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Content

From the Editor

We are proud to announce that the South East Journal of Economics and Business has been accepted for coverage in the ProQust/IBSS and the RePEc online databases.

This issue of the Journal contains ten articles, with most of them focusing on several issues of economics and business in the SEE region.

Kartal and Bozok studied socio-cultural variables and values and their impacts on ethical standards for accountants in Turkey. They examined the effect of socio-cultural values on the accountants' behavior. Ethical standards for accountants are analyzed, as well as some possible influences of socio-cultural values on accountants with the connection of Hofstede's model. Five questions, with each concerned with a different cultural aspect of Hofstede's measures were identified. Five hypotheses were established and according to the results of these hypotheses the expected ethical behaviors of Turkish accountants were determined and the results compared with Hofsdete's findings from the perspective of ethical behavior.

In their article entitled "The Pension System in Slovenia in Light of Current International Macroeconomic Changes and Trends," Dolenc and Vodopivec suggest some recommendations for future reforms of the pension system in Slovenia based on the current demographic trends in Slovenia and international experiences. The purpose of this paper is to shed light on trends and necessary reforms of the pension system in Slovenia. Therefore, the Slovenian pension system and recent changes are confronted with pension systems in similar economies, and policy recommendations are given. The authors suggested four points that have to be taken into consideration for future reforms.

Tchapchet-Tchouto, within the framework of an Overlapping Generation (OLG) model, presents how environmental factors considered as a production factor and other linked-assumptions can be introduced in a theoretical general equilibrium model. A three-factor or '3-dimension' OLG General Equilibrium model is described with regard to an issue of introducing an environmental policy into the economy through a System of Tradable Emission Permits (STEP) by the Public Authority. In the framework of OLG, the authors have developed a two-part theoretical model. In the first part, there is no environmental policy objective in the presence of pollution. In the second part, under a temporal flexibility assumption, a pollution permit system is introduced and considered as a financial asset. Furthermore, this system is coupled with a green fiscal policy which is applied on the sale of the environmental asset to firms. The authors highlighted that the environmental maintenance operations can generate long-term positive effects that are qualified as 'intergenerational welfare.'

Podrug analyzed the cultural similarities and differences in decision-making styles among Croatia, Slovenia and Hungary. The reality of international business is often a confrontation with failures and difficulties that are the result of a lack of understanding of cultural backgrounds, rather than market conditions. The decision-making process depends on cultural background and the choice of "the right way" - decision-making style is dependent on the values and beliefs of the people involved in the decision-making process. Considering the fact that Western managers often neglect cultural differences present in the CEE context, the objective of this research was to point out the cultural similarities and differences in decision-making styles among Croatia, Slovenia and

Hungary. A narrow-sample strategy was used in an empirical research that confirmed that cultural values do influence decision and decision-making style. The hypothesis was confirmed through X2 test analysis between Hofstede's dimensions of national culture and decision-making style.

The paper "Redesigning an Alternative Human Development Index by Considering Employment," by Tolga, Sezen and Mihci, empirically examined whether the inclusion of an unemployment factor in the HDI (Human Development Index) would yield different rankings for nations. It is argued that it is appropriate to modify the HDI by simply adding an unemployment indicator in the index. The paper aimed at constructing a new composite index for the development performance of a sample of 30 OECD countries by adding a fourth indicator, namely the unemployment index, to the calculation of HDI. The addition of an unemployment factor to the HDI as a new indicator has the potential to make the index more comprehensive and present a suitable approach for assessing the development performance of countries. This "Unemployment-adjusted Human Development Index" is denoted as HDI-2. The authors argued in favor of enriching the HDI, which is based on three indices, for longevity, educational attainment and per capita GDP, with a fourth index for employment.

In the paper entitled "Mutual Fund Performance in Slovenia: An Analysis of Mutual Funds with Investment Policies in Europe and the Energy Sector," Markovič-Hribernik and Vek examined the risks and return performances of mutual funds in Slovenia (2005-2009). The research was limited to regional investment policies in Europe and the energy sector. Several risk-adjusted measures such as the Traynor ratio, the Sortino ratio and the Information ratio were analyzed. The authors found out that the selection ability of fund managers is better than market timing and that the findings of this paper are in accordance with other international studies. The results showed that the Slovenian fund managers of investment policies in Europe have comparable risk and return characteristics to foreign mutual fund managers in developed European markets with several years of experience. The comparison of investment managers of investment policies in the energy sector is not appropriate because the majority of Slovenian mutual funds offered fewer points of observation than their European counterparts. This is due to the fact that they were introduced to the market after 2005, while the analysis was for the period from 2005 until August 2009.

The paper entitled "Returns for education in Kosovo: Estimates of wage and employment premia" by Hoti provides an analysis of the returns to education in Kosovo by using data from a "Household and Labour Force Survey." The author argues that given the high unemployment rate in Kosovo, employed individuals may not be randomly selected from the labor force. Therefore, the estimates of the rates of returns for education based on the standard Mincerian earnings function may be biased downwards. Hence the Heckman sample selection model is implemented, which adjusts the estimates of the wage equation for the self-selection of individuals into employment. The econometric results suggested that there is a large increase in the likelihood of being in waged employment due to education, consistent with the argument that in high unemployment economies part of the total returns for education takes the form of employment premia.

In the paper entitled "Media Reform in Bosnia: An interorganizational account of the Media Issues Group," Martin examined an interorganizational development assistance task force designed to help translate high-level policy objectives into ground-level action through cooperative, coordinated and collaborative action. The primary focus of this manuscript is the ability, and inability, of development assistance players to cooperate, coordinate and collaborate on projects of mutual interest. The case of the cross-sectoral and international Media Issues Group (MIG) designed to reform and develop the media sector in Bosnia and Herzegovina is described. Several variables that influenced interorganizational relationships (IORs) between development assistance organizations operating in B&H between 1995 and 2002 are analyzed in an effort to summarize the lessons learned.

Pašić, Kavkle and Boršić presented an overview of labor market characteristics in Slovenia with a focus on gender disparities. A survival analysis was conducted based on an extensive database obtained from the Employment Office of the Republic of Slovenia of more than 450,000 unemployment incidences between January 2004 and July 2008. The empirical analysis suggested that gender disparities in the duration of unemployment spells in Slovenia are significant. There are various reasons for gender disparities, and these can be found in the roles women play in families, unwillingness to move, less access to social networks and wage discrimination (on average women are still paid less than men).

Chandra Pradhan examined the performances of various hedge ratios estimated from different econometric models. This study evaluated optimal hedge ratios and the hedging effectiveness of stock index futures. The optimal hedge ratios were estimated from the ordinary least square (OLS) regression model, the vector autoregression model (VAR), the vector error correction model (VECM) and multivariate generalized autoregressive conditional heteroskedasticity (M-GARCH) models such as VAR-GARCH and VEC-GARCH using the S&P CNX Nifty index and its futures index. Hedging effectiveness was measured in terms of within sample and out of sample risk-return trade-off at various forecasting horizons. The analysis found that the VEC-GARCH time varying hedge ratio provides the greatest portfolio risk reduction and generates the highest portfolio returns.

On behalf of the Editorial Board
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The Effects of Socio-Cultural Variables on the Application of Ethical Standards for Turkish Accountants

Ali Kartal, Mehmet Sinan Bozok *

Abstract:

Ethical standards are needed for all professional organizations and associations. One of the most important ethical standard applications that belong to the accountants can be given as example for these applications. At the same time, it is also the case that the application of these standards will be affected according to the socio-cultural values of the society concerned. Therefore we should examine the effect of social-cultural values on accountants' behavior in each society separately.

If we know the influence of these variables on the behavior of the individuals concerned, we can establish special additional rules and regulations for that specific society. In this way, the negative effects of the application of ethical standards on ethical behavior in each specific society can be eliminated.

For this reason, this paper will provide information on ethical standards for accountants and explore the possible influence of socio-cultural values on accountants in connection with Hofstede's research. We will then try to determine these relationships from the viewpoint of Turkish accountants through our research. Our paper will conclude with suggestions on how to enhance the code of professional conduct in Turkey.

Keywords: Ethical standards, Culture, Accountants, Hofstede's measures, Ethical behavior

JEL: M40, M41, M14 **DOI:** 10.2478/v10033-011-0001-3

1. Introduction

Culture can be described as '... the interactive aggregate of common characteristics that influence a human group's response to its environment' (1). In other words, culture includes language, religion, lifestyle, custom and so on, common characteristics of a society, and these variables influence the general nature of individuals' behavior in society.

When a US businessman travels to a country in which time is not very important (for example, an undeveloped country) his agreement period probably will take much more time than normally expected (2). Japanese small retail stores can be given as another example because Japanese people prefer to buy fresh food on a daily basis within walking distance even though their lifestyle has been affected by Western styles of living (3)

Within the same vein, the application of some ethical standards which are successful in some countries may be unsuccessful in other countries. In other words, we need additional or different details when applying ethical standards in different societies. For example, the application of a standard of objectivity will be more

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difficult in a developing country than in a developed country. Thus, a developing country will probably need more rules and additional regulations than a developed country in order to have more successful ethical standards.

As seen in the examples given above, to get the most out of the application of a professional code of conduct, the effects of social-cultural variables on accountants should be understood before decisions are made in order to minimize negative influences on their behaviors.

We will first speak a little bit about the ethical standards for accountants, then briefly examine the possible influences of the socio-cultural variables on applications of ethical standards in Turkey. Later we will analyze the results of computer output that will show us expected problem areas during the applications of ethical standards in Turkey. The paper concludes with suggestions for enhancing the professional code of conduct in Turkey

2. Ethical Standards

Both external and internal accountants are expected to obey ethical standards. An unethical act is one that violates the ethical standards of the profession. Recent accounting scandals, such as Enron, for example, and the latest world economic crisis, have especially shown us the importance of ethical standards.

To overcome these kinds of ethical problems, the Institute of Management Accountants (IMA) has developed ethical standards to help management accountants. There is also a Code of Professional Conduct that was established by AICPA for its members, and the Main Ethics Principles, which were established by the IFAC. All of them have the same purpose of establishing ethical standards for accountants.

In Turkey, ethical standards for accountants were established in 1987 with Capital Market Law regulations and other regulations, as well as the additional ethical Principles and Rules issued in 1990 and 1996. Two main special regulations for ethical standards in Turkey were made by TÜRMOB in 2001 and 2007. These studies also address the same subjects as the IMA, AICPA and IFAC regulations.

Since standards leave much room for individual interpretation and judgments, many ethical dilemmas require value judgments and not the simple application of standards. In other words, ethical standards are the same for all over the world, but their applications are affected by the social-cultural values of each country. In this study we will try to explain this subject by using the classifications of IMA for ethical standards during our analysis.

First, we can explain these standards in the summary below as Competence, Confidentiality, Integrity and Objectivity. *(4)* ***Competence:*** *Maintain professional competence in knowledge and skills. Perform professional duties according to the relevant laws, regulations, and technical standards.* ***Confidentiality:*** *Refrain from the disclosure of information learned about customers' businesses except when authorized or legally obligated.* ***Integrity:*** *Refuse any gift, favor, hospitality or any other benefit that would influence your actions.* ***Objectivity:*** *Communicate information fairly and objectively.*

3. Socio-cultural Changes in Turkish Society

Turkish society is in the process of rapid change, as has been seen in almost all of the societies in the world. This change started with the foundation of the Republic Of Turkey in 1923 and it continued with the effect of revolutions (in the alphabet, government management, education, clothes, industrialization, etc.)

During the Ottoman Empire, Turkish people lived in a lineal orientation in which the members of the families took care of ancestral graves, obeying the wishes of members long since dead, and tending to their elderly parents. Furthermore, children were expected to continue this tradition.

Part of this foundation arose from the Ottoman Empire's administrative system under which wide and very old extended families ran the Empire. This value system is similar to Chinese and Japanese value systems (5). At that time, the decision maker was generally the father, with the family members being expected to entirely obey (6). Sons and grandsons remained in the family until the father's death, when the eldest son took over and the younger sons set up an independent household (7).

With the establishment of the Republic of Turkey in 1923, a collateral structure started to take the place of the lineal family orientation. In fact, kinship (collateral) relationships have become the most important aspect in society, in part due to a diminished sense of historical consciousness arising from the establishment of the Republic of Turkey.

In this structure, extended family members spend their leisure time together, cooperate in work, and help each other in economic crises or the arrival of an unexpected guest. Due to changes in the socio-political structure, the old family names, which derived from occupations, are not used any more. Sometimes, women and children do not even know their own official surnames, and only those responsible for official village business will know all the village surnames (8).

During the first years of the Republic of Turkey, Turkish people neither had much experience in business nor enough capital to open businesses because they worked in the different management or army levels of the Ottoman Empire. Thus the Turkish government established many state owned companies in Turkey. In these companies, Turkish people learned how to do business and found opportunities to increase their incomes.

Greater industrialization was seen especially in 1950. With this industrialization the population migrated from rural to urban areas, thus creating a nuclear family structure, with parents and children living together until marriage.

Today, the private sector has developed very strong power over the Turkish economy. Thus, the government started to sell some of the government companies to the private sector because of the increasing business experience of the private sector in Turkey. Revolutions, industrializations, and increases in education level have decreased the effect of collateral orientation and authority – a centered orientation in society. Consequently, nowadays, especially in the developed parts of Turkey, people are seen in a democratic and individualistic orientation in which families are child-centered, and people are seen as mobile, active, independent, open, and with direct specialties.

As a result of these developments, Turkish people have changed their lifestyles and socio-cultural values to accord more with Western lifestyles. Although this kind of change is pushing their demand for products of worldwide standards, the influence of these socio-cultural values on Turkish accountants should also be checked before making decisions about them. Accountants of every country may have some special and different perceptions about ethical behavior even though they have a Western lifestyle.

4. The Relationship between Social-cultural Variables and Ethical Standards

Since the differences of cultural variables affect a person's behavior, there are many studies on this subject. One of the most important studies on this subject was made by Geert Hofstede. From 1967 to 1973, Hofstede used data from 116,000 IBM employees from more than 50 countries and established four main dimensions that have given us an opportunity to know how to differentiate between cultures. These dimensions are power distance, individualism/collectivism, Masculine/feminine, and uncertainty avoidance. By using the values of these dimensions of a certain country, it is possible to have an idea about the behavior of that country's people. Later Hofstede added a fifth dimension, Confucian dynamism, to his theoretical framework with Michael H. Bond. The values of these cultural dimensions, which are issued for each country separately by Geert Hofstede, have been intensively used in many cross-cultural studies in the world.

According to Hofstede's measures of national culture, Turkey is seen in terms of the dimensions of power distance and uncertainty avoidance as having a *significant power distance and uncertainty avoidance*, and from the view point of the dimensions of individualism and masculinity as *collectivist and feminine* (9). Therefore the following connections with social-cultural variables and ethical standards for Turkey can be made using the following information (10): (see Table 1)

	Turkey	Difference in Index	USA
Individualism (IDV)	**37**	**(54)**	**91**
Uncertainty Avoidance Index (UAI)	**85**	**(39)**	**46**
Power Distance Index (PDI)	**66**	**(26)**	**40**
Masculinity (MAS)	**45**	**(17)**	**62**

Table 1

The individualism aspect (IDV) ranks first with a 54 point change in index values between the USA and Turkey. This dimension of culture is very important for the accounting profession because individualism means independence and objectivity, in other words freedom

from the influence of others. One of the most important indicators for individualism is the nature of the family, and the structure of the Turkish family has been changing from an extended family to a nuclear family structure. According to the index value it is not enough to speak about the situation of individualism in Turkish society. Most likely this *will affect objectivity standard applications* negatively for an accountant.

Uncertainty Avoidance Index (UAI) ranks second with a 39 point difference in index values between the USA and Turkey. The high value in this dimension indicates low tolerance in that country and it can be said that the country is a rule oriented society. Thus, we can say that Turkish accountants need more rules than USA accountants according to the results of the UAI index for the two countries. This dimension *can be concerned with competence standards, and other related regulations and rules.*

Power Distance Index (PDI) ranks third with a 26 point difference in index values for these two countries. According to Hofstede, the power distance index is a measure of the interpersonal power of influence between B (boss) and S (subordinate) as perceived by the less powerful of the two. Therefore, in high power distance countries, a local auditor may meet more difficulty resisting pressures from powerful and wealthy customers (11). In other words, a high power distance figure indicates inequality of power and wealth between accountant and customer (boss). This situation will affect the behavior of accountants from the view point of *competence and objectivity standards.*

Masculinity (MAS) ranks last with a 17 point difference in index values between the USA and Turkey. A high value for this index shows us a high degree of gender differentiation. In this kind of culture, males dominate a significant position in society. According to Hofstede's MAS index, the Turkish value is forty-five, whereas that of the USA was sixty-two; hence Turkish society has a lower level of differentiation. Thus it can be said that females are treated more as the equals of males than in the USA.

Since gender differences may affect ethical perceptions, during research on ethical issues the influence of this situation should not be forgotten. For example, a study has shown that women are significantly *less tolerant of unethical behavior* that promotes their self interest than men are (12). This would be more of a positive aspect for the application of ethical standards in Turkey than in the USA. Because *work is not central to life in a feminine based society***,** quality of life, time off, and vacations might be more important than financial rewards to the Turkish accountants, and more effective motivators (13).

Short-Term/Long Term Orientation (Confucian Dynamism). The main characteristics of long-term oriented societies are persistence, using status to order relationships, thrift, and having a sense of shame, which are considered marks of personal steadiness and stability, as well as protecting one's face and respect for tradition, while reciprocating greetings, favors, and gifts are all characteristic of short-term oriented societies (14). While Hong Kong, South Korea and Taiwan are seen as long-term oriented countries, the USA is seen as a short-term oriented country. This dimension of culture *can be connected with competence and integrity standards of ethics.* In other words, a lack of persistence, using status to order relationships, thrift, and having a sense of shame in short-term oriented cultures can affect negatively the application of competence and integrity standards of ethics. And while financial rewards may be important in short-term oriented societies, status, job title, job satisfaction, and education opportunities may be more important in long-term oriented societies.

5. Research and Explanation of Results

Five main questions, each of which concerned a different cultural aspect of Hofstede's measures, were posed to 100 accountants in Turkey. These accountants were selected at random from all over Turkey. Using the answers given by the accountants five hypotheses will be established and according to the results of these hypotheses the expected ethical behaviors of Turkish accountants will be determined and compared with Hofsdete' s findings from the perspective of ethical behavior. At the same time these collected data will also be subjected to principal component analysis and the results will be connected with a chi-square analysis and Hofstede's findings. This study will show us the needed modification areas during the applications of ethical standards in Turkey and the paper will conclude with suggestions for enhancing the rules of the code of professional conduct in Turkey. The same approach could also be applied to any country to get the highest application of ethical rules.

	Individualism	Uncertainty	P. Distance	Masculinity	C.Dynamism
Chi-Square *	39,000	76,100	22,300	72,600	32,200
df	4	4	4	4	4
Asymp.Sig.	.000	.000	.000	.000	.000

*.0 cells (,0%) have expected frequencies less than 5.The minimum expected cell frequency is 20.0.

Table 2: Test Statistics

	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1,716	34,316	34,316	1,709	34,188	34,188
2	1,016	20,317	54,633	1,022	20,445	54,633

Extraction Method: Principal Component Analysis.

Table 3: Total Variance Explained

	Component	
	1	**2**
Individualism	.758	-.153
Uncertainty	-.555	.067
P. Distance	.777	.147
Masculinity	-.030	.986
C. Dynamism	.471	.003

Extraction Method: Principal Compon. Analysis Rotation: Varimax with Kaiser Normalization

Table 4: Rotated Component Matrix

Hypotheses

H1: All of the information seen in the prepared financial statements and reports are presented objectively and fairly without being affected by anything else during my work.

H2: I need more detailed and relevant professional laws, regulations, technical standards and rules.

H3: I don't experience any overpowering influence from my customers during my work.

H4: Work is central in my life, thus my vacations are delayed sometimes

H5.Non-financial rewards are more important than financial rewards in my life

Statistical Results (see in Table 2)

Explanation of Test Results

According to the first accepted hypothesis, all of the information that is seen in the prepared financial statements and reports are presented objectively and fairly without being affected by anything else during the Turkish accountants' work. In other words, Turkish accountants don't have any independent problems according to the individualistic aspect of Turkish culture. But this result does not coincide with the indicators of Hofstede's measures for Turkey. Our analysis determined that this aspect of culture would not affect the behavior of Turkish accountants negatively with regard to their application of objectivity standards.

According to the second accepted hypothesis, Turkish accountants need more detailed and relevant professional laws, regulations, technical standards and rules. This result was the same with the indicator of Hofstede's measures for Turkey. In other words, Turkish accountants do need more rules than US accountants according to the uncertainty avoidance aspect of their culture. Turkey also is characterized as a kind of rule-oriented society and country. On competence Standard, it should be worked more than US.

According to the third accepted hypothesis, Turkish accountants do not have any overpowering influence from their customers during their work. This result does not coincide with the indicator of Hofsetde's measures for Turkey. Our analysis determined that this aspect of culture would not affect the behavior of Turkish

accountants negatively with regard to their competence and application of objectivity standards...

According to the fourth accepted hypothesis, work is central in a Turkish accountant's life. This result does not coincide with the indicator of Hofsetde's measures for Turkey. In other words, Turkish society is not characterized as a feminine society. Even though it is seen as having a lower level degree of gender differentiation in Hofstede's research on Turkey, according to the accepted hypothesis Turkish accountants have a high degree of gender differentiation. Therefore, we can say that Turkish accountants are significantly more tolerant of unethical behavior. This aspect of the culture can have a negative effect on ethical perceptions and may raise problems in the application of competence and objectivity standards in Turkey.

According to the last accepted hypothesis, non-financial rewards are more important than financial rewards in the lives of Turkish accountants. We say that Turkish society can be considered a long-term oriented society, where status, job title, job satisfaction and education opportunities may be more important. This aspect of its culture should not be forgotten during the application of ethical standards in Turkey.

When these collected data was also subjected to principal component analysis, the total variance explained was taken from an SSPS application with two components. As can be seen in table 3, the cumulative percent of variance for components 1 and 2 is 54.63%. In other words, the explanation of the percent of variance of these 2 components is 54.63. At the end of the analysis the rotated component matrix is seen in table 4 is

According to the factor analysis of the results in table 4, the first component shows us the characteristics of Turkish accountants, who do not have any independent problems, need more rules, have equality, and want non-financial rewards, while the second component shows us that work is central for Turkish accountants from the viewpoint of Hofstede's measurements. These results are also in agreement with the results of a chi-square analysis of our study.

6. Conclusion

After analyzing all of the data given above, the following results and suggestions could be summarized for enhancing the rules of the code of professional conduct in Turkey.

Hofstede's measures of behavior	Accepted Hypothesis	Effect on ethical
Individualism	Don't have Independence problem	Objectivity
Uncertainty Avoidance	Need more rules	Competence
Power distance	Equality	Objectivity / Competence
Masculinity	Work is central	more tolerance for unethical behavior
Short/Long term	Non-financial reward	Competence and Integrity

As a result, Turkish accountants do not have any independent problems, need additional regulations and rules to decrease uncertainty and to reduce the degree of tolerance of unethical behavior, and the need to establish non-financial rewards systems rather than financial systems to increase the success of ethical applications in Turkey. On the other hand, this kind of approach can be used for all societies making modifications to their ethical standards before their application in order to get the best results.

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The Pension System in Slovenia in Light of Current International Macroeconomic Changes and Trends

Primož Dolenc*

Abstract:

The paper presents the results of a study that sheds light on the pension system and its dilemmas in Slovenia in light of current international macroeconomic changes and trends. We found that Slovenia has a pension system similar to that of other comparable economies (with the exception of the second pillar) and that it currently faces similar dilemmas as other economies that are resulting in inevitable reforms of the pension system. On the basis of international comparison and current demographic trends in Slovenia we proposed some policy recommendations for future reforms of the pension system in Slovenia.

Key words: pension systems, reforms, demographic changes

JEL: G23, J11 **DOI:** 10.2478/v10033-011-0002-2

1. Introduction

Recent demographic trends and their effects on the pension systems are a challenging task for the economic policy of most developed and transitional countries around the world. Especially in economies with ageing populations, pension systems face sustainability issues and thus force economic policy, pension funds as well as individuals to reconsider the future of pensions and pension systems.

Modern pension systems are usually based on a Multi-Pillar structure with typically three pillars, (a) a "first-pillar" contributory system that is linked to varying degrees to earnings and seeks to replace some portion of income; (b) a mandatory "second pillar" that is essentially an individual savings account but can be constructed in a variety of ways; (c) voluntary "third-pillar" arrangements that can take many forms (individual, employer-sponsored, defined benefit, defined contribution). Pension systems as such usually combine two different parts, i.e., a redistributive part and an insurance part. The first guarantees a minimum life standard for pensioners, whereas the second part enables targeted pension receipts upon retirement (Holzmann and Hinz 2005).

In EU and OECD countries pension systems are very similar and only differ partly in their structure and relations between different pillars. These differences are mainly due to the different foundations of the systems and also the differences in the level of adjustments to recent demographic and socio-economic trends. In most of these countries reforms of pension systems were stimulated as a consequence of an ageing population, changes in the basic logic of the pension system, pressures on public finances, socio-economic changes, globalization and others. Reforms mostly relate to the so-called first pillar of "pay-as-you-go" (PAYG) pension systems, and which are due to the fact that traditional PAYG systems are usually not self-sufficient (or unconditionally sustainable) in new macroeconomic conditions. These changes, however, differ among countries, but the underlying fact is that similar recent

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demographic trends call for longer participation, lower benefits, changes to the pension system's parameters and other adjustments.

From this perspective Slovenia is not an exception, as it has an extremely old population and unfavorable expected trends. Therefore, it faces dilemmas to those of other comparable economies: the sustainability of its pension system, and what its appropriate structure and necessary adjustments should be. The purpose of the present paper is to shed light on trends and the necessary reforms of the pension system in Slovenia. Therefore, the Slovenian pension system and recent changes are confronted with pension systems in similar economies, and policy recommendations are given.

The paper is organized as follows. In the next section the methodology and data are presented. In section 3 we present some trends in economies that are similar to Slovenia from the perspective of demographic trends and pressures on pension systems. In section 4 we present the current pension system in Slovenia, some demographic trends and the dilemmas of facing its pension system. Before our conclusion we present policy recommendations.

2. Methodology and Data

The research employs comparative analysis of pension systems in EU and OECD countries. Here we resume and lean heavily on research made for the World Bank by Holzmann and Hinz (2005). This comparative analysis is the starting point for putting Slovenia in an international context. We use here the regulatory framework for the pension system in Slovenia, especially the Pension and Disability Insurance Act. We further employ inductive analysis and try to find common points in different pension systems of EU and OECD economies and apply these to the Slovenian case.

In estimation of the efficiency and sustainability of the Slovenian pension system we use statistical data from the Slovenian Statistical Office and the Slovenian Pension and Disability Fund. Demographic and financial data are taken into consideration, especially age structure, trends of average age and age structure, and financial transfers from the central budget to the pension fund. Based on this data we estimate future developments in age structure, which is (accompanied by a comparative analysis) a basis for policy recommendations. An explanation of methodology and data is presented in more detail in relevant sections.

3. The recent dilemmas of modern PAYG pension systems

Almost all European economies face similar problems: 1) the lowering number of active participants in the pension fund, and 2) the increasing number of retirees (see Whitehouse 2007 for more details). These trends were due to lower economic activity and a changed economic system.

These two facts consequently lead to several issues. The first is a *fiscal problem*. From a short-term perspective, pension systems are often blamed for unsustainable public finances, even though this might not be the real reason for questionable fiscal trends (see e.g. Dolenc and Stubelj 2010) – therefore reforms of the pension systems are underlined as necessary. From a long-term perspective, however, many pension systems, especially in transitional economies, are unsustainable due to population ageing (see Hagemann and Nicoletti 1989, and World Bank 1994).

Further, several *socio-economic changes* are obvious if we look at developments since the last decades of the 19th century (approx. when the pension systems were introduced). At first pension systems had a significantly different proportion of retirees to the active population than today. Namely, Holzmann and Palmer (2006) note that initially the pension system was intended to help the widows and children of an insurant, because full retirement was achieved by a low proportion of the latter. Vodopivec and Dolenc (2008) point out that pension system benefits have been increasing in the last decades, while contributions have been – paradoxically – decreasing. If all other effects are neglected, increasing life expectancy alone calls for reforms. Further, Kohli and Rein (1991) stress that in spite of higher life expectancy, people in modern economies work less and less.

Globalization also plays an important role. Economies have to use the advantages and reduce the negative effects of globalization when reforming their pension systems. Globalization brings higher labor force mobility among occupations, the public/private sector, regions and lastly the economies as such. The modern pension system should take these facts into consideration and adapt to them accordingly.

Turning to actual trends in economies similar to that of Slovenia, several changes can be noted. First, almost all developed and transition economies have changed by now the pension system according to which outflows are adjusted. Pensions are now mostly inflation indexed

instead of nominal wage growth indexed. In addition, the formulae for the calculation of benefits and contributions have changed, sometimes dramatically.

Second, the retirement age has been steadily increasing due to a relatively low initial retirement age. In addition, the period for the calculation of pension benefits has been prolonged, causing lower pension benefits for retirees. There are some economies under which the benefits are not bound to years of participation and amounts (see Lindeman, Rutkowski and Sluchynskyy 2001 for details). The latter measure was introduced to address poverty issues.

According to Holzmann and Hinz (2005) almost all transition economies have introduced a full featured three-pillar pension system. This helped the formation of private and public funded schemes, which are mandatory and therefore accumulate more funds as voluntary schemes under the third pillar. The exceptions are the Czech Republic, Moldova, Turkey and Slovenia, which have not fully incorporated the second pillar.

4. A summary of the pension system, demographic trends and dilemmas of the pension system in Slovenia

4.1. General information on the pension system

Slovenia has a similar pension system to that of other EU member states; however, there are some particularities. According to the definition of Holzmann and Hinz (2005) Slovenia has two pillars:

a) First Pillar: public pension system, mandatory and "Pay-As-You-Go", and
b) Third Pillar: private pension system, voluntary and funded pension scheme.

Two parts of the pension system are missing. First, Slovenia has no basic pillar – it does have a kind of minimum pension that is part of the first pillar, however. Yet of more concern is the fact that there is also a very limited second pillar as a mandatory, insurance-based and replacement rate increasing pension scheme. The later is mandatory only for some occupational groups.

The pension system has been somewhat reformed in the late 90s and in 2005. At full retirement age the pension benefits depend only on participation period (and the level of contributions) – the full age was adjusted a decade ago. Currently the full retirement age for women is 61 years[1] and 63 for men.[2] A comparison with other, similar economies (for a review see Whitehouse 2007) clearly shows that despite reform, the retirement age is still the lowest in the EU (besides Italy).

The minimum retirement age is now set as follows:

- 58 years on condition of a 40-year participation period,
- 63 years (men) and 61 years (women) on condition of a 20-year participation period and
- 65 years (men) and 63 years (women) on condition of a minimum 15-year participation period.

If an individual exceeds a participation period (40 years for men and 38 years for women), additional participation brings premiums to pension benefits. These account for 3% (for the 41st participation year) down to 1.5% (45 or more years). Further, some adjustments are introduced in case of an early/late retirement age. We address these issues later on.

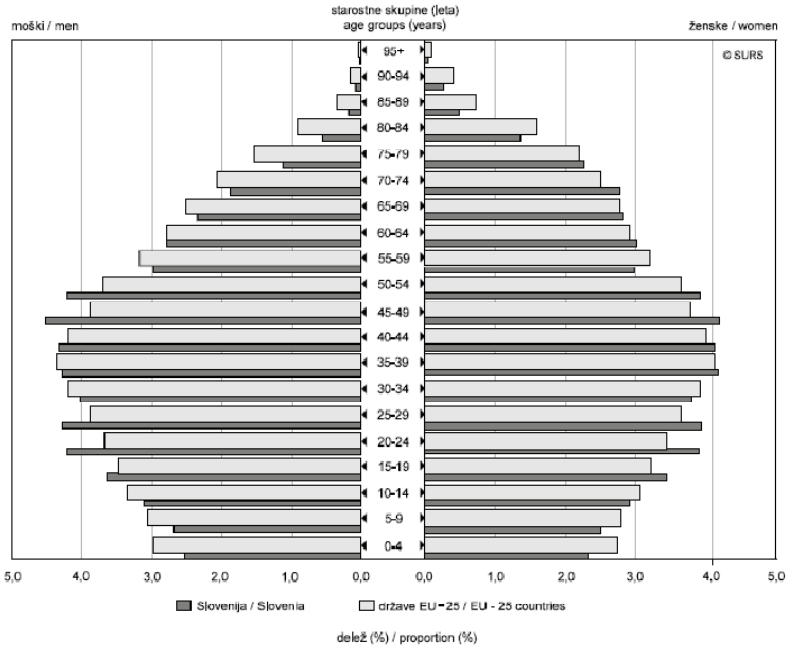
4.2. Demographic trends and the dilemmas of the pension system

Slovenia faces unfavorable demographic and other changes that will affect its pension system's sustainability. In spite of reforms, the question of the pension system's sustainability remains. Several facts are obvious. In Slovenia, demographic trends are extremely unfavorable from the perspective of the pension system – the population is ageing. The age structure (Figure 1) shows that the Slovenian population is old (similar to EU25 data); the majority of the population is currently in its active age. The average age of the population is growing (Figure 2) – in the last 30 years the average age has increased 6 years. Furthermore, the structures of the young (15 years or younger) and old (65 years and more) populations are converging with negative effects (Figure 3).

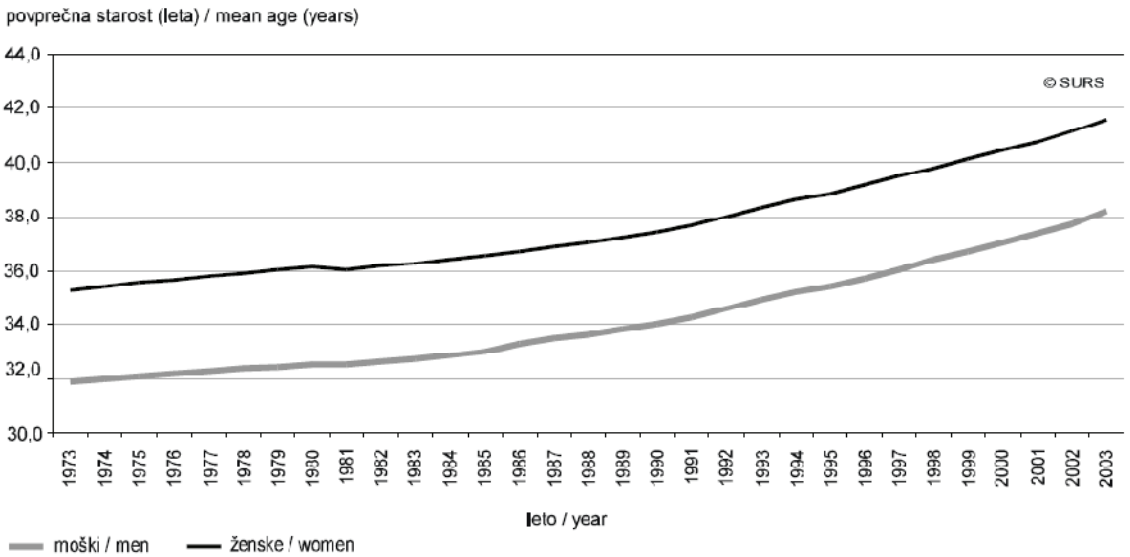
A simple calculation, based on a linear trend and its extrapolation (ceteris paribus), shows that until the year 2020 the share of the young population could fall below 10% (to approx. 7%), while the share of the old population – on the other hand – could increase to even

[1] This retirement age will be achieved not before 2022, while the full retirement age for women has been increasing for 4 months yearly from the level of 54 years in 2002.

[2] It has been increasing for 6 months yearly from 59.5 in 2002.



Source: Slovenian Statistical Office.
Figure 1: Population of Slovenia and EU15 (structure according to gender and age); data for year 2003

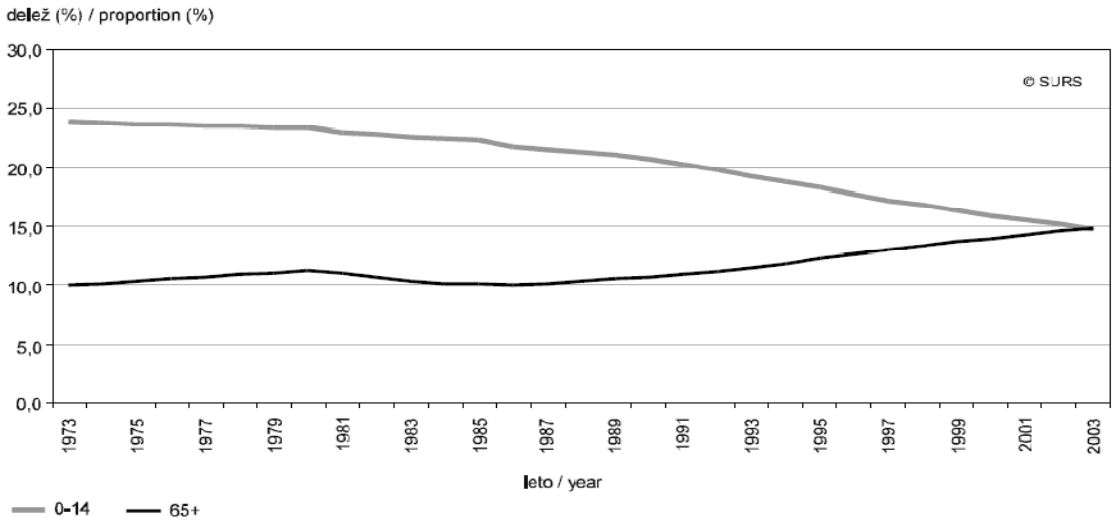


Source: Slovenian Statistical Office.
Figure 2: Average age in Slovenia

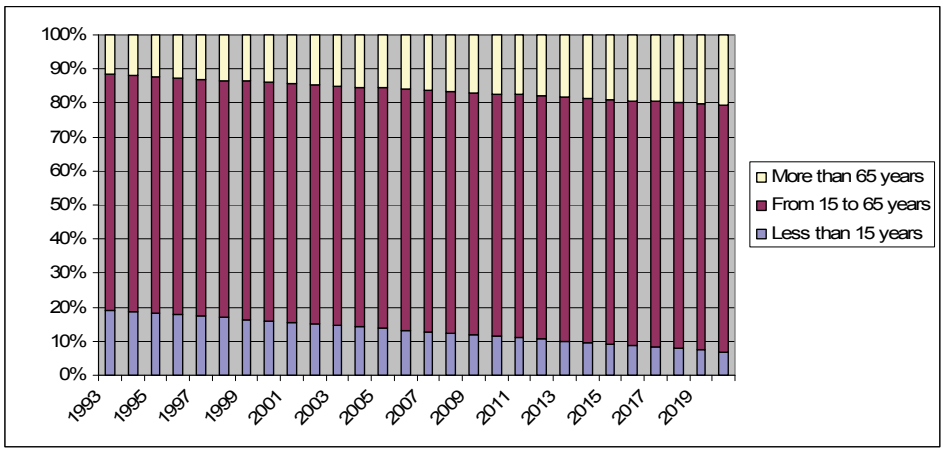
over 20% (Figure 4). This trend reflects the lower old to active population ratio, causing problems for the pension system.

In spite of the fact that life expectancy has been increasing in Slovenia in the last decades, the individual payments to the pension system have not followed. Some adjustments were made after the last reform, but these changes have not been sufficient.

There is also the question of the sustainability of the Slovenian pension system *per se*, especially if we look at the financial report of the first pillar. While it is a general postulate that a sustainable PAYG pension system should be "self sufficient," in Slovenia the central budget is obligated (according to article 233 of the Pension and Disability Insurance Act) to cover the eventual negative balance of the first pillar. Such transfers from the central budget were permanent in the last decade or more and accounted for 15 to 20% of all of the pension fund's income.



Source: Slovenian Statistical Office.
Figure 3: The share of the young population (15 years or less) and old population (65 years and more) in Slovenia



Source: Slovenian Statistical Office (data until year 2006) and own calculations (from year 2007 onwards).
Figure 4: Estimated structure of population in Slovenia until year 2020

This brief analysis and especially other analyses (see Verbič 2007a and 2007b, Verbič, Majcen and Nieuwkoop 2006) show that due to unfavorable general trends the pension system could become (if not the case even now) unsustainable unless some more dramatic changes/reforms take place. We discuss some possibilities in the next section.

5. Policy recommendations

According to the recent developments reviewed above, we propose several points for future pension system reforms in Slovenia:

- extension of the effective participation period,
- adjustments of some parameters of the pension system,
- introduction of the second pillar,
- eventual introduction of the basic pillar.

5.1. Extension of the effective participation period

International examples show that the participation period has to be extended in order to make a pension system sustainable. This holds especially for economies with demographic trends similar to those noted in Slovenia. There are, however, some dilemmas in extending working lives. Several authors (see Kohli and Rein 1991, Palacios 2003, Burtless and Quinn 2002, Vodopivec and Dolenc 2008 and others) argue that as people view retirement as their "entitlement," extending working lives is not an easy task. And the problem is not

confined to workers – employers, too, are reluctant to employ old workers.

There are, however, some possible measures on the workers' side; Vodopivec and Dolenc (2008) summarize some of them. The crucial measure could be a *financial reward for extending working life* (extending the participation period). If workers are financially rewarded for working longer, they might be more reluctant to retire as soon as they achieve retirement conditions. There are some inconsistencies in practice. In Slovenia, the pension system stimulates the extension of working life, but after 66 years of age the extension of working life does not increase pension benefits – the probability that one will work longer and postpone his/her right to claim pension is thus low. The pension system should reflect the real financial effect of early/late retirement. We discuss the necessary changes to parameters later on.

Alternative, flexible work arrangements can encourage the elderly to work longer. Ruhm (1990) and Friedberg (2007) found that old workers prefer more flexible work arrangements (that is, part-time or shorter-hour jobs) as such "bridge" jobs suit old workers on their path to retirement. This increase was particularly notable among relatively educated and well-off workers. Thus, the pension system in Slovenia should encourage workers/retirees to take alternative work arrangements after full entitlement, while receiving some benefits from the pension system.

Making old people healthier will also contribute to their desire to work longer. Not surprisingly, research shows that poor health has a negative effect on the likelihood of being in the workforce, on expected retirement age, as well as hours worked and wages (for a survey, see Currie and Madrian 1999).

How can employers be encouraged to offer more jobs to older workers? *Introducing flexible wage determination* can increase the employability of old workers, if institutional rigidities prevent wages adjusted to changes in the life-cycle productivity of workers (Vodopivec and Dolenc 2008). In Slovenia, however, the law and collective agreements still mandate a 0.5 percent increase of wage level per year of work experience, making older workers less competitive.

On the other hand, *improving the employability of older workers* should be encouraged. To increase the attractiveness of older workers to employers, new generations of older workers should possess better skills, which call for life-long learning – including learning toward the end of their work careers. Indeed, several considerations speak in favor of such development. First, if the anticipated age of retirement increases, the "break even" age of training increases, as the payoffs to training are spread over a longer work period. Second, the OECD (2003) also argues that if workers undergo continued training throughout their careers, it is unlikely that they will experience a decline in their trainability in old age. Third, because the retention rates of older workers are high, training older workers may be as profitable as training younger ones.

5.2. Adjustments of some parameters of the pension system

The problem of the modern "Pay-As-You-Go" first pillar of pension systems is that it cannot adjust to relevant demographic and other changes in the economy or the necessary adjustments are too slow. In Slovenia, pensions are average wage adjusted, taking into consideration no other relevant factors. Holzmann and Palmer (2006), Börsch-Supan (2006), Barr (2006) have introduced an idea of a notional-defined contribution pension scheme (NDC), where the sustainability of the "Pay-As-You-Go" first pillar is achieved by the more flexible parameters of the latter. In such a system the pension benefits are adjusted according to selected parameters, which affect the pension system: the size of the active population, wage growth, fiscal policy… a similar system could be adopted in Slovenia as well, while not changing much the existing first pillar and in fact ensuring its sustainability.

Further, the existing financial bonuses/penalties for late/early retirement have to be revised. We estimated for this purpose the effect of late/early retirement on the level of individual pensions for both men and women with average wages and its effect on the pension system. On the level of the pension system we calculated the present value of expected additional or lower payments. On the individual level we calculated:

a) additional or lower pensions according to current regulation and
b) expected/fair additional or lower pensions based on the estimated present value of the expected additional or lower payments (taken from the calculation for the pension system), divided on a monthly basis using expected life-expectancy for men/women and a financial annuity approach. The calculations have been made in a no-inflation environment.

Retirement age	Contribution period	Monthy premium/penalty	Pension benefits as % of full pension	Pension benefits	The difference between actual and full pension	Surplus (+) or deficit (-) of pension contributions	Monthly effect until anticipated life expectancy
(in years)	(in years)	(in %)	(in %)	(in €)	(in €)	(in €)	(in €)
58	35	-0,30%	82,0%	476,11	-104,51	-53.887,27	-264,15
59	36	-0,25%	88,0%	510,94	-69,67	-43.109,82	-224,53
60	37	-0,20%	92,8%	538,81	-41,80	-32.332,36	-179,62
61	38	-0,15%	96,4%	559,71	-20,90	-21.554,91	-128,30
62	39	-0,10%	98,8%	573,65	-6,97	-10.777,45	-69,09
63	40	0,00%	100,0%	580,62	/	/	/
64	41	0,30%	103,6%	601,52	20,90	10.777,45	81,65
65	42	0,20%	104,8%	608,49	27,87	21.554,91	179,62
66	43	0,10%	103,6%	601,52	20,90	32.332,36	299,37

Used parameters	
1. Net wage	846,38
2. Gross wage	1.303,92
3. Old age pension benefit relatively to average wage	68,60%
4. Life expectancy (in years)	75

Source: Slovenian Pension and Disability Insurance Act, Slovenian Statistical Office and own calculations.
Table 1: The calculation of premium/penalty for late/early retirement for men

Retirement age	Contribution period	Monthy premium/penalty	Pension benefits as % of full pension	Pension benefits	The difference between actual and full pension	Surplus (+) or deficit (-) of pension contributions	Monthly effect until anticipated life expectancy
(in years)	(in years)	(in %)	(in %)	(in €)	(in €)	(in €)	(in €)
58	35	-0,30%	89,2%	517,91	-62,71	-32.332,36	-112,27
59	36	-0,25%	94,0%	545,78	-34,84	-21.554,91	-78,10
60	37	-0,20%	97,6%	566,68	-13,93	-10.777,45	-40,82
61	38	0,00%	100,0%	580,62			
62	39	0,30%	103,6%	601,52	20,90	10.777,45	44,91
63	40	0,20%	104,8%	608,49	27,87	21.554,91	94,54
64	41	0,10%	103,6%	601,52	20,90	32.332,36	149,69

Used parameters	
1. Net wage	846,38
2. Gross wage	1.303,92
3. Old age pension benefit relatively to average wage	68,60%
4. Life expectancy (in years)	82

Source: Slovenian Pension and Disability Insurance Act, Slovenian Statistical Office and own calculations.
Table 2: The calculation of premium/penalty for late/early retirement for women

Tables 1 and 2 show that men with an average wage receive only €20 monthly more if they prolong their working activity for a year after meeting the full retirement criteria. The full (present value) effect for the pension system is almost €11,000, which means that the financial reward should in fact be at least €80 monthly (at a life expectancy of 75 years). On the other hand, the penalties for early retirement are too low: if a men retires 5 years before meeting full retirement conditions, his monthly loss in pension would be approx. €100, whereas the effective loss for the pension system would be more than €260 monthly. Similar results were found for women. Our simulations show that penalties for early retirement had to be increased (to 0.75-1.00% per month for men and 0.55-0.60% per month for women), as well as incentives for late retirement (to 1.1-1.4% per month for men and 0.6-0.7% per month for women). These adjustments would equalize additional/lower contributions to the pension system with higher/lower pension benefits (in present value terms).

5.3. Introduction of the second pillar

Verbič (2007a) found that workers should invest 5% of their net wage in a funded pension scheme in order to keep their expected pension benefits the same as before the reforms in 1999 and 2005. However, contributions to the third pillar in Slovenia account for less than 0.4% of net wages. It is obvious that the voluntary pension

scheme does not play its expected role – an insurance against income loss after retirement. Therefore, a mandatory second pillar (funded scheme) would probably be a proper solution for Slovenia as well. It could help the rising replacement rate and would also generate additional national savings.

5.4. Introduction of the basic pillar

As mentioned before, the basic pillar helps confronting basic poverty issues. These benefits are not directly linked to contributions to the pension system; therefore, benefits are usually not financed from the pension system, but more or less from the central budget. We suggest that following prior recommendations (hopefully resulting in the long-term self-sufficiency of the first pillar) funds that are currently transferred to the pension system due to the negative current result of the first pillar should be directed to the basic pillar.

6. Conclusion

This paper presents the results of a study that shed light on the pension system and its dilemmas in Slovenia in light of current international macroeconomic changes and trends. We found that Slovenia has a pension system similar to that of other comparable economies (with the exception of the second pillar) and that it currently faces dilemmas similar to those of other economies, resulting in inevitable reforms of the pension system. Slovenia also has an ageing population, causing substantial pressures on the pension system, and is faced with other current changes: socio-economic changes, pressures on fiscal policy, the challenges of globalization, etc. On the basis of international comparison and current demographic trends in Slovenia, we formed some policy recommendations for future reforms of the pension system in Slovenia.

We believe that four points have to be taken into consideration for future reforms. The first is the extension of the effective participation period due to higher life expectancy. This might be a challenging task, especially while workers and employers are not enthusiastic about extending working lives. Further, adjustments of some of the parameters of the pension system would be inevitable. Changes might go in the direction of a Notional Defined Contribution within the first pillar. In addition, penalties/premiums for early/late retirement have to be corrected so that they reflect the actual financial effects of participation. We suggest introducing the second pillar, because various empirical studies for Slovenia show that payments into the voluntary pension scheme are not sufficient to assure a sufficient living standard after retirement (contributions to the third pillar are less than a tenth of that desired). And lastly, the introduction of the basic pillar might be desirable – here the funds that are currently transferred to the first pillar due to its non-self-sufficiency might be used towards a poverty reduction scheme.

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Air Pollution, Allocation of Property Rights, Environmental Issues and Theoretical Overlapping Generations General Equilibrium Modelling

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Abstract:

This paper presents how the environment – considered as a production factor – and other related assumptions can be introduced step by step in a theoretical Overlapping Generations General Equilibrium Model (OLG - GE). The first part shows the behaviors of agents with pollution in the absence of an environmental policy. The second part emphasizes a Greenhouse Gas abatement policy through the allocation of Pollution Permit ownership, which allows property rights on the environment; here we assume a three-factor model: Capital – Labor – Environment. The last part of of the paper highlights one theoretical property about the allocation of pollution permits within a OLG-GE steady state with the environment. To our knowledge, it is the first time that the aforementioned property has been characterized.

Keywords: Environment Property Right, Pollution Permit Ownership, Environmental Maintenance, Air Pollution, OLG-GE model, Intergenerational Equity.

JEL: D62, D91, Q50, C68 **DOI:** 10.2478/v10033-011-0003-1

1. Introduction

Since the Kyoto agreement, quantitative constraints have been introduced with a Greenhouse Gas (GHG) abatement scheme using air pollution permits, which is a way to define property rights on the environment, following the Caose (1960) theorem. Otherwise, these property rights offer many opportunities in terms of analysis when the methodological framework mobilized is considered.

Compared with other instruments of environmental policies, the Pollution Permits System presents some main advantages, such as its simplicity and its use of incentives to achieve abatement at a minimal cost to society. In addition, as outlined by Jouvet et al. (2002), another advantage is that it operates ex-ante on the environment and allows emissions to be fixed, leaving prices to adjust. Otherwise, the Pollution Permits System gives wide flexibility in terms of adaptation to changes in the macroeconomic environment.

As international issues emerge in establishing a fund for the financing of climate change impacts (the Cancun UNCC Conference (2010)), this paper presents the particularity of highlihting these issues from the allocation of property rights within a relevant theoretical framework, the overlapping generations (OLG) model.

Indeed, in recent years, increasing attention has been dedicated to policies aimed at mitigating GHG emissions. Among this literature, many have focused mostly on the short term economic effects of the Pollution Permits System (Bergman (1991), Labandeira et al. (2004a), (2004b), Gonzalez et al. (2005), and Fullerton et al. (2007)). However, due to the long-term effects of GHG, as emphasized by Rasmussen (2003), environmental policies are considered within a very long timeframe, which naturally raises the question of intergenerational equity[1];

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[1] Weak and strong sustainability are two different ways of looking at the need to ensure that future generations can supply their needs. See Weiss (1990) or Beder (1996) for more details.

this is the concept that current generations hold the environment as natural capital in common with future generations. Therefore, present generations need not reduce the ability of future ones to meet heir needs. Hence, we introduce in this paper a mechanism which shows that young generations will be in charge of selling pollution permits to firms.

As outlined by Schelling (1995) using the Infinite Life Agent (ILA) model with environmental problems involves a fallacy of composition in intergenerational fairness. Therefore, abatement policies should be seen in the context of decisions involving intergenerational redistribution. Moreover, as underlined by Gerlagh et al. (2000), although a dynastic framework might be convenient for economic analysis, it is restrictive and can be misleading. On the other hand, OLG models are more flexible and may give results different from those derived from dynastic models.

In order to capture the long-term macroeconomic impacts of implementing TEP into an economy, OLG models seem to be more appropriate. The use of this aforementioned framework initially developped by Diamond (1965) is spreading in the literature, especially in environmental economics (John et al. (1994), Ono (1996), Stockey (1998), Grimaud (1999), Gerlagh et al. (2001), Ono (2002), Jouvet et al. (2002), Lambrecht (2005), Jouvet et al. (2006)).

In Jouvet et al. (2006) pollution is regulated by a system of tradable emission permits under political constraints. Jouvet et al. (2002) consider the question of the tradable emission permits variations' effects on long-term capital accumulation. Ono (1996) and John et al. (1994) implement environmental policies by applying financial controls on polluting activities. Ono (2002), Grimaud (1999) and Stockey (1998) introduce pollution permits in order to obtain an optimum allocation of capital and environmental protection. However they do not consider the effects in the variation in the number of permits, or on environmental quality. Gerlagh et al. (2000) show through an Integrated Assessment Model mainly that GHG abatement efficiency could be indirectly influenced by institutional decisions (interest rate) set to face a demographic change scenario. A rule of initial allocation of property rights (grandfathering) is designed for environmental protection. Lambrecht (2005), like Ono (2002), believes that the initial allocation of tradable emission permits would be through sales to companies. Lambrecht (2005) shows how the introduction of a permit system could generate capital accumulation compared to a 'laissez-faire' equilibrium. Both previous authors offer an environmental protection policy based on investment in the operation of environmental maintenance financed by young generations.

Following Beltrati (1996) and Jouvet et al. (2002) we assume that Pollution Permits can be used as investments or financial assets which need to be financed to achieve an equilibrium. We also assume that when an environmental policy is set by the Public Authority, property rights are defined on the environment and ownership is given to young generations, yet within our ideas of green fiscal policy and the use of this levy-fund.

Whilst our approach is closer to these papers from Lambrecht (2005), Ono (2002), Jouvet et al. (2002), Jouvet et al. (2006), nevertheless we differ by coupling a green fiscal system and Pollution Permits. The source of financing in terms of our taxation system is different from those of previous authors. In our approach, as did these previous authors, we deal with the question of environmental maintenance.

However, we differ from them on one hand by treating the investment/financial asset (tradable emission permits) as a source of income; this justifies the implementation of our fiscal policy on this income. On the other hand, we depart from the use of this fund (finance environmental debt and adaptation funding, equity – solidarity and intergenerational issues). Even though we assume GHG reduction policy aims as in Gerlagh et al. (2000) with allocation of property rights in our approach, property rights through Pollution Permits are not initially assigned for free to young generations and we do not regard ageing aspects. As a result, we do not consider the grandfathering allocation rule in this paper.

This paper is organized as follows. The Business as Usual frame is presented in section 2. The environment quality modelling here shows that to reduce GHG emissions, environmental policies are necessary. The two following sections characterize the OLG model with green policies with intertemporal capital equilibrium, and the study of theoretical property and implication of TEP allocation is defined here; to our knowledge, the concept of allowing property rights on the environment coupled with a green fiscal policy has not yet been broached within the framework of overlapping generations models. The last section concludes the paper.

2. Characteristics of the Model

2.1. Business as Usual Economy BAU

We assume an overlapping generations model (OLG) as in Diamond's (1965) model. Production activities generate negative environmental externality under "laissez-faire" conditions because of the absence of environmental policy.

2.1.1. Household Behavior

A representative agent lives over a two-period[2] live span (young and old) (H_1)[3]. He offers an inelastic unit of work, and receives in return a wage w_t. He uses his income for domestic consumption - c_t, and savings s_t (*H_2*). During retirement, he consumes b_{t+1} (See [1] below) which is the net return on the savings during the activity period, and receives from the government his pension $\left(TRF_{t+1}\right)$ (H_3). A fiscal policy is implemented on all the incomes (capital, wage, and pension) (H_4) to finance the government budget and expenditures $\left(\lambda_t\right)$.

In this first part of the model, we assume that the variables and parameters used are doubly indexed: on the one hand in time (*t*), and on the other hand, the economic situation ('*BAU*')[4].

Household maximization program:

$$[1] \quad \begin{cases} \underset{c_t, c_{t+1}}{Max}\left\{U\left(c_t, c_{t+1}\right)\right\} \\ c_t + s_t = w_t\left(1-\lambda_t\right)\left(1-Tau_t\right) \\ b_{t+1} = \left[1 + r_{t+1}\left(1-\lambda_{t+1}\right)\right]s_t + TRF_{t+1}\left(1-\lambda_{t+1}\right) \end{cases}$$

2.1.2. Intertemporal Optimization

The optimization problem under constraints within the OLG framework is resolved through the construction of the Intertemporal Budgetary Constraints (IBC) relation. In this first part we have specified a logarithmic utility function.

$$[2] \quad U\left(c_t, b_{t+1}, \psi\right) = \log\left(\psi c_t\right) + \varphi \log\left(\psi b_{t+1}\right)$$

Where $\psi \in \left(0,1\right)$ represents an index of environmental quality; φ is the time preference rate.

The closer this index approaches its maximum value, the better the environmental quality will be, and consumption will not be affected. Inversely, as we move away from this maximum value due to harmfulness, the negative impact on the agent's utility for each period of life will be greater.

The aforementioned IBC is:

$$[3] \quad c_t + \frac{b_{t+1}}{\left[1 + r_{t+1}\left(1-\lambda_{t+1}\right)\right]} = w_t\left(1-\lambda_t\right)\left(1-Tau_t\right) + \frac{TRF_{t+1}\left(1-\lambda_{t+1}\right)}{\left[1 + r_{t+1}\left(1-\lambda_{t+1}\right)\right]}$$

Where:

- TRF_{t+1} : Transfer or Pension received from government revenue in the second part of the life cycle (retirement) ;
- $TRF_t = Tau_t.w_t$.
- r_{t+1} : Interest rate between the period t and $t+1$, on the capital market ;

2.1.3. Optimal Consumption

Writing the following expression as being the 'Discounted Life Cycle Income' (named RCV):

[2] Cf. Model of Diamond [1958], p.449, in Truman F. Bewley 2007 General Equilibrium, Overlapping Generations Models and Optimal Growth Theory, Harvard University Press, Cambridge or Schubert (2000), pp. 270-285.

[3] (Hi*)* for hypothesis *i.*

[4] To simplify the writing of the equations, $\forall x$, variable index in t, or $\forall \varepsilon$ parameter of the model indexed in t considered as in this first part of the model x_t^{BAU} and ε_t^{BAU}, for parameters not indexed in t, consider as ε^{BAU}.

[4] $$RiCVi_t = w_t\left(1-\lambda_t\right)\left(1-Tau_t\right)+\frac{TRF_{t+1}\left(1-\lambda_{t+1}\right)}{\left[1+r_{t+1}\left(1-\lambda_{t+1}\right)\right]}$$

Optimal consumption in the first and second periods (Intertemporal consumption) is established as:

[5] $$c_t^{BAU} = RiCVi_t\left(\frac{1}{1+\varphi}\right)$$

[6] $$b_{t+1}^{BAU} = \varphi.c_t^{BAU}.\left[1+r_{t+1}\left(1-\lambda_{t+1}\right)\right]$$

Relation $[6]$ is the well-known 'Euler's Intertemporal Equation'[5] which is expressed in terms of the first period of optimal consumption. This equation stated the hypothesis that there is a no-inheritance assumption, as all the cumulated savings during the first period are used. Applying $N_t = N_{t-1}$ and that the aggregate consumption[6] $\left(C_t^{BAU} = N_t c_t^t + N_{t-1} b_t^{t-1}\right)$ during a given period t is the sum of both generations at each current period, we have:

[7] $$C_t^{BAU} = N_t RiCVi_t\left(\frac{1}{1+\varphi}\right)+N_t\left(\frac{\varphi}{1+\varphi}\right)RiCVi_t\left[1+r_{t+1}\left(1-\lambda_{t+1}\right)\right]$$

Thus:

[8] $$C_t^{BAU} = \frac{N_t RiCVi_t}{\left(1+\varphi\right)}\left(1+\varphi\left[1+r_{t+1}\left(1-\lambda_{t+1}\right)\right]\right)$$

2.2. Firms

2.2.1. Production

Production $\left(Y_t\right)$ of an aggregated good is done by a firm with a Cobb-Douglas function.

[9] $$Y_t^{BAU} = AK_t^{\alpha}L_t^{1-\alpha}\varsigma_t$$

Where $A>0$ is a parameter of scale, and $K_t>0$, $L_t>0$ are respectively the capital and labor employed during the period t, and $0<\alpha<1$. The intensity of the pollution is defined by $\varsigma_t \in (0,1)$.

This production generates a quantity of emission $\left(Em_t\right)$ at each period[7] as the following expression:

[10] $$Em_t = \varsigma_t^{1/\theta}Y_t$$

The expressions [9] and [10] allow a more general expression of the intensity of the pollution emitted during a given period t:

[11] $$\varsigma_t = \left(\frac{Em_t}{AK_t^{\alpha}L_t^{1-\alpha}}\right)^{\frac{\theta}{1+\theta}}$$

As there is no environmental policy, pollution intensity is at its maximum value: $\left(\varsigma_t = 1\right)$. Therefore:

[12] $$Em_t = Y_t^{BAU} \qquad with \qquad Y_t^{BAU} = AK_t^{\alpha}L_t^{1-\alpha}$$

Assuming perfect competition, and each firm's choices in capital and labor to maximize profits with $\left(k_t^{\alpha} = K_t^{\alpha}/L_t^{\alpha}\right)$, the capital per head:

[13] $$\pi_t = Ak_t^{\alpha} - \left(w_t L_t + \left(r_t+\delta\right)K_t\right)$$

This is achieved by equalizing the marginal productivity of the factors employed in the production process at their real cost. The capital is not entirely depreciated and we assume no adjustment cost of capital.

2.2.2. Relative Prices

Given decision variables K_t, L_t:

[14] $$\left\{\underset{K_t,L_t}{Max}\left\{\pi_t^{BAU}\right\} \quad et \quad \begin{cases}\dfrac{\partial \pi_t^{BAU}}{\partial X_i}=0\\ X_{i,t}=K,L\end{cases}\right.$$

With :

[5] Cf. Obstfeld, M., Kenneth, R. [1997], Foundations of international macroeconomics, The MIT Press, 2ème edition, Cambridge.

[6] The aggregate consumption is called C_t^{BAU}.

[7] Even though consumption is at the origin of pollution, we assume here that emissions are linked only to production.

- α : the rate of capital in production;
- δ : Capital depreciation rate
- π_t : Firm profits.

From the optimality conditions, we obtain the relative prices:

[15] $$r_t^{BAU} = \alpha A k_t^{\alpha-1} - \delta$$

[16] $$w_t^{BAU} = (1-\alpha) A k_t^{\alpha}$$

2.2.3 Investment

Capital accumulation is characterized by this relation:

[17] $$I_t = K_{t+1} - (1-\delta) K_t \qquad [14bis]$$

2.3. Government

2.3.1. Budget and Public Expenditures

Public expenditures and retirement income are funded by taxes applied on all the revenues at rate (λ_t).

During the present period t, the equation of public expenditure (GP_t) is hence:

[3] $$GP_t^{BAU} = \lambda_t N \left[w_t (1 - Tau_t) + r_t s_{t-1} + TRF_t \right]$$

The Public Authority budget is used to finance public goods and pension plans.

2.3.2. Retirement Funds Held by the State

The retirement budget used to finance transfers to the older generation comes from taxes on the young generation's gross wage.

[4] $TRF_t^{BAU} N_{t-1} = Tau_t w_t L_t \Rightarrow TRF_t^{BAU} N_t = Tau_t w_t L_t \Rightarrow TRF_t^{BAU} N_t = Tau_t w_t N_t$

2.4. The Quality of the Environment

We assume that production is at the origin of the pollution concentration in the atmosphere. At each moment, this concentration $(H_t > 0)$ for all of the GHG as shown below is:

[5] $$H_t = (1-\vartheta) H_{t-1} + \phi \left(c_{t-1}^{t-2} + c_{t-1}^{t-1} \right) + \mu Em_{t-1}$$

Where ϑ is the rate of natural absorption of the atmosphere and ϕ is a control parameter of household consumption externality. Being given the variable of the level of environmental quality EQ_t in the absence of maintenance operations given a reference value of environmental quality EQ_{ref} of GHG in the atmosphere even without human activity, we may write the following relation for all periods:

[6] $$EQ_t = EQ_{ref} - H_t$$

From the relations below, the level of environmental quality at each period t is:

[7] $$EQ_t = EQ_{t-1} + \vartheta \left(EQ_{ref} - EQ_{t-1} \right) - \phi\psi \left(c_{t-1}^{t-2} + c_{t-1}^{t-1} \right) - \mu Em_{t-1}$$

2.4.1. In Any Steady State

In the presence of GHG, we obtain the steady state environment quality, from [5] and [6]:

[8] $$EQ^s = EQ_{ref} - \frac{\mu}{\vartheta} Em - \frac{\varphi\phi}{\vartheta} RiCVi \left(\frac{1}{1+\varphi} \right) \left\langle 1 + \vartheta \left\{ 1 + r(1-\lambda) \right\} \right\rangle$$

From this equation [23]; we establish the following conclusions:

Proposition 1

In the absence of any environmental policy and considering everything else to be otherwise equal, the stationary quality of the environment as modelled here is a positive function of the natural concentration of GHG present in the atmosphere without production activity or consumption; and a negative function of the quantity of pollution emitted; the discount life cycle income and key economic parameters.[8]

The observation in this proposition leads to the fact that it could be necessary for the Public Authority to

[8] Actual policy for interest rates and levels of taxes introduced and applied on the households' income.

contemplate environmental policies in order to set down GHG abatement policies.

2.4.2. Defining the BAU Equilibrium

An equilibrium is defined by $\{EQ_t, k_t, c_t, s_t, w_t, r_t, GP_t\}_{t=0}^{\infty}$ so that households taking into account the initial conditions $\left(s_{-1} = k_0, EQ_0 = EQ_{ref}\right)$ to maximize their inter-temporal utility, under the defined constraints, firms maximize their profits and market hold (capital $s_t = K_{t+1}$, Labour $L_t = N_t$, and goods

$$Y_t = C_t + I_t + GP_t).$$

3. Overlapping Generations Model with Environmental Policy[9]

3.1. Overview

As mentioned above, GHG emissions come from firms' production activities, and decrease households' welfare. These GHG are also harmful to environmental quality through their negative impacts. The environment is considered a public good. We assume in this second part that firms have the same technology, and that the fossil fuel used in the production process is the main source of GHG.

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3.2. Instrument of Environmental Policy

The Public Authority is a member of a Supranational Committee[10] and has decided on the adoption of binding agreements through quantitative emissions targets. Therefore, a tradable emission permits system is implemented in the economy as an international mobilization (H_5).

3.2.1. Initial Allocation of Pollution Permits

Here, property rights are defined in terms of the environment. Indeed, under temporal flexibility, we assume that these private rights are owned and purchased from the Public Authority at price p_t only by young households; these property rights are resold at a profit on a tradable emission permits market (H_6) to firms which cannot use the flexibility of the system; this means that they are unable to invest in clean-production technology and reduce their GHG emissions as depicted in graph 1, below. Moreover, at each period, the property rights generate an amount of income $\left(p_t \overline{E}\right)$.

These assumptions are quite close to John et al. (1994), John et al. (1995), and Ono (2002) within the framework of an overlapping generations model in the case of environmental externalities. In their approach, they assume the existence of a Public Authority which represents young households and operates an environmental maintenance policy to their advantage. The amount of property rights at the beginning of the period is equal to exogenous emission targets (H_7) initially set by the Supranational Committee during agreement negotiations.

3.2.2. Further Assumptions and Propositions

H_8

As q_t is the resell price of emission permits to firms, we assume $\left(q_t > p_t\right)$ so $\frac{q_t}{p_t} > 1$. Given this, a green fiscal policy at rate $\left(\xi_t \in \left]0,1\right[\right)$ can be introduced and implemented on the gross revenue 'added' value $\left(d_t = \left(q_t - p_t\right)E_t\right)$ coming from these property rights.

H_9

i. The total value of the property rights $\left(p_t \overline{E}\right)$ and the funds made up from the tax $\left(\xi d_t E_t\right)$, feeds the budget GP_t^{WE} of the Public Authority which could be allocated to operating environmental maintenance.

[9] The variables and parameters of this 2nd part are assumed to be indexed on $x_t^{WE}, \varepsilon_t^{WE}, \varepsilon^{WE}, \forall x_t, \varepsilon_t, \varepsilon$ where WE means With Environment.

[10] As in the European Union, for example.

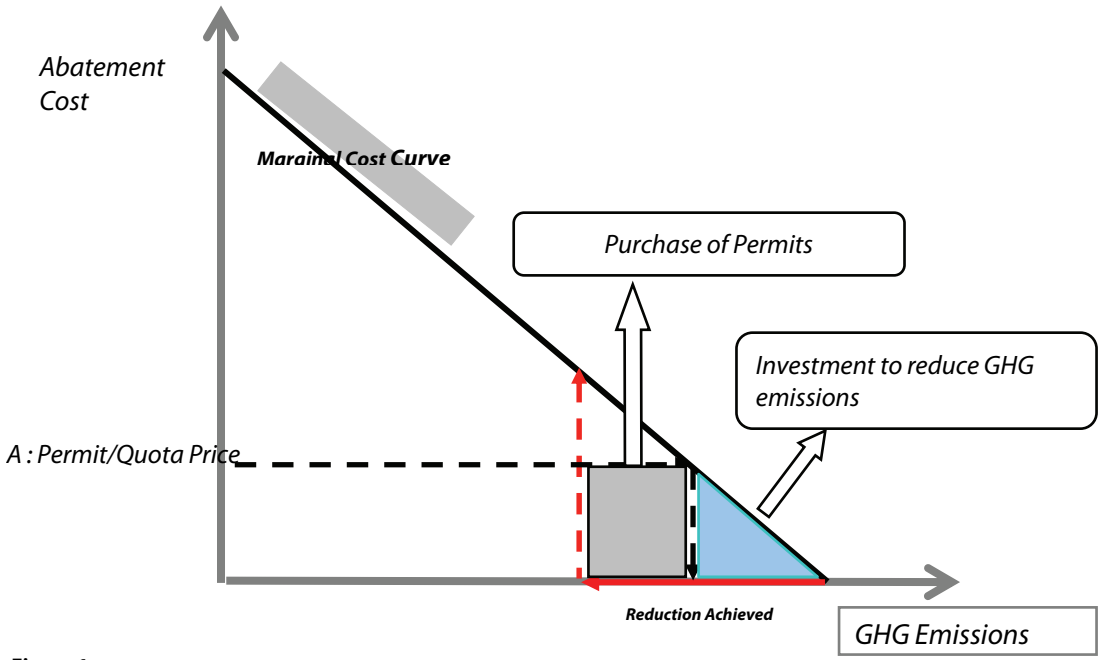

Figure 1

ii. Tax fund and property rights income could be used for achieving two policies:

1. In the absence of further administrative costs the budget surplus could be used for national environmental maintenance operations like :
   a. reforestation for carbon sinks to enhance natural and artificial carbon sequestration reforestation;
   b. Investment in renewable energy sources like wind farm parks for street lighting.

Proposition 2

Operations in the frame of national environmental maintenance could generate positive welfare effects and involve the development of sustainable energy not harmful to the environment. We qualify these impacts here as 'green-intergenerational positive welfare effects.'

2. Furthermore, the fund from the tax collected could feed the Common Supranational Committee fund for international solidarity actions like humanitarian aid in case of natural disasters occurring because of global warming, climate change or the effects of air pollution.

Proposition 3

Participating in international humanitarian operations mainly in developing countries is therefore an equity decision. Indeed, by considering the debate about 'ecological debt,' taking into account this reality concerning historical air pollutions ascribable to industrial or Northern countries (older generations), Southern countries which mainly suffer from natural climate change disasters need to be compensated. In this view, this operation could also consist of financing adaptations for mitigation purposes in those disadvantages areas.

Proposition 4

A future expectation with regard to current generations taking part in measures of international solidarity would also serve to avoid the accumulation of the aforementioned debt.

iii. If $\frac{q_t}{p_t} \equiv 1$, $\frac{q_t}{p_t} \equiv 1$, tax amount is (almost) null $\left(\xi_t d_t e_t \equiv 0\right)$, and the Public Authority in this case cannot levy sufficient taxes and does not realize any environmental maintenance or adaptation activities. If the Public Authority wishes to maintain its participation in these operations, this decision will create an excess of expenditures. Consequently it has the choice between creating a deficit to be covered by future generations (creating intergenerational

inequity) or not investing in environmental maintenance or other related activities.

3.3. Firm Behavior and GHG Emissions

3.3.1. The Three-factor Production Function

Firms rent the Environment-Factor to households assuring production of an aggregate good in each period. The so-called neoclassical production technology with constant returns to scale is also considered. However, three factors are used in this second part: Physical capital $\left(K_t\right)$, Labor $\left(L_t\right)$ and the Environment (E) (Emission permits represent the demands of the Environment Factor) (H_8). The use of tradable permits in the production process can be helpful to set a control on GHG emissions, and to reduce firms' clean technological adaptation costs through the real demand of permits.

For each period the production function is represented by:

[9] $$F\left(K_t, L_t, E_t\right) = Y_t^{WE} = AK_t^{\alpha_K} L_t^{\alpha_L} E_t^{\alpha_E} \qquad With \ \sum \alpha_i = 1 \ \ (i = K, L, E)$$

This equation may also be written as:

[10] $$Y_t^{WE} = AK_t^{\alpha} L_t^{\beta} E_t^{1-\alpha-\beta} \qquad with \ \ \alpha + \beta + \gamma = 1 \ \ où \ \ \gamma = 1 - \alpha - \beta$$

The problem of the representative firm consists in maximizing its new profit function below:

[11] $$\pi_t^{WE} = AK_t^{\alpha} L_t^{\beta} E_t^{1-\alpha-\beta} - \left\{w_t L_t + \left(r_t + \delta\right) K_t + q_t E_t\right\}$$

[12] $$\frac{\partial \pi_t}{\partial x_i} = 0 \ \ where \ \ \ x_i = \left(K_t, L_t, E_t\right)$$

3.3.2. New Relative Prices

From this equation[13], the relative prices are:

[14] $$r_t^{we} = \alpha A k_t^{\alpha-1} e_t^{\gamma} - \delta^{we} = F_K\left(k_t, e_t\right)$$

[15] $$w_t^{we} = \beta A k_t^{\alpha} e_t^{\gamma} = F_L\left(k_t, e_t\right)$$

[16] $$q_t^{we} = \gamma k_t^{\alpha} e_t^{\gamma-1} = F_E\left(k_t, e_t\right)$$

Where $r_t^{we}, w_t^{we}, q_t^{we}$ are respectively the new interest rate, wages and the unit price of tradable emission permits and $e_t = E_t / L_t$ represents the emissions per head.

3.3.3. Investment Equation

Capital accumulation is the same as seen in equation [17]

$$I_t = K_{t+1}^{\alpha} - (1-\delta) K_t$$

3.3.4. Dynamics of GHG Emissions and Pollution Accumulation Taken into Account

At each period t firms in a competitive market are allowed to emit as much pollution as they have has acquired the rights to emit, or by owning it on the tradable emissions market where households are sellers. Pollution is generated by the use of emissions permits in the firms' activities, and has negative impacts on environmental quality. Hence there is a negative correlation between Pollution Permits and the quality of the environment. As found in Jouvet et al. (2002), 'pollution stock at a particular time t depends on the stock of pollution of the preceding period – and of the demand of tradable emission permits revealed by firms during the current period.'

Taking ϑ as the natural level of pollution absorption, we can assume that the total level of pollution follows this dynamic:

[17] $$H_{t+1} = \left(1 - \vartheta\right) H_t + \phi \psi N_t \left(c_t^t + \Gamma c_t^{t-1}\right) + \mu E_t$$

Where $\Gamma \in \left(0,1\right)$ is the probability that an individual dies before the end of the second period of his life under the harmful effects of GHG, such as scorching heat. What is more, on a national plan, growing statistics about this heat wave and mortality rate among the old generation could urge the Public Authority to react, and invest in environmental maintenance.

3.4. Behavior of Other Institutional Components of the Model

3.4.1. Households

The general characteristics concerning the life cycle of the agents remain identical as above. The representative consumer in a cohort maximizes his/her preferences which are expressed across the inter-temporal utility function below. This is written with a separable consumption function over the two periods and within a parameter $\vartheta \in (0,1)$, an environmental quality index which affects life cycle consumption. It also reflects the sensitiveness of consumers to the conditions in which they consume. The household program is:

Optimization Program:

$$[33] \quad \underset{c_t^{we},b_{t+1}^{we}}{Max} \left\{ U\left(c_t^{we},b_{t+1}^{we},\vartheta\right) \right\} \quad où \quad \vartheta = f\left(EQ_i\right) \quad \forall i \in \{t\}$$

$$[34] \quad w_t^{we}\left(1-\lambda_t^{we}\right)\left(1-Tau_t^{we}\right)+\left[q_t\left(1-\xi_t\right)-p_t\right]E_t = c_t^{we}+s_t^{we}$$

$$[35] \quad \left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]s_t^{we}+TRF_t^{we}\left(1-\lambda_{t+1}^{we}\right)=b_{t+1}^{we}$$

Equations $[34],[35]$ are the budget constraints which take into account the initial allocation of permits.

Proposition 5

The introduction of tradable emission permits in the economy, the definition of property rights on the environment and their introduction in households' budget constraints change the allocation of household income.

Indeed, here young households' incomes are used for consumption c_t, saving as well as for owning property rights on the environment pe_t from the Public Authority. In fact, their income is increased by the net amount $q_t^{we}\left(1-\xi_t\right)E_t$.

In their retirement, old agents' consumption b_{t+1} is financed with the net returns from savings during their period of activity, and the net transfer received from the government pension plan.

Taking into account the fact that tradable emission permits are a financial asset, and under the temporal flexibility assumption, our initial allocation scheme will favor saving if consumption in the presence of the environmental policy remains equivalent to the consumption in BAU situations, all other things being equal. The following expression is the young savings function in this framework.

$$[36] \quad s_t^{we} = w_t^{we}\left(1-\lambda_t^{we}\right)\left(1-Tau_t^{we}\right)+\left[q_t\left(1-\xi_t\right)-p_t\right]E_t - c_t^{we}$$

During their retirement period, old agents consume b_{t+1}^{we} which corresponds to the net return on the new expression of savings s_t^{we} realized during the active period, and to the net amount of transfers given by the Public Authority in its pension plan.

The following function given below allows us to estimate households' utility:

$$[37] \quad U\left(c_t^{we},b_{t+1}^{we},\vartheta\right) = U\left(c_t^{we},\vartheta\right)+\left(\frac{1}{1+\varphi}\right)U\left(b_{t+1}^{we}\right)$$

$$U\left(c_t^{we},\vartheta\right)=\left(\frac{1}{1-\frac{1}{\sigma}}\right)\vartheta\left(c_t^{we}\right)^{1-\frac{1}{\sigma}} \text{ and}$$

$$U\left(c_t^{we},\vartheta\right)=\left(\frac{1}{1-\frac{1}{\sigma}}\right)\left(b_{t+1}^{we}\right)^{1-\frac{1}{\sigma}}$$

Where:

- $\sigma \neq 1$ is the elasticity of the inter-temporal substitution;
- φ is the time preference rate $\left(\varphi \in [0,1]\right)$.

3.4.2. Optimal Consumption

With the constraints [34, [35], the maximization program is expressed as:

[38] $$\begin{cases} \partial U\left(c_t^{we}, b_{t+1}^{we}\right) \\ s/c \\ [34] \;\; et \;\; [35] \end{cases}$$

This leads to the optimal choice of consumption (marginal rate of substitution between consumption in the first and second periods) over the life cycle of an individual:

[39] $$\frac{U_c}{U_b} = \left\{\frac{1+r_{t+1}\left(1-\lambda_{t+1}\right)}{\vartheta\left(1+\varphi\right)}\right\}$$

Consequently, consumption during the first and second periods is:

[40] $$c_t^{we} = RiCVi_t^{we}\left\langle 1-\frac{\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\left(\vartheta\right)\left(1+\varphi\right)\right]^{\sigma}}\right\}}{1+\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\left(\vartheta\right)\left(1+\varphi\right)\right]^{\sigma}}\right\}}\right\rangle$$

After several manipulations equation [38] above gives:

$$c_t^{we} = \left\langle \frac{RiCVi_t^{we}}{1+\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\left(\vartheta\right)\left(1+\varphi\right)\right]^{\sigma}}\right\}}\right\rangle$$

[41] $$c_{t+1}^{we} = \left\langle \frac{RiCVi_t^{we}\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]}{\vartheta\left(1+\varphi\right)}\right\}^{\sigma}}{1+\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\left(\vartheta\right)\left(1+\varphi\right)\right]^{\sigma}}\right\}}\right\rangle$$

Where the Discounted Life Cycle Income $\left(RiCVi_t^{we}\right)$:

[42] $$RiCVi_t^{we} = w_t^{we}\left(1-\lambda_t^{we}\right)\left(1-Tau_t\right)+\left[q\left(1-\xi_t\right)-p_t\right]E_t+\frac{TRF_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)}{1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)}$$

3.4.3. Optimal Agregate Consumption and Government Budget

[43] $$C_t^{we} = N_t c_t^{we} + N_{t-1} b_t^{we.t-1} \;\; ;Or, \;\; N_t = N_t^{t-1} \;\; ;==> C_t^{we} = N_t\left(c_t^{we} + b_t^{t-1}\right)$$

a. New Government Budget

With the assumption of green taxes financing environmental maintenance and/or an international solidarity fund, as well as the avoidance of ecological debt, the budget of the Public Authority becomes:

[44] $$GP_t^{we} = \lambda_t^{we}\left[w_t^{we}\left(1-Tau_t^{we}\right)+r_t^{we}s_{t-1}^{we}+TRF_t^{we}\right]+N_t E_t\left(p_t+\xi_t d_t\right)$$

3.5. Environmental Maintenance

Public Authority environmental policies set during each period have a direct effect on the parameter $\vartheta \in (0,1)$, which increases or decreases the utility of agents, as the maintenance improves the quality of the environment. When this maintenance is realized at an optimal level, due to cumulative positive effects, environmental quality is better than during the current and next period $t+1$.

Assuming a constant level of emissions, the quality of the environment during period *t*+1 ii is bequeathed to the following generation, hence the positive intergenerational effect is emphasized. Therefore, logically, future young generations who will enter in the

model will be consuming and living in a better environment.

Proposition 5

If the emission quota which is equal to the level of property rights, and GHG emissions assigned by the Supranational Committee are enforced, such that all the optimum relations presented above hold, the tax rate for achieving these policies will be the optimal one.

3.6. Dynamics of Capital Accumulation in the OLG model with an Environment and Market Equilibrium Summary

3.6.1. Capital Accumulation

As in Diamond's model, the total savings of the young generation are their savings S_1 in the economy and will be the stock of capital of the period *t*+1. So:

[45] $$S_t^{we} = s_t^{we} N_t = K_{t+1}$$

With

$$w_t^{we}\left(1-\lambda_t^{we}\right)\left(1-Tau_t^{we}\right)+\left[q_t\left(1-\xi_t\right)-p_t\right]E_t = RiCVi_t - \frac{TRF_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)}{1+r_{t+1}^{we}\left(1-\lambda_{t+1}\right)}$$

The savings of the agents living and working in each period *t* is:

[46] $$s_t^{we} = \left\langle RiCVi_t^{we}\left\{\frac{\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}\right)\right]^{\sigma-1}}{\left[\vartheta(1-\varphi)\right]^{\sigma}}\right\}}{1+\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}\right)\right]^{\sigma-1}}{\left[\vartheta(1-\varphi)\right]^{\sigma}}\right\}}\right\} - \frac{TRF_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)}{1+r_{t+1}^{we}\left(1-\lambda_{t+1}\right)}\right\rangle$$

One can note that this expression increases with Discounted Life Cycle Income ($RiCVi_t$) and a non-decreasing interest rate.

3.6.2. Markets Equilibrium Summary

The general equilibrium of the different markets is thus determined as follows:

a. Labor Market

The active population is equal to the number of young members in a cohort at each period *t*. So:

[47] $$N_t = L_t$$

b. Pollution Permits Market

The quantity of permits on offer, on the basis of attributed charges, is equal to the number of permits required by the companies:

[48] $$\overline{E} = E_t$$

c. Market of Goods and Services

As we are in a closed economy, the supply and the demand equilibrium on this market is verified when:

[49] $$Y_t^{we} = C_t^{we} + I_t^{we} + GP_t^{we}$$

d. Capital Market

Walras's law asserts that when considering any particular market, if all other markets in an economy are in equilibrium, then that specific market must also be in equilibrium. As a consequence, this principle leads us to consider that equilibrium is achieved on the capital market.

Furthermore, we assume as in Schubert (2000) that at the initial period of the economy or in the one preceding the current period t, there were pre-existing savings S_{-1} which financed the initial stock of capital (K_0). Following this, the savings of the young generation will finance the stock of capital for investment in the economy, so that at each period *t* we can have the equilibrium relationships $S_t^{we} = s_t^{we} N_t = K_{t+1}$ [44].

3.7. Intertemporal Capital Equilibrium

In this section the growth path is characterized within the environmental policy instrument.

From equation [44]: $S_t^{we} = s_t^{we} N_t = K_{t+1}$;

Taking the expressions of variables per head, and as it is assumed that generation sizes are constant, we obtain:

[50] $$s_t^{we} = k_{t+1}$$

Therefore, if:

$$\left\{\frac{\left[1+r_{t+1}^{we}\left(1-\lambda_{t+1}\right)\right]^{\sigma-1}}{\left[\vartheta\left(1-\varphi\right)\right]^{\sigma}}\right\} = \Upsilon_t^{we}$$

[51] $$k_{t+1}^{we} = \left\{RiCVi_t\left(\frac{\Upsilon_t^{we}}{1-\Upsilon_t^{we}}\right) - \frac{TRF_t\left(1-\lambda_{t+1}^{we}\right)}{1+r_{t+1}^{we}\left(1-\lambda_{t+1}^{we}\right)}\right\}$$

Given the dynamic written above, with relation [28], we have:

[52] $$k_{t+1}^{we} = RiCVi_t^{we}\left\{\frac{\frac{\left[1+\left(F_K\left(k_{t+1}^{we},e_{t+1}\right)-\delta\right)\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\vartheta\left(1-\varphi\right)\right]^{\sigma}}}{1-\frac{\left[1+\left(F_K\left(k_{t+1}^{we},e_{t+1}\right)-\delta\right)\left(1-\lambda_{t+1}^{we}\right)\right]^{\sigma-1}}{\left[\vartheta\left(1-\varphi\right)\right]^{\sigma}}}\right\}$$

4. Some Analyses in a Steady State

4.1. The Dynamic Equilibrium

Looking again at capital accumulation in the economy, it is possible to express it as a function of the variables and parameters.

If χ_t^{we} is the total savings of young generations:

[53] $$\chi_t^{we} = s_t^{we} - \left[q\left(1-\xi_t\right)-p_t\right]E_t = \chi\left(w_t, r_{t+1}, E_t\right)$$

From equations [30] and [44] the capital dynamic is established by:

[54] $$K_{t+1}^{we} = \chi_t^{we} + \left[\left(1-\xi_t\right)F_E\left(k_t^{we}, e_t\right) - p_t\right]E_t$$

All in a steady state:

[55] $$K^{we} = \chi^{we}\left(F_L\left(k,e\right), F_k\left(k,e\right), E\right) + \left[\left(1-\xi\right)F_E\left(k,e\right)-p\right]E$$

[56] $$H = \frac{\phi\psi}{\vartheta}\left(c^1 + \Gamma c^2\right) + \frac{\mu}{\vartheta}E$$

Such that :

[57] $$K^{we}\left\{1-\left[\left(1-\xi\right)F_E\left(k,e\right)-p\right]\frac{E}{K^{we}}\right\} = \chi^{we}\left(F_L\left(k,e\right), F_k\left(k,e\right), E\right)$$

– a general form which was roughly characterized by Diamond's[14] steady state, allowing a level of capital to be the solution to the above equation.

4.2. About the Nature of the Steady State

We can establish the relationship:

[58] $$\left\{1-\left[\left(1-\xi\right)F_E\left(k,e\right)-p\right]\frac{E}{K^{we}}\right\} = \frac{\chi^{we}\left(F_L\left(k,e\right), F_k\left(k,e\right), E\right)}{K^{we}}$$

Galor et al. (1989) (see De La Croix et al. (2002), Jouvet et al. (2002) or Jouvet et al. (2006)) have established as a sufficient condition within the framework of an overlapping generations model that there is *'an interior steady state or solution'* if:

[59] $$\underset{K^{we}\to 0}{Lim}\frac{\chi^{we}}{K^{we}} > 1$$

Checking:

From relation[18], we have:

[61] $$\begin{cases}\left\{1-\left[\left(1-\xi\right)F_E\left(k,e\right)-p\right]\frac{E}{K^{we}}\right\} = \frac{\chi^{we}\left(F_L\left(k,e\right), F_k\left(k,e\right), E\right)}{K^{we}} \\ Si \quad K\to 0, \ -\frac{e}{K}\to-\infty \quad \left[\left(1-\xi\right)F_E\left(k,e\right)-p\right]\frac{E}{K^{we}}\to 0\end{cases}$$

As well as:

[62] $$\underset{K^{we}\to 0}{Lim}\frac{\chi^{we}}{K^{we}} = 1$$

This result leads to the conclusion that the assumption concerning the initial allocation of tradable emission permits is unchecked in the case of Galor et al. (1989) within the framework of overlapping generations models.

4.3. Stability or Instability of the Stationary State

We have before us a case of a 3-factor model, with two stock-variables. Looking again at equation [54] and after

differential calculus, we obtain the dynamic of capital at the steady state equilibrium:

[63] $$\frac{\partial K^{we}}{\partial E} = \frac{\chi_1 F_{LE} + \chi_2 F_{KE} + \chi_3 + \chi_4 \left[(1-\xi_t) EF_{EE} + F_E \right] - \chi_5 p}{1 - \chi_1 f_{LK} + \chi_2 f_{KK} + \chi_4 E f_{EK}}$$

From this result, the dynamic equilibrium is stable if:

[64] $$1 - \chi_1 f_{LK} + \chi_2 f_{KK} + \chi_4 E f_{EK} > 0$$

Since:

$$\chi_1 F_{LE} + \chi_2 F_{KE} + \chi_3 + \chi_4 \left[(1-\xi_t) EF_{EE} + F_E \right] - \chi_5 p > 0$$

Moreover, instead of analyzing the sign of relation[19], we can conclude based on the nature of the equilibrium from relation [20] that we have a corner solution. It could be interesting to analyze the stability conditions with our results. This technical aspect could be the aim of another futher theoretical analysis based on this work.

5. Conclusion

In the framework of OLG, we have built a two-part theoretical model. In the first part, there is no environmental policy objective in the presence of pollution. In the second part, under temporal flexibility assumption, a pollution permit system is introduced and considered a financial asset.

Futhermore, this system is coupled with a green fiscal policy which is applied on the sale of environmental assets to firms. We show that the budget surplus compared with the BAU situation could be used for environmental maintenance. It also could be considered a budget for funding international solidarity measures or to generally avoid ecological debt. We also highlight that environmental maintenance operations can generate long-term positive effects which we qualified as 'intergenerational welfare.' To our knowledge, this is the first time that the debate about ecological debt has been introduced in the framework of an overlapping generations model.

We could also consider that the income coming from the sale of pollution permits would increase consumption with respect to well-known global income distribution. However, we have targeted savings, which allows for the deduction of those parts of income that are not consumed to be saved, thus emphasizing capital accumulation and/or investment.

As excess savings depend on tax levels applied on incomes based on financial assets, it is also important to discuss the tax regime. The Public Authority needs to levy sufficient taxes for environmental maintenance and for the participation of Supranational Committees. Otherwise, as taxes are lowered, so will the Environmental operations fund, leading to an environmental debt for future generations if the Public Authority creates a deficit to cover these environmental expenses.

Moreover, if the tax level is high, this could affect young households' incentive. Therefore, we assume that the tax level is fixed at an optimal level that allows the system to operate under the assumptions in the model.

To conclude, we studied the theoretical effects of Pollution Permits in a steady state. We then characterized the equilibrium, as we have a corner solution which characterizes our assumption about the allocation rule defined in this framework. It would, however, be interesting to study as well other tradable emission permits and their initial allocation following those studied by Jouvet et al. (2002).

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Influence of National Culture on Decision-Making Style

Najla Podrug*

Abstract:

The reality of international business is often a confrontation with failures and difficulties that are a result of a lack of understanding of cultural background, and not market conditions. The decision-making process depends on cultural background and choice of "the right way" – decision-making styles are dependent on the values and beliefs of the people involved in the decision-making process. Considering the fact that Western managers often neglect cultural differences present in the CEE context, the objective of this research was to point out the cultural similarities and differences in decision-making styles between Croatia, Slovenia and Hungary. A narrow-sample strategy was used in empirical research that confirmed that cultural values do influence decisions and decision-making styles and the hypothesis was accepted through X2 test analysis between Hofstede's dimensions of national culture and decision-making style.

Keywords: comparative cultural research, decision-making style, narrow-sample strategy, X2 test analysis

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1. Introduction

With the expansion of globalization, awareness of the global complexities involved in cross-cultural interactions has been expanding. Though it can be said that at the macro level there is a form of global culture around the use of technology, communication and business, at the micro level the experiences, values, perceptions, and behaviors of individuals vary within national and ethnic cultures (Sanyal, 2001). Therefore, for success in the new economy, it is essential to have knowledge of other cultures, cultural values and their impact on the types of organizations that emerge and behaviors that take place within them (Francesco and Gold 2005).

A different cultural environment requires different managerial behavior. The reality of international business is often a confrontation with failures and difficulties that are a result of a lack of understanding of cultural background rather than that of market conditions. Strategies, structures, and activities adequate for one cultural context can produce considerably different effects or even be counterproductive in another cultural context. Therefore, strategies, structures, and activities, as well as means and methods of achieving organizational goals, need to be adapted to the socio-cultural environment (Podrug 2005).

The focal interest of this research is to determine cultural differences in decision-making style. The decision-making process depends on the cultural background and choice of "the right way" – decision-making style is dependent on the values and beliefs of the people involved in the decision-making process. Empirical research on cultural differences in decision-making style is marginal in comparison to other research into aspects within management (Yousef, 1998). In addition to the abovementioned arguments for identifying cultural differences in decision-making style,

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cooperation between the countries analyzed and EU expansion enhances the possibility for political and economic cooperation with other countries. Considering the fact that Western managers often neglect cultural differences present in the CEE context (Kolman et al. 2003), the objective of this research was to point out the cultural similarities and differences among decision-making styles in Croatia, Slovenia and Hungary.

2. National Culture and its Role in Decision-Making Style

To understand cultural differences in decision-making style, it is necessary to understand the primary ways in which cultures around the world vary (Adler 2002, p. 16). Anthropology has produced a literature rich in descriptions of a full range of cultural systems, containing profound implications for managers working outside their native countries. After cataloging more than 100 different definitions of culture, anthropologists Kroeber and Kluckholm (1952) define culture in the following way: "Culture consists of patterns explicit and implicit, and for behavior acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiment in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other hand as conditioning elements of future action. Culture is something that is shared by almost all members of some social group that older members of the group try to pass on to younger members and something (as in the case of morals, laws and customs) that shapes behavior." Managers frequently view culture as "the collective programming of the mind which distinguishes the member of one group or category of people from another" (Hofstede, 2001).

Many experts have dealt with the problematic nature of defining a national culture's dimensions on theoretical or empirical bases. In 1961, Kluckhohn and Strodtbeck came up with a multidimensional classification of culture based on the following values and their extremes: (1) an evaluation of human nature (evil/mixed/good), (2) the relationship of man to the surrounding natural environment (subjugation/harmony/mastery), (3) orientation in time (toward past/present/future), (4) orientation toward activity (being/being in becoming/doing), and (5) relationship among people (lineality/collaterality/individualism). In 1976, Hall developed a unidimensional culture model according to ways of communicating (high and low context cultures). Inkeles and Levinson developed the following dimensions of national culture in terms of standard analytic issues: (1) relation to authority, (2) conception of self, including the individual's concepts of masculinity and femininity and (3) primary dilemmas of conflicts and ways of dealing with them, including the control of aggression and the expression versus inhibition of affect (Hofstede and Hofstede 2005). The abovementioned authors have determined their dimensions primarily starting from theoretical postulations; next the conclusions of their empirical research will be presented.

Schwartz (1999) has defined, apart from the classification of values on the level of the individual, the classification of values on the national level. Starting with the average values of students and professors in 38 different cultures, Schwartz has defined the following categories: conservatism, hierarchy, mastery, affective autonomy, intellectual autonomy, egalitarian commitment and harmony. Inglehart (1997) carried out a survey – the WVS (World Value Survey) – with over 60 000 subjects in 43 countries, representing around 70 % of the world population, and including 360 questions concerning all areas of human life, including ecology, economy, education, family, work, health, religion, politics and so on. One great contribution of the WVS to comparative cultural research is its identification of two factors called key cultural dimensions: "well-being versus survival" and "secular-rational versus traditional authority." In the business world, Trompenaars's classification with seven dimensions is very popular. It includes universalism versus particularism, individualism versus collectivism, affectivity versus neutrality, specificity versus diffuseness, achievement versus ascription, time orientation and relation to nature (Trompenaars and Hampden-Turner 2000). House has carried out Global Leadership and Organizational Behavior Effectiveness (GLOBE) research on 500 different organizations and 62 societies and calculated the following dimensions: power distance, uncertainty avoidance, social collectivism, in-group collectivism, gender egalitarianism, assertiveness, future orientation, performance orientation and humane orientation (House, Javidan, Hanges and Dorfman 2002). All the aforementioned researchers have contributed to the better understanding and acceptance of national culture as a prerequisite for the comparison of national and international business, but Hofstede's major

contribution for cross-cultural management on the global level is unquestionable (Nasierowski and Mikula 1998, Zagorsek, Jaklic and Stough 2004).

Hofstede's dimensions of national culture, determined for 53 countries and regions of the world, are preeminent based on the frequency of their citation and by their importance in the field of cross-cultural management (Sondergaard 1994). Engaged as a leading researcher in IBM's office for Europe, Hofstede carried out a research in the period from 1967 to 1969, with over 60,000 respondents, employees in IBM's branches in 53 countries, and repeated the research in 71 countries in the period from 1971 to 1973 with a modified questionnaire on 60,000 respondents (30,000 respondents from the first study, 20,000 respondents recently employed by IBM, and 10,000 respondents who did not participate in the first study). By factor analysis Hofstede defined four factors, that is, four dimensions of national culture: (1) power distance, (2) uncertainty avoidance, (3) individualism/collectivism and (4) masculinity/femininity. Long-term versus short-term orientation was added later (Hofstede and Bond 1984). These dimensions together cannot be assumed to exhaust the universe of differences between national cultures, but they have substantial face-validity and have been empirically demonstrated many aspects of management and organizations.

The power distance dimension measures "the extent to which less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (Hofstede 2001). The uncertainty avoidance dimension measures "the extent to which the members of a culture feel threatened by uncertain and unknown situations." Uncertainty avoidance indicates the extent to which a society feels threatened by ambiguous situations and the extent to which a society tries to avoid these situations by adopting strict codes of behavior, a belief in absolute truths, establishing formal rules, and intolerance toward deviant ideas and actions (Hofstede 1980). Individualism stands for "a society in which the ties between individuals are loose – everybody is expected to look after him/herself and his/her immediate family only" while collectivism stands for "a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetimes continue to protect them in exchange for unquestioning loyalty." Masculinity stands for a society in which social gender roles are clearly distinct: men are supposed to be assertive, tough and focused on material success, and women are supposed to be modest, tender, and concerned with quality of life; while femininity stands for a society in which social gender roles overlap: both men and women are supposed to be modest, tender and concerned with quality of life (Hofstede 2001). "Long-term orientation stands for the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift. Short-term stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of face and fulfilling social obligations" (Hofstede and Hofstede 2005).

Rowe and Boulgarides (1983) suggest that decision-making style approach is a useful means for understanding managers, their decision making, their problem solving, and their ability to interact with others in the organization. Many empirical studies (Ali 1989, Tayeb 1988, Mann et al. 1998) have confirmed the role of cultural background in the choice of a decision-making style. Unlike other aspects of management and organization that were on numerous occasions analyzed in connection to cultural context and Hofstede's dimensions, this has not been the case with decision-making style.

Taylor, Tannerbaum and Schmidt were pioneers in academic discussions on decision-making styles, although these were also closely connected to leadership styles. With Simon and other authors, the 1960s were characterized by a revolutionary turnaround towards decision-making and decisions (Sikavica et al. 1999). Researchers and practitioners have come to universal agreement on the definition of decision-making styles, yet not on types of decision-making styles. Classifications of decision-making styles within management literature are, as a rule, based on a continuum between autocracy and democracy, with differences in detail specifications of types between autocracy and democracy the opposite poles of the same continuum. Vroom and Yetton, Muna, Ali, P. L. Hunsaker, J. S. Hunsaker etc. defined different typologies of decision-making styles.

Adler (1991) emphasizes the role of national culture by saying that decision-making style must be attached to the corresponding national culture, values and norms. Therefore, decision making is culturally contingent, and in each step of the decision-making process culture influences the ways managers and others make decisions. As presented in Fig. 1, decision-making style is also determined by individual characteristics and organizational variables. Yousef (1998) defines age,

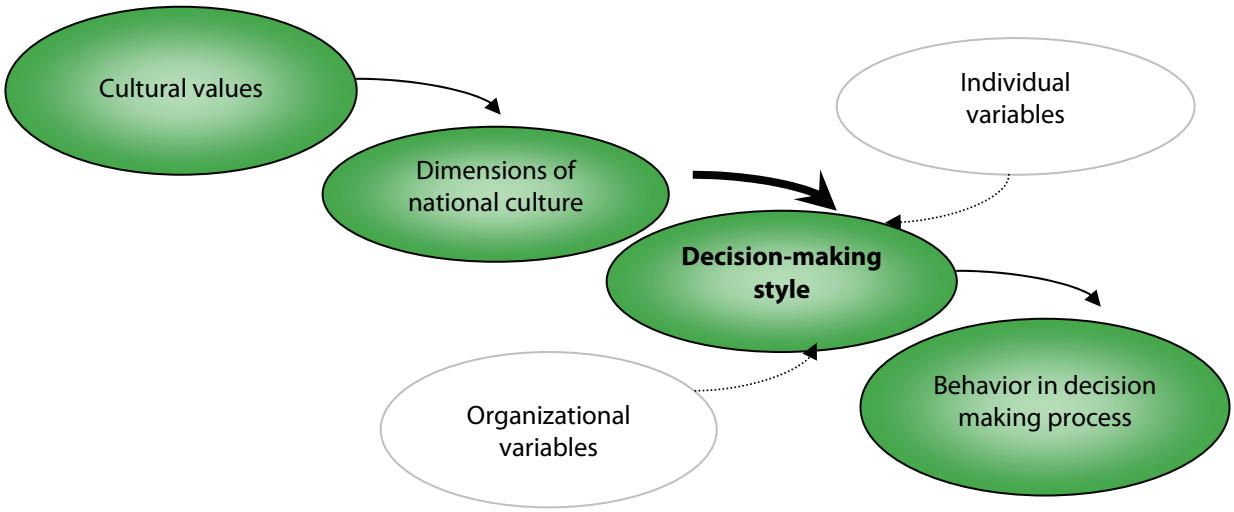


Figure 1: The national culture's influence on decision-making style

education and hierarchical level, but not gender as individual variables and size, level of development, ownership (state, private or mixed ownership), industry, technology and organizational culture as organizational variables.

Since modern business conditions result very often in situations in which we have to make complex decisions with long-term consequences, it is understandable that complex decisions are above all the consequences of social and cultural values instilled in every individual. Therefore, social and cultural values influence decisions and decision-making style. The hypothesis was tested through X^2 test analysis between Hofstede's dimensions and decision-making style.

3. Methodology and Interpretation of Empirical Research

The cross-cultural research strategy used for this empirical research was a narrow-sample strategy based on comparison of similar subcultures in different countries. Empirical research was conducted in Croatia, Slovenia and Hungary and respondents were graduate and doctoral students in the field of business and economics.

The instrument used in the study was a questionnaire containing general information about respondents and questions regarding decision-making styles with Ali's typology. Ali's typology (1993) includes six decision-making styles: autocratic, pseudo-consultative, consultative, participative, pseudo-participative and delegatory. The decision-making style was analyzed in the following four aspects: the most preferred decision-making style, the practiced decision-making style, the most effective decision-making style and the decision-making style used by an immediate supervisor.

		CROATIA	SLOVENIA	HUNGARY
GENDER	male	40	16	25
	female	28	14	24
AGE	under 25 years	10	0	-
	between 25-30 years	31	28	12
	between 31-40 years	22	2	25
	more than 41 years	5	0	12
EDUCATION LEVEL	B. Sc., B.A.	64	3	7
	M. Sc.	4	26	40
	Ph.D	0	1	2
	other	0	0	0
TOTAL		**68**	**30**	**49**

Table 1: Sample characteristics (number of respondents)

Decision-making styles	*the most preferred decision-making style*	*practiced decision-making style*	*the most effective decision-making style*	*decision-making style used by immediate supervisor*
Autocratic	-	1,5%	-	20,9%
Pseudo-consultative	3%	2,9%	4,4%	34,3%
Consultative	71%	64,7%	52,9%	22,4%
Participative	20%	19,1%	23,5%	6,0%
Pseudo-participative	6%	10,3%	5,9%	10,4%
Delegatory	-	1,5%	13,2%	6,0%
TOTAL	**100%**	**100%**	**100%**	**100%**

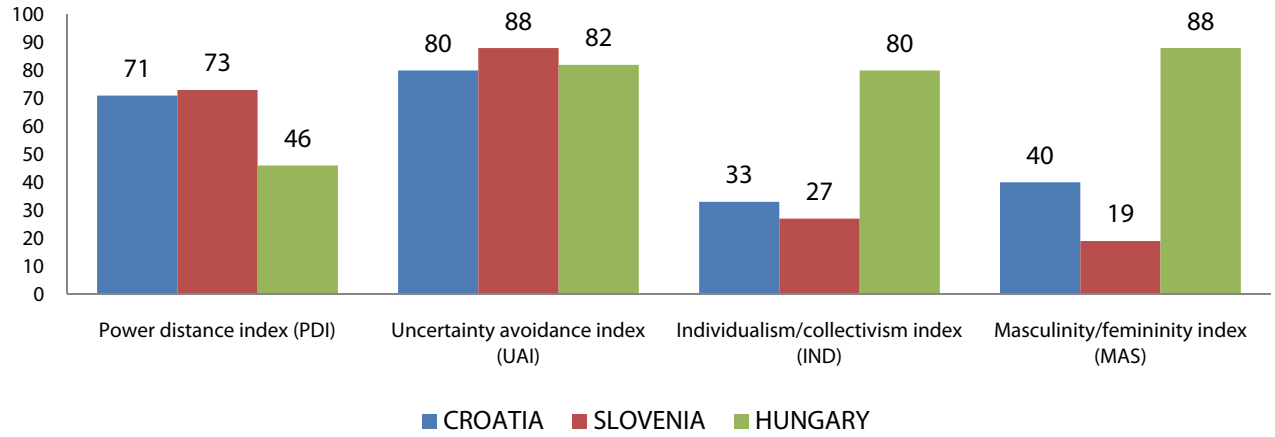
Table 2: Decision-making styles for Croatia

Decision-making styles	*the most preferred decision-making style*	*practiced decision-making style*	*the most effective decision-making style*	*decision-making style used by immediate supervisor*
Autocratic	5%	4,2%	-	15,2%
Pseudo-consultative	5%	4,2%	6,4%	37,0%
Consultative	57%	58,3%	46,8%	30,4%
Participative	14%	20,8%	29,8%	6,5%
Pseudo-participative	19%	12,5%	12,8%	4,3%
Delegatory	-	-	4,3%	6,5%
TOTAL	**100%**	**100%**	**100%**	**100%**

Table 3: Decision-making styles for Hungary

Decision-making styles	*the most preferred decision-making style*	*practiced decision-making style*	*the most effective decision-making style*	*decision-making style used by immediate supervisor*
Autocratic	7%	3,7%	-	7,1%
Pseudo-consultative	4%	-	6,9%	25,0%
Consultative	25%	29,6%	24,1%	35,7%
Participative	36%	44,4%	41,4%	21,4%
Pseudo-participative	25%	22,2%	27,6%	3,6%
Delegatory	4%	-	-	7,1%
TOTAL	**100%**	**100%**	**100%**	**100%**

Table 4: Decision-making styles for Slovenia



Source: Hofstede, G. 2001. Culture's Consequences: Comparing Values, Behaviours, Institutions and Organizations Across Nations. Second Edition, Thousand Oaks, CA: Sage Publications.
Figure 2: Hofstede's dimensions of national culture for Croatia, Slovenia and Hungary

The consultative style represents the leading decision-making style with regard to its preference and effectiveness for Croatia. The delegatory and autocratic styles are not recognized in the preferences of Croatian respondents, but these styles are recognized as those predominantly used by supervisors. Croatian managers employ styles that are closer to the autocratic side of the decision-making style continuum (autocratic 20.9%, pseudo-consultative 34.3%, and consultative 22.4%). On the contrary, respondents believe that their practiced decision-making styles are closer to the delegatory side (consultative 64.7%, participative 19.1% and pseudo-participative 10.3%).

Similar to Croatian respondents, for Hungarian respondents the most preferred and practiced decision-making style is consultative, followed by the participative and pseudo-participative styles. In terms of preference and practice, Hungarian respondents do not particularly value the delegatory style, although 4.3% of respondents recognize it as the most effective. The autocratic style is used by 15.2% of Hungarian managers, which is closer to the results from Croatia than those of Slovenian managerial practice, but they believe that it is not an effective decision-making style.

In terms of preference and effectiveness the foremost important decision-making style for Slovenia is the participative style. Also indicative is the fact that consultative and pseudo-participative immediately follow the participative decision-making style. Respondents from Slovenia do not recognize the autocratic and delegatory styles as the most effective.

Evidently, various decision-making styles similarities are identified for Croatia and Hungary. In terms of preference, practice and effectiveness the leading style is consultative, meaning that decisions are made after consultations with subordinates and colleagues, but do not necessarily reflect the subordinates' and colleagues' influence. Slovenian respondents give priority to the participative style in terms of preference, practice and effectiveness, meaning that they share and analyze problems with subordinate(s) and colleagues as a group, evaluate alternatives, and come to a majority decision. Concerning the decision-making styles used by immediate supervisors, it was concluded that Croatian and Hungarian managers employ styles closer to the autocratic side of the decision-making style continuum when compared to Slovenian managers.

In order to determine the influence of national culture on decision-making style, X^2 test analysis was used to identify the likelihood of connection between the variables of Hofstede's dimensions of national culture and decision-making style. The dimensions presented in fig. 2 for Hungary are taken from the original Hofstede research study, while the dimensions for Croatia and Slovenia are estimations done by Hofstede in 1991. The dimension of long-term/short-term orientation was excluded from analysis since it was not part of the original research, and consequently it was not possible for Hofstede to do estimations for Croatia and Slovenia.

The confirmation was identified in three aspects: the most preferred decision-making style; the most effective decision-making style; and the decision-making style used by immediate supervisors. Table 5 shows the results

of X^2 test analysis, conducted in order to determine statistical connection between the most preferred decision-making style preferred and the national culture, which was statistically significant with 1% probability (p-value = 0.005).

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39,676	20	**.005**
Likelihood Ratio	41,249	20	.003
Linear-by-Linear Association	2,727	1	.099
N of Valid Cases	147		

Table 5: X^2 test analysis - the most preferred decision-making style and national culture

According to the results presented in table 6, the conclusion is the following: with 1% probability, there is a statistically significant connection between the most effective decision-making style and national culture (p-value = 0,000). The effectiveness of a particular decision-making style is a reflection of personal and cultural values, and therefore the conclusion that a statistically significant connection between the most effective decision-making style and national culture exists is not surprising.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51,110	20	**.000**
Likelihood Ratio	46,554	20	.001
Linear-by-Linear Association	3,107	1	.078
N of Valid Cases	147		

Table 6: X^2 test analysis - the most effective decision-making style and national culture

The connection between decision-making style used by immediate supervisors and national culture was also tested with X^2 test analysis. The results are presented in table 7 and confirm a statistically significant connection with 5% probability (p-value = 0,046).

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31,730	20	**.046**
Likelihood Ratio	32,083	20	.042
Linear-by-Linear Association	,501	1	.479
N of Valid Cases	147		

Table 7: X^2 test analysis – decision-making style used by immediate supervisor and national culture

Evidently, social and cultural values do influence decisions and decision-making styles and the hypothesis is accepted through X^2 test analysis of the relationship between national culture and decision-making style.

4. Conclusion

Due to increased mobility in the global labor market and the internationalization of business, many organizations are confronted with business failures and difficulties due to a misunderstanding of cultural background. Misapprehending rather than understanding these differences is the reason for numerous business confusions and failures. This research and the results it presents might be of considerable value for academics and practitioners. From an academic perspective it might increase understanding of the nature and scope of the impact of numerous variables and in turn increase understanding of management thinking, practices and styles across cultures.

Many similarities and differences in value orientation and decision-making style have been identified for Croatia, Hungary and Slovenia. The abovementioned is extremely intriguing, since these countries faced similar political and economic contexts for many decades and the conclusions set forth here may be helpful for understanding managerial practice, and the sources and consequences of different management principles and practices in the countries analyzed.

Most of the past comparative cultural researches, including this research, use country as a surrogate for culture. It may be worthwhile, then, for future research to be conducted on the level of ethnic groups. In addition, it would be interesting to conduct a "time-series"- based study on culture change in a region, especially allowing for the examination of the impact of Western concepts on cultural values in transitional economies. A typical study

of cultural values can sometimes lead to ignoring individual differences in cultural values and result in national-level stereotypes. Future research needs to measure cultural values at the individual level and try to assess connections between individual cultural values and decision-making style.

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An Alternative Human Development Index Considering Unemployment

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Abstract:

The Human Development Index (HDI) has played an influential role in the debate on human development (HD) for many years. However, no index is perfect and neither is the HDI of the United Nations Development Program (UNDP). This paper aims to construct a new composite index for the development performance of a sample of 30 Organization for Economic Co-operation and Development (OECD) countries by adding a fourth indicator, namely the unemployment index, to the calculation of HDI. The addition of the unemployment factor to the HDI as a new indicator has the potential to make the index more comprehensive and present a suitable approach for assessing the development performance of countries.

Keywords: Development, Human Development, Human Development Index, Unemployment, OECD countries

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1. Introduction

During the last twenty years, development has increasingly been defined as HD rather than economic growth, and hence, HD indicators such as life expectancy at birth, school enrolment ratio, literacy rate, gender discrimination and poverty alleviation have largely been employed to determine and measure the level of development.

Until now, normalized measures of life expectancy, literacy, educational attainment, and GDP per capita have been considered the main indicators of HD for all nations. Each plays a different role in HD and are unified to give a measure named the Human Development Index (HDI). It should be indicated that HDI does not measure absolute levels of HD; rather it ranks the countries according to the lowest and highest levels of achievement. The countries are ranked into three groups: low HD (0.000 to 0.499), medium HD (0.500 to 0.799) and high HD (0.800 to 1.000)[1].

HDI was first calculated in the United Nations Development Program's (UNDP) Human Development Report (HDR). Since the first publication of this annual report in 1990, the UNDP has sought to explore the concept and improve the measurement of global HD. Nonetheless, over the last 20 years, there has been considerable improvement in many aspects of measuring HD.

HDI is a simple measure that computes and assigns a

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[1] The latest reports published in 2009 and 2010, however, have included a fourth group in the analysis and categorize these countries as "very high human development" for index values ranging from 0.900 to 1.000 (UNDP 2010 and 2009).

single, scalar value to each country of the world based on three components of HD. This measure has radically changed the debate on development and deeply influenced the agenda of both researchers and policy makers around the world since it was implemented. Criticisms and proposed alternatives abound, yet the index has managed to maintain its popularity and simplicity with only minor modifications over the years of 1991, 1994, 1995, 1999 and 2010.

The main function of the HDI is the annual ranking of countries. This ranking may serve primarily as a policy instrument, particularly in highly ranking developed countries. The rankings are often taken too seriously in public discourse. Since the underlying statistics are also uncertain with margins of several percent, the third decimal digit in the HDI is also uncertain, and the ensuing rankings can be at error in several points. Moreover, the rankings are sensitive to all HDI indicators and their reference minimum and maximum values used for scaling (Lind 2010). Thus, the annual rankings should reflect proper and definite results so that they can serve primarily as a policy instrument, particularly in developed countries.

This paper empirically examines whether the inclusion of an unemployment factor in the HDI would yield a different ranking of nations. It is argued that it is appropriate to modify the HDI by simply adding an unemployment indicator in the index. This Unemployment-adjusted Human Development Index is denoted as HDI-2. OECD countries have been chosen for analysis since unemployment data are not available or sufficiently reliable for other groups of countries in the world.

2. Theoretical and Empirical Background

The HDI was developed to measure "the basic concept of HD to enlarge people's choices" (Ul Haq 1995). It was also designed as an alternative to the use of GDP per capita alone as a measure of human prosperity. To these ends, it can be suggested that the HDI has achieved overwhelming success. Since 1990, the HDI has included only a limited number of indicators to keep it simple and manageable. This simple HDI algorithm is still being used today and calculated from regularly available data to produce a meaningful value that can be used to compare and rank countries across the world. Nonetheless, it is still prone to criticisms and lacks the means to correctly measure and analyze annual development performance.

Smith (1993) was the first author to suggest and support significant changes in the HDI, while Hopkins (1991), McGillivray (1991), Luchters and Menkoff (2000) and Crafts (1997, 2002) have supported the use of the original HDI. On the other hand, there have been many studies in the literature that suggest making radical changes and improvements in the dimensions of the HDI. For example, Srinivasan (1994) and Jordan (2004) have suggested the use of employment or unemployment dimensions in the HDI, while Engineer, King and Roy (2008) calculate the modified indices for OECD countries and compare them with the HDI. Marchante and Ortega (2006) suggested the use of the 100 minus the rate of long-term unemployment together with 6 other dimensions in an augmented version of the Human Development Index (AHDI). Bhattacharya and Mitra (1997) has defined growth in terms of the HDI in a wider sense while analyzing the nature of the transformation of employment in the tertiary sector in relation to economic development.

Paul (1996), Hicks (1997) and, Hirschowitz and Orkin (1997) have worked on the Gini coefficient and the relevance of inequalities. Recently, HDR for 2010 has published an inequality-adjusted HDI. Ogwang (2000) and Fukuda-Parr (2003) have suggested the gender dimension in their studies. Harttgen and Klasen (2010) suggest the use of the household-based HDI.

Furthermore, Doessel ve Gounder (1994) have highlighted the significance of absolute values rather than rankings in dealing with the HDI dimensions, whereas Panigrahi and Sivramkrishna (2002), Morse (2003), Osberg and Sharpe (2003), Cherchye, Ooghe and Van Puyenbroeck (2008) and Seguara and Mayo (2009) are concerned with the problems in HDI rankings.

Some critics of HDI have stated that it presents an oversimplified view of HD. However, collecting reliable data continues to be the major obstacle in low-income countries (Harkness, 2004). Regarding health and longevity, Harkness notes that mortality data are most likely to be missing in countries where mortality is high. According to another critic, both the resources allocated to economic activities and the levels of inequality that may exist within the economy and between various social classes are not taken into account in the HDI (Foster 2005; Ul Haq 1995). In recent years, most critics have taken issue with assigning equal weights to each of the respective indicators of the index (Mahlberg and Obersteiner 2001; Chowdhury and Squire 2006; Lind 2010); but assigning differing weights has been proven unnecessary

(Stapleton and Garrod, 2007). The HDI has also been extensively criticized for its lack of desirable statistical properties. Wolff, Chong, and Auffhammer (2009) and Taner et al. (2010) have statistically shown and criticized that the countries have been misclassified by the HDI.

The main critics of the HDI, however, have claimed that it uses very few or the wrong indicators in measuring the development performance of countries. The family of HD indices has been continuously evolving and struggling to overcome the statistical weaknesses of certain indicators. In this study, a new indicator, namely, an unemployment index, is proposed and introduced to the formula of the HDI.

The current HDI ignores the inequality in the distribution of resources across populations. This oversight together with the inadequate use of human resources might fully concern the UNDP and the addition of new indicators, such as the unemployment rate, to the HDI. The current HDI includes two non-income indicators of people's living conditions and one income indicator. The unemployment problem, however, needs to be considered in the long-term development perspective. Thus, this paper suggests that including an unemployment rate indicator in the calculation of the new version of the HDI would be a meaningful amendment. This new version of HDI is named the "Unemployment-adjusted Human Development Index" and denoted as HDI-2.

The HDI is not always parallel with GDP per capita. Some countries that are rich in resources like those exporting oil may have high per capita income levels, but they may reach relatively low ranks in term of the HDI. For example, although countries like Oman and Saudi Arabia have considerably high per capita income levels approaching US$23,000 in 2007, they only managed to attain 56th and 59th HDI rankings among all nations, respectively (UNDP 2009). This is partly due to the fact that existing wealth is unequally distributed and/or other aspects of development have not been appropriately factored in HDI calculations. Countries with high GDP per capita should be penalized in their HDI rankings if they are accompanied by high unemployment rates. Therefore, in order to highlight such deficiencies, it would be beneficial to include further indicators in the calculation of the HDI. The unemployment rate emerges as a good indicator for this purpose.

In today's world, employment can be recognized as a fundamental human right. It brings personal economic freedom. Providing and implementing strategies for meaningful and productive work for youth is one of the main targets of the Millennium development goals. Thus, the capacity to develop and meet the job needs of its citizens must be the major goals of every nation in the coming decades. Employment can be further considered a physical need. It constitutes the essential basis for peace, food security and HD. In this context, securing full employment level can be considered one of the primary objectives of every nation. Moreover, rising employment levels is also beneficial in fostering economic growth and achieving sustainable development.

Furthermore, unemployment is of growing concern because populations have expanded in recent decades at a faster rate than job creation, and because a larger percentage of the population, principally women, seek employment now more than at any time in the past. Economies with high levels of unemployment cannot achieve lasting and sustainable development. To put it differently, economies functioning with a full employment level, and thus, high levels of production, show radical improvements in terms of HD.

Human mobility is one of the major factors influencing employment changes in societies. Thus, migration, both within and beyond borders, has become an increasingly prominent theme in domestic and international debates, and was the topic of the HDR in 2009. While immigration pressures are increasing and have become the major concern in most OECD countries, an increase in the share of immigrants in the labor force is estimated to raise temporarily natives' unemployment over a period of approximately five to ten years (Jean and Jimenez 2007). Changes in the proportion of immigrants in the labor force may have a distributive impact on natives' wages, and a temporary impact on unemployment (Jean et al. 2007).

The unemployment rate is defined as the percentage of the labor force (the employed and unemployed population) aged 15 years and older who are not in paid employment, not self-employed, and who are available for work and have taken specific steps to seek paid employment or self-employment (HDR 2010). It is a measure of the risk that a person will not have a job even if he/she wants to work. Since unemployment negatively affects HD, the inverse of the unemployment rate (that is, 1 – unemployment) is the preferred standard in this research.

Although it has not been currently included in the sub-indices of the HDI, the unemployment rate is an indicator of social inclusion and quality-of-life through

efficient use of human resources. It impacts on well-being far more than loss of income (Clark and Oswald 1994). Unemployment precipitates declines in personal well-being, like health deterioration in self-esteem, often leading to suicide, and an increased propensity to engage in illegal activities (Machin and Manning 1998). It also displays considerable variation across countries. These are the rationales for inclusion of an unemployment measure in the proposed HDI-2.

3. Method

Formerly, the HDI had been based on three sub-indices and four indicators: longevity index (LEI), as measured by life expectancy at birth; educational attainment index, as measured by a combination of adult literacy (two-thirds weight) and combined (i.e. primary, secondary and tertiary) enrolment (one-third weight) ratios (EI); and standard of living, as measured by real GDP index (Purchasing Power Parity in US$). To calibrate the dimensions, UNDP has assigned minimum and maximum values (goalposts) for each underlying sub-index. Performance in each sub-index is then calculated and expressed as a value between 0-1. In the UNDP's approach, these sub-indices are assigned (equal) weights as suggested by Chowdhury and Squire (2006), Stapleton and Garrod (2007) and Nguefack-Tsague, Klasen and Zucchini (2010) as given as below:

$$HDI = (LEI + EI + GDPI)/3$$

However, in our approach, the four indices in the HDI-2 represent a different set of indicators for assessing the aggregate level of HD with equal weights in the following way:

$$HDI\text{-}2 = (3*HDI + RUI)/4$$

where RUI is the new included index, i.e. reversed unemployment index. The HDI-2 calculated likewise as a simple average of the sub-indices via basic algebra for each OECD country as shown in Table 1. These four sub-indices address conceptually different aspects of HD, which although correlated do not predetermine one another.

The equal weights allow easy comparison over time and across countries. The assessment of change in HDI-2 over the years (1998-2010) for all OECD countries is tabulated in Table 1. From HDI-2 values, comparisons of achievements between countries at a given year or for a particular country for different periods can also be made.

The data have shown that total unemployment rate and HDI-2 are inversely correlated. Therefore, employment rate is preferred instead. Performance in employment is expressed as a value between 0 and 1. The following general formula is constructed by scaling directly from the total unemployment rate as (%) of labor force:

$$RUI = 1 - [(20\text{-Actual Unemployment Rate})/(20\text{-Minimum})]$$

It should be noted that this formula reduces to (max-value)/max when min is set to 0.01 due to the concept of

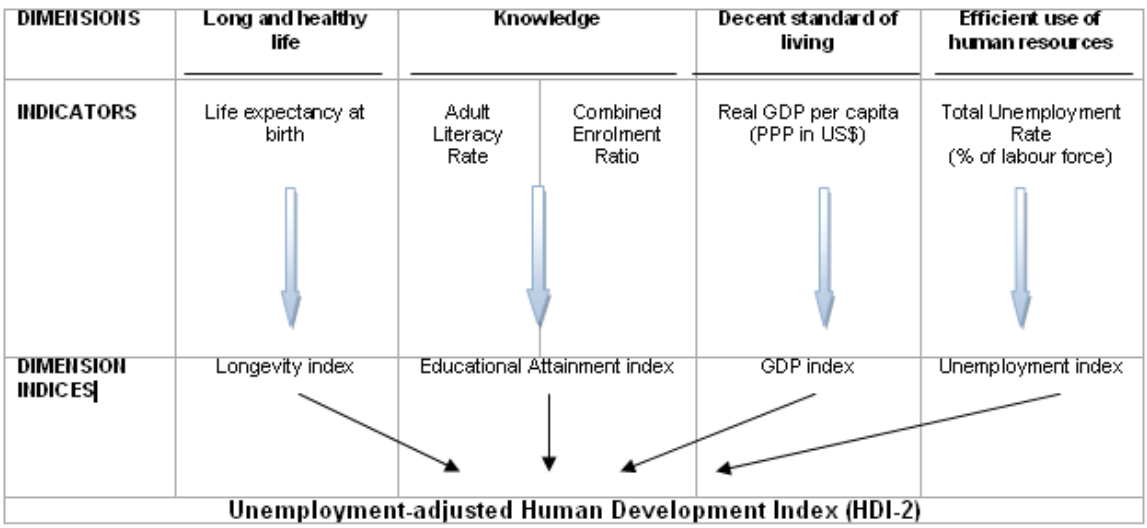

Figure 1: Unemployment-adjusted Human Development Index (HDI-2)

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	0.846	0.855	0.870	0.863	0.863	0.868	0.878	0.892	0.900	0.880
Norway	0.909	0.913	0.913	0.916	0.920	0.930	0.915	0.932	0.947	0.921
United States	0.889	0.898	0.905	0.890	0.883	0.883	0.899	0.906	0.910	0.854
Australia	0.845	0.863	0.876	0.869	0.879	0.890	0.901	0.910	0.923	0.904
Iceland	0.911	0.926	0.935	0.926	0.914	0.911	0.939	0.939	0.948	0.881
Sweden	0.843	0.880	0.896	0.905	0.910	0.899	0.893	0.879	0.896	0.836
Belgium	0.833	0.838	0.868	0.868	0.866	0.859	0.855	0.857	0.871	0.813
Netherlands	0.893	0.908	0.920	0.930	0.929	0.906	0.883	0.916	0.933	0.883
Japan	0.891	0.886	0.889	0.888	0.885	0.891	0.905	0.914	0.922	0.862
United Kingdom	0.859	0.865	0.876	0.884	0.885	0.893	0.895	0.894	0.894	0.816
Finland	0.795	0.815	0.825	0.833	0.836	0.841	0.850	0.868	0.883	0.824
France	0.791	0.804	0.826	0.834	0.835	0.834	0.833	0.846	0.867	0.811
Switzerland	0.885	0.911	0.920	0.924	0.911	0.913	0.911	0.916	0.925	0.867
Denmark	0.871	0.875	0.884	0.896	0.894	0.885	0.894	0.913	0.918	0.858
Germany	0.815	0.836	0.849	0.849	0.844	0.836	0.834	0.846	0.856	0.871
Austria	0.874	0.875	0.886	0.886	0.884	0.881	0.883	0.901	0.912	0.841
Luxembourg	0.895	0.906	0.910	0.913	0.913	0.913	0.900	0.898	0.918	0.841
Ireland	0.833	0.868	0.889	0.896	0.895	0.903	0.914	0.914	0.917	0.853
Italy	0.775	0.789	0.801	0.815	0.824	0.843	0.859	0.871	0.886	0.808
New Zealand	0.834	0.850	0.863	0.871	0.880	0.890	0.905	0.910	0.916	0.885
Spain	0.690	0.734	0.759	0.809	0.798	0.804	0.839	0.856	0.862	0.758
Greece	0.785	0.763	0.773	0.790	0.803	0.816	0.808	0.833	0.853	0.797
Portugal	0.836	0.849	0.860	0.871	0.859	0.849	0.834	0.827	0.831	0.753
Korea Rep.	0.801	0.826	0.859	0.864	0.879	0.885	0.888	0.897	0.913	0.872
Czech Rep.	0.801	0.773	0.774	0.790	0.809	0.808	0.815	0.829	0.861	0.831
Slovakia	0.673	n/a	0.640	0.634	0.650	0.669	0.688	0.730	0.771	0.747
Hungary	0.763	0.784	0.794	0.803	0.814	0.824	0.814	0.812	0.817	0.821
Poland	0.728	0.696	0.674	0.653	0.639	0.648	0.675	0.730	0.790	0.760
Mexico	0.803	0.825	0.818	0.819	0.819	0.826	0.823	0.832	0.844	0.764
Turkey	0.715	0.709	0.728	0.694	0.684	0.684	0.693	0.708	0.745	0.641

Source: Authors' own calculations using HDR (2000-2010) data
Table 1: HDI-2 values (1998-2010)

structural unemployment (Salop 1979; Richardson et al. 2000). The choice of goalposts is the same over the years. That is, maximum and minimum goalposts are taken as 20% and 0.01%, respectively. The maximum and mimimum unemployment rates between 1998 and 2010 have been recorded in Portugal in 2004 and in Iceland in 2002 as 19.9% and 1.4%, respectively.

Although all countries reported in the HDI report are not included, the minimum and maximum unemployment values in this formula have been determined by considering the whole set of countries included in the HDI. This index transformation is used in many indices of social and economic well-being. Increases in the value correspond to decreases in the unemployment value. The range of values is between 0 and 1, and unlikely to change much from year to year for any country regardless of any improvements. The lower values correspond to higher levels of unemployment and vice versa[2].

As shown in Figure 1, in addition to the three essential choices of leading a long and healthy life, acquiring knowledge, having access to resources needed for a decent standard of living and efficient use of human resources are included in the measure of HDI-2. This is meant to capture the ability of a nation to utilize the efficient use of human resources.

4. Data

The HDI time series are taken from HDRs from different years, i.e. 2000-2010. Table 1 and Table 9 list all the values for HDI-2 and HDI for 1998-2010, respectively.

[2] For the values of the unemployment index for the whole analysis period, see Table 8 in the Appendix.

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
T	-7.428	-7,149	-6.116	-6.430	-7.045	8.165	-9.243	10.699	11,973	-5,946
t-significance (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0,000	0,000
Pearson Correlation	0.710	0.715	0.749	0.785	0.771	0.814	0.808	0.809	0,864	0,553
Significance (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0,000	0,000

Table 2: Paired t-test and Pearson Correlation

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	1	3	3	6	4	4	6	4	4	7
Norway	2	1	1	1	1	1	1	1	1	1
United States	3	6	4	8	8	10	8	12	13	4
Australia	4	2	4	4	3	3	3	3	2	2
Iceland	5	7	7	2	7	2	2	1	3	15
Sweden	6	3	2	3	2	4	5	6	7	8
Belgium	7	5	4	8	5	9	12	17	17	16
Netherlands	8	8	8	5	5	11	10	9	6	6
Japan	9	9	9	9	9	11	7	8	10	10
United Kingdom	10	14	11	12	10	15	17	16	20	23
Finland	11	10	10	12	13	13	11	10	12	14
France	12	12	11	17	18	16	16	10	8	13
Switzerland	13	11	11	10	10	7	9	7	9	12
Denmark	14	15	15	11	16	13	15	13	16	17
Germany	15	15	16	18	19	20	21	21	21	8
Austria	16	15	14	16	14	17	14	15	14	22
Luxembourg	17	12	16	14	15	5	13	18	11	21
Ireland	18	18	16	14	10	8	4	5	5	5
Italy	19	20	20	21	21	18	17	20	18	20
New Zealand	20	19	19	20	18	19	20	19	19	3
Spain	21	21	20	19	20	21	19	13	15	18
Greece	22	22	22	23	22	22	22	22	22	19
Portugal	23	24	24	22	23	23	24	24	24	27
Korea Rep.	24	23	23	24	24	24	23	23	23	11
Czech Rep.	25	25	24	25	25	25	25	25	25	24
Slovakia	26	n/a	27	28	28	28	28	28	27	25
Hungary	27	26	26	27	27	26	26	26	28	26
Poland	28	27	28	26	26	27	27	27	26	27
Mexico	29	28	29	29	29	29	29	29	29	29
Turkey	30	29	30	30	30	30	30	30	30	30

Source: Human Development Reports (2000 – 2010)
Table 3: Rankings of OECD countries in terms of the HDI

In all tables, the countries are listed in the same rank order as HDI-1998.

For all years and countries, HDI-2 values are always lower than HDI values except for Iceland, Hungary and Mexico in 2010. The improvements in HDI values over the years seem to originate from the changes in GDPI since the values of LEI and EI remained almost the same. On the other hand, many OECD countries represent a significant improvement in HDI-2 over the years. This is partly attributable to the inclusion of the unemployment index in the calculation of the HDI.

Table 3 and Table 4 list all the ranks for the HDI and HDI-2 for 1998-2010, respectively. According to HDI-2, Norway has always been ranked among the top 4 countries. Only the Republic of Korea has experienced a continuous rise in HDI-2 rankings throughout the analysis period due to the structure of its economy. It is observed that the Netherlands experienced a drastic fall in rank in 2004/5 after being ranked as the 1st in 2001 and 2002. This sharp decline is due to the variations in its unemployment rate. On the other hand, significant

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	11	14	14	18	17	16	16	15	14	3
Norway	2	2	4	4	2	1	2	2	2	1
United States	6	6	6	9	12	14	9	10	13	15
Australia	12	13	12	15	14	10	7	8	5	11
Iceland	1	1	1	2	3	4	1	1	1	6
Sweden	13	8	7	6	6	7	12	16	15	19
Belgium	16	17	15	16	16	17	18	19	19	22
Netherlands	4	4	2	1	1	5	14	4	3	2
Japan	5	7	8	10	9	9	5	6	6	12
United Kingdom	10	12	12	12	9	8	10	14	16	17
Finland	22	21	21	21	20	20	19	18	18	20
France	23	22	20	20	21	22	23	21	20	24
Switzerland	7	3	2	3	5	2	4	3	4	5
Denmark	9	9	11	7	8	12	11	7	7	7
Germany	18	18	19	19	19	21	20	22	23	10
Austria	8	9	10	11	11	15	14	11	12	9
Luxembourg	3	5	5	5	4	2	8	12	7	4
Ireland	16	11	8	7	7	6	3	5	9	18
Italy	25	23	23	23	22	19	17	17	17	23
New Zealand	15	15	16	13	13	10	5	9	10	13
Spain	29	27	27	24	27	27	20	20	21	29
Greece	24	26	26	26	26	25	27	23	24	25
Portugal	14	16	17	13	18	18	20	26	26	26
Korea Rep.	20	19	18	17	14	12	13	13	11	8
Czech Rep.	20	25	25	26	25	26	25	25	22	16
Slovakia	30	n/a	30	30	29	29	29	29	29	28
Hungary	26	24	24	25	24	24	26	27	27	14
Poland	27	29	29	29	30	30	30	28	28	27
Mexico	19	20	22	22	23	23	24	24	25	21
Turkey	28	28	28	28	28	28	28	30	30	30

Source: Authors' own calculations using HDR (2000-2010) data
Table 4: Ranks of OECD countries as for HDI-2

advances in the rankings of Australia, Ireland, Italy, New Zealand, and Spain are observed.

The stability of the rankings has increased. The rankings of some developed countries such as Belgium, France and Greece, and developing countries such as Poland, Slovakia and Turkey, remained almost the same. These three developing countries often act like outliers in the sample.

Most OECD countries experienced a fall in their employment in 2001 and 2002 while their GDPIs have increased. This has resulted in falls in their HDI-2 for these years (See Table 1 and Table 5). This trend can be further considered a signal of "jobless growth" for the same OECD countries.

5. Empirical Analysis

All LEI, EI, GDPI, RUI and HDI values are obtained from HDRs. Then, for each year, the HDI values are compared with the values of HDI-2 by means of a paired t-test. The results indicate that the difference between the two indices are statistically significant.

To analyze the impact of the modification between the HDI and HDI-2, a Pearson Correlation is employed. The results show that there is high rank of correlation between HDI rankings and HDI-2 rankings as tabulated in Table 2. The results show that adjusting for unemployment results in major changes in the rankings of countries. The results for all years show that the difference between the rankings of two indices are statistically significant. The behavior of HDI 2010 against HDI-2 2010 is displayed in Figure 2. In addition, the

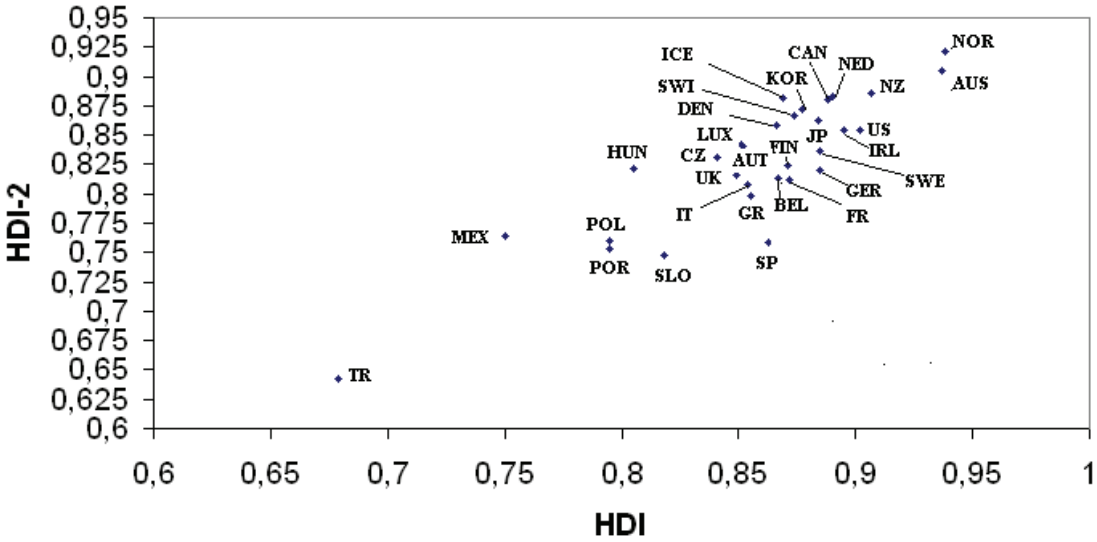

Figure 2: HDI 2010 versus HDI-2 2010 for OECD countries

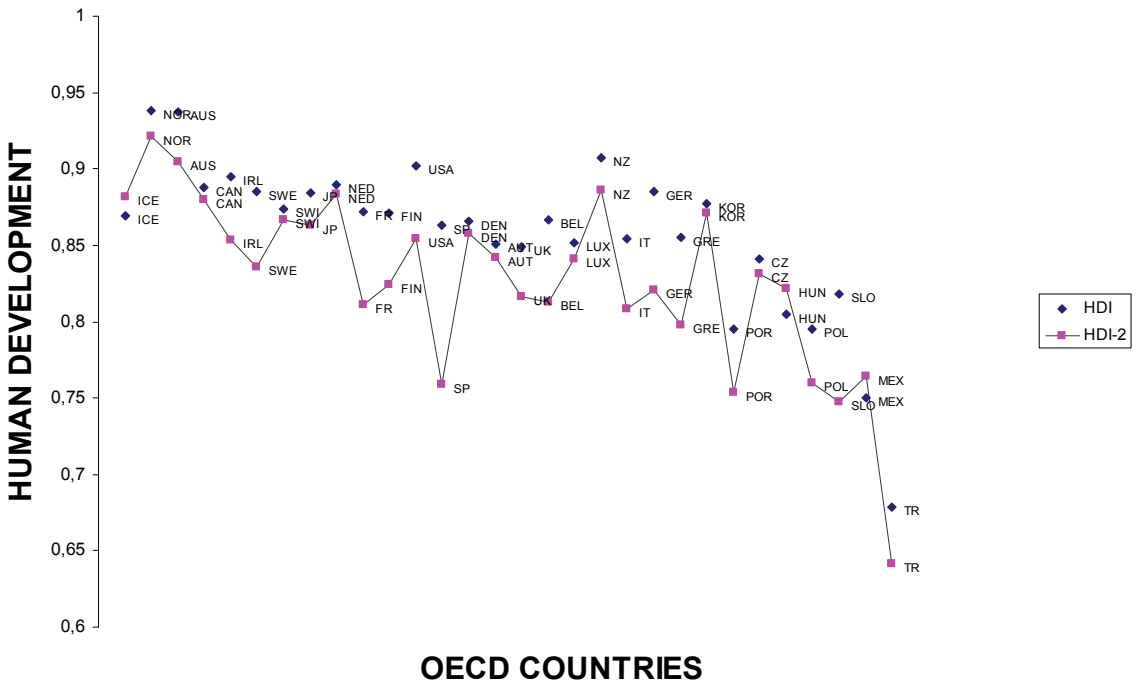

Figure 3: The Impact of the Unemployment rate on HDI for 30 OECD countries

impact of the unemployment rate on HDI for 30 OECD countries is displayed in Figure 3.

Comparing the rankings of nations given by the HDI and HDI-2 gives one a basis for assessing whether the added unemployment information matters or not. Table 5 shows how much each country's rank order changed from the UNDP's HDI ranking. As shown in Table 5, inclusion of the unemployment index in HDI calculations has resulted in crucial increases in the rankings of the Republic of Korea, Denmark, Luxembourg and Switzerland for all years. These OECD countries have made evident and concrete amelioration in the context of HD. The inclusion of unemployment rate had no particular effect on the ranks of Turkey, Slovakia and Poland.

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	10	11	11	12	13	12	10	11	10	-4
Norway	0	1	3	3	1	0	1	1	1	0
United States	3	0	2	1	4	4	1	-2	0	11
Australia	8	11	8	11	11	7	4	5	3	9
Iceland	-4	-6	-6	0	-4	2	-1	0	-2	-9
Sweden	7	5	5	3	4	3	7	10	8	11
Belgium	9	12	11	8	11	8	6	2	2	6
Netherlands	-4	-4	-6	-4	-4	-6	4	-5	-3	-4
Japan	-4	-2	-1	1	0	-2	-2	-2	-4	2
United Kingdom	0	-2	1	0	-1	-7	-7	-2	-4	-6
Finland	11	11	11	9	7	7	8	8	6	6
France	11	10	9	3	3	6	7	11	12	11
Switzerland	-6	-8	-9	-7	-5	-5	-5	-4	-5	-7
Denmark	-5	-6	-4	-4	-8	-1	-4	-6	-9	-10
Germany	3	3	3	1	0	1	-1	1	2	2
Austria	-8	-6	-4	-5	-3	-2	0	-4	-2	-13
Luxembourg	-14	-7	-11	-9	-11	-3	-5	-6	-4	-17
Ireland	-2	-7	-8	-7	-3	-2	-1	0	4	13
Italy	6	3	3	2	1	1	0	-3	-1	3
New Zealand	-5	-4	-3	-7	-5	-9	-15	-10	-9	10
Spain	8	6	7	5	7	6	1	7	6	11
Greece	2	4	4	3	4	3	5	1	2	6
Portugal	-9	-8	-7	-9	-5	-5	-4	2	2	-1
Korea Rep.	-4	-4	-5	-7	-10	-12	-10	-10	-12	-3
Czech Rep.	-5	0	1	1	0	1	0	0	-3	-8
Slovakia	4	n/a	3	2	1	1	1	1	2	3
Hungary	-1	-2	-2	-2	-3	-2	0	1	-1	-12
Poland	-1	2	1	3	4	3	3	1	2	0
Mexico	-10	-8	-7	-7	-6	-6	-5	-5	-4	-8
Turkey	-2	-1	-2	-2	-2	-2	-2	0	0	0

Source: Authors' own calculations using HDR (2000-2010) data
Table 5: Differences in HDI rankings (HDI-2 rank less HDI rank)

Additionally, unemployment negatively affected the HDI values of some OECD countries, especially Canada, France, Sweden, Finland and Spain. The drops in the rankings of these countries were crucial. These countries are among those to experience net inflows of migrants since their GDP per capita has had an increasing trend (HDR 2009). Therefore, they should address unemployment, control immigration, make adjustments and implement new policies regarding immigrants' integration into the host country's labor market. As these adjustments may depend on country-specific factors, the influence of immigrants on the wage setting mechanism needs to be studied to lead to the creation of economic opportunities for the natives.

The global economic crisis has negatively impacted on the GDP per capita and unemployment indices of the developed economies in 2010. Both the HDI and HDI-2 have decreased for all OECD countries except for Hungary, which shows a slight increase in its HDI-2.

In our sample of 30 OECD countries, Spain has the highest unemployment rate at 11.3% in 2010, while the Netherlands shows the lowest, 2.8% for the same period. The Unemployment Index has decreased for Iceland, the United States, the United Kingdom, Spain, Italy, Luxembourg and New Zealand in 2010, whereas it has increased by 34,92% in Hungary that year.

Using our approach, Iceland, Luxembourg and France lost (12), (10) and (5) HDI places in their rankings due to the global crisis, whereas the ranks of New Zealand, Germany, the Republic of Korea and the United States have been increased by (16), (13), (12) and (9), respectively. The rankings of Norway, Australia, the Netherlands, Mexico and Turkey remained unaffected among the OECD countries with respect to the previous year. The GDP per capita of developing OECD countries such as Turkey has been badly affected in 2010 after a prosperous year in 2007 (See Table 3).

HDI-2 less HDI	Number of Countries	Countries
-17	1	Luxembourg
-13	1	Austria
-12	1	Hungary
-10	1	Denmark
-9	1	Iceland
-8	2	Mexico, Czech Republic
-7	1	Switzerland
-6	1	United Kingdom
-4	2	Canada, Netherlands
-3	1	Republic of Korea
-1	1	Portugal
0	3	Norway, Poland, Turkey
2	2	Japan, Germany
3	2	Italy, Slovakia
6	3	Finland, Belgium, Greece
9	1	Australia
10	1	New Zealand
11	3	Sweden, United States, Spain
13	1	Ireland

Table 6: Table of ranking difference, i.e. HDI-2 less HDI (HDR 2010)

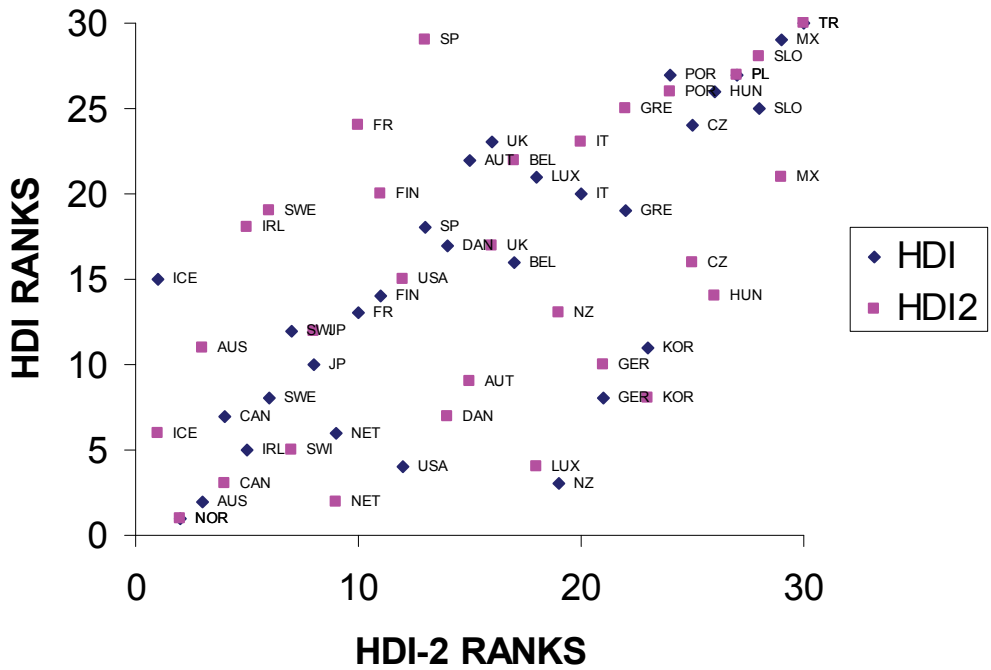

Figure 4: Distribution of HDI ranks in 2010 and HDI-2 ranks in 2010 (Data taken from HDR 2010)

Unlike the rankings announced by the UNDP, the ranking of the United States dropped by (2) in 2010 according to our proposed index. This is logical when the severeness of the crisis in United States is considered. Our analysis shows that the HDI has underestimated the effects of the global crisis in Ireland, Greece, New Zealand, Finland, Australia, Sweden, France, Spain and Belgium. Our analysis also further indicates that the economies of Switzerland, Iceland, Hungary, Luxembourg, Denmark, Austria, Canada and the Netherlands have not been hit by the global crisis as severely as has been alleged.

For 2010, a table for ranking changes between the HDI and our proposed HDI-2 is provided (See Table 6). While there is no change in ranking in 3 countries; 14 countries

show a positive change in ranking (implying improved rankings under HDI-2) while 13 countries show a negative change in ranking (implying worsening rankings under HDI-2). Nineteen countries show a ranking change that is greater than 5 in absolute value. The mode of the absolute value of ranking change is (11). In the top developed countries, the most substantial changes in ranking were Luxembourg (17), Ireland (13), Austria (13) and Hungary (12). In the top developed countries, the most dramatic gains were shown by Luxembourg (17), Austria (13), Hungary (12) and Denmark (10). The maximum drop in ranking was by Ireland (13).

6. Discussion and Concluding Remarks

This study can be considered an initial argument for inclusion of the unemployment factor in the HDI. It argues in favor of enriching the HDI, which is based on three indices: for longevity, educational attainment and per capita GDP, with a fourth index for employment.

The great advantage of the HDI is that it covers both developed and developing countries, but a weakness is that it is not particularly useful for developed countries as the value for these countries are often bunched together. In this paper, the proposed index is calculated mostly for developed countries, which reduces its usefulness for tracking human development globally. Yet, the introduction of the employment index component does result in greater differentiation among developed countries.

The proposed index introduces a new understanding of well-being as an alternative or companion to the HDI as a way to measure levels of HD for comparison across both countries and time.

By means of this new method, the number of HDI determinants has slightly increased, but it still remains manageable and easily understood, enabling one to define HD in a more holistic way. It is understood that the process required to attain high and very high development levels is a greater struggle than the current HDI envisaged.

Development, and especially HD, should not solely consist of economic growth. In fact, increasing each indicator's weight from 1/3 to ¼ diminishes the effect of GDPI in the HDI. Lowering the weighting by including more human and social factors would better fit the HDI's nature. Assuming that *"growth is a necessary but not sufficient condition for development,"* humanitarian aspects of development should be encapsulated in its measurement and assessment.

As educational attainment and longevity indices do not show significant improvements in the short term, the HDI value may likely change from year to year for any country only by means of the improvements in GDP per capita. Inclusion of unemployment as a dynamic measure that may significantly vary from year to year can bring additional explanatory power to the index.

Unemployment is a relatively more advanced indicator variable to be incorporated in a modified HDI index. Its inclusion provides balance to the index. With improved explanatory power, the proposed version of the HDI gives more information about the development performance of nations. Furthermore, it is a relatively more advanced quantitative instrument to evaluate the HD capacity of countries. The inclusion of an unemployment factor in HDI substantially altered the overall ranking of nations. Through adding a fourth sub-index to the current HDI, namely the unemployment index, the HDI has become more comprehensive with respect to development. The new HDI favors countries attempting to overcome the problem of unemployment. The effect of adding the dimension of unemployment has resulted in more sensible and realistic rankings between OECD countries.

The new HDI-2 values have shown that there is a need to attain better HD performance due to the problem of a global increase in unemployment. Therefore, this problem is reflected in HDI measurements and additional goals for HD are suggested. Without the dimension of unemployment, the current HDI measures might direct policy makers to emphasize heavily the overall income factors, such as GDP, to increase HD. This is due to the fact that non-income factors approach their limit, especially for highly developed countries. However, the distribution of income among people and the probability and chance of having a job should also be considered in evaluating nations' HD levels.

As shown in Table 1 and Table 9, the HDI-2 values are generally lower than those of the HDI for each year. Moreover, they follow an increasing trend over the years. The year 2001 was exceptional, as the HDI decreased for Japan, France, the United States, Belgium, Luxembourg, Germany, Greece, the Republic of Korea, Portugal, the Czech Republic, Hungary, Poland, Slovakia, Mexico and Turkey. The year 2010 has also been equally exceptional.

This study shows that the strong economies of Switzerland, Japan, South Korea and Denmark have been

underestimated by the HDI. On the other hand, the HDI has overestimated the economies of Australia, Ireland, Canada, Sweden, Germany and Spain. Including the unemployment factor to the HDI as a new indicator has made the index broader. The integrity of the HDI is more assured for assessing the development performance of countries. Its concept is more complete and interpretable.

One major limitation of the study is that although the original values and rankings in HDR-2010 are based on 169 countries out of the 192 UN member countries worldwide, in this paper 30 OECD economies are taken as the research sample due to the obstacles in obtaining reliable data and then re-ranked among themselves. It should be further noted that most economies in the sample are at a stage of very high development. Only seven can be considered developing, namely the Czech Republic, the Republic of Korea, Hungary, Slovakia, Mexico, Poland and Turkey. A major potential problem in expanding the unemployment index to developing countries is that the concepts of unemployment are much harder to apply when the informal sector or household activities are very important in the developing world (Hirschowitz and Orkin 1997). In poor counties, with no social safety net, everyone has to do something to survive, so that the vast majority of the working age population is engaged in some sort of gainful activity, no matter how poorly productive. Therefore, future research studies in a similar context should consider such differences between developed and developing countries.

Additionally, the years included in the analyses are from 1998 to 2010. Since the actual values of the HDI are not available after 2007 (or HDR 2009), estimates for the components of the HDI 2010 have been directly adapted from the HDR 2010. However, the year 2009 saw changes in both unemployment and income in both developing and developed countries due to the economic crisis. There would be much greater cyclical variation in HDI values if the data were available for these years.

Future studies may offer new and more advanced approaches for the usage of the HDI in the assessment of development. Similarly, future research agendas may also focus on the computation of the HDI through adding new indicators relevant for HD.

Future studies will hopefully fill in the gap for the lack of data for many countries and permit the development of more comprehensive and reliable calculation of the HDI. Nevertheless, it is believed that the current study provides significant insights for a better understanding of the development process and the implementation of public policies.

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Appendix

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	0.91	0.93	0.94	0.94	0.95	0.96	0.96	0.970	0.982	0.844
Norway	0.93	0.94	0.95	0.95	0.99	0.99	0.99	1.000	1.000	0.906
United States	0.95	0.96	0.97	0.97	0.98	0.99	1.00	1.000	1.000	0.872
Australia	0.90	0.92	0.93	0.92	0.94	0.95	0.95	0.962	0.977	0.849
Iceland	0.92	0.94	0.95	0.95	0.95	0.96	0.98	0.985	0.981	0.820
Sweden	0.89	0.90	0.92	0.92	0.93	0.93	0.95	0.965	0.986	0.832
Belgium	0.91	0.92	0.94	0.92	0.94	0.94	0.96	0.963	0.977	0.826
Netherlands	0.90	0.92	0.93	0.94	0.95	0.95	0.96	0.966	0.994	0.852
Japan	0.91	0.92	0.93	0.92	0.93	0.94	0.95	0.959	0.971	0.821
United Kingdom	0.89	0.90	0.91	0.92	0.93	0.94	0.96	0.969	0.978	0.825
Finland	0.89	0.91	0.92	0.92	0.93	0.94	0.95	0.964	0.975	0.823
France	0.89	0.91	0.92	0.91	0.93	0.94	0.95	0.954	0.971	0.819
Switzerland	0.92	0.94	0.94	0.94	0.95	0.96	0.97	0.981	1.000	0.860
Denmark	0.92	0.93	0.94	0.95	0.96	0.96	0.96	0.973	0.983	0.831
Germany	0.90	0.91	0.92	0.92	0.94	0.94	0.94	0.949	0.975	0.827
Austria	0.91	0.92	0.93	0.93	0.95	0.95	0.96	0.971	0.989	0.839
Luxembourg	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.000	1.000	0.948
Ireland	0.90	0.93	0.95	0.96	0.98	0.99	1.00	0.994	1.000	0.843
Italy	0.89	0.90	0.91	0.92	0.93	0.94	0.94	0.944	0.954	0.804
New Zealand	0.86	0.88	0.88	0.88	0.90	0.90	0.91	0.922	0.936	0.790
Spain	0.85	0.87	0.88	0.89	0.90	0.9	0.92	0.935	0.96	0.806
Greece	0.82	0.84	0.85	0.86	0.87	0.88	0.90	0.910	0.944	0.796
Portugal	0.83	0.85	0.86	0.87	0.87	0.87	0.88	0.888	0.906	0.763
Korea Rep.	0.82	0.84	0.86	0.84	0.86	0.87	0.89	0.900	0.920	0.800
Czech Rep.	0.80	0.81	0.82	0.83	0.84	0.85	0.88	0.889	0.916	0.772
Slovakia	0.76	n/a	0.79	0.80	0.81	0.82	0.83	0.846	0.885	0.758
Hungary	0.77	0.79	0.80	0.80	0.82	0.83	0.86	0.866	0.874	0.733
Poland	0.72	0.74	0.75	0.76	0.78	0.79	0.81	0.823	0.847	0.728
Mexico	0.73	0.80	0.75	0.74	0.75	0.75	0.77	0.781	0.826	0.688
Turkey	0.69	0.69	0.71	0.68	0.69	0.70	0.73	0.740	0.812	0.679

Source: Human Development Reports (2000 – 2010) and www.undp.org
Table 7: GDP Index (1998-2010)

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	0.585	0.620	0.660	0.640	0.620	0.620	0.660	0.685	0.700	0.850
Norway	0.835	0.840	0.830	0.825	0.800	0.830	0.770	0.825	0.875	0.870
United States	0.775	0.790	0.800	0.760	0.710	0.700	0.750	0.770	0.770	0.710
Australia	0.600	0.640	0.685	0.665	0.685	0.700	0.750	0.755	0.780	0.790
Iceland	0.865	0.905	0.930	0.885	0.835	0.775	0.880	0.850	0.885	0.850
Sweden	0.590	0.720	0.765	0.800	0.800	0.755	0.720	0.650	0.695	0.690
Belgium	0.560	0.550	0.650	0.670	0.635	0.605	0.580	0.590	0.625	0.650
Netherlands	0.800	0.840	0.870	0.900	0.885	0.795	0.690	0.805	0.840	0.860
Japan	0.795	0.765	0.765	0.750	0.730	0.735	0.780	0.795	0.805	0.800
United Kingdom	0.685	0.700	0.725	0.745	0.740	0.750	0.760	0.735	0.735	0.720
Finland	0.430	0.490	0.510	0.540	0.545	0.545	0.570	0.615	0.655	0.680
France	0.415	0.445	0.525	0.565	0.550	0.515	0.500	0.530	0.585	0.630
Switzerland	0.790	0.865	0.900	0.905	0.845	0.800	0.800	0.800	0.820	0.830
Denmark	0.745	0.740	0.765	0.785	0.775	0.720	0.760	0.805	0.810	0.835
Germany	0.530	0.585	0.625	0.635	0.595	0.545	0.540	0.580	0.580	0.625
Austria	0.765	0.740	0.765	0.755	0.735	0.715	0.710	0.760	0.780	0.810
Luxembourg	0.860	0.855	0.870	0.870	0.850	0.810	0.770	0.760	0.790	0.745
Ireland	0.610	0.720	0.785	0.805	0.780	0.770	0.790	0.780	0.770	0.700
Italy	0.390	0.425	0.465	0.520	0.545	0.560	0.620	0.660	0.690	0.665
New Zealand	0.625	0.660	0.700	0.735	0.740	0.770	0.820	0.810	0.815	0.795
Spain	0.060	0.205	0.295	0.475	0.430	0.435	0.550	0.575	0.585	0.435
Greece	0.520	0.400	0.430	0.480	0.500	0.525	0.470	0.555	0.585	0.615
Portugal	0.755	0.775	0.800	0.795	0.745	0.685	0.630	0.615	0.595	0.620
Korea Rep.	0.645	0.685	0.795	0.815	0.845	0.830	0.810	0.825	0.840	0.850
Czech Rep.	0.675	0.560	0.555	0.590	0.635	0.610	0.600	0.640	0.735	0.780
Slovakia	0.220	n/a	0.060	0.035	0.070	0.125	0.180	0.330	0.445	0.525
Hungary	0.600	0.645	0.675	0.710	0.705	0.705	0.650	0.625	0.630	0.850
Poland	0.470	0.305	0.195	0.090	0.005	0.020	0.110	0.310	0.520	0.645
Mexico	0.850	0.870	0.890	0.875	0.865	0.875	0.820	0.840	0.815	0.800
Turkey	0.670	0.635	0.680	0.575	0.485	0.485	0.500	0.505	0.560	0.530

Source: Human Development Reports (2000 – 2010) and www.undp.org
Table 8: Unemployment Index (1998-2010)

	1998	1999	2000	2001	2002	2003	2004/5	2005/6	2007	2010
Canada	0.935	0.936	0.940	0.937	0.943	0.949	0.950	0.961	0.966	0.888
Norway	0.934	0.939	0.942	0.944	0.956	0.963	0.965	0.968	0.971	0.938
United States	0.929	0.934	0.939	0.937	0.939	0.944	0.948	0.951	0.956	0.902
Australia	0.929	0.936	0.939	0.939	0.946	0.955	0.957	0.962	0.970	0.937
Iceland	0.927	0.932	0.936	0.942	0.941	0.956	0.960	0.968	0.969	0.869
Sweden	0.926	0.936	0.941	0.941	0.946	0.949	0.951	0.956	0.963	0.885
Belgium	0.925	0.935	0.939	0.937	0.942	0.945	0.945	0.946	0.953	0.867
Netherlands	0.925	0.931	0.935	0.938	0.942	0.943	0.947	0.953	0.964	0.890
Japan	0.924	0.928	0.933	0.932	0.938	0.943	0.949	0.953	0.960	0.884
United Kingdom	0.918	0.923	0.928	0.930	0.936	0.939	0.940	0.946	0.947	0.849
Finland	0.917	0.925	0.930	0.930	0.935	0.941	0.947	0.952	0.959	0.871
France	0.917	0.924	0.928	0.925	0.932	0.938	0.942	0.952	0.961	0.872
Switzerland	0.915	0.924	0.928	0.932	0.936	0.947	0.947	0.955	0.960	0.874
Denmark	0.911	0.921	0.926	0.930	0.932	0.941	0.943	0.949	0.955	0.866
Germany	0.911	0.921	0.925	0.921	0.925	0.930	0.932	0.935	0.947	0.885
Austria	0.908	0.921	0.926	0.929	0.934	0.936	0.944	0.948	0.955	0.851
Luxembourg	0.908	0.924	0.925	0.930	0.933	0.949	0.945	0.944	0.960	0.852
Ireland	0.907	0.916	0.925	0.930	0.936	0.946	0.956	0.959	0.965	0.895
Italy	0.903	0.909	0.913	0.916	0.920	0.934	0.940	0.941	0.951	0.854
New Zealand	0.903	0.913	0.917	0.917	0.926	0.933	0.936	0.943	0.950	0.907
Spain	0.899	0.908	0.913	0.918	0.922	0.928	0.938	0.949	0.955	0.863
Greece	0.875	0.881	0.896	0.892	0.902	0.912	0.921	0.926	0.942	0.855
Portugal	0.864	0.874	0.885	0.896	0.897	0.904	0.904	0.897	0.909	0.795
Korea Rep.	0.854	0.875	0.888	0.879	0.888	0.901	0.912	0.921	0.937	0.877
Czech Rep.	0.843	0.844	0.885	0.861	0.868	0.874	0.885	0.891	0.903	0.841
Slovakia	0.825	n/a	0.882	0.836	0.842	0.849	0.856	0.863	0.880	0.818
Hungary	0.817	0.829	0.883	0.837	0.848	0.862	0.869	0.874	0.879	0.805
Poland	0.814	0.828	0.880	0.841	0.850	0.858	0.862	0.870	0.880	0.795
Mexico	0.784	0.790	0.800	0.800	0.802	0.814	0.821	0.829	0.854	0.750
Turkey	0.732	0.735	0.742	0.734	0.751	0.750	0.757	0.775	0.806	0.679

Source: Human Development Reports (2000 – 2010) and www.undp.org
Table 9: Human Development Index (1998-2010)

Mutual Fund Performance in Slovenia: An Analysis of Mutual Funds with Investment Policies in Europe and the Energy Sector

Tanja Markovič Hribernik, Uroš Vek *

Abstract:

This paper examines the risk and return performance of mutual funds in Slovenia from 2005 until August 2009. The research is limited to the regional investment policies in Europe and the energy sector. Using monthly returns, we analyzed different risk-adjusted measures such as: the Treynor ratio, the Sortino ratio and the Information ratio. We also studied selections and timing ability using the Treynor-Mazuy model. The risk and return performance of mutual funds in the Slovenian market does not deviate from those in developed markets. We also found out that the selection ability of fund managers is better than market timing and that the findings of this paper are in accordance with other international studies.

Keywords: mutual funds, investment policy, risk adjusted measures, Slovenia, Europe

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1. Introduction

The development of the Slovenian capital market has its roots in early 1990. Citizens came into contact with capital investments through privatization. They received certificates that allowed them to buy shares of different companies. The next step in the development of the capital market was the introduction of closed investment funds and mutual funds. From that point on, the mutual fund industry made rapid progress and is still, despite the financial crisis, a success story. The number of investors increased to 20 percent of the entire population of Slovenia by the end of September 2009.

Funds are often the subject of research and analysis, all sharing the aim of finding the best performing fund relative to the benchmark. Investors focus a great deal of attention on the historical returns of a fund when making investment decisions. They disregard the fact that historical returns do not assure future returns.

Investment and portfolio theory has introduced plenty of measures to compare the risk and returns of a fund. The theory appeared with the publication of an article by William Sharpe (1966) in which he first presented a measure of excess returns per unit of risk. The unit of risk was standard deviation.

This paper will analyze mutual fund performance in Slovenia with the regional investment policy of Europe in the energy sector from 2005 until August 2009. The aim of the study is to find the best performing funds in their investment policies and to examine Slovenian fund managers' competitiveness compared to fund managers of other countries. We will introduce different risk-adjusted return measures, such as: M^2, the Treynor ratio, the Sortino ratio, the Information ratio and examine

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selection ability with Jensens Alpha, and timing ability with the Treynor-Mazuy model.

2. Methodology

2.1. Theoretical Background of Modern Portfolio Theory

One of the first researchers of modern finance was Markowitz (1952) with his study of the implication of diversification on risk and the return characteristics of a portfolio. He showed increasing diversification lowered the portfolio's standard deviation and variance. The set of portfolios that have the highest expected returns for a given level of risk form an Efficient Frontier.

Studies of mutual fund performance started getting more attention from 1960 on with the introduction of the Capital Asset Pricing Model (CAPM) by William Sharpe (1964) (who for his work in the field of finance received a Nobel Prize in 1990) and John Lintner (1965). The CAPM (the model is presented in detail in the next section) is the pillar and the groundwork of Modern Portfolio Theory (MPT) which explains the relation between expected returns and risk. The aim is to maximize the expected returns of a portfolio for a given amount of risk. It became the mainstream occupation of financial literature in the years following its introduction.

In the early period, authors like Sharpe (1964), Jensen (1968) and Treynor (1965) marked the scientific contribution to the field of mutual fund performance with the implication of the CAPM and received great attention in the financial community. They also introduced several risk and return measures for the evaluation of mutual fund performance that are widely used in finance.

The theoretical dominance of the CAPM was challenged in the following periods by concentrating on anomalies of the CAPM. The assumptions on which the model is based represent an idealized, rather than real world. Roll (1977) pointed out that the CAPM could never really be tested because the market portfolio was unmeasurable. Fama and French (2004) claimed that the CAPM has never been an empirical success. If we include size and market to book value in the model, beta becomes insignificant.

Regardless of rising criticism, the CAPM remains a very useful financial toolkit for several reasons as pointed out by Head (2008). First, it considers only systematic risk, which reflects the reality in which most investors have diversified portfolios. It states a theoretical relationship between required rate of returns and systematic risk and it is a much better method of calculating the cost of equity than the dividend growth model. Finally, it is superior to the WACC in providing discount rates for use in investment appraisal.

As noted by Sharpe (1966): "The theory of portfolio analysis is essentially normative as it describes efficient techniques for selecting portfolios on the basis of predicitions about the performance of individual securities." The final "analysis" or choice for specific mutual fund is made by the investor and is the combination of his preferred risk and returns. The purpose of mutual fund studies is to reveal those that have the greatest expected returns for a given level of risk.

In this paper we focused our study on the mutual fund market of Slovenia based on the findings, risk and return measures of the early period of Modern Portfolio Theory.

2.2. Risk and Return Measures

Modern Portfolio Theory uses a Capital Asset Pricing Model - CAPM[1] to estimate the expected returns of mutual funds, which is a linear function of systematic risk (beta) and selection ability (α). The fund's return is equal to the returns on a risk-free asset, market premium and the selection ability of the fund manager.

$$R_{i,t}=\alpha_i + R_{f,t} + \beta_i\left(R_{m,t} - R_{f,t}\right) + \varepsilon_{i,t} \qquad (1)$$

$R_{i,t}$ is the return of fund i, $R_{f,t}$ risk-free return, $R_{m,t}$ market return. β_i is a measure of systematic risk and shows the market exposure of the fund and $\varepsilon_{i,t}$ is stochastic and a fund-specific return. A risk-free asset is by definition not exposed to the market, so the systematic risk is 0. If the fund´s actual return is higher than the expected return, calculated with the CAPM, the fund manager shows selection ability. In equation 1, the constant measures the manager´s selection ability. α>0 states that the manager is superior to the market in stock picking and vice versa if α <0.

In 1966, Treynor-Mazuy presented a modification of CAPM to assess a manager´s ability to predict market fluctuations.

[1] The model was first introduced by Jack Treynor (1961-1962), William F. Sharpe (1964), John Lintner (1965) and John Mossin (1966) independently, yet all were based on the earlier work of Harry Markowitz on diversification and modern portfolio theory

$$R_{i,t}=\alpha_i + R_{f,t} + \beta_i(R_{m,t} - R_{f,t}) + \gamma_i(R_{m,t} - R_{f,t})^2 + \varepsilon_{i,t} \quad (2)$$

α is a measure of selection ability and γ of market timing. If the Treynor-Mazuy coefficient is positive, the fund manager is able to shift from high-beta stock to low-beta stock when the market falls. If the coefficient is negative, the manager is not able to properly asses the market conditions and shift from high-beta stock to low-beta stock when the market falls.

In this paper, we decided to value the funds' performance with absolute risk-adjusted return measures (M^2, Treynor ratio, Treynor-Mazuy), relative (Information ratio) and downside risk-adjusted returns.

Modigliani (1997) first introduced M^2 to compare returns that have been adjusted to risk. The coefficient is a modified Sharp ratio, which shows the return per unit of risk and puts the benchmark and fund on the same risk basis.

$$M^2=\left[\left(\frac{\overline{RP_i}-\overline{RF_i}}{\sigma_i\times\sqrt{P}}\right)\times\left(\sigma_j\times\sqrt{P}\right)\right]+\overline{RF_i} \quad (3)$$

where: $\overline{RP_i}$ is the average return of the fund *i*, $\overline{RF_i}$ is the average return of a risk-free asset *i*, σ_i is the standard deviation of the fund *i*, σ_j is the standard deviation of the benchmark *j*, and P is the number of observations in a year.

The total risk is $\sigma^2 = \beta^2\sigma_m^2 + \sigma_e^2$, which can be divided into systematic risk and unsystematic risk. With diversification, unsystematic risk can be reduced, but one can not avoid systematic risk when investing in the stock market.

The Treynor ratio is calculated by dividing excess returns with market or systematic risk (β). The fund lacks proper diversification if M^2 is low while the Treynor ratio is high.

$$T_p=\left(\frac{\overline{RP_i}-\overline{RF_i}}{\beta_i}\right) \quad (4)$$

where: $\overline{RP_i}$ is the average return of fund *i*, $\overline{RF_i}$ is the average return of risk free asset *i* and β_i is the measure of market or systematic risk *i*.

William F. Sharpe is the author of the information ratio, whose average value added over the benchmark divides by its standard deviation:

$$IR=\frac{\left(\frac{\sum RP_i - RM_i}{N}\right)\times\sqrt{P}}{\sigma(RP_i - RM_i)\times\sqrt{P}} \quad (5)$$

where: RP_i is the return of fund *i*, RM_i is the return on benchmark *i*, $\sigma(RP_i - RM_i)$ is the standard deviation of value added *i*, N is the number of observations, and P is the number of observations in a year.

The Sortino ratio is a measure of downside risk, where positive returns are not observed. In the denominator only returns that are smaller than the target return (T) are considered. The ratio measures excess return to downside risk taken.

$$S=\frac{(\overline{RP_i}-T)\times P}{\left(\sqrt{\frac{\sum (RP_i-T)^2; RP_i<T}{N}}\right)\times\sqrt{P}} \quad (6)$$

where: RP_i is the return of a fund *i*, $\overline{RP_i}$ is the average return on the fund *i*, T is the target rate of return, N is the number of observations, and P is the number of observations in a year.

3. Data

The research includes comparable mutual funds that were present in the Slovenian market at the end of 2008. The funds were selected in accordance with geographical investment policies in Europe and in the energy sector.

Funds within the investment policy of the energy sector had to satisfy certain criteria: the fund had to have at least 75% of its assets in shares of companies which produce and distribute oil, gas and electricity; mining coal and uranium; producing equipment for energy companies; or producing and investing in R&D of renewable energy sources.

Funds within the geographical investment policy of Europe had to have at least 75% of their assets in shares of companies that have headquarters or the major part of business operations within the European Union. More

than 50% of their assets had to be held in shares of companies located outside Slovenia.

Mutual funds were observed 33 times, all ending at the same point in time. In the research we used log monthly returns $R_{i,t} = \ln(S_{i,t}/S_{i,t-1})$, where $S_{i,t}$ is the monthly return of a fund *i* in month *t*. When analyzing funds within the investment policy of Europe, we used the 10-year German Bund as a risk-free rate of return and the benchmark of MSCI Europe. The risk-free asset, when analyzing funds within investment policy in the energy sector, was compounded by 10-year German, Japanese and USA bonds, and the benchmark was MSCI ENERGY in euros.

4. Results of Analysıs

In accordance with EFAMA (2008) Slovenia had the highest growth of mutual fund assets in 2007 with 45.9%. In that same year, the market of mutual funds reached a size of €2.97 billion. The reason was the Slovenian stock market and the high net inflows of money to mutual funds. The performance of the Slovenian stock market index was more than 70% and was one of the best performing indices in the world in 2007. A particular characteristic of the Slovenian investor was his high risk profile. The structure of mutual funds assets was dominated by equity funds. At the peak of the market in 2007, equity funds represented 66% of all mutual fund assets. The share of equity funds to total assets in the European Union was 41%. Net withdrawals and drops in equity prices, as a result of the financial crisis, started to shift the structure of mutual fund assets in Slovenia toward EU standards.

The mutual fund market in Slovenia shrank to 1.75 billion euros in September 2009. However, this is still 91% higher than at the beginning of 2005. In addition to asset growth, the number of investors in mutual funds jumped 200% to 393,000.

4.1. Analysis of Mutual Fund Performance with Investment Policies in Europe

First, we started estimating the CAPM (equation 1) with the standard method of linear regression: ordinary least square. In the Slovenian mutual fund market there were seven funds present with investment policies in Europe at the end of 2008. Table 2 shows the results of estimating CAPM and the Treynor-Mazuy model (equation 2) for the period from 2005 to August 2009. NLB-Evropski delniški started in September 2005 and therefore was observed at only 47 points, which resulted in a worse monthly average return because in the year 2005 European equities surged. The financial crisis is reflected in the numbers we obtained. The average monthly log return of some funds and the benchmark was negative. The best performing fund, PIA-Select Europe Stock, had an average monthly log return of 0.05%, followed by VB-Europa Invest with 0.04%.

When comparing the risks and returns of the two best performing funds we can see that PIA- Select Europe Stock achieved a higher return with lower risk than VB-Europa Invest. All funds except PF-Top European Players had a higher standard deviation than the benchmark, but only four outperformed the benchmark. Higher risk taking was profitable for only half of the funds, which had higher average monthly log returns than the benchmark.

The benchmark MSCI Europe explains the mutual funds returns with R^2-statistics between 0.8-0.997. The beta of funds is in the range of 1-1.35. VB-Europe Invest can be pointed out with a beta of 1.35. Low R^2, high beta and high standard deviation can be explained by a riskier investment policy. The fund had invested more in one sector or region than the benchmark.

When analyzing the market timing ability of funds with the Treynor-Mazuy model (equation 2) only two out of seven funds had a positive γ coefficient and none of them were significant at the 5% level. The majority of funds had negative γ coefficients, which means that managers increased their holdings of high beta stocks when the market performed poorly and vice versa. We can conclude that the fund managers lacked market timing ability when making investment decisions. This is in accordance with the findings of Chucky and Glen (1990) and Jagrič (2007).

Table 3 shows the risk adjusted statistics of the M^2, Treynor ratio, Sortino ratio, Information ratio and α-coefficient. Funds are sorted in accordance with M^2, where a higher positive value represents a better relationship between risk and return. The average monthly log return for the majority of funds was negative - as well as M^2. In this case, the fund with a lower negative value for M^2 represents a better relationship between risk and return. The funds VB-Europa Invest and PIA-Select Europe Stock had a positive M^2 value, while the others had negative values. Other ratios reflect the performance of funds in a similar classification as M^2.

Six out of the eight funds had a positive coefficient α, but with a low nominal value (third decimal). The only

statistically significant, at a 5% level, was SGAM Fund-Equities Europe. These results are comparable to Ippolito (1989), who, in researching 143 funds, found that 127 funds had α 0,.12 funds were positive and 4 funds were negative.

The analysis of mutual funds with investment policies in Europe includes two Slovenian managed funds: Infond Europa and NLB-Evropski delniški. On the basis of this analysis, we can say they do not lag behind in return and risk when compared with the relatively strong European competition. The funds are competitive even if they were present on the market for around five to six years and were able to offer investors returns comparable to strong European competitors.

4.2. Analysis of Mutual Fund Performance in Investment Policy in the Energy Sector

Table 4 shows the results for nine funds with an investment policy in the energy sector. The average monthly log return for the benchmark in the period from January 2005 until August 2009 was 0.3%. The majority of funds had negative average monthly log returns. The Slovenian mutual funds had higher negative average returns. This is due to the fact that they were introduced to the market after January 2005. Infond Energy and MP-Energy started in October 2005, while Ilirika-Modra energija began in November 2006. Slovenian fund managers were not able to compete during the time when markets were surging. This fact has to be remembered when interpreting the results.

The best performing fund was PIA-Energy Stock, with an average monthly log return of 0.57%. In addition to the PIA-Energy Stock, two other funds outperformed the benchmark with an average return of 0.3%. Seven out of nine funds had a standard deviation higher than the benchmark. EEF-Energy&Materials was able to outperform the benchmark while having a lower standard deviation and therefore being less risky.

The benchmark MSCI World Energy Index does not explain fund returns as well as MSCI Europe. The R^2 statistics range from 0.649 to 0.914, while the beta stretched from 0.867 to 1.044 -- all significant at a level of 5%.

When analyzing the Treynor-Mazuy model, we came to the same conclusion as in subchapter 4.1: fund managers lack the ability to correctly predict market fluctuations. The coefficient γ was negative for all funds.

Table 5 shows risk adjusted statistics for funds with investment policies in the energy sector. Funds are sorted in accordance with M^2 performance. PIA-Energy Stock has the best relationship between risk and return, followed by Raiffeisen Energie Aktien. The two funds with the highest M^2 value also have higher Treynor ratios. They were rewarded for taking higher risks, which is reflected in other ratios as well. The beta of both funds is higher than 1 and the standard deviation is higher than the benchmark.

5. Conclusions

We analyzed mutual fund performance in Slovenia to discover the quality of fund managers of investment policy within the areas of Europe and the energy sector. Up until the beginning of the financial crisis, Slovenia was marked by exceptionally high growth rates in the mutual fund industry. The reasons for this were in the performance of the Slovenian stock market index, which was one of the best performing markets in 2007, with a growth of more than 70%. Additionally, the number of investors and mutual funds increased. This was all supported by a good macroeconomic picture of low budget deficits and public debt, which deteriorated during the financial crisis. Slovenia in 2009 registered a budget deficit of around 5.5% and a public debt of around 36% (SURS 2010).

During the period of economic success, investors did not pay much attention to the risk and returns analysis. With the financial crisis, investors became more aware of the fact that risk goes hand in hand with returns.

The success story for the mutual fund industry ended with the financial crisis, which caused net outflows of assets of €304 million in 2008. This represented 10% of all assets in 2007. According to EFAMA, in Europe the net outflow of assets in 2008 accounted for only 4.4% of all assets. The Slovenian mutual fund industry is still far away from EU standards. The structure of Slovenian household financial assets (Banka Slovenije 2009) consists of 6.3% of assets in investment funds (mutual funds and investment companies), while in Europe it is 9.1%. The share of deposits and cash in Slovenia is 49.9%, while in Europe it is 42%. When we compare investment fund assets to national GDP, we see that in Slovenia, investment fund assets represent 5.1% of GDP, while in Europe it is 45.9%. These figures show the potential of the domestic mutual fund market despite its development in the past.

In the analysis of the performance of mutual funds in Slovenia from January 2005 until August 2009, we used the monthly log returns of funds. The research included mutual funds that were present on the market at the end of 2008. The focus was on funds with investment policies in Europe and the energy sector. With the CAPM and Treynor-Mazuy model, we examined both selection and market timing ability. Selection ability shows if a fund manager is superior in stock picking in comparison to the market. Fund managers who are capable of shifting from high beta stocks to low beta stocks when the market falls exhibit market timing ability.

When analyzing selection ability, only one fund was superior to the market in stock picking, while the majority of fund managers had a positive coefficient, but none significant at the 5% level. The results of the market timing analysis states that fund managers were not able to properly predict market fluctuations. Only two out of seventeen funds had a positive market timing coefficient, while all of the others were negative. However, none of the coefficients of the analyzed funds were statistically significant. We can state that fund managers are better at stock picking than in predicting market fluctuations. In this paper, we reject the selection and market timing ability of fund managers. This conclusion is in accordance with other empirical studies.[2]

The results show that the Slovenian fund managers of investment policies in Europe have comparable risk and return characteristics to foreign mutual fund managers in developed European markets that have several years of experience. The comparison of investment managers of investment policies in the energy sector is not appropriate because the majority of Slovenian mutual funds yielded fewer opportunities for observation than their European counterparts. This is due to the fact that they were introduced to the market later than 2005, while the analysis was for the period from 2005 until August 2009.

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[2] The findings of Jagrič (2007), Chucky and Glen (1990) and Ippolito (1989) show similar results.

Tables

Mutual Funds	N	Introduction of funds	2005	2006	2007	2008	2009*
EUROPE			**%**	**%**	**%**	**%**	**%**
Infond Europa	56	oct.04	20.95	18.09	10.89	-51.73	19.97
NLB-Evropski delniški	47	sep.05	6.00	18.10	2.49	-42.80	22.22
PF-Top European Players	56	dec.00	23.74	17.49	-8.38	-46.06	21.35
VB-Europa Invest	56	okt.89	28.18	24.48	-6.25	-50.22	37.48
PIA-Select Europe Stock	56	dec.56	26.69	13.60	1.51	-43.54	24.37
SGAM-Equities Europe	56	may.88	25.18	15.16	-1.16	-48.96	22.73
Raiffeisen Europa Aktien	56	jun.96	25.31	18.22	-2.87	-50.27	32.89
EEF-Equity Europe	56	jun.01	22.81	17.81	0.29	-45.04	20.52
MSCI EUROPE INDEX		**dec.98**	**22.77**	**16.49**	**0.07**	**-45.52**	**18.26**
ENERGY			%	%	%	%	%
Infond Energy	46	oct.05	-0.12	16.46	25.42	-47.80	24.52
KD-Surovine in energija	39	may.06	-	10.55	21.91	-46.98	22.48
EEF-Energy&Materials	56	jul.00	42.05	6.26	15.71	-41.81	17.12
Ilirika-Modra energija	33	nov.06	-	1.44	13.07	-45.40	18.37
MP-Energy	46	oct.05	18.47	9.72	7.93	-50.09	31.31
NLB-Naravni viri	43	jan.06	-	12.95	21.87	-43.38	25.23
PIA-Energy Stock	56	jun.01	53.04	13.41	24.31	-48.71	24.48
Raiffeisen Energie Aktien	56	feb.02	50.03	13.29	14.03	-48.58	26.36
SGAM-Global Energy	56	oct.98	12.73	-6.77	20.14	-40.19	10.35
MSCI WORLD ENERGY INDEX		**dec.98**	**44.57**	**3.90**	**15.30**	**-36.61**	**7.96**

*till 31.8.2009

Source: Finančna točka 2009

Table 1: General figures

Mutual fund	μ	σ_d	β	R^2	β*	γ
Infond Europa	-0.0015	0.06075	1.134 (18.516)	0.864	1.012 (15.888)	-2.633 (-3.773)
NLB-Evropski delniški	-0.0023	0.05006	1.01 (27.61)	0.944	1.008 (23.492)	-0.03 (-0.065)
PF-Top European Players	-0.0025	0.04940	0.971 (34.884)	0.958	0.995 (31.138)	0.519 (1.48)
VB-Europa Invest	0.0004	0.07540	1.356 (14.805)	0.802	1.316 (12.324)	-0.876 (-0.749)
PIA -Select Europe Stock	0.0005	0.05161	0.998 (26.308)	0.927	0.996 (22.4)	-0.057 (-0.117)
SGAM-Equities Europe	-0.002	0.05775	1.093 (20.706)	0.888	1.013 (17.498)	-1.745 (-2.751)
Raiffeisen Europa Aktien	-0.0009	0.06178	1.2 (27.852)	0.935	1.171 (23.486)	-0.631 (-1.156)
EEF-Equity Europe	-0.0007	0.05008	1.005 (132.86)	0.997	1.005 (113.487)	0.012 (0.12)
MSCI EUROPE INDEX	-0.0015	0.04977	1	1		

μ – average monthly log return; σ_d– total risk (standard deviation on fund); β –systematic risk**;** R^2 **–** statistics is obtained from the equation 1; coefficients (β*, γ) are estimated with the regression equation 2; the benchmark used is the MSCI Europe Index; the average year return of risk-free assets in the observed period is 3.69%; t-statistics is significant at a 5% level.

Table 2: Monthly Log Returns of Mutual Funds with Investment Policies in Europe

Mutual Fund	M^2	Th	α	S	IR
VB-Europa Invest	0.0159	-0.02346	0.003 (0.762)	-0.14972	0.17026
PIA-Select Europe Stock	0.0066	-0.03142	0.002 (0.998)	-0.22107	0.47437
Raiffeisen Europa Aktien	-0.0015	-0.03971	0.002 (0.678)	-0.27196	0.10168
EEF-Equity Europe	-0.0082	-0.04514	0.0001 (2.01)	-0.32131	0.92198
Infond Europa	-0.0085	-0.04885	0.001 (0.168)	-0.30620	-0.01431
SGAM-Equities Europe	-0.0159	-0.05596	-0.001 (-0.058)	-0.35492	-0.10103
NLB-Evropski delniški	-0.027	-0.06364	0.003 (1.36)	-0.44725	0.68705
PF-Top European Players	-0.0299	-0.06820	-0.001 (-0.812)	-0.47012	-0.33697
MSCI EUROPE INDEX	-0.0174	-0.05422	0	-0.38103	0

T_h-Treynor ratio; α-coefficient; S-Sortino ratio; IR-Information ratio.

Table 3: Risk Adjusted Statistics of Mutual Funds with Investment Policies in Europe

Mutual Funds	μ	σD	β	R^2	β*	γ
Infond Energy	-0.0004	0.07250	1.018 (11.648)	0.755	1.001 (9.84)	-0.365 (-0.32)
KD-Surovina in energija	-0.0035	0.06990	0.936 (9.807)	0.722	0.897 (7.773)	-0.78 (-0.63)
EEF-Energy&Materials	0.0031	0.06132	0.928 (23.964)	0.914	0.909 (21.752)	-0.587 (-1.18)
Ilirika-Modra energija	-0.0092	0.07156	0.871 (8.016)	0.675	0.841 (6.337)	-0.585 (-0.41)
MP-Energy	-0.0038	0.07202	0.937 (9.016)	0.649	0.892 (7.403)	-1.026 (-0.77)
NLB-Naravni viri	-0.0015	0.06177	0.867 (11.205)	0.754	0.86 (9.188)	-0.143 (-0.14)
PIA-Energy Stock	0.0057	0.07374	1.032 (13.891)	0.781	0.976 (12.399)	-1.743 (-1.86)
Raiffeisen Energie Aktien	0.0041	0.07221	1.044 (16.442)	0.834	1.003 (14.781)	-1.254 (-1.55)
SGAM- Global Energy	-0.0033	0.06711	0.928 (13.23)	0.764	0.842 (11.989)	-2.669 (-3.19)
MSCI WORLD ENERGY INDEX	0.003	0.06319	1	1		

μ – average monthly log return; σD– total risk (standard deviation on fund); β –systematic risk**;** R^2 **–** statistics obtained from the equation 1; coefficients (β*, γ) are estimated with the regression equation 2; benchmark used is MSCI Energy Index; average year return of a risk-free asset in the observed period is 3.09%; t-statistics is significant at a 5% level.

Table 4: Monthly Log Returns of Mutual funds with Investment Policies in the Energy Sector

Mutual Funds	M^2	Th	α	S	IR
PIA-Energy Stock	0.0633	0.03656	0.003 (0.57)	0.18033	0.26953
Raiffeisen Energie Aktien	0.0471	0.01771	0.001 (0.266)	0.09083	0.12693
EEF-Energy&Materials	0.0375	0.00688	0.0001 (0.043)	0.03559	0.01409
Infond Energy	0.0002	-0.03467	0.003 (0.596)	-0.17307	0.30222
NLB-Naravni viri	-0.0191	-0.05633	0.004 (0.85)	-0.28746	0.58735
KD-Surovina in energija	-0.0348	-0.07754	0.002 (0.262)	-0.35489	0.19814
SGAM-Global Energy	-0.035	-0.07536	-0.006 (-1.412)	-0.36084	-0.66251
MP-Energy	-0.0359	-0.08123	-0.001 (-0.102)	-0.37207	-0.02223
Ilirika-Modra energija	-0.0936	-0.16191	-0.003 (-0.39)	-0.64531	-0.13109
MSCI WORLD ENERGY INDEX	0.0364	0.00548	0	0.02998	0

T_h-Treynor ratio; α-coefficient; S-Sortino ratio; IR-Information ratio.

Table 5: Risk Adjusted Statistics of Mutual Funds with Investment Policies in the Energy Sector

Returns for Education in Kosovo: Estimates of Wage and Employment Premia

Avdullah Hoti *

Abstract:

This paper provides an analysis of the returns for education in Kosovo using data from a Household and Labour Force Survey. We argue that given the high unemployment rate in Kosovo, employed individuals may not be randomly selected from the labour force. Therefore, the estimates of the rates of returns for education based on the standard Mincerian earnings function may be biased downwards. Hence, the Heckman sample selection model is implemented, which adjusts the estimates of the wage equation for the self-selection of individuals into employment. We estimate the rate of returns for level of education and for years of education. We find relatively low rates of returns for education in terms of wage premia and argue that in countries with chronic labour market disequilibria (such as in Kosovo), the returns for education may be in terms of employment premia. To our knowledge, this is the first systematic study of these issues in this post-socialist and post-conflict economy.

Keywords: returns for education, wage and employment premia, Kosovo, transition economies

JEL: J30, J31 **DOI:** 10.2478/v10033-011-0007-x

1. Introduction[1]

There is a growing literature supporting the argument that the quantity and quality of human capital is important for economic growth in both developing and developed countries (Canton et al., 2005; Keller, 2006). When transition started, based on indicators of educational attainment, it was argued that the average level of education embodied in the labour force in transition countries was relatively high (Duczynski, 2001; Druska et al., 2002; Spagat, 2006). However, a number of studies suggested that firms in these economies lag behind those in advanced industrialised countries in terms of the quality of their workforce (EBRD, 2000). Beirne and Campos (2007) conclude that the official human capital stock figures were indeed overestimated during socialism. The previous system emphasised narrow technical skills, which were appropriate to the nature of socialist economies (Boeri and Flinn, 1997; Sabirianova, 2000; World Bank, 2000). As revealed later during transition, these skills were not generally valued in the market economy. Druska et al. (2002) argue that there was a significant mismatch between the types of skills that workers possess and the type of skills that the new emerging economy demanded.

In this paper we utilise human capital theory and the Mincerian wage function to estimate the private returns of education in Kosovo. In Section 2, we provide the context of the labour market and education in Kosovo. In Section 3, we survey the literature concerning transition economies and identify the key patterns in the rates of returns of education. In Section 4 we argue that in cases of chronic labour market disequilibria (which is typically the case in Kosovo), the Heckman sample selection model (rather than the conventional Ordinary Least Squares) is the appropriate model to estimate the Mincerian wage

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equation. In Section 5, we consider Riinvest Household Labour Force Survey (HLFS) data regarding employment and wages in Kosovo, identify the sample that we use in our estimations and discuss the choice of, and rationale for, the explanatory variables included in the Mincerian wage equation. In Sections 6 and 7, we present our findings on returns based on level of education and year of education and employment premia, respectively. Section 8 provides a conclusion. Given the noticeable gender differences in almost all labour market outcomes, we pay particular attention to these differences.

2. Context: The Labour Market and Educatıon in Kosovo

Kosovo has had a unique history during both the socialist system and the transition process. It was the poorest region in the former Yugoslavia, with a per capita social product of a quarter of the Yugoslav average in 1989 (SOK, 1989; Bevc, 1993). Estimated at 2003 prices, GDP per capita fell from around €1,500 in 1987 to below €300 in the late 1990s (World Bank, 2004; Moalla-Fetini et al., 2005). Unlike in other European Transition Countries (ETCs), where output (and employment) decline was due to transitional changes and the associated structural reforms, in Kosovo it was largely due to the absence of such reforms and political unrest. Since emerging from the military conflict and a decade of disinvestment, modest economic growth has been recorded that is mainly attributed to immense international donor support (during 2000-2003 this support totalled €4.1 billion). The GDP is recovering and is estimated to have reached the level of €3.4 billion in 2007, nearly €1,645 in per capita terms (MEF, 2008). Despite this increase, GDP per capita in Kosovo is the lowest of all SEE countries.[ii]

Labour market developments in Kosovo since the end of the socialist system are different in many respects from those found in other transition economies. Kosovo is known for its young population, implying a large number of new entrants into the labour force each year, which is estimated at 21-25 thousand or 7-8 percent of current employment (Riinvest Institute, 2003). In the early 1990s, some 145,000 workers (60% of employment in 1989) were dismissed from their jobs, which had implications for their labour market status during the post-war period by which time their skills were likely to have deteriorated. Data reported in SOK (2005) suggest that there are large gender differences in all indicators. The female activity rate is very low compared to that of males. On average only 4 out of 10 males and 1 out of 10 females of working age are employed. The unemployment rate of around 40 percent is especially high among females and young persons and around 85 percent of the unemployed are long-term unemployed.

Nearly a quarter of the population is in full-time education (MEST, 2005). Although the number of students in higher education has recently increased, participation at this level is well below the 25 percent found in most European Transition Countries (ETCs) and there are also significant gender differences. The 'parallel system' of education[iii] during the 1990s has decelerated the pace of skill formation and is expected to have decreased significantly the average education level of the current working age population. Despite the reforms implemented in the education system, an issue of concern remains the quality of skills obtained by the new graduates. There are indications that employers are not satisfied with the skills of the new graduates (Riinvest Institute, 2003). An important issue is whether the education system is providing the type of skills that are required in a labour market, where new private sector jobs during the last four years have been created in the Small and Medium Enteprises (SMEs) sector.

3. The Mıncerıan Wage Equatıon and Evıdence for Transıtıon Economıes

In this section, we briefly consider the Mincerian wage equation and provide evidence on the rates of returns for education for transition economies. At the microeconomic level, the basic Mincerian wage equation (Mincer, 1974) relates the log wage *($ln\ w_i$)* to years of education *(Ed_i)* and experience *(Exp_i)* and its square *(Exp_i^2)*:

$$\ln w_i = \alpha + \theta\, Ed_i + \varphi_1 Exp_i + \varphi_2 Exp_i^2 + \varepsilon_i \qquad (1)$$

where ε_i is a random error term. The estimated θ shows the rate of return for years of education, controlling for work experience. The education variable may also be specified in terms of dummies for each educational level, such that:

$$\ln w_i = \alpha + \theta\ Prim_i + \theta\ Sec_i + \theta\ igh_i + \varphi_1 Exp_i + \varphi_2 Exp_i^2 + \varepsilon_i \qquad (2)$$

where now the estimated θs measure the wage premia associated with each educational level over the base category of education. Unlike Equation (1), which

	Country	Pre-transition				During transition			
		Year	Males	Female	All	Year	Males	Females	All
	[1]	[2]	[3]	[3]	[4]	[5]	[6]	[7]	[8]
Cheidvasser and Benitez-Silva (2006)	Russia					1992-99	3.2	4.9	4.0
Andren et al. (2004)	Romania	1950-			3-4	2000			8.5
Münich et al. (2004)	Czech R.	1989	2.7	3.9		1996	5.8(5.7	7.1(6.8)	
Campos and Jolliffe (2002)	Hungary	1986			6.4	1998			11.2
Clark (2003)	Russia					1991-99			6-13
Chase (1998)	Czech R.	1984	2.4	4.2		1993	5.2	5.8	
	Slovakia	1984	2.8	4.4		1993	4.9	5.4	

Table 1: The rate of return based on years of education for selected transition economies before and during transition

provides an estimate on the overall increase in earnings for a year of education, this approach allows for non-linearity between (though not within) levels of education.

As Heckman et al. (2003) argue, Mincer's framework captures a pricing equation or hedonic wage function revealing how the labour market rewards productive attributes like schooling and work experience. Note that the Mincerian framework neglects other determinants of returns to schooling, such as non-pecuniary returns,[iv] taxes, length of working life and uncertainty about future returns at the time schooling decisions are made (Card, 1999; Björklund and Kjellström, 2002; Heckman et al., 2003; Blundell et al. 2005). It also neglects the likelihood of being in employment in the first place, which we explore in this paper. Blundell et al. (1999) and Psacharopoulos and Patrinos (2004) argue that the literature has usually ignored these aspects on the assumption that the pluses and minuses cancel out and one ends up with a net benefit almost equal to the unadjusted one.

For a number of countries, estimates of the rates of returns for education from the Mincerian wage equation are available since the late of 1950s. Psacharopoulos (1973, 1985, 1994) and Psacharopoulos and Patrinos (2002) provide a comprehensive update of the returns for investment in education on a global scale. Their findings suggest that returns for investment in education decline with the level of schooling and women generally enjoy higher rates of returns than their male counterparts. The literature concerning transition economies is large and growing, but cross-country comparison of these rates is not straightforward due to the different methodologies employed to estimate them. Some studies use years of schooling, whereas others use the level of education to yield estimates of the rate of return for schooling.

With the introduction of the market economy in ETCs, two competing extreme hypotheses were put forward regarding the likely changes in the rates of returns for education. (Svejnar, 1999; Newell and Reilly, 1999; Boeri and Terrell, 2002; Campos and Jolliffe, 2002; Münich et al., 2004). The first argued that the socialist system provided an egalitarian distribution of income through maintaining a deliberately compressed wage structure. With the introduction of market-based reforms, wages and prices would adjust to market forces (Orazem and Vodopivec, 1997), hence, rates would rise during the transition compared to their pre-transition level. The competing hypothesis maintained the argument that human capital and experience gained under communism may not be very useful in a market economy, and that therefore the rates of returns for education would fall. In addition, it was also expected that the gender gap in wage differentials would widen and the rate of return for education for female workers would decrease relative to that of male workers.

Estimates of the rates of returns according to years of education for transition economies are presented in Table 1. A general pattern is that the rates increased during transition compared to the pre-transition period, supporting the first hypothesis above. Andren et al. (2004) find for Romania that this rate increased from 3-4 percent during the pre-transition period to 8.5 percent in 2000. A similar pattern is reported for other countries as well.

There are very few studies that provide estimates on returns based on level of education. Pastore and Verashchagina (2006) find for Belarus that male and female university graduates get a wage premia of 74 and 67 percent higher over their counterparts with compulsory education, respectively. Hazans (2005) finds for Latvia that individuals with higher education earn wage premia 80 (50) percent higher than those with basic (secondary) education and the estimated wage premia is higher for females compared to males at each level of education. Münich et al. (2004) find for the Czech Republic that a woman with university education earned on average 45 percent more than a woman with secondary education and that this had increased to 85

percent by 2002. Orazem and Vodopivec (1997) find for Slovenia that during transition the more educated workers have gained not only in terms of increased relative wages, but they have experienced greater relative success in switching jobs, a lower probability of layoffs and better chances of finding a job if unemployed.

To summarise, the rates of returns for education during transition generally increased compared to the socialist period, giving support to the hypothesis that the socialist system compressed wages artificially.

4. Estimatıon Strategy for Kosovo: The Heckman Sample Selectıon Model

In much of the transition literature, the Ordinary Least Squared (OLS) model is utilised to estimate the Mincerian wage equation under the assumption that the sample of individuals is a random sample. If this is violated then OLS produces an estimate for θ in the above equations that is biased and inconsistent. Later in this section, we provide evidence for Kosovo that education (which affects the observed wage) has a non-negligible effect on the probability of being in employment, suggesting that the sample of employed individuals is a non-random sample. To account for this selectivity bias we utilise the Heckman correction model (Heckman, 1979). This model initially controls for the selection into employment (the sample consisting of employees and unemployed persons) and then the wage equation is estimated from the sample of employees after controlling for selection.

The nature of the selection mechanism in our case is such that we observe an individual's wage (*w*) only when some criteria is met (when a person is employed, denoted by *y=1*). This is incidental truncation, since wage is missing because of another variable (employment status) and the selection into the sample is due to the behaviour of individuals and not due to the sample design. Following Wooldridge (2002), this selection mechanism can be expressed by the following equations:

$$w = x_1\beta + u_1 \quad (3)$$

$$y = 1\ (x_2\gamma + u_2 > 0) \quad (4)$$

which are referred to as the main and the selection equations, respectively. The following assumptions apply: (i) *y*, x_1 and x_2 are always observed and *w* is observed only when *y=1*; (ii) (u_1, u_2) is independent of x_2 with zero mean; (iii) u_2~Normal*(0, 1)*; and (iv) $E(u_1 \mid u_2)=\rho u_2$.

Wooldridge (2002) shows that if $\rho \neq 0$ then u_1 and u_2 are correlated, implying that there is a sample selection problem and that OLS estimation of Equation (3) produces biased estimates of β. In the estimation, exclusions restrictions in the main equation should be applied to identify β, i.e. x_2 should include at least one variable that is not also included in x_1 and which is expected to have a significant impact on selection. In addition, x_1 should be a strict subset of x_2. This is often a problem in empirical estimations, because the additional variable in x_2 should be expected to affect employment status, but not the wage itself. We use the partial Maximum Likelihood (ML) approach to estimate the Heckman selection model.

5. The Sample and Some Descriptive Statıstıcs

We use the data from the Riinvest Household and Labour Force Survey (HLFS) conducted in December 2002. The sample consisted of 1,252 households (randomly selected after sample stratifications by the 7 regions in Kosovo and urban/rural areas) with 8,552 members, an estimated 0.45 percent of the population of Kosovo. Figure A1 in the Appendix shows how an individual's labour force status is determined in this survey, which complies with international labour standards (ILO, 1982; ILO 2005). Following the ILO guidelines we find that out of 4,460 working age individuals (16-64),[v] 2,731 are active in the labour force. Out of labour force participants, 1,422 are employed (52 percent) and 844 (59.4 percent) of the employed are employees or wage earners. The rest are self-employed, workers in their family business or farm etc., that we refer to as non-wage earners. The human capital theory underpinning the Mincerian wage equation is related to estimating the wage differentials due to education for employees only. Therefore, in line also with other studies (Orazem and Vodopivec, 1997; Newell and Reilly, 1999; Camposs and Jolliffe, 2002; Münich et al., 2004), in estimating the Mincerian wage equation we only use observations for employees.

Due to missing data on wages, we have to drop 13 observations on employees (1.5 percent of all employees) and therefore have 831 observations. This approach of listwise deletion is arguably acceptable, since the missing data comprise a small percentage of total cases (Cameron and Trivedi, 2005),

Therefore, our sample consists of 831 observations of employees and 1,309 of unemployed persons presented

	Employees	Unemployed	Total	t-tests of equal means or equal proportions H_0:
	[1]	[2]	[3]	[4]
Observations	*831*	*1309*	*2,140*	
Males (proportion)	0.733	0.538	0.614	Rejected
Average age	39.48	30.45	33.95	Rejected
Age structure				
16-24	0.089	0.361	0.255	Rejected
25-34	0.264	0.325	0.301	Rejected
35-44	0.297	0.201	0.238	Rejected
45-54	0.255	0.079	0.148	Rejected
55-64	0.095	0.034	0.058	Rejected
Educational level*				
Less than upper-secondary	0.142	0.368	0.28	Rejected
Upper-secondary	0.537	0.571	0.557	Not
Higher	0.319	0.057	0.158	Rejected
No answer **	0.002	0.005	0.004	-
Education (average years)	12.04	10.61	11.31	Rejected
Marital status (married)	0.805	0.537	0.641	Rejected

Source of data: Riinvest HLFS of December 2002; * A small proportion of those with a higher education degree have completed only 2 years of higher education. The majority have completed 4 or 5 years depending on the type of higher education, with very few having a Master's or a PhD degree. On average, this would give 4 years of higher education for all those with a higher education degree. Similarly, those with less than upper-secondary education includes a number of individuals (usually older people) with less then primary education.** In the estimation these few observations are included in the base category of education (less than upper-secondary) since they are largely older.
Table 2: The characteristics of the sample used in the wage equation utilising the Heckman selection model

in Table 2 (columns 1 and 2, respectively). From column 4 of Table 2, findings from the *t-test* suggest that most of the observed differences between the employed and unemployed workers are statistically significant, indicating that there may be sample selection (i.e. the sample of employees is not a random sample of the labour force).

Nearly half of all employees (47 percent) are working in the public sector (see Table A1). As shown in Table A2, the average gross monthly wage for females of €178 (s.d. 8) is lower than for males of €229 (s.d. 6). From column 4, the ratio of female to male average wage is 0.78 and the gap is larger in the private sector. The distribution of monthly wages by gender follows the expected pattern of lower average wages for females (Figure A2 in Appendix). Based on human capital theory, this pattern may be explained by: (i) their lower education level and work experience than males; (ii) from choosing occupations where the increase in wages due to experience is lower (supply-side argument); and (iii) rejecting the assumption of a competitive labour market, as well as due to discrimination in the labour market (demand-side argument). Figure A3 shows the relative wage compared to a less than upper secondary completed level of education. The relative increase in wages due to education is larger among female employees. Furthermore, from Figure A4, in addition to higher average wages, a higher education level is associated with a significant increase in the likelihood of being an employee. This may suggest that part of the returns for education may take the form of employment premia.

The evidence from the descriptive statistics and the t-tests is supportive of the argument that the employed sample is not a random sample of individuals in the labour force and hence indicates the need to use the Heckman sample selection model to estimate returns to education, or some other model that can account for a selectivity bias.

We estimate two specifications of the Mincerian wage equation as shown by Equations (1) and (2) above. In the returns based on years of education specification (1), we impute years of education from the reported level of education[vi] and estimate the average increase in earnings due to years of education. However, such an imputation of data causes a problem in statistical inference and does not allow for non-linearity in the returns for education. Another problem is that for some individuals it may take more years than is usual to attain a given level of education. In addition, this approach does not allow for a sheepskin effect, because each year of education yields the same rate of return. It is estimated here to allow

	Males		Females		Males		Females	
Explanatory variables	Coeff.	z	Coeff.	z	Coeff.	z	Coeff.	z
	[1]		[2]		[3]		[4]	
A: Wage equation								
Constant	5.462***	12.34	2.789***	4.48	5.113***	44.99	4.407***	16.84
Upper-secondary education	-0.004	-0.06	0.324***	2.60	0.088	1.30	0.247*	1.86
Higher education	0.113	1.21	0.699***	4.14	0.258***	2.64	0.543***	2.57
Age	0.006	0.32	0.075***	2.76				
Age squared	-0.0002	-0.90	-0.001***	-2.75				
B: Selection equation								
Constant	-2.901***	-6.42	-3.752***	-6.16	-2.956***	-6.61	-3.299***	-5.27
Upper-secondary education	0.436***	4.57	0.894***	7.05	0.442***	4.64	0.893***	7.06
Higher education	1.124***	8.84	1.613***	9.38	1.117***	8.80	1.655***	9.66
Age	0.087***	3.29	0.111***	3.15	0.090***	3.48	0.083**	2.35
Age squared	-0.001**	-2.17	-0.001**	-2.23	-0.001**	-2.25	-0.001	-1.44
Married	0.360***	3.12	-0.034	-0.33	0.286**	2.43	-0.018	-0.16
Likelihood Ratio test of independent equations [i.e. $\rho = 0$, $\chi^2_{(1)}$]	1.00		2.22		1.84		3.46	
Log likelihood	-1227.61		-540.94		-1233.14		-544.89	
Wald test, $\chi^2_{(4)}$ and $\chi^2_{(2)}$	19.36		22.38		7.49		6.68	
All observations	1,313		827		1,313		827	
Censored observations	704		605		704		605	
Uncensored observations	609		222		609		222	

***, **, * significant coefficient at 1, 5 and 10 percent, respectively.
The dependent variable in panel A is the log monthly wage
The dependent variable in panel B equals 1 if an employee and 0 if unemployed

Table 3: Estimates of the returns based on level of education

comparisons to other studies, many of which follow this approach of estimating the returns based on years of education.

Data regarding work experience is not available. As in other studies, we initially use age and its square to proxy for experience. However, this is with reservation, as in Kosovo, given its high current as well as previous unemployment rate, age is likely to be a poor and probably inappropriate proxy. We do not include other control variables in the wage equation (e.g. sector of employment, company's ownership etc.). A simple specification of the Mincerian wage equation with only human capital variables is suggested if one intends to estimate the total effect of education on earnings (Psacharopoulos and Patrinos, 2002; Pereira and Martins, 2004; Psacharopoulos and Patrinos, 2004).

In the selection equation, the dependent variable equals 1 if the individual is an employee and 0 if unemployed. In the selection equation we also include marital status (dummy equals 1 if married). In the case of females, we expect that being married lowers the likelihood of employment because of both higher opportunity costs of employment and the traditional nature of the Kosovan society, where women are regarded as the second earner in the household. For males, being married is expected to have a positive effect on employment due to the greater need to provide additional income for the extended household.

6. Findings: Returns for Education in Terms of Higher Wages

In this section, we present our findings and compare them with those found elsewhere in transition economies. We estimate separate regressions for males and females given the argument in Section 6 above.

6.1. Returns Based on Level of Education

Our estimates on returns based on level of education are presented in panel *A* of Table 3 (columns 1 and 2 for males and females respectively). The estimated ρ (in the bottom panel of the table) is, unexpectedly, insignificant for both genders. For males, apart from the constant term, all other coefficients in the wage equation are insignificant.[vii] The reason for these results is not clear. It does not seem to be due to problems with identification, since the coefficient on marital status in the selection

	Males		Females		Males		Females	
Explanatory variables	Coeff.	z	Coeff.	Z	Coeff.	z	Coeff.	z
	[1]		[2]		[3]		[4]	
A: Wage equation								
Constant	5.091***	9.95	2.056***	2.91	4.840***	25.48	3.814***	8.45
Years of education	0.020*	1.68	0.096***	4.40	0.033***	2.85	0.075***	2.82
Age	0.011	0.59	0.070***	2.63				
Age squared	-0.0002	-1.08	-0.001**	-2.56				
B: Selection equation								
Constant	-4.089***	-8.73	-5.378***	-8.40	-4.131***	-8.91	-5.036***	-7.78
Years of education	0.135***	8.29	0.213***	9.54	0.136***	8.33	0.217***	9.65
Age	0.088***	3.32	0.108***	3.05	0.090***	3.46	0.084**	2.38
Age squared	-0.001**	-2.09	-0.001**	-2.08	-0.001**	-2.15	-0.001	-1.40
Married	0.364***	3.12	-0.023	-0.22	0.307***	2.63	-0.005	-0.05
Likelihood Ratio test of independent equations [i.e. $=0$, $^2_{(1)}$]	0.43		2.80		1.77		3.80	
Log likelihood	-1230.9		-541.6		-699.3		-358.5	
Wald test, $^2_{(2)}$	17.10		23.57		10.12		7.75	
All observations	1,313		827		1,313		827	
Censored observations	704		605		704		605	
Uncensored observations	609		222		609		222	

*** significant at 1 per cent; ** significant at 5 per cent; * significant at 10 per cent.
The dependent variable in panel A is the log monthly wage
The dependent variable in panel B equals 1 if an employee and 0 if unemployed

Table 4: Estimates of the rate of return based on years of education

equation (panel *B,* column 1) is significant for males. These unexpected results might be due to the age variable proxy for experience as noted above (i.e. on-the-job training) being a poor and probably inappropriate proxy in the case of Kosovo. For females, all coefficients in the wage equation are significant (column 2) and with the expected signs, but there is also an insignificant coefficient for ρ.

Given our strong reservations on using age as a proxy for experience, we estimated the relationships without age and aged squared in the Mincer equation as shown in columns 3 and 4 of Table 3 (for males and females respectively). In these revised specifications, there is a significant coefficient on the educational dummy for higher education for both genders in the wage equation. The coefficient on the educational dummy for upper-secondary education is not significant for males, while for females it is significant only at the 10 percent level.

Bearing these problems in mind, we now discuss these estimates and consider what they indicate about the wage premia due to education. For both genders, the coefficients on educational dummies suggest that average returns to education increase with education: males with upper-secondary and higher education get wages on average 9.2 and 29.4 percent higher than males with less than upper-secondary education, respectively; for females, the estimated wage premia are 28.0 percent and 72.1 percent for upper-secondary and higher education, respectively.

There is no previous study for Kosovo with which to compare our findings. The only previous relevant study is Bevc (1993), and which utilises a cost-benefit analysis approach to estimate the average returns for education for Kosovo and for other regions of the former Yugoslavia for 1976 and 1986 (the socialist period). She finds that the average rate of return decreased with a region's stock of educational capital and with the level of economic development. Kosovo had the highest rates of return for education in the former Yugoslavia. However, any comparison with our findings is difficult due to differences in the estimation approach used. Compared to findings from other transition countries, the estimated wage premia in Kosova are lower even when we consider the revised model, particularly for males.

	Age 25		Age 34		Age 40	
	Male	Female	Male	Female	Male	Female
	[1]	[2]	[3]	[4]	[5]	[6]
A. Probability of being an employee for a married person with:*						
- less than upper-secondary education	0.15	0.03	0.22	0.05	0.25	0.06
- upper-secondary education	0.27	0.17	0.37	0.22	0.41	0.24
- higher education	0.53	0.42	0.64	0.50	0.67	0.52
B. Change in the percentage points in the probability of being an employee due to an additional year of education for a married person (from- to) **	2-6	2-9	4-5	3-8	4-5	3-7

* Using the estimated coefficients from the selection equations in Table 6.8 (columns 3 and 4);
** Using the estimated coefficients from the selection equations in Table 6.10 (columns 3 and 4).
Table 5: The estimated probability of being an employee

6.2. Returns based on years of education

Table 4 gives the estimates using the imputed years of education and estimate the rate of return based on years of education. In columns 1 and 2 we face similar results as in our previous estimation, with education only significant at the 10 percent level for males and with an insignificant sample selection coefficient. In the estimation without age and age squared in columns 3 and 4, we again find a significant coefficient on years of education for both genders. For females, there is now evidence of sample selection, although only at the 10 percent level.

The estimated rate of return based on years of education from panel *A* (columns 3 and 4) is 3.3 percent for males and 7.5 percent for females. In the case of males, these rates are again low relative to those for the other transition economies summarised above.

In our most favourable case, our estimates of the wage premia due to education are low relative to other transition economies, particularly for males. A low wage premia due to education in Kosovo may be partly explained by the excess labour supply at each level of education. The descriptive statistics from the Riinvest HLFS discussed above suggest that unemployment for those with higher education is still as high as 20 percent, reaching the level of more than 60 percent for those with less than upper-secondary education. This excess labour supply may suppress wage differentials due to education, as workers are likely to trade lower wages for more secure employment. This implies that in a high unemployment economy part of the return to education takes the form of employment premia rather than higher wages. We now investigate this possibility.

7. Findings: Returns for Education in Terms of Employment Premia

Given the findings above of a relatively low wage premia due to education, there may be other forms of returns so that individuals find it worthwhile investing in education. Panel *A* of Table 5 gives the estimated probability of being an employee for each level of education (for males and females at different ages) derived from the estimates of the selection equation presented in Table 3. For a 34 year old male (sample average) that is married and with less than an upper-secondary education, the probability of being an employee is 0.22, while for a similar female it is as low as 0.05. With upper-secondary education, this probability increases to 0.37 for males and 0.22 for females, and for higher education increases to 0.64 for males and 0.50 for females. From panel *B*, derived from the estimates of the selection equation presented in Table 4, at age 34 an additional year of education increases the probability of being an employee from 4 to 5 percentage points for males and from 3 to 8 percentage points for females (depending on the starting year of education). For females, the marginal increase associated with each level of education is higher than for males.

8. Conclusions

In this paper, we investigated the private returns for education in Kosovo and found that our estimates are noticeably different compared to those found elsewhere in ETCs. Our investigations of the data suggest that the level of completed education is an important determinant of the incidence of employment, implying that the employed are likely to be a non-random sample of labour force participants. To account for this in the estimation of returns for education we utilised the

Heckman sample selection model. We identified the difficulties encountered in applying this model to Kosovo and related concerns may apply more generally in empirical work on ETCs.

We find low returns for education in terms of wage premia relative to other transition economies, particularly for males. Returns for education are higher for females than for males and these returns increase with educational level. Such low wage premia are to be expected in high unemployment economies where workers are likely to trade off lower wages for more secure employment. Blundell et al. (2005) argue that if wage differentials due to education reflect changes in productivity then the estimated rates of returns to education provide evidence of productivity differences associated with education. On this basis, our results could imply a relatively low value of education in Kosovo in terms of improving productivity in the workplace. Although this possibility cannot be ruled out, we consider another explanation for these low rates of returns. We argue that poor job prospects weaken the bargaining position of employees, leading them to trade lower wages in return for more secure employment. Assuming some minimum reservation wage, this makes wages more compressed, resulting in low returns for education in terms of wage premia. Our econometric results suggest there is a large increase in the likelihood of being in waged employment due to education, consistent with the argument that in high unemployment economies part of the total returns for education takes the form of employment premia.

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End notes

[i] I would like to thank Professor Nick Adnett and Jean Mangan from Staffordshire University (United Kingdom) for their useful comments as well as the Riinvest Institute (Kosova) for allowing me to use the data for this research.

[ii] Albania €2,140, Bosnia and Herzegovina €1,961, Bulgaria €2,771, Croatia €6,972, Macedonia €2,280, Romania €3,665, Slovenia €13,675, Serbia €2,583 and Montenegro €2,600 (WIIW, 2007).

[iii] This parallel system of education was in fact an underground education system, which was organised and financed by the Albanian population in Kosovo. This followed the closure of the schools for the Albanian students by Serbia in 1991.

[iv] Including better health, improved habits, consumption aspects of education, ability to process and use information etc.

[v] After excluding emigrants and those in full-time education.

[vi] Less than upper-secondary 8 years (cumulatively 8 years); upper-secondary 4 years (cumulatively 12 years); higher education 2 years for less then BA, 4 years for BA, 6 years for MA and 8 years for PhD (cumulatively 14, 16, 18 and 20 years respectively).

[vii] We tried with age minus years of education minus 6, but it made no significant difference.

Appendix: Tables and Figures

	Number			Proportion		
	Females	Males	Total	Females	Males	Total
	[1]	[2]	[3]	[4]	[5]	[6]
Observations	*222*	*609*	*831*	*0.267*	*0.733*	*1.000*
Ownership of the company						
Private	47	172	219	0.212	0.282	0.264
Public	122	271	393	0.550	0.445	0.473
Socially Owned Enterprises	36	127	163	0.162	0.209	0.196
Foreign firm	15	28	43	0.068	0.046	0.052
Non-Governmental Organisations	1	4	5	0.005	0.007	0.006
No answer	1	7	8	0.005	0.011	0.010
Sector of employment						
Agriculture	0	8	8	0.000	0.013	0.010
Mining	0	24	24	0.000	0.039	0.029
Industry	7	47	54	0.032	0.077	0.065
Construction	2	52	54	0.009	0.085	0.065
Transportation and communications	3	39	42	0.014	0.064	0.051
Utilities (water, electricity, waste disposal, etc.)	12	73	85	0.054	0.120	0.102
Trade and storage	18	44	62	0.081	0.072	0.075
Finance (banking, insurance, real estate, etc.)	9	22	31	0.041	0.036	0.037
Administration, justice and police	16	57	73	0.072	0.094	0.088
Health and education	104	114	218	0.468	0.187	0.262
Restaurants and hotels	4	28	32	0.018	0.046	0.039
Gas stations and car repair	20	46	66	0.090	0.076	0.079
Other services	26	50	76	0.117	0.082	0.091
No answer	1	5	6	0.005	0.008	0.007
Company size						
Small (1-4 persons)	24	99	123	0.108	0.163	0.148
Medium (5-49 persons)	91	218	309	0.410	0.358	0.372
Large (50+)	90	253	343	0.405	0.415	0.413
No answer	17	39	56	0.077	0.064	0.067
Payment period						
Monthly	221	588	809	0.995	0.966	0.974
Bimonthly	0	5	5	0.000	0.008	0.006
Weekly	0	1	1	0.000	0.002	0.001
Daily	1	15	16	0.005	0.025	0.019

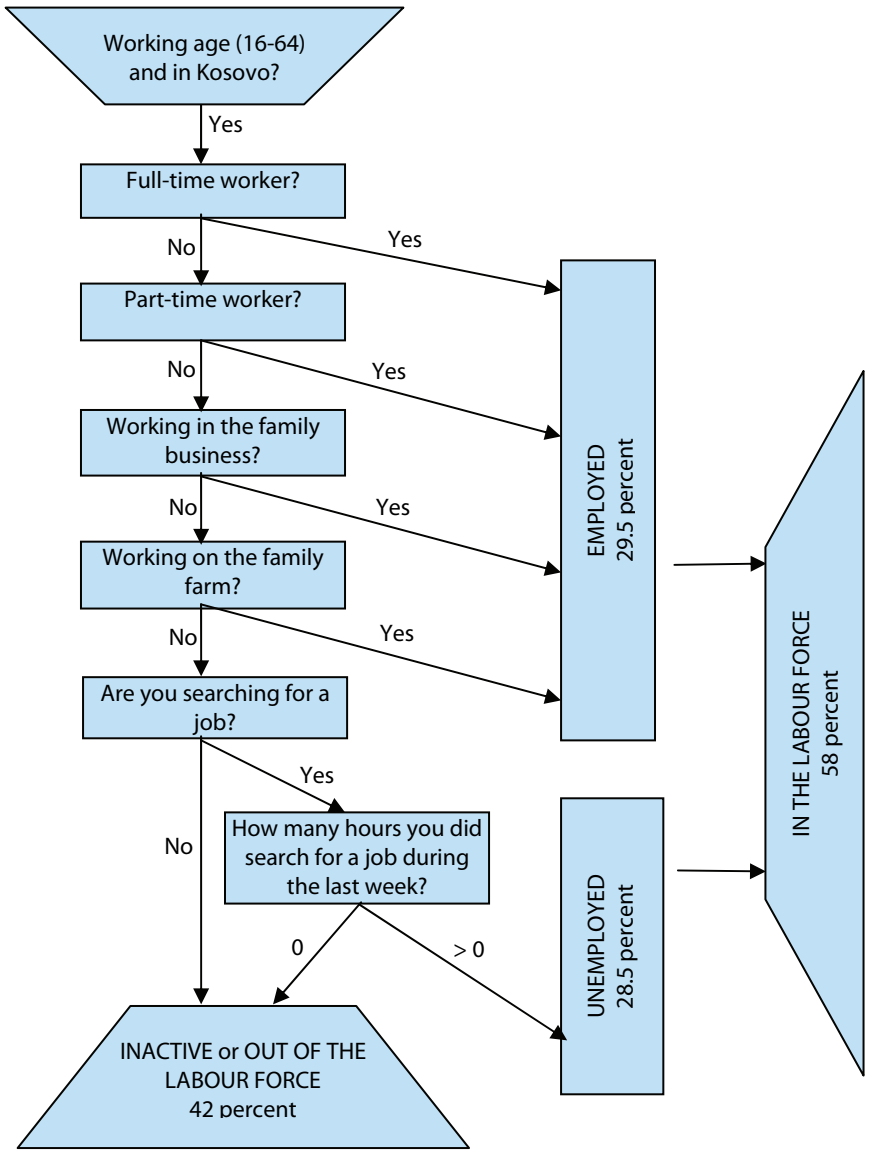
Source of data: Riinvest HLFS of December 2002.

Table A1: The characteristics of the sample of employees with data on wages

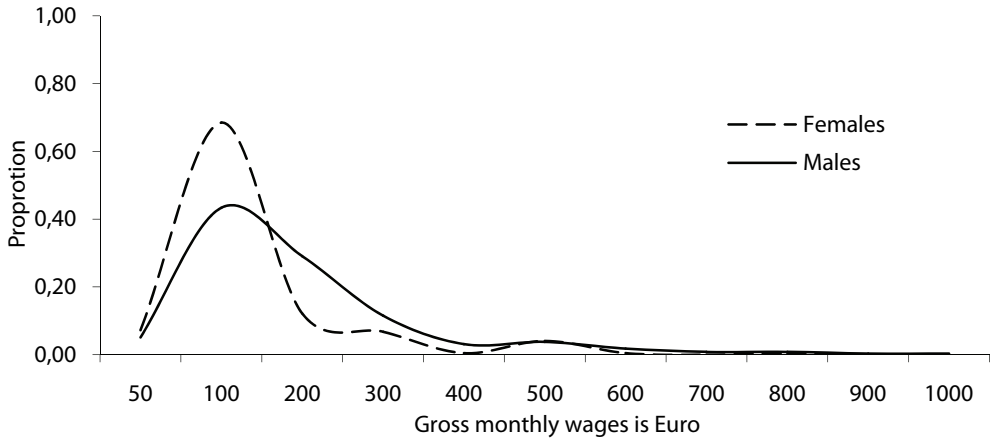
(in €/month, not including food and travel allowances)

	Females	Males	All employees	Female to male wage ratio
	[1]	[2]	[3]	[4]
Observations	*222*	*609*	*831*	-
The average wage for all observations	178	229	215	0.778
By average age				
16-24	172	225	206	0.764
25-34	209	238	229	0.878
35-44	178	261	235	0.681
45-54	139	207	194	0.670
55-64	134	188	180	0.713
By residence				
Urban residents	182	256	232	0.710
Rural residents	166	194	189	0.858
By education				
Less than upper-secondary	154	210	197	0.734
Upper-secondary	176	227	212	0.777
Higher	191	242	229	0.791
No answer				
By ownership of the company				
Private	186	264	247	0.704
Public	146	181	170	0.802
Socially Owned Enterprises	167	192	187	0.870
Foreign	452	575	532	0.786
By sector of employment				
Agriculture		167	167	-
Mining		190	190	-
Industry	147	188	183	0.782
Construction	444	275	281	1.614
Transportation and communications	230	236	235	0.976
Utilities (water, electricity, waste disposal, etc.)	185	206	203	0.900
Trade and storage	170	230	213	0.739
Finance (banking, insurance, real estate, etc.)	237	400	352	0.593
Administration, justice and police	233	229	230	1.018
Health and education	142	166	155	0.853
Restaurants and hotels	158	256	244	0.615
Gas stations and car repair	251	258	256	0.975
Other services	137	142	141	0.963
By company size				
Small (1-4 persons)	161	240	224	0.673
Medium (5-49 persons)	166	233	213	0.715
Large (50+)	191	213	207	0.895
No answer	184	280	251	0.657
By payment period				
Monthly	177	223	210	0.793
Bimonthly		710	710	-
Weekly		129	129	-
Daily	538	308	323	1.744
By job tenure				
Less then 1 year	198	319	312	0.62
1-5 years	222	293	277	0.76
More then 5 years	166	215	203	0.77

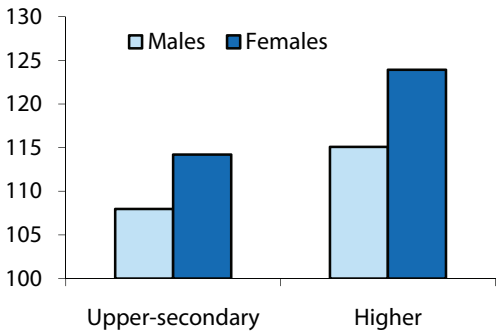
Source of data: Riinvest HLFS of December 2002.
Table A4: Average gross monthly wages from main job



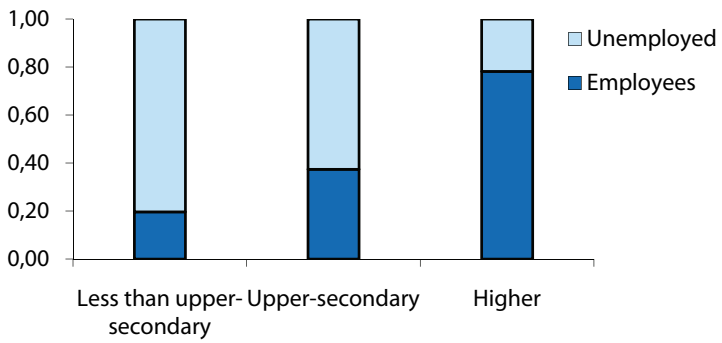
Source: Riinvest HLFS of December 2002.
Figure A1: Defining the labour force status of the working age population



Source of data: Riinvest HLFS of December 2002.
Figure A2: The distribution of gross monthly wages for employees in Kosovo (2002)



Source of data: Riinvest HLFS of December 2002.
Figure A3: Relative wages by education in Kosovo (2002)
(less than upper-secondary education=100)



Source of data: Riinvest HLFS of December 2002.
Figure A4: The proportion of employment and unemployment by education in Kosovo (2002)

Media Reform and Development in Bosnia: An Interorganizational Account of the Media Issues Group

Eric C. Martin*

Abstract:

This manuscript focuses on development assistance players' efforts to cooperate, coordinate and collaborate on projects of mutual interest. I target the case of the cross-sectoral and international Media Issues Group designed to reform and develop the media sector in Bosnia and Herzegovina. I identify and categorize variables that influenced interorganizational relationships to summarize lessons learned and potentially inform similar interventions. This work suggests that cooperation, coordination and collaboration are constrained by contextual, strategic and procedural variables. Through participant narrative based on observation and interviews, this work clarifies the nuances within these three sets of variables for potential extrapolation to other settings. Perhaps more importantly, it provides lessons learned that can inform future international community interventions in market development activities.

Keywords: International Development; Cross-Sectoral Cooperation; Media in Bosnia

JEL: O19; F35; F42

DOI: 10.2478/v10033-011-0008-9

1. Introduction

This study examines an interorganizational international development assistance task force designed to help translate high-level policy objectives into ground-level action through cooperative, coordinated and collaborative action. While *programmatic* lessons-learned, post-mortems and best practices are common, reports of administrative, organizational or interorganizational experiences in development settings are not, as they are often more prone for criticism and bad press. Which organization would really want to blame a programmatic failure on the inability of two individuals to work together, mismatched fiscal years, turf wars over beneficiaries, or the inability to agree upon a common agenda with their partners? Yet such seemingly manageable concerns can significantly and negatively influence development assistance. And that development assistance has significant influence over market development; in this case, the media market in Bosnia.

The primary focus of this manuscript is the ability, and inability, of development assistance players to cooperate, coordinate and collaborate on projects of mutual interest. I target the case of the cross-sectoral and international Media Issues Group (MIG) designed to reform and develop the media sector (a typical activity in democracy assistance programs) in Bosnia and Herzegovina (hereafter referred to as Bosnia or BiH). I identify and categorize variables that influenced interorganizational relationships (IORs) between development assistance organizations operating in Bosnia between 1995 and 2002, in an effort to summarize lessons learned and potentially inform similar interventions, of which there are plenty at present.

Nation building efforts in Kosovo, East Timor, Afghanistan, Iraq and Haiti present similar complexities: a massive international community presence, divided local populations, extreme institutional voids, post-conflict or disaster recovery, social, political, and economic

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transitions and development. Programs within such complex humanitarian emergencies (CHEs) or nation building projects must coordinate among themselves, as well as between themselves and local stakeholders. In either case, cooperation, coordination and collaboration are constrained by contextual, strategic and procedural variables. The work reported below attempts to indentify some of the variables in an effort to improve both the giving and receiving of assistance.

Three main categories of variables present opportunities and obstacles to interorganizational action. The first is contextual. The environment or setting hinders many activities. Development professionals have relatively little control over these macro or external variables; Bosnian examples include the structure of the Dayton Peace Accords, ethnic division, the weak central government and presence of the UN protectorate government, etc. The second set of variables is strategic or policy oriented. Different development organizations have different, at times conflicting, goals, as do international and local host country players. It is difficult to agree on a common vision for the future across myriad policy arenas and choices among stakeholders with wildly divergent interests. The third category of variables is procedural in nature. These refer to the interactions between stakeholders that must negotiate their social order as they work through these difficult reforms that require interaction. Interorganizational, international and cross-sectoral relationships present a difficult dynamic. And yet the same issues and calls for improved coordination within the international community arise with each new CHE. The research question, therefore, guiding this work remains, what are the opportunities for and obstacles to cross-sectoral, international and interorganizational action?

2. Media Development after Conflict

A sizable literature focuses on the role media does, should or might play in reform efforts; as an instrument of peace in challenging governmental positions, providing information, supporting elections, fostering civil society and enhancing democracy (Easterman, 2000; Gulyas, 2003; Jakubowicz 1995, 1996; Jamal, 2001, Jusic, et. al. 2000; Spurk, 2002; Taylor and Kent, 2000). These authors note both success and failures of media transition activities in Eastern Europe, touching upon themes of corruption, public acceptance, trust, legitimacy, and relations with both the state and previous regimes. They address media as both a positive force for change and a negative force that perpetuates conflict and helps obstruct reform efforts.

Several studies focus on actual international media reform efforts in BiH (Deluce, 2003; U.S. Government Accountability Office, 2005; Henderson, et. al., 2003; Stability Pact for South Eastern Europe, 2004; Taylor, 2000; United Nations Development Programme, 2004). These studies highlight four key areas of activity: journalism education, media business development, free speech and the protection of journalists, and the creation of associations and networks of media professionals designed to develop professional standards and codes of conduct, typically concluding that these are complex problems that cannot be solved by one organization or action. All four were being implemented in Bosnia at the time of this research (1995-2002).

Others explore more macro concerns regarding the role of media assistance efforts and their influence on Bosnian development and transition more broadly (Domi, 2002; International Crisis Group, 1997a, b; Internews, 2001; Jusic, 2000; Pech, 2000; Price, 2000; Shuey, 2003; Udovicic et al, 2001). They do address technical issues such as regulation of the airwaves to prevent ethnic hate propaganda, and the coordination of transmission frequencies, for example.

More importantly, this work targets the economic viability of media, the need for improved managerial practices regarding business development within local media outlets, and the role media plays in civil society development, institutional strengthening, ethnic relations and democracy-building efforts. For example, Taylor and Kent focused on the difference between alternative media and independent media (2000) and subsequent public perception. With alternative voices to state controlled media, confusion can arise over internationally supported media outlets and their objectivity. Others targeted the relationship between media and the various political power structures that are simultaneously evolving in transition states (Gulyas, 2003; Jamal, 2001; Palmer, 2001).

These accounts allude to the process through which the international development assistance community coordinates its activities, but do not explicitly target it. Relationships between international players are one of a number of structural concerns that influence program outcomes, which are typically of greater concern. This manuscript instead focuses explicitly on the process of relationship formation within the international

community and the opportunities and obstacles it presents for the implementation of media reform efforts.

Research has addressed this interorganizational nature of development, highlighting the necessity and difficulty of coordinating policies and implementing programs within the international community and between international and domestic actors (Black, 1999; Brown, 2005; Martin and Miller, 2003). Several frameworks for interpreting such cross-sectoral coordination efforts have emerged (Aubrey, 1997; Brinkerhoff and Brinkerhoff, 2002; Brinkerhoff, 2002; Donini, 1996; Edwards, 1999; Evans 1996; Ostrom 1996; Westley and Vrandenburg, 1997) as have accounts detailing coordination efforts in response to the crisis in Rwanda, (Borton, 1995), peacekeeping in Afghanistan (Roberts and Bradley, 2005), environmental work in Madagascar (Brinkerhoff, 1996), women's groups in Costa Rica (Vargas, 2002), and privatization in Bosnia (Martin, 2004), to name a few. These efforts serve as exemplars for this research and help us better understand differences in settings, context, and environments.

Development in post-conflict situations is almost always "extreme" along multiple dimensions – by definition. It comes as no surprise then, that these situational variables and external jolts have a heavy bearing on organizational action. To overcome these constraints and obstacles, individual development agencies must cooperate, coordinate and collaborate with diverse partners to implement the desired reforms. Summaries of actual coordination mechanisms like that presented below across various settings (like those mentioned above) might help scholars and practitioners better conceptualize and contextualize development to ultimately improve the implementation of effective, efficient and equitable policy.

3. Methods

Interviews took place during two summer-long research field trips to Sarajevo in 1999 and 2000 and three one-month trips in 2003, 2004 and 2005. I met with representatives of all the organizations mentioned in this manuscript at least once during each visit (though the actual individual at times changed). I met with the director, deputy director and/or media director, or the person most responsible for media assistance (sometimes housed in democracy building departments, or economic development, etc) from the following organizations: Independent Media Commission (IMC); Open Broadcast Network (OBN); Office of the High Representative (OHR); the Organization for Security and Cooperation in Europe (OSCE); the North Atlantic Treaty Organization (NATO-SFOR), the European Union (EU); the United States' Embassy, Agency for International Development (USAID) and Office of Public Affairs (USOPA), as well as USAID contractors IREX and INTERNEWS; and regional think tank International Crisis Group (ICG).

In all, I interviewed 16 individual representatives of these organizations; nine on multiple occasions, two or three times, depending on their tenure over the period. These interviews were enhanced with nearly 100 other interviews with development professional related to media, for example, as a component of an economic development, human rights, or democracy building agenda. I explicitly ended each interview asking, "who are the other key players I should speak with along these lines?" I followed all of these leads and feel confident I spoke with all the key international stakeholders. This snowball sampling began with one media player and evolved into meeting all major players and actually sitting in on coordination meetings between these organizations.[1]

The long interview format was used. I coded interviews and observations in the field to shape subsequent questioning (Lofland and Lofland, 1995; McCracken, 1988; Strauss and Corbin, 1990). Initial coding efforts grouped responses by, for example, the subject's field experience, organizational type (local, bilateral, NGO, contractor) and focal area (protection of journalists, business development, regulatory work, etc.). Data were recoded several times into clusters of related concerns, at times emerging from the data, at times, based on reflection from related literature. It is here that the context, strategy and process grouping emerged. I integrated the initial codes into the context-strategy-process framework and selected representative and/or divergent quotations to present for each key concern.

The key findings are reported in the following narrative under these three separate headings: 1) the context – the setting, the tasks and the players involved; 2) the strategy – what the group tried to achieve, what opportunities and obstacles presented themselves; and 3)

[1] While many of the international players I spoke with were, in fact, from the Balkans, they worked for and represented international organizations. I interviewed only a small handful of local Bosnian officials in various ministries. As such, I stress that this work is primarily about the international players in media sector reform. Also a reviewer pointed out that I did not speak with Council of Europe representatives.

the process – actually working through the MIG to translate policy objectives into outcomes.

Context – The Setting, Tasks and Players:

Contextual concerns refer to variables associated with the development context, structure, environment or setting, including the particular organizations, past histories, individuals employed and current socio-economic conditions. Participants often blamed their inability to work together on the unique complexities of Bosnia; i.e. the massive international response that brought hundreds of uncoordinated organizations to the tiny nation, the local divisions and complex structures of the Dayton Peace Agreement, and the deep-seated ethnic division resulting from the war to name a few. Contextual issues constrained strategic planning, which in turn influenced action, providing both an opportunity for and an obstacle to coordinated activity.

Strategy – International Rationales for Working Cooperatively

Strategies refer to the policies, goals, ideas, and internal motivations of participants and partner organizations and their representatives that required cooperative, cross-sectoral and interdisciplinary solutions. Participants were keenly aware that given the size and scope of the tasks, they needed to work together for efficiency. Participants also knew that their work crossed organizational lines that would require partnerships. And finally, they knew that locals would take advantage of international divisions or differences in opinion. These realizations suggested to most that a coordinated response was of paramount importance, but the complexities that caused the divisions often hampered coordinated activity.

Process – The Actual Coordination Efforts

The third set of variables revolved around activities and processes that organizational representatives took toward cooperative activity – i.e. the actual workings and interactions of the Media Issue Group (MIG) members. While there were some successes, for the most part it remained difficult and many reported it 'unpleasant' to work together. This section provides an overview and understanding of the complexities and dilemmas of "development by committee." The context and strategies suggested the impetus and need to coordinate, but doing so proved more complex than it appears on paper.

4. Analysis: The Case of the Media Issues Group

The following participant narrative describes media reform efforts in Bosnia and the evolution of coordination among international players.

4a. Context – The Setting, Tasks and Players

Development professionals with experience across many diverse countries pointed to the particularly unique and onerous complexity of the situation here. Reforms in Bosnia took place against the backdrop of the Dayton Peace Accords and the difficult transition from central planning to a free-market democratic system. Respondents often commented on the constraints these conditions presented.

> It is a transitional economy, (but unlike Eastern Europe) it never actually got the 1990 spirit of 'kill communism, let's go capitalism.' Second, there was a hideous war, aspects of which are still being uncovered every day. Third, the country was largely underdeveloped before any of this happened. Finally, you have the inability of the international community (IC) and its inconsistency, not speaking with one voice. (Contractor)

In media, the ethnic tensions were particular problematic. After the peace agreement, one multilateral official commented, "we had to take care of the political problem by giving every group their own channel." These nationalist broadcasters then more easily spread ethnic hatred over the air. The international community response was to reduce the relative power of the hate broadcasting by overloading the system with more mainstream, moderate and internationally supported outlets.

> After Dayton the primary problem was the inflammatory TV. There was some bad stuff on. It was hate broadcasting. With elections coming, the IC poured money in everywhere to essentially multiply the number of voices in the hopes of drowning out the nasty ones. So you had this explosion of stations. (Multilateral)

The strategy exacerbated two issues. First, nationalist political parties more easily controlled the smaller, supposedly independent, media outlets, buying influence and aggravating journalists until they followed the party line. "The number one pressure was economic. Tax police will come and visit you, or visit the people that are advertising on your station." (Multilateral)

Second, the number of broadcasters soon exceeded market capacity. The majority of stations became completely reliant upon donor support, and those that were independent simply couldn't compete. In 2000, there were about 300 stations for a market that could sustain comfortably perhaps 50. As one official noted, "The market would flush out 80%. If you took the grants away, unfortunately, some of the ones you would want to die wouldn't die." The international community soon found itself in the uncomfortable position of determining which stations would survive and which would not. Donors would have liked to only support those stations that conformed to their principles and political positions. However, "you never want to be a member of the donor state that says 'I think that station should stay alive and that one should close.'" Regardless, the massive international influence here on market development is obvious.

Technical issues regarding frequency distribution represented a third primary concern in media, "to sort out the frequencies so bad guy A was not jamming the frequency of good guy B or at least it was more organized." The OHR eventually developed its own independent regulatory agency (the IMC, with the aim that his would be eventually turned over to locals, and it was, in the form of the Communications Regulatory Agency). They developed a licensing process to limit political influence, strengthen the market by weeding out non-viable stations, and organize the distribution of frequencies.

> They registered with us and we licensed them. In turn, they signed a code of practice. It was creating a relationship between a newly established regulator and broadcasters that had been working under a different system before, with broadcasters interfering with each other, getting licenses under the table, and paying draconian fees. There was no transparency. Nobody was trying to create a market. So we did tread on a few peoples' toes. (Multilateral)

In addition to these bedrock issues, programming on many stations was poor. Donor money was being wasted on weak stations that weren't supported by the public. Improved programming soon became a focal point for media development. One former editor lamented, "We had news bulletins consisting of one press conference after another, with no questions by the journalists and no attempt to go behind the story."

Attacks on journalists also threatened the development of an independent media. Journalists were poorly paid, ill supported by their stations and open to very serious threats, including bodily harm, if they criticized parties in power. This unacceptable situation concerned all internationals involved in media, spanning human rights, media, democratization, and election reform. Finally, reformers had to cope with the ever-present problems of local division and obstruction.

> If you ask a local ministry what to fund in media, their answer will be exactly opposite from what you want to fund. (Bilateral)

> The politics here are somewhat Byzantine[2]. There's never an end to a fight. It is one layer upon another of secrets and lies. Everyone here has a political agenda. Often those in charge do not see reconciliation as a solution. Separation is better and they want to encourage that. (Multilateral)

Furthermore, many international professionals had limited media and development experience before coming to Bosnia, and yet had enormous influence over media activities. Inexperienced players were criticized often. One contractor commented, "There isn't a great deal of depth of experience in either private or public broadcasting."

> There have even been some criticisms in the local press that the international community should leave these well-intended and highly skilled Bosnian journalists alone and let them take care of their problems domestically. Then it went on to say the head of OHR media isn't a journalist, the head of the IMC isn't a journalist he is a judge, and OSCE's head is a Ph.D. in psychology. (Multilateral)

[2] A reviewer noted the use of this particular word as indicative of international community stereotypes of locals.

4b. Strategy – International Rationales for Working Cooperatively

Many respondents broadly agreed that greater coordination was necessary; often pointing to general areas that lacked coordinated action as examples of need. However, the reasons for the lack of coordination differed greatly – with most blaming others for the inability to work together.

Realizing the need for improved cooperation and the recognition of failed actions progressed simultaneously. Respondents seemed unclear as to causality. For example, participants often criticized donor conferences for not being specific enough to actually coordinate implementation level activity. Instead, they coordinated funding and policy at very high levels. And, due to the general lack of coordination, more meetings were held. Criticisms of failed efforts served as a major motivator to better coordinate activity. Even within governments coordination problems were identified. One bilateral official commented that the "EU doesn't even talk to itself, let alone others."

> USIS and USAID were supplying equipment to stations that were in direct competition with each other, which is not good since everyone here agrees that one of the objectives is to decrease the number of broadcasters. (Multilateral)

Difficulties in synthesizing different organizational mandates, responsibilities and goals were reported as the primary obstacles that prevented more effective coordination. One contractor suggested that, "some agencies work a bit autonomously without cooperation because they have different mandates, lords and masters."

> A very weird market of donors exists. Donors are often at odds with each other, even different organizations or agencies controlled by one donor. They can actually have different objectives and since they don't tell each other what they are doing, we get international donors who are on the same side funding things that are totally at odds with each other. That needs to change. (Contractor)

Others were more optimistic about opportunities to coordinate and their desire to proactively make it happen.

> I have to be transparent. I have to tell my constituents what the hell we are doing here anyway. As soon as a contract is signed with an organization, it's no longer confidential. So I don't have a problem in disclosing information. (Bilateral)

> I have a mantra that is 'no competition, no repetition.' I am not going to do what you do and I really hope you are not going to do what I do. I would say it was received with something between skepticism and criticism. But I kept cooperating, but maintaining my boundaries. (Multilateral)

Respondents spoke of the potential value of information exchange, access to information and the need simply to learn more about each other's activities and the environment in which they operated.

> We need to cooperate to avoid mistakes! It's triage. Some assistance organizations select the wrong stations to support. There were a lot of strong ties to Belgrade from before the war. Many stations had nasty pasts, and that is hard to uncover. It is often a surprise unless you work with others. (Bilateral)

Overwhelmingly, respondents suggested that the need to cooperate was propelled by dwindling funds and the waning importance of Bosnia on the international agenda. One contractor suggested, "the shortage of funds brings people to the table." But with the shortage of funds came other related changes. For example, changes in personnel greatly affected media reform efforts.

> The gentleman who used to run media division was removed when the new High Representative arrived. He was a major proponent of OBN and a very strong defender. The person that replaced him doesn't support OBN. Also, he doesn't have nearly the power that the former guy did, so media has been chopped into public affairs and other areas. (Multilateral)

While media was extremely important in the years immediately following the war, at some point policy makers began to recognize the need for long-term sectoral stability. Activity increased, focusing on media as an industry and not just a tool to promote change,

revealing the evolution of tasks from post-conflict to transition and development.

> About the time that IMC began issuing provisional licenses, the IC forced the nasty stations to straighten up or took them off the air and they did fine people. They were very strict and very fair. So they got a lot of the bad voices off the air. Now the focus has changed to target the good stations that will likely survive and help them become more sustainable. (Bilateral)

Changes also resulted from increased removals of obstructionist locals, including significant political figures, like the president of the RS. These changes facilitated international action by removing those who caused the most problems, allowing more drastic reform measures.

The biggest motivator to coordinate and work together was to avoid wasting money and overlapping efforts. This motivator stemmed less from a desire to necessarily become more effective, than from the political sensitivities of working in media. Media development was a very visible activity that could have been decimated with bad perceptions on the part of constituents of how money was wasted.

> If the US feels that they have core interest and a lot of experience developing the commercial market, and Europe has more interest in developing the public service, no problem. But let's not step on each other's toes. (Embassy)

Coordination was also mandated in some proposal and tendering processes, suggesting that the demand for coordination by others may have preceded the recognition of that same need by the field. Therefore, perhaps it was not that field level personnel overtly and independently made these recognitions based on their perceptions and experience, rather the seed was planted by headquarters and took time to disseminate out to field offices.

> We have to include a section in our proposals about coordination, especially on larger projects, regarding who else is doing what. But it is difficult to keep track of your funding, you have to know exactly what you are funding, and if there is another donor, what they're funding. (Bilateral)

The need to speak in one voice and present a unified front to the Bosnians also represented an important motivator to work more closely together.

> If they were to go out on a limb and OSCE didn't, that would be a problem. It would give the impression of a split and that would send signals (to the Bosnians) that we would rather not send. (Multilateral)

> There is a general rule that internationals don't fight in front of nationals. If we have squabbles, we do it behind the scenes. It is like being in a family, there are things you do in the living room that you don't do on the street. (Multilateral)

While participants seemed certain that the need for one voice was paramount, few offered examples of problematic Bosnian reactions in instances where they did not speak in one voice. Therefore, it was difficult to determine whether this motivator was based on circumstance or cautious, preventative strategy.

In general, respondents agreed that the lack of an overall plan or strategy was a primary reason why coordination could not be achieved. However, that lack of consensus was also the very reason why coordination became such a necessity. An Embassy official lamented, "We are all just crushing ahead like a thunderous herd."

> The fact that we don't have a coherent plan for the entire international community to follow is a major problem. (Bilateral)

> The problem was the schizophrenic, and I don't use that word lightly, approach to identifying the (overall direction) for media development. (Contractor)

Differences also existed regarding the nature of basic media reform, especially between Americans and Europeans. Americans' concerns with First Amendment rights and the promotion of private media outlets set them apart from many other countries, often sparking great debate. However, the situation on the ground often precluded some American principles from practical consideration, like strict adherence to the First Amendment regarding potentially inflammatory speech in this tense environment.

More fundamental issues existed, however, regarding basic differences in assistance ideology and culture. Americans were seen as more aggressive and more results oriented, willing to use strict conditionality and force through certain reforms. "The Americans are very direct, often willing to act unilaterally in light of what they perceive as national interest or, in their view, local interests from an American point of view." One contractor suggested that there was much more than an ideological or political rift between the Europeans and the Americans; "I think basically there is intense competition."

Overwhelmingly, respondents stressed funding as the major dimension across which EU and US organizations differ. The EU was notoriously slow, while the United States tended to pay immediately, once they had decided to fund a project. The funding issue tended to give Americans a bit more leverage and control. Because the Americans followed up on their plans and financed them, one multilateral official admitted, "We have to follow their policy." Many blamed the overly bureaucratic nature of the EU and its administrative arm, the European Commission, for such problems. Respondents suggested that 15 different bosses must approve aid from Europe, which turned minor revisions into major administrative operations.

4c. Process – The Actual Coordination Efforts

The MIG met biweekly and representatives of all the major media players (USAID, EU, OHR, OSCE, IMC as well as SFOR and UNHCR) attended regularly. "Every single media issue is discussed. It's a very long meeting, but it is very useful. That meeting is than mirrored back at very senior levels, ambassadorial levels, where the heads of missions meet to discuss bigger issues." (Bilateral)

Participation was a major issue revolving not only around actual levels of representation, but the skills and objectives of various representatives. For example, in the beginning , private contractors were not allowed to attend these meetings, which soon changed as the MIG gelled, representing an improvement since these contractors were often the key players in implementing specific reforms rather than the donor organizations that funded their work. However, at times, representatives simply were not appropriately informed or skilled for effective decision-making. Others reflected on levels of representation and the difficulties presented by political nuances.

> You have to find your pecking order. You can go up a level and down a level and not up two levels, and down two levels only if you are kind. People are pretty unpretentious, but nonetheless these diplomatic courtesies have to be worked out. (Multilateral)

One official commented that she was "shocked at the level of comprehension of the embassy types. Their depth of understanding is a mile wide and an inch deep."

Several individuals mentioned that coordination in "media was easier (than other sectors) because there was a smaller group of people." Many organizations only interacted regularly with one or two other organizations. As a result, it was generally easy to get all of the important players together at the table. However, if one or two members did not attend, their absence greatly diminished the group's effectiveness.

Respondents generally were disappointed that media issues could not be coordinated through the Bosnians, because it hampered their efforts to transition control over to local authorities. In other countries it was logical to coordinate these things through their ministry, but that seemed impossible in Bosnia due to the internal ethnic divisions. "They would want you to fund everything you don't want to fund, and vice versa. They would want you to fund little political pet projects. You can't do that."

> There may be some Bosnian natives at the table, but they are either the English speakers or just wired into the Western community. They aren't necessarily the right people to get real media change happening. (Contractor)

Concerns with local involvement emerged early in this discussion and continued to present obstacles to more effective coordinated action. Complaints revolved around the fact that some organizations were reluctant to share information. One bilateral official remarked, "I don't know why they wouldn't say how much or what, they are just cagey on money." Another said, "Organizations are guarded. To reveal is an invitation to leakage. Only under duress will they tell you where else they are receiving money from."

> Some organizations don't want to share information because if details get to the press, it would become a pissing match. A Croat would say why is the US

> supporting that station and not me? And of course, you would have three renditions of that story. So a lot of organizations just don't like to say whom they support. (Bilateral)

Some mentioned a bit of organizational pride creeping into discussions, preventing more effective open dialog or exchange. One director suggested, "No organizational director worth his salt will acknowledge that another organization can do its tasks better than they can." While some suggested this was a result of overlapping mandates, others stressed the importance of individual personalities.

> We set up a hotline for journalists. Well, another organization was outraged that we should do this. They thought they should do this. Eventually, we did turn it over to them. But if you look at their formal press, it says that they started this, no mention of the fact that we started it and turned it over to them. (Contractor)

> They were irritated that we would consider getting involved in freedom of information and libel. The head of media there said to me once, 'whenever I turn around, there you are yapping at my heels.' (Contractor)

Occasionally, it seemed that representatives could not completely represent their national or organizational positions which created problems for the group because it seemed as though organizations had reversed positions at different levels.

> The official contact that we have at the embassy may be totally on board with us, but the State Department may take a different position and we are like ok, where are the Americans today? (Bilateral)

Many recognized that problems stemmed from the basic bureaucratic nature of funding and programming on the part of all donors and implementers.

> I don't know where the money comes from. It is filtered down maybe 6 or 7 layers from the time it left its original source to when it arrives at the broadcaster. Who knows where it has gone to get there. (Bilateral)

Despite such initial obstacles, the MIG met often and generally agreed to try to work together. However, it was difficult to set a common direction for action and even harder to commit resources to this alliance. Europeans and Americans simply had different views of media development.

> There are different ideas about how to regulate the media. The US has a more 'free speech' slant than other countries that have stricter controls over their media. That was a big issue since we had advisors from different countries. (Bilateral)

Some respondents stressed that they were not able to go into enough detail to really address a common agenda or even begin to commit resources.

> We couldn't get down to the nitty-gritty details. Everybody agrees on the general principles, but when it comes down to how it will actually work, there were significant disagreements. (Bilateral)

Others stressed their inability to allow national earmarked funds to be redirected by an international advisory group.

As such, it was difficult for some players to commit on behalf of their organizations. The level of flexibility or autonomy field offices had relative to their capitals played a significant role in such discussions. A US representative suggested that problems were often, "forced upon (him) by Congress. We work for taxpayers." As a result, "we get agreement at our level. Then at another level they reverse it. It is crazy. There is nothing you can do."

> You can't have committees for everything. We are never going to allow US money to be put through a committee where someone else has veto power. That is virtually impossible to do. We have conditions that need to be met. (Bilateral)

> The working level stiffs like me, we can't commit anything, so we live in this dual world where things are thrashed out at the middle levels, and then only when a crisis arises do the heads of the missions start to make decisions. (Contractor)

But they forged ahead regardless, recognizing that they could divide labor on some tasks and at least be well informed about where others were working and how

overlaps might be avoided. Many suggested that they did work on the same issues often; they simply did them in separate ways. One contractor mentioned, "It works when we mutually serve a common agenda. We agree to a set of goals and then we each have a different sort of way to get there."

> Working in the international community is like standing on the back of five stallions. Occasionally one is heading off in the other direction, but by and large the direction is agreed upon. (Embassy)

However, few participants could identify specific instances where this occurred. One contractor admitted, "Dividing labor is difficult since we really can't always agree on a common agenda." Another concurred, "There is not full agreement. That is the first reason why you wouldn't want to divide labor." As one participant put it, nobody can really commit to anything, instead, "it all simply comes down to good will and trust." One participant commented that he viewed their alliance largely as "de facto coordination, if then."

> I looked at the landscape and saw how this was being carved up. I inherited a radio station, so it became natural that I would deal with radio. One thing just led to another. (Multilateral)

Others suggested the MIG was able to identify some areas where one or another player was more dominant. Organizations that dominated an area tended to be responsible for coordination of that area.

> We did divide up the labor. OHR deals with policy on public broadcasting. The IMC deals with regulatory issues. OSCE deals with protection of journalists, development of media laws and journalist training. OSCE deals with radio, as opposed to OHR, which deals with TV. (Multilateral)

The group did feel as though they had worked together cooperatively in some instances. For example, respondents pointed to information exchange within the MIG as an important cooperative activity.

> We talk about media development and the future of media and who's doing what. But it's more touching base. We go through current issues to keep each other informed and to coordinate to present a common public image. (Bilateral)

The group developed a database designed to detail which organizations were involved in which activities. Respondents often referred to this database as a potential success. Unfortunately, it was not updated regularly and many felt it would simply fade away for lack of interest. Aside from the database, some limited information exchange, general conversations regarding the future of media and discussion of potential new activities, most respondents felt that in general the meetings were not very effective, often stressing limits due to personalities and varying individual desires or efforts to cooperate.

> Everyone would sit nice and say, 'well we are doing this and this' and some people would stay quiet and only later on would you find out who is really doing what. (Bilateral)

The effort to shut down EROTEL was reported as the single most important and one of only two specific examples of impressive coordination and cooperation mentioned by nearly all of the major players. EROTEL was the biggest and most illegal Croatian broadcaster in the country. The international community, after much negotiation, decided to shut it down. But this action did not materialize in a formalized manner; instead it developed out of a variety of dyadic and somewhat informal personal connections only loosely connected to the actual MIG.

> Removing EROTEL took a lot of coordination between OHR, OSCE, SFOR, IMC and AID. I mean we had to make the high representative decide. We had to get a letter from OHR and push it to the highest levels within the US government. There was always the potential of protests and destabilization. Eventually, SFOR raided mountaintops and disconnected feeds. That was a very sensitive process. We had to work well with everyone to get that done, at the highest and lowest levels. There was potential for great miscommunication, but due to diligent efforts, we were able to pull that off. That was coordination. (Multilateral)

Aside from such an impressive coordinated action, the second main tangible output of coordinated activity was the production of papers and reports. While many

commented on the value of information exchange, these reports seemed to unify the group even more and were, occasionally, proudly displayed in some offices. Others focused instead on the weaknesses in the reports and the political maneuvers that surrounded its production.

> The donors asked for a paper to be written on how OBN could be sucked into the PBS system as a news provider. OHR will write that. But OSCE will also have a hand in it because the OSCE-run radio station may also be sucked into PBS. IMC is involved because we have a regulatory view on the transmission systems around the country. So it will be written by all of us. Unfortunately, you know the old adage, a camel is a racehorse designed by a committee. (Multilateral)

5. Discussion

Coordinating activity in complex, divided and troubled areas provides an opportunity to combine what we know about management, interorganizational collaboration and the more technical aspects of peacekeeping and development. This work identified specific opportunities for and obstacles to coordination in this difficult setting in order to help improve the transfer and delivery of service in unsettled, uncertain and extremely fluid democracy-building settings.

Hundreds of countries currently deploy thousands of people and spend billions of dollars supporting international development and peacekeeping operations throughout the world. Unfortunately, reports and field studies suggest great service overlap, inefficiencies and waste in these international efforts (Brahimi, 2000; Donini, 1996; Martin and Miller, 2003; Summers, 2000). This case was no exception. Many practitioners and politicians cited the lack of cooperation and coordinated activity as the primary culprit in ineffective programs and initiatives. However, blanket calls to simply 'improve' coordination are equally problematic. Improving coordination under such circumstances is complex.

Much of the complexity reported here results from the fact that this situation reaches beyond 'media reform' 'development' or even 'peacekeeping.' This is indeed democracy- or nation-building. But the job is not being implemented, nor even being directed, by a single organization. These efforts are the product of a vast network of disparate players that must work together intimately, communicate constantly, and coordinate minute aspects of seemingly disparate tasks. The boundary lines between players, countries, tasks and objectives blur. In addition, success often required cooperation among reluctant, if not obstructionist, partners. Few practitioners had the vision, legitimacy or power necessary to translate high-level strategy into ground-level implementation requiring collective action among highly autonomous organizations. Furthermore, in this international arena, no clear hierarchy existed. Instead, various aspects of the strategy had independent hierarchies, with many of the same organizations often serving different roles in different task settings. And relationships among international organizations and between the internationals and locals were not clearly defined.

Cooperative activity does not always mean overt efforts towards compromise and sharing. Maintaining clear boundaries and working in isolation based on an orderly division of tasks can be a very productive output from IORs. Perhaps most importantly, it simply takes time to allow such relationships to mature – and in post-conflict situations many tasks, like media reform in particular, must be implemented urgently, without the luxury of time.

Cooperative interorganizational activity is perhaps more difficult in environments where organizations value accountability and caution over efficiency and risk. As such, it may explain why IORs in the private sector receive so much attention and typically serve as models for public or cross-sectoral cooperation. Such efforts may be misguided. Public, NGO and cross-sectoral cooperation presents a difficult and complex environment within which IORs do not inherently flourish. Greater thought must accompany calls for cooperation in such chaotic settings. In addition, attention should be paid to differences between cooperation, coordination and collaboration. What type of IOR is right for which activity? Since the complex, turbulent and conflict-laden environment in Bosnia influenced strategic planning and decision-making, action was often based on the context of the situation (i.e. feasibility), rather than being based on the actual needs of beneficiaries. In addition, the real beneficiaries of development assistance were removed from the decision-making process, which became problematic.

6. Conclusions

I highlighted three sets of variables that constrained cooperative, coordinated and collaborative activity regarding media reform in Bosnia. The participant narrative helped contextualize the situation in an effort to make these findings more relevant to other similar interventions throughout the world. While the details of the stories will change, I suspect practitioners and observers of nation building activities in Kosovo, Afghanistan and Iraq will identify similarities. Indeed, recent reports from Haiti stress the same pattern evident early in Bosnia's development story – a massive international presence; a weak host government; competition among implementing agencies; a near complete absence of local institutions; sketchy early results, funding delays and administrative hurdles and impending donor fatigue within just six months. A development official working in Afghanistan (and a key informant on this paper) commented to me recently that the situation in Kabul was "worse than Bosnia ever was" with respect to coordination within the international community and between internationals and locals. The lessons from Bosnia should be documented and shared. It represents a distinct early archetype of a new era of nation building experiments largely led by the United States and the European Union.

Context. The stakeholders I interviewed had little control over the environment in which they worked. However, the context within which they worked was the result of earlier efforts made during the "conflict" stage, for example, in the Dayton Peace Accord negotiations. That a compromised peace solution created complexities down the road for development may have been unavoidable. But the temporal flow and connectivity between reforms at different phases should be considered. Detailed accounts of development settings could help practitioners and scholars develop a typology of development settings. Complex humanitarian emergences (CHEs) and post-conflict situations are often chaotic. Though each case is of course unique, similarities can be found. On some dimensions, for example, the situation in Kosovo mimics the situation in Bosnia. Across other dimensions, Haiti seems remarkably similar to Bosnia. These dimensions can be clarified and catalogued. Researchers should document changes in the environment over time, and return to former hotspots over time to determine the long term outcome of these policies and programs. Lessons learned from Bosnia's reconstruction might provide more insight for practitioners in Haiti, for example, with the benefit of a fifteen year perspective.

Strategy. While most strategic decisions will be based on a case-by-case basis, some ideological perspectives could be clarified and discussed within the international community. For example, USAID identified cluster competitiveness as a theme to guide economic development for some years. International community partners should adopt, modify or oppose each others' anchoring perspectives at conferences, in non-emergency task forces and within academic outlets – journals such as this, as well as conferences. Cluster competitive gave way to value creation over time. Are these fads or strategic evolutions in approach? For example, one of the initial responses, in the case reported above, to the problem of hate broadcasting was to increase the number of stations in the country in the hopes of crowding out the hate with more positive messages. This spawned competition and market saturation in short order, necessarily forcing improved licensing and frequency distribution. Was the interim strategy to increase the number of voices a positive incremental step necessary while the regulatory agency developed capacity or did it only waste donor money by temporarily increasing media outlets, further burdening the licensing and frequency distribution problem once they were up and running, and create more work for regulators? Or, was the short term effect of this interim strategy positive in other political, social and economic dimensions? The lack of a guiding vision for various sectors makes improvisation based on perceived realities on the ground difficult.

Process. Many respondents pointed to the lack of an overarching vision for media sector reform. This was largely due to the lack of leadership within the international community. If USAID was the lead agency, their media strategy would dominate. However, OHR, OSCE, USAID, OBN and IMC all claimed the "lead" on various aspects of this work. Coordination need not result in centralization, but most stakeholders in this process were indeed calling for centralization. When a host country doesn't develop its own strategic plan for the future, which internationally developed plan should be adopted? The UN's OHR, charged with implementing the civilian aspects of the DPA seems like the logical choice. However, most development assistance agencies viewed OHR negatively; they lacked skills, local knowledge and experience in such extreme settings and proved more

reactionary then proactive. In addition, implementing agencies followed donor priorities, and thus when forced to choose between OHR and Washington or Brussels, the choice was clear.

Many obstacles to effective reform efforts lie not in the actual circumstances and dilemmas of development, where attention is often focused, but in the organizational and managerial dilemmas of "development by committee." It is here that organizational mandates, administrative procedures, organizational cultures and institutional logics tend to obscure potentially successful collaborative implementation mechanisms. Sharing knowledge about best practices in such cooperative experiences might help practitioners move beyond "redeveloping wheels" in each new country they target.

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Gender Disparities in the Duration of Unemployment Spells in Slovenia

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Abstract:

The paper offers an overview of labor market characteristics in Slovenia with an emphasis on gender disparities. A survival analysis is conducted based on an extensive database obtained from the Employment Office of the Republic of Slovenia of more than 450,000 unemployment incidences between January 2004 and July 2008. Kaplan-Meier estimates of survival functions show specific disparities among unemployed women and men in Slovenia. Unemployed men are better off when re-entering the labor market as they are re-employed more quickly than women.

Keywords: gender, unemployment, labor market, survival analysis, Kaplan-Meier, Slovenia

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1. Introduction

Human capital is one of the most important driving forces for economic competitiveness, development and growth. One half of a nation's skills, knowledge, and productivity is represented by women. In the long run, a country's economic performance depends on how effectively and to what extent female talent is well utilized. A recent analysis by Hausmann, Tyson and Zahidi (2009) shows the correlation between gender equality and level of economic development. The authors argue that empowering women leads to more efficient use of human talent. However, this finding does not apply only to the developing world. According to Daly (2007), any reduction in the gender gap would have enormous economic consequences for developed countries also. For example, closing the gap between male and female employment would boost the US GDP by 9%, the Eurozone GDP by 13% and the Japanese GDP by as much as 16%. Moreover, Daly (2007) argues that reducing gender inequality could contribute to solving the twin problems of population aging and pension sustainability. Establishing a friendly environment for women where it is easier for them to work and have children causes both female employment and fertility to be higher.

According to the Global Gender Gap Report (Hausmann, Tyson, and Zahidi 2009) women are as healthy and educated as men worldwide, but when considering political empowerment and economic

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participation, women haven't advanced much and no country has actually yet reached gender equality. Slovenia ranks 52nd among 134 countries with a gender gap index of 0.698, where index scores range from 0 (inequality) to 1 (equality). Of the four components of the index, the educational attainment subindex is the highest (0.998) followed by health and survival (0.973), and economic participation and opportunity (0.721). The lowest score (0.100) was for the political empowerment of women. According to the Human Development Report (United Nations 2009) Slovenia belongs to a group of countries with very high human development. In terms of gender disparities in Slovenia, 34% of legislators, senior officials and managers are female, and 56% of professional and technical workers are female. Women held 18% of ministerial positions in January 2008 and 10% of seats in the parliament in February 2009.

In the last couple of decades, different survival analysis and duration techniques have gained popularity in the social sciences to model the length of unemployment spells and strike duration. Moffitt (1999) applied the usual econometric techniques in labor economics, including proportional hazard methods and duration models. Examples of duration model applications in labor markets can be found in Green and Riddell (1995), D'Agostino and Mealli (2000), and Arranz and Romero (2003). They explain the effects of the different determinants of unemployment duration for Canada, nine EU15 members and Spain. Factors of unemployment duration in Ukraine are discussed in Kupets (2006), using the Cox proportional hazard model with two competing risks. The author concludes that age, marital status, income during unemployment and local demand constraints significantly affect the duration of unemployment.

Vodopivec (1995, 2004), Domadenik and Pastore (2006), Orazem, Vodopivec, and Wu (2005) and Kavkler and Boršič (2006, 2007) have all analyzed Slovenian unemployment. Vodopivec (1995) used a duration model to study the effects of unemployment insurance on unemployment duration. Domadenik and Pastore (2006) tested the impact of education and training systems on the participation of young people in the labor markets of Slovenia and Poland. The above papers are devoted to the aggregate labor market in Slovenia. Indeed, analytical papers dealing with gender issues of unemployment in Slovenia are rare. Thus, this paper attempts to estimate the effect of gender disparities on the duration of unemployment in Slovenia by using duration data techniques, namely the Kaplan-Meier estimator.

Aware of the importance of female participation in economic activities, the EU strives for average female employment of at least 60% (the Lisbon Strategy). Slovenia has already reached the Lisbon goal, but the overall employment rate still needs to be higher. Thus, maintaining and ameliorating the high employment of women is of crucial importance. The analyzed topic is of special importance to Slovenia, since employment policy has to identify the main factors that influence the duration of unemployment and establish precise mechanisms to target specific unemployed groups more effectively. By clearly identifying gender disparities in the duration of unemployment, this paper contributes to the implementation of an optimal employment policy for Slovenia.

The paper is structured as follows. The introduction is followed by an overview of the characteristics of the total unemployment rate in Slovenia. Then, gender issues in the unemployment rate are discussed and compared to the European average. Next, a brief presentation of duration models and survival analysis is given, followed by a description and preliminary analysis of the dataset with the results of Kaplan-Meier estimates. The paper concludes with a short summary of the main findings.

2. Characteristics of the Unemployment Rate in Slovenia

Table 1 presents the registered and ILO unemployment rates in Slovenia for the period between 2000 and 2009. The registered rate of unemployment decreased from 2000 to 2008, and then increased in 2009. In 2000, the average rate of unemployment was 12.2% (the average number of unemployed was 106,601), and in 2008, 6.7% (the average number of unemployed then was 63,216). The decrease in the level of unemployment was mainly due to the economy performing well in Slovenia. In 2000, the Slovenian GDP was 21,435 mio EUR (in current prices) and then increased to 37,135 mio EUR in 2008. In 2009, the Slovenian GDP decreased to 34,894 mio EUR, and the average rate of unemployment increased to 9.1%, or by 2.4 percentage points when compared to 2008.

The registered unemployment rate in Slovenia was higher than the ILO unemployment rate for the period 2000 - 2009. The main reasons for the differences were in the high unemployment benefits, the high level of

Unemployment rate	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Registered	12.2	11.6	11.6	11.2	10.6	10.2	9.4	7.7	6.7	9.1
ILO	6.7	6.2	6.3	6.7	6.3	6.5	6	4.9	4.4	6.0
Difference (% points)	5.5	5.4	5.3	4.5	4.3	3.7	3.4	2.8	2.3	3.1

Source of data: Employment Office of the Republic of Slovenia (registered) and Eurostat (ILO).
Table 1: Registered and ILO unemployment rates in Slovenia

Duration	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Up to 3 months	17.9	20.2	20.2	23.6	25.5	22.7	22.4	21.7	27.6	27.3
From 3 to 6 months	10.0	13.2	13.0	14.0	14.3	13.9	11.3	12.6	12.8	14.0
From 6 to 9 months	5.5	6.2	7.0	8.4	8.2	8.8	8.1	7.8	7.1	12.0
From 9 to 12 months	5.2	5.8	7.5	8.0	7.5	8.3	7.5	7.2	6.1	11.1
From 1 to 2 years	15.3	14.2	18.5	19.1	19.4	18.3	20.4	18.2	16.4	15.3
From 2 to l 3 years	12.1	9.0	8.1	9.7	9.1	9.5	9.7	10.3	8.4	6.2
From 3 to 5 years	16.4	13.5	10.2	7.3	7.7	8.8	9.7	10.1	9.4	6.0
From 5 to 8 years	10.5	9.3	7.5	4.4	3.6	4.5	5.3	6.3	6.5	4.3
More than 8 years	7.2	8.6	7.9	5.4	4.7	5.2	5.5	5.9	5.7	3.8
Total	100	100	100	100	100	100	100	100	100	100

Source of data: Employment Office of the Republic of Slovenia.
Table 2: Duration of registered unemployment in Slovenia as % of total number of unemployed

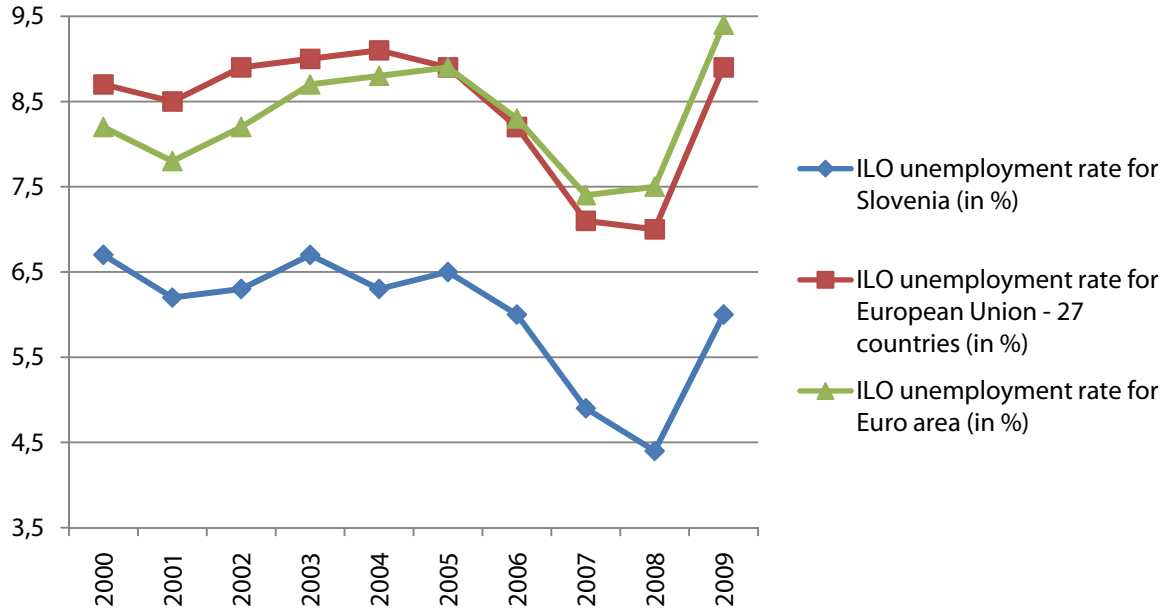
informal work and the high level of long-term unemployed who were not actively seeking a job (Kajzer 2005). For the period 2000 – 2009, the difference between the rates decreased from 5.5 percentage points in 2000 to 3.1 percentage points in 2009, with the lowest difference of 2.3 percentage points achieved in 2008. In this paper, a comparison of Slovenia to the European Union and the Euro area is presented based on the ILO rates, while the analysis is based on registered unemployment data gathered by the Employment Office of the Republic of Slovenia.

A decrease in the difference between the rates relates to the changes that occurred in long-term unemployment. In 2000, unemployment of more than 1 year amounted to 61.5% of all unemployed workers, whereas in 2008 and 2009 the same type of unemployment amounted to 46.4% and 35.6% of all unemployed workers, respectively (Table 2).

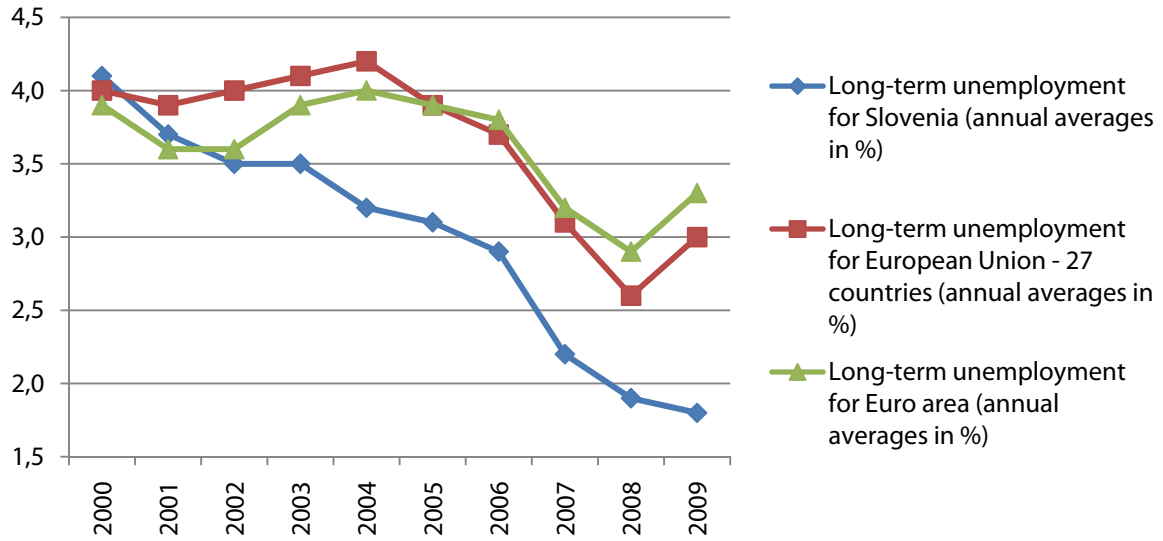
In 2009, the unemployment rate in Slovenia (6.0%) was below the unemployment rate of EU27 (8.9%), and also below the Euro area unemployment rate (9.4%). According to the Labor Force Survey (Figure 1), the unemployment rate in Slovenia for the observed period was 2.4 and 2.3 percentage points lower than the European Union average and the Euro area average, respectively.

The long-term unemployment rates for Slovenia were also below the average of EU27 and the Euro area (Figure 2). The long-term unemployment rate for Slovenia in 2009 amounted to 1.8%, whereas the long-term unemployment rates for EU27 and the Euro area amounted to 3.0% and 3.3%, respectively. For the period 2000 – 2009, the long-term unemployment rate for Slovenia was on average 0.6 percentage points below the average of both the EU27 and the Euro area.

Table 2 presents statistics for the duration of registered unemployment in Slovenia in terms of the percentage of the total number of the unemployed. For the period 2000 – 2009 the highest share is represented by unemployment spells of up to 3 months, mainly due to the fact that in the first three months of unemployment the unemployed receive a share of their previous wages as a financial compensation if they had been employed for at least a year. Unemployment of more than 1 year



Source of data: Eurostat.
Figure 1: ILO unemployment rates for Slovenia, European Union (27) and Euro area.



Source of data: Eurostat.
Note: Long-term unemployment for the EU27 for the year 2005 is an estimate only, since official data is not available.
Figure 2: Long - term unemployment rates for Slovenia, the European Union (27) and the Euro area.

decreased from 61.5% in 2000 to 35.6% in 2009. The largest decrease (10.4 percentage points) was identified for unemployment that lasted from 3 to 5 years.

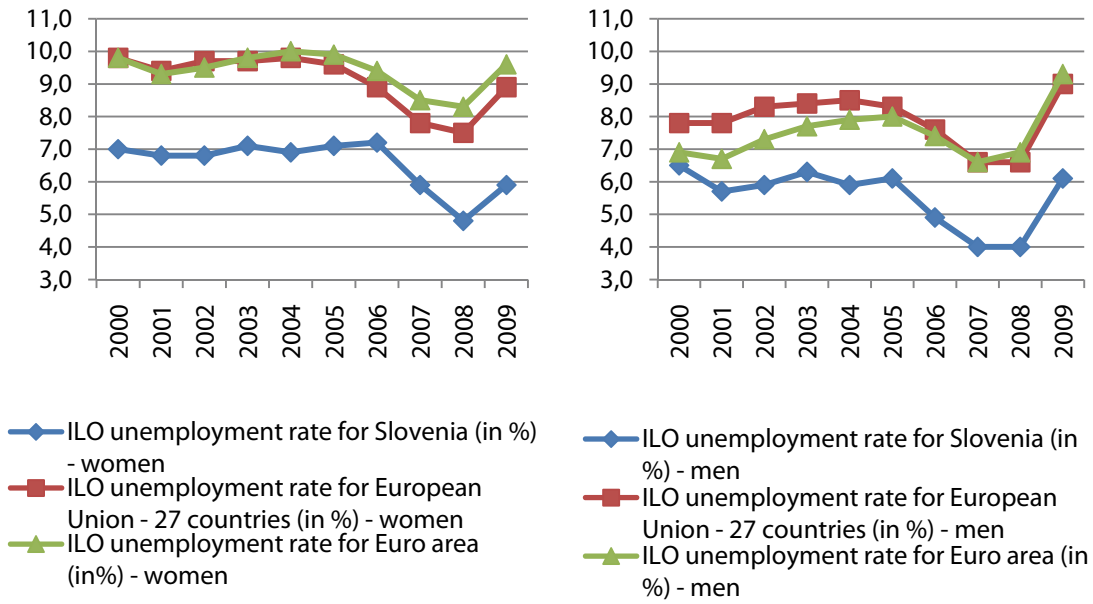
2.1 Gender disparities in the Slovenian labor market

In 2008, the population of Slovenia was 2,032,362, of which 50.5% were women and 49.5% were men (SORS 2009a). According to the Statistical Office of the Republic of Slovenia (SORS 2009b) there were 942,473 people in the workforce in 2008, of which 44% were women and 56% were men.

In 2008, the highest percentage of employed persons were in manufacturing (26.1%) and in wholesale, retail trade and repair of motor vehicles and motorcycles (12.0%) (SORS 2009a). In terms of gender, 31.1% of men

Year	%	Year	%	Year	%	Year	%
1990	47.2	**1995**	47.2	**2000**	50.3	**2005**	53.7
1991	44.2	**1996**	48.2	**2001**	50.8	**2006**	54.4
1992	43.9	**1997**	48.9	**2002**	51.6	**2007**	53.7
1993	438	**1998**	50.0	**2003**	52.4	**2008**	50.8
1994	45.7	**1999**	50.6	**2004**	52.7	**2009**	48.1

Source of data: Employment Office of the Republic of Slovenia and Statistical Yearbook 2009.
Table 3: Share of women in total number of registered unemployed in Slovenia, end of year



Source of data: Eurostat.
Figure 3: ILO unemployment rates for Slovenia, European Union (27) and the Euro area, for women and men.

were employed in manufacturing and 11% in construction, whereas for women 20.2% were employed in manufacturing, 14.4% in wholesale, retail trade and repair of motor vehicles and motorcycles and 13.0% in education.

According to the Employment Office of the Republic of Slovenia, there were 66,239 registered unemployed persons at the end of 2008, with 50.8% women and 49.2% men (see Table 3). Due to the economic crisis there was an increase in unemployment to 96,672 registered unemployed persons by the end of 2009. This was also the first year after 1998 with fewer women (48.1%) than men (51.9%) in the total number of registered unemployed in Slovenia, mostly due to the characteristics of the sectors hurt the most in the current crisis, and which also affected men more than women in those sectors (construction). A similar trend, the lower level of unemployed women compared to men, was also present from 1990 to 1998, due to the economic transformation, which mostly affected heavy industry where more men were laid off than women. After 1998 the textile industry crisis caused more female unemployment.

Regarding unemployed men in Slovenia in 2008, 32.2% had technical or general upper secondary education, 30.8% had short-term vocational and vocational upper secondary education, and 19.2% had only elementary school education. Out of all the unemployed women in Slovenia in 2008, 36.9% had a technical or general upper secondary education, 22.1% had tertiary education and 21.6% had short-term vocational or vocational upper secondary education. It is interesting to note that one fifth of unemployed women (22.1%) had tertiary education, compared to only 14.5% of unemployed men who had the same level of

education. Figure 3 presents the ILO unemployment rates for Slovenia in comparison to rates in the European Union (27 countries) and the Euro area for women and men. Unemployment rates for women in Slovenia, EU27, and in the Euro area were higher than the unemployment rates for men in the period 2000 – 2008, although that situation slightly changed in 2009. In 2009, the ILO unemployment rate favored women in Slovenia and the EU27 with a difference of 0.2 percentage points for Slovenia and 0.1 percentage points for EU27 in comparison to men. In the Euro area, however, women still experienced a higher ILO unemployment rate (9.6%) compared to men (9.3%) in 2009.

Similar to the ILO unemployment rates, the long-term unemployment rates for Slovenian women and men differed the most in 2006 by 1.0 percentage point and the least in 2000 and 2002 by 0.1 percentage points. Greater long-term unemployment differences between women and men were recorded in EU27 and in the Euro area, on average 0.7 percentage points and 1.1 percentage points, respectively.

As there are differences in unemployment rates and duration of unemployment by gender, there are also differences in salaries by gender. In 2008, the average gross monthly salary in Slovenia amounted to 1,431 EUR. Women earned 92.4% of the average gross monthly income of men. Among the economic sectors, the greatest difference in salaries appeared in the financial and insurance services, and health and social work services where the difference in favour of men amounted to 33.8% and 30.6%, respectively. In 2008, women had higher salaries in comparison to men in the following employment areas: water supply, sewerage, waste management and remediation services, construction, and transportation and storage (SORS 2010).

According to Eurostat, the average gender wage gap in Slovenia is among the smallest in the EU. Kajzer (2006) argues that this is due to a prolonged wage equality mechanism from the previous social economic structure and the current legal framework, the relatively low level of part-time and temporary employment compared to other European countries, a compulsory proportional wage supplement for the employment period for both women and men, and a high rate of female employment in the public sector, where salaries are higher when compared to the private sector.

3. Survival Analysis and Duration Models

Survival analysis and duration models originate in biostatistics, where the survival time is the time until death or until relapse of an illness. During the recent years these techniques have also gained popularity in the social sciences to model length of unemployment spells and strike duration. One of the unavoidable problems encountered when analyzing duration data is so-called *censoring*. Since the event under observation (i.e. death or the end of an unemployment spell) often does not occur until the end of the study, it is only possible to estimate the lower bound of the survival time. This kind of censoring is called *right censoring*.

A comprehensive overview of the methods and models used in survival analysis is given by Therneau and Grambsch (2000) and also by Klein and Moeschberger (1998).

3.1. Basic notions

Let the random variable T denote *survival time*. The distribution function of T is defined by the equation

$$F(t) = P\left(T < t\right) \tag{1}$$

and measures the probability of survival up to time t. Since T is a continuous random variable, its density function can be computed as the first derivative of the distribution function $f(t) = F'(t)$. The *survival function* S(t) denotes the probability to survive until time t or longer and is given by

$$S(t) = P(T \geq t) = 1 - F(t). \tag{2}$$

The limit

$$\lambda(t) = \lim_{\delta \to 0} \frac{P\left(t \leq T < t + \delta \mid T \geq t\right)}{\delta} \tag{3}$$

represents the risk or proneness to death at time t. The function $\lambda(t)$ is usually called the *hazard function* or the *failure rate* and measures the instantaneous death rate given survival until time t. Because any of the functions F(t), S(t), f(t), and $\lambda(t)$ may be expressed with the help of any of the remaining three functions, one can decide to model any one of them and estimate the others from the derived equations.

The parametric survival models are often used in practice because of their simplicity. It has to be emphasized, however, that they impose a complex

	N	Mean	Standard deviation	95% confidence interval for mean
Total	389.904	378	623	(376, 380)
Gender				
Men	188.887	354	611	(351, 357)
Women	201.026	400	633	(397, 403)

Table 4: Descriptive statistics for length of unemployment spells (in days)

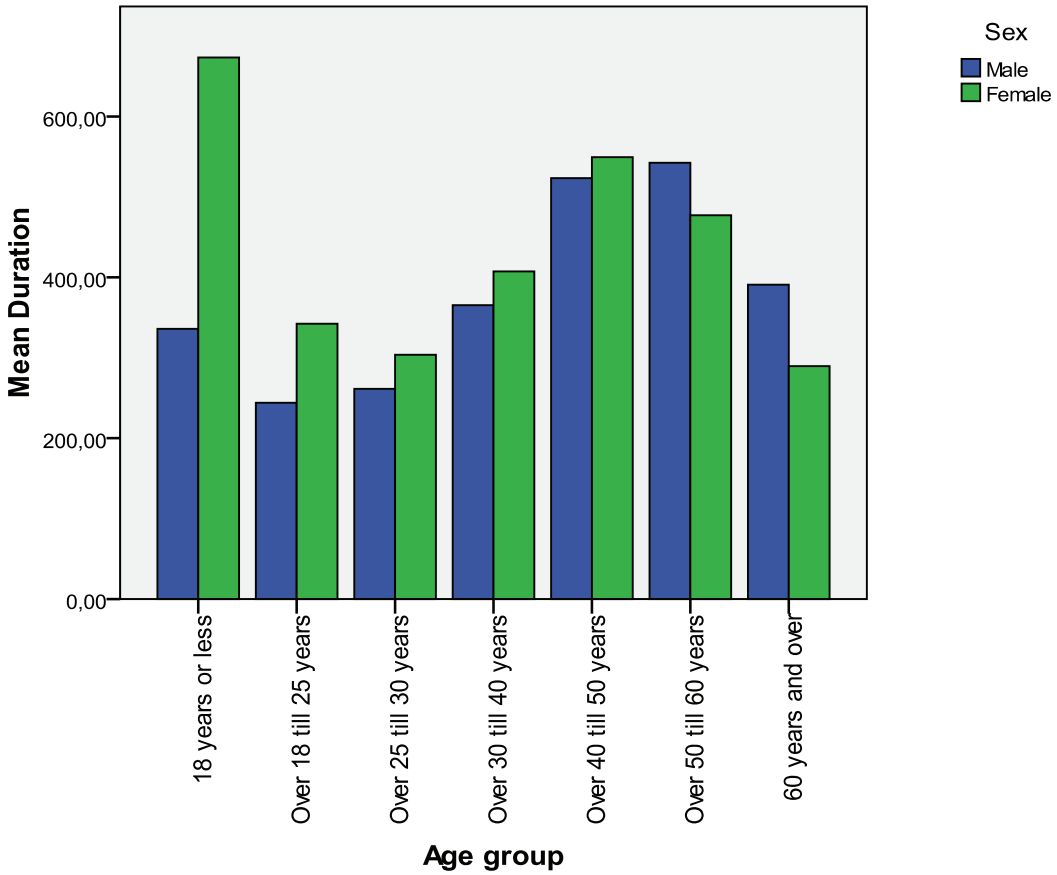


Figure 4: Gender disparities according to age

structure on the data, which can lead to distortions in the estimated hazard rates. Better models can be obtained by using nonparametric methods that impose very few restrictions.

3.2 Kaplan – Meier estimator

The derivation of the Kaplan – Meier estimator for the survival curve can be found in Greene (2003). This estimator of the survival function is also called the *product limit estimator* for reasons that shall be clear later on. Given n individuals with p distinct survival times $t_1 < t_2 < \ldots < t_p$ and d_i deaths at t_i, assume at first that no censoring occurs. For the time t from the interval $[t_s, t_{s+1})$ the survival function can be estimated as follows:

$$\hat{S}(t) = 1 - \hat{F}(t) = \frac{n - \sum_{j=1}^{s} d_j}{n}, \qquad t_s \le t < t_{s+1}. \tag{4}$$

If the numerator and the denominator of the previous expression are successively multiplied by factors of the form $n - d_1 - d_2 - \ldots - d_i$, $i = 1, 2, \ldots, s-1$, one obtains

$$\hat{S}(t) = \frac{n-d_1}{n} \cdot \frac{n-d_1-d_2}{n-d_1} \cdot \ldots \cdot \frac{n-d_1-d_2-\ldots-d_s}{n-d_1-\ldots-d_{s-1}} \tag{5}$$

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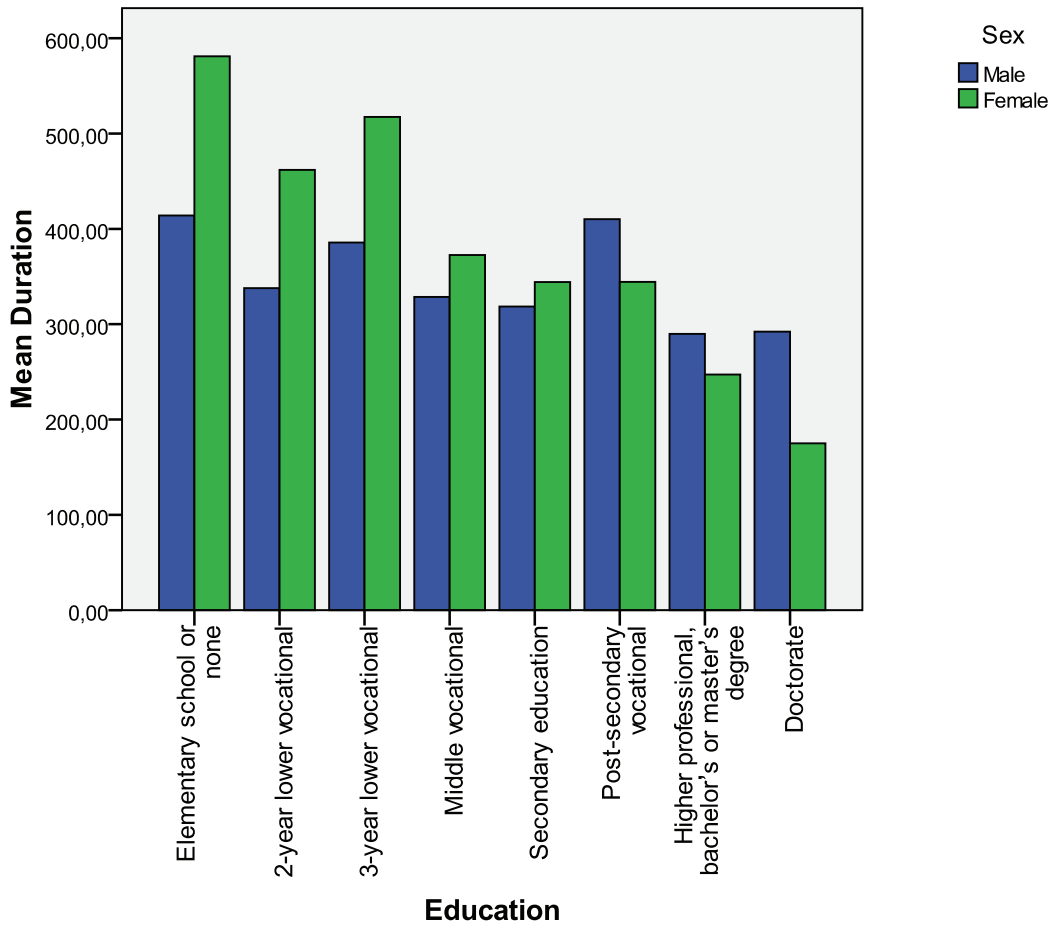

Figure 5: Gender disparities according to education

Let $r_i,\ i=2,\ldots,p$, denote the number of individuals whose observed survival time is at least t_{i-1} and let $r_1=n$. In other words, the *number at risk* r_i takes into account all individuals alive during the time interval $\left[t_{i-1},t_i\right)$. Under the assumption of no censoring the equation $r_{i+1}=r_i-d_i$ holds, whereas $r_{i+1}=r_i-d_i-c_i$ if censorings do occur, with c_i equal the number of censored observations in the interval $\left[t_{i-1},t_i\right)$. The final version of the Kaplan – Meier estimator can thus be written as

$$\hat{S}(t)=\left(1-\frac{d_1}{r_1}\right)\cdot\ldots\cdot\left(1-\frac{d_s}{r_s}\right)=\prod_{j=1}^{s}\left(1-\frac{d_j}{r_j}\right),\qquad t_s\le t<t_{s+1}\cdot \tag{6}$$

4. Database and results

The database for our analysis was obtained from the Employment Office of the Republic of Slovenia and consists of registered unemployment spells completed between January 1, 2004 and July 4, 2008. For each unemployment spell, we obtain information about start and end date, gender, age, education level and region. Since the Employment Office of the Republic of Slovenia is not allowed to disclose personal data about the unemployed, a personal identifying number was added to enable identification of repeated unemployment spells. Our database includes 451,320 unemployment spells, out of which 61,416 (13.6%) are censored. The maximum length for a completed unemployment spell was 10,637 days.

Empirical analysis was conducted using SPSS and R. Table 4 presents the mean, standard deviation and the 95% confidence intervals for the mean for gender. The 389,904 unemployment spells completed between

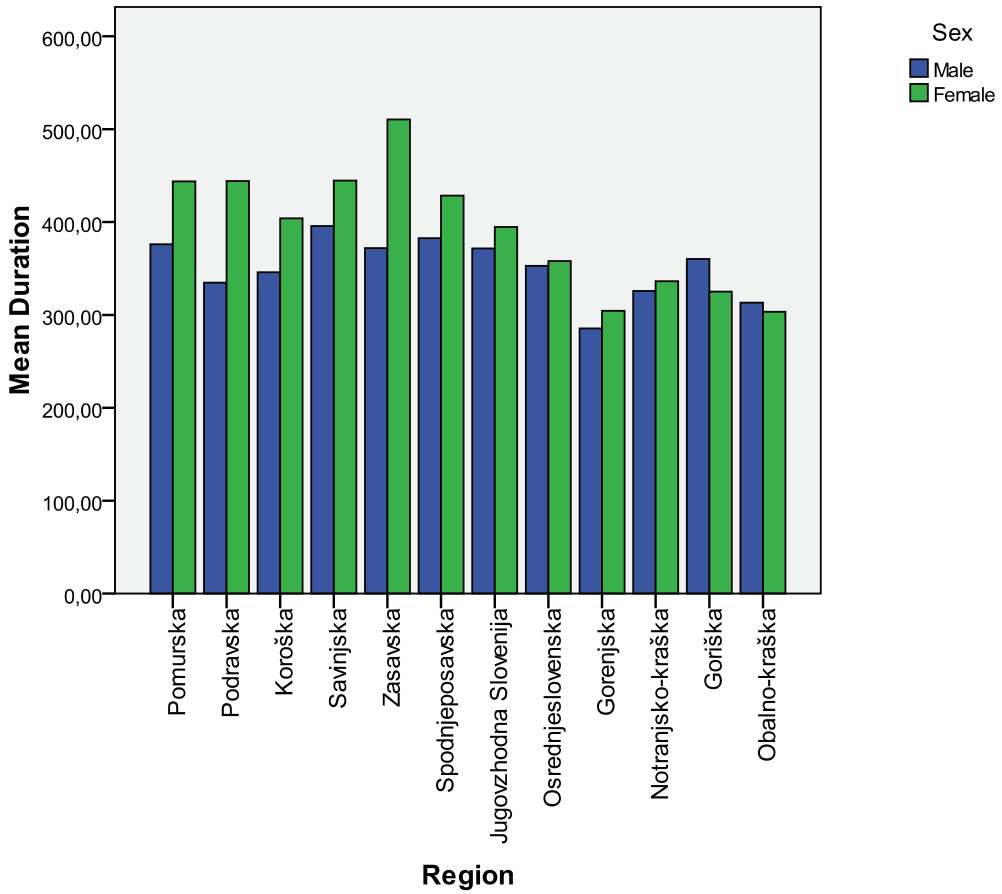

Figure 6: Gender disparities according to region

January 1, 2004 and July 4, 2008 were included in the analysis. In the observed period, the average length of unemployment was 378 days. The unemployment spells were on average 46 days (13%) longer for women than for men.

Women aged 18 years or less were unemployed for the longest period with a mean length of unemployment spells of 673 days (Figure 4). Men, on the other hand, exhibited the longest duration of unemployment spells in the age group 50 to 60 years (542 days). In total, the longest duration of unemployment spells was among those between 40 and 50 years with the mean length of unemployment spells being 537 days. Those between 25 and 30 years were on average unemployed only for 286 days.

The longest mean length of unemployment was for women with elementary school or no education (581 days, Figure 5). Women with a doctorate took on average the least time (175 days) to get a new job. Men with the longest period of unemployment were those with elementary school or no education, who needed on average 414 days to become employed again. With increased education level, however, the situation changes in favor of women. For men with post-secondary vocational or higher education, the mean duration of unemployment was 331 days and for women 255 days. On the other hand, duration of unemployment for men with lower education (i.e. elementary school or none to secondary education) was shorter compared to unemployed women, with an average mean length of 357 and 455 days, respectively. In total, the longest mean length of unemployment spells was held by the unemployed with elementary school or no education (487 days). With an increased level of education, the mean length of unemployment spells decreased to 230 days (for those unemployed with a doctorate).

Figure 6 depicts the regional disparities for duration of unemployment spells for women and for men. In all the regions except Goriška and Obalno-kraška, it takes more time for women to be re-employed than it takes for men.

In Goriška and Obalno-kraška the mean duration of unemployment spells for women was 35 days and 10 days, respectively, lower than for men. For women in the Zasavska region, unemployment took the longest, on average (510 days). Men with the longest mean length of unemployment spells were in the Savinjska region (396 days). In total, the longest mean length of unemployment spells appeared in the Zasavska region (444 days) and the shortest in the Gorenjska region (296 days).

4.1 Results of the Kaplan-Meier analysis

Recall that the survival function S(t) denotes the probability for an unemployment spell to last until time t or longer. Figure 7 presents survival function estimates for women and men. The differences for gender are clearly visible. The estimate for unemployed women decreases to 0 with a slower rate, indicating that unemployed men have a better position in the labor market. Figure 7 shows almost coinciding survival functions for women and men after 4 years of unemployment spells, implying that the differences among gender are more pronounced for unemployment spells that last less than 4 years.

To test the null hypothesis that the survival functions are the same for two or more levels of a given factor, the log rank test with the χ^2 - distribution under the null can be used. When performed for our data using the factor gender, the highly significant p – value (lower than 10^{-16}) confirms the results derived graphically from the Kaplan – Meier estimates of the survival function.

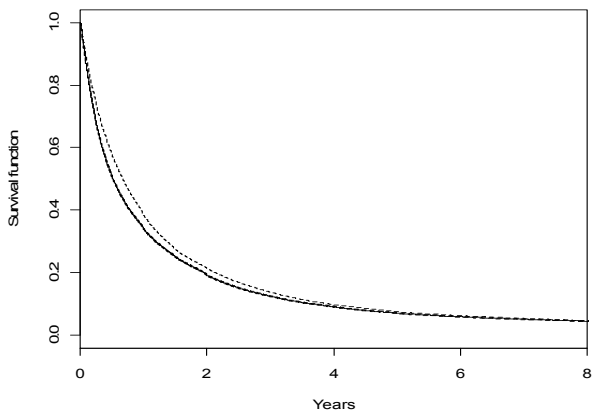

Figure 7: Kaplan-Meier estimates of survival functions by gender (dotted line indicates women)

The results are in line with studies of other countries. Examples of the research done on gender disparities for the duration of unemployment spells can be found in Danacica (2009) and Tansel and Tasci (2004). Both authors came to the same conclusion: the duration of unemployment for women is higher than the duration of unemployment for men. The study by Danacica (2009) for a Romanian county shows that the employment probability for men registered as unemployed is 1.6% higher than the probability for women with the same status. Tansel and Tasci (2004) also found that women experience higher unemployment durations than men, meaning that the probability for ending unemployment is substantially lower for women than for men.

The results of the analysis for Finland (Ollikainen 2006) indicate that the labor market position of women differs from men. Female labor market position is inferior to men's and is more responsive to family-related background characteristics. While having a family turned out to be an insignificant or a positive factor for men, it was mainly a negative factor for women, since it motivated women to stay at home, either as non-participants or as unemployed. Moreover, the study reveals that unemployment history is particularly scarring for men as they are penalized more than women. Women in Finland are expected to have a lower attachment to the labor market. There was a significant correlation between education and the probability of employment for both men and women, but the influence of education on women was stronger. Women with a high level of education had a better probability of employment than men.

Orazem, Werbel and McElroy (2003) showed that women had lower starting-pay-expectations: the differences were present even for men and women with the same major, job-market information, and job-search strategies. Lower pay expectations also led to lower pay outcomes for women. Women who engaged more intensively in career planning had pay expectations and starting pays that were more in line with those of men.

The research conducted by Lentz and Tranaes (2005) on Danish micro data showed that the job-finding effort of married men and women was affected by the income of their spouses, but in opposite directions. The more the man earned and the wealthier the woman, the longer it took for her to find a job. On the other hand, the results for men showed that the more the wife earned, the faster the husband found a job.

Löfmark (2008) found that being a married man simplified job findings. As the author suggests, this may be due to discrimination, a pattern of male breadwinners, or difficulties women have in combining housework and efficient job seeking.

One of the ways to lower unemployment is also self-employment. Entrepreneurship is an important source of innovation and overall economic growth and development. In Slovenia, it is rarer for women to start their own company due to fewer business opportunities, but when they do, they have as high an ambition for growth as their male counterparts (Tominc and Rebernik 2010).

5. Conclusion

Our analysis of gender disparities in the duration of unemployment spells in Slovenia reveals that there were more unemployed women than men in the period from 1999 to 2008. In 2009, that trend slightly changed, with a higher percentage of unemployed men (51.9%) than women (48.1%). The same trend, favoring women, was present also in the period from 1990 to 1998.

Survival analysis of the duration of unemployed spells presented in this paper was based on a dataset with more than 450,000 unemployment spells for individuals between January 2004 and July 2008. The analysis yielded the following results. The unemployment spells lasted on average 46 days (13%) longer for women than for men. Regarding the gender disparities based on age, women were unemployed longer than men in all age groups until 50 years old. After 50 the trend changes, and the duration of unemployment for men becomes longer than for women. Regarding gender disparities according to education, our analysis showed that unemployed women with post-secondary vocational or higher education have a better position in the labor market than men. Women with secondary education or lower, on the other hand, need more time to find a job than men. Gender disparities according to region showed that unemployed men find a job sooner than women in all regions, except in Goriška and Obalno-kraška. In the Goriška region unemployed men had to wait on average 35 days longer than women and in the Obalno-kraška region 10 days longer than women to find a job.

The empirical analysis offered here suggested that gender disparities in the duration of unemployment spells in Slovenia are significant. There are various reasons for gender disparities, and these can be found in the roles women play in families (the role of women in families is still perceived as quite stereotypical – women take care of family, and men earn money), unwillingness to move, less access to social networks and wage discrimination (on average women are still paid less than men).

Women still have difficulties getting employed even when they are highly educated. It is even more difficult for them to achieve higher positions. However, the situation has been changing over the last few years. The greater empowerment of women has led to women running big companies and the greater presence of women in politics. In 2009, there was actually a higher percentage of unemployed men in comparison to women, mostly due to job losses in certain sectors (manufacturing and construction) highly affected by the economic crisis. The growing number of men taking "maternity" leave also demonstrates that gender stereotypes are gradually changing.

Slovenia needs an active employment policy that is focused on providing work places for less educated young women in the Eastern regions. Since manufacturing companies that have employed low educated women (textiles) are increasingly downsizing, employment possibilities for these women should be encouraged in services. On the other hand, the unemployment spells of women with tertiary education are shorter in comparison to those for men, but still much more frequent. Our database shows that there are 107% more unemployment spells for women with tertiary education compared to men with the same level of education. This fact indicates unexploited potential and the underuse of female talents, which, if accessed, could contribute to higher competitiveness and the overall stronger economic growth of the country.

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The Hedging Effectiveness of Stock Index Futures: Evidence for the S&P CNX Nifty Index Traded in India

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Abstract:

This study evaluates optimal hedge ratios and the hedging effectiveness of stock index futures. The optimal hedge ratios are estimated from the ordinary least square (OLS) regression model, the vector autoregression model (VAR), the vector error correction model (VECM) and multivariate generalized autoregressive conditional heteroskedasticity (M-GARCH) models such as VAR-GARCH and VEC-GARCH using the S&P CNX Nifty index and its futures index. Hedging effectiveness is measured in terms of within sample and out of sample risk-return trade-off at various forecasting horizons. The analysis found that the VEC-GARCH time varying hedge ratio provides the greatest portfolio risk reduction and generates the highest portfolio returns.

Keywords: Hedging, M-GARCH, Forecast horizons, S&P CNX Nifty futures

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1. Introduction

A stock index futures contract is an agreement between a buyer and seller to buy or sell a specified quantity of security that matches the underlying index on a future date and for an agreed upon price. They are traded on organized exchanges and feature highly standardized contract terms in all aspects except price. Therefore, the clearing and the settlement are facilitated and can be guaranteed by the clearinghouse against the defaults of market participants.

Futures buyers make profits when the contract settlement price is higher than the price at which they traded it and suffer losses when the contract settlement price is lower. The position of futures sellers is opposite and symmetrical. Since the settlement price at maturity coincides with the value of the underlying index, the futures price bears a close relationship with the index value during the lifetime of the contract, which is enforced by the activity of arbitrageurs on both markets. The link with the underlying stock market and their liquidity makes the index futures important means for price discovery and risk transfer. The essence of the price discovery function depends on whether new information is reflected first in the futures markets or spot markets. Hedging is a process of reducing exposure to risk, and it is an act that reduces the price risk of a certain position in the spot market.

This paper provides an empirical investigation of the risk transfer functions of the futures market. Hedging with stock index futures applies directly to the management of stock portfolios. An optimal hedge ratio is usually defined as the proportion of a spot position that should be covered with an opposite position on a futures market. Still in the literature of futures trading, there is a continuous argument in estimating optimal hedge ratios. The hedgers need to hold a certain amount of futures contracts in order for them to hedge their spot assets on hand. Therefore, it is necessary to estimate how many futures contracts should be seized for each unit of spot

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asset and very important to calculate the appropriate hedge ratio.

Hedging strategy is measured by the extent to which it reduces risk and many techniques have been developed and applied to find the optimal hedge ratio (OHR) with the aim of reducing risk. Early investigation of hedging includes Working (1953), Johnson (1960), Stein (1961) and Ederington (1979). It postulates that the objective of hedging is to minimize the variance of the spot portfolio held by the investor. Therefore, the hedge ratio that generates the minimum portfolio variance should be the optimal hedge ratio, which is also known as the minimum variance hedge ratio. A large body of research has been developed in the estimation and evaluation of optimal hedging strategies.

In empirical investigations, the hedge ratio varies according to the conditioning information adopted. The earlier studies concluded that the conventional regression approach to optimal hedge ratio estimation fails to take proper account of all of the relevant conditioning information available to hedgers when they make hedging decisions and implicitly assumes that the covariance matrix of spot and futures prices, and hence optimal hedge ratios, are constant over time (Myers, 1991). The studies by Park and Switzer (1995a, 1995b), Lypny and Powalla (1998), Koutmos and Pericli (1998), Lien and Tse (1999), Floros and Vougas (2004), Bryant and Haigh (2005) and Bhaduri and Sethu Durai (2007) also supported the findings and came to similar conclusions. The vector auto regression (VAR) method incorporates the history of both spot and futures prices as conditional information, whereas the error correction model adds the previous basis as a conditioning variable. Statistical properties, for instance the cointegrations between the spot and futures prices, have been documented to support the information value of the lagged prices. Also, vector auto regressive and error correction models ignore the time varying nature of hedge ratios. Thus, multivariate generalized autoregressive conditional heteroscedasticity (M-GARCH) equations are adopted to describe the conditional second moments of the spot and futures prices. They concluded that the constant hedge ratio does not consider the joint distribution of the spot and futures varies over time and that the multivariate GARCH provides a flexible and consistent framework for estimating the time-varying hedge ratio by considering the conditional variance and covariance of the spot and futures prices. Therefore, the generalized auto regressive conditional heteroscedasticity (GARCH) model is incorporated with the bivariate vector auto regression (VAR) and vector error correction (VEC) models, which are known as: the VAR-GARCH and VEC-GARCH models. Based on the above background, the present paper compares the effectiveness of hedge ratios estimated from the ordinary least square regression, VAR, VECM and time varying M-GARCH models (i.e. VAR-GARCH and VEC-GARCH models).

The rest of the paper is structured as follows. After a brief introduction to the subject in Section 1, Section 2 presents the methodology and data of the study. Empirical results and discussions are presented in Section 3 and concluding remarks are presented in Section 4.

2. Methodology and Data

The present study employs regression, VAR, VECM and time varying M-GARCH models (i.e. VAR-GARCH and VEC-GARCH models) to determine optimal hedge ratios. Then, the performance of the hedge ratios is compared to assess whether the more advanced time varying hedge ratios calculated from Bollerslev, Engle and Wooldridge's (1988) Multivariate-GARCH model can provide more efficiency than other constant hedge ratios from the regression model, the Bivariate VAR model and the Vector Error-Correction Model. This study focuses on five different methods for estimating the hedge ratios and testing their effectiveness for both forecasted in-sample and out-samples data with 1, 5, 10 & 20 day horizons.

Model 1: The Conventional Regression Method

The conventional approach in estimating minimum variance hedge ratio (MVHR) relies upon the simple regression method. Let *St* and *Ft* be logged spot and futures prices, respectively, the one period minimum variance constant hedge ratio can be estimated from the expression:

$$\Delta S_t = \alpha + \beta \Delta F_t + \varepsilon_t \qquad (1)$$

Where, ε_t is the error term from OLS estimation, ΔSt and ΔFt representing spot and futures price changes. β, is the estimated optimal hedge ratio.

Model 2: The Bivariate VAR Model

The conventional regression method ignores many information variables that may be incorporated into models. Sometimes, previous price movements in the

spot and futures markets may affect the current price movements. The regression model is invalid due to the fact that the residuals are autocorrelated. In order to eliminate the serial correlation, the following bivariate VAR model incorporates these considerations.

$$\Delta S_t = \alpha_s + \sum_{i=1}^{n} \beta_{si} \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{si} \Delta F_{t-i} + \varepsilon_{st} \qquad (2)$$

$$\Delta F_t = \alpha_f + \sum_{i=1}^{n} \beta_{fi} \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{fi} \Delta F_{t-i} + \varepsilon_{ft} \qquad (3)$$

Where, $(\varepsilon_{st}, \varepsilon_{ft})$ are independently identically distributed (IID) random vectors. Let var $(\varepsilon_{st}) = \sigma_{ss}$, var $(\varepsilon_{ft}) = \sigma_{ff}$ and $\text{cov}(\varepsilon_{st}, \varepsilon_{ft}) = \sigma_{sf}$. The minimum variance hedge ratio is $\sigma_{sf} / \sigma_{ff}$, which is called the VAR hedge ratio.

Model 3: The Error Correction Model

The bivariate VAR model ignored the effect of co-integration of the two series and it is further addressed in Ghosh (1993), and Lien and Luo (1994). They argue that if the two price series are found to be cointegrated, a VAR model should be estimated along with the error-correction term, which accounts for the long-run equilibrium between spot and futures price movements. Thus, a VAR model can be modified as:

$$\Delta S_t = \alpha_s + \sum_{i=1}^{n} \beta_{si} \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{si} \Delta F_{t-i} + \lambda_s Z_{t-1} + \varepsilon_{st} \qquad (4)$$

$$\Delta F_t = \alpha_f + \sum_{i=1}^{n} \beta_{fi} \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{fi} \Delta F_{t-i} + \lambda_f Z_{t-1} + \varepsilon_{ft} \qquad (5)$$

Where, Z_{t-1} is an error correction term with (1-δ) as cointegrating vector and λ_s, λ_f as adjustment parameters, which measure how the dependent variable adjusts to the previous period's deviation from long-run equilibrium. The same procedure of generating the residual series and the minimum variance hedge ratio can be calculated using the VAR model.

Model 4: The Multivariate GARCH Model

In the above model, they have assumed that that the residuals have constant variances and covariances. In general, GARCH models assume that the conditional variance is affected by its own history and the history of the squared innovations. The advantage of GARCH models is that they have been able to capture the behavior of financial time series, such as serial correlation in volatility and co-movements in volatilities. The large literature on optimal hedging has extensively used multivariate GARCH models to generate minimum variance hedge ratios. Those studies include Myers (1991), Park & Switzer (1995a, 1995b), Lypny & Powalla (1998), Koutmos & Pericli (1998), Lien & Tse (1999), Floros and Vougas (2004) and Cotter & Hanly (2006). From a hedging point of view, the multivariate GARCH models are suitable, because they can estimate jointly the conditional variances and covariances required for a minimum variance hedge ratio. Thus, the multivariate GARCH model is applied to calculate the dynamic hedge ratios that vary over time based on the conditional variance and covariance of the spot and futures prices and generalized from GARCH (1, 1). A standard M-GARCH (1, 1) model is expressed as:

$$\begin{bmatrix} h_{ss} \\ h_{sf} \\ h_{ff} \end{bmatrix}_t = \begin{bmatrix} c_{ss} \\ c_{sf} \\ c_{ff} \end{bmatrix}_t + \begin{bmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} \end{bmatrix} \begin{bmatrix} \varepsilon_s^2 \\ \varepsilon_s \varepsilon_f \\ \varepsilon_f^2 \end{bmatrix}_{t-1} + \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} \\ \beta_{21} & \beta_{22} & \beta_{23} \\ \beta_{31} & \beta_{32} & \beta_{33} \end{bmatrix} \begin{bmatrix} h_{ss} \\ h_{sf} \\ h_{ff} \end{bmatrix}_{t-1} \qquad (6)$$

Where h_{ss}, h_{ff} are the conditional variances of the errors (ε_{st} ε_{ft}) from the mean equations. The M-GARCH process may be incorporated into the bivariate VAR and VEC models. In this model the main equations are the bivariate vector autorgression (VAR) and the vector error correction (VEC) model equations. As the model has a large number of parameters to be estimated, Bollerslev, Engle and Wooldridge (1988) proposed a restricted version of the above model with **α** and **β** matrices having only diagonal elements which allows for a time-varying conditional variance. The diagonal representation of the conditional variances elements h_{ss} and h_{ff} and the covariance element h_{sf} can be expressed as:

$$h_{ss,t} = c_{ss} + \alpha_{11}\varepsilon^2_{s,t-1} + \beta_{11}h_{ss,t-1} \quad (7)$$

$$h_{sf,t} = c_{sf} + \alpha_{22}\varepsilon_{s,t-1}\varepsilon_{f,t-1} + \beta_{22}h_{sf,t-1} \quad (8)$$

$$h_{ff,t} = c_{ff} + \alpha_{33}\varepsilon^2_{f,t-1} + \beta_{33}h_{ff,t-1} \quad (9)$$

The time varying hedge ratio has been estimated as the ratio between the covariance of spot and futures prices with the variance of futures prices. So $h_{sf,t}/h_{ff,t}$ will be the time varying hedge ratio and hence generates a more realistic time-varying hedge.

2.1. Estimating Hedging Effectiveness

In the above, four hedging strategies have been discussed to derive optimal hedge ratios, each of which is based on different econometric theories and involves different degrees of computational complexity. The ex-post and the ex-ante forecasting methods are then employed to compare the performance of these four types of hedge ratios. Hedging effectiveness is calculated by the variance reduction in the hedged portfolio compared to that of an un-hedged portfolio in each forecasting horizon. The returns on the un-hedged and the hedged portfolios are simply expressed as:

$R_{unhedged} = S_{t+1}-S_t$ *(10)*

$R_{hedged} = (S_{t+1}-S_t)-h^*(F_{t+1}-F_t)$ *(11)*

Where $R_{unhedged}$ and R_{hedged} are returns on un-hedged and hedged portfolios, respectively. Ft and St are logged futures and spot prices at time period *t*, respectively, h* is the optimal hedge ratio, and the return on the hedged portfolio is the difference between the return on holding the cash position and corresponding futures position. Similarly, the variance of the un-hedged and hedged portfolio is expressed as:

$$Var_{unhedged} = \sigma_s^2 \quad (12)$$

$$Var_{hedged} = \sigma_s^2 + h^{*2}\,\sigma_f^2 - 2h^*\sigma_{sf} \quad (13)$$

Where $Var_{unhedged}$ and Var_{hedged} represent variance of un-hedged and hedged portfolios, respectively. σ_s, σ_f and σ_{sf} are standard deviations of spot and futures prices and the covariance between them, respectively. The effectiveness of hedging (HE) can be measured by the percentage reduction in the variance of a hedged portfolio as compared with the variance of an un-hedged portfolio (Ederington, 1979). The variance reduction can be calculated as:

$$HE = 1 - \left[\frac{Var_{HedgedPortfolio}}{Var_{UnhedgedPortfolio}}\right] \quad (14)$$

HE = 1, then the futures contract completely eliminates risk and indicates a 100% reduction in the variance. When HE = 0, then hedging with the futures contract does not reduce risk. The hedging performance of the models may vary according to the hedge horizon. Therefore, hedging effectiveness of the four models will be considered over horizons of 1, 5, 10, 15 and 20 days in this context.

The data set employed in the present study is retrieved from the NSE website. It encompasses the S&P CNX Nifty Index and the corresponding NSE Stock Index Futures prices on a daily basis for the period of June 12, 2000 to November 28, 2007 summing up to a total of 1871 observations. Only the first 1721 observations are employed in the empirical tests, leaving the last 150 observations starting from April 27, 2007 for an out of sample hedge ratio performance comparison.

3. Empirical Results and Implications

Results of Unit Roots and Cointegration

In Table (1), the unit root tests for the logged spot of the S&P CNX Nifty Index and logged futures of the Nifty index with the levels and first differences are presented. The Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) and Phillips-Perron (pp) tests have reported to test the stationarity of the series. The results of unit root tests indicate that both series are non-stationary at levels and stationary at the first difference. Therefore, it is necessary to use the Johansen and Juselius (1990) cointegration test between the variables. The results of the cointegration test are presented in Table (2).

The trace and max-eigen value statistics suggest the existence of one cointegrating vector at a 5 percent level of significance. It shows the existence of a long-run relationship between the spot and futures prices.

3.1. Results of the Optimal Hedge Ratio

First, the optimal hedge ratio can be derived from the regression in equation-1, where the logged difference of spot prices are regressed on the difference of logged futures prices. Table (3) presents the results of the

regression model to obtain the optimal hedge ratio. The optimal hedge ratio (OHR) is 0.922355.

According to Akaike's Information Criteria (AIC) and the Schwarz Bayesian Criterion (SBC), the appropriate lag length of the bivariate VAR model is two. The test results of the optimal hedge ratio (OHR) from bivariate auto regression (BVAR) and the vector error correction (VEC) model are presented in Tables (4) and (5) simultaneously. In the vector error correction model (VECM), the coefficients of the error-correction term in the futures equation are significant as indicated by the large values of the *t*-ratios. It is noticed that λ_f =0.291372. This implies that the futures price series *Ft* has a greater speed of adjustment to the previous period's deviation from long-run equilibrium than the spot price series. This finding is consistent with the fact that on the delivery date of each contract the futures price has to adjust itself to the prevailing spot price. The hedge ratios of both models are estimated using the variance and covariance of the residuals.

In the Bivariate VAR model, $\text{var}(\varepsilon_{\text{st}}) = \sigma_{ss}$ =0.0000394, $\text{var}(\varepsilon_{\text{ft}}) = \sigma_{ff}$ =0.0000438 and cov $(\varepsilon_{\text{st}}, \varepsilon_{\text{ft}}) = \sigma_{sf}$ =0.0000405. The minimum variance hedge ratio as per VAR model result is $\sigma_{sf} / \sigma_{ff}$ =0.92527. In the VECM model, $\text{var}(\varepsilon_{\text{st}}) = \sigma_{ss}$ =0.0000394, var $(\varepsilon_{\text{ft}}) = \sigma_{ff}$ =0.0000434 and $\text{cov}(\varepsilon_{\text{st}}, \varepsilon_{\text{ft}}) = \sigma_{sf}$ =0.0000404. The minimum variance hedge ratio is $\sigma_{sf} / \sigma_{ff}$ =0.92974, which is the VECM optimum hedge ratio. As expected, and in line with most of the previous studies by Ghosh (1993) and others, the hedge ratio estimated by the error-correction model is greater than that obtained from other models. The reason is that it takes into account the tighter long-run equilibrium relationship between the spot and futures prices. The hedger ignorant of the cointegrating relationship between futures and spot prices is likely to take a smaller-than-optimal futures position.

The study is extended to examine the efficiency of both the Bivariate VAR model and the VEC model. The features of the residuals are investigated. Figures (1) and (2) plot the residuals from the BVAR and VEC models simultaneously. The plots of the actual values of the residuals from the BVAR and VEC models in Figures (1) and (2) simultaneously display volatility clustering even though the mean seems constant. The variance of the series changes through time and large (small) changes tend to be followed by large (small) changes of either sign. This characteristic has been commonly established in most economic time series by Mandelbrot (1963, 1967), Klien (1977), Engle (1982) etc. and it clearly shows the presence of an autoregressive conditional heteroskedasticity (ARCH) effect.

Another way to test for the presence of ARCH effects has been suggested by McLeod and Li (1983). According to McLeod and Li (1983), a casual examination of the sample autocorrelation function of the mean equation squared residuals for a significant Q-statistic at a given lag can be used to infer the presence of ARCH effects. The Ljung-Box Q-statistic at lag *n* is a test statistic for the null hypothesis that there is no autocorrelation up to order *n*. For squared residuals, the autocorrelation functions (ACF) and partial autocorrelation functions (PACF) from equations (2) and (3) which are presented in Table (6). Table (7) presents ACF and PACF from equations (4) and (5). They are all highly significant, confirming the presence of ARCH effects.

The above tests have all indicated the existence of heteroskedasticity in the VAR and VEC models. Therefore, it confirms the necessity of M-GARCH modeling to estimate the conditional variance and covariance for calculating time varying hedge ratios. This paper estimated the bivariate vector autorgression (VAR) and vector error correction (VEC) multivariate GARCH models of Bollerslev, Engle and Wooldridge (1988), in particular, the mean equations (first moment) modeled with bivariate vector autorgression (VAR) and vector error correction (VEC) models. In addition, time-varying variances and covariances are taken into account by modeling the second moment with VAR-GARCH and VEC-GARCH models. The estimation from variances and covariances and time-varying hedge ratios based on a GARCH model are expected to give better results. The estimated results are presented in Tables (8) and (9) from the VAR-GARCH and VEC-GARCH, respectively, in equations (7)-(9). The parameter estimates are all positive, definite and highly significant. Furthermore, the sum of the coefficients for each equation is close to unit, (for example: $c_{ss} + \alpha_{ss} + \beta_{ss}$ = 0.9776, $c_{sf} + \alpha_{sf} + \beta_{sf}$ =0.9786 and $c_{ff} + \alpha_{ff} + \beta_{ff}$ =0.9820 in the VAR-GARCH model and $c_{ss} + \alpha_{ss} + \beta_{ss}$ =0.9775, $c_{sf} + \alpha_{sf} + \beta_{sf}$ =0.9734 and $c_{ff} + \alpha_{ff} + \beta_{ff}$ =0.9814 in the VEC-GARCH model) which suggests the persistence of ARCH effects in

the data sets. This particular phenomenon in the GARCH model is examined by Engle and Bollerslev (1986) and termed an integrated generalized auto regressive conditional heteroskedasticity (IGARCH) model. This implies that current information remains important for forecasts of the conditional variance at all horizons.

The mean values of the time varying hedge ratios of the VAR-GARCH and VEC-GARCH models are 0.95731 and 0.96375, respectively. Hence, the hedge ratio estimated by VEC-GARCH models is greater than the values obtained from all other models. Therefore, hedge ratios estimated by the VEC-GARCH model should be more efficient in reducing the risk of spot prices. The optimal hedge ratios (OHR) estimated from the four different models are listed in Table (10).

3.2. Results of Hedging Effectiveness

Using the above estimation results, this paper also calculates the post-sample hedge ratios and compares the hedging performance of each strategy. In the sample, daily data on the S&P CNX Nifty Index and the corresponding NSE Stock Index Futures prices have been considered for the period from June 12, 2000 to April 26, 2007, summing up to a total of 1871 observations, and the 150 observations starting from April 27, 2007 to November 28, 2007 have been considered for an out of sample hedge ratio performance comparison. The results for the in-sample and post-sample performances are presented to obtain the hedging effectiveness with 1, 5, 10, 15 and 20 day horizons in Tables (11)-(16).

The different hedging strategies for within sample and out of sample have been presented. The study considers hedge horizons of 1, 5, 10, 15 and 20 days. The mean returns, variance returns and average variance reduction have been estimated for 1, 5, 10, 15 and 20 day horizons for both within sample and out of sample validations.

A hedging strategy is effective only if the mean return from the strategy is higher than the competing strategies and it reduces a significant portion of the variance with respect to its unhedged strategy. Table (11) gives within sample mean returns, Table (12) gives within variance returns and Table (13) gives the percentage in variance reduction for different hedging ratios. These tables show the trade-off between risk and returns. In the one-day forecasting horizon, OLS gives the best hedging strategy because it generates the greatest mean returns, lowest variance returns and highest percentage in variance reduction compared to other models. In the other day forecasting horizons, OLS gives the greatest mean return, highest variance return and lowest variance in reduction compared to other models. Hence it provides the greatest risk. Therefore, the results reveal that the OLS provides the highest mean returns in all forecasting horizons and provides the lowest variance reduction in longer forecasting horizons, except for one-day forecasting horizons in the case of within-sample forecasts. The results show that the time-varying VAR-GARCH and VEC-GARCH give the best hedge strategy in the long horizons. The VEC-GARCH model generates the lowest return and highest percentage in variance reduction in the longer forecasting horizons compared to the other four models except for one-day forecasting horizons. Overall, in the case of the within sample, the VEC-GARCH provides the best hedging strategy in the long horizons and OLS provides the best hedging strategy in the short horizons.

Tables (14) and (15) show the out of sample mean returns and variance returns, respectively. Table (16) shows the percentage in variance reduction for the out of sample. In the one-day horizon, the OLS gives the lowest mean returns, lowest variance returns and highest percentage in variance reduction. It generates the lowest risk compared to other models in the case of one-day forecasting horizons. In the case of 5, 10, 15 and 20 day forecasting horizons, VEC-GARCH provides the highest mean returns, lowest variance returns and highest percentage of variance reduction. It generates the smallest risk compared to other models such as: the OLS, VAR, VECM and VAR-GARCH. Overall, the time varying VEC-GARCH provides the best hedging strategy compared to the other models.

4. Conclusion

The present study examines the performance of various hedge ratios estimated from different econometric models and compares them in terms of the risk-return trade-offs of the within sample and out of sample forecasting horizons. In the one-day within sample forecasting horizons, the conventional regression model (OLS) provides the best hedging strategy compared to other models. On the other hand, the hedge ratio calculated from the conventional regression model performs the worst in terms of reducing portfolio variance, but yields the highest rate of return in the case of 5, 10, 15 and 20 day forecasting horizons. In the long within sample forecasting horizons, VEC-GARCH generates the best hedging strategy with the lowest

mean returns, lowest variance returns and highest percentage in variance reduction. In the performance of hedge ratios, the out of sample forecast gives the highest returns in all horizons. The OLS model provides the lowest mean return, lowest variance return and highest percentage in variance reduction in the one-day forecasting horizon. In addition, the VEC-GARCH provides the lowest variance returns and highest percentage in variance reduction in 5, 10, 15 and 20 day forecasting horizons. It generates the lowest risk with the highest returns. By and large, the in-sample and out-of-sample forecasts conclude that the time varying VEC-GARCH gives the best hedge strategy compared to the OLS, VAR and VECM and VAR-GARCH models.

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Tables and Figures

Constraint	DF		ADF		PP	
	Levels	Difference	Levels	Difference	Levels	Difference
			Logged Spot price			
Intercept	1.28	-7.79*	0.82	-30.43*	0.70	-37.52*
Intercept and Trend	-0.51	-29.63*	-2.28	-30.54*	-2.31	-37.58*
			Logged Futures price			
Intercept	1.16	-4.14*	0.73	-40.09*	0.72	-40.07*
Intercept and Trend	-0.54	-16.76*	-2.33	-40.18*	-2.34	-40.18*

Note: * denotes 1% level of significance
Table 1: The Unit Root Test

Null Hypothesis	Alternative Hypothesis			5% critical value
λ_{trace} tests		Eigen value	(λ_{trace}) Stat.	
$r = 0$ *	$r > 0$	0.047	83.61	15.49
$r \leq 1$	$r > 1$	0.0002	0.38	3.84
$\lambda_{\max}$ test		Eigen value	$\lambda_{\max}$ Stat.	
$r = 0$ *	$r = 1$	0.047	83.23	14.26
$r = 1$	$r = 2$	0.0002	0.38	3.84

Table 2: Cointegration Tests of Johansen

	Coefficients	t-Statistic
A	0.000023	0.62917
B	0.922355*	170.0909
R^2	0.943946	

Note: * denotes 1% level of significance
Table 3: Results of Regression Model

$$\Delta S_t = \alpha_s + \sum_{i=1}^{n} \beta_{si}\, \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{si} \Delta F_{t-i} + \varepsilon_{st}$$

$$\Delta F_t = \alpha_f + \sum_{i=1}^{n} \beta_{fi}\, \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{fi}\, \Delta F_{t-i} + \varepsilon_{ft}$$

	ΔS_t	t-statistics	ΔF_t	t-statistics
α_i i=s,f	0.000265***	1.74656	0.000266***	1.65983
ΔS_{t-1}	0.289698*	2.71718	0.561593*	4.99910
ΔS_{t-2}	-0.043978	-0.42273	0.134053	1.22291
ΔF_{t-1}	-0.17898***	-1.76728	-0.484915*	-4.54418
ΔF_{t-2}	-0.051473	-0.51527	-0.207406**	-1.97051

Note: * denotes 1% level of significance, ** denotes 5% level of significance and *** denotes 10% level of significance.
Table-4: Estimates of Bivariate Vector Autorgression (VAR) Model

$$\Delta S_t = \alpha_s + \sum_{i=1}^{n} \beta_{si}\, \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{si} \Delta F_{t-i} + \lambda_s Z_{t-1} + \varepsilon_{st}$$

$$\Delta F_t = \alpha_f + \sum_{i=1}^{n} \beta_{fi}\, \Delta S_{t-i} + \sum_{i=1}^{n} \gamma_{fi} \Delta F_{t-i} + \lambda_f Z_{t-1} + \varepsilon_{ft}$$

α_i i=s,f	0.000266***	1.75166	0.000267	1.67676
ΔS_{t-1}	0.219787**	1.90479	0.385085*	3.17839
ΔS_{t-2}	-0.090679	-0.83880	0.016145	0.14223
ΔF_{t-1}	-0.109270	-0.98955	-0.308906*	-2.66419
ΔF_{t-2}	-0.006494	-0.06254	-0.093845	-0.86081
Z_{t-1}	0.115407	1.58047	0.291372*	3.80021

Note: * denotes 1% level of significance, ** denotes 5% level of significance and *** denotes 10% level of significance.
Table-5: Estimates of Vector Error Correction (VEC) Model

	Equation-2				Equation-3			
Lags	AC	PAC	Q-Stat	Prob.	AC	PAC	Q-Stat	Prob.
1	0.503	0.503	435.89	0.000	0.433	0.433	322.56	0.000
2	0.230	-0.031	526.90	0.000	0.164	-0.029	368.65	0.000
3	0.138	0.046	559.51	0.000	0.135	0.092	400.11	0.000
4	0.120	0.052	584.51	0.000	0.105	0.020	419.29	0.000
5	0.107	0.029	604.16	0.000	0.100	0.050	436.55	0.000
6	0.068	-0.009	612.02	0.000	0.059	-0.013	442.56	0.000
7	0.050	0.014	616.38	0.000	0.035	0.004	444.66	0.000
8	0.082	0.061	628.10	0.000	0.081	0.068	456.01	0.000
9	0.106	0.044	647.61	0.000	0.147	0.099	493.19	0.000
10	0.074	-0.013	657.16	0.000	0.071	-0.047	501.95	0.000
11	0.041	-0.006	660.05	0.000	0.036	0.008	504.22	0.000
12	0.084	0.076	672.13	0.000	0.058	0.028	509.97	0.000
13	0.086	0.004	684.96	0.000	0.088	0.049	523.45	0.000
14	0.069	0.007	693.33	0.000	0.052	-0.026	528.11	0.000
15	0.052	0.007	697.94	0.000	0.041	0.023	531.09	0.000
16	0.062	0.031	704.55	0.000	0.043	0.011	534.34	0.000
17	0.043	-0.023	707.73	0.000	0.038	-0.003	536.83	0.000
18	0.044	0.018	711.02	0.000	0.039	-0.001	539.45	0.000
19	0.031	-0.003	712.67	0.000	0.025	0.004	540.50	0.000
20	0.059	0.048	718.66	0.000	0.040	0.030	543.23	0.000

Table 6: Squared residuals from the Bivariate VAR Model

	Equation-4				Equation-5			
Lags	AC	PAC	Q-Stat	Prob.	AC	PAC	Q-Stat	Prob.
1	0.501	0.501	431.71	0.000	0.417	0.417	299.73	0.000
2	0.227	-0.032	520.56	0.000	0.154	-0.025	340.41	0.000
3	0.14	0.052	554.45	0.000	0.139	0.101	373.77	0.000
4	0.118	0.044	578.5	0.000	0.098	0.007	390.2	0.000
5	0.103	0.029	596.85	0.000	0.091	0.049	404.47	0.000
6	0.067	-0.006	604.56	0.000	0.056	-0.011	409.84	0.000
7	0.051	0.014	609.07	0.000	0.036	0.008	412.02	0.000
8	0.082	0.06	620.74	0.000	0.078	0.062	422.6	0.000
9	0.107	0.047	640.53	0.000	0.145	0.103	459.18	0.000
10	0.077	-0.01	650.87	0.000	0.078	-0.034	469.71	0.000
11	0.04	-0.011	653.68	0.000	0.034	-0.003	471.71	0.000
12	0.083	0.077	665.49	0.000	0.055	0.026	476.91	0.000
13	0.09	0.011	679.47	0.000	0.096	0.063	492.8	0.000
14	0.068	0.012	687.48	0.000	0.047	-0.036	496.66	0.000
15	0.052	0.01	692.1	0.000	0.042	0.029	499.66	0.000
16	0.062	0.031	698.77	0.000	0.044	0.007	503.04	0.000
17	0.042	-0.023	701.88	0.000	0.035	-0.001	505.23	0.000
18	0.046	0.021	705.48	0.000	0.04	0.1	508.01	0.000
19	0.034	-0.003	707.46	0.000	0.029	0.006	509.49	0.000
20	0.06	0.048	713.74	0.000	0.042	0.03	512.5	0.000

Table 7: Squared residuals from the VEC Model

Variable	Coefficient	t-Statistic	Probability
c_{ss}	9.28E-07	1.273718	0.2029
c_{sf}	8.64E-07	1.241838	0.2145
c_{ff}	7.64E-07	1.293859	0.1959
α_{ss}	0.000699	2.299586	0.0216
α_{sf}	0.000566	1.977283	0.0482
α_{ff}	0.000453	1.846006	0.0651
β_{ss}	0.976941	55.85609	0.0000
β_{sf}	0.978078	57.01693	0.0000
β_{ff}	0.981563	70.74960	0.0000

Table 8: The Estimates of the VAR-GARCH Model

Variable	Coefficient	t-Statistic	Probability
c_{ss}	9.30E-07	5.883056	0.0000
c_{sf}	8.74E-07	5.858305	0.0000
c_{ff}	7.84E-07	5.640412	0.0000
α_{ss}	0.000915	4.440057	0.0000
α_{sf}	0.000788	4.740649	0.0000
α_{ff}	0.000652	4.909928	0.0000
β_{ss}	0.976672	253.2110	0.0000
β_{sf}	0.977556	261.2652	0.0000
β_{ff}	0.980696	292.2567	0.0000

Table 9: The Estimates of the VEC-GARCH Model

Method	OHR
OLS	0.92236
BVAR	0.92528
VECM	0.92974
VAR-GARCH	0.95731
VEC-GARCH	0.96375

Table 10: Optimal Hedge Ratios from different Models

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	0.00005%	0.00020%	0.00053%	0.00054%	0.00062%
VAR	0.92528	0.00003%	0.00019%	0.00050%	0.00052%	0.00060%
VECM	0.92974	0.00001%	0.00017%	0.00047%	0.00049%	0.00057%
VAR-GARCH	0.95731	-0.00011%	0.00005%	0.00024%	0.00028%	0.00034%
VEC-GARCH	0.96375	-0.00014%	0.00003%	0.00018%	0.00024%	0.00029%

Table 11: Mean Return for within sample

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	0.000185%	0.000047%	0.000034%	0.000029%	0.000028%
VAR	0.92528	0.000184%	0.000047%	0.000032%	0.000028%	0.000026%
VECM	0.92974	0.000184%	0.000046%	0.000029%	0.000025%	0.000021%
VAR-GARCH	0.95731	0.00019%	0.000034%	0.000016%	0.000011%	0.000009%
VEC-GARCH	0.96375	0.000189%	0.000032%	0.000014%	0.000009%	0.000007%

Table 12: Variance Return for within sample

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	95.30%	98.91%	99.24%	99.33%	99.37%
VAR	0.92528	95.31%	98.94%	99.28%	99.38%	99.41%
VECM	0.92974	95.31%	98.99%	99.34%	99.44%	99.48%
VAR-GARCH	0.95731	95.23%	99.24%	99.63%	99.75%	99.79%
VEC-GARCH	0.96375	95.19%	99.27%	99.68%	99.80%	99.85%

Table 13: Percentage in Variance Reduction for within sample

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	0.00001%	-0.00271%	-0.00521%	-0.00612%	-0.00727%
VAR	0.92528	0.00018%	-0.00254%	-0.00496%	-0.00587%	-0.00699%
VECM	0.92974	0.00043%	-0.00228%	-0.00457%	-0.00549%	-0.00659%
VAR-GARCH	0.95731	0.001988%	-0.00068%	-0.00219%	-0.00314%	-0.00404%
VEC-GARCH	0.96375	0.00235%	-0.00031%	-0.00163%	-0.00259%	-0.00345%

Table 14: Mean Return for out of sample

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	0.000097%	0.000027%	0.000022%	0.000022%	0.000025%
VAR	0.92528	0.000098%	0.000026%	0.000020%	0.000020%	0.000023%
VECM	0.92974	0.000099%	0.000024%	0.000018%	0.000018%	0.000020%
VAR-GARCH	0.95731	0.000112%	0.000017%	0.000008%	0.000006%	0.000007%
VEC-GARCH	0.96375	0.000116%	0.000016%	0.000007%	0.000005%	0.000005%

Table 15: Variance Return for out of sample

Method	OHR	One-Day	Five-Day	Ten-Day	Fifteen-Day	Twenty-Day
OLS	0.92236	97.89%	99.46%	99.52%	99.49%	99.46%
VAR	0.92528	97.88%	99.49%	99.56%	99.54%	99.49%
VECM	0.92974	97.85%	99.52%	99.61%	99.59%	99.56%
VAR-GARCH	0.95731	97.57%	99.66%	99.83%	99.85%	99.85%
VEC-GARCH	0.96375	97.48%	99.67%	99.86%	99.89%	99.89%

Table 16: Percentage in Variance Reduction for out of sample

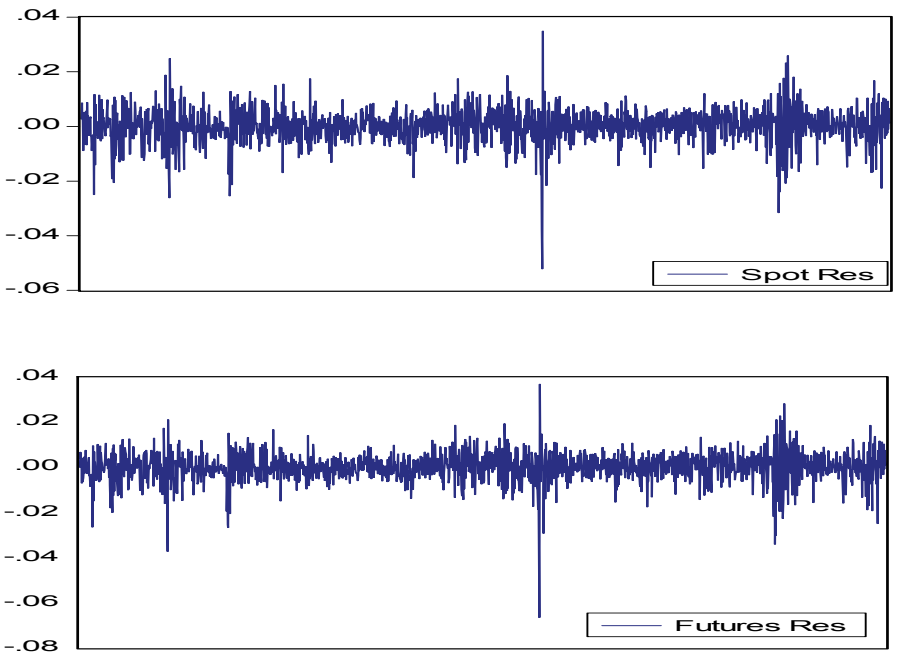

Figure 1: Residual series from Spot and Future equation in Bivariate VAR model

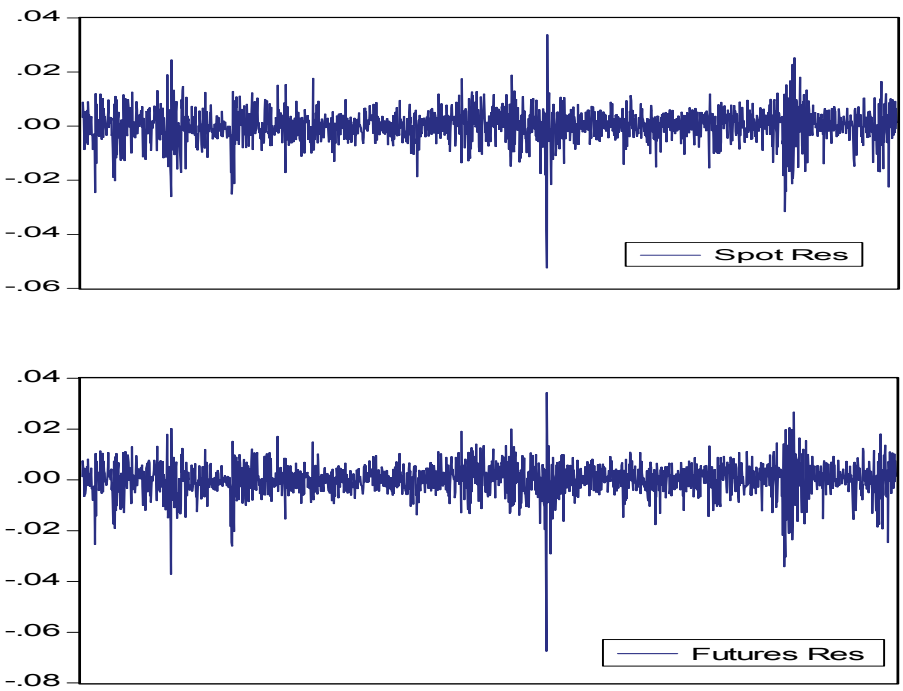

Figure 2: Residual series from Spot and Future equation in VECM model

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