the American and European financial market. In this study we also investigated the interaction between efficiency and other bank specific variables like total assets, indicators of profitability, intermediation ratio, etc. The results suggest that variables total assets and loan to deposit ratio were significantly positively, and variable cost to income ratio was significantly negatively related to the pure technical efficiency.

Keywords: bank efficiency, data envelopment analysis, top 50 world banks.

JEL Classification: C14, G21

1. Introduction

Efficiency of banks and other financial institutions is very frequently discussed topic in literature. Efficiency of banking system is one of the most important issues in the financial market as efficiency of banks can affect the stability of the banking industry and thus the effectiveness of whole monetary system. (Yilmaz, 2013)

Bank efficiency can be measured by different methods. The earliest techniques, used to measure efficiency through ratio analysis, which examined the financial statements of individual banks and compared them with benchmark. Now, there is also number of other methods for efficiency measuring. We can talk about the parametric and non-parametric methods, which employ different techniques to envelop a data set with different assumption for random noise and for the structure of production technology (Stavarek and Repkova, 2012). Parametric methods include the Stochastic Frontier Approach (SFA), Thick Frontier Approach (TFA) and Distribution Free Approach (DFA). These methods measure economic efficiency. Non-parametric methods include Data Envelopment Analysis (DEA) and the Free Disposal Hull (FDH) and measure technical efficiency of production units.

This study had three objectives. The first objective was to estimate the overall technical efficiency, pure technical efficiency, scale efficiency of top 50 commercial banks in the world and to identify the reasons of efficiency. For estimation of relative efficiency, non-parametric method of Data envelopment analysis (DEA) has been used. We evaluated relative technical efficiency of top 50 world banks in 2011. The Banker Database published list of top 50 world banks. The criterion for selecting the top 50 world banks was the value of Tier 1 capital. The second objective was to compare the average efficiency of banks in different regions. Since we know that averaging without any respect of size of banks causes loss of information, we implemented into analysis also sized-adjusted average efficiency to compare the average efficiency in different regions. The third objective was to define the input and output variables (strengths and weaknesses) that influence efficiency of evaluated banks, and to find out the factors (bank specific variables like total assets, profitability, rate of intermediation etc.) positively and negatively related to the pure technical efficiency. The strengths and weaknesses that

influence efficiency were defined through the values of weights calculated in the DEA models and regression analysis was used to explain the factors that were related to efficiency.

The structure of the paper is following. Section 2 presents review of literature about usage of DEA model in banking area; section 3 presents methodology; selection of variables and results of analysis are described in section 4; and the last section concludes the paper with summary of key findings.

Conclusion

In this study, efficiency of top 50 world banks was investigated using DEA. The highest level of average overall efficiency (CCR model) was obtained in case of operating approach; so we can say that the banks were the most efficient in management of costs and revenues. On the other hand average pure technical efficiency (BCC model) was highest under the intermediation approach, indicating the highest economic viability of banks. The average efficiency under production approach was the lowest one, in both CCR and BCC model, which means, that the banks achieved the lowest cost efficiency.

In case of production approach, efficiency was negative influence mainly by input “personal costs” and the output “total loans” positive influenced on efficiency. Under intermediation approach the efficiency was negative influence by input “fixed assets”; positive by output “total loans”. If the operating approach was applied the efficiency was negative affected by input “personal costs” and positive affected by output “interest income”.

It was found that that as the international frontier was divided into national frontiers, the average efficiency scores decline in case of American and European banks; and increased in case of Asian and Australian banks. On the “national” level almost all of banks reported lower intermediation efficiency than the operating efficiency; the production efficiency was the lowest one.

Regression was used to identify factors that influence efficiency. From the group of variables of bank size, profitability and rate of intermediation, only in case of three variables were found significant impact. It was found that variables total assets and loan to deposit ratio were significantly positively related, and variable cost to income ratio was significantly negatively related to the pure technical efficiency.

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FISCAL IMBALANCES AND CURRENT ACCOUNT ADJUSTMENTS IN THE EUROPEAN TRANSITION ECONOMIES

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Abstract

Origins and implications of twin deficits occurrence in a large scale of countries seems to be a center of rigorous empirical as well as theoretical investigation for decades. The reality of persisting fiscal and current account deficits became obvious in many advanced as well as advancing, emerging and low-income countries seemingly without a direct association with the phase of business cycle or trends in key fundamental indicators. European transition economies experienced current account deficits during the most of the pre-crisis period. Despite generally improved economic environment and high rates of economic growth it seems that countries with weaker nominal anchor experienced periods of persisting fiscal imbalances during the most of the pre-crisis period. Crises period affected both fiscal stance of government budgets and current account pre-crisis levels and trends in all countries from the group. As a result, leading path of both indicators significantly changed.

In the paper we analyze effects of fiscal policies on current accounts in the European transition economies. Our main objective is to investigate causal relationship between fiscal policy discretionary changes and associated current account adjustments. We identify large episodes of current account and fiscal policy changes to provide an in-depth insight into frequency as well as parallel occurrence of deteriorations (improvements) in current accounts and fiscal stance of government budgets. From employed VAR model we estimate responses of current accounts in each individual country to the cyclically adjusted primary balance shocks.

Keywords: fiscal imbalances, current account adjustments, economic crisis, vector autoregression, impulse-response function.

JEL Classification: C32, E62, F32, F41, H60

1. Introduction

Origins and implications of twin deficits occurrence in a large scale of countries seem to be a center of rigorous empirical as well as theoretical investigation for decades. The reality of persisting fiscal and current account deficits became obvious in many advanced as well as advancing, emerging and low-income countries seemingly without a direct association with the phase of business cycle or trends in key fundamental indicators. However, flows of capital resulted from excessive external imbalances followed by the periods of large current account deficits obviously strengthened intention of policy makers as well as academics to investigate the contribution of internal and external sources of current account imbalances to associated foreign debt accumulation.

European transition economies experienced periods of improved conditions for maintaining the overall macroeconomic stability during the last decade. Accelerated convergence toward western European countries associated with high real output growth rates implied increased intention to reduce excessive internal (fiscal deficit) and external imbalances (current account deficit) to maintain fast economic growth. Despite relatively high rates of growth in export performance, all countries from the group experienced current account deficits during the most of the pre-crisis period.

Fast economic growth, EU membership as well as euro adoption perspectives strengthened appreciation pressures on nominal exchange rates in all European transition economies but countries with pegged exchange rate arrangements (Bulgaria, Estonia, Latvia and Lithuania) (Stavarek, 2012). At the same time, real exchange rates in all countries from the group appreciated steadily despite adopted exchange rate arrangement while having relatively low negative interference with their export performance (Mirdala, 2013b). As a result, exchange rate leading paths seem to have just negligible negative effects on the current account determination in the European transition economies during the last decade.

Despite generally improved economic environment and high rates of economic growth, countries with weaker nominal anchor experienced periods of persisting fiscal imbalances during the

most of the pre-crisis period. As a result, sovereign debt accumulation in Czech republic, Hungary, Poland, Romania, Slovak republic and Slovenia resulted from persisting fiscal deficits. Contrary, in Bulgaria, Estonia, Latvia and Lithuania we have observed a significant improvement in the sovereign debt to GDP ratio followed by the periods of much more prudential fiscal discipline necessary to maintain a sustainability of tough exchange rate arrangement.

Crises period affected both fiscal stance of government budgets and current account pre-crisis levels and trends in all countries from the group. As a result, leading path of both indicators significantly changed. Negative implications of the economic and debt crisis revealed questions associated with disputable implications of fiscal incentives that seem to be contrary to the crucial need of the effective fiscal consolidation that is necessary to reduce excessive fiscal deficits and high sovereign debts. While the challenges addressed to the fiscal policy and its anti-cyclical potential rose steadily but not desperately since the beginning of the economic crisis, the call for fiscal consolidation became urgent almost immediately and this need significantly strengthen after the debt crisis contagion flooded Europe. Overall fiscal budgetary stance thus became determined by mutually contrary discretionary fiscal forces while remained affected by lagging recession. Economic crisis has also intensified redistributive effects (cross-country expenditure shifting) that provided quite diverse and thus spurious effects on current account adjustments. Immediately after the beginning of the crisis the current accounts temporary deteriorated (with quite differing intensity in each particular economy). However, we have soon observed a positive trend (either by improvement or stable outlook) in almost all countries reflecting intensified redistributive effects of the crisis on the cross-country expenditure shifting.

In the paper we analyze effects of fiscal policies on current accounts in the European transition economies. Our main objective is to investigate causal relationship between fiscal policy discretionary changes and associated current account adjustments. From employed VAR model we estimate responses of current accounts in each individual country to the cyclically adjusted primary balance shocks. To provide more rigorous insight into the problem of the current account adjustments according to discreet changes in fiscal policy associated with cyclically adjusted primary balance changes we estimate models for each particular country employing data for two subsequent periods 2000-2007 (pre-crisis period) and 2000-2012 (extended period). This approach should help us to examine specific features in the process of the current account determination according to the different overall macroeconomic conditions. We suggest that a comparison of the results for models with different time period is crucial to understand redistributive effects of the economic crisis in the view of changes in the cyclically adjusted primary balance determination capabilities in the group of ten countries from the past Eastern block.

Following the introduction, we provide brief overview of theoretical concepts referring to the relationship between fiscal policy changes and current account adjustments in Section 2. In Section 3 we provide an overview of the current empirical evidence about current account adjustments and fiscal policy stance. While the area of our research seems to be well documented in current empirical literature it seems that causal relationship between fiscal policy changes and associated current account adjustments are unclear or even puzzled. In Section 4 we observe main trends in fiscal imbalances and current account adjustments in the European transition economies and highlight some simplified stylized facts about investigated causal relationship. At the beginning of the Section 5 we summarize key methodological remarks to episodes of large current account and fiscal policy changes. Subsequent analysis of large current account and fiscal policy episodes provides an in-depth insight into frequency as well as parallel occurrence of deteriorations (improvements) in current accounts and fiscal stance of government budgets. In Section 6 we provide a brief overview of the VAR model (recursive Cholesky decomposition is employed to identify structural shocks) we employ to investigate responses of the current account to negative one standard deviation cyclically adjusted primary balance shocks. In Section 7 we discuss main results.

Conclusion

Current account adjustments revealed crucial implications of the continuously rising international economic and financial integration of this group of countries (increased indebtedness, lacking competitiveness, fiscal imbalances, foreign capital inflows, etc.), there seems to be still enough

room to investigate partial effects of dynamic changes in key current account determinants to observe associated current account adjustments.

Changes in the fiscal policy stance associated with changes in CAPB affected current accounts in the European transition economies. Despite some differences, we have observed similar trend in the leading paths of current accounts and savings-investments gaps clearly following main outcomes of an intertemporal approach. However, expenditure shifting effects associated with current account imbalances in each individual country do not seem to be determined solely by internal balance between savings and investments. Countries from the group of “peggers” experienced periods with generally higher discrepancies in CAPB and current account balances. However, the beginning of the crisis period clearly reduced these misalignments. In the group of “floaters” we examined persisting negative SI imbalances originated in excessive fiscal deficits.

Occurrence of episodes of large CAPB changes seems to be uniformly distributed across the whole period. Durability of continuous CAPB improvements is clearly higher in Baltic countries (with rigorous exchange rate anchoring) highlighting a commitment to conduct prudential fiscal policies necessary to maintain a sustainability of tough exchange rate arrangement. In countries with flexible exchange rate arrangements (“floaters”) we observed some sort of alteration in episodes of CAPB improvement and deterioration in the medium term period. All countries (except for Hungary) experienced large deteriorating episode at the beginning of the crisis period followed by improving episode (except for Poland) with differing lag revealing a crucial need of a fiscal consolidation. Large CAPB improvements and deteriorations revealed significant responsiveness of large current account adjustments to the fiscal incentives (0.65+) in the whole group of countries. The ratio is slightly higher for CAPB deteriorating episodes.

Regression results indicate that a decrease in CAPB at 1 percent point caused current account deterioration at a range of 0.05-0.26 percent points for model A (2000-2007) and 0.07-0.2 percent points for model B (2000-2012). However, the current account interference to CAPB changes seems to be lowest in big and low performing countries, followed by the group of “floaters” and then “peggers”. Crisis period reduced exposure of external imbalances to CAPB changes resulted in decreased regression coefficients in all countries.

Results of impulse-response functions revealed some differences in responses of current accounts in each country to the negative one standard deviation CAPB shock. While big and low performing economies experienced slow and less intensive current account deterioration, “peggers” experienced less dynamic current account deterioration low smaller durability and “floaters” experienced more dynamic and more durable current account deterioration. Crisis period slightly changed short-term response patterns in all countries. Durability of the current account deterioration in big and low performing economies together with “peggers” slightly increased while immediate response increased in both groups of countries with pegged and flexible exchange rate arrangements. Despite euro adoption in Slovenia (2007) and Slovak republic (2009), regression results as well as impulse-response functions do not provide any empirical evidence about similar patterns comparable with the results for countries in the group of “peggers” in model for extended period.

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OPTIMIZATION OF TAX LOADING ON THE ECONOMY AS THE MAIN DIRECTION OF TAX POLICY IMPROVEMENT OF THE COUNTRY

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Abstract:

The approaches to the definition of the concept "tax loading" have been discussed in the article. The evaluation of widely used methods of tax loading calculation on macrolevel has been performed. The level of this index throughout Ukraine and in the light of some taxes and collections has been analysed. The estimation and comparison of calculation results in accordance to social and economic development of the country have been conducted. The dynamics of this development has been analysed in comparison with the same indices of the developed countries of the world. The expediency of the optimization of tax loading level of domestic economy has been argued. The main problems on the way to the optimization of tax loading and possible ways of their solution have been indicated. Special attention has been paid to the policy of tax benefits and preferences as the main direction of stimulation of the economic development of the country.

Key words: tax loading, economic activity, tax coefficient, effective tax rate, economic entity, financial provision.

JEL Classification: E 62, H 21, H 22, H 26

1. Introduction

The development of domestic economy is impossible without formation and realization of an effective tax policy. Taxes have a strong influence on the tempos and proportions of social and economical development of the country. They stimulate business and innovative and investing activity of the country and facilitate the increase of factors of production and employment. Conducting tax policy the state should keep to the optimal level of tax loading by means of effective combination of the indices of some taxes and collections and general harmonization of the structure of tax system. Tax loading index helps to determine the real fiscal influence of tax system on the economy of the country. Nowadays we can observe the situation when exceeding tax loading has a bad influence on the economic growth of Ukraine. Tax loading facilitates the decrease of entrepreneurial activity, destroys favourable market environment, raises the shadow sector of the economy and causes crisis effects in the society. This is the reason to ground such level of tax loading which will correspond to the present-day social and economic situation in Ukraine. Thus, the importance and insufficient investigation of the problem define the choice of the theme of research and prove its actuality in present-day conditions.

Conclusions

Summarising the results of conducted investigation it should be noted that the level of tax loading in Ukraine is more moderate than in developed countries of the world while the mechanism of administration of taxes and collections is much more complicated. However, some scientists consider that a real level of tax loading is much higher and it has a bad influence on the economy of the country and causes social tension in the society. The problem of the equality and proportionality of the apportionment of tax pressure among tax payers is still unsolved.

The main task of officials, experts and scientists is to balance the tax loading level through offering benefits and preferences which would stimulate the economy of the country and will not cause aggravation of the problem of relocating tax loading from one tax payer to another. This problem can be solved by means of improving the mechanisms of tax administration since the expenses for the management of tax payments are not always grounded within the period they were spent. The solution as to the offering benefits should be taken on the account of the sphere of tax payer activity; i. e. the benefits should be given mainly to the investment and innovational enterprises to attract investors to concrete regions or branches of the economy which are not interesting for running entrepreneurial business under the regime of general system of taxation. It is necessary to emphasize

that one of the most important ways of the optimization of tax pressure on payers is efficient policy of tax planning. It helps the economic entities to regulate the level of tax loading independently and legally by means of their own method of tax loading estimation and analysis of taxes which have to be paid.

The vital tasks on the way to the optimization of tax loading in Ukraine are the following:

- legislative improvement of the system of tax control with the aim of creating conditions which make tax and collections evasion impossible;
- regulation of taxation and accounting systems.

The tasks determine the urgency of the theme of investigation and emphasize the necessity of conducting further research in this direction.

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THE PLACE AND ROLE OF SMALL AND MEDIUM SIZE ENTERPRISE'S IN THE ROMANIAN ECONOMY. BASE FOR EFFICIENT USE OF RESOURCES

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Abstract:

For large firms, SMEs are the world from which they have come and where their future competition will arise. For individuals, SMEs are often a first job, the first step in their careers. They are also a first step towards the world of entrepreneurs. For the whole economy, SMEs are launchers of new ideas and new assembly processes that accelerate growth based on a more efficient use of resources.

Firms will not be able to capitalize on the advantages arising from the internationalization will not keep within the limits of economic efficiency and default, will come out of the international economic relations. It is for this reason that, any undertaking, regardless of its size, must master the costs and revenues.

Keywords: SME, economic and financial crisis, opportunities providers, business environment, market economy.

JEL Classification: M12, M54, J53

1. Introduction

Events that occurred 20 years ago in Romania as in other Central and Eastern European countries have caused evolution of two components, namely: the transfer of ownership of enterprises from state to private persons and the emergence of new private enterprises following independent private initiatives.

The two paths of development occurred more or less simultaneously and at different speeds, both having repercussions on the labor market. Thus, while privatization has reduced the number of jobs, boosting unemployment, private sector induced an opposite effect, creating new jobs.

Analyzing characteristics of the Romanian economy, according to data provided by the NSI and Eurostat, note that they tend to approach those of a functioning market economy.

SMEs have become increasingly important in our society as providers of employment opportunities and key elements for the welfare of local and regional communities.

Conclusions

In our opinion, given constant change of a changing economic environment, SMEs are flexible and possess a great capacity for adaptation, facilitated by the small size and rapid decision making process. They easily adapt to the needs and demands of consumers, being closer to the market.

Growing economies, whose demand is increasing or at least stabilized, help the SMEs to maintain or develop their business. On the other hand, increasing the real added value is a combined result of increased employment and real productivity, contribution of the first factor is clearly dominant. If an economy is strong in terms of high-tech and medium industry and services based on intensive use of knowledge, this is also a positive factor. Reducing employment in SMEs in Member States with above features was also more modest than in SMEs in other Member States.

In the same time, we note that in the economic environment in our country which is still hostile, in 2012 it has been felt a rising trend of development characterized by achieving the highest levels of performance indicators. Although SMEs face difficulties in the current economic and financial crisis context, from the above it results that they will remain at the forefront of economic development in the future.

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INTERBANK INTEREST RATE TRANSMISSION IN THE BALTIC COUNTRIES

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Abstract:

Integration process, harmonisation of bank legislation and mutual economic interdependence among European countries contribute to similar evolution of several financial indicators in the European Union. Current financial and economic crisis has revealed that some indicators evolved similarly only in short run and their symmetry among countries was not justified. This was the case of e.g. bond interest rates. However, we supposed that interbank interest rates reflected mutual transmission among the Baltic countries and the European Union in long run. We wondered whether this symmetry was not shattered by the recent financial and crisis. This assumption has not been confirmed using the vector error correction model. Our results show that interbank interest rates transmission was maintained even during the crisis. In addition, this transmission in the Baltic countries was significant also due to fixed exchange rate regimes which they applied. The paper was elaborated within the project VEGA 1/0973/11.

Keywords: interbank interest rate, transmission, vector error correction model, the Baltic countries

JEL Classification: E43, G15

1. Introduction

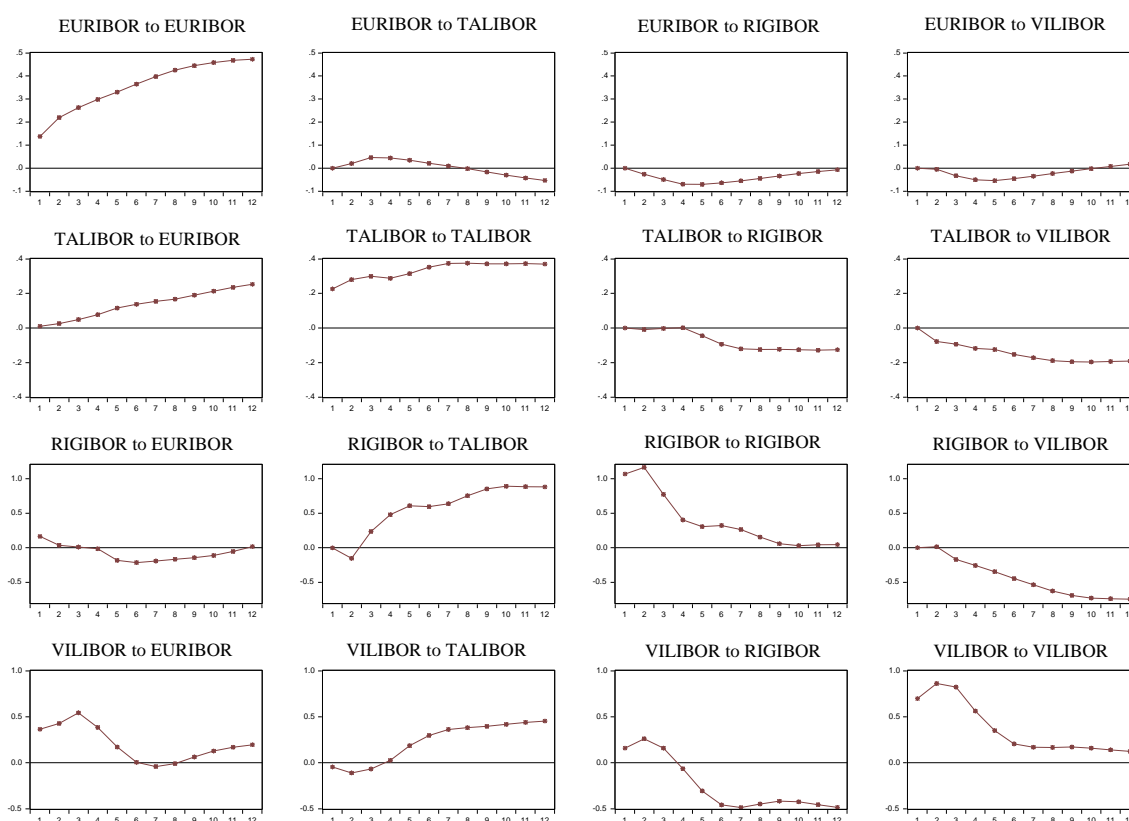
The monetary policy is based on several transmission mechanisms by which changes in the settings of monetary policy instruments lead to targeted macroeconomic result (the most often inflation). The first step in the transmission mechanism is a change of the monetary policy instrument setting. This implies a change in the intermediary objectives, e.g. in banking markets. The change in these markets in turn leads to modifications in the field of final goals such as inflation. The transmission mechanism acts through several channels simultaneously. Here, we will focus on the interest rate channel of the transmission mechanism. An increase or decrease in a base rate leads first to an increase or decrease of interest rates in interbank markets. This in turn motivates banks to raise or lower their rates on credits and deposits. Changed interest rates will restrain or stimulate investments, aggregate demand and will finally weaken or strengthen inflation pressures. Consequently, the reaction of interbank rates to monetary policy base rate is very important for final objective result.

However, we suppose that interbank interest rates do not respond only to monetary policy measurements in a given country but react also to interbank rates in foreign countries. This interdependence among interbank rates is influenced by international synchronisation of business cycles, by integration process at macroeconomic level, by harmonisation of financial market and banking legislation, by capital interconnection of banking sector throughout the European Monetary Union and the world as a whole. Therefore we can observe certain symmetry of interest rates evolution in financial markets. However, some symmetry does not have to be justified by economic fundamentals and is rather implied by political background or other shocks (Ďurčová, 2012). This is the case of bond interest rates in the European Union. Debt and financial crisis revealed that their setting at almost the same level from 1998 to 2008 was incorrect (Micossi, 2012).

Our research takes into account interest rate theories summarised e.g. by Revenda (2005) or Polouček (2010). It respects principles of Dornbush model (Dornbush, 1976) according to which nominal variables, such as interest and exchange rates, respond more quickly to money supply than prices and wages. The relationship between interest rates is studied by several authors. Arghyrou *et al.* (2009) study real interest rate convergence in the European countries. Heryán and Stavárek (2010) observe relationship between interbank interest rates and corporate loan rates in the European Union. Applied cointegration methodology and Granger causality testing detect different relations in

particular countries. Frankel *et al.* (2004) explore impact of exchange rate regime on sensitivity of local interest rates to international ones. They apply dynamic estimation on the large sample of developing and industrialised economies during 1970-1999. In the long run they cannot reject an evident transmission of international interest rates. Their results show that interest rates of the countries with rather flexible regimes respond more slowly to changes in international rates.

Objective of the paper is to analyse behaviour of interbank interest rates in the Baltic countries (i.e. Estonia, Latvia and Lithuania), their mutual interdependence and response to the European Monetary Union interbank interest rate EURIBOR. We assume that EURIBOR has a key role in the Baltic countries due to important bank capital and external trade flows from the euro area to this region (Borys and Zemčík, 2011) and due to gradual integration process. In addition, the three Baltic economies have been applying rather fixed pegs (Nenovsky, 2009). Estonia and Lithuania have been applying currency board regime since 1992 and 1994 respectively. Estonia adopted euro in 2011. Latvia implemented fixed peg depending on SDR (special drawing rights) from 1994 to 2005. Since 2005, Latvia has been preparing to euro adoption within the ERM II (European exchange rate mechanism) which will be introduced in January 2014. According to the research carried out by Frankel *et al.* (2004), international interest rates transmission to local ones should be significant and quick in these countries due to their fixed peg regimes. Our objective is to verify this assumption through the vector error correction model, variance decomposition and impulse-response functions estimation.



Source: Own calculations

Figure 2 - Impulse-response functions

Impulse-response functions confirm the fact that EURIBOR is the most independent interbank rate within researched rates. The response of EURIBOR to Baltic interbank rates (first row, Figure 2) is negligible. Furthermore, results show that RIGIBOR loses its independence and becomes more implied by TALIBOR. Resembling evolution is in the case of VILIBOR. In general, impulse-response functions indicate the interdependence among interbank rates of all three Baltic countries (see columns 2 - 4 and corresponding rows 2 - 4, Figure 2).

Comparing to our previous research (Siničáková, Šulíková, Árvayová, 2013) and Árvayová (2013) focusing on interbank interest rate transmission in the Visegrad countries (Czech Republic,

Hungary, Poland and Slovakia), interdependence in the case of the Baltic countries and the euro area seems to be more significant and quicker. Consequently, results of international interest rate transmission in the Baltic countries are in line with findings by Frankel *et al.* (2004) that local interest rates are more sensitive to international ones if fixed peg is applied. The more exchange rates are fixed, the more local interest rates are sensitive. Interest rates in Estonia (i.e. TALIBOR) and those in Lithuania (i.e. VILIBOR) reacted more flexibly to EURIBOR fluctuation as interbank rates in Latvia which has been applying less fixed regime comparing to its neighbouring countries (see Table 5 and Figure 2).

Generally speaking, similar phenomenon as in the bond interest rate market appears in interbank interest rate. Economies and their macroeconomic indicators have tendency to converge in the times of prosperity. However, many indicators have divergent trends in the period of crisis (Horváth *et al.*, 2013 and Mirdala, 2012). Our previous observations focusing on the Visegrad countries (Siničáková *et al.*, 2013 and Árvayová, 2013) are in line with these findings. The Visegrad interbank interest rates are significantly influenced by EURIBOR evolution. Relevant investors in financial markets including banking markets, take the European Union as comparatively homogeneous region during times of prosperity. Yet, during the crisis, investors and so do interest rates, behave rather independently and in respect to actual economic situation in a particular country.

Nevertheless, situation in the Baltic countries is quite different. Convergence of their interbank interest rates has not been shattered by recent financial and economic crisis. Interbank interest rate evolution in the Baltic countries is obviously symmetric with EURIBOR. The transmission is quite strong due to fixed peg and currency board regimes in these countries. Nominal convergence has been priority of the Baltic economies as they have been planning their integration into the European Monetary Union for long time. Nominal goals were often maintained at the expense of real indicators. The three countries experienced very important fall of economic output and employment in 2009. Their remarkable economic growth of 5.4% in Estonia, 12.5% in Latvia and 9.6% in Lithuania in 2008 dropped to -1.4%, -1.6% and -3.4% in 2009 (Eurostat, 2013). However they managed to maintain exchange rate stability with euro and symmetric evolution of their interbank rates with EURIBOR.

As interbank interest rate evolution has been converging with EURIBOR at least for last decade, exchange rate is fixed to euro, the three countries are small and open economies highly dependent on the euro area trade; introduction of euro and application of EURIBOR in these countries seems to be from our point of view a reasonable solution.

5. Conclusion

Interbank interest rates evolution in the Baltic countries reflects quite significant level of mutual interdependencies. This phenomenon is obvious not only in the pre-crisis period but even during crisis. Crises, in general, stress differences and particularities among countries. Thus, evolution of economic variables such as interest rates differs in a more visible way. Nevertheless, variance decomposition approach detects rather important impact of EURIBOR on the Baltic interbank interest rates even during crisis. Effect of exchange rate regimes on interest rate transmission seems to be very significant. The Baltic countries applied fixed pegs eventually currency board regime which is also rather fixed exchange regime. Sensitivity of their interbank interest rates to international rates is therefore higher than in the case of countries with more flexible exchange rates.

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FIRST STEPS OF JAVA-BASED SIMULATION FOR DECISION SUPPORT SYSTEM OF BUSINESS COMPANIES

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Abstract:

The motivation of this paper was to model and to implement an innovative approach to simulate the trading processes of a virtual business company. Agent-based methods together with the Java development platform are used to implement a multi-agent system to serve as a simulation framework. The framework should be a basic part of a decision support system operating in the integration with real system of a company (e.g. ERP system) to investigate and to predict chosen business metrics of a company. This will ensure the management of a company to work with the simulation possibilities of this framework and to support their decision-making processes. The paper firstly introduces some of the existing theories about consumer behavior and the types of factors influencing it. Secondly, characterizes multi-agent model of a virtual company, the agents participating in the trading processes, and the production function. Finally, the simulation results and their validation are described. To conclude, the proposed approach to the simulation of trading processes in an agent-based model could properly contribute to better decision-making process.

Keywords: system modeling, agent, business company, multi-agent systems, negotiation, decision support, trading processes.

JEL Classification: C63; C81; C92; D12; D22

1. Introduction

In the contemporary, dynamic, global and competitive market environment, consumer behavior depends on many different types of factors, which are difficult to grasp. With personal and social factors deals e.g. Enis (1974), with physical factors deals, e.g. McCarthy and Perreault (1993). More complex view on the social, economic, geography and culture factors gave Keegan *et al.* (1992). Schiffman (2007) brought marketing mix and environment into the types of factors mentioned herein above. Previous discussions have so far either relied on an objectivist (complete information of customers, constant decision mechanism, constant consumer preferences) or a constructivist view (consumption discourses, consumption as a crucial aspect in the construction of identity). However, both have failed to integrate the consumers' interactions with their social behavior and physical environment as well as the materiality of consumption (Gregson *et al.* 2002, Jackson *et al.* 2006). The complexity of the factors influencing consumer behavior and their changes in the time shows relations between external stimuli, consumer's features, the course of decision-making process and reaction expressed in his choices. As a result, the investigation of consumer behavior seems to be too complicated for traditional analytical approaches (Forrester 1971, Challet and Krause, 2006).

Agent-based modeling and simulation (ABMS) provides some opportunities and benefits resulting from using multi-agent systems as a platform for simulations with the aim to investigate the consumers' behavior and trading processes (Spišák and Šperka 2011, Šperka 2012). Agent-based models are able to integrate individually differentiated types of consumer behavior. They are characterized by a distributed control and data organisation, which enables to represent complex decision processes with only few specifications. In the recent past there were published many scientific works in this area. They concern in the analysis of companies positioning and the impact on the consumer behavior (e.g. Tay and Lusch 2002, Wilkinson and Young 2002, Casti 1997). Often discussed is the reception of the product by the market (Goldenberg *et al.* 2010, Heath *et al.* 2009), innovation diffusion (Rahmandad and Sterman 2008, Shaikh *et al.* 2005, Toubia *et al.* 2008). More general deliberations on the ABMS in the investigating of consumer behavior shows e.g. (Adjali *et al.* 2005, Ben 2002, Collings *et al.* 1999).

The approach introduced in this paper uses an agent-based model in the form of multi-agent system to serve as a simulation platform for the seller-customer negotiation in a virtual trading company. The overall idea comes from the research of Barnett (2003). He proposed the integration of the real system models with the management models to work together in real-time. The real system (e.g. ERP system) outputs proceed to the management system (e.g. simulation framework) to be used to investigate and to predict important company's results (metrics). Actual and simulated metrics are compared and evaluated in a management model that identifies the steps to take to respond in a manner that drives the system metrics towards their desired values. We used a generic control loop model of a company (Wolf 2006) and implemented multi-agent simulation framework, which represents the management system. This task was rather complex, therefore we took only a part of the model – trading processes and the negotiation of seller and customer.

The work described in this paper aims at proposing an approach to describe the customer behavior in the trading processes of a virtual company. Implemented simulation framework will be a basic part of a future management system simulating business metrics – key performance indicators (KPIs) of a real company's system. The paper is structured as follows. In the section 2 the multi-agent model is described. In the section 3 the seller-customer negotiation is introduced. The core of this section is the production function definition. The simulation results are presented in section 4.

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CONSTRUCTING ABATEMENT COST CURVES FOR F-GASES

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Abstract

Scientific research on Greenhouse Gases (GHG) focuses mainly on CO₂ emissions. But non-CO₂ gases (mainly F-gases in the form of HFCs, PFCs, SF₆) are more potent at trapping heat within the atmosphere. Currently, F-gases constitute a small proportion of GHG emissions but they are extremely high Global Warming Potential gases with very high atmospheric lifetimes. They are also expected to increase massively due to expansion of some emitting industries. This study constructs the least-cost curve of F-gases control for the EU-27 and for the year 2020. It seems more cost-effective to abate SF₆ first, then PFCs and then control HFCs.

Keywords: F-gases, control methods, emissions, GWP.

JEL Classification: Q00, Q01, Q53, L52; L95.

1. Introduction

Greenhouse gases (GHGs) include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and a number of high Global Warming Potential gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), also known as F-gases. The Kyoto Protocol regulates all these GHGs. CO₂ emissions from the burning of fossil fuels and the change in the use of human land may be considered as the most important anthropogenic effect. The rest of the GHGs (the non-CO₂ gases) are also important. Methane and nitrous oxide are naturally present in the atmosphere while the F-gases are industrial gases. The F-gases are used as substitutes for the Ozone Depleting Substances (ODS, chlorofluorocarbons CFCs and hydrochlorofluorocarbons HCFCs) that were going to be phased out under the Montreal Protocol. They are also used and emitted from a number of industrial sources like the use of PFCs in aluminium smelting or in semiconductor manufacture or the use of SF₆ as an insulating gas in various electrical systems.

The full set of fluorinated gases (CFC, PCFC, HFC, PFC, SF₆) comprised almost 25% of the added anthropogenic radiative forcing of the climate in 1980 and 1990 (IPCC, 1990). The main responsibility for this percentage may be attributed to the chemically related anthropogenic gases CFCs and PCFCs. Due to their depleting influence on stratospheric ozone, CFCs and PCFCs were regulated, as mentioned, by the Montreal Protocol but were not considered in the Kyoto Protocol.

The majority of scientific research concerns CO₂ emissions, although non-CO₂ gases, especially F-gases, are more potent at trapping heat within the atmosphere. F-gases are expected to rise quickly due to the rapid expansion of some emitting industries such as semiconductor manufacture and magnesium production, and the replacement of ODSs (CFCs and HCFCs) with HFCs in various applications like air-conditioning, fire fighting, foams, refrigeration, solvents and aerosols. Moreover, the atmospheric lifetimes of PFCs and SF₆ are very long, ranging from 3200 years for SF₆ to 50000 years for CF₄ (Schaefer *et al.*, 2006). For these reasons, F-gases are considered extremely harmful for the environment, so they have been included in the Kyoto-Protocol.

Even if F-gases constitute only a small fraction of present GHG emissions they are responsible for a more considerable amount of climate degradation, compared to other GHGs, because of their high Global Warming Potentials^[1] (GWPs), which range from 140 for HFC-152a to 23900 for SF₆. The marginal costs of achieving reduction of high-GWP gases, such as F-gases, are less than achieving reductions of CO₂ gases. According to several studies, the inclusion of the abatement of non-CO₂ GHGs, reduces dramatically the overall implementation cost of the Kyoto Protocol (Reilly *et al.*, 1999, 2000, 2006; Jensen and Thelle, 2001).

The purpose of this study is the construction of the F-gases control cost curve for the year 2020 and for the EU-27. The structure is as follows. Section 2 reviews the existing relative efforts of research and academic institutions on constructing abatement cost curves for F-gases. Section 3

explains the estimation of F-gases emissions by activity and sector. Section 4 derives the stepwise abatement cost curve in the case of F-gases. The last section concludes this¹.

Concluding remarks and limitations

In abating F-gases, it is found as more cost-effective to start abating SF₆ gases first, then moving to PFCs and then applying control methods to HFCs. Important activities emitting F-gases in 2020 are air conditioning and refrigerator sectors and aluminium industry. More than 20 abatement options to mitigate F-gases and their costs were presented. The existing results show average cost per ton CO₂ controlled using these methods to range from 0.11 to 50 €/t CO₂ eq. Half of these options have cost below 15 €/t CO₂ eq.

The policy implications are interesting. Concerning domestic refrigeration attention must be given to the improvement of recovery efficiency for old equipments containing still HFC-134a instead of isobutane (HC-600a) or propane (HC-290). Better recovery to prevent emissions at the end of life stage is necessary. In industrial refrigeration, leak detectors are important in order to reduce emissions by leakages while regular service inspections are required. Ammonia (R-717) is used as refrigerant in large installations worldwide while CO₂ can be used as a secondary refrigerant and it can also be used in applications with evaporation temperatures down to -52° C and up to 5° C (Rhiemeier and Harnisch, 2009).

In stationary A/C improvement in the design and installation of systems, maintenance and repairing of systems, refrigerant recovery during servicing, recycling of recovered refrigerants are some of the ways to reduce leakages. In mobile A/C inspections are important. For PU foams a main mitigation option is the use of hydrocarbons instead of HFCs.

In the case of sulphur hexafluoride emission abatement the main control methods are improved recovery, minimization of leakages and optimal use. In the case of the manufacture and use of GIS, the main control methods are proper design, gas recovery, re-use and training of personnel handling SF₆.

At last, it is worth mentioning that, as in any environmental problem, we may expect synergies to be present in the case of F-gases mitigation. Tohka (2005) claims that using alternative refrigerants may increase electricity use in some sectors like commercial, industry and air-conditioning. At the same time, mobile air-conditioning increases both HFCs emissions and fuel consumption leading to more emissions of other gases too. Primary aluminium production is also associated with particulate matter (PM) emissions and its abatement will also influence PM emissions (Klimont *et al.*, 2002). Finally, mitigation of PFC emissions influences also CO₂ emissions.

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¹ An earlier draft of this study was presented in the Workshop on Abatement Costs of Chemicals at the European Chemical Agency Conference Centre in Helsinki Finland 5-6 October 2010 organized by the European Chemicals Agency (ECHA).

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The 6th Online International Conference on „Advanced Researches in Management, Finance and Accounting” Craiova, Romania, 22th November, 2013

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