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Editorial Office:
ASECU, University of Macedonia
156 Egnatia Str., 546 36 Thessaloniki, Greece
tel: +30 2310 891 793, fax: +30 2310 891 748
e-mail: asecu@uom.edu.gr
web site: http://www.asecu.gr

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INTANGIBLE CAPITAL IN A TRANSITION ECONOMY- IMPROVEMENTS AND CONSTRAINTS: AN ANALYSIS OF SERBIAN FIRMS

BOŽIDAR CEROVIĆ*
SANJA MITIĆ
ALEKSANDRA NOJKOVIĆ
University of Belgrade, Serbia

Abstract
During the 1990s Serbian economy stayed on the margin of major investment flows, technology progress and businesses in international markets. In view of the deficiency in capital except for some FDI, we analyse to what extent Serbian economy can develop some other resources, such as human capital, internal relations, management and marketing skills, innovations and other fields perceived as intangible capital elements. Analysing a total of 71 firms we attempt to identify whether the role of intangible assets was recognised within the firms and – according to the results obtained – to recommend some policy measures. The paper addresses three major issues: (i) human capital accumulation including internal relations, (ii) external relations, as well as (iii) innovation, R&D and competencies.

JEL Classification: P31, O31, M53, J50
Keywords: Intangible Capital, Internal Relations, Innovation, R&D, Serbian Economy

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**Corresponding Author:* Prof. Božidar Cerović, University of Belgrade, Faculty of Economics, Kamenicka 6, 11000 Beograd, Serbia. e-mail: cerovi@ekof.bg.ac.rs

1. Introduction

In this paper we are presenting an overview of some basic findings from broader research aimed at defining the role of intangible capital as a factor of firms' competitiveness in Serbian economy. Our main objective is to identify to what extent the notion of intangible capital is recognised in an economy that has gone through profound though delayed institutional changes on its way to a market economy. We start from the premise that some aspects of intangible capital could be an available resource even when there is a lack of financial means and a lower level of investments in physical capital, both specific characteristics of a transition economy. Since the importance of intangible capital has been broadly studied in literature[1], followed by ample empirical evidence concerning its positive impact on firms' performance[2], we find that under certain conditions it can become an important source of competitiveness in transition economies. However, it seems that this idea is still at a rudimentary level due to various constraints identified. Based on the survey responses we shall also attempt to identify to what extent FDI inflows and foreign owned companies could give local firms an incentive to invest in intangibles, what FDI spillovers could be expected in the sector of intangibles and to what extent an export led growth model –until recently rather neglected in transition economies– could help accelerate adoption of contemporary management practices, relational and social capital growth and R&D development.

The paper is structured in nine sections. After the introduction, we present the principal methodology of our research that is based upon a survey of a sample of 71 Serbian firms (section 2). In section 3 we deal with human capital, in particular with upgrading employees' skills and competences. Section 4 is devoted to internal relations within the firms analysed in the context of (i) decision making, (ii) position of labour and (iii) effects on workers' loyalty and satisfaction. Section 5 deals with external relations and includes relationships with (i) business buyers, (ii) consumers, (iii) competitors and (iv) suppliers. In sections 6, 7 and 8 we analyse investments in innovation, research and development (R&D) and competences. Finally, in section 9 we summarise our findings and offer some policy advice that could foster investments in intangible capital in the country.

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1. See e.g. Johanson *et al.*, (2001); Lev, (2001, 2005); Lev and Zambon, (2003); Corrado *et al.*, (2006, 2009); Perrini and Vurro, (2010), Conlon *et al.*, (2012).
2. See for emerging economies: Indonesia (Hidayati *et al.*,2012), Taiwan (Tseng and Goo 2005), Albania (Prasnikar, *et al.* 2012), Slovenia (Prasnikar, ed., 2010), Brazil (Dutz, 2012); see for developed economies: Brynjolfsson *et al.*, (2002); Youndt and Snell, (2004); Pike *et al.* (2005); Global Intangible Tracker, (2007); Van Ark, *et al.*, (2009); Roth and Thum, (2010), Kuznar, (2012); Corrado and Hao (2013) etc.

2. Research Methodology

We have conducted a survey of a sample of 71 Serbian firms from the end of 2012 and throughout 2013. The survey is a part of broader research on intangible capital and it is based on a questionnaire developed by Prasnikar *et al.* (2012) with some adjustments made by researchers from the Faculty of Economics in Belgrade. In order to become familiar with the questionnaire, the companies observed received it first in a hard copy form by mail. The questionnaire was answered by each company's CEO, financial and/or HR manager. In some cases, researchers complemented the questionnaires received with some data from the Serbian Business Registers Agency and Intellectual Property Office.

Due to the limited resources of the research team the sample of firms was chosen using the snowball method, that is, the sample was not chosen randomly. However, we tried to capture the most typical structure of Serbian firms by industry, albeit with an increased share of larger companies. In our analyses we shall be particularly interested in whether there are some differences in firms' behaviour and their understanding and investing in intangible capital associated with the (a) field of business activity – manufacturing of tangible goods *vs.* services; (b) owners' origin – foreign *vs.* local; (c) internationalisation of their businesses; (d) size of firms. We present these basic structural elements of the sample in Table 1 below.[3]

Table 1. Sample structure

	Number of firms	% of firms
Total	71	100%
Type of business activity		
Manufacturing (and similar)	46	65%
Services	25	35%
Ownership		
Foreign owned	17	24%
Domestic owned	54	76%
Internationalisation of businesses		
Exporters	52	73%
Non-exporters	19	27%
Size of firms		
Small (< 50 employees)	26	37%
Medium (50<employees<200)	22	31%
Large (>200 employees)	23	32%

3. Regarding the scope and the structure of our sample, including the sampling method, it should be noted that our preliminary analysis was based on the results received from 41 firms (v. Cerovic *et al.* 2014). Since all basic findings are almost the same or, at least, very similar to those for the actual sample of 71 firms, we find the choice and the scope of the sample to be acceptable and correctly structured.

As presented above, the sample consists of 46 manufacturing firms and those that produce tangible goods (65%), while 35% of sample firms are from the service sector. There are 17 companies owned by foreign capital (FOFs), while the major part of the sample (76%) is represented by domestically owned companies (DOFs). As to the size of firms, in the sample we used the number of employees as the main criterion, with an approximately equal share of small (defined as firms with under 50 employees), medium (50-200 employees) and large firms (over 200 employees). As already stated, these proportions/ratios were intentionally selected in order to better assess and compare the behaviour of the three groups of enterprises. Similarly, and for research purposes, the sample was intentionally biased in favour of manufacturing and exporting companies (exporters are defined as firms that earn at least some fraction of their sales revenue in foreign markets; in further analyses we shall also explore whether there are differences between larger exporters that earn at least a third of their revenue in foreign markets *vs.* all other firms).

In this paper we present our preliminary results and the analysis relies mostly on descriptive statistics. Whenever possible, our analysis is accompanied by simple statistical testing and it is partially enhanced by probit models estimations.

3. Human Capital

In this section we explore how much firms invest in human capital by organising, developing and improving various training courses and by elaborating on-the-job training practice. We also explore whether firms introduce adequate compensation systems that give workers an incentive to develop their skills. In Table 2 some basic responses to the questions concerning the issues mentioned are presented in regard to (i) the firm ownership type and (ii) the firm size.

As seen from the table above, we firstly, explore whether there are organised forms of training, what the scope of these training practices is (did they involve more than 50% of employees during the previous year?) and how firms measure the effects of such training (apart from general overviews).

Looking at the results obtained, it is evident that an overwhelming majority of firms (81.4%) have reported at least some organised form of training. However, it is remarkable that FOFs lead in this activity (100%) when compared to DOFs (75.9%) the difference is statistically significant (t=-2.220; p=0.030). It also appears that training sessions are more frequently organised at large (95.5%) and medium firms (90.9%) than at smaller ones (61.5%) making another significant difference in regard to the firm's size in favour of larger companies (F=6.226; p=0.003)[4]. Although some

4. We have checked whether the results may be overlapping since the sets of small, medium and large firms consists also of FOF and DOF but found no indication of that kind: a similar sequence of results has been obtained when DOF only were observed.

further responses should be taken cautiously, since they seem to be too optimistic, it is noteworthy that 41.4% of firms claim that more than 50% of their employees participate in training activities, whereas 40% claim that the subsequent effects achieved are seriously measured.

Table 2. Upgrading human capital (positive responses in %)

	FOF	DOF	All firms	Small	Medium	Large
Investment in human capital						
Organised training	100	75.9	**81.4**	61.5	90.9	95.5
Past year >50% workers included	43.8	47	**41.4**	38.5	36.4	50
Measuring training effects	50	37	**40.0**	34.6	31.8	54.5
Self-organised training by employees	57.1	52.1	**53.2**	41.7	68.4	52.6
On-the-job training						
Is there organised on-the-job training?	75	77.4	**76.8**	64	86.4	81.8
Transfer of knowledge among employees	81.2	77.8	**78.6**	65.4	81.8	90.9
Preparation of workers who are to succeed their colleagues when necessary	62.5	58.5	**59.4**	48	54.5	77.3
Control and compensation						
System of control that allows managers to distinguish good and bad workers	100	96.3	**97.1**	100	100	90.1
Are there rewards for good workers	81.2	90.7	**88.6**	92.3	86.4	86.4
Are there warnings for less successful workers, inciting them to work better	50	61.1	**58.6**	61.5	59.1	54.5

Nevertheless, one may notice the diminishing percentages of affirmative responses when the questions aim at a deeper insight in investing in human capital. Thus, for example, there is wide discrepancy between organised training, as confirmed by the firms and their scope (number of workers participating) and the results of the firm's measurements of training effects. This discrepancy is particularly evident among smaller and medium enterprises, which indicates/reflects just a rudimentary concern about human capital development. On the other hand, we find a relatively high number of self-organised training sessions arranged by the employees themselves, particularly at medium firms. This can be perceived as a positive sign concerning the motivation of workers (though some of these training sessions are not necessarily related to the tasks these employees are working on) but also reflect certain deficiencies in the training organised by the firms' management.

Secondly, we examine whether the firms have developed on-the-job training, how skills are transferred among employees and whether a firm prepares or, more precisely, has prepared new workers to succeed those retiring or leaving work for other reasons so that they may be able to undertake more responsible jobs and tasks.

When analysing answers regarding these issues, we find that various on-the-job training forms are relatively widespread (76.8%) including transfer of knowledge among employees that was confirmed by as much as 78.6% of firms observed. Although some self over-estimation is probable, this could be regarded as a positive sign of introducing new practices in human resource management. However, there is a substantially smaller number of firms that report proper preparation of workers who are to succeed colleagues when necessary (59.4%). This difference is particularly evident in smaller firms, which is comprehensible, to a certain extent, bearing in mind the small number of their employees; however, it is even more evident in medium enterprises that should not be constrained in a similar manner. There are no other specific differences among firms, except for exporting firms that provide significantly more on-the-job training ($t=-1.855$, $p=0.068$) and also among larger exporters (that earn at least a third of their sales revenue from exports), when compared to non-exporters and/or firms with small exports. This may indicate that links with foreign markets urge firms to make sure they upgrade their employees' skills.

Finally, we checked for some additional practices in developing human capital connected with compensation schemes. Firms were asked whether they follow workers' productivity and whether they can distinguish between good and bad workers, whether they reward good workers and whether they warn less successful ones and give them incentives to work better/more efficiently. Although almost all firms gave positive answers to the first and second questions (97.1% of small firms and as much as 100% of medium firms), only 58.6% expressed some concern about less successful workers. In our view, this demonstrates that firms are usually more interested in keeping and offering incentives to efficient workers than ready to be engaged in improving the performance of less successful ones. Such a differentiation in human recourse management probably points at the temporary character of the local labour market, which is burdened by high unemployment that threats employees with layoffs if not sufficiently successful and making firms less concerned with the undesirable results of this group of workers. Nonetheless, this cannot be assessed as /considered a good and promising practice, particularly in the long run.

4. Internal Relations

In the context of intangible capital, we accept that harmonious and consensual relations within a firm, as well as relations with external stakeholders, could considerably improve a firm's performances and raise its social capital. When analysing internal relations, we shall particularly highlight the decision-making process, relations between managers and owners and all along the agency chain when making strategic decisions, including the position of labour within the organisational structure and workers' participation in decision-making and fulfilling business objectives.

Our study of internal relations starts with the issue of decision-making. It has been analysed from several perspectives, such as: (i) to what extent strategic decisions are recognised and separated in regard to operative decisions; (ii) what level of cohesion in decision-making has been achieved in terms of harmony between owners and managers and workers and other employees; (iii) to what extent, if any, workers' participation is developed within the firms. Finally, we shall try to reveal (iv) what kind of loyalty workers exhibit towards their firms and if they are prepared to undertake certain risks a firm may encounter, and (v) to what extent this can be coupled with the workers' more or less active position in the decision-making process.[5] Basic results on internal relations obtained from our survey in regard to (i) firm ownership type and (ii) firm size are presented in Table 3.

Table 3. Internal relations (positive responses in %)

	FOF	DOF	All firms	Small	Medium	Large
Decision making						
Strategic decisions are recognised and separated in regard to operative decisions	82.4	59.3	**64.8**	23.1	86.4	91.3
Harmony and coordination between owners and managers in strategic decision-making over the past five years	76.5	57.4	**62.0**	26.9	72.7	91.3
Harmony and coordination between owners, managers and workers in strategic decision-making over the past five years	64.7	48.1	**52.2**	23.1	61.9	77.3
Workers participation in decision making						
Right to be informed	76.5	68.5	**70.4**	50	72.7	91.3
Free to make proposals	47.1	58.5	**55.7**	48	50	69.6
Members of the board	23.5	22.2	**22.5**	11.5	18.2	39.1
Workers' loyalty and risk participation						
Ready to 'do something more' for the firm	84.4	68.5	**71.8**	57.7	86.4	73.9
Stay with the firm if offered a better paid job	64.7	38.9	**45.1**	35.6	49	69
Willing to invest in the firm (financially)	23.5	15.1	**17.1**	26.9	9.5	13

5. In a wide range of literature references, not *a priori* aversive to the idea of workers' participation, there are a number of studies discussing the issue of workers' participation and companies' performance (for a broader survey of the literature, see Summers and Hyman, 2005; see also Sengupta, 2008; on participation and risk bearing, see Williamson, 1982; on consensus and cooperation within organisational structure, see Aoki, 2010, etc.).

We have firstly investigated whether firms systematically separate strategic from current operative decisions at various levels of decision-making. In total, 64.8% of firms confirmed such practices. It is remarkable that the majority of negative answers come from small firms (76.9%), which is, to a certain extent, understandable. On the other hand, medium firms and large firms mostly confirm this management practice (86.4% and 91.3%, respectively) making an overall significant difference regarding this issue in relation to the firm size ($F=26.970$; $p=0.000$). A significant difference ($t=1.752$, $p=0.084$) also appears between groups of FOFs (82.4%) and DOFs (59.3%), which indicates better management in foreign owned companies.

We have basically found similar results when analysing managers' responses on the subject of relationship between owners and managers in strategic decision-making over the past five years. In total, 62% of the firms declare that managers and owners act harmoniously, but, once again, there is a significant difference in regard to the size of firms (26.9% of small firms confirm harmony, as opposed to 72.7% of medium and 91.3% of large ones; $F=16.323$; $p=0.000$). Once again we found a remarkable difference between FOFs (76.5%) and DOFs (57.4%) confirming our earlier conclusion on better structured management process in foreign owned enterprises.

When asked whether strategic decisions are coordinated between owners, managers and workers, that is, along the entire agency chain, there were 52.2% of responders confirming such a state of affairs, but, once again, with a difference emerging between FOFs (64.7%) and DOFs (48.1%). Besides, the size of firms appeared to matter: the statement was confirmed by 23.1% of small, 61.9% of medium and 77.3% of large firms; this is one more statistically significant difference ($F=9.302$; $p=0.000$).

Putting all these pieces together, we may conclude that a large share of the firms observed recognises a difference between strategic and operative decisions, but additional exploration shows that the real use of this knowledge is still at a primary stage and particularly weak regarding communications between various organisational levels within a firm. Not surprisingly, we may conclude that managerial practices in the group of FOFs, when compared with those of the DOF group, are developed in a more constructive way. The least encouraging situation is in smaller firms, mainly because of the over-estimated role of owners who opt to act alone even if this means neglecting managers' opinions (we found a certain number of responses claiming that owners should be the only ones in charge of the decision-making process).

In regard to some more developed practices that involve workers in decision-making, it is noticeable that just a little over half of the firms in the sample (55.7%) develop opportunities for their employees to make suggestions and/or put forward proposals. It is interesting that, concerning practices used for informing workers, FOF are leading but are slightly more reserved regarding the workers' right to propose and suggest; however, there are no specific differences regarding workers' participation in boards. On the other hand, the size of a firm seems to be an important factor in regard to the improvement of workers' participation: in all forms of participation

investigated the percentage of firms practising thisis increasing with the size of the firm (e.g. workers's rights to be informed are significantly different in regard to firm size: F=5.624; p=0.005, as well as their participation in boards: F=2.950, p=0.059).

It is important to note that the group of larger exporters, defined as companies that earn at least a third of their revenue from foreign markets, have a remarkably better developed system of informing employees including their possibility to recommend certain measures and to participate in boards. When compared to smaller exporters (less than 33% of revenue from foreign markets) and non-exporters, there is significant difference concerning all participation practices: in regard to being informed, t=-2.152, p=0.035, in regard to making suggestions, t=-2.535, p=0.014 and in regard to participation in boards, t=-2.375, p=0.020).

Finally, we explored some issues that could be summarised as workers' loyalty to the firm and workers' willingness to take (financial) risks within the firms employing them. We found 71.8% of firms responses claiming their workers' willingness to 'do something more' for the company and 45.1% expecting workers to stay with the firm even if they are offered a better paid job elsewhere. We also found that workers in the companies observed are pretty risk aversive: only 17.1% of the responders presumed that workers would be willing to invest in their firms at a somewhat higher percentage (23.5%) in FOF[6] expressing a higher level of trust in business performances of foreign owned companies.

However, the data on workers' loyalty could be correlated with data on other characteristics of internal relations studied in our research. Indeed, if there is such a linkage, one can fully understand the significance of internal relations for strengthening the social capital of a firm and its subsequent improved economic performance. Moreover, in some earlier analyses based on partial results of our survey (see e.g. Cerovic *et al.*, 2014) some statistically significant correlations between indicators of workers' satisfaction and loyalty and their participation, including general harmony of decision-making, have been found.

In order to additionally explore such relationships, we firstly defined the indicator of Workers' Loyalty and Satisfaction (WLS) as the sum of positive answers to the (two) questions on loyalty and (the one) on risk participation, plus positive answers to the question on whether responders in the firms analysed believe that their workers are, at least, as satisfied as those in competitor firms. Hence, WSL can take values from 0 to 4. Secondly, we constructed an indicator on Workers' Rights (WR) that summarises positive answers to the (three) questions on workers' participation plus to the question on the existence of trade unions (TU) in the firms observed and the

6. An even higher percentage was found among small firms (26.9%), but the figure was not fully reliable since it included owners and their relatives employed by these firms.

question on TU engagement in improving the productivity of the firms[7]. Similarly, WR can take values from 0 to 5. Finally, we formed a third indicator on Decision Making (DM) as the sum of positive answers to the (three) questions related to this issue that can take values ranging from 0 to 3. This has enabled us to specify several probit models so as to reveal mutual relationships between DM, WR and WSL.

We tested four binary probit models. In models (1) and (2) we considered positive responses to the question whether workers are ready to do 'something more' for the firm as a dependent variable, while in model (1) independent variables are wage level (WL), that is, positive answers to the question whether workers' wages in the firm are among higher wages in the economy (wage level should be a standard economic proposition for satisfying a rational worker), number of employees in the firm (L), since our survey indicates better results for larger firms, and, finally, indicators WR and DM mentioned above . In model (2) all variables remain the same except for WR and DM the sum of which is considered to be one variable (WR+DM) representing a compound indicator of internal relations. In models (3) and (4) the dependent variable is represented by positive answers to the question whether workers will stay within the firm if offered a better paid job elsewhere, while independent variables in model (3) are the same as in model (1) and in model (4) as in model (2). Further on, we tested two ordered probit models (5) and (6), where the dependent variable is the WSL indicator, while the set of independent variables in model (5) remains the same as in binary models (1) and (3) and in model (6) as in binary models (2) and (4). The results of our estimations are presented in Table 4 below.

The results obtained firmly suggest that the workers' level of satisfaction and loyalty to the firm – as judged by managers – is significantly correlated with the qua-lity of internal relations. Thus, WSL is positively related to WR+DM (workers' rights and decision-making) in model 6; also, two separate aspects of WSL (doing 'something more' for the firm and staying with the firm when offered a better paid job) are significantly and positively correlated to WR+DM in models 2 and 4 (all significant results in bold letters). Moreover, we can conclude that the willingness of employees to do 'something more' for the company significantly depends on well coordinated decision-making processes (DM in model 1), while loyalty in terms of remaining in the firm despite some formally more attractive offers is significantly correlated/ with a better position of workers in regard to their participatory and other

7. We faced a very specific situation regarding the existence and activity of a TU. Except for only one firm (medium sized, exporter, manufacturer) TUs are found exclusively in 'old' firms inherited from former Yugoslavia, whether privatised (a majority) or not. A similar state of affairs was found regarding wage formation since our responders appeared clearly unfamiliar with collective bargaining in many cases. This indicates a poor state of traditional workers' rights: they exist rather as an inherited custom from previous times than a normal and a necessary part of a firm's organization.

rights (WR in model 3). Also, the general level of satisfaction and loyalty (WSL) significantly depends on advanced employees' rights (WR in model 5)[8]. On the other hand, it should be noted that under estimated specifications we found no significant correlation between workers' satisfaction and loyalty to the firm and the level of wages earned (despite theoretically described and postulated linkage of this type) suggesting a higher significance of workers' active position within a firm and of the quality of internal relations in general, when compared to wage level.

Table 4. Estimated probit models

Variables	**Binary probit models**				**Ordered probit models**	
Dependent variable→	**Workers willing to do 'something more' for the firm**		**Workers will stay with the firm if offered a better paid job**		**WSL**	
Model→	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables↓	Coefficient (Probability)	Coefficient (Probability)	Coefficient (Probability)	Coefficient (Probability)	Coefficient (Probability)	Coefficient (Probability)
Constant	-0.203299 (0.4684)	-0.216426 (0.4448)	-0.844154 (0.0026)	-0.849029 (0.0027)		
WL	0.089515 (0.8139)	0.214405 (0.5743)	0.338788 (0.3237)	0.263049 (0.4319)	0.063265 (0.8192)	-0.029355 (0.9149)
L	-0.000106 (0.5072)	-0.000129 (0.4347)	0.000162 (0.3727)	0.000180 (0.3121)	4.15E-05 (0.8007)	6.69E-05 (0.6515)
WR	0.106873 (0.4482)		0.224176 **(0.0619)**		0.245964 **(0.0363)**	
DM	0.384185 **(0.0101)**		0.045009 (0.7487)		0.005457 (0.9644)	
WR+DM		0.231470 **(0.0091)**		0.145469 **(0.0427)**		0.139075 **(0.0358)**
Cut-off point 1					-0.970245 **(0.0003)**	-0.949443 **(0.0004)**
Cut-off point 2					0.147493 (0.5714)	0.164823 (0.5236)
Cut-off point 3					0.863425 **(0.0020)**	0.871959 **(0.0019)**
Cut-off point 4					1.693989 **(0.0000)**	1.681055 **(0.0000)**
Log likelihood	-35.73619	-36.41188	-43.66334	-43.99763	-103.6643	-104.5533
Avg. log likelihood	-0.503327	-0.512843	-0.614977	-0.619685	-1.460061	-1.472582
Pseudo R-sq	0.1534	0.137415	0.106501	0.099660	0.046922	0.038748
No. of observations (0/1)	20/51	20/51	39/32	39/32	8/18/18/17/10	8/18/18/17/10

8. Note that cut-off points are all significant (except for the WSL level change from 1 to 2) confirming that an increase in WSL level is significantly connected with advances in WR. The issue is relevant from the standpoint of firms performance and competitiveness: among newer analyses that connect workers satisfaction and better firms performance see Edmans (2012) and Zhou *et al.* (2008).

5. External Relations

After analysing internal relationships we addressed relationships with external stakeholders. The analysis of external relations includes four aspects: (a) relationships with business buyers, (b) relationships with consumers, (c) relationships with competitors and (d) relationships with suppliers. Major findings are presented in Table 5.

As long-term relationships with customers represent firms' most valuable assets, the central part of the analysis in this section is dedicated to business buyers and consumers. Comparing the results for these two stakeholders indicates that relationships with business buyers (B2B) are more developed than with consumers (B2C). The firms in the sample are more dedicated to business buyers, in the sense of their commitment to their wants and needs (employees meet regularly to exchange notes on customers in 78% of the firms; there are regular meetings with business customers to determine their needs in 88% of the firms). The highest level of commitment to and cooperation with business buyers is concerned with business customers in the process of developing new products and services, which is reported by 65% of the firms in the sample.

Table 5. External relations (positive responses in %)

	FOF	DOF	All firms	Small	Medium	Large
B2B relations						
Employees meet regularly to exchange observations about customers	86.7	75.4	**77.94**	69.2	71.4	95.2
Regular meetings with business customers to determine their needs	87.5	88.68	**88.41**	88.5	81	95.5
Business customers engaged in developing new products/services	68.75	64.15	**65.22**	65.4	61.9	68.2
B2C relations						
Is there a regular and detailed analysis of consumer needs?	56.2	55.6	**55.7**	53.8	45.5	68.2
Does a company employ a customer relationship management system?	35.3	14.8	**21.5**	3.8	22.7	34.8
Relations with competitors						
Activities of competitors influence our business activities	76.5	74.1	**74.6**	65.4	86.4	73.9
Aggressive business action in response to activities of major competitors	68.8	38.9	**45.7**	34.6	54.5	50
Relations with suppliers (origin of suppliers)						
More than 50% of suppliers are from foreign markets	62.5	35.8	**42**	26.9	45.5	57.1
Majority of suppliers comes from developed countries	50	35.3	**38.8**	19.2	50	52.4

Inclusion of a customer during innovation development has positive influence on a firm's performance and competitive advantage (von Hippel, 2001; Pedrosa, 2012; Laursen and Salter, 2006) as well as on a firm's innovation performance, especially in the case of service companies (Matthing *et al*., 2004; Bogers *et al.,* 2010; Vargo and Lusch, 2004). Contrary to findings in the literature, service companies underperform when compared with the firms in the manufacturing sector in our sample (50% of service firms cooperate with business buyers in the innovation development process as compared to 73.3% of manufacturing firms). In general, interactions between managers of service firms with business buyers are not as high as in the case of manufacturing firms, which is hard to explain, bearing in mind that delivering services implies contact between seller and buyer that can foster further communication and cooperation.

Our analysis of the results for different groups of firms reveals a statistically significant difference regarding involvement of business customers in the development of new products and services among larger exporters (more than 33% of revenue earned abroad) *versus* small exporters and non-exporting firms, in favour of large exporters ($t=-2.610$; $p=0.011$).[9] Specific international business environment and additional restraining factors, such as a psychic distance, make cooperation between seller and international buyers specifically important. In addition, international buyers frequently have different needs when compared to domestic buyers, so exporters need to adjust their offer, which can be done more effectively in cooperation with buyers.

In the field of business-to-consumer relationships, we have tried to examine whether there is a regular and detailed analysis of consumer needs and whether the in question company employs a customers' relationship management system. In all of these aspects we have found evidence of a low level of firms' commitment to long term relations with consumers and of developing partnership marketing. Though more than 50% of the firms in the sample declare that they have regular and detailed analyses of consumer needs (55.7%), we have found that only 28% of firms define a specific budget for market research. This implies that they do not undertake nor/or organise formal market research, which means that their main sources of information are informal market research procedures, which are not sufficient for tracking consumers' needs and their behaviour.

The second aspect of our analysis of B2C relations deals with the implementation of consumer relationship management (CRM). Less than a quarter of the firms (21.5%) reported implementation of CRM. In this aspect, FOFs (35%) outperform DOFs (14.8%; $t=-2.014$; $p=0.048$). One may also find that service firms do better than manufacturing companies (28% and 15% respectively), which can be perceived

9. Statistically significant differences appear between exporters that earn 33% or more of their revenue in foreign markets and the group of non-exporters and those with foreign sales revenue share below 33%.

as an outcome of the nature of the service industry, i.e., it is customary to have direct contact between service providers and consumers. In general, FOFs report implementing more advanced marketing practices in segments of external relations, brand capital and marketing competencies than what is found among DOFs (see, in more detail, Cerovic, *et al.* 2014; Mitic and Nojkovic, 2014; Mitić, 2015). As evident from Table 4, large firms implement CRM more often than small and medium ones (F=4.052; p=0.022), which is to be expected due to the relatively high costs of developing and implementing CRM. On the other hand, since CRM represents an important system that enhances a company's ability to track individual behaviour of consumers, it becomes an important competitive factor in various industries (Rollins and Bellenger, 2012). It also stands for the highest level of partnership marketing, which can help sustain competitive advantage. Hence, the low number of firms reporting implementation of CRM indicates that B2C relations are still underdeveloped among Serbian firms.

Finally, we tried to explore firms' relations with competitors and suppliers. Less than 50% of the firms report that they have an offensive competitive orientation, while 54.3% of the firms choose to follow leaders rather than to adopt a proactive and strong response to te competitors' business actions. More offensive competitive orientation has been reported by FOFs (with statistically significant difference from DOFs, t=−2.145; p=0.036), large firms (50% as compared to 34.6% among small firms) and exporters (50% as compared to 33% among non-exporting firms). Moreover, a major number of exporters hold a position of market leaders in domestic markets, having already more developed competencies and other resources necessary for aggressive competitive positioning in a foreign market. Regarding suppliers, we have investigated the origin of suppliers, since quality of inputs (related to the deve-lopmental level of the country of their origin) has positive influence on productivity and usage of advanced technology. In the sample, only 38.8% of firms have suppliers from developed countries (which is substantially less than, for example, among Slovenian firms – 73% has been found in a corresponding analysis by Prasnikar, 2010). Therefore, it is unlikely to expect a great and positive suppliers' impact on technology enhancement in Serbian firms. However, we have found statistically significant differences between exporters and non-exporting firms (t=−2.309; p=0.024), in favour of exporters (47% among exporters *vs.* 16.7% among non-exporting firms) implying, yet again, that presence in foreign markets can boost various firms' capabilities. Also, and expectedly, we found statistically significant differences (F=3.662; p=0.031) between large (52.4%), medium (50%) and small firms (27%) regarding the origin of their suppliers.

6. Innovation

Investments in innovations and research and development (R&D) are traditionally seen as an important component of upgrading the intangible capital stock of a firm. For that reason an important section of the survey has been dedicated to these is-

sues. Our general conclusion is that a big group of firms overestimates their commitment and achievements concerning this activity. However, the cascade type of survey questions has enabled us to form a broad picture about real practices and to recognise firms that have more developed innovation policies and processes and R&D investments.

The survey section on innovation starts with a question regarding the firms' new products in the last five years (2008-12) asking them to assess the quality of these products in comparison to the firms they compete with. In total, 59 firms out of 70 that have responded (84%) declare to have had new products over this period, estimating that the firms are at least as successful as their competitors. All FOFs that responded to this question (16) confirmed the launch of new products and were fully confident regarding their quality when compared to those of competitors. Confidence about competitiveness is also confirmed by 80% of DOFs. It is remarkable that no major differences among firms could be found when smaller firms are separately analysed: as many as 77% of them reported a similar statement. It seems that manufacturers are slightly more innovative (89%) when compared to companies in the service sector (76%).

When asked whether they do consider themselves to be more successful than their competitors, 53% of all firms believe in their advantage. It is interesting to note that FOFs appeared to be just slightly more confident about the competitiveness of their products (56%) than DOFs are (52%). However, when asked whether the firms consider them as leaders within the industry, this gap was remarkably widened in favour of FOFs: 63% of FOFs consider themselves as leaders compared to only 37% of DOFs (statistically significant difference: t=-1.856; p=0.068). However, deeper investigation of the set of all 30 firms that claim leading position in their principal markets, we find 20 firms that sell 80-100% of their products in the local market, plus 2 that also sell 70-75% of their production locally. The remaining output of these 22 companies is predominantly sold in neighbouring markets that emerged from former Yugoslavia. Such business orientation can raise the question whether they are real leaders in their industries or rather enjoy some monopolistic bias within local boundaries. Indeed, among all firms that attribute themselves a leading position, there are only 5 major exporters (four of them earning even more than 50% of their revenue in foreign markets) with a large portion of their production going to developed markets. Surprisingly, they are all DOFs (four are privatised).

We also tried to explore how firms would assess the importance of upgrading, renewing and/or producing new products or introducing product lines. In Table 6 below we present the corresponding firms' assessments[10].

10. Contrary to previous tables, absolute number of firms is used instead of percentages, since firms' responses vary and percentage numbers become incomparable. For the same reason, we shall continue in this manner in the tables that follow (7-10).

Table 6. Importance of new products and product lines (number of firms)

Assess the importance of the following forms of new products in the firm	High	Medium	Low	Not in use
Repositioning of existing products (65 answers)	18	31	11	5
Improving existing products (67 answers)	29	30	6	2
Upgrading existing product lines (63 answers)	19	29	11	4
New product lines (65 answers)	29	21	6	9
New products according to international standards (65 answers)	32	18	9	6

The wide range of answers shown in the table indicates a certain hesitation among some responders to clearly assess the innovative practices proposed. This indicates that the managers of the firms in question were not familiar with such activities. Hence, one may add the missing answers to the last column (not in use). On the other hand, a persistent number (50-60) of responses grouped around the notions of high and medium importance for almost all proposed innovative practices can be noticed, which is in accordance with the innovations reported over the five year period (but could also be a sort of giving the answers perceived to be 'desired').

Comparing average assessments given by firms for the importance of certain innovations, it emerges that they evaluate improvements of existing products (2.28 on average) as particularly high, followed by launching new products (2.17). However, the distribution of these assessments varies across certain types of firms. Thus, for example, FOFs attribute highest importance to new products (2.37) whereas DOFs give priority to improvements in existing products (2.36). Most likely, this result reflects different practices, implying that FOFs introduce new products more frequently than DOFs can. Similar differences could be found, and probably for similar reasons, in regard to the size of a firm: large firms allot the highest importance to new products (average value 2.25), while medium and small ones give priority to improvements on existing products (2.36 and 2.33, respectively). All these results indicate a lower level of innovative capacity among smaller firms, as well as among DOFs. On the other hand, certain differences are found between the export-oriented group and non-exporting enterprises. On average, exporters attribute higher significance to innovations assessing importance of all innovative practices at 2.2 (in a range from 2 to 2.3),[11] while non-exporters at 1.8 (in a range from 1.6 to 2.2). This is another indication of the greater competition exporters -come up against when selling in foreign markets; it is a kind of spillover-effect that reflects their export experience.

11. Among exporting firms even higher assessments are given by larger exporters (at least one third of revenue earned abroad): on average, they assess innovations by 2.3 in a range from 2.1 to 2.5.

We intended to get some information about processing innovations asking firms whether they have undertaken, during the past five years, any substantial innovation in general and specifically in production, logistics, distribution or in supporting departments like accounting, etc. The answers obtained were definitely over-optimistic: 86% of all firms reported some considerable general innovations, while in other, more specified questions, improvements were reported by at least 82% up to 86% of the firms (with a tiny exception regarding supporting departments where essential innovations were reported by 73% of the firms). It was mostly small and medium size firms that over-estimated their innovations in the fields mentioned (sometimes positive answers go up to 100%), thus exhibiting a rather low degree of actually recognising what kind of improvements could be regarded as substantial or considered innovative.

7. Research and Development

The structure of the sample observed suggests that one should expect some variability in results particularly when organisation of R&D is concerned. For that reason we have firstly investigated what could be the scale of investments in R&D among firms observed, since this could provide an indication as to what extent firms did recognise the importance of this kind of spending. In total, 51 firms (74% of 69 respondents) claim that, in 2011, they have invested at least 1% of their revenue in R&D. Manufacturing firms are more active investors in R&D (80%) as compared to service providing firms (60%). Among the 51 firms that invested in R&D there were 26 that invested more than 2% of their revenue (20 manufacturers), while 14 of them reported investments higher than 3% (9 manufacturers; among them 4 big exporters earning more than 50% of their revenue abroad).

It is remarkable that, among the 51 firms that invest in R&D, there are 38 exporters (with at least 5% of their revenue earned abroad) or 65% of all exporting firms. Among them 18 enterprises are major exporters earning at least 33% of their revenue in foreign markets (86% of this group of firms). As many as 31 of 38 exporting firms invest 2-3% or more of their revenue in R&D, which is considerably higher than what other enterprises invest. However, some firms report a diminishing trend of such investments due to the effect of the global crisis over the 2008-11 period.

We found one more interesting feature concerning R&D investments. We divided the sample into two sub-samples according to profit per worker (the only indicator that we could calculate for all firms). It appeared that firms from the lower profit per worker group invest more frequently in R&D (71%) than firms with higher profit per worker (61%). Moreover, investments are higher: in the former group, where 61% of the firms report investments higher than 2% of their revenue, while, in the latter, there are only 48% that report investments of that level. This is mainly due to the fact that manufacturing firms dominate the low profit per worker group, which is, in turn, a probable consequence of the transition growth model that favoured service

firms oriented towards domestic markets and importers rather than exporters (see Cerovic and Nojkovic, 2011). Such a position of manufacturing and no proper industrial po-licy might explain the relatively overall low level of investments including R&D and a substantial deterioration of manufacturing industries during transition.

It is also remarkable that among FOFs, which usually exhibit better management practices as compared to DOFs, we find 50% of the firms that do not invest in R&D. Also, in 56% of FOFs there are no R&D departments. All of them are parts of larger international systems that usually organise R&D departments in other locations, predominantly in their countries of origin. They are dominated by firms that are predominantly sellers of renowned brand products (sometimes with some minor local finishing). Similar practices are found among DOFs that are parts of larger companies. Hence, it is not expected that such firms might have any particular investments in R&D or corresponding departments. However, this might be in line with the findings that point to relatively poor effects of FDI in transition economies: frequently they do not enhance all expected spillover particularly regarding knowledge and technology (see for example: Gunter, 2005; Gorodnichenkou *et al*. 2007). This also suggests a relatively low level of technology and related development is expected to take place over time in locally established FOFs.

Consequently, we find that DOFs are more active in R&D investments, particularly (and expectedly) when larger firms are concerned, but there are also examples of medium sized firms (32% of all manufacturers from various industries) that are developing their own R&D departments, particularly if exporting a share of their production. However, we find that the influence of R&D departments on company development is pretty limited, and it particularly technology and a specific design of products.

8. Competencies

Firms were asked to assess their competencies in technology and marketing as compared to their competitors, but also to assess their complementary or matching competencies when compared to their competitors. The results are presented in the tables 7, 8 and 9 below.

Table 7. Firm's technological competences *vis-à-vis* competitors (number of firms)

Assessment	substantially lower	lower	similar	better	substantially better
R&D knowledge highly developed (56 responses)	5	11	20	11	9
We have high technological abilities in the firm or within strategic partnerships (57 responses)	1	4	20	21	11
We correctly predict technological trends (58 responses)	-	9	18	20	11

The first remarkable result is that around one fifth of firms are not able to precisely report their technological competencies when compared with their main competitors. This demonstrates a rather negligent attitude towards this aspect of competitiveness. Moreover, the most hesitant responders are found among larger firms, although, on average, responders assessed their competencies as relatively high (between 3.5 and 3.88, on average).[12] Conversely, almost all small firms responded to this question and remarkably over-assessed their competencies (average marks are very high in a range from 3.14 to 3.74). Medium sized firms appear to be the most aware of their weak and strong features, with assessments of their technological competencies ranging from 2.74 to 3.41. The most highly assessed technological competencies are those of FOFs, the average marks of which range between 3.83 and 4.

Table 8. Firm's marketing competences *vis-à-vis* competitors (number of firms)

Assessments	substantially lower	lower	similar	better	substantially better
Acquiring information on consumers' preferences and needs (64 responses)	2	5	34	13	10
Acquiring information on competitors (63 responses)	2	4	34	10	13
Long-term relations with buyers (63 responses)	-	1	22	22	18
Long-term relations with suppliers (56 responses)	-	-	20	18	18

It is remarkable that all firms observed highly assess their marketing skills with only few examples that are ready to confess their knowledge and practices are at a lower level in comparison to their competitors. It is also remarkable that there are more answers lacking in regard to long term relations with suppliers indicating that these firms do not develop this kind of relationship. However, it is remarkable that exporters assess their marketing competencies to be somewhat higher than other firms do: their assessments range from an average mark of 3.5 for acquiring information on consumers' preferences and on competitors to 4.1 for long-term relationships with suppliers (4.2 among exporters that earn at least 33% of their revenue in foreign markets). These results suggest, yet again, how entering foreign competition urges for advancement in business practices and they are in full accordance with our findings on external relations.

12. Assessments on competencies are given in the following manner: from 1 for substantially lower to 5 for substantially better.

Table 9. Firm's complementary competences *vis-à-vis* competitors (number of firms)

Assessment	substantially lower	lower	similar	better	substantially better
Clearly defined tasks of units/dpts (63 responses)	2	4	24	23	10
Good transfer of technological and marketing competencies between units (64 responses)	1	6	25	22	10
High level of R&D knowledge transfer among strategic partners (61 responses)	7	3	21	19	11
Product development is efficient (in terms of costs) (63 responses)	1	5	17	24	16

In identifying complementary competencies in regard to competitors firms seem to be somewhat more reserved than in assessing their own marketing skills. However, they are confident that they are particularly strong in efficient development of their products (40 firms). A deeper reflection on the data could alter this broad picture. Thus, for example, there is a pretty peculiar distribution of answers in regard to the firms' size: large firms quantify their organisational capabilities (well-designed tasks), transfer of technology and R&D knowledge by higher average assessments in comparison to smaller firms, but small and, particularly, medium size firms assess their efficiency in developing new products as higher than large ones. A similar result may be found when FOFs are questioned: they assess the first three competencies giving higher and balanced marks (3.62-3.64, on average), but are more reserved in assessing efficiency concerning new products launched (3.43). Contrasting distribution is found among DOFs: they assess their efficiency highly (3.88), but are less optimistic in regard to organisational competencies and technology transfer (3.5) and, in particular, R&D competencies (3.3). Although, theoretically this could be possible (smaller firms are usually *de novo* firms that exhibit better results than older companies throughout transition economies) it is hard to believe that without the support of good organisation, technology and R&D they could achieve such efficient results. Hence, such self-estimates should be attributed to overstated self-confidence frequently encountered among smaller firms and their owners and/or entrepreneurs (see Cerovic and Petkovic, 2003). Despite these probable shortcomings, it is evident that exporters assess their competencies higher than non-exporters. Moreover, exporters exhibit more balanced reasoning (larger firms in particular) by assessing their competencies, on average, from 3.5 (for R&D) to 3.8 (for efficiency in launching new products). This indicates that exporters are more realistic in their assessments of complementary competencies, but also more successful, since they are facing more advanced competition.

Finally, firms were asked to evaluate the importance of various sources of information that help them acquire knowledge regarding innovations, R&D and other components of their competitive advantages. Results are reported in table 10, below.

Table 10. Sources of information – importance level (number of firms)

Assessment		high	medium	low	Not in use
Internal	Within the firm (57 responses)	32	21	3	1
Market	Equipment suppliers (65 responses)	26	34	2	3
	Other suppliers (65 responses)	32	26	3	4
	Buyers (63 responses)	34	24	2	6
	Competitors or other firms from the region (64 responses)	19	33	10	2
	Consultants, R&D private firms, etc. (66 responses)	10	23	16	17
Institutional	Universities, higher education institutions (64 responses)	7	16	19	22
	Government or public research institutions (64 responses)	3	15	23	23
Other	Conferences, fairs, exhibitions (65 responses)	26	23	8	8
	Journals or commercial publications (64 responses)	11	29	11	13
	Associations, chambers etc. (63 responses)	6	25	18	16

From the table presented it is evident that major sources of information are those that are found within the firms and those that are acquired from suppliers and buyers. To a lesser extent, market information sources found with competitors are also frequently in use. It is interesting that SMEs evaluate (on average) the information acquired from suppliers as more important than that coming from their buyers. In our view, this indicates that SMEs in Serbian economy act as individual units seeking their market place and buyers rather than acting as firmly connected and involved in the schedules of larger firms. It is also evident that small firms, on average, consider all sources that could be seen as institutional ones, e.g. universities, public agencies and professional associations, as of low importance (or not in use) (average evaluation varies from 0.8 to 0.9). This indicates a lack of sound connections between firms and institutions that are expected to assist small businesses (particularly when public agencies and associations are considered). Things are similar when medium sized firms are questioned, although their evaluation is a bit higher, indicating somewhat better relations with these institutions.

On the other hand, it is also remarkable that small and medium sized firms rarely rely on private assistance of consultants or R&D firms (average evaluation around 1.1-1.2). This could be attributed to a typical local entrepreneurial attitude – owners of smaller firms recognise predominantly their own ideas and do not feel they could acquire some additional knowledge from professional consultants or advisers. Moreover, this result is compatible with our findings in regard to decision-making: smaller firms exhibit less developed interior relationships, leaving most decisions up to their owners.

In contrast to this finding, it is remarkable that exporters and, particularly, larger exporters are more interested in and more satisfied with their cooperation with consultants (average assessment 1.7), universities (1.4) and information acquired from journals and professional publications (2.0). Such evaluation is on average higher by

around 50% of firms when compared with the average evaluation by other firms and reflect the higher competition encountered in foreign markets, which gives them an incentive to look for resources that can help in introducing innovative measures. A similar result, in the case of assistance provided by private consultants, can be found among manufacturing companies as compared to firms providing services. Such a result could also be attributed to the effects of competition, which is higher among industrial producers (including exporters) than in the service sector (oriented towards the domestic market).

9. Conclusions

Following the analyses conducted and the results reported, our first and general conclusion is that the importance of intangible capital is slowly becoming recognised in Serbian economy. However, deeper reflection shows that, despite some improved results, many aspects of intangible capital have been recognised and/or invested just at a rudimentary level. We also found that awareness of the importance of intangible capital investments as a factor of competitiveness is somewhat advanced among foreign owned firms and, in particular, among exporting firms present in foreign markets.

As to foreign companies doing business in the Serbian market, it is evident that they usually go further than a typical local firm in investing in some forms of intangible capital (management, external relations, marketing). Nevertheless, in some aspects, our results are similar to findings that question the effects of FDI on transition economies, indicating lower spillover effects than expected. This can be found particularly in R&D investments and in the absence of R&D departments among local FOFs, since such activities usually remain within countries of origin, which implies a /explains the lower technology level of locally established firms.

In regard to firms that export their products or, at least, have some other relations with foreign markets, we have noticed deeper involvement concerning intangible investments. We find this to be indirect evidence of the need for export-led growth in transition economies: according to the results obtained, it appears that competition in foreign markets substantially accelerates adoption of more modern management, marketing, internal & external relational practices, as well as other aspects of intangible capital, e.g. R&D, acquiring information and knowledge, among exporting firms.

A specific concluding note should be made in regard to internal relations. Firstly, our analysis has shown that, even despite declared separation of strategic and operational decisions in many companies, this distinctiveness is pretty blurred and the decision-making process could be better structured. It seems that internal relations suffer of an understanding of social relations change during the transition that is too direct and is reflected in attributing to owners an excessive role and power in mana-ging companies; this is even more apparent, and even directly confirmed by responders, among smaller firms.

Secondly, we found specific problems in regard to the workers' position within the firms observed. The importance of workers' participation – from effective updating to workers' proposals and some decision-making – as a factor of harmonious internal relations affecting firms' performance, appears to be rather neglected. Moreover, there is an evident lack of traditional workers' rights regarding trade unions, and collective bargaining that sporadically appears; it is, predominantly, just as a legacy among 'old' companies. Some explanation could be found in poor institutional arrangements of workers' rights and high unemployment rates in the local labour market. It can also be attributed to excessive blame on the self-management legacy for all difficulties suffered since the 1990s, instead of blaming wrong political choices. On the other hand, we find that the extent of workers' satisfaction and loyalty to the firm firmly depends on well-ordered internal relations along the entire agency chain – owners, managers, workers and on the level of workers' rights protection.

Finally, we have found a specific difference in recognising various forms of intangible capital within smaller firms that exhibit both unawareness concerning the matter and exceeding self-confidence among their owners. We consider that this attitude is a consequence of low level knowledge, a poor institutional (ineffective regulatory framework) and economic environment (high unemployment, absence of competition). However, a low level of recognition of possible support that could be provided by public consultants, economic associations and the educational sector to small entrepreneurs leads us also to conclude that some important reforms should take place in these institutions.

The basic conclusions presented above have led us to some policy suggestions: more active industrial policies that will support export-led growth, enhance the production of tradables and make the country attractive for higher tech foreign investments should be implemented. According to our findings, the companies to emerge and/or develop under such policies will eventually acquire better understanding and proceed to broader undertaking of intangible investments. We also recommend that more attention should be paid to the overall economic and business education, in particular including a deeper study on human resource management, upgrading internal relations and marketing management and strategies, as well as various forms of entrepreneurial training. Special care should be dedicated to smaller enterprises and incentives for their networking and/or clustering should be provided, since such firms currently act more or less as individuals on their own, and this prevents them from improving their competencies, relational capital and other forms of intangible capital upgrade. Finally, we suggest that industry associations, employers' associations, chambers of commerce and trade unions be better institutionally positioned and designed in a new manner so as to respond more effectively to ongoing changes and the global economic environment.

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CORPORATE SOCIAL RESPONSIBILITY AND SOCIAL DIALOGUE IN HUMAN RESOURCES MANAGEMENT IN THE BANKING SECTOR IN GREECE: A CASE STUDY OF ELDER BANK EMPLOYEES

MILTIADIS STABOULIS[a*], GRIGORIS ZAROTIADIS[b]
[a]University of Macedonia, Greece
[b]Aristotle University of Thessaloniki, Greece

Abstract
Corporate Social Responsibility constitutes a powerful tool for Greek Banks for the development and formulation of their public image. However, many times this does not conform to socially accepted practices in the management of their human resources. In this current phase of economic crisis and restructuring in the banking sector some crucial issues have emerged. A major one is the problem of supporting and encouraging the employment of elder employees in a framework of practices, principles and values, which embed internationally accepted standards emanating from CSR and HR management. Balancing the public image of banks in relation to a difficult social reality regarding the issue of elder bank employees goes through the formulation of a consultation and social dialogue system including all social factors involved. In this article we propose the development of a structured system for public consultation and social dialogue based on primary research on a weighted sample of elder employees and managers of banks, as well as trade unions heads. This system will comprehensively address the issue of active ageing in the banking sector by proposing effective actions and solutions per policy area: awareness, using awareness indicators, maintaining employment and supporting career pathways, combating stereotypes related to age, etc. The proposed consultation system aims to increase transparency, collegiality and quality in decision making processes. The consultation system is governed by general principles, stages, fields and levels of social dialogue and takes into account the conditions for the development of social dialogue mechanism. The authors believe that the system proposed is also applicable in other branches (provided necessary adaptations are made); therefore it provides a useful tool for applying a policy dealing with worsening labour relations in the context of current circumstances.

JEL Classification: J52, J53, J71
Keywords: Corporate Social Responsibility, HR Management, Active Ageing, Social Dialogue

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**Corresponding Author:* Prof. Miltiadis Staboulis, University of Macedonia, Department of Educational and Social Policy, 156, Egnatia Street, GR-54636 Thessaloniki, Greece, e-mail: staboulis@uom.edu.gr.

Introduction

Managing human resources at a time of demographic ageing is one of the main challenges developed countries are facing today. According to the United Nations, ageing of the population from the vantage point of increased average life expectancy is a positive fact on which the recent term "active ageing" is based. According to the World Health Organization (WHO), active ageing is "*the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age*." In this context, the term "active ageing" implies that older people can participate in economic, social, spiritual, cultural and political activities besides being capable of physical activity or work.

A normal professional life plays an instrumental role in promoting active ageing. As a result, occupational health and security decisively contribute towards ensuring active ageing through a more satisfying and longer-lasting professional life. Working in the best possible conditions also promotes cooperation between younger and older generations.

Undoubtedly, the issue of active ageing is multifaceted to the extent that it concerns the processes of and the time frame within which people are entitled to retirement from professional life; it also concerns their state of health, their ability to respond to laborious tasks, their income status and living standards, their social participation and their relationships with their extended family and social environment. Enactment of generous legislative provisions and implementation of programmes designed for early retirement, as well as lack of incentives for older employees so that they can continue their working lives have inevitably had adverse consequences for public finances, particularly during the current period of economic crisis. On the other hand, there are moral implications involved in all this in regard with maintaining stereotypes and discriminations.

Statistics published by European organizations bear proof to the fact that Europe is ageing. According to Eurostat's latest set of population projections, the comparison of age pyramids for 2013 and 2080 shows that the EU-28's population is projected to continue to age. In the coming decades the high number of baby-boomers will swell the number of elderly people. More specifically, EU-28's population is projected to increase to a peak of 525.5 million around 2050 and thereafter gradually decline to 520 million by 2080. This ageing is visible in the development of the age structure of the population and it is reflected in an increasing proportion of older people and a declining share of younger - working age - people in the total population and the labour market. The EU employment rate for those aged 55-64 rose from 50.1% in 2013 to 51.8 % in 2014. Sweden recorded a very high employment rate in this age group (74.0%), followed by Germany (65.6%) and Estonia (64.0%). Greece is among the countries with the lowest employment rates for people aged 55-64 (34.0%). As a result of the population shift to older ages, the EU-28's old-age dependency ratio

is projected to almost double from 27.5% in 2013 to 51.0% by 2080. The total age dependency ratio is projected to rise from 51.1% in 2013 to 77.9% by 2080.

It is no coincidence then, that, in Europe, the importance of ageing of the population and, as a result, that of the work force has been acknowledged since the beginning of the 20th century. Successive European Councils (Nice, Stockholm, Gothenburg, Laeken, Lisbon) have acknowledged the need to deal with the consequences population ageing has for European social models. The European Commission makes certain recommendations based, *inter alia*, on the revised Lisbon Strategy for Growth and Jobs, so that the EU may benefit in the best possible manner from the opportunities offered by the extension of lifespan and inaugurate demographic renewal and solidarity among generations, which constitutes Objective 3 of the Strategy. Active ageing is a substantial element in the Europe 2020 Strategy, the success of which depends – to a large extent – on the provision that elderly people have the capacity to make full contribution in and out of the labour market. Elderly people should be enabled to remain active as working people, consumers, caretakers, volunteers and citizens. In this context, the European Commission implemented the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) in 2011; this partnership attracted a wide range of interested parties who agreed on a coordinated attempt to deal with the problem of ageing population. The European Partnership has set the goal to increase healthy life expectancy of EU citizens by two years until 2020 and it aims to achieve a triple benefit for Europe:

- Improvement of health and quality of life for elderly citizens
- Increase in sustainability and efficiency of social and healthcare systems
- Creation of opportunities for businesses development.

It is, therefore, important for businesses to adopt adequate solutions in order to implement ageing management measures – particularly ones which promote active ageing, thus enhancing the presence of elder employees in respective jobs. In order to address the challenges of demographic change, managers' as well as specialized professio-nals' main mission should be to design, communicate and realize suitable strategies on active ageing and knowledge dissemination among different generations of employees within their respective companies. Managers also play a highly significant role as it is they who develop strategies aiming at improving the quality of work conditions.

Besides, reforms are really meant to provide businesses with incentives so that they can adjust to changes in the economic climate – incurred by the economic and fiscal crisis - thus allowing closer alignment between salaries and productivity (at industry level), enhancing price competitiveness and promoting labour redistribution. The industrial relations system – or, at least, some of its elements – has, therefore, become central in reforms, thus constituting ground for consultation and social dialogue. The notion that industrial relations constitute significant ground for social consultation

amidst the ongoing economic crisis goes side by side with the belief that by improving working conditions and keeping employees satisfied a company can succeed in pursuing a socially sensitive profile.

The turbulent times incurred by the economic crisis could not spare the Greek banking sector which – during the period preceding the crisis – was characterized by the emergence of new, non-traditional forces. Those forces were primarily strengthened by a series of strategic agreements with groups both inside the country and abroad, which were ratified in the form of mergers and acquisitions, thus leading to substantial changes in the working environment to which human resources had to adjust. Issues such as the institutional liberation of the banking system, enhancement of the growth rate of the Greek economy, readjustment of the guidelines and the supervision of Credit Institutions, as well as technological advances in the field of Information and Communication Technology systems have helped transform the Greek banking system to its current shape.

However, when the economic and fiscal crisis hit the country, new restructuring and adaptation needs emerged, since domestic systemic banks were impelled to proceed to successive mergers as well as shrinkage practices through the introduction of voluntary redundancy schemes. These changes led to a substantial percentage of human resources being forced to early retirement, thus fostering all those conditions which render application of ageing management measures and promotion of active ageing in the Greek banking institutions imperative.

Therefore, in the context of measures taken to deal with the consequences of the economic and fiscal crisis and in light of "corporate social responsibility", the issue of changing human resources management systems has become timelier than ever before (Kotsiris, 2003).

This article endeavours not only to analyze the existing situation regarding the phenomenon of active ageing in the Greek banking sector, but also to make suggestions as to how to develop a comprehensive consultation system with the aim of promoting transparency in decision making processes as well as collegiality and quality. The main objective is for the consultation system to be governed by general principles, stages of social dialogue as well as fields and levels, taking into consideration the conditions for the development of social dialogue mechanisms in addition to the aspirations of Greek bank administrations to demonstrate their socially responsible role.

1. CSR in the financial sector – The case of Greek Banks

Dealing with the issue of Corporate Social Responsibility (CSR) – a concept which ever more increasingly is associated with the image of businesses – seems timely now that international adverse circumstances render business competitiveness susceptible to evaluation on the basis of quantitative and economic criteria, as well as criteria related to corporate attitude to major social issues (e.g. unemployment, pollution).

CSR strategy serves the principles of sustainable development while creating benefits for the entire society, the environment and the business itself (Elkington, 1994). Specifically, CSR functions as an evaluation tool of business practices through multifa-ceted assessment of their economic, environmental and social activities and operations (Werther and Chandler, 2006). These constitute the "triple bottom line" (3BL) of a business, which is defined as "business solutions and choices, while being socially responsible, environmentally sound and financially viable" (McIntosh *et. al*., 1998). By adopting socially responsible practices, albeit seemingly costly, the company image is boosted and its efficiency is enhanced in the long run (Pamboukis, 2007), since businesses thrive in a prosperous society. Some people would argue that CSR is a gimmick of businesses, a marketing tool which will help improve their reputation or attract socially conscious institutional investors and consumers (Belidis & Kargidis, 2009).

We site the example of the Italian "Banca Etica" which, amidst the economic crisis, managed to increase its revenue by 30%. It is a financial institution governed by moral values, which operates in terms of social awareness through funding projects and activities driven by social and environmental values. Reservations drastically increase when those supporting CSR comprise companies which are not reputed to be compliant with labour or environmental legislation.

Corporate Social Responsibility as a concern for the improvement of the working environment and employee satisfaction is expressed in adopting measures for a fair compensation system, exploitation of skills and initiatives, respect and solidarity, health and security at the workplace, achievement of work-life balance, etc.

Discussions about Corporate Social Responsibility in the banking sector date back to 2002, when the European Banking Federation in cooperation with the banking unions European Saving Banks and European Association of Cooperative Banks and the trade union UNI - Europa Finance (Banks) took the initiative – in the context of a wider dialogue – to promote CSR in the banking sector through special actions, since it is clear that the mission of a really viable bank cannot be exclusively determined in terms of maximizing shareholder value and satisfying customers; indeed, it should incorporate broader sustainability objectives (Gelder, 2006).

Organizations operating in the banking sector have eagerly introduced social responsibility practices into their business activities, thus cooperating with a wide range of NGOs, agents, associations, etc. A research study conducted by the Labour Institute of the Hellenic Federation of Bank Employee Unions has shown that Greek Banks are reputed to have been particularly responsible corporations within the Greek community, which is proved by their socially responsible practices, the awards they have received, their participation in domestic and international initiatives, the disclosure of social reports and their substantial donations to charity and public benefit projects (Lidorikis, 2006).

These "socially responsible practices" include investments in human resources, health and security, as well as change management (Kotsiris, 2003). Given the importance of "human resources" for the competitiveness of businesses, Greek banks are taking a series of initiatives in order to improve the conditions in which their employees work and live (Pamboukis, 2006). More specifically, domestic financial institutions are striving to become "first choice" employers for new entrants in the labour market by offering career prospects based on merit, but also by promoting education and lifelong employee training programmes. Special reference is made to fringe benefits and compensation packages, as well as performance-related remuneration schemes. It is generally accepted, though, that the initiatives above mentioned constitute much more an effort on the part of businesses to promote staff loyalty and, as a result, increase productivity than a rational application of social responsibility practices in human resources. This particular estimation is corroborated by the type of educational modules, such as the formulation and application of codes of conduct for staff as well as internal communication processes.

However, the conditions recently created in the business environment of the banking sector, as a consequence of the fiscal crisis, have altered both the intensity and the type of SCR practices applied by Greek banks. The prevalence of a business model oriented towards maximizing shareholder value and intensification of competition have impelled banking organizations to adopt new models of management and human resources rewarding (e.g., setting of targets), which have proved to have particularly adverse effects on the physical and mental health of employees.

It is worth noticing that, while the majority of Greek banks include the role of trade unions and/or collective agreements in their social reports, in reality only a few of them elaborate on the matter by placing emphasis on a wider range of trade union related issues, such as:

- employee participation in "managing change" (e.g. in the case of restructuring)
- adherence to collective bargaining and agreements
- the operation of European Employee Councils,
- participation of employee representatives in committees and the Board of Directors of the bank.

The rest of the measures regarding human resources management, which appear in social reports of banks, bear relevance to CSR to a varying degree, ranging from initiatives aiming at promoting volunteerism to commitments guaranteeing equal opportunities and work diversity. Rarely, however, do they make any reference to actions of crucial importance, such as measures targeted at ensuring work-life balance. Finally, extensive reference is made to health and safety issues and the self-evident compliance of banks with the existing regulatory framework (Efstathopoulos, 2009).

It is worth mentioning, though, that the economic and fiscal crisis have contributed to a rapid decrease of phenomena according to which CSR, in all business sectors,

used to function mainly as a marketing and public relations tool, since consumers now appear to have much more acute intuition for "corporate hypocrisy" (Klara, 2011; Quelch & Jocz, 2009). On the other hand, however, the view that CSR is a "redundant" flexible expense has become common belief nowadays, since businesses are being faced with serious cash flow problems and even have to struggle for survival. In general, the recession has led to a prevalent tendency of reducing the budget for CSR initiatives, especially at a time when demand for these very actions has increased considerably. Amidst crisis, therefore, businesses adopt a more conservative and defensive strategy (Ellis & Bastin, 2011; Harwood, Humby & Harwood, 2011; Yelkikalan & Köse, 2012). Njoroge (2009) indicates that, due to the crisis, CSR initiatives or policies, mainly in their social dimension, decrease in number and range, are postponed or even cancelled.

2. The dynamics of restructuring in the Greek banking sector and the issue of bank employee ageing

Globalization - over the last few decades in particular - has impelled the banking sector to proceed to intense restructuring and reforming. Furthermore, due to rapid developments in technology (Moerou, A. 2013) resulting in internationalization of economic transactions, there have been noticeable changes in the international banking system, which now plays a primary role in the modern financial system. Changes in our life style and purchasing habits, changes in the way banks operate now and changes in the market, as well, have imposed highly important competencies on Human Resources Management, since – after all – it is human resources that are being reformed. Every bank should set the objective of making the most of their human resources in order to improve competitiveness, create successful leaders and provide the organization with the competitive advantage of their human capital. According to Broker (2009), Greek banks will be able to cope with these new developments at a European level only if they apply new organizational methods, reduce operational costs and, mainly, improve the quality of their human resources. Due to the fact that the financial system presents increased difficulties as far as operations and products/services are concerned, it is imperative that employees be constantly trained in order to be equally competitive with their counterparts in other European countries. Prosperity and progress of banking employment depend upon factors such as expansion of the banking system into new markets and human resources' adaptation to new prospects.

Modern employees should possess specialized knowledge and be able to take on responsibilities and take initiatives when this is needed. Employees have ceased being passive clerks responsible only for following orders and have now turned into active members of the Organization's dynamics. Their attitude is determined by the mission, the vision and the values of the Organization but, also, on some occasions, by customer expectations (Grensing-Pophal, 2006). It is also typical that advances in

technology themselves determine different models regarding job description. Some posts have been altered due to the use of technology tools and are being re-evaluated in order to be in compliance with the demands imposed by the new reality (Britt, 1995).

On this basis, participation of financial sector employees in procedures related to the administration and operation of the bank, as well as its capital and gains, is emerging as a modern institution bearing social and economic value. Respect for the institutional rights of bank employees during the production process, the process of transference or merger of banking institutions, as well as the process of public bid submission for the acquisition of a banking institution, contributes to improving the quality of the employees' working environment as well as to increasing bank productivity, and it does it in a creative way. What is considered equally important is, of course, the degree to which bank employees participate in decision making processes of the administration, as well as in developments of social dialogue with the European Employee Councils and trade unions. All this is considered to additionally contribute towards increasing the quality of services rendered and restoring bank-customer relations disrupted due to the recent fiscal crisis.

According to a study conducted by the Labour Institute of the Hellenic Federation of Bank Employee Unions (2007), the most important characteristics of takeovers and mergers in the Greek banking sector are the following:

- in most cases serious problems appeared in "domestic takeovers" (mid 1990s), privatizations of state concern banks and their mergers with private banks, which acquired them without any significant participation of foreign capital or foreign banks whatsoever throughout the process.
- in the new "surge" of buyouts – the dominant part of which concerned cross-border and in some cases hostile takeovers – employees had to face some serious problems, such as job losses, which resulted in significant reduction in employment (approximately 25% of the original human capital of the bank acquired) mainly in the case of domestic banks[1], "voluntary redundancies" following takeovers and mergers in some other banks insecurity for the employees regarding the terms and prospects of retaining their jobs, authoritative behaviour on the part of executives of the acquiring bank to the staff of the acquired one; all this resulted in weakening sectoral and collegial consciousness.

1. For example, ALPHA BANK, after taking over Ionian Bank, showed a reduction in employment by 12.9% in 2002, in comparison to human resources of both banks in 1998. Former Ergasias Bank (taken over by E.F.G. Eurobank) reduced its initial human resources by 32%; former Cretan Bank (taken over by E.F.G. Eurobank) by 29% ; former Macedonia-Thrace Bank (taken over by Piraeus Bank) by 16.5%.

It is worth mentioning that voluntary redundancy is a programme for managing human resources in the context of the obligations imposed by the restructuring plan recently approved by the DG Competition of the European Commission. The ongoing economic crisis and mergers have forced domestic systemic banks - one after another - to introduce voluntary redundancy schemes. By reducing their staff Greek banking institutions are striving to curtail their operational costs to about 40% of their revenue by 2018. Further objectives of voluntary redundancy schemes concern staff renewal, reduction of average employee age by 8-10 years (the figure reflects the situation in four systemic banks), further modernization of banking transactions and operations (shift to new products and services).

When examining the parameters of voluntary redundancy schemes which have already been implemented by four (4) banking institutions one can come to the conclusion that:

- the right to take advantage of voluntary redundancy schemes applies to all members of staff on indefinite contracts. The only exception to this rule is the National Bank of Greece (NBG), which has drawn out four (4) different programmes to accommodate four different categories of staff based on criteria such as age, the right to retirement due to old age, etc.
- the severance pay intended for voluntary redundancy applies to all types of schemes and concerns a) statutory compensation, b) additional incentives based on age, marital status, length of service, etc.) other benefits (e.g. hospital care, counselling, etc.). It is worth noting that in the case of the National Bank of Greece additional incentives are only provided by two of the four programmes, while in none of them are there arrangements for bank loans to the staff, contrary to the other three banking institutions.

The figures themselves reflect the situation in the labour market of the banking sector highlighting the clear tendency for staff reduction. To elaborate on this, according to the Labour Force Survey conducted by the Hellenic Statistical Authority (EL.STAT.) on a quarterly basis, the number of staff members employed in the financial and insurance sectors during the fourth quarter of 2014 was 84.2 thousand, whereas for the same quarter of 2012 it stood at 101.5 thousand, which reflects the clear tendency of Greek banks to reduce their staff. As for the age distribution of those employed in the financial and insurance sectors, in the fourth quarter of 2014 employees aged 45-64 accounted for 35.6% of the total number of staff, whereas for employees aged 30-44 the respective percentage came to 57.8%.

The number of bank employees over 45 years is estimated to have drastically decreased in 2014 through the introduction of voluntary redundancy schemes by systemic banks, which strengthens the will or desire of employees to switch to other employment environments in the broader financial sector or - quite often - leave the labour market. In this specific environment of rapid changes, and witnessing the developments in industrial relations in the banking sector, the Interbanking Train-

ing and Documentation Centre has taken the initiative to carry out a project titled "Encouraging active participation of elder bank employees in employment".

In recent years and in the context of an overall apprehension concerning the issue of demographic ageing of the population in Europe, greater emphasis has been given on issues regarding the position of elder people in the 55-64 age group in the labour market and, generally, their participation in socio-economic life.

An active ageing policy aims at creating greater employment opportunities for elder citizens in the European Union. To achieve this it is imperative that working conditions be improved, employees be better informed and retrained, as well as life-long training programmes be designed. At the same time, it is necessary that taxation and benefit systems be revised so that elder individuals are encouraged to work for a longer period of time.

The object of the project mentioned above was to initiate support actions for elder citizens who often face a series of problems, such as work-related stress, risk of losing their jobs as a result of continuous mergers and changes in proprietary status, reduction of benefits and salaries, etc.; these problems need to be addressed so that the position of elder citizens in the labour market may be strengthened through a number of actions aimed at educating/training them, certifying their skills and competencies and facilitating their mobility in the broader financial sector.

In order for these objectives to be achieved a primary research study was carried out among those directly involved in the banking sector, that is, bank employees, Human Resources Managers in Greek banks and representatives of fist-level bank employee associations. During the primary research 70.3% of respondents were working in banking institutions. At the same time, a particularly large percentage of them were in the process of taking advantage of the voluntary redundancy scheme introduced by their banks. Only 3.8% of respondents had either been dismissed, or taken a sabbatical or were already out of work.

The most important findings of the primary research carried out among bank employees are the following (Interbanking Training and Documentation Centre, 2014):

- Concerning the importance of individual needs of bank employees in the 50+ age group, 46.2% of the respondents stated that banking institutions were taking into consideration these needs to a varying degree, ranging from adequately to highly.
- About 38% of male samples sustained that there should be more favourable terms in their current jobs, whereas 44% of female samples said that they would wish to stay on doing their jobs under the existing terms.
- The overwhelming majority of respondents (73%) were opposed to the likelihood of working part-time until retirement age. This pattern remains the same for both male and female samples.

- Finally, bank employees in the 50+ age group stated that they would wish to receive certified training - provided by Interbanking Training and Documentation Centre Support Structures - so as to remain in the labour market (15.7%), whereas 12.4% of respondents expressed their need to attend continuing vocational training programmes. Moreover, other services were also desirable, such as support programmes for employee mobility in and out of the banking sector (9.7%), information about new employment opportunities (8.1%), as well as counselling (8.1%).

When it comes to factors which hinder participation of bank employees in the 50+ age group in training programmes, respondents made particular reference to the following:

- Lack of incentives, since the seminars offered are either not subsidized, not recognized, or not offering certification
- The scheduling of seminars
- Lack of free time, considering that most elder employees have family commitments
- Primary research has made known the notion that elder employees can respond to the demands of their work to a high degree, a fact which, on the other hand, comes partly in contrast to the trends prevailing in the conditions of the labour market in the banking sector; according to these trends, the average age of bank employees is low, on one hand, while, on the other, the number of employees participating in voluntary redundancy schemes is high. This fact reflects and corroborates the findings of secondary empirical research, according to which no significant attempts have been made to retain elder employees in the labour market of the banking sector.

However, the most significant element that derives from primary research and concerns bank employees themselves is the fact that the overwhelming majority of samples did not attend any continuing vocational training programme whatsoever in the last three years (from 2012 to 2014). This is corroborated by a number of inhibiting factors, such as lack of interest on the part of employees themselves to upgrade their qualifications and lack of time. On the other hand, banking institutions themselves or bank employee trade unions do not run training programmes tailor-made to the needs and specific characteristics of elder employees, nor do they make any attempt to motivate them to participate in such programmes.

3. Proposal for active ageing policy implementation in the Greek banking sector – facilitation through structured social dialogue and the involvement of CSR

Despite the magnitude of the problem in Greece, the issue of active ageing appears on the national political agenda basically via the European political agenda. It is

estimated, however, that for Greece, as well as other EU member states, managing active ageing, that is, supporting and maintaining employment of elder work force, is particularly important in order to sustain economic growth, social protection systems and the standard of living in general.

In the present-day situation and on the basis of the characteristics of the Greek labour market, the first priority of employment policies is obviously to reduce unemployment regardless of age and to better exploit human resources in general. In a long-term perspective, however, increasing participation of elder employees in the labour market presupposes significant policy changes in many fields, such as education, the labour market, mechanisms securing equal opportunities and social security system organization. If banking institutions adopt such measures, this may contribute to confining or even eliminating the causes which lead employees of the target age group out of the work force.

However, it is worth noticing that adopting measures aiming at managing active ageing effectively should, in no case, be done in a discontinuous or incidental manner, nor should it last for only a short period of time; on the contrary, it should be a continuous process, which – in order to bring successful results – calls for constant monitoring and evaluation, valid designing and implementation and, most importantly, full support by all parties involved (Management, Human Resources Management, executives of other departments, as well as employees themselves).

In order to enhance active ageing by providing better and longer lasting careers to elder employees several reforms are needed:

- Change of mentality, which, in turn, will help shape fair and appropriate treatment of elder employees;
- Reform of the management practice implemented, so as to enhance and exploit the advantages of elder employees;
- Reforms in the working life, which will create an amicable working environment for all generations of employees;
- Retirement reforms, which will take into consideration major individual differences among elder employees, thus providing flexible retirement eligibility age limits as well as financial incentives in order for employees to prolong their working life;
- Organizational reform in order to improve cooperation of various agents and factors that influence the quality level as well as the extension of working life;
- Reforms in health care services in order to strengthen proactive and preventive occupational health services.

Age management practices applied at the workplace in Europe reflect the fact that businesses address ageing issues either under the concept of "problem solving" or that of "prevention". Because of poor information about ageing issues, businesses deal with the situation on a pretty tight budget and by lowering job requirements

for elder employees ("problem solving" approach). Through perceiving ageing more as a challenge or an opportunity, companies which opt for prevention take care to reinforce the development of individual resources among their staff and facilitate transgenerational learning. The best case scenario, in the context of age management, is to adopt a lifelong approach and offer equal opportunities to all generations (IImarinen, 2012).

Lack of relevant literature corroborates the fact that no active ageing management measures are being taken in the banking sector, either by employee associations or by banking institutions. On the contrary, banking institutions take discontinuous measures primarily aiming at contributing to a harmonious work-life balance for their employees and/or guaranteeing health and safety conditions at the workplace, regardless of the age group the staff belong to.

Therefore, initiatives to implement projects related to the issue of active ageing - through a multifaceted approach with regard to actions taken and target groups involved – are not only a prerequisite for the maturation of integrated strategies in the particular sector, but also indicate that the development of a model for social dialogue among all parties involved (government officials, social partners, employees) should be opted for with the view to promoting regulations and initiatives so as to manage elder employees effectively.

At times of growth there are often cases of consensus, good practices and mutually beneficial social dialogue, which are absolutely anticipated, since for as long as there are gains to share, the cases of win-win negotiations appear more frequently. On the contrary, at times of crisis, trade unions often raise the issue of allocating losses, costs and loss of benefits (concession bargaining) in order to secure or even spare employment in the respective sector.

As further elaborated in a report on Social Dialogue, good practices in the banking sector (Georgakopoulou, 2012) - undertaken in the framework of the project Di@logos.net - in counties where the tendency for staff redundancies due to restructuring pre-existed, trade unions have already gained significant experience in making interventions in order to prevent or minimize layoffs through social dialogue. However, at times of prolonged crisis, when employment is under strong pressure combined with high unemployment rates and restructuring efforts in the banking sector, the conditions created are particularly adverse; in fact, they constitute a potentially explosive mixture, as in the cases of Spain, Greece and Portugal.

In these countries, similar to Belgium and Italy, employment protection has always ranked high in the priorities of trade unions, which have strived to succeed in reaching balanced and consensual agreements through social dialogue procedures in order to limit adverse consequences on bank employees.

In most countries the banking sector has traditionally been characterized by high levels of stable employment and low rates of flexible employment forms (e.g. temporary or occasional employment, etc.) in contrast to other sectors of the

economy. Today, under current circumstances imposed by the fiscal crisis, we are witnessing a clear trend for employment destabilization combined with reduction in investments, ongoing or impending restructuring in the banking sector and, in some cases, direct government interventions in order to weaken labour legislation on issues of mass redundancies and introduction of flexible employment schemes. Equally important is the pressure exercised to ensure increased labour mobility - both internal and external; these pressures can become particularly intense in cases of takeovers and mergers and are combined with the promotion of international activities and procedures aiming at outsourcing operations.

In parallel, bank administrations, in their attempt to reduce labour and operational costs in general, are introducing measures aiming at restructuring working time as well as salary development policies through expanding labour cost variables at the expense of constants (e.g. by setting individual quantitative targets and arranging salary rates based on performance, etc.)

In this context, bank employee trade unions are opposed to such developments demanding weighted solutions when managing structural changes and addressing employment problems. At times of crisis there is an increased need for centralized agreements (at sectoral and/or inter-professional level) aiming at applying long-term, weighted solutions when dealing with unemployment, solving core economic/social problems, etc.

In the time preceding the onset of the crisis, social dialogue in the banking sector had gone through several stages. For decades there had been strong government intervention in the sector combined with the absence of an institutionalized negotiating counterpart of the Hellenic Federation of Bank Employee Unions at sectoral level, which had led to industrial relations becoming heavily subject to political interference. The attempt to resolve any labour and insurance problems had generally been based on direct dialogue or, quite often, on trade union confrontation with the government or even government intervention in negotiations.

Despite the serious problems related to shedding government dependence in the decade from the mid 1990s to the mid 2000s, several common bargaining grounds between the Hellenic Federation of Bank Employee Unions and the administration of banking institutions were found. At that time there were several innovative interventions, such as: the study and pilot implementation of a 35-hour working week in the banking sector; approaching issues such as gender equality, bank security, problems related to modernization of the banking system, education; and, the bilateral Sectoral Labour Observatory, which operated as a statistics service of the sector in matters of employment and industrial relations. Unfortunately, this Observatory operated only for a short period of time.

Around the mid 2000s and as a result of the first surge of buyouts, mergers and privatizations in the sector, all interventions mentioned above - gradually weathered and stopped, since the state had de facto lost its role as the prime employer in the banking sector and, consequently, its role as the privileged counterpart of trade

unions in negotiations and its power to influence directly and decisively decisions made by private banks. Meanwhile, private banks, which now dominated the sector, were not interested in investing in any procedure of meaningful dialogue whatsoever, at the sectoral level.

Today there are three (3) basic aspects in the national industrial relations systems (Georgakopoulou, 2012):

Collective bargaining levels

In recent years there has been a clear tendency for decentralizing collective bargaining at industry level on the grounds that, this way, "better and faster adaptation of employment to the real needs of businesses and markets" is achieved, particularly when the latter is under pressure by the crisis and operate in a state of deregulation. Decentralization in Greece is unilaterally promoted by the Government with a view to eliminating sectoral agreements to the benefit of collective agreements at industry level, or to establishing overall prevalence of individual agreements, which has been pursued by certain employers in the sector over the last few years[2].

Union density

Trade union density in Greece is as high as 85%, due to a successful attempt on the part of the Hellenic Federation of Bank Employee Unions to set up trade unions in all banks. In long-established, traditional big banks, mainly those formerly of a state character, union density reaches 100%. However, in private and, in particular, foreign banks, union density is significantly lower. Trade unions themselves strive to attract new members, but also to retain their credibility among existing members, who, due to the ongoing crisis, feel particularly in need of union protection. Therefore, the bigger the protection trade unions provide to their members (through satisfactory Collective Employment Agreements and effective interventions in all areas), the higher the probability of their retaining already existing members and having new ones enrolled, thus increasing union density.

Percentage of sectoral collective coverage

In our country sectoral Collective Employment Agreements cover at least 70% of employees, a percentage which extends to 100% by decree. That was the case until the end of 2011, when the possibility of sectoral CEAs to extend was suspended until 2015.

2. In Greece, the principle of favouring convergence between Collective Agreements at sectorl and industry level was abolished at the end of 2011 by law, effective until the end of the Support Programme EU-ECB-IMF in 2015. This accommodated a number of Collective Agreements at industry level in the banking sector, on the basis of which salaries can decrease without generally impacting minimum sectoral rates.

In the Greek banking sector collective bargaining is mainly carried out at national level; employers are represented by the Greek Bank Association, despite the fact that the banks deny their role as employers, whereas employees are represented in negotiations by the Hellenic Federation of Bank Employee Unions. Collective bargaining and collective agreements at industry level, concluded between the most representative individual trade union and the respective employer, until the end of 2011, had only a supplementary role to that of sectoral CEAs and regulated issues such as:

- Additional fringe benefits not foreseen/provided for by sectoral CEAs, depending on employee position in the bank, specialization, special conditions or job requirements (e.g. tellers, dealers, computer scientists, etc.);
- Fringe benefits for bank employees related to issues such as holidays, family support, etc.;
- Additional service recognition (in relation to sectoral CEAs), training, team bonuses and (rarely) systems for performance evaluation, promotion and career advances to executive level;
- Certain absolutely necessary exceptions to the sectoral (institutionalized) working time scheme, which only concerned certain individual branches and executive services, on the basis of minimal frameworks and rules set by the sectoral Collective Employment Agreement of 2006-2007.

Consultation mechanisms have been developed and consolidated in the banking sector both at sector and industry levels. Of course, now that the sector is being adversely affected by the economic crisis, participation in social dialogue procedures has decreased whether such processes are formal or informal. Formal procedures, for example, include voting to elect representatives at various levels of union representation, as well as direct voting on highly significant matters. Informal procedures include active participation of employees in work meetings, training groups, cultural issues, planning, etc.

Although there is an institutional distinction between formal and informal participation, these two types are interdependent, and moving from one type to the other is absolutely permissible and often deliberate in order to create a meaningful consultation culture. In order to duly understand and promote consultation culture, one needs to perceive employee participation as an overall strategy, which works like a network or a system; a mere change in one element can bring about changes in a number of coordinates. Similarly, exclusion of one group of employees can have an impact on relationships among all other groups.

In the context of collective bargaining, an active ageing promotion strategy is reflected in adopting regulations and implementing actions which enhance employment of elder employees while protecting them against labour exclusion. These measures are mainly related to the following:

- elimination of direct and indirect age discrimination practices in recruitment, dismissal or professional development of employees;
- work restructuring and improvement of working conditions for elder employees;
- provision of information and counselling services to Human Resources Managers on ageing management issues;
- implementation of actions targeted at training and improving employability of elder staff.

An integrated Social Dialogue process for the preparation of the programmes mentioned above is imperative, following stages precisely described in guidebooks and methodology textbooks. In total, there are **seven typical stages** which, ideally, run through almost every participation procedure. They can also be used as a check list by those responsible for the coordination of the procedure in order to monitor if all elements have been considered or whether some other parameters should, perhaps, be taken into consideration.

Stage 1: Preparation – Clarifying social dialogue mechanisms

It is the first stage of the procedure and the one which will eventually define the quality and dynamics of the final result. It is very important to precisely determine all participants on the basis of their representation and the extent of their involvement in the subject of consultation.

Stage 2: Communication with potential stakeholders

It includes targeted communication with agents who may potentially become involved in social dialogue procedures. This targeted updating is key to the success of consultation, since it lays the foundations so that everybody can participate in decision making processes. Particularly important for employees to be informed employees, since their elected representatives have a lead on this matter.

Dissemination of information, however, is more than a mere technical process. The way information is conveyed and disseminated configures the perception of every view to be tabled in the next stages of the process, thus laying the foundations for trust and opportunities emanating from it. Information has, of course, one more peculiarity: it can exist on its own. Information per se can have its own value and it does not need to be connected to the next stages of the participation process.

Stage 3. Implementation of social dialogue mechanisms

Such mechanisms include the operation of working groups, meetings, open and/or closed discussions, open consultation events, etc. The expertise of participants is collected both orally and in writing and is directly discussed at periodic meetings or

regular working groups as, well as through the Internet. Before every consultation, however, any viewpoints and information to be passed on to participants at the outset should be checked.

Stage 4. Decision making

It is reasonable to think that consultation results will be evaluated by the Federation so that it might reach the final decision.

Stage 5. Employee updating

The decision must be followed by informing employees about all ideas and suggestions presented, whether they were actually accepted or eventually rejected, justifying the reasons why those decisions were taken.

Stage 6. Implementation of the decision

Implementation of the decision should start immediately. Actually, in many cases, the role of employees should not be restricted to that of the recipients of the decision, but it should be extended to decision implementation.

Stage 7. Evaluation –Conclusion

This stage includes evaluation and symbolic conclusion of the consultation and this practice attributes the importance deserved to everything achieved so far and prepares the ground on which problems and shortcomings arisen during decision implementation can be identified and assessed.

The basic challenges most trade unions in the sector are facing today, which are worth constituting **fundamental modules in consultation,** are the following:

1. **Employment protection for elder employees** while, in parallel, **boosting the necessary solidarity** among different **generation employees** in the sector. In this context, it is imperative to seriously consider the necessity of implementing reliable diagnostic systems, identifying and meeting the needs of the target group, as well as guaranteeing equal opportunities of their members to accessing training.

2. **Management of working time of elder employees.** Asserting a more balanced and amicable working time scheme for employees without unauthorized time extension, or unpaid overtime, is undoubtedly the concern for all parties involved in the programme. Employers, however, raise the issue of flexible working time management as a means of sparing jobs. This flexibility, when used systematically and massively in order to reduce labour cost and prevent

dismissals (destabilization – individualization of working hours, reduction in working time, reflected in salary decrease, staff availability, job rotation, etc.), has serious consequences on the total revenue of employees, as well as their personal, family and social time, which is being destabilized and needs to be organized.

3. Education and training of elder employees. **Proper education and training, as well as reliable career management systems as a means of providing elder staff with a multitude of skills, thus safeguarding their employment during the crisis,** is a self-evident challenge. Investing in employees, guaranteeing continuous and reliable training support for all of them through the use of suitable systems, which can diagnose and respond to their needs as well as certify their competences, is a fundamental priority for trade unions. In many cases (e.g. Italy, Belgium, Portugal) this issue has repeatedly been the object of social dialogue resulting in specific frameworks and institutions.

4. Revenue protection and salary flexibility for elder employees. The **issues of guaranteeing employee income** in relation to the cost of living, austerity measures and policies for freezing or cutting salaries are the concern of most partners. Direct legislative government interventions in order for banks (the majority of state-owned, but private ones as well) to curtail salaries - contrary to what has been set by collective agreements – constitute a serious challenge and lead to friction.

5. Enhancement of **issues concerning Health and Safety** in the workplace.
   - **Full implementation of the European and national legislation** for employee protection;
   - **Dealing with work-related stress** and exacerbating factors (e.g. job insecurity, pursuit of targets and additional income (bonuses), etc.)

6. The role and **scope of collective bargaining** in the sector against government interventions, which either change data radically or cause tensions and serious problems in the social dialogue (mainly in Greece) on issues which concern active ageing management. Social dialogue should be promoted to the upper sectoral level so that long-lasting, comprehensive solutions, suitable frameworks, criteria and principles for dealing with any specialized business problems can be guaranteed. Furthermore, a crucial parameter in promoting social dialogue is the existence of a F42.2 under ICD 10stable, institutionalized negotiating counterpart of the Hellenic Federation of Bank Employee Unions at sectoral level, which will guarantee systematic consultation on sector issues.

4. Conclusion

The dialogue between managers and employees should be a continuous procedure, since managers are those who organize production and work processes as well as the work tasks of every employee. It is the managers who take all decisions concerning changes in work organization. Managers are also responsible for health and safety issues including evaluation of dangers and risk assessment.

Adapting work to the skills, competencies and health status of an employee should be a continuous and dynamic process based on adequate risk assessment. In the case of elder employees, adapting work to their health status and their needs should not be an additional burden on managers' shoulders. This is the reason why awareness of managers and supervisors on issues concerning employee age should improve.

In addition, public authorities and all partners involved should contribute to taking such measures. Those who are responsible for policy design at all hierarchy levels and ranks should realize the urgency of the situation and adopt a senior-age oriented approach, for example, by supporting those companies which adopt policies in their internal practice that are amicable to elder employees or by laying the foundations for sharing best practices among economic agents. Trade unions, NGOs and social partners can also play a role by focusing on how to improve collective awareness of the consequences of demographic challenge in society and by mobilizing the social groups concerned.

The aforementioned highlight the socially responsible character of Greek banks. Based on this character, and through actions of social dialogue focused on active ageing issues, we can increase human resources' satisfaction and improve the working environment. Furthermore, F42.2 under ICD 10 proposed is also applicable in other branches (provided necessary adaptations are made); therefore, it provides a useful tool for the policy applied to deal with worsening labour relations in the background of current circumstances.

In conclusion, a socially responsible institution has the capacity to attract and retain specialized work force, to take lifelong training action, to concede competencies and powers to employees, but also to keep them as best informed as possible regarding the institution's course and targets.

Moreover, a banking institution socially responsible to its human resources strives to promote better work/family/free time balance, workforce diversity, equal compensation and career prospects for all, naturally for women employees as well, profit sharing, as well as systems providing share capital equities. The institution also concerns itself with issues regarding employability and guarantees the principles of non-discrimination and non-exclusion. Finally, managing change includes measures for socially responsible restructuring that balances the interests and concerns of all those afflicted when a business proceeds to staff redundancies, merges or close-downs. All this concerns the internal dimension of CSR, as opposed to the external one, which applies to the business' relationships with its customers, suppliers, and the public in general, as well as to management of natural resources and protection of the environment.

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WHO PARTICIPATES IN THE UNDECLARED ECONOMY IN SOUTH-EASTERN EUROPE? AN EVALUATION OF THE MARGINALIZATION THESIS

COLIN C. WILLIAMS[a*], IOANA A. HORODNIC[b]
[a]University of Sheffield, U.K.
[b]Alexandru Ioan Cuza University of Iasi, Romania

Abstract
To evaluate the "marginalization thesis" which posits that marginalized populations are more likely to engage in the undeclared economy, a 2013 Eurobarometer survey of six South-East European countries is analysed. Finding that some marginalized populations (e.g., those having difficulties paying household bills, the unemployed, younger people) are significantly more likely to participate in undeclared work, but others are not (e.g., poorer nations, women, those with fewer years in formal education, those living in rural areas), the outcome is a call for a more variegated and nuanced understanding of the marginalization thesis. The paper then discusses the theoretical and policy implications.

JEL Classification: H26, J46, K42, O17
Keywords: Informal Economy, Underground Sector, Shadow Economy, Marginalized, Baltic region.

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*Corresponding Author: Prof. Colin C. Williams, Management School, University of Sheffield, Conduit Road, Sheffield S10 1FL, United Kingdom. e-mail: C.C.Williams@sheffield.ac.uk

Introduction

Since the turn of the millennium, a burgeoning literature has drawn attention to the growth of the undeclared economy and its important role in helping people secure a livelihood in South-East Europe and well beyond (Baric and Williams, 2013, Dzhekova and Williams, 2014; Dzhekova et al., 2014; Franic and Williams, 2014; Gaspareniene et al., 2014; Hudson et al., 2012; Kapelyushnikov et al., 2012; Morris and Polese, 2013; Remeikiene et al., 2014; Rodgers and Williams, 2009; Schneider, 2013; Wallace and Haerpfer, 2002; Wallace and Latcheva, 2006; Williams et al., 2012, 2013b). The consequent dominant view when considering who participates in the undeclared economy has been that those marginalized from the declared economy are more likely to engage in such work (Arnstberg and Boren, 2003; Castree *et al.*, 2004; Rubić, 2013; Sasunkevich, 2014; Surdej and Ślęzak, 2009). Known as the "marginalization thesis", this argues not only that people living in marginalized areas, such as less affluent countries and peripheral rural areas, are more likely to participate in the undeclared economy (ILO, 2012, 2013), but also marginalized socio-economic groups, including unemployed people and those in financial difficulty (Morris and Polese, 2014b; Round and Williams, 2008; Slavnic, 2010; Taiwo, 2013). Until now however, this thesis has been founded upon a weak evidence base of either small-scale surveys of particular localities or population groups (e.g., Christofides, 2007; Danopoulos and Znidaric, 2007; Liaropoulos et al, 2008; Loukanova and Bezlov, 2007; Lyberaki and Maroukis, 2005), or out-of-date surveys conducted in South-East Europe (Williams, 2010a,b; Williams et al., 2013b). Consequently, the aim of this paper is to explore who participates in the undeclared economy and in doing so, the validity of the marginalization thesis, using a contemporary extensive data set, namely a cross-national survey conducted in 2013 in six South-East European countries involving 5,567 face-to-face interviews.

To do this, the first section reviews the competing views on the participation of marginalized populations in undeclared work. This reveals that although the 'marginalisation thesis', which holds that marginalised populations are more likely to participate in undeclared work, is dominant, the emergence of a recognition that such endeavour is conducted out of choice rather than necessity and identification of a wider range of determinants of participation, have led to questions being raised about the validity of the marginalization thesis. Revealing that the only evidence supporting the marginalisation thesis are small-scale surveys of specific localities or populations, the second section begins to fill this gap by introducing the methodology section which describes the extensive Eurobarometer survey of participation in undeclared work conducted in 2013 in six South-East European countries (Bulgaria, Croatia, Cyprus, Greece, Romania and Slovenia). The third section reports the results. This displays that whether marginalization populations are more likely to participate in undeclared work depends on how one defines the marginalised. Al-

though some marginalised populations are more likely to participate in undeclared work, others are not, and yet others are significantly less likely. The fourth and final section then concludes by discussing the wider theoretical and policy implications of these findings.

Reflecting the widespread consensus in the literature and also the definition used in the Eurobarometer survey reported in this paper, undeclared work is defined here as paid activities not declared to the authorities for tax, social security and/or labour law purposes (European Commission, 2007; OECD, 2012; Schneider, 2013; Schneider and Williams, 2013; Vanderseypen et al., 2013; Williams, 2014; Williams and Windebank, 1998). If a paid activity possesses other absences or shortcomings therefore beyond not being declared, then this activity is not defined here as undeclared work. For example, if the paid activity involves trading goods and/or services that are illegal (e.g., illegal drugs), then this is not here deemed to be part of the undeclared economy but rather part of the broader "criminal" economy, and if there is no payment involved, then this activity is not undeclared work but part of the separate unpaid economy. However, and as with all definitions, there are blurred edges. One such question is whether paid activities reimbursed in the form of gifts or in-kind favours should be included. Here, such "paid" activity is excluded. So too are declared employees in declared jobs for their legitimate employer who sometimes receive part of their wage as a declared salary and an additional undeclared ("envelope") wage (Williams, 2009, 2010a,b). Instead, only paid activities that are wholly undeclared for tax, social security and/or labour law purposes are defined as undeclared work.

The participation of marginalized populations in undeclared work: competing perspectives

Competing views exist on the participation of marginalized populations in undeclared work. The dominant "marginalization thesis" holds that marginalised populations, which are usually loosely defined, are more likely to participate in undeclared work (Ahmad, 2008; Arnstberg and Boren, 2003; Castree *et al*, 2004; Rubić, 2013; Sasunkevich, 2014; Surdej and Ślęzak, 2009). A long-standing view at all spatial scales is that participation in undeclared work is greater in less affluent areas. This applies whether discussing global regions (ILO, 2012; Williams, 2014), cross-national variations (Roberts, 2013; Rodgers and Williams, 2009; Schneider, 2013; Schneider and Williams, 2013), local and regional variations (Williams and Round, 2008, 2010) or urban-rural variations (Button, 1984; Williams, 2014). It is similarly the case when discussing population groups. Groups marginalized from the declared economy are commonly viewed as more likely to participate in undeclared work. Unemployed people are claimed to be more likely to participate in undeclared work than those in declared employment (Castells and Portes, 1989; Slavnic, 2010;

Taiwo, 2013), women more likely to do undeclared work than men (ILO, 2013; Stănculescu, 2005) and those with financial difficulties more likely than affluent population groups (Barbour and Llanes, 2013; Smith and Stenning, 2006). Such a view is premised on the assumption that participation in undeclared work is a necessity-driven endeavor conducted as a last resort by those populations excluded from the formal labour market and social protection systems (Castells and Portes 1989; Gallin 2001).

However, this dominant marginalization thesis has been regularly contested over the past few decades. Based on the view that necessity is not the only factor driving populations to engage in undeclared work, it has been argued that it is not always marginalized populations who engage in cash-in-hand work. Indeed, several studies reveal that populations living in more affluent places are more likely to engage in undeclared work than populations in less affluent places (van Geuns et al., 1987; Williams et al., 2013), the unemployed less likely to participate than people in declared jobs (Balabanova and McKee, 2002; Kaitedlidou et al., 2013; MacDonald, 1994; Moldovan and Van de Walle, 2013; Pahl, 1984; Renooy, 1990; Williams, 2001), women less likely to participate than men (McInnis-Dittrich, 1995; Williams, 2011) and those with financial difficulties less likely to conduct such work than more affluent population groups (Neef, 2002; Williams, 2004; Williams et al., 2013).

Analysing the evidence base underpinning these marginalization and/or reinforcement theses, it becomes quickly apparent that the supporting evidence is derived largely from small-scale studies of particular nations and of particular population groups and/or places, such as the small-scale studies conducted in Bulgaria (Centre for the Study of Democracy, 2008; Chavdarova, 2002; Loukanova and Bezlov, 2007), Cyprus (Christofides, 2007), Greece (Danopoulos and Znidaric, 2007; Karantinos, 2007; Lazaridis and Koumandraki, 2003; Liaropoulos et al, 2008; Lyberaki and Maroukis, 2005; Tatsos, 2001), Romania (Ghinararu, 2007; Kim, 2005; Neef, 2002; Stănculescu, 2002), Serbia and Montenegro (Benovska-Sabkova, 2002) and Slovenia (Ignjatović, 2007). Indeed, the only extensive survey in South East Europe is a 2007 Eurobarometer survey (Williams, 2010a,b, 2012; Williams, Fethi and Kedir, 2011; Williams et al., 2013). Given this paucity and out-of-date nature of the evidence-base on who participates in undeclared work and the relevance of the marginalization thesis therefore, this paper begins to fill a major gap by reporting the results of a more extensive up-to-date survey.

Methodology

To evaluate who participates in undeclared work in South East Europe and thus the validity of the marginalization thesis in this European region, we here report Special Eurobarometer No. 402. This survey on participation in undeclared work was conducted in April and May 2013 and involves 27,563 face-to-face interviews

in all 28 European Union member states, of which 5,567 were undertaken in the six South East European countries that are member states of the European Union, namely Bulgaria, Cyprus, Croatia, Greece, Slovenia and Romania. In each country, the interviews were conducted in the national language and a multi-stage random (probability) sampling method was used (the number of interviews varying from 500 in Cyprus to 1000 in the other countries), which ensured that on the issues of gender, age, region and locality size, a representative sample was collected. For the univariate analysis therefore, we employ the sampling weighting scheme as the literature suggests (Sharon and Liu, 1994; Solon, Haider and Wooldridge, 2013; Winship and Radbill, 1994). For the multivariate analysis however, there is a debate over whether such a weighting scheme should be used (Pfeffermann, 1993; Sharon and Liu, 1994; Solon et al., 2013; Winship and Radbill, 1994). Reflecting the dominant viewpoint, the decision was taken not to do so.

Given how undeclared work is a sensitive topic since it is income not declared to the authorities, the interview schedule followed best practice (see Ram and Williams, 2008) by building rapport with the participants before turning to more sensitive questions regarding their engagement in undeclared work. The interview schedule thus commenced with questions about their attitudes towards undeclared work, followed by questions on whether they had purchased goods and services on an undeclared basis. Only following this were questions asked regarding their own engagement in undeclared work. After the interview was completed, the interviewer rated the cooperation of the respondent. Analysing the responses of the interviewers regarding the perceived reliability of the interviews, the finding is that cooperation was deemed bad in only 0.6% of the interviews. Cooperation was deemed excellent in 49.3%, fair in 41.2% and average in 8.9%.

Given this, attention can turn to an analysis of the results. The hypothesis is that participation in undeclared work varies according to socio-demographic variables (gender, age, marital status, age when stopped full time education, people 15+ years in own household, number of children, tax morality), socio-economic variables (employment status, household financial circumstances) and spatial characteristics (urban-rural character of the area in which the respondent lives). To analyse this, we here use logistic regression analysis. The dependent variable measures whether respondents participated in undeclared work and is based on the question "Apart from regular employment, have you yourself carried out any undeclared paid activities in the last 12 months?". The independent variables used to analyse whether marginalized populations are more likely to participate in undeclared work are divided into socio-demographic, socio-economic and spatial variables as Table 1 displays.

Table 1. Variables used in the analysis: definitions and descriptive statistics (N = 4,727[1])

Variables[2]	Definition	Mode or mean (Standard deviation)	Min / Max
Undeclared activities (dependent variable)	Dummy variable with recorded value 1 for persons who answered "yes" to the question "QE14 Apart from a regular employment, have you yourself carried out any undeclared paid activities in the last 12 months?" and with recorded value 0 otherwise.	No undeclared activities (95.86%)	0 / 1
Socio-demographic independent variables:			
Gender	Dummy variable with value 1 for males and 0 for females.	Female (50.98%)	0 / 1
Age	Categorical variable for the age of the respondent with value 1 for those aged 15 to 24 years old, value 2 for those aged 25 to 34, value 3 for those aged 35 to 44, value 4 for those aged 45 to 54, value 5 for those aged 55 to 64, and value 6 for those over 65 years old.	35-44 years (19.14%)	1 / 6
Marital status	Categorical variable for the marital status of the respondent with value 1 for married/ remarried individuals, value 2 for cohabiters, value 3 for singles, separated or divorced, and value 4 for widowed and for other form of marital status.	Married/ Remarried (56.55%)	1 / 4
Social class	Categorical variable for the respondent perception regarding social class of society to which it belongs with value 1 for working class of society, value 2 for middle class of society, value 3 for higher, other or none class of society.	Working class of society (48.80%)	1 / 3
Age when stopped full time education	Categorical variable for age of the respondent when stopped full time education with value 1 for 15 years old and under, value 2 for 16-19 years old, value 3 for 20 years old or over, and value 4 for "still studying".	16-19 years old (45.81%)	1 / 4
People 15+ years in own household	Categorical variable for people 15+ years in respondent`s household (including the respondent) with value 1 for one person, value 2 for two persons, and value 3 for 3 persons or more.	Two people (47.08%)	1 / 3
Children	Categorical variable for number of children with value 1 for individuals with no children, value 2 for the presence of children less than 10 years old live in respondent`s household, value 3 for the presence of children aged 10 to 14 years old live in respondent`s household and value 4 for the presence of children less than 10 years old and children aged 10 to 14 years old live in respondent`s household.	No children (73.40%)	1 / 4
Tax morality index	Constructed index of self-reported tolerance towards tax non-compliance. To identify the level of their tax morale, participants' responses to six attitudinal questions were analysed regarding how they rate the acceptability of various types of undeclared work on a 10-point Likert scale (where 1 means absolutely unacceptable and 10 means absolutely acceptable). Questions used[3]: (1) an individual is hired by a household for work and s/he does not declare the payment received to the tax or social security authorities even though it should be declared; (2) a firm is hired by a household for work and it does not declare the payment received to the tax or social security authorities; (3) a firm is hired by another firm for work and it does not declare its activities to the tax or social security authorities; (4) a firm hires an individual and all or a part of the wages paid to him\ her are not officially declared (5) someone receives welfare payments without entitlement; (6) someone evades taxes by not declaring or only partially declaring their income. Collating responses to these six questions by examining the mean score across these six behaviours, an aggregate 'tax morale index' is constructed for each individual.	2.22 (1.43)	1 / 10

Socio-economic independent variables:			
Employment	Dummy variable with value 1 for employed respondents and 0 for unemployed respondents.	Unemployed (53.03%)	0 / 1
Difficulties paying bills	Categorical variable for the respondent difficulties in paying bills with value 1 for having difficulties most of the time, value 2 for occasionally, and value 3 for almost never never.	Almost never/never (37.81)	1 / 3
Spatial independent variables:			
Area respondent lives	Categorical variable for the area where the respondent lives with value 1 for rural area or village, value 2 for small or middle-sized town, and value 3 for large town.	Large town (39.25%)	1 / 3
Country	Categorical variable for the country where the respondent lives with value 1 for Greece, value 2 for Cyprus, value 3 for Slovenia, value 4 for Bulgaria, value 5 for Romania, and value 6 for Croatia.	Romania (42.88%)	1 / 6

[1] *Individuals for which data on each and every independent variable is available.*

[2] *For the categorical variables we used their dummy correspondences.*

[3] *These six questions in the Eurobarometer survey are in fact standard questions taken directly from previous surveys such as the International Social Survey (Torgler, 2005a), the World Values Survey (Alm and Torgler, 2006; Torgler, 2006), the European Values Surveys (Hug and Spõrri, 2011; Lago Peñas and Lago Peñas, 2010), the British Social Attitudes Survey (Orviska and Hudson, 2002), the Latinbarometro (Torgler, 2005b) and the Afrobarometer (Cummings et al., 2009).*

Below, we report the findings.

Findings

Descriptive statistics

From the 5,567 face-to-face interviews, we kept in the analysis 4,727, representing the individuals for which data on each and every independent variable is available. Examining their answers, and as Table 2 displays, 4.14% of participants report undertaking undeclared work during the prior 12 months. A further 5.81% of the respondents refused to answer or said that they did not know. Even if participation in undeclared work is a sensitive topic and the differences between the reported situation and lived practice might be significant, this survey nevertheless finds that 1 in 24 citizens of the South East European nations self-reported that they had participated in undeclared work in the past year. Investigating how much they earned from their undeclared work, the mean earnings are €734, with 10% earning in the range of €1-100, 10% €101-200 and 13% between €201-500. Therefore, 33% of South East European people working in the undeclared economy earn €500 or less. A further 8% earn €501-1000 and 8% earned more than €1000. Some 51% nevertheless, either do not remember how much they earned, do not know or refused to answer.

Table 2. Participation in undeclared work in South East European nations in the prior 12 months

	Sample size	% engaged in undeclared work	Chi-square test[1]	Earnings from undeclared work: €1-100 (%)	€101-200 (%)	€201-500 (%)	€501-1000 (%)	€1000 + (%)	Don`t remember / know; refusal (%)	Mean (€)	GDP in PPS (EU28=100), 2013
All SEE	4,727[2]	4.14		10	10	13	8	8	51	734	-
Slovenia	859	8		20	12	13	9	15	31	1092	82
Croatia	868	7	$X^2(5) =$	8	11	14	9	21	37	945	61
Bulgaria	810	5	38.61,	19	12	19	5	0	45	249	45
Romania	787	4	p<0.001	3	7	12	9	0	69	364	54
Greece	934	3		13	12	11	4	15	45	1253	73
Cyprus	469	2		10	30	0	10	0	50	314	89

[1] *Chi-square test of independence between participation in undeclared work and country.*
[2] *Individuals for which data on each and every independent variable is available.*

Table 2 starts to evaluate who engages in undeclared work and the relevance of the marginalization thesis by examining whether the poor South East European countries have higher participation rates than the more affluent South East European countries. The finding is that the phenomenon is not evenly spread across the South East European countries. Participation rates are highest in Slovenia (8%), Croatia and (7%) and Bulgaria (5%) and lowest in Romania (4%), Greece (3%) and Cyprus (2%). A chi-square test is reported to see if there is relationship between participation in undeclared work and the country where respondent lives. The results shows that the relation between these variables is significant, (5, N = 4,727) = 38.61, p <.001. However, a correlation test shows that there is no statistically significant relationship between cross-national variations in the level of participation in undeclared work and cross-national variations in the wealth of countries, as measured in purchasing power standards (rho= - 0.046, p>0.05). The result is that no support is found for the marginalization thesis when analyzing cross-national variations in participation rates in South East Europe. It is similarly the case when average earnings are examined. Those living in Greece, Slovenia and Croatia earn more money from undeclared work than the South East European countries average of €734 (€1253, €1092 and €945 respectively) whilst those living in Romania, Cyprus and Bulgaria earn from undeclared work less than the South East European countries average (€364, €314 and €249 respectively). However, there is again no statistically significant relationship between average earnings and the level of affluence of the country, measured in terms of personal purchasing power (rho=0.188, p>0.05). As such, the marginalization thesis is not valid in relation to cross-national variations in undeclared work.

Turning to socio-demographic, socio-economic and other spatial variations in who engages in undeclared work, Table 3 displays that contrary to the marginalization thesis, participation in undeclared work is higher amongst men than women (6%

of men participated in undeclared work over the prior 12 months but only 3% of women). The chi-square test shows that the relation between gender and participation in undeclared work is statistically significant, X^2 (1, N = 4,727) = 40.72, p <.001. Also, women earn less than men from such work (i.e., their earnings from undeclared work are 76% the amount earned by men). Furthermore, the unemployed are no more likely to participate in undeclared work than the employed (the relation between employment status and participation in undeclared work is not statistically significant, X^2 (1, N = 4,727) = 0.09, p >.1) and even when they do, their earnings are 83% the amount earned by the employed. Neither do those living in rural areas participate to a greater extent than respondents living in towns (the relation between area respondent lives and participation in undeclared work is not statistically significant, X^2 (2, N = 4,727) = 3.29, p >.1). The tentative suggestion from these descriptive statistics therefore is that the marginalization thesis does not apply when discussing women compared with men, the unemployed compared with the employed and those living in rural areas compared with urban areas. Instead, when examining gender, employment status and the urban-rural divide, it appears to be the opposite which is the case: marginalized populations (i.e., women, the unemployed and rural populations) are significantly less likely to participate in undeclared work.

However, when examining other population groups, the marginalization thesis tentatively appears to be applicable. Not only are younger age groups more likely to participate in undeclared work than older age groups (the relation between respondent age and participation in undeclared work is statistically significant, X^2 (5, N = 4,727) = 44.39, p <.001), reinforcing previous studies (Williams, 2004), but so too those who are not married or divorced compared with married/remarried participants (the relation between respondent marital status and participation in undeclared work is statistically significant, X^2 (3, N = 4,727) = 11.91, p <.05), those with more than one child (the relation between respondent number of children and participation in undeclared work is statistically significant, (3, N = 4,727) = 11.84, p <.05), and those who have difficulty paying bills compared with those who seldom have difficulties (the relation between the respondent financial situation and participation in undeclared work is statistically significant, X^2 (2, N = 4,727) = 10.81, p <.05) . For all these population groups, the marginalization thesis appears to be valid. The relationship between engaging in undeclared work and the class, number of adults in households and level of education is not statistically significant.

Analysing these descriptive statistics therefore, the tentative conclusion is that it is not possible to assert that the marginalization thesis is universally applicable at all spatial scales and across all socio-demographic and socio-economic groups. Instead, the marginalization thesis appears to be applicable when analysing some marginalized population groups but not others.

Table 3. Participation in undeclared work in South East European nations: socio-demographic, socio-economic and spatial variations

N = 4,727[1]		% engaged in undeclared work	Chi-square test[2]	Earnings from undeclared work: €1-100 (%)	€101-200 (%)	€201-500 (%)	€501-1000 (%)	€1000+ (%)	Don`t remember / know; Refusal (%)	Mean (€)
Gender	Male	6	$X^2(1) = 40.72$, $p<0.001$	11	9	16	7	8	49	792
	Female	3		8	12	9	8	6	57	602
Age	15-24	6	$X^2(5) = 44.39$, $p<0.001$	11	9	13	3	9	55	723
	25-34	6		7	13	20	10	5	45	708
	35-44	4		14	5	14	12	9	46	883
	45-54	4		12	13	10	4	7	54	528
	55-64	4		4	13	7	9	9	58	958
	65+	1		14	5	10	11	0	60	362
Marital status	Married/ remarried	3	$X^2(3) = 11.91$, $p<0.05$	7	13	12	5	8	55	750
	Unmarried/ cohabitating	5		25	6	31	5	7	26	458
	Single/divorced/ separated	6		12	9	12	13	8	46	731
	Widowed/ other	3		4	2	7	2	6	79	1598
Social class	Working class	5	$X^2(2) = 1.03$, $p>0.1$	8	11	8	5	6	62	716
	Middle class	4		13	9	19	8	9	42	752
	Higher class/ other/ none	4		12	3	27	41	13	4	716
Age education ended	<15	4	$X^2(3) = 6.09$, $p>0.1$	7	15	15	4	0	59	298
	16-19	4		13	11	12	9	6	49	610
	20+	4		2	8	19	9	12	50	1126
	Still studying	5		22	1	6	4	12	55	807
Adults in household	One	5	$X^2(2) = 0.75$, $p>0.1$	9	3	6	20	10	52	835
	Two	4		8	15	20	5	7	45	608
	Three and more	4		13	9	9	3	7	59	869
Children	<10 years old	5	$X^2(3) = = 11.84$, $p<0.05$	6	6	5	17	9	57	1065
	10-14 years old	3		8	7	8	2	13	62	1025
	<10 and 10-14	7		8	31	23	0	2	36	445
	No children	4		12	9	15	7	7	50	682
Employment	Unemployed	4	$X^2(1) = 0.09$, $p>0.1$	12	12	12	10	8	46	674
	Employed	4		8	8	15	5	7	57	814
Difficulties paying bills	Most of the time	5	$X^2(2) = 10.81$, $p<0.05$	11	18	13	6	14	38	965
	From time to time	4		11	7	21	7	3	51	438
	Almost never/never	3		8	5	4	10	6	67	819
Area	Rural area or village	4	$X^2(2) = 3.29$, $p>0.1$	5	16	7	9	8	55	858
	Small or middle sized town	5		9	10	14	6	5	56	632
	Large town	4		16	4	19	8	9	44	686

[1] Individuals for which data on each and every independent variable is available.

[2] Chi-square test of independence between participation in undeclared work and socio-demographic, socio-economic and spatial characteristics.

Analysis: are marginalized populations more likely to participate in the informal economy?

We analyse the hypothesis that participation in undeclared work varies according to socio-demographic variables (gender, age, marital status, age when stopped full time education, people 15+ years in own household, number of children, tax morality index), socio-economic variables (employment status, difficulty in paying bills) and spatial characteristics (area respondent lives) when other variables are held constant. As the dependent variable is dichotomous, we use a logistic regression. The binary response variable is whether or not a respondent carried out any undeclared paid activities in the last 12 months.

To analyse the effect of the various independent variables on participation in undeclared work when other variables are held constant, an additive model is used. The first specification (S1) includes solely the socio-demographic factors to examine their effects while the second specification (S2) adds socio-economic factors alongside the socio-demographic factors, and the third specification (S3) adds spatial factors to the socio-demographic and socio-economic factors to examine their association with the participation in undeclared work. Table 4 reports the results.

The first specification of the model (S1) in Table 4 shows that the marginalization thesis is valid when analysing various socio-demographic disparities in participation rates. Younger age groups are significantly more likely to participate in the undeclared economy, reinforcing previous studies (Williams, 2004), doubtless due to their greater exclusion from the formal labor market (European Commission, 2014a). Households with more than three persons are less likely to participate in undeclared work than single living persons and so are parents with teenagers compared with people without children. In addition, those more tolerant of undeclared work and holding non-conformist attitudes towards tax compliance are more likely to participate in such endeavour, reinforcing previous studies (Torgler, 2006). This is important because it shows that those marginalized in the sense that their norms, values and beliefs regarding undeclared work do not conform to the formal institutions (i.e., the codes, regulations and legislation) are more likely to engage in such work (Williams and Martinez, 2014a,b).

Contrary to the marginalization thesis however (ILO, 2013; Stănculescu, 2005), men are found to be significantly more likely to participate in the undeclared economy than women in these south-east European countries, reflecting how the exclusion of women from the declared labour market is reinforced when examining the undeclared labour market. No significant relationship between participation in undeclared work and marginal populations nevertheless, when analysing the marital status, the social class self-assessment and the age they stopped full time education. As such, when considering the socio-demographic variables, the finding is that a variegated understanding of the validity of the marginalization thesis is required.

Table 4. Logistic regression of participation in undeclared work in South East European nations

Variables	S1	S2	S3
Gender (CG: Female)			
Male	0.957*** (0.155)	1.033*** (0.159)	1.080*** (0.160)
Age (CG: 15-24)			
25-34	0.025 (0.300)	0.084 (0.302)	-0.045 (0.300)
35-44	-0.519 (0.335)	-0.409 (0.338)	-0.515 (0.340)
45-54	-0.112 (0.321)	-0.055 (0.331)	-0.214 (0.330)
55-64	-0.440 (0.344)	-0.558 (0.351)	-0.768** (0.358)
65+	-1.760*** (0.451)	-1.997*** (0.455)	-2.121*** (0.451)
Marital status (CG: Married/ Remarried)			
Cohabitating	0.096 (0.259)	0.090 (0.268)	-0.059 (0.269)
Single/ divorced/ separated	-0.198 (0.232)	-0.279 (0.234)	-0.280 (0.235)
Widowed/ other	0.346 (0.295)	0.287 (0.293)	0.083 (0.290)
Social class, self-assessment (CG: The working class of society)			
The middle class of society	-0.100 (0.162)	0.062 (0.168)	0.066 (0.173)
The higher/ other/ none class of society	-0.066 (0.369)	-0.054 (0.370)	-0.115 (0.366)
Aged stopped full time education (CG: 15-years)			
16-19	0.236 (0.250)	0.404 (0.253)	0.235 (0.254)
20+	0.212 (0.280)	0.455 (0.284)	0.441 (0.290)
Still studying	0.062 (0.418)	0.013 (0.428)	-0.133 (0.430)
Number 15+ years in household (CG: 1 person)			
2 persons	-0.450* (0.261)	-0.453* (0.259)	-0.457* (0.260)
3+ persons	-0.512** (0.243)	-0.517** (0.242)	-0.548** (0.249)
Number of children (CG: No children)			
Children < 10	0.150 (0.211)	0.107 (0.215)	0.003 (0.214)
Children 10-14	-0.625* (0.349)	-0.688* (0.360)	-0.806** (0.368)
At least one child < 10 and at least one 10-14	0.562* (0.312)	0.485 (0.313)	0.356 (0.304)
Tax morality	0.405*** (0.037)	0.405*** (0.0374)	0.378*** (0.040)
Employment (CG: Unemployed)			
Employed		-0.541*** (0.182)	-0.434** (0.183)
Difficulties paying bills last year (CG: Most of the time)			
From time to time		-0.387** (0.177)	-0.561*** (0.182)
Almost never/ never		-0.529*** (0.200)	-0.858*** (0.223)
Area respondent lives (CG: Rural area or village)			
Small or middle sized town			-0.066 (0.180)
Large town			-0.196 (0.186)
Country (CG: Greece)			
Cyprus			0.159 (0.391)
Slovenia			1.275*** (0.290)
Bulgaria			0.731** (0.287)
Romania			0.440 (0.319)
Croatia			1.243*** (0.271)
Constant	-3.977*** (0.509)	-3.628*** (0.519)	-3.842*** (0.545)
N	4,727	4,727	4,727
Pseudo R^2	0.1251	0.1365	0.1602
Log likelihood	-778.34148	-768.23098	-747.11993
Wald χ^2	209.15	220.91	250.76
p>	0.0000	0.0000	0.0000

*Notes: significant at *** p<0.01, ** p<0.05, * p<0.1 (robust standard errors in parentheses). When using the weighting scheme, there is no other variable which became significantly associated with engagement in undeclared work. Also, the other variables keep their significance, except for number of people 15+ years in household, number of children, the employment status and difficulties paying bills.*

The marginalization thesis is here found to be valid in relation to some marginalized population groups (e.g., younger people, single people, parents with teenagers and those with non-conformist attitudes), but not others (e.g., women).

When in the second specification (S2) the socio-economic factors of employment status and financial circumstances people face are added to the socio-demographic variables, there are no major changes to the influence of the socio-demographic variables on participation in the undeclared economy. However, the additional finding is that the unemployed are significantly more likely to participate in the undeclared economy than those who have declared jobs, reflecting previous studies (Castells and Portes, 1989; Slavnic, 2010; Taiwo, 2013). It is also the case that those who have difficulties paying the household bills most of the time are more likely to participate in the undeclared economy than those more seldom having such difficulties, again reinforcing previous studies (Barbour and Llanes, 2013; Smith and Stenning, 2006). Both these socio-economic characteristics, namely employment status and financial circumstances, thus provide support for the marginalization thesis.

When spatial factors are added in the third specification (S3), the findings show that there are no major changes to the significance of the socio-demographic and socio-economic characteristics discussed above in relation to who is more likely to participate in the undeclared economy and the directions of the associations remain the same. However, there is no evidence to support the marginalization when those living in rural areas are compared with those living in more urban areas, refuting previous studies (Button, 1984; Williams, 2014). Moreover, those living in Slovenia, Bulgaria and Croatia are more likely to participate in undeclared work compared with those living in Greece.

Discussion and Conclusions

To evaluate who participates in the undeclared economy and the relevance of the marginalization thesis, this paper has reported the findings of a 2013 Eurobarometer survey of participation in undeclared work in six South East European countries which are member states of the European Union. Using logistic regression analysis, this reveals support for the marginalization thesis in relation to some marginalized population groups. Younger age groups are significantly more likely to participate in undeclared work, as are single people, single-person households, parents with teenagers, those more tolerant of undeclared work (who are marginalized in the sense that their values and attitudes do not conform to those of the codes, regulations and laws of the formal institutions), the unemployed and those who have difficulties most of the time paying the household bills. Contrary to the marginalization thesis meanwhile, men are found to be significantly more likely to engage in undeclared work than women. No significant correlation is found between participation in undeclared work and marginalization however, so far as educational level, marital status, social class or the urban-rural divide are concerned.

This has implications for theorizing participation in undeclared work. It reveals the need to transcend the notion that the marginalization thesis is valid across all marginalized populations. This survey displays that although the marginalization thesis applies so far as the age, household size, tax morality, employment status and household financial circumstances are concerned, when gender is analysed, the opposite is the case. When other characteristics are analysed moreover, such as education level, the urban-rural divide and social class, no evidence of a significant correlation between marginalization and participation in undeclared work is found. The result is the need for a more nuanced understanding of the relevance of the marginalization thesis. Whether the same findings prevail when analysing who engages in the undeclared economy on other spatial scales, such as in particular South East European nations, regions and localities, now requires evaluation. In particular, this future research will need to introduce how culture influences which marginal populations participate and which do not, since this seems tentatively likely to be an important determinant of who does so in different contexts.

Examining the policy implications of these findings, moreover, the first important consequence is that this study reveals the specific populations that need to be targeted when tackling the undeclared economy. In recent years for example, there has been an emphasis in the European Union on targeting poorer EU nations when allocating resources through European structural funds to tackle undeclared work (Dekker et al., 2010, European Commission, 2014b). However, the findings of this survey reveal that the populations of poorer South East European countries are not more likely to participate in undeclared work. The result is a need to reconsider the spatial allocation of European funds for tackling the undeclared economy. However, this survey reveals that the present targeting of the unemployed by many governments in South-East European countries when tackling undeclared work is not a mistake. The unemployed are significantly more likely to participate. Popular policy initiatives such as seeking to smooth the transition from unemployment to self-employment therefore, appear worthwhile. Furthermore, this survey reveals that targeting other marginalized populations when tackling undeclared work might also be beneficial, such as younger people, men and single-person households. The outcome, in other words, is that this analysis provides a useful risk assessment of different populations which enables not only the relevance of the currently targeted groups to be evaluated but also the identification of possible groups to be targeted by future policy measures.

In conclusion, this paper has revealed for the first the need for a more nuanced understanding of the relevance of the marginalization thesis when discussing who engages in undeclared work in South Eastern Europe. Although this thesis is relevant for some marginalized populations who are more likely to participate in the undeclared economy, it is not valid in relation to other marginalized populations. If these results thus stimulate the development of a more variegated understanding of the validity of

the marginalization thesis, then it will have fulfilled its major intention. If this then encourages a policy shift as a result of this more variegated understanding, not least in terms of how resources are allocated and the populations being targeted by the authorities, then it will have fulfilled its broader objective.

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THE INS AND OUTS OF UNEMPLOYMENT IN THE CURRENT GREEK ECONOMIC CRISIS

JOAN DAOULI, MICHAEL DEMOUSSIS*,
NICHOLAS GIANNAKOPOULOS, NIKOLITSA LAMPROPOULOU
University of Patras, Greece

Abstract
We are investigating unemployment inflows and outflows using micro-data from the Greek Labour Force Survey (1998-2013). Focusing on the post-2008 recessionary period, aggregate unemployment decompositions show that both inflow and outflow rates affect unemployment fluctuations. In particular, early on in the recession period, inflow rates dominates, while later outflow rates take over. These findings remain unaltered when unemployment persistence and low transition rates are taken into account. Furthermore, by applying multinomial regression techniques, we find that the ins and outs of unemployment vary with individual-specific heterogeneity (gender, age, education, etc.). This heterogeneity, however, exhibits a differentiated impact in the pre- and post-2008 periods. Overall, designing an effective employment policy in Greece needs to take into consideration the exceptionally low job finding rate (10%) and employment composition in the ongoing labour market crisis.

JEL Classification: J64, E32, C5
Keywords: Unemployment, Worker Flows, Transition Probabilities, Unemployment Decomposition.

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**Corresponding Author:* Prof. Michael Demoussis, Department of Economics, University of Patras, University Campus, 26504 Rio, Patras, Greece. e-mail: micdem@upatras.gr

1. Introduction

High and persistent unemployment rates constitute a permanent feature of the Greek economy. During the last three decades (1984-2014) the annual unemployment rate oscillated around the 11.0% mark and never fell below 7.0%. In addition, the 2nd quarter of 2008 marked the end of a rather long period of low unemployment rates (7.25% in May), while in the post-2008 period joblessness exploded reaching, for the first time, the 27.9% mark in September 2013. It is well documented that the Greek labour market suffers from deep rooted structural problems which call for urgent and effective public policy responses (Blanchard, 2005). While some reforms have been adopted in Greece, under the Memorandum signed by the Greek government and the Troika, unemployment has accelerated rapidly due to the implementation of fiscal austerity measures and structural reforms (Tagkalakis, 2013; Pissarides, 2013; Venetis and Salamaliki, 2015). Undoubtedly, designing an effective employment policy requires good understanding of unemployment dynamics, which, in turn, requires knowledge of the "ins and outs" of unemployment (Mortensen and Pissarides, 1999; Hall, 2005; Petrongolo and Pissarides, 2008; Fujita and Ramey, 2009; Elsby *et al.* 2009; Smith, 2011; Shimer, 2012; Nordmeier, 2014). Relevant evidence regarding the Greek labour market is limited to the work of Kanellopoulos (2011) who utilized LFS data for the 2004-2009 period, during which only minor changes were observed in the unemployment rate; the author concluded that the "ins and outs" of Greek unemployment are relatively minor, stable and countercyclical. He also suggested that the unemployment inflow rate (job separation) slightly dominates the outflow rate (job finding) in this period. The present study covers a longer period (1998-2013) during which unemployment fluctuations drastically and rapidly increased, particularly after 2009, and provides fresh evidence on qualitative differences in the "ins and outs" that have taken place due to significant shifts in aggregate demand factors.

For analytical purposes we have employed quarterly individual-level data, drawn from the Greek Labour Force Survey (LFS) and a "worker-flow" approach (Davis *et al.* 2006)[1], while for identification purposes, we follow Elsby *et al.* (2011) in order to calculate individual annual transitions between activity statuses for the sur-

1. Usually, data on workers who move "in" or "out" of the unemployment pool are either administrative (unemployment benefit claimants/registered unemployed persons) or survey-based (e.g., US Current Population Survey, British Household Panel, European Labour Force Survey). In addition, the reference period is usually monthly (primarily because of the longitudinal dimension of datasets). Since the rotated-panel dimension of the Greek LFS does not cover the entire 1998-2013 period, but only the 2004-2009 period (Kanellopoulos, 2011), analysis of the "ins" and "outs" is performed using repeated cross-sections.
2. We acknowledge that recall data are not a good substitute for longitudinal data regarding transitory components of certain labour market outcomes. Paull (2002) analytically discusses problems related with the use of recall data. However, Ward-Warmedinger and Macchiarelli (2014) and Casado *et al.* (2014) utilize the EU-LFS dataset in order to calculate annual transition probabilities (using the recall status variable) for European Union member states.

vey week and for the same period one year previously.[2] At the aggregate level, we explore unemployment dynamics by using typical steady state decomposition techniques. Our results show that in the beginning of the recession the unemployment rate substantially deviates from its steady state level and the inflow rate dominates. In contrast, the outflow rate takes over in later phases of the recession. We also found that unemployment inflows are pro-cyclical in the post-2009 period. At the micro-level, data allow us to investigate the heterogeneous nature of the ins and outs of unemployment (Lundberg, 1985; Gomes, 2012; Krueger *et al.* 2014). This approach could lead to significant policy implications since specific worker groups (e.g., the young, the old, women, the low-educated) face different risks of losing their jobs during severe recession. Applying multinomial logistic regression techniques (Clark and Summers, 1979; Bellman *et al.* 1995) we found that the ins and outs of unemployment vary with individual-specific heterogeneity and across time.

The rest of the paper is organized as follows. In Section 2 we present the data and their sources and we discuss the Greek unemployment composition. Section 3 presents labour market flows and the results of aggregate unemployment decomposition. In Section 4 we model the relationship between transitions in-and-out of unemployment and several individual-specific characteristics. Section 5 presents the results of micro-econometric estimations and Section 6 concludes.

2. Data and preliminary analysis

2.1 Data sources

Data are drawn from the Greek Labour Force Survey (LFS) conducted by the Hellenic Statistical Authority (EL.STAT) on a quarterly basis since 1998 and providing information on several labour market outcomes. The survey concerns a sample of 25,000-30,000 households in each quarter (approximately 65,000-80,000 individuals). We focus on survey years 1998Q1-2013Q4 and data provide representative aggregates for the entire economy since they are adjusted by the LFS sampling weights. The LFS database includes information on several individual-specific characteristics such as gender, age, length of education, marital status, nationality, region, degree of urbanization, labour market status, economic activity, duration of job search, reasons for becoming unemployed and other elements. In order to derive worker flows at the individual level, we rely on the ILO definition of current labour market status and on the recall question regarding last year's labour market status ("Situation with regard to activity one year before survey").[3] We are, thus, able to

3. The recall status allows us to identify individuals as employed, unemployed or inactive. The latter category includes students or apprentices, the retired, the permanently disabled, housewives, military service personnel, etc.

designate individuals as employed (E), unemployed (U) or inactive (I) in the current year (t+1) and at one year before the survey (t). We focus on two distinct periods (1998Q1-2008Q3 and 2008Q4-2013Q4), given that a break in the unemployment series is observed for the third quarter of 2008 (Venetis and Salamaliki, 2015), which coincides with the beginning of the recessionary period (Tsouma, 2014).

2.2. Unemployment composition

The Greek unemployment rate after the end of 2007 is characterized by continuous increase which, however, intensified in the beginning of 2010. Theoretically, unemployment may increase due to various cyclical and/or structural reasons. In the Greek case, the recent upsurge of unemployment seems to be the consequence of a cyclical decline in demand and, to a much lesser extent, due to the changing structure/ composition of the labour force. Table 1 presents unemployment rates for selected time periods and for groups of workers defined according to basic demographic and socio-economic characteristics. It can be observed that the average annual unemployment rate for the 1998Q1-2008Q3 period stands around the 10% mark and for the crisis period (2008Q4-2013Q4) at the 16% mark. The same overall pattern is observed for specific groups of individuals as well, but variations between groups differ substantially. For example, the unemployment rate for men increased by 128% (from 6.5% to 14.95%) and for women by 40% (from 15.38% to 21.61%). Similarly, unemployment rates have risen disproportionately among age groups. For instance, the unemployment rate for older individuals (over 45 years of age) has risen substantially between the two periods substantially and more than that of younger ones. Furthermore, unemployment has increased considerably more for the married and the formerly-married (separated-widowed) than for unmarried individuals (87% vs 64%). It also appears that the increased unemployment rate mostly concerns non-EU born individuals. The breakdown of unemployment rates by educational level reveals that increase in unemployment steadily declines with increased education, indicating that joblessness concerns mostly those workers who lack skills. Lastly, the increase in unemployment rates is also characterized by a regional dimension. The highest unemployment increase between the two periods is observed in rural areas, even though the level of unemployment is higher in urban centres.

In order to form a more complete picture of the rising unemployment rate, we present statistics regarding the decomposition of unemployment by reason of unemployment and duration of job search by the unemployed in Table 2. Most of the increase in unemployment over the last sub-period (2008Q3-2013Q4) is identified among job losers (lay-offs and contract termination). However, the more pronounced increase concerns laid-off workers. In particular, the share of the unemployed who are laid-off rose from 16.8% in the 1998Q1-2008Q3 period to 30.3% in the 2008Q3-2013Q4 period. The share of workers who became unemployed because their contract was terminated increased from 21.1% to 25.8% between the two periods.

Table 1.Unemployment by demographic and socio-economic characteristics (in %)

Groups of individuals	1998Q1-2008Q3	2008Q4-2013Q4
Total	9.98	16.51
Gender		
Males	6.55	14.95
Females	15.38	21.61
Age		
15-24	27.82	40.34
25-34	13.41	22.88
35-44	7.56	14.61
45-54	5.32	11.80
55-64	3.60	8.47
65-74	1.15	2.82
Current marital status		
Never married	18.13	26.33
Married	6.21	11.62
Separated/Widowed	11.02	18.03
Birthplace		
Native-born	9.81	15.84
EU-born	14.72	18.42
Non EU-born	11.95	23.19
Education		
Ph.D.-M.Sc.	6.48	11.03
University degree (AEI)	6.82	11.62
Technological Institute degree (TEI)	9.65	17.30
Post-secondary non-tertiary	13.51	20.76
Upper secondary (High school)	12.67	18.52
Lower secondary (Gymnasium)	11.51	18.31
Primary school	7.20	13.52
Never in school	6.19	21.07
Urbanization		
Urban	11.19	18.26
Semi-urban	9.41	15.78
Rural	7.33	13.02

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).

Notes: Individuals aged 15-74. Figures are weighted averages multiplied by 100 to represent percentages.

Consequently, the share of workers who lost their job for "other reasons" (i.e., resignation, early and/or normal retirement, etc.) decreased. Thus, involuntary separation seems to be the major reason for the rising unemployment rates of the crisis years, i.e. 2008Q4-2013Q4. Lastly, it is noted that long-term unemployment is a rather permanent feature of the Greek labour market. Even in the pre-crisis period more than 55% of the unemployed had been searching for a job more than 12 months.

Table 2. Unemployment by reason and duration (%)

	1998Q1-2013Q4	1998Q1-2008Q3	2008Q4-2013Q4
Reason for unemployment			
Lay-off	22.36	16.77	30.31
Contract termination	23.08	21.13	25.84
Resignation	3.96	5.01	2.49
Other reasons	50.60	57.09	41.36
Total	100.00	100.00	100.00
Duration of unemployment			
0-2months	15.29	15.26	15.33
3-5 months	12.94	13.29	12.44
6-11 months	16.04	16.24	15.76
12-23 months	23.31	22.53	24.43
24 months or more	32.41	32.68	32.03
Total	100.00	100.00	100.00

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).

Notes: Individuals aged 15-74. Figures are weighted averages multiplied by 100 to represent percentages.

3. Labour market flows and unemployment decomposition

In an attempt to fully gauge flows in the Greek labour market, we rely on the movements -at the individual level- across different states (E,U and I) between two discrete time periods (t, t+1). This transmission mechanism is a Markov process, which can be illustrated by a 3×3 matrix. In this context, the probability P^{ij} that a person will move from state *i* to state *j* (where *i, j*=E, U and I) between *t* and *t+1* equals the ratio of the number of persons who move from state *i* at *t* to state j at *t+1* to the total number of persons in the original state *i* at *t*. For instance, P^{EU} represents the probability of a worker moving from employment to unemployment and is given by $P^{EU}=EU_{t+1}/E_t$. All rates are seasonally adjusted (X-12-ARIMA Seasonal Adjustment Program) and weighted using the cross-sectional LFS population weights. Table 3 presents average annual transition probabilities between the three labour market states for the two sub-periods in question, as well as the entire period. In the pre-crisis period, an employed individual had a probability of 96% to classify him/

herself as employed after one year and this slightly decreased to 94% during the crisis years. Similarly, an individual who classified him/herself as unemployed had a probability of 64% to remain at this state after one year during the 1998Q1-2008Q3 period. This probability further increased in the crisis years reaching the 77% mark. Thus, unemployment persistence in the Greek labour market, although widespread during the pre-crisis period, has dramatically deteriorated during the crisis years. In addition, it is observed that unemployed workers have an almost 10% probability of moving out of the labour force in both sub-periods. Furthermore, the probability of inactive individuals to become unemployed in the next year increases over time indicating that the contribution of non-participation to unemployment is increasing. Lastly, significant reductions have been observed in the probability of transition from unemployment to employment. This probability was 26% in the first sub-period and dropped to 12% in the second.

Table 3. Annual transition probabilities between statuses of economic activity

	Current status (t+1)			
	Employed	Unemployed	Inactive	Sum
Recalled status (t)				
	1998Q1-2013Q4			
Employed	95.06	2.73	2.21	100.00
Unemployed	19.66	69.89	10.45	100.00
Inactive	2.29	2.77	94.94	100.00
	1998Q1-2008Q3			
Employed	95.62	2.11	2.27	100.00
Unemployed	25.60	63.87	10.53	100.00
Inactive	2.62	2.56	94.82	100.00
	2008Q4-2013Q4			
Employed	93.90	4.01	2.09	100.00
Unemployed	12.48	77.16	10.36	100.00
Inactive	1.56	3.24	95.20	100.00

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).
Notes: Figures are weighted averages multiplied by 100 to represent percentages.

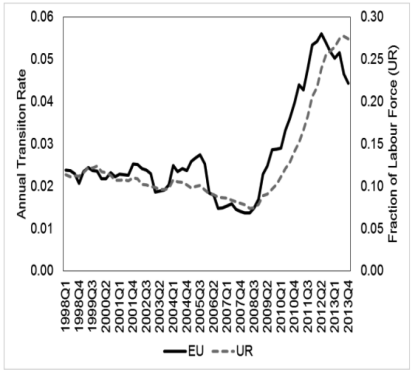
Figure 1 presents a graph of annual transition probabilities for every possible pair of E, U and I statuses. Panel A of Figure 1 presents the annual unemployment inflow rate (EU) which, as expected, exhibits countercyclical behaviour. During the 1998Q1-2008Q3 period, a period of substantial economic growth, the annual employment to unemployment transition probability decreased (from 2.4% in 1998Q1 to 1.4% in 2008Q3). In the 2008Q4-2013Q4 period, a time of unprecedented economic recession, the probability in question kept increasing (from 1.7% in 2008Q4 to 5.6% in

2012Q2). Panel B presents the UE transition rate. This rate appears to be acyclical in the 1998Q1-2008Q3 period and pro-cyclical in the upcoming recessionary period (2008Q4-2013Q4). Specifically, in the first sub-period of declining unemployment the annual rate of unemployment outflow was around 25%. In contrast, in the second sub-period, the UE transition rate dropped to 8% in the 2nd quarter of 2012 and stabilized at around 10% in the last quarter of 2013. Panel C presents the IU transition rate which appears to be countercyclical, as expected. We observe that this transition probability dropped from 3.8% in 1999Q2 to 2.1% in 2008Q3 and increased again from 2.2% in 2008Q4 to 4.0% in 2013Q2. In other words, as the economy grows a lower number of inactive individuals move into the unemployment pool. For example, young individuals move directly into the employment state (new entrants) or they may remain inactive (e.g., due to human capital investments). On the contrary, when the economy shrinks more inactive individuals move into the unemployment state. Panel D presents the UI transition rate which appears to be rather acyclical for both periods (around 10%). This implies that even during periods of unfavourable employment prospects and growing unemployment rates the flow from the unemployment pool into the inactivity state remains at the same level as in periods of rising prospects. Panel E presents the IE transition rate which appears to be countercyclical in the 1998Q1-2008Q3 period and pro-cyclical in the 2008Q4-2013Q4 period. It is obvious that the rate of new-entry or re-entry into the employment state is low and declining in the Greek labour market. Panel F presents the EI transition rate, which appears to be countercyclical in both periods. That is, when the economy grows, the rate at which the employed become inactive falls, and when the economy shrinks this rate increases.

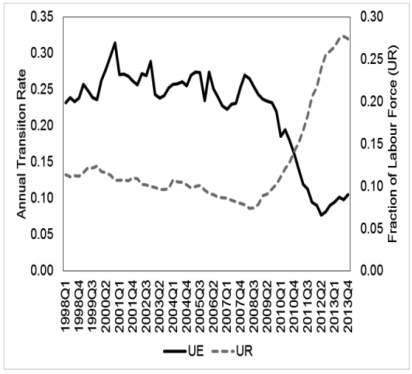
Greek unemployment grows because of sizeable inflows from employment and inactivity (non-participation). At the same time, the unemployment pool expands because of low unemployment outflows. Is the rising Greek unemployment due to sizeable inflows or insufficient outflows? To answer this question we need to conduct a decomposition analysis of aggregate unemployment dynamics. A required first step in answering this question is to examine whether the actual unemployment rate deviates from its steady state level. It is noted that the majority of available decomposition techniques assume that the actual unemployment rate is identical to that of the steady state (Hall, 2005; Shimer, 2012; Petrongolo and Pissarides, 2008; Elsby *et al.* 2009; Fujita and Ramey, 2009). However, Smith (2011) proposes a dynamic, non-steady state decomposition in cases where transition rates between labour market statuses are very low and, consequently, current unemployment is primarily determined by its lagged values (persistence). Actual and steady state unemployment rates for Greece using LFS quarterly data on annual flows are shown in Figure 2 (Panel A).[4]

4. Analytical derivation of the steady state unemployment decomposition can be found in Smith (2011).

Figure 1. Annual transition probabilities and unemployment rates

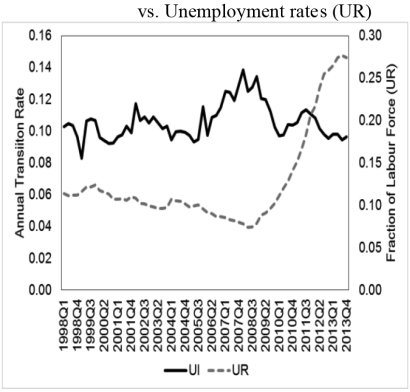


A): Employment to Unemployment (EU) vs. Unemployment rates (UR)



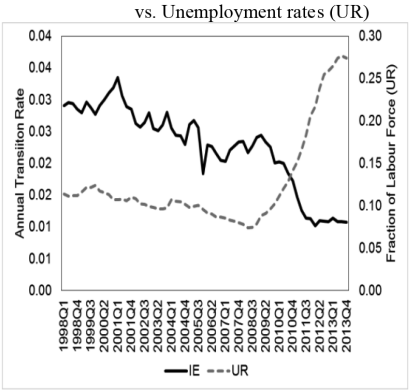
(B): Unemployment to Employment (UE) vs. Unemployment rates (UR)

(C): Inactivity to Unemployment (IU) vs. Unemployment rates (UR)



(D): Unemployment to Inactivity (UI) vs. Unemployment rates (UR)

(E): Inactivity to Employment (IE) vs. Unemployment rates (UR)



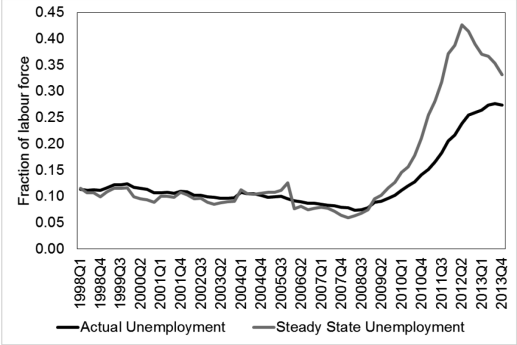
(F): Employment to Inactivity (EI) vs. Unemployment rates (UR)

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).

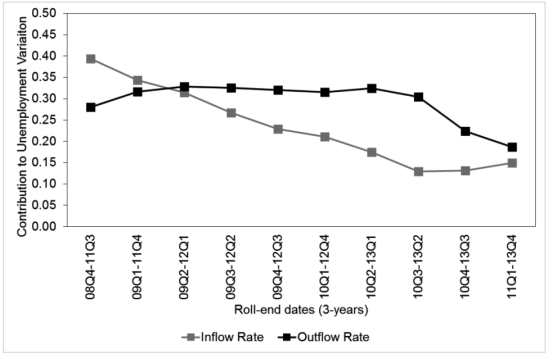
We observe that in the 1998Q1-2008Q3 period the steady state unemployment rate is very similar to the actual one. In the 2008Q3-2013Q4 period, however, significant deviations between the two unemployment rates are observed, indicating that the steady state unemployment rate does not adequately approximate the actual one. Such deviations are evident in periods of accelerating unemployment rates, while when actual unemployment rates stabilize then the two figures seem to be converging. Thus, for the 1998Q1-2008Q3 period the steady state decomposition constitutes an appropriate technique for explaining unemployment dynamics. In contrast, for the recessionary years (2008Q4-2013Q4) non-steady state decomposition is more appropriate. For comparison purposes both techniques (steady state and non-steady state) have been implemented in the context of a three-state world where individuals are employed, unemployed or inactive.

Figure 2. Unemployment rates and unemployment decomposition

Panel A: Actual and steady state unemployment rates



Panel B: Non-steady state unemployment decomposition



Source: Labour Force Survey (1998Q1-2013Q2).Hellenic Statistical Authority (EL.STAT).

Notes: The steady state unemployment rate was calculated according to Smith (2011, p.413, eq. 6). Both lines are seasonally adjusted (X-12-ARIMA). Inflow and Outflow rates are derived according to Smith (2011, p. 418) and are seasonally adjusted (X-12-ARIMA).

Table 4 includes the results of the steady state unemployment decomposition. When we consider the entire period (1998Q1-2013Q4), changes in the inflow rate account for 63% of the variation in steady state unemployment. This percentage is composed by a direct (separation) and an indirect effect (unemployment via inactivity). It is observed that changes in the separation rate account for 42% of steady-state unemployment dynamics (66.7% of total inflow rate). The contribution of the outflow rate is lower and explains the remaining 37%. This percentage is composed of a direct (job finding) and an indirect effect (employment via inactivity). Changes in the job finding rate account for 31% of the steady state unemployment variation. The inflow rate via inactivity exhibits a beta value of 21%, which is much higher than the effect of outflow rate changes via inactivity, i.e., 6%. These results exhibit the same patterns in the pre-crisis years (1998Q1-2008Q3). In the crisis period (2008Q4-2013Q4) and in comparison to the pre-crisis period we observe that the effect of the direct inflow rate has substantially increased, while the indirect effect has significantly dropped. Regarding the outflow effect we observe that both direct and indirect effects increased with the former exhibiting a higher rate. These findings indicate that the impact of the inflow rate becomes weaker and the impact of the outflow rate becomes stronger in explaining unemployment dynamics. Finally, it should be noted that in the crisis period, indirect effects (for both inflows and outflows) appear to be very low and, thus, do not suffice to explain unemployment variations.

Table 4. Steady state unemployment decomposition

	Inflow rate			Outflow rate		
Rolling dates	Direct (β^{EU})	Indirect (β^{EIU})	Total (β^{S})	Direct (β^{UE})	Indirect (β^{UIE})	Total (β^{F})
Panel A: Entire period, pre- and post-crisis years						
1998Q1-2013Q4	.42	.21	.63	.31	.06	.37
1998Q1-2008Q3	.37	.31	.68	.28	.04	.32
2008Q4-2013Q4	.51	.07	.58	.36	.06	.42
Panel B: Crisis years (3-year rolling window)						
2008Q4-2011Q3	.70	.06	.76	.13	.11	.24
2009Q1-2011Q4	.74	.03	.77	.15	.08	.23
2009Q2-2012Q1	.32	.15	.47	.52	.01	.53
2009Q3-2012Q2	.40	.13	.54	.45	.01	.46
2009Q4-2012Q3	.36	.12	.48	.51	.01	.52
2010Q1-2012Q4	.33	.11	.44	.55	.01	.56
2010Q2-2013Q1	.35	.11	.46	.51	.03	.54
2010Q3-2013Q2	.33	.11	.44	.53	.03	.56
2010Q4-2013Q3	.36	.10	.46	.49	.05	.54
2011Q1-2013Q4	.34	.08	.42	.52	.06	.58

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).
Notes: $\beta^{EU} + \beta^{EIU} = \beta^{S}$; $\beta^{UE} + \beta^{UIE} = \beta^{F}$; $\beta^{S} + \beta^{F} = 1$.

Panel B of Table 4 shows the evolution of the contribution of current changes in transition rates to the variance of steady-state unemployment (beta) for a 3-year rolling window period (2008Q4-2013Q4). We observe that, as the recession deepens, the job finding rate exceeds the job separation rate indicating that early on in the recession the inflow rate dominates while later in the recession the outflow rate governs unemployment dynamics. Our results seem to be in accordance with those reported by Petrongolo and Pissarides (2008), Elsby *et al.* (2009), Fujita and Ramey (2009), and Smith (2011), highlighting the qualitative differences of the ins and outs of unemployment during recessions. In addition, our results confirm those reported by Kanellopoulos (2011) for Greece with respect to the slightly dominant role of unemployment inflows in explaining unemployment variations in pre-crisis years (2004-2009).

Figure 2 (Panel B) shows the results of the non-steady state unemployment decomposition. For interpretation purposes we focus on the relative contributions of inflow and outflow rates during the crisis years (2008Q4-2013Q4). It is evident that early on in the recession, the inflow rate is dominant, while the opposite is observed after 2009Q3. These results are quite similar to those obtained by the steady-state unemployment decomposition. Overall, our findings suggest that, at times of accelerating unemployment, the separation rate dominates, while at times in which unemployment changes are ordinary, the job finding rate seems to play the primary role.

4. Ins and outs of unemployment: micro-econometric evidence

In this section we model individual transitions in and out of unemployment. More specifically, information on individual movements across different states (E, U and I) and between two discrete time periods (t, t+1) is exploited. Our interest mostly focuses on unemployment inflows (EU and IU) and unemployment outflows (UE and UI). Thus, three independent samples are defined. The first refers to those employed at time t (E), the second to those who are inactive at time t (I) and the third to those who are unemployed at time t (U). Individuals from the first sample (employed) may be observed *at t*+1 as unemployed (EU) or inactive, or they may have remained employed. Individuals from the second sample (inactive) may be observed at t+1 as unemployed (IU) or employed, or they may have remained inactive. Lastly, individuals from the third sample (unemployed) may be observed at t+1 as employed (UE) or inactive (UI), or they may have remained unemployed. Thus, in each sample, we consider outcomes j in the period t+1 (j=E, U or I), recorded in the form of a dependent categorical variable and a set of explanatory variables (including a constant term). Given that j outcomes are unordered, we utilize a multinomial logit model in order to estimate the determinants of each labour market transition (Wooldridge, 2010). Starting from the case of EU transition, the multinomial logit can be written as:

$$P_i^{EU} = \frac{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{EU} + \varepsilon_{ij}\right)}{1 + \exp\left(\mathbf{x}_i\boldsymbol{\beta}_{EU} + \varepsilon_{ij}\right) + \exp\left(\mathbf{x}_i\boldsymbol{\beta}_{EI} + \varepsilon_{ij}\right)} \tag{1}$$

where, $\boldsymbol{\beta}$ is a set of parameters to be estimated and $\boldsymbol{\varepsilon}_{ij}$ is the disturbance term. With [illegible] can be written as:

$$P_i^{IU} = \frac{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{IU} + \varepsilon_{ij}\right)}{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{IE} + \varepsilon_{ij}\right) + \exp\left(\mathbf{x}_i\boldsymbol{\beta}_{IU} + \varepsilon_{ij}\right) + 1} \tag{2}$$

Similarly, in the case of unemployment outflows (UE and UI), the multinomial logit

$$P_i^{UE} = \frac{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UE} + \varepsilon_{ij}\right)}{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UE} + \varepsilon_{ij}\right) + 1 + \exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UI} + \varepsilon_{ij}\right)}$$
$$P_i^{UI} = \frac{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UI} + \varepsilon_{ij}\right)}{\exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UE} + \varepsilon_{ij}\right) + 1 + \exp\left(\mathbf{x}_i\boldsymbol{\beta}_{UI} + \varepsilon_{ij}\right)} \tag{3}$$

For practical purposes we present the Relative Risk Ratios (RRR) which indicate (in the first sample) how each variable influences the probability of leaving the employment state (E_t) in order to move to the unemployment state (U_{t+1}) or the inactivity state (I_{t+1}) relative to the probability of remaining in the same state (E_{t+1}). Similar interpretations apply to the other two sub-samples. As a rule, when the value of the RRR coefficient is above (under) unity, this indicates that an individual with this characteristic is more (less) likely to be observed in other categories than in the reference category. If the RRR coefficient equals unity, this indicates an absence of risk difference between the two groups. We note that, although all possible annual transition probabilities have been estimated, for presentation purposes the focus is only on the ins and outs of unemployment.[5] The analysis is carried out for the pre-crisis period (1998Q1-2008Q3) and the recessionary one (2008Q4-2013Q4). This will allow us to highlight the changes that occurred in the two periods.

The inclusion of several explanatory variables (in vector **x**) is expected to provide evidence – in terms of correlations rather than causal effects – regarding the differentiated patterns of entering or exiting the unemployment pool across the entire Greek population (i.e., economically active and non-participating). This exercise is of considerable importance, given the depth and duration of the post-2008 economic crisis in Greece, a crisis associated with significant deterioration of all labour market outcomes. In such circumstances the employment adjustment process is expected to be thorny and discriminatory for numerous demographic groups (Elsby *et al.* 2010).

5. Data for transitions from employment or unemployment to inactivity are available by the authors upon request.

Table 5. Averages of independent variables for unemployment inflows and outflows

	1998Q1-2008Q3				2008Q4-2013Q4			
	Inflows		Outflows		Inflows		Outflows	
	EU	IU	UE	UI	EU	IU	UE	UI
Gender								
Female	.48	.67	.50	.62	.41	.63	.46	.62
Age								
15-24	.15	.51	.28	.23	.08	.47	.15	.12
25-34	.41	.28	.46	.31	.36	.31	.45	.22
35-44	.25	.13	.17	.18	.30	.12	.25	.24
45-54	.14	.06	.08	.14	.20	.07	.12	.19
55-64	.05	.02	.02	.11	.06	.03	.04	.17
65-74	.01	.01	.01	.03	.01	.01	.01	.05
Current marital status								
Never married	.47	.64	.63	.44	.34	.69	.55	.31
Married	.47	.33	.33	.52	.51	.29	.39	.62
Separated/Widowed	.06	.03	.04	.05	.06	.02	.05	.07
Birthplace								
Native-born	.88	.92	.90	.91	.79	.90	.85	.88
EU-born	.02	.02	.01	.02	.03	.02	.03	.02
Non EU-born	.10	.06	.09	.07	.17	.08	.12	.10
Education								
Ph.D.-M.Sc.	.01	.02	.01	.01	.02	.03	.02	.01
University degree (AEI)	.10	.13	.14	.12	.10	.18	.15	.10
Technological Institute degree (TEI)	.04	.07	.07	.03	.07	.12	.10	.04
Post-secondary non-tertiary	.18	.16	.19	.10	.17	.15	.17	.13
Upper secondary (High school)	.31	.38	.32	.31	.32	.37	.31	.33
Lower secondary (Gymnasium)	.15	.12	.14	.16	.16	.08	.12	.14
Primary school	.21	.11	.14	.25	.16	.07	.12	.21
Never in school	.01	.01	.01	.02	.01	.01	.01	.02
Urbanization								
Urban	.76	.73	.74	.63	.74	.71	.67	.66
Semi-urban	.11	.12	.11	.14	.12	.13	.13	.14
Rural	.13	.15	.15	.23	.14	.16	.18	.20

Source: Labour Force Survey (1998Q1-2013Q4). Hellenic Statistical Authority (EL.STAT).

Literature pertaining to movements between pairs of activity statuses highlight the role of gender (Theodossiou, 2002; Booth, 2009), age (Bell and Blanchflower, 2011), education (Nickel, 1979; Theodossiou and Zangelidis, 2009; Riddell and Song, 2011), marital status (Mussida and Fabrizi, 2014) and geographical differentials (Bertola and Garibaldi, 2003). Given the availability of such information in the LFS

dataset, we present in Table 5 averages of these variables for selected transitions (unemployment inflows and outflows) and time periods. Indicatively, we observe that IU and UI transitions are more pronounced for females in both periods (i.e., .67 and .62 in the first period and .63 and .62 in the second). However, a different pattern is identified when EU and UE transitions are considered: females in the second period, as compared to the first one, are less frequently observed in the EU transition (.48 vs .41). The same holds for the UE transition. Regarding the age component of inflows and outflows, it is observed that the age distribution of the EU transition has shifted to the right in the second period. These indicative findings highlight the potential importance of individual-specific heterogeneity in modelling the ins and outs of unemployment.

5. Estimation results

5.1 Unemployment inflows

In this sub-section we explore the relationship between the aforementioned individual-specific correlates and annual transition rates from employment to unemployment (EU) and from inactivity to unemployment (IU). The effects of independent variables are represented by the relative risk ratio (exponential value of the estimated coefficient) for both periods (1998Q1-2008Q3) and (2008Q4-2013Q4) and are presented in the 2nd and 3rd column of Table 6. In the case of EU transition we employ the continuously employed (EE) as the base category. We have chosen not to present the estimated results for EI transition, since we are mainly interested in unemployment inflows originating from the employment pool. Similarly, in the case of the IU transition the continuously inactive (II) are used as the base category and estimated results for IE transition are not reported.

According to the results obtained for the first period (1998Q1-2008Q3), the EU-transition relative risk ratio for females -as compared to that of males- is 1.62. In other words, the relative risk of moving from the employment to the unemployment state (EU) is higher for female workers. This finding remains valid in the second period (2008Q4-2013Q4), albeit now at a lower magnitude (1.15). The reduction in the estimated coefficient (from 1.62 to 1.15) implies that, in the second period, the probability of making the EU transition has increased for males as compared to females. Thus, unemployment inflows in Greece are a phenomenon that mostly affects female workers, although in the post-2008 period the relative position of male workers has worsened. With regard to inflows coming from the inactivity state (IU) we observe that females are slightly more likely to make this transition in the first period. However, this gender difference vanishes in the second period. Thus, unemployment inflows embody a gender-bias which is exclusively attributed to separation rate (EU). Regarding the effects of age, it is observed that younger workers face increased risk of making the annual transition from employment to unemployment (EU). This finding is true for both time periods, while relative risk for the younger

(15-24) and the older (45-54) has increased in the crisis years. Concerning the IU transition, it is observed, as expected, that the younger are more likely to enter (new entry or re-entry) the labour force as unemployed. During the crisis years, however, this likelihood has reduced, which implies that non-participation of the younger has increased. This might indicate that the problem of increased joblessness in the post-2008 period has negatively affected the job search returns expected.

Concerning marital status, it is observed that married individuals are less likely to make transitions EU or IU, even though this risk is upgraded in the crisis period. Similarly, foreign-born individuals (as compared to natives) face increased risks of making EU or IU transitions. In addition, highly educated individuals run lower risks of losing their jobs (EU) and it appears that they are only slightly affected by the ongoing crisis. Concerning the IU flow, we observe that the highly-educated have an increased probability of entering (new entry or re-entry) the labour force as unemployed rather than of remaining in the inactivity state. However, in the crisis years, due to limited employment opportunities, highly-educated, inactive individuals face even higher risks of entering the labour market as unemployed. Thus, unemployment inflow primarily concerns the low-educated and, in the crisis years, it concerns all the more even the highly-educated. Lastly, EU transition primarily concerns those workers residing in urban areas and it appears to be unaffected by the ongoing crisis. In contrast, IU transition is more prevalent in semi-urban and rural areas.

5.2 Unemployment outflows

Let us now turn our attention to the relationship between the aforementioned individual-specific characteristics and the annual transition from unemployment to employment (UE) and from unemployment to inactivity (UI). Again, the effects of the independent variables are represented by the relative risk ratio for the two periods under examination and are presented in the 4th and 5th columns of Table 6. In this case, the continuously unemployed (UU) are used as the base category.

The results obtained indicate that, in the pre-crisis period, the UE transition relative risk ratio for females -as compared to males- is 0.51, suggesting that the relative likelihood of moving from the unemployment to the employment state (UE) is lower for unemployed women. This finding remains valid in the crisis years, but its value (0.65) indicates that the probability of exiting unemployment has decreased more for unemployed males. Thus, unemployment outflows (job finding) in Greece are a phenomenon that concerns primarily male unemployed individuals, although in the post-2008 period the relative position of females has slightly improved. With regard to outflows concerning the non-participation state (UI), it is observed that females are more likely to be found in this position in the crisis years. Thus, in the crisis period, departures from the pool of the unemployed are more likely to end up into employment for males and into non-participation for females.

Table 6. Results of Multinomial Logistic Regression, ins and outs of unemployment

Independent Variables	Inflows		Outflows	
	EU	IU	UE	UI
Female				
1998Q1-2008Q3	1.62 (0.02) [a]	1.06 (0.02) [a]	0.51 (0.01) [a]	1.02 (0.02)
2008Q4-2013Q4	1.15 (.020) [a]	1.04 (0.03)	0.65 (0.02) [a]	1.588 (0.04) [a]
Age 15-24				
1998Q1-2008Q3	3.06 (0.12) [a]	35.9 (1.98) [a]	3.41 (0.16) [a]	0.54 (0.02) [a]
2008Q4-2013Q4	3.23 (0.15) [a]	23.07 (1.91) [a]	2.86 (0.21) [a]	0.59 (0.36) [a]
Age 25-34				
1998Q1-2008Q3	2.73 (0.09) [a]	41.50 (2.12) [a]	2.97 (0.13) [a]	0.38 (0.01) [a]
2008Q4-2013Q4	2.67 (0.10) [a]	30.73 (.234) [a]	2.66 (0.17) [a]	0.30 (0.02) [a]
Age 35-44				
1998Q1-2008Q3	1.84 (0.06) [a]	23.51 (1.22) [a]	2.14 (0.09) [a]	0.37 (0.01) [a]
2008Q4-2013Q4	1.87 (0.07) [a]	15.91 (1.26) [a]	2.00 (0.13) [a]	0.35 (0.02) [a]
Age 45-54				
1998Q1-2008Q3	1.35 (0.04) [a]	7.51 (0.40) [a]	1.56 (0.07) [a]	0.47 (0.02) [a]
2008Q4-2013Q4	1.53 (0.06) [a]	6.03 (0.48) [a]	1.43 (0.09) [a]	0.38 (0.02) [a]
Never married				
1998Q1-2008Q3	1.03 (0.03)	0.61 (0.03) [a]	0.74 (0.02) [a]	1.01 (0.05)
2008Q4-2013Q4	1.06 (0.42)	1.17 (0.09) [b]	0.82 (0.05) [a]	0.82 (0.05) [a]
Married				
1998Q1-2008Q3	0.57 (0.02) [a]	0.40 (0.01) [a]	0.87 (0.03) [a]	1.54 (0.07) [a]
2008Q4-2013Q4	0.70 (0.02) [a]	0.64 (0.05) [a]	1.01 (0.05)	1.53 (0.08) [a]
EU-born				
1998Q1-2008Q3	1.27 (0.08) [a]	0.94 (0.06)	1.03 (0.06)	0.94 (0.08)
2008Q4-2013Q4	1.55 (0.08) [a]	1.14 (0.08) [c]	1.57 (0.11) [a]	1.07 (.08)
Non EU-born				
1998Q1-2008Q3	1.39 (0.04) [a]	1.31 (0.04) [a]	1.33 (0.03) [a]	1.04 (0.04)
2008Q4-2013Q4	1.83 (0.05) [a]	1.51 (0.07) [a]	1.22 (0.04) [a]	0.78 (0.03) [a]
Ph.D.-M.Sc.				
1998Q1-2008Q3	0.40 (0.05) [a]	21.61 (2.23) [a]	2.06 (0.23) [a]	0.57 (0.12) [a]
2008Q4-2013Q4	0.35 (0.04) [a]	28.43 (4.54) [a]	3.12 (0.49) [a]	1.20 (0.19)
University degree (AEI)				
1998Q1-2008Q3	0.43 (0.03) [a]	8.77 (0.58) [a]	1.79 (0.13) [a]	1.44 (0.11) [a]
2008Q4-2013Q4	0.39 (0.04) [a]	15.72 (2.19) [a]	2.70 (0.35) [a]	0.88 (0.09)
Technological Institute degree (TEI)				
1998Q1-2008Q3	0.52 (0.04) [a]	13.8 (0.97) [a]	1.87 (0.14) [a]	0.82 (0.07) [b]
2008Q4-2013Q4	0.55 (0.05) [a]	26.20 (3.69) [a]	2.74 (0.37) [a]	0.57 (0.07) [a]
Post-secondary non-tertiary				
1998Q1-2008Q3	0.99 (0.06)	11.22 (0.75) [a]	1.50 (0.10) [a]	0.66 (0.05) [a]
2008Q4-2013Q4	0.88 (0.08)	14.30 (2.01) [a]	1.92 (0.25) [a]	0.70 (0.07) [a]
Upper secondary (High school)				
1998Q1-2008Q3	0.78 (0.05) [a]	1.83 (0.12) [a]	1.16 (0.08) [b]	0.93 (0.06)
2008Q4-2013Q4	0.78 (0.07) [b]	2.89 (0.40) [a]	1.88 (0.24) [a]	0.85 (0.09)
Lower secondary (Gymnasium)				
1998Q1-2008Q3	0.97 (0.06)	0.57 (0.03) [a]	1.12 (0.08)	1.07 (0.08)
2008Q4-2013Q4	1.02 (0.09)	0.68 (0.10) [a]	1.70 (0.22) [a]	0.88 (0.09)
Primary school				

1998Q1-2008Q3	1.09 (0.07)	1.76 (0.11) [a]	1.07 (0.07)	0.97 (0.07)
2008Q4-2013Q4	1.06 (0.10)	2.87 (0.41) [a]	1.72 (0.22) [a]	0.80 (0.08) [b]
Semi-urban				
1998Q1-2008Q3	0.71 (0.01) [a]	1.11 (0.02) [a]	0.88 (0.01) [a]	1.15 (0.03) [a]
2008Q4-2013Q4	0.76 (0.19) [a]	1.33 (0.04) [a]	0.96 (0.03)	1.03 (0.04)
Rural				
1998Q1-2008Q3	0.46 (0.01) [a]	1.12 (0.02) [a]	0.92 (0.01) [a]	1.32 (0.03) [a]
2008Q4-2013Q4	0.57 (0.14) [a]	1.40 (0.04) [a]	1.02 (0.31)	1.11 (0.04) [a]
Number of observations				
1998Q1-2008Q3	1,246,205	801,993	139,138	
2008Q4-2013Q4	508,231	303,961	89,514	
Pseudo R-squared				
1998Q1-2008Q3	0.0749	0.1980	0.0406	
2008Q4-2013Q4	0.0707	0.2229	0.0567	

Source: Labour Force Survey. Hellenic Statistical Authority (EL.STAT).

Notes: Estimates are relative risk ratios (i.e., exponential of the coefficient estimated) from a multinomial logit model. Reference categories for independent variables are the following: male, age 55-64, previously married, native-born, primary education and urban area. All models include region, year and quarter dummies. Estimate of the constant term is not reported. Standard errors are corrected for heteroskedasticity.

[a], [b] and [c] denote statistical significance at 1%, 5% and 10% levels, respectively.

Regarding the effects of age, it is observed that younger unemployed individuals face increased probability of making the annual transition from unemployment to employment (UE). This finding concerns both time periods, although it is less important in the crisis years. Turning now to the UI transition, it is observed, as expected, that the younger (as compared to the older) are less likely to exit the labour market and prefer to be continuously unemployed than to become inactive. We also observe that married unemployed individuals are less likely to make the UE transition and more likely to move from U to I. In addition, foreign-born unemployed individuals (as compared to natives) have a greater chance of finding a job (UE). Unemployed individuals of a high educational level have a greater probability of finding a job (UE) and it appears that their relative position (compared to the unemployed of a low educational level) has substantially improved in the crisis years. Furthermore, unemployed individuals of a higher educational level have a smaller chance of becoming inactive (UI). Lastly, those residing in urban areas are more likely to find a job (UE), but this likelihood has vanished during the ongoing crisis. On the contrary, movement towards non-participation (UI) is more prevalent in rural areas.

6. Conclusions

The present study analyses the ins and outs of Greek unemployment against the background of the ongoing economic crisis. Our major finding is that in the beginning of the crisis (2008Q4-2011Q4) inflows dominated outflows in explaining unemployment variations. Later on in the recession, outflows contribute more than inflows to rising unemployment rates. Thus, both, job separation and job finding rates shape

unemployment fluctuations. These findings are in agreement with those reported for Anglo-Saxon and other Continental Europe countries (Petrongolo and Pissarides, 2008; Elsby *et al.* 2009; Fujita and Ramey, 2009; Smith, 2011). At the micro-level, data allow us to define individual annual transitions and investigate the heterogeneous nature of the ins and outs of unemployment using multinomial regression techniques. It has been found that the flows in question vary with gender, age, marital status, country of birth, education and place of residence. These variations are of a different magnitude in the sub-periods examined. For example, relative risk ratio for females in the 2008Q4-2013Q4 period decreased for EU transition and increased for UE. In addition, it has been found that highly-educated youth in Greece faces rising unemployment rates primarily due to large inflows from inactivity, highlighting the scarcity of jobs in the Greek labour market.

Our results should be interpreted with some caution since data limitations/problems and methodological shortcomings are present. For example, our estimates are drawn from cross-sectional survey data rather than from longitudinal datasets. This prevents measuring monthly or quarterly transitions and implementing well-known techniques for eliminating possible biases, i.e., the time aggregation bias. However, we do not expect that these biases could substantially alter our findings given the low level of labour market transitions in Greek economy. In addition, it has not been possible to fully identify one's individual employment history (duration dependence), within an unemployment-spell approach. Furthermore, evidence cannot be provided regarding alternative measures of unemployment by including marginally unemployed individuals, whose number is expected to increase during recession periods. At the individual level, and given that Greece records the highest self-employment rates in the EU, one may wish to explore a four-state model of worker flows (paid employment, self-employment, unemployment and non-participation).

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THE DYNAMICS OF WEALTH, ENVIRONMENT AND LAND VALUE IN A THREE-SECTOR GROWTH MODEL

WEI-BIN ZHANG
Ritsumeikan Asia Pacific University, Japan

Abstract
This study builds a three-sector growth model with endogenous wealth accumulation and environmental change. It deals with dynamics of land value and rent in tandem with economic growth and economic structural change. The economy consists of industrial, agricultural and environmental sectors. The land is used by the agricultural sector and for providing housing services. The model is based on the neoclassical growth theory and Ricardian theory. The household's decision is modeled with an alternative approach proposed by Zhang (1993). After building the model, we simulate the motion of the economy. We demonstrate that the economic system has a unique, stable, steady state. We also conduct comparative dynamic analysis. We demonstrate how exogenous changes in the environmental sector's productivity, the population, and the tax rates affect the consumption level of the industrial goods, the output level of the industrial sector, the rent income, the consumption of housing during transitory processes and in long-term equilibrium

JEL Classification: O41, O44, H23
Keywords: Land Value and Rent, Environment, Taxes, Wealth Accumulation, Economic Structure

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**Corresponding Address:* Prof. Wei-Bin Zhang, Ritsumeikan Asia Pacific University Jumonjibaru, Beppu-Shi, Oita-ken, 874-8577 Japan. e-mail: wbz1@apu.ac.jp

1. Introduction

Determination of land value over time and space is an important issue in free market economies. It makes common sense to argue that land prices vary over time and space in association with economic development. Nevertheless, only a few theoretical growth models include endogenous determination of land value in the economic growth theories with microeconomic foundation. This study makes a contribution to the literature of land value dynamics in a growth model with endogenous wealth accumulation and environmental change.

A well-known study of land rent is Ricardo's *On the Principles of Political Economy and Taxation* published in 1817. Ricardo studied income distribution to explain how a change in this distribution could hinder or favor accumulation. The Ricardian system attempts to interconnect wages, interest rate, and rent together in a compact theory. Ricardo distinguished between the three production factors, labor, capital, and land. He provided a theory to explain the functional income distribution of labor share, the capital, and the land rent share of total income. Ricardo (1821: preface) pointed out: "The produce... is divided among three classes of the commodity, namely, the proprietor of land, the owners of the stock or capital necessary for its cultivation, and laborers by whose industry it is cultivated. But in different stages of society, the proportions of the whole produce of the earth which will be allotted to each of these classes, under the names of rent, profits, and wages, will be essentially different; depending mainly on the actual fertility of the soil, on the accumulation of capital and population, and on the skill, ingenuity, and the instruments in agriculture." Since the publication of the *Principles*, many attempts have been done to extend or generalize the system (Barkai, 1959, 1966; Pasinetti, 1960, 1974; Cochrane, 1970; Brems, 1970; Caravale and Tosato, 1980; Casarosa, 1985; Negish, 1989; Morishima, 1989). Nevertheless, we can still apply what Ricardo (1821: preface) observed a long time ago to describe the current situation: "To determine the laws which regulate this distribution, is the principal problem in Political Economy: much as the science has been improved by the writings of Turgot, Stuart, Smith, Say, Sismondi, and others, they afford very little satisfactory information respecting the natural course of rent, profit, and wages." In Ricardo's statement there is no reference to land value (price). A genuine analysis of "the natural course" involves high-dimensional dynamic analysis as determination of land value and rent is related to many factors. As Cho (1996: 145) stated, "During the past decade, the number of studies on intertemporal changes in house prices has increased rapidly because of wider availability of extensive micro-level data sets, improvements in modeling techniques, and expanded business applications." The literature on house and land prices has been increasingly expanding since then (e.g., Bryan and Colwell, 1982; Case and Quigley, 1991; Chinloy, 1992; Clapp and Giaccotto, 1994; Calhoun, 1995; Quigley, 1995; Capozza and Seguin, 1996; Alpanda, 2012; Alexander, 2013; Du and Peiser, 2014; Kok *et al*. 2014). Most of these studies are empirical. There are

only a few formal growth models with endogenous land values. According to Liu *et al*. (2011: 1), "Although it is widely accepted that house prices could have an important influence on macroeconomic fluctuations, quantitative studies in a general equilibrium framework have been scant." Since land value is related to physical wealth which can be accumulated through saving, we need microeconomic mechanism to determine land value and saving in an integrated framework. The traditional Ricardian theory does not provide a proper microeconomic mechanism of wealth accumulation. On the other hand, the neoclassical growth theory models endogenous wealth accumulation with a microeconomic foundation. We will integrate the neoclassical growth theory with the Ricardian theory of distribution to determine land value and land rent.

Another important dimension of economic development is the environment. The environment affects productivities of firms and the welfare of households. On the other hand, both consumption and production pollute the environment. To deal with environmental change it is necessary to develop a dynamic interdependence between consumption, production, and a government's environmental policies. The dynamic relations between consumption and pollution have been extensively analyzed in the literature of formal economic analysis since the publication of the seminal papers by Ploude (1972) and Forster (1973). There are an increasing attention to environmental change in the literature of economic growth and development (e.g., Copeland and Taylor, 2004; Stern, 2004; Dasgupta *et al.*, 2006). Three main processes are taken into account for explaining the level of environmental pollution (e.g., Tsurumi and Managi, 2010). They are: (i) increases in output; (ii) changes in preferences or policy changes; and (iii) income changes (Pearson, 1994; Grossman, 1995; Brock and Taylor, 2006; and Kijima *et al.*, 2010). Another important phenomenon is the so-called environmental Kuznets curve (e.g., Kijima *et al.,* 2010). There is a large number of empirical studies on the environmental Kuznets curve for various pollutants. These studies identify different relations - for instance, inverted U-shaped relationship, a U-shaped relationship, monotonically increasing or monotonically decreasing relationship - between pollution and rising per capita income levels (e.g., Dinda, 2004; Managi, 2007; Tsurumi and Managi, 2010). The ambiguous or situation-dependent relations between environmental quality and economic growth and the inability of economic growth theory to explain properly these observed phenomena implies the necessity for developing more comprehensive theories.

This study builds an economic growth model with endogenous environment and dynamics of land value and land rent. The economic production and market aspects are based on the neoclassical growth theory. The models in the neoclassical growth theory are extensions and generalizations of the pioneering works of Solow (1956). As far as the economic structure is concerned, this study is influenced by Uzawa (1961), who made an extension of Solow's one-sector economy by a breakdown of the productive system into two sectors using capital and labor (see also, Diamond, 1965; Stiglitz,

1967; Drugeon and Venditti, 2001; Zhang, 2005). In the Uzawa two-sector growth model, one sector produces industrial goods and the other consumption goods. We extend the Uzawa analytical framework to an economy with agricultural production and housing. It should be noted that we deviate from the traditional approaches in the neoclassical growth theory in that we analyze behavior of households with the alternative approach proposed by Zhang (1993). There are three main approaches to household behavior in economic growth theory with wealth accumulation. The Solow model is the starting point for almost all analyses of economic growth (Solow, 1956). The Solow model does not provide a mechanism of endogenous savings. Another important approach is the so-called representative agent growth model based on Ramsey's utility function (Ramsey, 1928). The Ramsey approach assumes that utility is additive over time. Cass and Koopmans integrated Ramsey's analysis of consumer optimization and Solow's description of profit-maximizing producers within a compact framework (Cass, 1965; Koopmans, 1965). A main problem of this approach is that it makes the analysis intractable even for a simple economic growth problem. Another approach in economic modeling is the so-called OLG approach. In his original contribution to growth theory with capital accumulation, Diamond (1965) used the overlapping generation's structure proposed by Samuelson (1958) to examine the long-term dynamical efficiency of competitive production economies. The approach is a discrete version of the continuous Ramsey approach. Most models of the approach assume that agents live only two periods – as mentioned in Azaridias (1993), each period should last over 30 years if one really wants to use analytical results to provide direct insights into reality. The time period of over 30 years period is generally considered too long for discussing modern economic changes because within each period nothing is allowed to be changeable. The model in this study is an integration of the two models recently proposed by Zhang (2014, 2015). This model is different from Zhang's 2014 model in that this study introduces endogenous environment and land value based on Zhang's 2015 model with environment. The rest of the paper is organized as follows. Section 2 defines the basic model. Section 3 shows how we solve the dynamics and simulates the model. Section 4 examines effects of changes in some parameters on the economic system over time. Section 5 concludes the study. The appendix proves the main results in Section 3.

2. The model

The economy consists of industrial, agricultural and environment sectors. The industrial sector produces goods, which are freely traded on the market. The industrial production is the same as that in Solow's one-sector neoclassical growth model. It is a commodity used both for investment and consumption. The agricultural sector produces agricultural goods, which are used for consumption. In our economic system there is an environmental sector which keeps the environment clean and is financially sup-

ported by the government. The government's income comes for taxing producers and consumers. The population N is homogenous and constant. We neglect issues related to the endogenous population and will study effects of exogenous population changes on economic structure and land values. The total land L is homogenous and constant. The land is owned by households and is distributed between housing and agricultural production in the competitive land market. The assumption of fixed land is strict. As observed by Glaeser, *et al.* (2005), the land supply elasticity varies substantially over space in the USA (see also, Davis and Heathcote, 2007). This study neglects possible changes in land supply. Households achieve the same utility level regardless of what profession they choose. All the markets are perfectly competitive. We select industrial goods to serve as numeraire.

The industrial sector

We assume that the production of the industrial sector is through combining the labor force, $N_i(t)$ and the physical capital, $K_i(t)$. We use the following conventional production function to describe a relationship between inputs and output

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

where $\Gamma_i(E)$ is a function of the environmental quality measured by the level of pollution, $E(t)$, and A_i, α_i and β_i are parameters. The parameter A_i is the total factor productivity. The parameters α_i and β_i are the output elasticities of capital and labor, respectively. The productivity of the sector is negatively related to the pollution level, i.e., $d\Gamma_i / E \leq 0$. The production function is a neoclassical one and homogeneous of degree one with the inputs. Markets are competitive; thus labor and capital earn their marginal products. The rate of interest $r(t)$ and wage rate $w(t)$ are determined by markets. The marginal conditions are given by

$$r(t) + \delta_k = \frac{\alpha_i \bar{\tau}_i F_i(t)}{K_i(t)}, \quad w(t) = \frac{\beta_i \bar{\tau}_i F_i(t)}{N_i(t)}, \tag{2}$$

where δ_κ is the fixed depreciation rate of physical capital and $\bar{\tau}_i \equiv 1 - \tau_i$ where τ_i is the fixed tax rate of the industrial sector's output, $0 < \tau_i < 1$.

The agricultural sector

We assume that agricultural production is the result of combining capital $K_\alpha(t)$ labor force $N_\alpha(t)$ and land $L_\alpha(t)$ as follows

$$F_a(t) = A_a \Gamma_a(E(t)) K_a^{\alpha_a}(t) N_a^{\beta_a}(t) L_a^{\varsigma}(t), \quad A_a, \alpha_a, \beta_a, \varsigma > 0, \quad \alpha_a + \beta_a + \varsigma = 1, \tag{3}$$

where $\Gamma_\alpha(E(t))$ is similarly defined as $\Gamma_i(E(t))$, and A_α, α_α, β_α and ς are parameters.

The marginal conditions are

$$r(t)+\delta_k=\frac{\alpha_a\,\bar{\tau}_a\,p_a(t)F_a(t)}{K_a(t)},\quad w(t)=\frac{\beta_a\,\bar{\tau}_a\,p_a(t)F_a(t)}{N_a(t)},\quad R(t)=\frac{\varsigma\,\bar{\tau}_a\,p_a(t)F_a(t)}{L_a(t)},\tag{4}$$

where $p_\alpha(t)$ is the price of agricultural goods, $R(t)$ is the land rent, and $\bar{\tau}_a \equiv 1-\tau_a$ where τ_α is the fixed tax rate on the agricultural sector's output, $0<\tau_\alpha<1$.

Choice between physical wealth and land

Land may be owned by different agents under various institutions. We assume that land is privately owned by households. There are different approaches with regard to determination of land prices and rents. For instance, in some approaches (Iacoviello, 2005; Iacoviello and Neri, 2010) households are assumed to be credit constrained and these households use land or houses as collateral to finance consumption expenditures. These models with credit-constrained households are used to explain positive co-movements between house prices and consumption expenditures (see also, Campbell and Mankiw, 1989; Zeldes, 1989; Case, *et al.*, 2005; Mian and Sufi, 2010; Oikarinen, 2014), even though they are not effective in explaining well-observed positive co-movements between land prices and business investment. In Liu *et al.* (2011), instead of households, firms are assumed to be credit constrained. Firms finance investment spending by using land as a collateral asset. We assume that land can be sold and bought in free markets without any friction and transaction costs. Land use will not waste land and land cannot regenerate itself. Households own land and physical wealth. We use $p_L(t)$ to denote the price of land. Consider now an investor with one unity of money. He can either invest in capital goods thereby earning a profit equal to the net own-rate of return $r(t)$ or invest in land thereby earning a profit equal to the net own-rate of return $R(t)/p_L(t)$. As we assume capital and land markets to be at competitive equilibrium at any point in time, two options must yield equal returns, i.e.

$$\frac{(1-\tau_R)R(t)}{p_L(t)}=(1-\tau_k)r(t),\tag{5}$$

where τ_R and τ_k are the fixed tax rates of the land rent income and income from interest payment on wealth, respectively. This equation enables us to determine the choice between owning land and wealth. This assumption is made under many strict conditions. For instance, we neglect any transaction costs and any time needed for buying and selling. The expectations of land are complicated. Equation (5) also implies perfect information and rational expectation.

Consumer behavior

For simplicity, we use the lot size to stand for housing. As argued, for instance, by Davis and Heathcote (2007), most of the fluctuations in house prices are driven by land price rather than by the cost of structures. Consumers decide consumption levels of industrial and agricultural goods and lot size, as well as on how much to save. The land distribution between the agricultural use and residential use is determined in competitive land markets. The land rent is equal both for the land used for agricultural production and for the residential use. This study uses the approach to consumers' behavior proposed by Zhang (1993). We denote physical wealth by $\bar{k}(t)$ and land $\bar{l}(t)$ owned by the representative household, respectively. The total value of wealth owned by the household $a(t)$ is the sum of the two assets

$$a(t) = \bar{k}(t) + p_L(t)\bar{l}(t). \tag{6}$$

Per capita current income from the interest payment $r(t)\bar{k}(t)$, the wage payment $w(t)$, and the land revenue $R(t)\bar{l}(t)$ is given by

$$y(t) = (1 - \tau_k)r(t)\bar{k}(t) + (1 - \tau_w)w(t) + (1 - \tau_R)R(t)\bar{l}(t), \tag{7}$$

where τ_k, τ_w, and τ_R are respectively the fixed tax rates on the wealth income, wage, and land rent income. It should be noted that in the Solow growth model $y(t)$ is the disposable income. In our approach we call $y(t)$ the current income. In our approach the disposable income is the sum of the current value and the value of the household's wealth. It is evident that what a household is is not only what the household currently earns, but also should include the value of the household's wealth (if the wealth could be sold instantaneously without any transaction costs). In this study we assume that agents can sell and buy their assets instantaneously without any transaction costs. This is obviously a strict assumption. This assumption simplifies modelling behavior of agents. The per capita disposable income is given by

$$\hat{y}(t) = y(t) + a(t). \tag{8}$$

At each point in time, a consumer would distribute the total available budget between the saving $s(t)$, the consumption of industrial goods $c_i(t)$, the consumption of agricultural goods $c_a(t)$, and the lot size $l_h(t)$. Let $\tilde{\tau}_c$, $\tilde{\tau}_a$, $\tilde{\tau}_h$ stand for, respectively, the fixed tax rates on consumption of industrial good, agricultural good, and housing. The budget constraint is given by

$$(1 + \tilde{\tau}_c)c_i(t) + s(t) + (1 + \tilde{\tau}_a)p_a(t)c_a(t) + (1 + \tilde{\tau}_h)R(t)l_h(t) = \hat{y}(t). \tag{9}$$

The left-hand side is the total expenditure on consumption and saving. The right-hand side is the value of the total available income. The representative household has four variables, $s(t)$, $c_i(t)$, $c_a(t)$, and $l_h(t)$, to decide. It should be remarked that $\bar{l}(t)$ and $l_h(t)$ represent the land owned by the representative household and the representative household's lot size, respectively. All the households and producers pay the same land rent. The consumer's utility function is specified as follows

$$U(t) = \Gamma_c(E(t))c_i^{\xi_0}(t)c_a^{\mu_0}(t)l_h^{\eta_0}(t)s^{\lambda_0}(t), \quad \xi_0, \mu_0, \eta_0, \lambda_0 > 0,$$

in which ξ_0, μ_0, η_0, and λ_0 are the household's elasticity of utility with regard to industrial goods, agricultural goods, housing, and saving. We call ξ_0, μ_0, η_0, and λ_0 propensities to consume industrial goods, agricultural goods, housing, and to hold wealth, respectively. Saving from the disposable income enables the household to accumulate wealth, increasing the household's welfare. It should be noted that this study does not explicitly take account of consumers' awareness of the environment. For instance, consumers may prefer environment-friendly goods when their living conditions are changed. We may take account of changes in consumers' behavior, for instance, by assuming that the representative consumer spends a proportion of the disposable income on environment or the tax rate on the consumer's consumption is explicitly related to income and consumption level.

Maximizing the utility $U(t)$ subject to (9) yields

$$c_i(t) = \xi\,\hat{y}(t), \quad p_a(t)c_a(t) = \mu\,\hat{y}(t), \quad R(t)l_h(t) = \eta\,\hat{y}(t), \quad s(t) = \lambda\,\hat{y}(t), \tag{10}$$

where

$$\xi \equiv \frac{\rho\,\xi_0}{1+\tilde{\tau}_c}, \quad \mu \equiv \frac{\rho\,\mu_0}{1+\tilde{\tau}_a}, \quad \eta \equiv \frac{\rho\,\eta_0}{1+\tilde{\tau}_h}, \quad \lambda \equiv \rho\,\lambda_0, \quad \rho \equiv \frac{1}{\xi_0 + \mu_0 + \eta_0 + \lambda_0}.$$

Wealth accumulation

According to the definition of $s(t)$, the change in the household's wealth is given by

$$\dot{a}(t) = s(t) - a(t). \tag{11}$$

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

Balances of demand and supply for agricultural goods

The demand and supply for the agricultural sector's output balance at any point in time

$$C_a(t) = c_a(t)N = F_a(t). \tag{12}$$

All the land owned by households

The land owned by the population is equal to the national available land

$$\bar{l}(t)N = L. \tag{13}$$

Full employment of capital

We use $K(t)$ to stand for the total capital stock. We assume that the capital stock is fully employed. We have

$$K_i(t) + K_a(t) + K_e(t) = K(t). \tag{14}$$

where $K_e(t)$ is the capital stocks employed by the environmental sector.

Balances of demand and supply for industrial goods

The demand and supply for the industrial sector's output balance at any point in time

$$\dot{K}(t) = F_i(t) - c_i(t)N - \delta_k K(t).$$

According to Say's law, we can consider this equation redundant in the general equilibrium system.

The value of physical wealth and capital

The value of physical capital is equal to the value of physical wealth

$$\bar{k}(t)N = K(t). \tag{15}$$

Full employment of the labor force

We assume that the labor force is fully employed

$$N_i(t) + N_a(t) + N_e(t) = N. \tag{16}$$

The land market clearing condition

The condition that land is fully used for the agricultural production and residential use implies

$$l_h(t)N + L_a(t) = L. \tag{17}$$

Dynamics of pollutants and the environment sector

We now describe dynamics of the stock of pollutants, $E(t)$. We assume that pollutants are created both by production and consumption. We specify the dynamics of the stock of pollutants as follows

$$\dot{E}(t) = \theta_i F_i(t) + \theta_a F_a(t) + \widetilde{\theta}_i C_i(t) + \widetilde{\theta}_a C_a(t) - Q_e(t) - \theta_0 E(t), \tag{18}$$

in which θ_i, θ_a, $\widetilde{\theta}_i$, $\widetilde{\theta}_a$, and θ_0 are positive parameters and

$$Q_e(t) = A_e \Gamma_e(E) K_e^{\alpha_e}(t) N_e^{\beta_e}(t), \quad A_e, \alpha_e, \beta_e > 0, \tag{19}$$

where $N_e(t)$ is the labor force employed by the environmental sector, A_e, α_e, and β_e are positive parameters, and $\Gamma_e(E)$ (≥ 0) is a function of E. As one referee points out, equation (18) implies end-of-pipe abatement technology, as opposed to process-integrated technology. The end-of-pipe abatement technology reduces the amount of contaminants before they form. The process-integrated technology is used after the production process to remove already formed contaminants (Palivos and Varvarigos, 2015). The term $\theta_i F_i$ (or $\theta_a F_a$) means that pollutants that are emitted during production processes are linearly positively proportional to the output level (Gutiérrez, 2008). The parameter, $\widetilde{\theta}_i$ (or $\widetilde{\theta}_a$) means that in consuming one unit of the good the quantity $\widetilde{\theta}_i$ (or $\widetilde{\theta}_a$) is left as waste (Prieur, 2009). The parameter $\widetilde{\theta}_i$ depends on the technology and environmental sense of consumers. The parameter θ_0 is called the rate of natural purification. The term $\theta_0 E$ measures the rate that the nature purifies environment. The term, $K_e^{\alpha_e} N_e^{\beta_e}$, in Q_e means that the purification rate of the environment is positively related to capital and labor inputs. The function $\Gamma_e(E)$, implies that the purification efficiency is dependent on the stock of pollutants. For simplicity, we specify Γ_e as follows $\Gamma_e(E) = E^{b_e}$, $1 > b_e \geq 0$. This equation means that the productivity of the environment sector is positively related to the level of pollutants. The more the environment is polluted, the more pollutants the environment sector can clear per unit of time with the same inputs (in the case of $b_e > 0$). We require $1 > b_e$ as doubling the level of pollutants would not double the environment's productivity.

We now determine how the government determines the number of the labor force and the level of capital employed for purifying pollution. We assume that all the tax incomes are spent on the environment. In the literature of environmental economics, for instance, Ono (2003) introduces tax on the producer and uses the tax income for environmental improvement in the traditional neoclassical growth theory. Different from Ono's approach, our study takes account of tax not only on producers, but also on consumers. The government's tax incomes consist of the tax incomes on the production sectors, consumption, wage income and wealth income. Hence, the government's income is given by

$$Y_e(t) = \tau_i F_i(t) + \tau_a p_a(t) F_a(t) + I_c(t), \tag{20}$$

where

$$I_c(t) \equiv \left[\widetilde{\tau}_c c_i(t) + \widetilde{\tau}_a p_a(t) c_a(t) + \widetilde{\tau}_h R(t) l_h(t) + \tau_k r(t) \bar{k}(t) + \tau_w w(t) + \tau_R R(t) \bar{l}(t)\right] N.$$

For simplicity, we assume that the government's income is used up only for the environmental purpose. As there are only two input factors in the environmental sector, the government budget is given by

$$\left(r(t)+\delta_k\right)K_e(t)+w(t)N_e(t)=Y_e(t). \tag{21}$$

We need an economic mechanism to determine how the government distributes the tax income. As in Zhang (2005), we assume that the government employs the labor force and capital stocks for purifying the environment in such a way that the purification rate achieves its maximum under the given budget constraint. The government's optimal problem is thus given by maximizing (19) under constraint (21). That is

$$\text{Max } Q_e(t) \quad \text{s.t. (21)}$$

The optimal solution is given by

$$\left(r(t)+\delta_k\right)K_e(t)=\alpha Y_e(t), \quad w(t)N_e(t)=\beta Y_e(t), \tag{22}$$

where

$$\alpha \equiv \frac{\alpha_e}{\alpha_e+\beta_e}, \quad \beta \equiv \frac{\beta_e}{\alpha_e+\beta_e}.$$

We thus built the model. The model describes dynamics of the economic structure and land value. We now examine dynamic properties of the model.

3. The dynamics and the motion by simulation

We built a model with endogenous wealth accumulation and environment. The model also determines the value of land and land rent. The system contains many variables which are connected to each other with nonlinear relations. It is impossible to give analytical solutions to this kind of nonlinear differential equations. For illustration, the rest of the study simulates the model. In the appendix, we show that the dynamics of the national economy can be expressed as two differential equations. First, we introduce a variable $z(t)$ by

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

We now show that the dynamics can be expressed by two dimensional differential equations with $z(t)$ and $E(t)$ as the variables.

Lemma

The motion of the system is determined by the following two differential equations

$$\dot{z} = \Lambda(z, E),$$
$$\dot{E} = \Omega(z, E),$$

where the right-hand sides of (23) are functions of $z(t)$ and $E(t)$ determined in the appendix. Moreover, all the other variables can be determined as functions of $z(t)$ and $E(t)$ at any point in time by the following procedure: $r(t)$ and $w(t)$ by (A2) $\rightarrow \bar{k}_1(t)$ by (A28) $\rightarrow K_a(t)$ by (A6) $\rightarrow K_i(t)$ and $K_e(t)$ by (A19) $\rightarrow N_i(t)$, $N_a(t)$ and $N_e(t)$ by (A1) $\rightarrow \hat{y}(t)$ by (A13) $\rightarrow L_a$ and l_h by (A9) $\rightarrow \bar{l}$ by (13) $\rightarrow p_L(t)$ by (A21) $\rightarrow R(t)$ by (A12) $\rightarrow a(t)$ by (A23) $\rightarrow p_a(t)$ by (A5) $\rightarrow F_i(t)$ by (1) $\rightarrow F_a(t)$ by (3) $\rightarrow c_i(t)$, $c_a(t)$, and $s(t)$ by (5) $\rightarrow Y_e(t)$ by (22) $\rightarrow Q_e(t)$ by (19) $\rightarrow U(t)$ by the definition.

The lemma shows that once we determine the values of the two variables with initial conditions, we determine all the other variables in the economic system. The lemma is important as it gives a procedure to follow the motion of the system by computer. First we specify environment-related functions as follows:

$$\Gamma_m(t) = E^{-b_m}(t), \quad m = i, a, e, c.$$

In order to follow the motion of the system, we specify the parameter values as follows:

$$N = 20,\ L = 8,\ A_i = 1,\ A_a = 0.8,\ A_e = 0.5,\ \alpha_i = 0.32,\ \alpha_a = 0.1,\ \beta_a = 0.2,\ \alpha_e = 0.3,$$
$$\beta_e = 0.7,\ \lambda_0 = 0.7,\ \xi_0 = 0.15,\ \mu_0 = 0.06,\ \eta_0 = 0.06,\ b_i = b_a = 0.15,\ b_e = -0.1,\ b_c = 0.1,$$
$$\tau_m = 0.01,\ m = i, a, k, R, w,\ \tilde{\tau}_m = 0.01,\ m = h, a, c,\ \theta_i = 0.1,\ \theta_a = 0.05,\ \tilde{\theta}_i = 0.05,$$

$$\tilde{\theta}_a = 0.01,\ \theta_0 = 0.05,\ \delta_k = 0.05. \tag{24}$$

The population is fixed at 20 and the land at 8. We assume that the propensity to save is much higher than the propensity to consume industrial goods and the propensity to consume agricultural goods. The tax rates are approximately 1 percent. The environmental impact parameters b_m are about 0.1 to 0.15. Although these parameter values are not based on any real economy, we choose them for the purpose of simulation. We also need to specify initial conditions. As shown in the lemma, the differential equations contain the two variables, $z(t)$ and $E(t)$. We specify the following initial conditions:

$$z(0) = 0.5,\ E(0) = 7.5.$$

As shown in the appendix, the following variables are invariant in time:

$$l_h = 0.236,\ \ L_a = 3.275,\ \ \bar{l} = 0.4.$$

We plot the motion of the other variables in Figure 1. In Figure 1 the national gross product (GDP) is

$$Y(t) = F_i(t) + p_a(t)F_a(t) + l_h N R(t).$$

It should be remarked that the paths of the changes of all the variables in the figure are dependent on the initial conditions specified. For the given initial conditions the GDP and national capital stock fall over time till they become stationary. The wage rate, the price of land, price of agricultural goods, and land rent are reduced, and the rate of interest is enhanced. The output levels of the agricultural and industrial sectors are reduced. Some of the force is shifted from the agricultural and environment sectors to the industrial sector. The capital inputs of the three sectors are increased. The physical wealth, total wealth, and consumption levels of the two goods are reduced. The output of the environment sector falls and environment is deteriorated. It should be noted that the dynamic relationship between the GDP and the land price plotted in Figure 1 is similar to the phenomenon described by Liu *et al*. (2011: 1): "The recent financial crisis caused by a collapse of the housing market propelled the U.S. economy into the Great Recession. A notable development during the crisis period was a slump in business investment in tandem with a sharp decline in land prices." The conclusions made by Liu *et al*. are based on the data for the Great Recession period as well as for the entire sample period from 1975 to 2010.

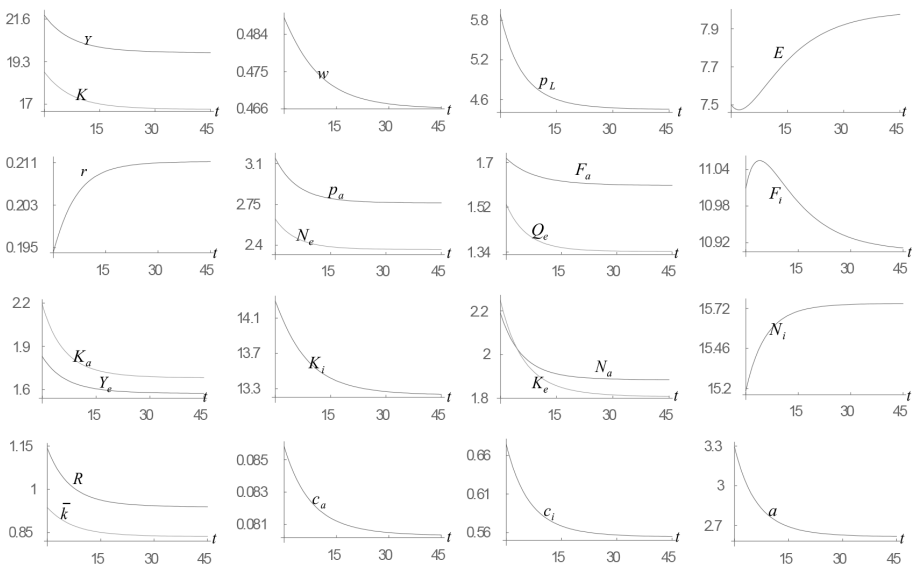

Figure 1. The Motion of the Economic System

From Figure 1 we observe that all the variables tend to become stationary in the long term. This implies the existence of some equilibrium point. We confirm the existence of a unique equilibrium point as follows

$$Y = 19.78,\ Y_e = 1.57,\ K = 16.71,\ E = 7.99,\ w = 0.47,\ p_L = 4.44,\ R = 0.94,\ r = 0.21,$$
$$p_a = 2.76,\ F_a = 1.61,\ F_i = 10.91,\ Q_e = 1.34,\ K_a = 1.68,\ K_i = 13.23,\ K_e = 1.81,\ N_a = 1.88,$$
$$N_i = 15.75,\ N_e = 2.36,\ L_a = 3.28,\ l_h = 0.24,\ \bar{l} = 0.4,\ \bar{k} = 0.84,\ c_a = 0.08,\ c_i = 0.55,$$

$$\alpha = 2.61.$$

The two eigenvalues at the equilibrium point are
–0.189, –0.093.

The confirmed stability is important as this guarantees that we can effectively conduct comparative dynamic analysis.

4. Comparative dynamic analysis

We now examine effects of changes in some parameters on the motion of the economic system. As the lemma gives a computational procedure to calibrate the motion of all the variables and the equilibrium point is locally stable, it is straightforward to conduct comparative dynamic analysis. In the rest of this study we use $\overline{\Delta} x_j(t)$ to mean the change rate of the variable, $x_j(t)$, in percentage due to changes in a parameter value.

A rise in the propensity to consume housing

First we examine the effects of the following change in the propensity to consume housing on the economic variables: $\eta_0 : 0.06 \Rightarrow 0.07$. As the household has a stronger preference for housing, the land is redistributed as follows

$$\overline{\Delta} L_a = -8.96,\ \overline{\Delta} l_h = 6.21,\ \overline{\Delta} \bar{l} = 0.$$

More land is relocated to residential use. The effects on the other variables are plotted in Figure 2. The rent of lot size, the land value, and rate of interest are increased. The wage rate falls initially and is reduced in the long term. The price of agricultural goods is increased. The household's physical wealth per capita is reduced. The household's wealth is enhanced. The household consumes less agricultural goods. Initially the household consumes more industrial goods and consumes slightly less agricultural goods in the long term. The national capital stock is reduced and the GDP is increased. The output of the industrial sector falls and the output of the agricultural sector is enhanced. The government receives more income and the environment sector's output is enhanced. In the long term some of the industrial sector's labor force is shifted to the environment sector. The environment is improved. The household gets higher utility.

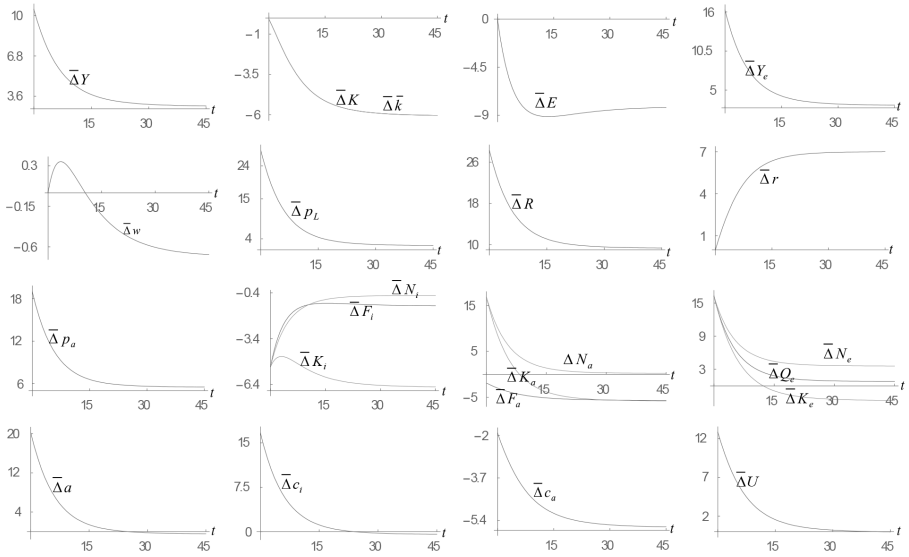

Figure 2. A Rise in the Propensity to Consume Housing

A rise in the propensity to consume industrial goods

We now allow the propensity to consume industrial goods to be increased as follows: $\xi_0 : 0.15 \Rightarrow 0.17.$ The land distribution is not affected by the preference change. The effects on the other variables are plotted in Figure 3. As the household spends more out of the disposable income on consuming industrial goods, the total capital stock and the GDP are reduced. The fall in the total capital stock is in tandem with the rise in the rate of interest and the fall in the wage rate. Both the land value and the land rent are reduced. The household holds less wealth and physical wealth. The household's consumption level of industrial goods rises initially and falls in the long term. This occurs as the income falls in the long term. The price of agricultural goods falls in association with falling output of the sector. The output level and the two inputs of the industrial sector are increased initially. In the long term the output level and capital of the industrial sector are reduced. The reallocation of the labor force occurs from the agricultural and environment sectors to the industrial sector. The capital inputs of all the sectors are reduced in the long term. The government's income falls in tandem with the fall in the output of the environment sector. The environment deteriorates. The household has less wealth, consumes less agricultural goods, and has a lower utility level.

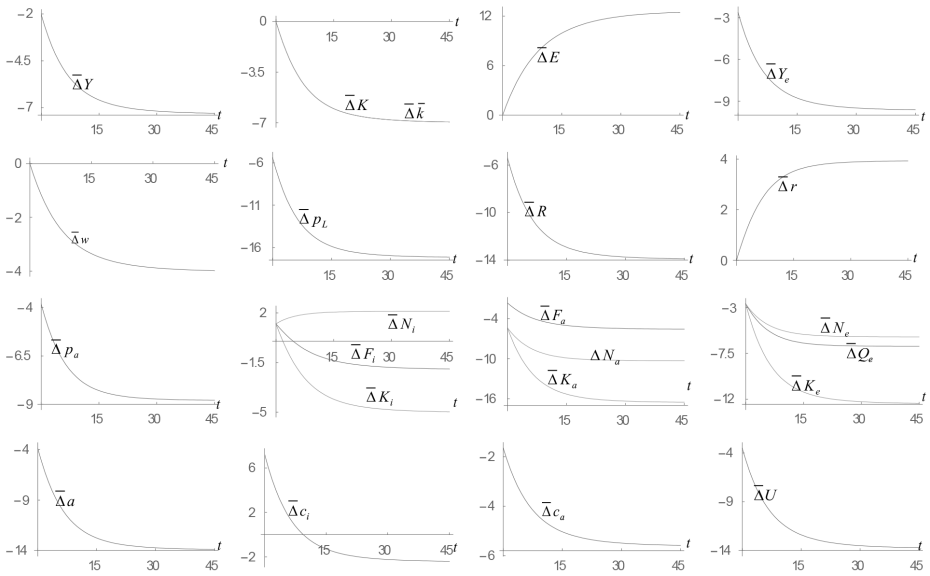

Figure 3. The Propensity to Consume Industrial Goods Is Enhanced

A rise in the propensity to consume agricultural goods

We now study the effects that the propensity to consume agricultural goods is increased as follows: $\mu_0 : 0.06 \Rightarrow 0.07$. The land is reallocated as follows:

$$\overline{\Delta}L_a = 9.22,\ \ \overline{\Delta}l_h = -6.39,\ \ \overline{\Delta}\bar{l} = 0.$$

Some of the land is reallocated to the agricultural sector. The effects on the other variables are plotted in Figure 4. As the household spends more of the disposable income on consuming agricultural goods, the output level and capital and labor inputs increase. The total capital stock is reduced and the GDP is augmented. The wage rate is raised initially and reduced in the long term. The rate of interest is enhanced. The land rent and the value of land increase. The household holds more wealth and physical wealth initially and less wealth and physical wealth in the long term. The household's consumption level of agricultural goods rises. The household's consumption level of industrial goods rises initially and falls in the long term. The price of agricultural goods rises. The output level and two input factors of the agricultural sector are augmented. The output level and two input factors of the industrial sector are reduced. The government's income rises in tandem with rising in the output of the environment sector. The environment is enhanced. The household has less wealth and consumes more agricultural goods. The household has higher utility level and consumes more industrial goods initially, and has lower utility level and consumes less industrial goods in the long term.

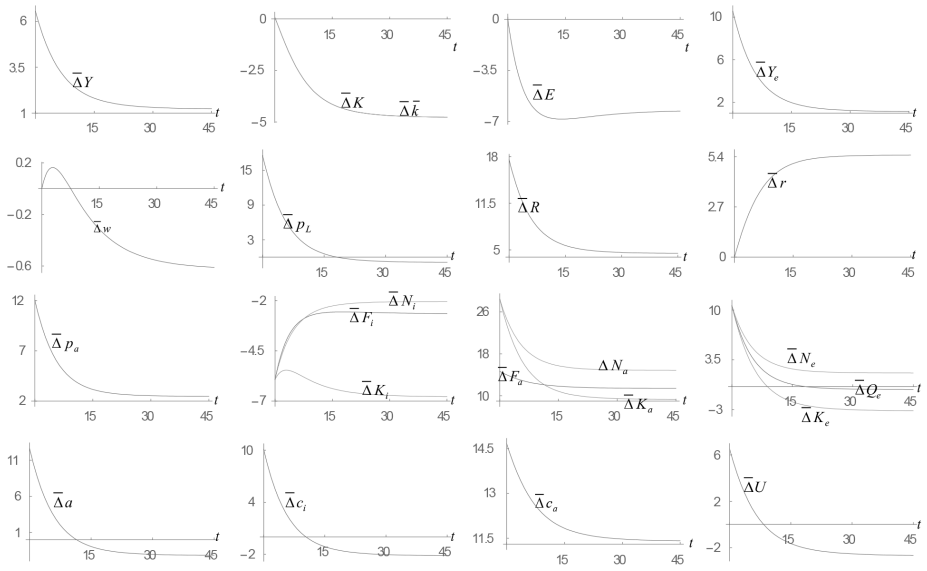

Figure 4. A Rise in the Propensity to Consume Agricultural Goods

A rise in the propensity to save

Like almost any important economic question there are opposing answers to the question if changes in the saving propensity impact on national economic development. In Keynesian economic theory savings tend to reduced national income, while neoclassical growth theory tends to suggest the opposite effect. As only a few growth models with space take account of endogenous land value, economic growth theory has not much to say on how a change in the propensity to save can affect land value and economic structural change in a consistent manner. We now change the propensity to save as follows: $\lambda_0 : 0.7 \Rightarrow 0.71$. There is no impact on land-use allocation. The impact is plotted in Figure 5. The household has more physical wealth and the nation holds more physical capital. The household's wealth falls initially and rises in the long term. This occurs as the land value falls initially and rises in the long term. The GDP also falls initially and rises in the long term. The government's tax income is lowered initially and augmented in the long term. The output level and two inputs of the environment sector are lowered initially and augmented in the long term. The environment deteriorates initially and then improves. The wage rate rises and the rate of interest falls. The land rent and the price of agricultural goods are reduced initially and increased in the long term. The output and two input factors of the industrial sectors are expanded. The output and capital input of the agricultural sector are reduced initially and increased in the long term. The utility level is enhanced.

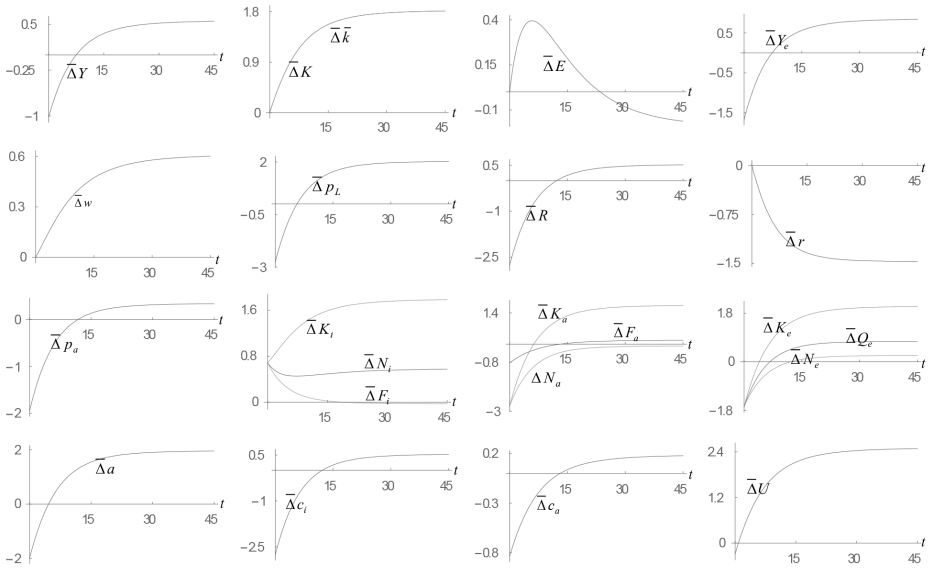

Figure 5. A Rise in the Propensity to Save

An improvement in the environment sector's productivity

We now study the effects of the following improvement of the environment sector's productivity: $A_e : 0.5 \Rightarrow 0.6$. There is no impact on land-use allocation. The impact is plotted in Figure 6. The output of the environment sector is enhanced. The environment improves. The output levels of the industrial and agricultural sectors increase. The utility level is also enhanced. The labor distribution is slightly affected. The household has more physical wealth and the nation holds more physical capital. The household's total wealth rises. The GDP rises. The government's tax income is increased. The capital input of the environment sector is augmented. The wage rate and the rate of interest rise. The land rent is enhanced. The price of agricultural goods is reduced initially and increased in the long term. The land value increases. The household consumes more goods.

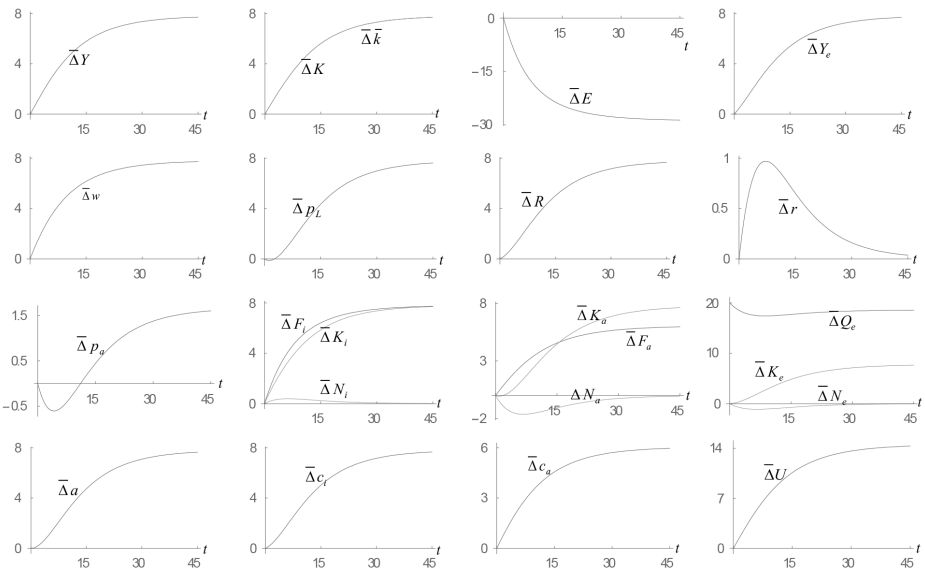

Figure 6. An Improvement in the Environment Sector's Productivity

A rise in the tax rate on consumption of industrial goods

We now study the effects that the tax rate on consumption of industrial goods is increased as follows: $\tau_i : 0.01 \Rightarrow 0.015$. The land use pattern is not affected. The effects on the other variables are plotted in Figure 7. The consumption of industrial goods is reduced and the consumption of agricultural goods is slightly augmented. The total capital stock and GDP are slightly augmented. The wage rate, the rate of interest, the land rent and the value of land are slightly increased. The household holds more wealth and physical wealth. The price of agricultural goods is slightly affected. The output level and capital inputs of the agricultural and industrial sectors are augmented. The environment is enhanced.

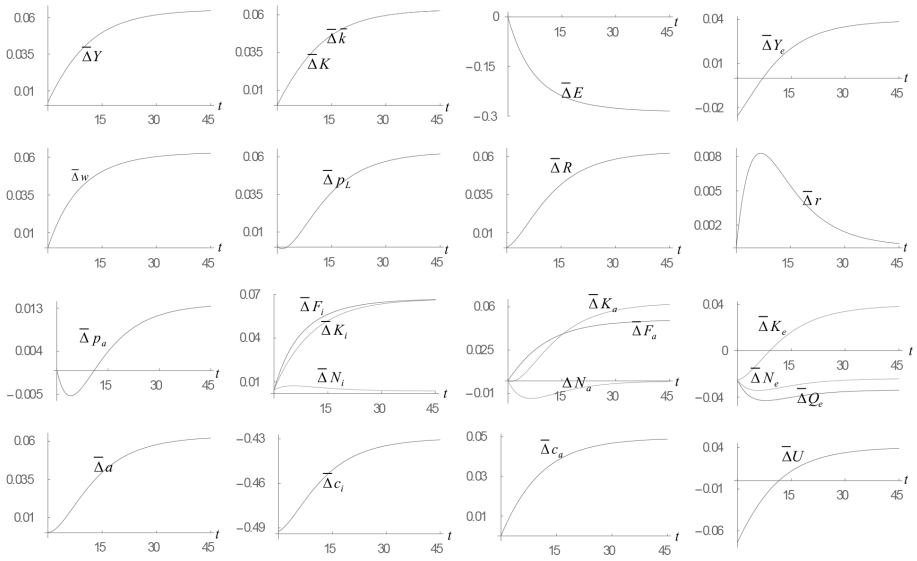

Figure 7.A Rise in the Tax Rate on Consumption of Industrial Goods

A rise in the tax rate in the industrial sector

We now study the effects when the tax rate on consumption of industrial goods is increased as follows: $\tau_i : 0.01 \Rightarrow 0.015$. The land use pattern is not affected. The effects on the other variables are plotted in Figure 8. Comparing Figures 7 and 8, we see that the long-term effects are similar.

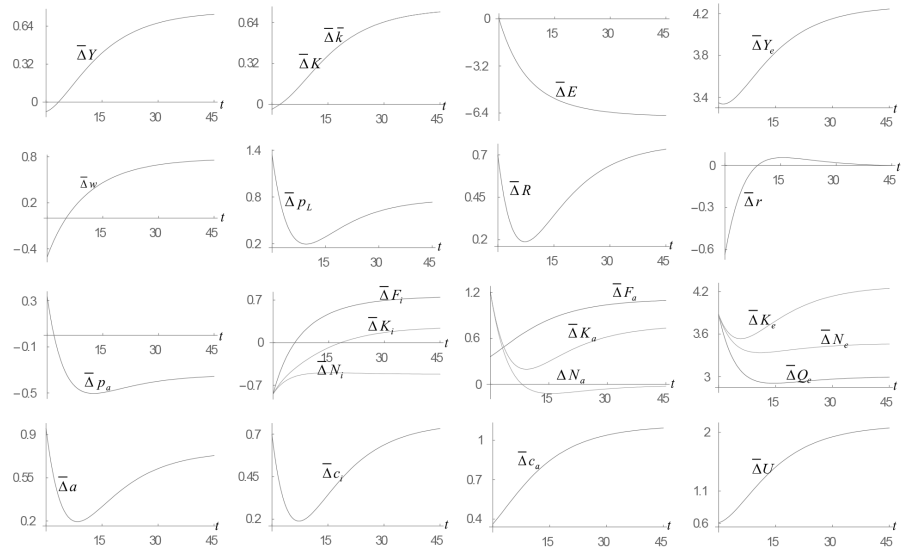

Figure 8. A Rise in the Tax Rate in the Industrial Sector's Output

An increase in the population

We now study the effects of the following population increase: $N: 20 \Rightarrow 21$. The impact on land-use allocation is as follows:

$$\overline{\Delta} L_a = 0, \ \overline{\Delta} l_h = -4.76, \ \overline{\Delta} \bar{l} = -4.76.$$

The land use for agriculture is not affected. The lot size and the per household land are reduced. The effects on the other variables are plotted in Figure 9. The GDP and national physical capital are augmented. The environment deteriorates. The government receives more income initially and less in the long term. The capital input rises initially and falls in the long term. The output level and labor input of the environment sector are increased. Both wage rate and rate of interest are lowered. The output levels and capital and labor inputs of the industrial and agricultural sectors are augmented. The utility level is lowered. The household has less physical wealth and total wealth. The land rent is enhanced. The price of agricultural goods and the land value are increased. The household consumes less goods.

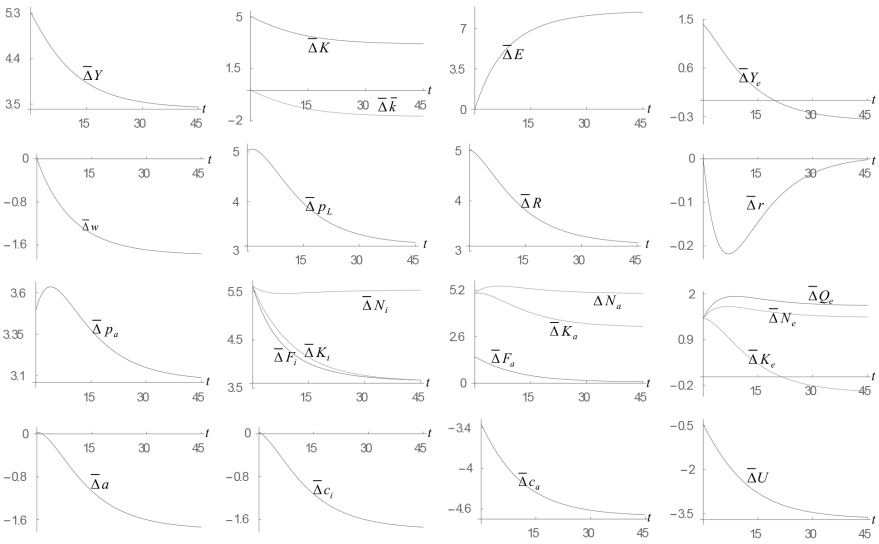

Figure 9. An Increase in the Population

A rise in the tax rate in the land rent income

We now study the effects that the tax rate on land ownership is increased as follows: $\tau_R : 0.01 \Rightarrow 0.015$. The land-use pattern is not affected. The effects on the other variables are plotted in Figure 10. As the household has to pay more tax on owning housing, the land value and GDP fall initially. The household increases physical wealth.

The national physical capital is augmented. In the long term the land value and the GDP are augmented. The wage rate rises and the rate of interest falls. The price of agricultural goods falls. The output level and two input factors of the agricultural sector are reduced initially and augmented. The output level and labor input of the industrial sector are increased and the sector's capital input is reduced. The government's income rises in tandem with rises in the output of the environment sector. The environment is enhanced. The household has less wealth initially and more in the long term. The household has lower consumption levels of agricultural and industrial goods and lower utility initially and these variables are enhanced in the long term.

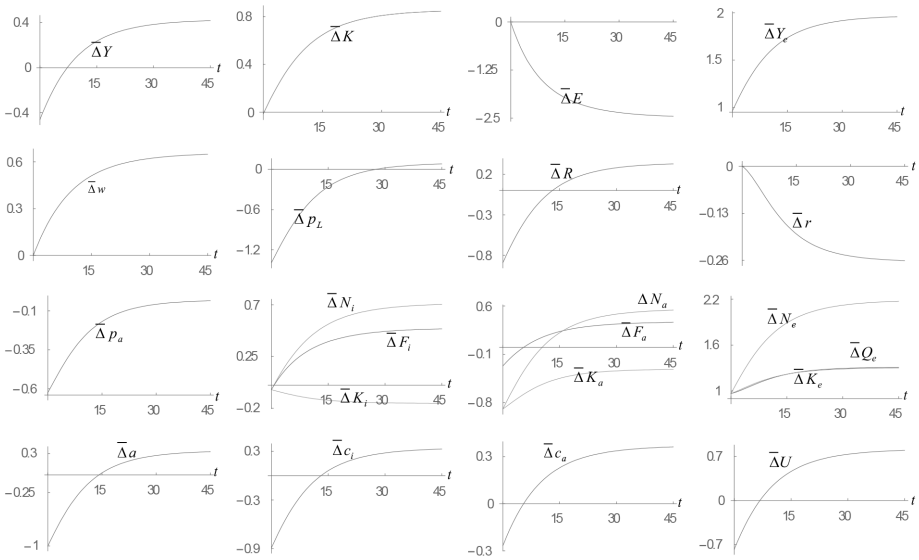

Figure 10. A Rise in the Tax Rate on the Land Rent Income

A rise in the tax rate on consuming housing

We now study the effects of the following change in that the tax rate on consuming housing: $\tau_R : 0.01 \Rightarrow 0.015.$ The land is reallocated as follows:

$$\overline{\Delta}L_a = 0.29, \ \overline{\Delta}l_h = -0.2, \ \overline{\Delta}\bar{l} = 0.$$

Some of the land is reallocated to the agricultural sector. The effects on the other variables are plotted in Figure 11. As the household has to pay more in consuming the same amount of housing, the lot size and land rent falls. The government receives less tax income. The environment produces less and uses less capital and labor inputs. The environment is deteriorated. The household owns more physical capital and the

total capital stock is augmented. The GDP is reduced. The wage rate and the rate of interest are reduced. The land value is reduced. The industrial sector increases its output level and capital and labor inputs. The agricultural sector increases its output level and reduces its capital and labor inputs in association with rising in the land input. The price of agricultural goods falls and the household's consumption level of agricultural goods rises. The household's consumption level of industrial goods falls. The household has a lower utility level.

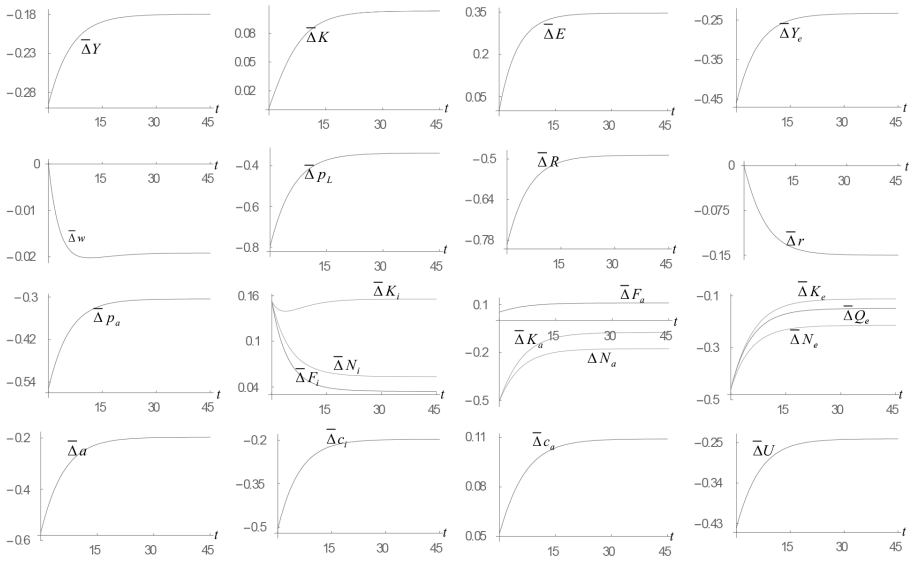

Figure 11. A Rise in the Tax Rate on Consuming Housing

5. Concluding remarks

This study examined dynamic interactions among land, capital, economic structure, and environment. The main framework is neoclassical and the household's decision is based on an alternative approach by Zhang. We integrated some ideas in the neoclassical growth theory, environmental economics and land economics in a compact framework. The national economy consists of three – industrial, agricultural, and environment – sectors. The production side is the same as in the neoclassical growth theory. We simulated the motion of the model and examined the effects of changes in the propensity to consume housing, the propensity to consume industrial goods, the propensity to consume agricultural goods, the propensity to save, the environment sector's productivity, the tax rate on consumption of industrial goods, the tax rate on the industrial sector, the population, the tax rate on owning land, the tax rate on consuming housing, and the tax rate on consuming housing. The comparative dynamic analyses

provide some important insights. For instance our simulation results in relations between economic growth and land value being similar to the phenomenon that is described by Liu *et al*. (2011: 1), "The recent financial crisis caused by a collapse of the housing market propelled the U.S. economy into the Great Recession. A notable development during the crisis period was a slump in business investment in tandem with a sharp decline in land prices." The similarity is concluded in the sense that a rising period in the GDP is in tandem with a rising period in the land value. Indeed, our conclusion is obtained under the strict conditions without taking account of many possible important determinants of land prices. It should be noted that many limitations of this model become apparent in the light of the sophistication of the literature of growth theory and land economics. The model can be extended and generalized in different directions. For instance, it is important to study the economic dynamics when utility and production functions are taken on other functional forms.

Appendix: Proving the lemma

The appendix shows that the dynamics can be expressed by two differential equations. From (2), (4), and (22) we obtain

$$z \equiv \frac{r+\delta_k}{w} = \frac{\widetilde{\alpha}_i N_i}{K_i} = \frac{\widetilde{\alpha}_a N_a}{K_a} = \frac{\widetilde{\alpha}_e N_e}{K_e},$$

where we omit the time index and $\widetilde{\alpha}_j \equiv \alpha_j / \beta_j$, $j = i, a, e$. By (1) and (2), we have

$$r+\delta_k = \frac{\bar{\tau}_i \alpha_i A_i}{\widetilde{\alpha}_i^{\beta_i}} \Gamma_i z^{\beta_i}, \quad w = \frac{\bar{\tau}_i \widetilde{\alpha}_i^{\alpha_i} \beta_i A_i \Gamma_i}{z^{\alpha_i}},$$

where we also use (A1). We express w and r as functions of z and E.

From (12) and (10), we get

$$\mu \hat{y} N = p_a F_a.$$

From (4), we have

$$r+\delta_k = \frac{\bar{\tau}_a \alpha_a p_a F_a}{K_a}.$$

From (A4) and (3) we get

$$p_a \left(\frac{L_a}{K_a}\right)^{\varsigma} = \frac{\widetilde{\alpha}_a^{\beta_a} \left(r+\delta_k\right)}{\bar{\tau}_a \alpha_a A_a \Gamma_a z^{\beta_a}},$$

where we use (A1). From (A3) and (A4), we get

$$\mu \hat{y} N = \left(\frac{r+\delta_k}{\bar{\tau}_a \alpha_a}\right) K_a.$$

By (4) and (A3), we have

$$R = \frac{\bar{\tau}_a \varsigma \mu \hat{y} N}{L_a}.$$

From $R l_h = \eta \hat{y}$ in (10) and (A7), we have

$$\bar{\tau}_a \varsigma \mu N l_h = \eta L_a.$$

From (17) and (A8), we calculate the land distribution as follows:

$$L_a = \frac{\bar{\tau}_a \varsigma \mu L}{\eta + \bar{\tau}_a \varsigma \mu}, \quad l_h = \frac{\eta L}{(\eta + \bar{\tau}_a \varsigma \mu) N}.$$

The land distribution is invariant over time.

From the definition of $\hat{y}$, we have

$$\hat{y} = (1 + (1 - \tau_k) r)\bar{k} + (1 - \tau_w) w + (1 - \tau_R) \frac{R L}{N} + p_L \frac{L}{N},$$

where we also use (13). Insert (5) in (A10)

$$\hat{y} = (1 + (1 - \tau_k) r)\bar{k} + (1 - \tau_w) w + \left[1 + \frac{1}{(1 - \tau_k) r}\right] \frac{(1 - \tau_R) L R}{N}.$$

From $R l_h = \eta \hat{y}$ in (10) and (A11) we calculate

$$R = \omega_1 \bar{k} + \omega_2,$$

where

$$\omega_0(z, E) \equiv \left\{ \frac{l_h}{\eta} - \left[1 + \frac{1}{(1 - \tau_k) r}\right] \frac{(1 - \tau_R) L}{N} \right\}^{-1},$$
$$\omega_1(z, E) \equiv (1 + (1 - \tau_k) r) \omega_0, \quad \omega_2(z, E) \equiv (1 - \tau_w) w \omega_0.$$

From (A11) and (A12) we have

$$\hat{y} = \tilde{\omega}_1 \bar{k} + \tilde{\omega}_2,$$

where

$$\tilde{\omega}_1(z, E) \equiv (1 + (1 - \tau_k) r) + \left[1 + \frac{1}{(1 - \tau_k) r}\right] \frac{(1 - \tau_R) L \omega_1}{N},$$
$$\tilde{\omega}_2(z, E) \equiv (1 - \tau_w) w + \left[1 + \frac{1}{(1 - \tau_k) r}\right] \frac{(1 - \tau_R) L \omega_2}{N}.$$

Insert (A1) in $N_i + N_a + N_e = N$

$$\frac{K_i}{\tilde{\alpha}_i} + \frac{K_a}{\tilde{\alpha}_a} + \frac{K_e}{\tilde{\alpha}_e} = \frac{N}{z}.$$

From (14) and (15) we have

$$K_i + K_a + K_e = N\bar{k}.$$

From (A6) and (A13) we calculate

$$K_a = \hat{\omega}_1 \bar{k} + \hat{\omega}_2,$$

where

$$\hat{\omega}_1(z, E) \equiv \tilde{\omega}_1 \mu N\left(\frac{\alpha_a \bar{\tau}_a}{r+\delta_k}\right), \quad \hat{\omega}_2(z, E) \equiv \tilde{\omega}_2 \mu N\left(\frac{\alpha_a \bar{\tau}_a}{r+\delta_k}\right).$$

Insert (A16) in, respectively, (A14) and (A15)

$$\frac{K_i}{\tilde{\alpha}_i} + \frac{K_e}{\tilde{\alpha}_e} = b_1(z, E) \equiv \frac{N}{z} - \frac{\hat{\omega}_2}{\tilde{\alpha}_a} - \frac{\hat{\omega}_1 \bar{k}}{\tilde{\alpha}_a},$$
$$K_i + K_e = b_2(z, E) \equiv N\bar{k} - \hat{\omega}_1 \bar{k} - \hat{\omega}_2.$$

Calculate (A17)

$$K_i = \alpha_0 b_1 - \frac{\alpha_0 b_2}{\tilde{\alpha}_e}, \quad K_e = \frac{\alpha_0 b_2}{\tilde{\alpha}_i} - \alpha_0 b_1,$$

where

$$\alpha_0 \equiv \left(\frac{1}{\tilde{\alpha}_i} - \frac{1}{\tilde{\alpha}_e}\right)^{-1}.$$

Insert the definitions of b_j in (A18)

$$K_i = m_i \bar{k} - \bar{m}_i, \quad K_e = m_e \bar{k} - \bar{m}_e,$$

where

$$m_i(z, E) \equiv -\frac{\alpha_0 \hat{\omega}_1}{\tilde{\alpha}_a} - \frac{\alpha_0}{\tilde{\alpha}_e} N + \frac{\alpha_0}{\tilde{\alpha}_e} \hat{\omega}_1, \quad \bar{m}_i(z, E) \equiv \frac{\alpha_0 \hat{\omega}_2}{\tilde{\alpha}_a} - \frac{\alpha_0 N}{z} - \frac{\alpha_0}{\tilde{\alpha}_e} \hat{\omega}_2,$$
$$m_e(z, E) \equiv \frac{\alpha_0 N}{\tilde{\alpha}_i} - \frac{\alpha_0 \hat{\omega}_1}{\tilde{\alpha}_i} + \frac{\alpha_0 \hat{\omega}_1}{\tilde{\alpha}_a}, \quad \bar{m}_e(z, E) \equiv \frac{\alpha_0 \hat{\omega}_2}{\tilde{\alpha}_i} + \frac{\alpha_0 N}{z} - \frac{\alpha_0 \hat{\omega}_2}{\tilde{\alpha}_a}.$$

By (A8), we solve the capital distribution as functions of z, E and $\bar{k}$. By (A1), we solve the labor distribution as functions of z, E and $\bar{k}$ as follows

$$N_i = \frac{z K_i}{\widetilde{\alpha}_i}, \quad N_a = \frac{z K_a}{\widetilde{\alpha}_a}, \quad N_e = \frac{z K_e}{\widetilde{\alpha}_e}.$$

From (5)

$$p_L = \frac{(1-\tau_R)R}{(1-\tau_k)r}.$$

Insert (2) and (A18) in (20)

$$Y_e = \left(\frac{r+\delta_k}{\alpha_i \bar{\tau}_i}\right)\tau_i K_i + \left(\frac{r+\delta_k}{\alpha_a \bar{\tau}_a}\right)\tau_a K_a + I_c.$$

Substituting (A16) and (A19) into (A22) yields

$$Y_e = I_k \bar{k} - I_0 + I_c,$$

where

$$I_k(z, E) \equiv \left(\frac{r+\delta_k}{\alpha_i \bar{\tau}_i}\right)\tau_i m_i + \left(\frac{r+\delta_k}{\alpha_a \bar{\tau}_a}\right)\tau_a \hat{\omega}_1, \quad I_0(z, E) \equiv \left(\frac{r+\delta_k}{\alpha_i \bar{\tau}_i}\right)\tau_i \overline{m}_i - \left(\frac{r+\delta_k}{\alpha_a \bar{\tau}_a}\right)\tau_a \hat{\omega}_2.$$

Insert (10) in the definition of I_c

$$I_c = \tau_0 \hat{y} + \tau_k r N_0 \bar{k} + \tau_w N_0 w,$$

where

$$\tau_0 \equiv \left(\tau_c \xi + \tau_a \mu + \tau_h \eta + \frac{\eta \tau_R \bar{l}}{l_h}\right) N_0.$$

Insert (A13) in (A24)

$$I_c = (\tau_0 \widetilde{\omega}_1 + \tau_0 \tau_k r N_0)\bar{k} + \widetilde{\omega}_2 + \tau_w N_0 w.$$

Insert (A25) in (A23)

$$Y_e = (I_k + \tau_0 \widetilde{\omega}_1 + \tau_0 \tau_k r N_0)\bar{k} - I_0 + \widetilde{\omega}_2 + \tau_w N_0 w.$$

From (22) and (A26) we calculate

$$\left(\frac{r+\delta_k}{\alpha_e}\right)K_e = (I_k + \tau_0 \widetilde{\omega}_1 + \tau_0 \tau_k r N_0)\bar{k} - I_0 + \widetilde{\omega}_2 + \tau_w N_0 w.$$

Insert (A19) in (A27)

$$\bar{k}(z, E) = \left[\left(\frac{r+\delta_k}{\alpha_e}\right)\overline{m}_e - I_0 + \widetilde{\omega}_2 + \tau_w N_0 w\right]\left[\left(\frac{r+\delta_k}{\alpha_e}\right)m_e - \left(I_k + \tau_0 \widetilde{\omega}_1 + \tau_0 \tau_k r N_0\right)\right]^{-1}.$$

From (6) and (A28) we have

$$a = \phi(z, E) \equiv \bar{k} + \frac{(1-\tau_R)\bar{l} R}{(1-\tau_k)r}.$$

It is straightforward to check that all the variables can be expressed as functions of z and E at any point in time as follows: r and w by (A2) $\rightarrow \bar{k}$ by (A28) $\rightarrow K_a$ by (A6) $\rightarrow K_i$ and K_e by (A19) $\rightarrow N_i$, N_e, and N_a by (A1) $\rightarrow \hat{y}$ by (A13) $\rightarrow \bar{l}$ by (13) $\rightarrow R$ by (A12) $\rightarrow p_L$ by (A21) $\rightarrow a$ by (A23) $\rightarrow L_a$ and l_h by (A9) $\rightarrow p_a$ by (A5) $\rightarrow c_i$, c_a, and s by (10) $\rightarrow F_i$ by (1) $\rightarrow F_a$ by (3) $\rightarrow Y_e$ by (22) $\rightarrow Q_e$ by (19). From this procedure, (18) and (11), we have

$$\dot{a} = \Lambda_0(z, E) \equiv s - a,$$

(A30)

$$\dot{E} = \Omega(z, E) \equiv \theta_i F_i + \theta_a F_a + \widetilde{\theta}_i C_i + \widetilde{\theta}_a C_a - Q_e - \theta_0 E.$$

Taking derivatives of (A29) with respect to t yields

$$\dot{a} = \frac{\partial \phi}{\partial z}\dot{z} + \Omega\frac{\partial \phi}{\partial E},$$

in which we use (A31). Equal (A30) and (A32)

$$\dot{z} = \Lambda(z, E) \equiv \left(\Lambda_0 - \Omega\frac{\partial \phi}{\partial E}\right)\left(\frac{\partial \phi}{\partial z}\right)^{-1}.$$

From (A31) and (A33), we determine the motion of z and E. We thus proved the lemma.

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The SSE, defined as a concept including organizations and enterprises producing goods, services and knowledge while pursuing social and economic objectives, emerges as a response to the need for innovation within the current model of production and consumption. During recent years a great deal of legislation has been adopted concerning SSE.

This legislative activity and institutional recognition of the SSE on an international level is characterized by efforts to incorporate economically dynamic and socially innovative aspects into the joint construction of public policies that aim to promote greater cohesion and inclusion.

Hence, organizers of the conference especially expect participants to explore and examine the impact of the SSE on inclusive and sustainable development.

The conference official language is English.

CONFERENCE SUB-TOPICS

1. Socioeconomic and Environmental Sustainability: holistic, balanced development, integrating environmental, social, and economic aspects, considering different sectors and recognizing their inter-linkages. Special issue: utilizing the advantages of technology - entrepreneurship in the digitized ecosystem.

2. Towards an alternative socio-economic model and institutional framework, based on the further evolution of the post-modern conceptual paradigm the values and principles - (re)introducing mutualism and cooperation, equity, social welfare, social and economic democracy, pluralism and diversity, for the "creation of a better world". Necessary innovations in education, ethics and ethos, integrating social entrepreneurship and sustainability.

3. Innovative, progressive approaches for the introduction of participatory functionality, allowing for the promotion of social cohesion and contributing to an increase of a region's social capital.

4. Concerns about the "big picture". Socio-economic re-evolution with respect to wider issues of humanity: climate change; aging, population explosion and demographic issues; unemployment, inequality and poverty; misuse of children, women and special social groups, trafficking; environmental integrity and sustainability.

IMPORTANT DATES

February 14, 2016	: Deadline for receipt of abstracts
March 14, 2016	: Notification for abstracts acceptance
June 12, 2016	: Deadline for receipt of full papers and application forms
July 3, 2016	: Notification for full-paper acceptance
July 10, 2016	: Deadline for registration and payment (there is no returning payment in case of cancellation)
August 1, 2016	: Announcement of the preliminary conference program
September 19, 2016	: Announcement of the detailed conference program (at http://asecu2016.anadolu.edu.tr/)

CONFERENCE COMMITTEES

SCIENTIFIC Committee

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TIRYAKİ Ahmet
TOSUNOĞLU Tuğberk
ULUKAN Bengül Gülümser
YAZICI Ayla

GUIDELINES FOR ABSTRACT SUBMISSION (All submissions are refereed)

- Submissions must not have been published, submitted or presented at other conferences.
- Title of the paper written in English (type size - 16, font - Times New Roman, bold)
- The title page must include names, degree, affiliations, complete addresses (e-mail, telephone) for all authors
- Abstracts, written in English, should be no longer than 10-18 lines (format: Times New Roman 11 italic, Spacing: Before: 0, After: 0, Line Spacing: 1.5, Alignment: Justified, Indentation: Left: 0, Right: 0, Special: 0). JEL classification and up to 6 keywords should be used.

Detailed information concerning abstracts' submission can be found at Abstract Submission on the asecu2016.anadolu.edu.tr

GUIDELINES FOR FULL-PAPER SUBMISSION

- The full paper should be a maximum of ten (10) pages including references and exhibits. Requirements for the paper formatting: Page: A4; Font: Times New Roman, Size: 11 pt; multiple line spacing (1,15); Page Setup: Margins: Left: 3; Right: 3; Top: 4; Bottom: 3.
- In the first mandatory page (presentation page) you insert the title of the paper (Center, times new roman, 16 point, bold). Leave 1 blank line (16 point) between the titles. Authors' names (Center, times new roman, 12 point). Affiliations such as Institution/Department, City, Country (Center, times new roman, 10 point) and e-mail of the corresponding authors.
- Headings: enumerate Chapter Headings by Arabic numbers (1., 2., etc.). First level Chapter Headings use all caps (Times New Roman, 11). Subchapter headings are font 11, italic, bold and will follow the enumeration of the previous heading (1.1., 1.2., etc.).

More information about full-paper submission are given at Full-paper Submission at the asecu2016.anadolu.edu.tr.

All the presented papers will be included at the Proceedings of the Conference, which will be issued, with an ISBN nr in electronic form. The authors will have a certain time after the conference for submitting the revised version of their papers.

The Editorial Board of South Eastern Europe Journal of Economics (SEEJE), the official journal of ASECU, after having the agreement of the authors, plans to publish selected conference papers following a blind refereeing process. More information at http://www.asecu.gr/Seeje/

Paper presented at the Conference ASECU2016 will have also the opportunity to be published at the Anadolu University Journal of Social Sciences (indexed in Econ Lit). Further details for the journal http://sbd.anadolu.edu.tr/home.html

The papers for both journals will follow the usual procedure of evaluation and the journals will be under no commitment to publish any article. However, they do promise an expedited refereeing process.

CONFERENCE FEE AND HOTEL ACCOMMODATION

The conference fee amounts to **125 EURO** per participant (for all participants).

Account name: 12th Inter.Conference of ASECU2016

Account owner: Anadolu University, Genclik ve Spor Kulubu

Address: Anadolu Universitesi 26470 Eskisehir / Turkiye (Turkey)

Bank: VakifBank; **Branch**: Vakifbank Anadolu University Branch

SWIFT Code (BIC): TVBATR2A

IBAN (for Euro): TR21 0001 5001 5804 8015 8281 38

IBAN (for Dollar): TR13 0001 5001 5804 8015 8281 85

IBAN (for Turkish Lira): TR25 0001 5001 5800 7303 9908 52

The payments should be clearly mentioned by the note: *ASECU 2016*, as well as *the Name and Surname of Participant.*

All prices are per person. Conference material as well as lunches, dinner, refreshments during the conference are included in the registration fee.

Registrations could be accepted also at the registration desk during the Conference. In this case the fee will amount 150 EURO.

Receipts will be prepared for the payments with the full name, university name and the country of the participant. In case that specific information is needed to be mentioned at the receipt, the participant is obliged to inform the Secretariat accordingly

Payment of the registration fee should be made by bank transfer. Payments by credit cards will not be accepted.

Each participant should cover travel costs to and from Eskisehir, and should directly book accommodation in Eskisehir (Accommodation is not included in the registration fee).

The following hotels are recommended by the Organizing Committee (list of hotels close to conference venue):

Albatros Hotel: This three star hotel is also located next to the university campus, 15 min. walking distance to the conference hall at the university campus, 20 min. walking distance to the train station, and 10 min. to the intercity bus station by tramway. For further information: http://www.esalbatroshotel.com/

Dedepark Hotel: This four star hotel is also located in the city center. It is within 20 minutes walking distance (or 5 min. by tramway) to the conference hall at the university campus, 15 minutes walking distance to the train station, and 10 minutes distance to the intercity bus station by tramway. For further information: http://dedepark.com/

Divan Express Eskisehir: This four star hotel is also located in the city center. It is within 20 minutes walking distance to the conference hall at the university campus (or 5 min. by tramway). The train station is within 15 minutes walking distance. It takes 20 minutes to the intercity bus station by tramway. http://www.divan.com.tr/

IBIS Hotel: This three star hotel is also located in the city center. It is within 20 minutes walking distance to the conference hall at the university campus (or 5 min. by tramway). The train station is within 15 minutes walking distance. Further information: http://www.ibishotel.com/gb/hotel-6567-ibis-eskisehir/index.shtml

Namlı Otel: This three star hotel is located in the city center. It is within a 30 minutes walking distance to the conference hall at the university campus (by bus it takes 15 minutes). It is within a walking distance to the train station and it takes 20 minutes to get to the intercity bus station by tramway. For further information: http://www.namliotel.com.tr/tr/eskisehir.asp;

Sör Otel: This three star hotel is located within a 10 minute walking distance to the conference hall at the university campus, 20 minute walking distance to the train station, and it takes 10 minutes to the intercity bus station by tramway. For further information see: http://www.sorotel.net/

The Merlot Hotel: This four star hotel is also located in the city center. It is within 20 minutes walking distance to the conference hall at the university campus (or 5 min. by tramway). The train station is within 15 minutes walking distance. It takes 20 minutes to the intercity bus station by tramway. For further information: http://www.merlot.com.tr/

CONTACT INFORMATION

Organizing Committee
of the 12th International Conference of ASECU

Anadolu University
Faculty of Economics and Administrative Sciences
Eskişehir, 26470, Turkey

Fax: +90 222 335 05 95
Tel: +90 222 335 05 80
Secretariat of the Conference: asecu2016@anadolu.edu.tr

Technical support: ftepecik@anadolu.edu.tr (TEPECİK Filiz)

guide for authors

The articles should be written as follows:
(1) Papers must be in English.

(2) Papers for publication (two copies) should be sent to:

Mrs. Melina Petromelidou
Editorial Secretary
South-Eastern Europe Journal of Economics
ASECU, University of Macedonia, 156, Egnatia Str., 546 36 Thessaloniki, Greece

The *Journal's* phone number is (+30) 2310891793, fax: (+30) 2310891748
e-mail: asecu@uom.edu.gr
Submission of a paper will be held to imply that it contains original unpublished work and is not being submitted for publication elsewhere. The Editor does not accept responsibility for damage or loss of papers submitted. Upon acceptance of an article, author(s) will be asked to transfer copyright of the article to the publisher. This transfer will ensure the widest possible dissemination of information.

(3) Papers will be considered in any form, but authors of papers accepted for publication will be expected to provide a final copy conforming to the general style of the Journal as outlined in notes 4 through 13 below.

(4) Manuscripts should be 1,5 spaced, with wide margins, and printed on one side of the paper only. All pages should be numbered in sequence. Titles and subtitles should be short. References, tables, and captions for the figures should be printed on separate pages.

(5) The first page of the manuscript should contain the following information: (i) the title; (ii) the name(s) and institutional affiliation(s) of the author(s); (iii) an abstract of not more than 100 words. A footnote on the same sheet should give the name, address, and telephone and fax numbers of the corresponding author [as well as an e-mail address].

(6) The first page of the manuscript should also contain at least one classification code according to the Classification System for Journal Articles as used by the Journal of Economic Literature; in addition, up to five key words should be supplied.
The classification system used in JEL can be found at:
http://www.aeaweb.org/journals/jel_class_system.html.

(7) Acknowledgements and information on grants received can be given in a first footnote, which should not be included in the consecutive numbering of footnotes.

(8) Footnotes should be kept to a minimum and numbered consecutively throughout the text with superscript Arabic numerals.

(9) Displayed formulae should be numbered consecutively throughout the manuscript as (1), (2), etc. against the right-hand margin of the page. In cases where the derivation of formulae has been abbreviated, it is of great help to the referees if the full derivation can be presented on a separate sheet (not to be published).

(10) References to publications should be as follows: 'Smith (1992) reported that...' or 'This problem has been studied previously (e.g., Smith et al., 1969)'. The author should make sure that there is a strict one-to-one correspondence between the names and years in the text and those on the list. The list of references should appear at the end of the main text (after any appendices, but before tables and captions for figures). It should be double spaced and listed in alphabetical order by author's name. References should appear as follows:

For monographs
Sen, A., 1970, *Collective Choice and Social Welfare*, San Francisco: Holden Day.

For contributions to collective works
Kornai, J., 1991, Stabilization and Economic Transition in Hungary: The Next Two Years, in J. de Melo and A. Sapir (eds.), *Trade Theory and Economic Reform: North, South and East*, Oxford: Basil Blackwell, 307-326.

For periodicals
Magdalinos, M., 1990, "The Classical Principles of Testing Using Instrumental Variables Estimates", *Journal of Econometrics,* 44, 241-279.

Note that journal titles should not be abbreviated.

(11) Illustrations will be reproduced photographically from originals supplied by the author; they will not be redrawn by the publisher. Please provide all illustrations in quadruplicate (one high-contrast original and three photocopies). Care should be taken that lettering and symbols are of a comparable size. The illustrations should not be inserted in the text, and should be marked on the back with figure number, title of paper, and author's name. All graphs and diagrams should be referred to as figures, and should be numbered consecutively in the text in Arabic numerals. Illustration for papers submitted as electronic manuscripts should be in traditional form.

(12) Tables should be numbered consecutively in the text in Arabic numerals and printed on separate sheets.

(13) Accepted papers should be submitted in electronic form in a storage media (i.e. CD, DVD, USB, etc.) with accompanying manuscript. Electronic manuscripts have the advantage that there is no need for re-setting of text, thereby avoiding the possibility of introducing errors and resulting in reliable and fast delivery of proofs. The preferred format is either .doc or .docx. Make absolutely sure that the file on the disk and the printout are identical.

(14) Page proofs will be sent to the corresponding author. Proofs should be corrected carefully; the responsibility for detecting errors lies with the author. Corrections should be restricted to instances in which the proof is at variance with the manuscript. There are neither submission fees nor page charges.