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HABILITATION THESIS

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Domain: FINANCE

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CONTENT

ACKNOWLEDGEMENT

This Habilitation Thesis gathers together my recent scientific and professional contributions in the field of Finance. A great great part of all my scientific achievements in Finances are the result of the fruitfull collaboration with the researchers of the Institute for Economic Forecasting in Bucharest (IPE). The interest for Finances as scientific domain was significantly enhanced while attending conferences, workshops, or simple discussions and debates at the IPE. I therefore address my gratitude to all my colleagues there, especially to acad.prof.dr. Lucian Albu, CSI Mariana Iordan and CS Sâman Corina, who were not only my coauthors on topics in Finances, but also research partners who have provided to me valuable feedback on my own research ideas over time, as well as encouragement and support.

(A) ABSTRACT

This habilitation thesis is aimed at presenting the most important academic scientific and professional achievements as well as my development plans for the next years. The presentation of the main research results concerns only the period after completing the doctoral studies and makes reference only to the most relevant publications.

The habilitation thesis is structured into two main parts. The first part entitled "Scientific and Professional Achievements" separately presents my academic and scientific achievements in the domain of Finance since graduation from the Ph.D. studies. In fact, my contributions that will be synthesized in this thesis, regard the fields of International Finance, Public Finance and Financial markets. They can be classified into three main categories: Public expenditure policy, Income redistribution and social policy, and International Finance and Financial markets. These Finance sub-domains reflect my recent topics of research, as well as important parts of my professional activity reflected for instance by the teaching activity and the activity of rising research funds by research research contracts and grants in the field of finance.

In the first section, I present my academic and scientific achievements, step by step, by making reference at my teaching activity, the educational grants and contracts that I have earned in my career, the performances of my students, participation in conferences, workshops, summer schools and research seminars, some of them being organized be me at my university, as well as to my publishing activity aimed to facilitate the transfer of knowledge to students and to also broadly disseminate my research output.

The second part entitled "Professional, Scientific and Academic Development Plans" synthesizes the career development plans in the field of Finance, with regard to both the university specific- and research activities. The main aspects that I mention in this sections are about the research issues that I plan to investigate in future, the conferences that I want to attend, the doctoral programme in the specialisation of Finance that I want to join as Ph.D. supervisor at the Faculty of Economic Sciences within Transilvania University of Brasov, and the external funding that I intend to attract to our faculty by research and educational contract and grants, to stimulate collaborative research, to improve the teaching activity and academic curricula, as well as to finally increase the visibility of our faculty at the international level.

Before to present the main directions of research undertaken after finalizing the Ph.D. studies, I make a brief exposure of the main steps that I have followed in my academic career. In the year 1997 I graduated from the Faculty of Economic Sciences of Transilvania University of Brasov, specialization "International Economic Relations". Two years after graduation I enrolled

at the Ph.D. programme of ASE Bucharest, Faculty of General Economics. My Ph.D. thesis entitled "The contemporary concept of poverty. Theory and measurement" was conducted under the scientific supervision of acad.prof.dr. Tudorel Postolache, and was defended in January 2004 at ASE Bucharest. From 2006 to 2008 I conducted postdoctoral studies at the research institute LISER (former CEPS/ INSTEAD) from Luxembourg, on the topic of income redistribution. During my postdoctoral activity I had to adapt econometric methods used in other research fields (such as Psychology and Epidemiologic studies) to the measurement and analysis of income redistribution, social inequality and poverty. At present I work as Professor in the Department "Finance, Accounting and Economic Theory" within the Faculty of Economic Sciences of Transilvania University of Brasov.

In 2014 I defended at the Academy of Economic Studies in Bucharest my first Habilitation Thesis in the field of International Business and Economics, and from 2015 onwards I hold the position of Ph.D. supervisor at the Faculty of International Economic Relations within the Academy of Economic Studies (Bucharest). This first Habilitation Thesis points out my achievements in the early stage of my career. However, my entire scientific and professional activity has always had a strong interdisciplinary character, framing different research issues at the confluence of economics, public finances and econometrics. Especially in recent years, my focus has slightly moved in a prevalent manner to the field of finances, by approaching a series of topics such as the public expenditure and policies (education, social care/ assistance and health), financial markets (financial integration and stock indexes), and income redistribution (social inequality, social policies, welfare).

The scientific and professional work of all habilitated persons should be outstanding or excellent. I am not sure to what extent I fit this high requirement, but however I have tried to get as close as possible to this standard. In the scientific activity I was always focused on publishing in highly ranked international WOS-indexed journals, especially in those recently classified by Uefiscdi in the yellow and red areas upon the IF or AIS factor. Moreover, my research papers are applied on real microeconomic or macroeconomic data, by using different quantitative econometric techniques. With this quantitative focus, I brought new contributions to the literature. In the professional activity which is mostly the teaching activity in my case, I was concerned to provide high quality lectures and seminars, using new teaching methods and interactive case-studies.

Among my publications, a number of 16 research papers are published in ISI/ WOS ranked national and international journals, of which 7 papers are published in journals that belong to yellow or red WOS areas, according to the UEFISCDI classification. All WOS indexed papers have been published while holding the Ph.D. title, and moreover, a number of 10

WOS-indexed papers have been published after defending my Habilitation thesis in the field of International Business and Economics in 2014.

Beside the publication of articles in WOS journals, I wrote a number of books as single author or co-author, of which one book that I edited and also co-authored was published with the prestigious international publisher Palgrave MacMillan, and was awarded by AFER (Association of Romanian Economic Sciences Faculties) for the category of "2013 Economic Publications". Without neglecting the importance of theoretical aspects, I have tried to put much emphasis in all my research contributions on the quantitative aspects, being oriented toward finding new empirical insights when using innovative and complex econometric models. In the both fields of research, the dynamics and longitudinal dimensions are rather explored than the cross-sectional ones. The interest for panel-datasets and panel data models can be justified by the specific of the research topics, because both, the poverty/ deprivation and economic growth are processes, and therefore they require longitudinal representation and panel data analysis.

The postdoctoral studies allowed me, over the stage of three years, to bring innovative contributions to the measurement of economic and social phenomena, through the development and adaptation of a methodology which is specific to the psychometrics. This model is called Item Response Theory and subsequently has been applied by me to the measurement of several financial and economic phenomena. The major aim that has guided my entire research activity by now was to bring innovative contributions to the literature, either in the methodological field, or in the area of empirical findings. I have clearly underlined these aspects in the thesis. I will follow this aim in future as well, not only in the research activity, but hopefully in my future Ph.D. supervision activity. The innovative contributions to the literature are in our days a necessary condition for publication in high-ranked journals or with prestigious editors, being at the same time a measure of the performance acknowledgement in the research activity.

REZUMAT

Scopul principal al acestei teze de abilitare este de a prezenta cele mai importante realizări în plan academic și științific, precum și planurile de dezvoltare viitoare a carierei. Prezentarea rezultatelor obținute în planul cercetării științifice vizează doar perioada de după finalizarea studiilor doctorale, și face referință doar la cele mai relevante publicații.

Teza de abilitare este structurată în două părți. In prima parte a tezei, care este intitulată „Realizări academice și profesionale", am prezentat separat principalele mele realizări în plan academic și științific obținute după finalizarea studiilor doctorale. De fapt, toate contribuțiile pe care le voi sintetiza în această teză sunt în domeniul Finanțelor. Ele pot fi clasificate în trei

categorii principale, şi anume: (1) Cheltuieli publice şi politici publice, (2) Distribuţia venitului şi politici sociale, şi (3) Pieţe financiare. Acestea reflectă nu doar direcţiile mele recente de cercetare, dar şi părţi importante din întreaga mea activitate profesională din sfera finanţelor, precum cele legate de activitatea de predare la universitate sau de atragere de fonduri de cercetare prin contracte şi granturi de cercetare.

În prima parte a tezei prezint realizările mele în plan academic, pas cu pas, făcând referire la activitatea de predare, granturile şi contractele educaţionale câştigate de-a lungul timpului, la performanţele studenţilor coordonaţi de mine, la conferinţele, workshopurile, şcolile de vară şi seminariile de cercetare la care am participat şi în organizarea cărora m-am implicat, şi la activitatea de publicare direcţionată spre a facilita transferul de cunoştinţe studenţilor, dar şi la creşterea vizibilităţii rezultatelor cercetării mele.

A doua parte a tezei, care se numeşte „Planuri de dezvoltare academică, ştiinţifică şi profesională", sintetizează planurile de dezvoltare a carierei, cu privire atât la activitatea de din sfera academică, cât şi la cea de cercetare. Principalele aspecte pe care le menţionez în această secţiune sunt legate de planurile şi ideile din sfera cercetării, conferinţele viitoare la care doresc să particip, la programul de doctorat în finanţe, parte a Scolii Doctorale Interdisciplinare a Universităţii Transilvania din Braşov la care doresc să particip în calitate de membru. Totodată, în această parte voi face referiré şi la fondurile externe pe care intenţionez să le atrag în facultate prin granturi şi contracte educaţionale şi de cercetare, în vederea stimulării cercetării colaborative, îmbunătăţirii activităţii de predare şi a ofertei educaţionale, precum şi pentru creşterea vizibilităţii facultăţii noastre pe plan internaţional.

Înainte de a prezenta principalele domenii de cercetare pe care le-am urmat dupa finalizarea studiilor de doctorat, voi face o scurtă prezentare a etapelor parcurse în cariera academică. În 1997 am absolvit Facultatea de Ştiinţe Economice a Universităţii Transilvania din Braşov, specializarea Relaţii Economice Internaţionale. La doi ani după absolvire, m-am înscris la şcoala de doctorat a Facultăţii de Economie Generală din cadrul ASE Bucureşti. Teza mea de doctorat intitulată „Conceptul contemporan de sărăcie. Teorie şi cuantificare" a fost realizată sub îndrumarea ştiinţifică a acad.prof.dr. Tudorel Postolache, şi a fost susţinută public în ianuarie 2004 la ASE Bucureşti. Între 2006 şi 2008 am urmat studii postdoctorale la institutul de cercetare LISER (fost CEPS/ INSTEAD din Luxemburg), pe tema redistribuirii venitului. În timpul activităţii mele de post-doctorat am studiat şi adaptat o serie de metode econometrice specifice altor domenii precum Psihologie şi Studii epidemiologice la măsurarea şi analiza procesului de redistribuire a venitului, a inegalităţii sociale şi sărăciei. În prezent sunt angajată ca profesor universitar în cadrul departamentului „Finanţe, Contabilitate şi Teorie Economică" din cadrul Facultăţii de Ştiinţe Economice a Universităţii Transilvania din Braşov.

În anul 2014 mi-am susținut prima Teză de Abilitare la Academia de Studii Economice din București (ASE) în domeniul Economie și Afaceri Internaționale, și începând cu anul 2015 sunt îndrumător de doctorat la ASE, Facultatea de Relații Economice Internaționale. Această primă teză de abilitare valorifică și punctează realizările mele din prima parte a carierei universitare. Cu toate acestea, întreaga mea activitate științifică și profesională pe care am desfășurat-o de-a lungul anilor (de la obținerea titlului de doctor) a avut un pronunțat caracter interdisciplinar, prin studiul diferitelor probleme economice aflate la confluența dintre economie, finanțe și econometrie. În special în ultimii ani atenția mea în cercetare s-a focalizat pe domeniul finanțelor, prin abordarea unor teme specifice domeniului, precum: cheltuieli și politici publice (educație, asistență social, cheltuieli militare și sănătate), piețe financiare (integrare financiară și indici bursieri), și redistribuirea venitului (inegalitate socială, sărăcie, politici sociale și bunăstare socială).

Consider că activitatea științifică și profesională a doctorilor abilitați trebuie să fie una remarcabilă/ excelentă. Nu știu în ce măsură am atins acest deziderat înalt, însă cu siguranță eforturile mele din ultimii ani s-au canalizat spre acest scop. De exemplu, în activitatea științifică am fost interesată de publicarea lucrărilor mele în jurnale internaționale de top WOS, în special în cele clasificate de Uefiscdi în zona galbenă și roșie după factorul de impact sau cel de influență. Toate lucrările mele științifice analizează date microeconomice sau macroeconomice prin intermediul a diferite tehnici econometrice cantitative. Având acestă orientare mai degrabă cantitativă decât descriptivă asupra datelor, consider că am reușit să aduc contribuții noi, inovative la literatura de specialitate. În activitatea profesională, care în cazul meu este reprezentată în mare măsură de activitatea de predare, am încercat să furnizez studenților și masteranzilor cursuri și seminarii de înaltă calitate, prin utilizarea de metode noi de predare și studii de caz interactive.

Din totalitatea lucrărilor mele științifice, un număr de 16 lucrări au fost publicate în reviste naționale și internaționale indexate ISI/ Web of Science (WOS), dintre care 7 lucrări sunt publicate în reviste care se încadrează în zona galbenă sau roșie a revistelor WOS conform clasificării UEFISCDI. Toate publicațiile mele în reviste WOS au fost elaborate după obținerea titlului de doctor, iar un număr de 10 lucrări WOS au fost publicate după obținerea abilitării în domeniul Economie și Afaceri Internaționale în anul 2014 (cf. Ordin de Ministru din 2015).

În afară de publicarea de articole în reviste indexate WOS, am elaborat un număr de monografii/ cărți în calitate de unic autor și coautor, dintre care o carte, la care am participat atât în calitate de editor cât și de coautor, a fost publicată la prestigioasa editură internațională Palgrave MacMillan, și a fost totodată premiată de Asociația AFER la categoria „Literatură Economică 2013".

Un punct important al activității mele de cercetare îl reprezintă utilizarea cu predilecție a abordărilor cantitative, orientate spre găsirea unor noi și complexe evidențe empirice cu ajutorul unor modele econometrice inovative și complexe. În cadrul ambelor tematici de cercetare prezentate mai sus am explorat mai degrabă dimensiunile longitudinale/ dinamice, decât cele transversale/ statice. Interesul pentru bazele de date de tip panel și modelele specifice lor este justificat de tematicile analizate, pentru că atât sărăcia/ deprivarea, cât și creșterea economică sunt procese, a căror dinamică face necesară reprezentarea longitudinală și analiza cu metode specifice panelurilor de date.

Studiile doctorale au făcut posibil ca pe parcursul celor trei ani de stagiu să pot aduce contribuții inovative la măsurarea fenomenelor economice și sociale, prin dezvoltarea și adaptarea unei metodologii specifice domeniului psihometriei. Acest model se numește „Teoria Răspunsului la Itemi" (IRT) și a fost aplicat de către mine la măsurarea deprivării, a bogăției și a riscului de faliment. Obiectivul major urmat de-a lungul întregii activități de cercetare de până acum a fost să aduc contribuții inovative la literatura de specialitate, fie în plan metodologic, fie în planul rezultatelor empirice. Aceste aspecte au fost clar subliniate în teza de abilitare. Voi urma acest obiectiv și în viitor, nu doar în activitatea mea de cercetare, dar sper și în cea de coordonare științifică a tezelor de doctorat. Contribuțiile inovative reprezintă în prezent o condiție absolut necesară pentru publicarea în reviste și edituri de prestigiu internațional, fiind totodată o măsură a recunoașterii performanței în activitatea de cercetare.

(B) Scientific and professional achievements and the evolution and development plans for career development

(B-i) Scientific and professional achievements

Introduction

In this section I emphasize my main scientific contributions to the field of Finances, as well as the most important steps recently undertaken in my professional activity, in areas related to Finances. The scientific contributions will be presented in the next three chapters, by their association to three three areas of Finances: (1) Public expenditure and policies, (2) Income redistribution and social policy, and (3) Financial markets. Each chapter also presents at the end, after underlying the scientific contributions, the professional achievements in the domain of Finance as well, by emphsizing other kind of achievements than the scientific ones (mainly related to the teaching activity).

As reflected by the next sections, all my research work in the field of Finance is using international datasets being aimed to draw insights to different mechanisms, processes or phenomena based on real micro- or macroeconomic data. I don't have any pure threoretical paper/ contribution, so that all my papers use econometric quantitative techniques to explore different research isssues and to bring empirical insights.

Given that all my research papers have a strong econometric focus (applied econometrics), I will shortly present next in Introduction the main methodologies that I used in the last years, with reference to a selected group of papers using them.

a) **Multilevel models**

This method has been used in the following papers: „A multilevel analysis of the returns to education in Ecuador. The multifaceted impact of human capital" (**Scientific Annals of Economics and Business, 2016**), „New insights from a multilevel approach to the regional digital divide in the European Union" (**Telecommunications Policy, 2018**), „Explaining the EU regional economic growth through regional- and country-level achievements in education" (**Romanian Journal of Economic Forecasting, 2019).**

To address the hierarchical structure of the dataset, papers usually follow multilevel approaches and use, as econometric methods, random intercepts and random slopes/ coefficients

models. The multilevel analysis is the appropriate methodology to be used whenever the data are clustered (i.e. nested data), as it is the case of our data. As in any linear regression model, in the multilevel framework as well, the dependent variable is explained through regression models upon a set of covariates. Specific to the multilevel analysis is that the dependent variable is usually considered at Level 1, whereas the explanatory variables could be at any level. Several multilevel models were developed over time. The random-intercepts models are models in which intercepts are allowed to vary across groups, and slopes are fixed. Determining interclass correlations is particularly important when using this model. In contrast to them, the random slopes (coefficients) model assumes that both the intercepts and slopes vary across groups, being therefore considered to be the most complex and realist multilevel model.

When developing a multilevel model, one should always start by running the simplest model (e.g. the variance components model) and then to gradually add more parameters. The complex model must be always compared to the previous one in order to assess better model fit (e.g. using the likelihood-ratio test).

The first step of our multilevel methodology consists of estimating the correlation among observations within clusters, by the interclass correlation coefficient (ICC), because it helps deciding about the appropriateness of this kind of models. The ICC is measured as the ratio of the between- cluster variance to the total variance, and it explains the proportion of the total variance that can be attributed to the clustering. If the ICC is near zero, it means that there is a very low clustering of data, and in this case linear models should be used. The ICC can be measured at each level of the clustering structure.

Even though the three-level model is the main multilevel model intended to be used in the empirical section, it is important to first find out whether this model fits the data significantly better than the two-level model and also than the single-level model. Given that the models are estimated here by the maximum likelihood method, the comparison between models will be performed by likelihood ratio (LR) tests. The LR test statistic represents the "badness of fit", as we gradually move from the simpler model to the more complex model.

As a general rule, we first examine the null hypothesis that there are no higher level effects, by comparing the three-level model to the single-level model. This test proves the usefulness of the multilevel approach. The single-level model is presented in model (1):

$$y_{tij} = \gamma_{000} + e_{tij} \tag{1}$$

Where, e_{tij} (residual) is the time-specific deviation from region's predicted outcome and γ_{000} (fixed intercept) is the grand mean.

Second, we test the null hypothesis that there are no country effects by comparing the three-level model to the two-level repeated observations-within-regions. The two level model can be written as in model (2):

$$y_{tij} = \gamma_{000} + u_{0ij} + e_{tij} \tag{2}$$

Where, u_{0ij} (region random intercept) is the region-specific deviation from country's predicted outcome.

Third, we test the null hypothesis that there are no region effects by comparing the three-level model to the two-level repeated observations-within-countries model. The latter model is written as in model (3):

$$y_{tij} = \gamma_{000} + v_{00j} + e_{tij} \tag{3}$$

Where, v_{00j} (country random intercept) is the country-specific deviation from fixed intercept.

In models (1)-(3), the random effects and residuals are assumed to be independent one from another, and normally distributed with zero means and constant variances.

In case that the three-level model is found to fit the data better than the single-level and two-level models, this is the only model that will be reported and interpreted in our empirical analysis. Further on, the same LR test is used to examine whether (1) the random intercept model fits the data better than the random slope- three-level models, and (2) it is worth introducing a set of socio-economic covariates.

In case that the LR tests indicate the use of the three-level model, the variance components model, the random intercept model and the slope coefficient model will be comparatively examined, to establish which specific model fits better. We start our empirical analysis by running the three-level variance-components model, which is often referred to as the "empty" or "null" three-level model. This basic model also represents an unconditional random intercept model. When adding Level1, Level2 and/ or Level3 predictor variables, the basic model becomes a three-level random-intercept model with covariates, which allows explaining the response variation allocated to each of the three levels. Up to this step of our analysis, the slope coefficients of explanatory variables are assumed fixed across higher levels. But it could be possible that the relationships between one or more explanatory variables and the dependent variable to vary across the higher level units. And this hypothesis is taken into consideration only by the three-level random slope (coefficient) model.

b) Panel data regression models

This method has been used in: "Re-examining the relationship between economic growth and inequality in the New Member States" (**Quality & Quantity, 2013d**), „A multidimensional approach to the inclusiveness of the economic growth in the New Member States" (**Romanian Journal of Economic Forecasting**, 2014), "The role of business education provided through lifelong learning in enhancing professional competencies. Evidence from the EU-27 dataset" (**Amfiteatru Economic**, 2014), „Explaining the dynamics and drivers of financial well-being in the European Union" (**Social Indicators Research**, 2015a), "Comparative Examination of Self-Perceived Health and Other Measures of the Quality of Life across the EU-27" (**Social Indicators Research,** 2017), "Globalisation, economic growth and covid-19. Insights from international finance" (**Romanian Journal of Economic Forecasting**, 2020b), „Regional Patterns and Drivers of the EU Digital Economy" (**Social Indicators Research**, 2020d)

Before running the regression analysis it is necessary to decide upon what estimator to use. This decision, which represents the central piece into the regression analysis, is based on the examination of panel data specific problems such as endogeneity, serial correlation or heterokedasticity. When endogeneity is suspected and then confirmed by specific tests, the method of instrumental variables (IV) allows the derivation of consistent estimates. In this case the Ordinary Least Squares estimation (OLS) produces biased and inconsistent estimates. Selecting "good" or suitable instruments is particularly important at this point because, with weak instruments, the IV estimators are as biased as the OLS. When there are an equal number of endogenous and instrumental variables, the endogenous variables are considered to be just identified. When there are more instrumental variables than endogenous ones, the endogenous variables are over-identified, and in this case the two-stage least squares (2SLS) could be used. Both the OLS and 2SLS are particular cases of the Generalized Method of Moments (GMM).

In recent years, the difference GMM (Arellano and Bond, 1991) and the extended-GMM (Arellano and Bover, 1995; Blundell ajnd Bond, 1998) have been extensively used in empirical studies. The Arellano-Bond estimation uses the GMM and transforms all regressors according to the method of differencing, being therefore known as difference-GMM. In comparison with the OLS, within-groups and the Anderson-Hsiao difference and level estimators, the difference GMM produces the least amount of bias and variance in estimating the parameters (Arellano and Bond, 1991). But the first-differenced GMM is found to be subject to large downward finite-sample bias when the number of available time periods is small (Blundell and Bond, 1998). The Arellano-Bover (1995) and Blundell-Bond (1998) use additional moment conditions in which lagged differences of the dependent variable are orthogonal to the levels of disturbances, by

assuming that the panel level effect is independent of the first observable first-difference of the dependent variable (Drukker, 2008). This is because they found that the lagged levels are weak instruments when the autoregressive process is too persistent. Their model consists of two equations (the original equation and the transformed one) and is known as the system-GMM. Overall, the Arellano-Bover (1995) and Blundell-Bond (1998) estimators allow for an improved efficiency when more instruments are introduced.

According to Roodman (2009), there is a number of reasons which would suggest using the GMM difference and system estimators in our paper: (1) The dynamic processes whose current observations of the dependent variable depend on past ones; (2) The data are supposed to be affected by endogeneity and/ or heteroskedasticity and/ or serial correlation; (3) Internal instruments (based on lags of instrumented variables) are available in our dataset; (4) Idiosyncratic disturbances are presumed to be uncorrelattyyed across individuals; (5) Time-invariant country characteristics (fixed effects) might be correlated with the explanatory variable, and (6) The panel dataset has a short time component in most of my papers (10-20 years in my working datasets) and a large country dimension (roughly 27 countries). These estimators assume that the only available instruments are "internal", i.e. the lags of the instrumented variables, but external instruments can also be included in the model. However, given that finding outside instruments could be a difficult task, the use of the system GMM instead of the first-differenced GMM might be preferred (Bond et al., 2001).

The general model that we use in the empirical section takes the following form:

$$y_{it} = \alpha y_{i,t-1} + \beta X_{it} + \delta Z_{it} + \varepsilon_{it} \tag{4}$$

$$\varepsilon_{it} = u_i + v_{it} \tag{5}$$

Where, X_{it} is a vector of exogenous regressors, Z_{it} is a vector of endogenous regressors (being correlated with u_i), β and δ are two column vectors of coefficients, and y_{it} and ε_{it} are random variables. The dependent variable (y_{it}) could be a measure of the quality of life or economic growth rate (e.g. self-perceived health). As shown in eq.5, the disturbance term ε_{it} has two orthogonal components: u_i are the fixed effects, and v_{it} are the idiosyncratic shocks.

c) Time-varying VAR with stochastic volatility

This model has been used in the paper "Transmission of Monetary Policy to Asset Prices: Evidence using Stochastic Volatility Models" (**Transformations in Business & Economics**, 2020c).

In this subsection, two models are presented, i.e. a vector autoregressive model with stochastic volatility and variable coefficients (TVP_VAR) and a multivariate time series models with both time varying variance covariance matrix and Student-t distributed shocks in each of the equations (TVARSVOL).

The TVP_VAR model can be represented as follows:

$$Y_t = B_{0,t} + \sum_{j=1}^p B_{j,t} Y_{t-j} + \varepsilon_t, \tag{6}$$

The innovation ε_t is a random vector of variables normally distributed with zero mean and covariance matrix Ω_t:

$$Var(\varepsilon_t) \equiv \Omega_t = A_t^{-1} H_t (A_t^{-1})'. \tag{7}$$

The parameters in (1) follow a random walk process with no drift:

$$\beta_t = \{B_{0,t}, B_{1,t}, B_{2,t}, \dots, B_{p,t}\} \quad \beta_t = \beta_{t-1} + \eta_t, \quad VAR(\eta_t) = Q, \tag{8}$$

$$p(\beta_t | \beta_{t-1}, Q) = I(\beta_t) f(\beta_t | \beta_{t-1}, Q), \tag{9}$$

where: $I(\beta_t)$ is an indicator function used to assure non-explosive paths of the variables.

The matrices $H_t = \begin{pmatrix} h_{1,t} & 0 & \cdots & 0 \\ 0 & h_{2,t} & \ddots & 0 \\ \vdots & \ddots & \ddots & 0 \\ 0 & \cdots & 0 & h_{6,t} \end{pmatrix}$, $A_t = \begin{pmatrix} 1 & 0 & \cdots & 0 \\ a_{21,t} & 1 & \ddots & 0 \\ \vdots & \ddots & \ddots & 0 \\ a_{51,t} & \cdots & a_{53,t} & 1 \end{pmatrix}$,

$$h_t = \{h_{1,t}, h_{2,t}, \dots, h_{6,t}\}, \quad \ln(h_{i,t}) = \ln(h_{i,t-1}) + \mu_{i,t}, \quad VAR(\mu_t) = Z, \tag{10}$$

$$a_t = \{a_{21,t}, a_{31,t}, \dots, a_{53,t}\}, \quad a_{ij,t} = a_{ij,t-1} + u_t, \quad VAR(u_t) = S. \tag{11}$$

We calibrate priors according to the literature:

$$\beta_0 \sim N[\hat{\beta}_{OLS}, 4V(\hat{\beta}_{OLS})], \quad lnh_0 \sim N[\ln(vec(c_{ii}^2)), 4V(I_5)], a_0 \sim N[\bar{a}_{OLS}, V(\bar{a}_{OLS})], \tag{12}$$

where: parameters $\hat{\beta}_{OLS}$ and the covariance matrix of the innovations $\hat{\Sigma}_{OLS}$ ($\hat{\Sigma}_{OLS} = CC'$, and C is the Choleski factor) are estimated in a time-invariant VAR on a pre-sample of five years. Matrices Q, S, and Z are considered to follow inverted Wishart distribution:

$$Q \sim IW(Q_0^{-1}, d_0), \text{ with } Q_0 = \gamma \Sigma_{OLS}. \tag{13}$$

The blocks $S_i, i = 1, \dots, 5$ referring to the lines of A_t of non-zero and non-one elements are also assumed as inverted Wishart distributions with minimum degree of freedom and scale matrices calibrated as:

$$S_i \sim IW\left(\bar{S}_i^{-1}, i\right), \quad i = 1, \dots, 5. \tag{14}$$

The element of matrix Z, which hold the variances of the stochastic volatility innovations are assumed to be inverse-Gamma.

Non-Gaussian VAR model with stochastic volatility (TVARSVOL)

The TVARSVOL model (Chiu, Mumtaz and Pinter, 2017) can be represented as follows:

$$Y_t = B_0 + \sum_{j=1}^{p} B_j Y_{t-j} + \varepsilon_t, \tag{15}$$

The innovation ε_t is a random vector with zero mean and covariance matrix Ω_t:

$$Var(\varepsilon_t) \equiv \Omega_t = A_t^{-1} H_t (A_t^{-1})' \tag{16}$$

Where $H_t = \begin{pmatrix} h_{1,t} & 0 & \cdots & 0 \\ 0 & h_{2,t} & \ddots & 0 \\ \vdots & \ddots & \ddots & 0 \\ 0 & \cdots & 0 & h_{n,t} \end{pmatrix}$ $A = \begin{pmatrix} 1 & 0 & \cdots & 0 \\ a_{21} & 1 & \ddots & 0 \\ \vdots & \ddots & \ddots & 0 \\ a_{n-1,1} & \cdots & a_{n-1,n-1} & 1 \end{pmatrix}$

$$h_t = \{h_{1,t}, h_{2,t}, \ldots, h_{6,t}\} \quad h_{i,t} = \sigma_{i,t}^2 \frac{1}{\lambda_{i,t}} \tag{17}$$

$$\ln(\sigma_{i,t}) = \ln(\sigma_{i,t-1}) + \mu_{i,t} \quad VAR(\mu_t) = Z \tag{18}$$

Like in other relevant papers in the literature (as detailed in the paper using this method), we assume $\lambda_{i,t}$ follow the Gamma distributions $p(\lambda_i) = \coprod_{t=1}^{T} p(\lambda_{i,t}) = \coprod_{t=1}^{T} \Gamma(1, v_{i,t})$ and $p(v_{i,t}) \sim \Gamma(v_0, 2)$ and the standardized residuals $u_t = Y_t \varepsilon_t$, $Y_t = A_t^{-1} H_t$ follow a scale mixture of Gaussian distribution. This way it accommodates the heavy tails with multivariate t-distribution for $\varepsilon_{i,t}$ that has $v_{i,t}$ degree of freedom.

The elements of the covariance structure of the innovations in stochastic volatility equation (Z) is modelled as inverse Gamma: $p(z_{i,t}) \sim IG(D_0, T_0)$, where $D_0 = 0.0001, \ T_0 = 1$.

Apriori distribution for elements of matrix A are Gaussian, $p(a_{i,t}) \sim N(0, 1000)$.

  d) Item Response Theory (IRT)

This methodology has been applied in several papers, such as: "Item response theory and the measurement of deprivation: Evidence from Luxembourg data", **Quality & Quantity** (2013c), „On Testing and Estimation in the Economic Measurement, when using Item Response Models" (**WSEAS Transactions on Business and Economics**, 2008a), „Introducing an innovative mathematical method to predict the bankruptcy risk: measures for the financial markets stability**, Proceedings MACMESE'08**, 2008c).

The Rasch model is a well-known one-parameter item response model, where Di* are treated as fixed parameters and where the error term has a logistic distribution (Molenaar 1995). Under these assumptions, the unweighted sum score is a sufficient statistic of the individual ability parameter given the item parameters. This means that the simple aggregation of the indicators respecting the Rasch model assumptions contains all the statistical information on the value of the unknown ability parameter. Conditional maximum likelihood can be used to

estimate the item parameters (Skrondal and Rabe-Hesketh 2004). The property of specific objectivity stipulates that "comparison of the ability of two subjects should only depend on the ability of these subjects (and not the ability of others) and that the comparison should yield the same results whatever item the comparison is based on" (Skrondal and Rabe-Hesketh 2004:73). The difficulty with this model is to find indicators which comply with its restrictive properties. It is not only the Rasch model but rather the one-parameter IRT model in general that imposes strong assumptions. From a theoretical point of view, Fusco and Dickes (2008) consider that the Rasch model is well suited to operationalise a definition of poverty in terms of an accumulation of disadvantages.

Another strategy is to treat the individual latent scores as individual random effects. In this case, the standard maximum likelihood provides estimates of the difficulty parameter, and the predicted value of Di* can be estimated by empirical Bayes methods that make use of both the assumed latent variable distribution and the pattern of observed responses of the posterior distribution and the item parameters. As mentioned by Cappellari and Jenkins, some caveats apply to this method, including the unknown small-sample properties and the strong assumptions underlying the model, such as the equi-correlation between any pair of items.

The use of the two-parameter IRT model allows relaxation of the assumption of equi-correlation between multiple items through the introduction to the model of a second item parameter. λ_j are factor loadings and are called discrimination parameters as they reflect the power of the items to discriminate between individuals whose latent scores of deprivation are below and above the item difficulty. The larger λ_j is, the better the discriminating power of the item.

$$y_{ij}{}^* = \beta_j + D_i^* \lambda_j + \varepsilon_{ij} \tag{19}$$

$$y_{ij} = 1 \quad if \quad y_{ij}^* > 0 \quad and \quad y_{ij} = 0 \quad otherwise \tag{20}$$

The item parameters β_j and λ_j can be estimated by maximum likelihood and D_i^* using empirical Bayes methods. For model identification, the scale of Di* is fixed by anchoring, i.e. assuming that $\lambda_1 = 1$. In the two-parameter IRT model, a change in the latent score of deprivation does not affect the items of deprivation equally.

Given the existence of the various versions of the model, it is natural to ask which one should be chosen (Wilson 2003). The two-parameter IRT model is less constraining on the data, meaning that it often has a better fit than the one-parameter IRT model. From a statistical point of view, this can be seen as an advantage (Cappellari and Jenkins 2007); in terms of operationalisation of the concept of poverty as an accumulation of disadvantage, the one-

parameter IRT model seems to be more appropriate. Indeed, the one-parameter IRT model involves the estimation of one unique parameter per item; hence, all items have the same form in the relationship between the latent variable of deprivation and the probability of presenting a disadvantage so that the definition of poverty as an accumulation of disadvantages can be tested (Fusco and Dickes 2008).

e) Nonparametric analysis (Kernel density estimation)

Nonparametric measures have been used in papers such as ,,Nonlinearities and divergences in the process of European financial integration'' (**Economic Modelling**, 2015b) and "Analyzing the Regional Economic Convergence in Ecuador. Insights from Parametric and Nonparametric Models" (**Romanian Journal of Economic Forecasting**, 2016).

A kernel can be defined as a continuous, limited and symmetric function, whose indefinite integral is equal to unity.

$$\int K(u)d(u) = 1 \tag{21}$$

Where, K is the chosen kernel function.

The density estimator can be represented as the density function for the scalar Z at the point z_0:

$$f(z_0) = \lim_{h->0} \frac{1}{2h} P(z \in (z_0 - h, z_0 + h)) \tag{22}$$

The estimator for the $\hat{f}(z_0, z)$ could be of the following form:

$$\hat{f}(z_0, z) = \frac{\#(z \in (z_0 - h,\ z_0 + h))}{2hn} \tag{23}$$

Based on (22) and (23), the kernel density estimation can be written as:

$$\hat{f}(z_0, z) = \frac{1}{nh} \sum_{i=1}^{n} K(\frac{z_0 - z_i}{h}) \tag{24}$$

The kernel function used in (24) includes the indicator function I and takes this form:

$$K(u) = \frac{1}{2} I_{(-1,1)}(u) \tag{25}$$

The Gaussian kernel, which is selected to be used in the empirical section, could be defined as follows:

$$2\pi^{-1/2} \exp(-u^2) \tag{26}$$

The parameter *h* in equations (22)-(24) is known as bandwidth parameter and its role is to control the degree of smoothing, by attributing weighting to the points $z_i \neq z_0$. In fact, the choice

of the value of the bandwidth is crucial in the kernel density estimation, because it influences at a great extent the quality of the kernel estimate. Small values of *h* lead to under-smoothing (spiky estimates), while larger values of *h* lead to over-smoothing. A number of authors recommend looking at a family of density estimates based on a set of smoothing parameters.

The stochastic kernel density can be described as a transition probability function which gives insights to the functional relationship of the transitions between different states, according to a certain probability distribution. The stochastic kernel indicates how the probability distribution changes over time, being a summary of the first moment, last moment and the transitions during the periods. In comparison with the stochastic kernel, the traditional beta-convergence approach only looks at the transition relative to the first period without looking at the last moment, while the sigma- convergence approach uses only a part of the available information in the data to derive standard deviations for all observed periods.

Quah (1997) uses the continuous version of the transition probability matrix, i.e. the stochastic kernel, to plot the dynamics of distribution between two moments in time. This approach allows studying the convergence and integration processes, by identifying the formation of convergence clubs in the density distribution.

If we assume that the distribution of our measure (e.g. governmental bond yields) at time t is φ_t, then the dynamic of distribution can be represented as a first order autoregressive process:

$$\varphi_t = T(\varphi_{t-1}, u_t), \quad t \geq 1 \tag{27}$$

Where, u_t is the error term and *T* is the operator describing how one part of the distribution changes into another from time *t-1* to time *t*, i.e. is represented in the continuous yield space by the stochastic kernel.

Equation (27) can alternatively be written as:

$$\varphi_t = T_{ut}(\varphi_{t-1}), \quad t \geq 1 \tag{28}$$

Where, T is the stochastic kernel which describes the distribution dynamic over time.

By iterations and based on the Markov chain assumptions, the dynamic of the distribution at time *t+S* is:

$$\varphi_{t+S} = (M^S)' \varphi_t \quad \text{for all } s \geq 1 \tag{29}$$

The ergodic distribution, which is also presented in the empirical section of the paper, is in fact the long term distribution and results from iterating the system up to infinity.

$$\varphi_\infty = M' \varphi_\infty, \ S \to \infty \tag{30}$$

Where, φ_∞ is the ergodic distribution of income across countries and *M* is the transition matrix. If the ergodic distribution *S* is found to be unimodal, then it suggests the convergence

process developing over time. The bimodality indicates polarisation, while the multimodality (identification of more than two modes) is indicative of stratification.

Chapter 1. Contributions to the field of Public Expenditure Policy

Research output

A very important part of my teaching and research activity was devoted to the analysis of public expenditure and public policies, with a very strong focus on social policy (but not limited

to this one). In the research area, this orientation grounds in the Ph.D. research work (the analysis and measurement of poverty).

Poverty (unidimensional, multidimensional, objective, subjective), social inequality and social exclusion, the welfare state, as well as the social policies (and other overnmental policies) targeting the reduction of social disequilibria, have been the main research issues investigated under the broad umbrella of public policies – social policies. All papers elaborated in this area of research use quantitative methods applied on cross-sectional/ cross-country or panel micro- or macro data. Moreover, all papers that belong to this particular area, even those that focus on the relationship between economic growth and poverty/ inequality, are aimed to unveil the appropriate mix of public policies that help the decision makers to alleviate poverty, to reduce inequality, or to improve the citizen's well-being.

The first paper published in a WOS indexed journal was "Re-examining the relationship between economic growth and inequality in the New Member States" (**Quality & Quantity, 2013d).** The main research issue examined in this paper is the relationship between economic growth and income inequality, as well as their macroeconomic and institutional determinants in the New Member States, between 2000 and 2009.

The adoption of **pro-growth policies** in general, and especially during the global economic crisis, must tackle the underlying economic and social imbalances accompanying the crisis in the EU economies. In the decades before the crisis, the economic growth produced just few jobs, widened income inequalities and reduced the weight of wages in national income in most of EU countries. The future economic growth needs therefore an employment-oriented framework to support acceleration of the job rich recovery. When writing this paper, I considered that new empirical insights based on the latest available data produced by the World Bank, Eurostat and European Bank for Reconstruction and Development could be useful for governmental policy purposes, especially in the context of the new post-crisis EU growth strategy.

In fact the paper could be also seen as a validation of Kuznetz curve in the New Member States area. According to Kuznets (1955), the relationship between economic growth and social inequality takes the form of an inverted –U, which suggests that in early stages of development inequality increases, it reaches a maximum point at a medium level of income, and declines when the average level of per capita income is relatively high. Most of studies testing the Kuznets hypothesis used cross-sectional data and only a few used time-series data. The results are contrasting but it seems that the cross-sectional studies are more supportive for the Kuznets hypothesis (Deininger and Squire, 1996).

In the first step, the relationship between economic growth and income inequality is described using a graphical analysis. The chart includes a number of 10 NMS and plots the natural logarithm of per capita GDP in 2000, on the horizontal axis, against the average value of Gini index between 2000 and 2009, on the vertical axis. Although this type of graphical approach is used as a standard representation of the real convergence process, in this case it gives insights to the relationship between income inequality and economic growth. The relationship suggests that countries with a higher initial level of per capita GDP will experience later lower levels of income inequality, while countries having lower initial levels of per capita GDP will experience higher levels of income inequality.

In the second step, the Grange causality test is used to determine the causality between income inequality and economic growth, i.e. whether income inequality is a determinant of economic growth or economic growth is a determinant of income inequality. As the Granger tests indicated that there is no direct and unconditional (or absolute) relationship between growth and inequality, the next step of our empirical analysis was to apply panel data regression models in order to examine the conditional relationship between growth and inequality, as well as their determinants.

. The relationship between economic growth and social inequality is found to be a U-shaped one, which is contrary to the Kuznets curve (1955). **The increase of secondary school enrolment rate and the increase of health expenditures lead to the reduction of income inequality**, but these effects turn to the opposite direction as the per capita GDP increases. Detailed explanations on these relationships are provided in the paper, with reference to the literature. For instance, the direct effect of the secondary school enrolment rate on income inequality is negative, which shows that the increase of this rate reduces the inequality. But education may affect income inequality differently over time, as the average per capita income grows. In the long term the effect is positive, because the income gap between the highly educated people and people without education (or with low attainments) increases. *The increase of health expenditure as a share of GDP ensures the access of the entire population to health services, being therefore favourable for inequality reduction.* In the medium term this effect may become slightly negative, leading to the deepening of inequality.

These empirical results suggest that increasing **public expenditures for secondary education and health are important for inequality reduction**, *only in the early stages of development*. In fact, the findings of paper could be useful for **public policy purposes**. The U-shaped relationship between inequality and growth indicates that the economic growth will not be anymore a factor of inequality reduction as per capita GDP growths in the NMS. Furthermore, *the large privatisations and governmental policies aimed at encouraging economic growth will*

deepen the social inequality. The economic growth will cause the society polarisation at higher stages of economic development so that the *pro-growth economic policies should be accompanied by social policies targeting inequality reduction*. Also, the policy makers should consider the **direct and indirect effects of health and education on inequality** in order to promote effective social policies.

Education is another public policy approached in my scientific papers. In particular, three WOS indexed papers have been written on the topic of **education and public policies in the area of education**. One paper published in this area of research is entitled **"The role of lifelong learning in enhancing professional competencies through business education. Evidence from the EU-27 dataset"** and was published in a number of the ISI Romanian journal **"Amfiteatru Economic" (2014)**, which focuses on the key-role of business education in economy. The paper examines the macroeconomic implications of business education provided by lifelong learning, based on the panel dataset comprising the EU-27 countries. The central point of the paper is that business education is a valuable component of adult education, and the lifelong learning represents the main channel facilitating the transfer of this knowledge. A number of three panel regression models are conducted separately for the New Member States (NMS) and Old Member States (OMS).

This paper has shown that business education, provided through the process of lifelong learning, generate positive effects into the economies of EU Member States. The business education has a long history and tradition in the OMS, while in the NMS this segment of the adult education is just under development. The empirical analysis has suggested that the effects induced by business education on economic growth and poverty reduction are more powerful in the NMS than in the OMS. Moreover, the positive impact of the third-level education attainment on the poverty reduction, often discussed in the literature, which prevails in the NMS, is annihilated in the absence of the lifelong learning.

Duration of working life is included into the analysis as to allow drawing insights to the impact of business education on the European pension systems which are in a deep crisis. It has been shown that business education, facilitated the lifelong learning, is not just a determinant of economic growth and poverty reduction, but also a factor contributing to the increase of the working life duration. Therefore, the extension of the duration of working life allows partially surpassing the actual crisis of pensions in the EU.

Overall, the economic and social benefits of business education are found to be more important for the NMS than for the OMS. The business education is therefore a major component of adult education, and therefore the lifelong learning is the most important channel facilitating the transfer of this kind of knowledge.

Education is the main topic of research in the paper **"A multilevel analysis of the returns to education in Ecuador. The multifaceted impact of human capital"**(published in **Scientific Annals of Economics and Business, 2016- indexed WOS).** This paper is one result of the fruitful collaboration with the GIER research team of Cuenca University (Ecuador), which started in 2014. *The place of this paper in my research activity on Finances is somehow between the analysis of public policies (this section) and the income redistribution (next section).* However, at the time of publication, the paper significantly contributed the literature, being the first study on that particular topic for Ecuador. This paper was actually aimed to analyse the returns to education in Ecuador based on a cross-sectional dataset that runs from 2005 to 2015, using the methodological framework of multilevel models. This methodology allows identifying the influence of both the individual level- and cantonal level- characteristics on the individual labour income.

The study of the returns to education is particularly important because they reflect the influence of educational attainments on labour market earnings. They could therefore carry a strong impact on the performance of **national education policies**. All over the European Union, education in general, and the access to education in particular, represents a major concern for all governments. This is because more schooling years provide better opportunities on the labour market, as well as higher salaries, and ensure a better quality of life for a lifetime. But this is not necessarily the same in other countries and regions in the world. The education attainments as well as the access to education are sometimes conditioned upon local traditions and policy priorities. The gender and race discrimination as well as the poor regional economic structures and regional disparities hamper the process of economic development and the progress of education policies.

The Latin American economies are characterised in general by a high regional economic heterogeneity and large regional income inequalities. These regional patterns strongly influence the national education policies, as well as the access to education. Remarkable progress in the education upgrading of the Latin America's population has continuously been done since 1990, and this positive dynamic has often been associated to the reduction in social inequality and poverty rates. Among all levels of education, the secondary education has been found to have the most impressive dynamic.

The paper used cross-sectional data collected from ENEMDU 2000-2015 (National Survey on employment, unemployment and underemployment), provided by the National Institute of Statistics and Census in Ecuador. Both random intercept model and random slopes models are used in the empirical section. The linear random-intercept model with covariates is used to explain the returns to education upon a set of explanatory variables at the individual and

cantonal levels, when individuals (at Level 1) are nested in cantons (at Level 2). With this model we presume that the impact of explanatory variables is constant across cantons. Even though this hypothesis might theoretically appear as unrealistic, we use this model for comparison purposes.

The multilevel methodology, which is used in other papers authored by me, being one of the methods developed in several forms and extensively applied by me on micro and macro data, will be shortly presented below, in the context of the education research issue.

The general form of the multilevel model is presented in eq.31.

$$y_{ij} = (\beta_1 + \varsigma_j) + \beta_2 x_{2ij} + ... + \beta_p x_{pij} + \varepsilon_{ij} \tag{31}$$

Where, subscript i reflects the Level 1 and subscript j refers to Level 2, y_{ij} is the dependent variable (i.e. the labour hourly income of individual i located in canton j), x_{ijp} are the explanatory variables, and ε_{ij} and ς_j are error terms. The Level-2 error term ς_j is a canton-specific error component, which is constant across individual.

In eq. 31, the term $\beta_1 + \varsigma_j$ represents the canton-specific intercept. The Level-1 error term ε_{ij} is the individual-specific error component that varies between individuals i and also between cantons j. The two error components are independent of each other. ς_j is the random parameter or canton-specific error component, whose variance Ψ is estimated together with the variance θ of the ε_{ij}. It represents the unobserved heterogeneity or the combined effects of omitted canton characteristics. As all individuals within each canton share the same ς_j, there is within-canton dependence among the total error terms ε_{ij}.

The total error terms, as well as the dependent variable y_{ij}, given the explanatory variables x_{ij}, are homoscedastic, as shown in eq. (32) and (33).

$$Var(\xi_{ij}) = Var(\varsigma_j + \varepsilon_{ij}) = \psi + \vartheta \tag{32}$$

$$Var(y_{ij} \mid x_{ij}) = \psi + \vartheta \tag{33}$$

The conditional interclass correlation of y_{ij} and $y_{i'j}$ for canton j, given the set of explanatory variables, can be written as in eq. (34).

$$\rho \equiv Cor(y_{ij}, y_{i'j} \mid x_{ij}, x_{i'j}) = \frac{\psi}{\psi + \vartheta} \tag{34}$$

In the next step of our analysis we use the random-coefficient model, where random coefficients (also called random slopes) are introduced beside the random intercepts. The difference between the random intercept and the random-coefficient model is that the former specify a canton-specific random intercept, whereas the latter specifies not only a canton-specific random intercept, but also a canton-specific random slope, as in eq. (35).

$$y_{ij} = (\beta_1 + \varsigma_{1j}) + (\beta_2 + \varsigma_{2j})x_{ij} + \varepsilon_{ij} \tag{35}$$

Where, ς_{1j} represents the deviation of canton j's intercept from the mean intercept β_1, and ς_{2j} represents the deviation of canton j's intercept from the mean intercept β_1. The intercepts ς_{1j} and slopes ς_{2j} are independent across cantons, and the Level-1 error terms are independent across cantons and individuals.

In eq. (35), given x_{ij}, the random intercept and random slope follow a bivariate normal distribution with zero mean and covariance matrix of the form:

$$\Psi = \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \end{bmatrix} \equiv \begin{bmatrix} Var\,(\varsigma_{1j}\mid x_{ij}) & Cov\,(\varsigma_{1j},\varsigma_{2j}\mid x_{ij}) \\ Cov\,(\varsigma_{2j},\varsigma_{1j}\mid x_{ij}) & Var\,(\varsigma_{2j}\mid x_{ij}) \end{bmatrix} \tag{36}$$

The correlation between the random intercept and slope can be written as in eq. (37):

$$\rho_{21} = \frac{\psi_{21}}{\sqrt{\psi_{11}\psi_{22}}} \tag{37}$$

When particularly studying education and other social settings, the random-coefficient model is generally presented into the two-steps formulation, because this allows a better understanding of the model by separating the Level-1 and Level-2 covariates.

In the two-stage formulation, the model includes canton-specific coefficients at Level 1, as shown in eq. (38):

$$y_{ij} = \eta_{1j} + \eta_{2j}x_{ij} + \varepsilon_{ij} \tag{38}$$

Where, η_{1j} is the canton-specific intercept, and η_{2j} is the canton-specific slope.

Further on, the canton-specific coefficients are modeled as in eq. (38):

$$\begin{aligned} \eta_{1j} &= \gamma_{11} + \varsigma_{1j} \\ \eta_{2j} &= \gamma_{21} + \varsigma_{2j} \end{aligned} \tag{39}$$

It is assumed that the error terms ς_{1j} and ς_{2j} in eq.(39) have a bivariate normal distribution, and covariance matrix of the form presented in eq. (36).

Although including random slopes generally allows enriching the empirical results, it could also generate a number of problems. First, including a random slope into the model (35) usually requires also including a random intercept for that covariate. Second, since there is a variance parameter for each random effect and a covariance parameter for each pair of random effects, the number of parameters in the random part of the model increases very fast with the number of random slope. Third, random-coefficient models are either not identified, or affected by convergence problems. Fourth, the covariate should exhibit a significant degree of variability at the lower level in order to justify the inclusion of random-coefficient.

By substituting eq.(39) in eq.(38) and rearranging the equations' terms, we get the reduced-form model:

$$y_{ij} = (\gamma_{11} + \gamma_{21}x_{ij}) + (\varsigma_{1j} + \varsigma_{2j}x_{ij} + \varepsilon_{ij}) \tag{40}$$

Where, the term $(\gamma_{11}+\gamma_{21}x_{ij})$ represents the fixed part of the model, whereas the term $(\varsigma_{1j}+\varsigma_{2j}x_{ij}+\varepsilon_{ij})$ denotes the random part of the model.

Given that $\beta_1 \equiv \gamma_{11}$ and $\beta_2 \equiv \gamma_{21}$, the model specified in (40) is equivalent to the model in (35).

The covariates at Level 2 are included in the Level 2 models (eq.9) either for the random intercept, or for the random slope. If we include a categorical variable v_{2j} for the random intercept, then eq. (39) and (40) takes the following form:

$$\eta_{1j} = \gamma_{11} + \gamma_{12}v_{2j} + \varsigma_{1j} \tag{41}$$

$$y_{ij} = (\gamma_{11} + \gamma_{12}v_{2j} + \gamma_{21}x_{ij}) + (\varsigma_{1j} + \varsigma_{2j}x_{ij} + \varepsilon_{ij}) \tag{42}$$
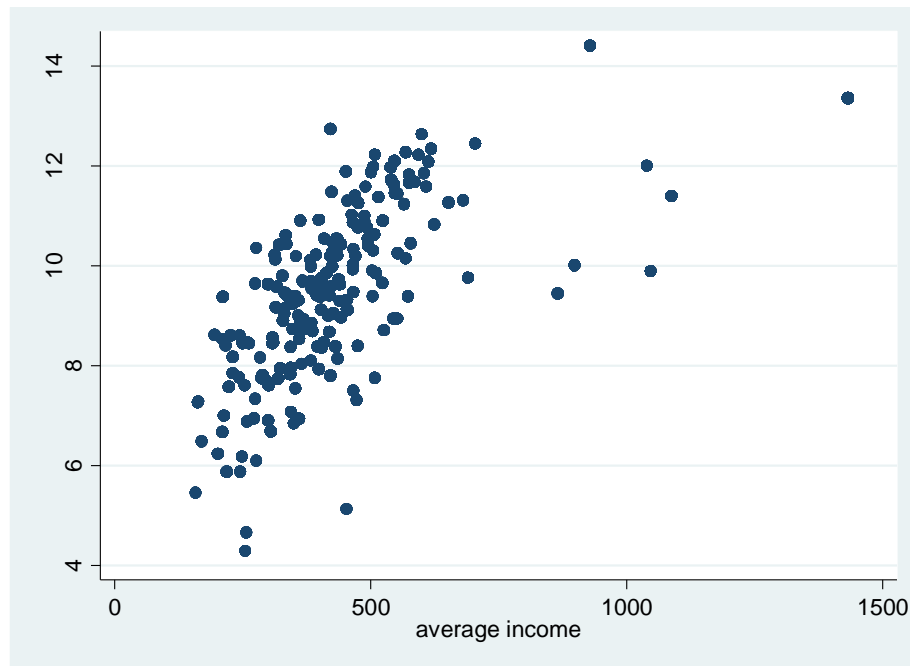
If we include the categorical variable v_{2j} in the model for the random slope, then eq. (39) and (40) become:

$$\eta_{2j} = \gamma_{21} + \gamma_{22}v_{2j} + \varsigma_{2j} \tag{43}$$

$$y_{ij} = (\gamma_{11} + \gamma_{12}v_{2j} + \gamma_{21}x_{ij} + \gamma_{22}v_{2j}x_{ij}) + (\varsigma_{1j} + \varsigma_{2j}x_{ij} + \varepsilon_{ij}) \tag{44}$$

The model in eq. (44) reflects in fact the cross-level interactions in the reduced form.

Fig.1 The relationship between the average cantonal income and the cantonal average years of schooling in 2015

Note: The average income refers at cantonal average wage per month; 206 cantons in 2015

Source: Data are taken from the National Survey on employment, Unemployment and Underemployment, ENEMDU.

In Fig.1 above the relationship between the average cantonal income and the average cantonal years of schooling seems to be a direct one, in the sense that individuals have on average more years of schooling in the rich cantons, in comparison with the poor cantons. From another point of view, the data exhibit a large dispersion thus indicating a large regional heterogeneity at the cantonal level. The analysis also indicates the presence of a small group of outliers, but this aspect is widely explained in the literature on regional convergence in Ecuador (e.g. Mendieta Muñoz, 2015).

In 2015 each additional year of education is found to increase the returns to education by almost 6% in the most complex specifications. This finding is in line with other empirical results in the literature, such as Devereux and Hart (2010) and Grenet (2009). However we notice that from 2005 to 2015 there was a decrease of 1.5 pp. in the returns to each year of additional schooling, that may suggests the effect of saturation sent by the labour market.

When interacting the number of years of schooling with the level of education, we get that in 2005, as well as in 2015, the returns to education increase with each level of education. According to our results, in 2015 the hourly incomes of postgraduates were 1.2% higher than the returns to tertiary education, 2.6% higher than the returns to secondary education, and 3% higher than the returns to primary education. In comparison with 2005, in 2015 the premium income earned by postgraduates in comparison with graduates has slightly increased by 2pp, maybe because of the overall need for highly qualified employees (e.g. Ph.D. holders).

The highest remunerations are found to be in financial intermediation and in activities specific to the primary sector (mining and quarrying), while the lowest are in agriculture, livestock, fishing and hunting. The gender pay gap and race pay gap are important forms of discrimination on the Ecuadorian labour market. The highest incomes (especially for graduates and postgraduates) are provided by the state sector, which could be seen as surprising and in contrast to experiences of advanced economies. The introduction of canton-level explanatory variables allows finding that higher individual hourly incomes are more likely to be obtained in richer cantons and also in cantons where the average number of schooling years is rather low. According to the random effects output and following the most complex specification, a percentage of 12% of the variance in individuals' hourly incomes is found to be determined by differences between cantons.

The implications of empirical results for policy makers have been found to be threefold. First, the *national authorities must continue implementing* **effective education policies** *to ensure the free access to education and to also encourage people staying more years in education.* Second, **anti-discrimination policies must be designed by governments** *as to eliminate the gender and race pay gaps, and to therefore ensure equal conditions on the labour market for all citizens.* Third, the process of regional economic convergence must continue and to finally determine the elimination of the regional economic heterogeneity that carries a negative impact on the regional dispersion of the returns to education as well.

The third paper on education published in a WOS indexed journal is **"Explaining the EU regional economic growth through regional- and country-level achievements in education"- Romanian Journal of Economic Forecasting (2019)**. This paper looks to identify *what mix of public policies, among which the education and ICT policies are the main focus, is able to stimulate economic growth in the EU*, when a special attention is given to the distinction between the New Member States and Old Member States. The multilevel analysis represents the main quantitative method used here.

Increasing the expenditure on education and the expenditure on R&D, *increasing the quality of school and educational programs, and discouraging early leavers from education are just few policy measures that could determine better educational attainments at all levels.* However, the empirical results are broad and diverse. There is a mixed and inconclusive literature on the effect of education expenditure on economic growth, with a consistent strand of empirical papers discussed in the Literature review. The positive impact of ICT (Information and Communication Technologies) on economic growth has been widely analysed in the literature but mixed results are found when studying the differences between countries. One strand of literature argues that less developed countries can get higher growth rates through ICT

(Steinmuller, 2001), while other papers find that investment in ICT should be undertaken by upper middle income countries where higher marginal returns are anticipated (Dimelis and Papaioannou, 2009). Recent evidence indicates that developing and emerging countries do not benefit more from investment in ICT than developed countries (Niebel, 2018).

The empirical analysis uses Eurostat panel data running from 2001 to 2017, aggregated at the region- as well as at the country level. All 28 EU countries are included in the analysis. According to the NUTS 2016 classification, the 281 NUTS2 statistical regions of the EU group together basic regions for the application of regional policies. The selection of variables included in this study first depends on the data availability in Eurostat, and secondly has theoretical grounds.

The overall mean of the economic growth rates from 2001 to 2017 across the EU regions is -3.29%, The between country (Level 2) variance in growth rates is estimates as 9.50%, while the within country between-regions (Level 1) variance is 57.83%. This results in a total variance of 67.33%. The variance partition coefficient is 9.50/67.33, meaning that 14.11 % of the variance in the regional economic growth can be attributed to differences between countries. This means that regional policies are strongly needed to stimulate the regional economic growth.

One step in our empirical analysis is to test whether the effect of holding tertiary educational attainments varies across countries by applying the log likelihood test (LR test). The null hypothesis for this test is that the two additional parameters (intercept and slope variance) are simultaneously equal to zero. Applied on our data the test indicates that the effect of the tertiary education attainments significantly differ among countries, so that it is worth dropping the assumption of equal slopes, as presumed at the previous step.

The negative covariance (-0.001) means that countries with a high intercept tend to have a flatter-than-average slope (Fig.2). Similarly, countries with a low slope tend to have seen a more marked increase in tertiary educational attainments (above-average slope). The random slope model we have fitted implies that the between-country variance in regional economic growth is a function of tertiary educational attainments; that is, the amount of between-country variance differs along with the tertiary educational attainments.

Fig.2 Plot of the predicted country lines. Between country variance,
as a function of tertiary educational attainments
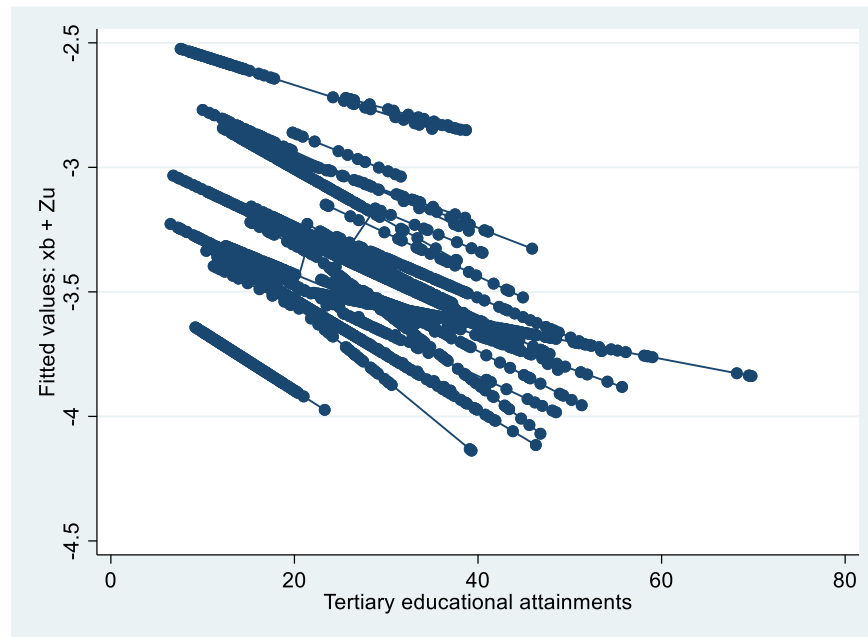
Several multilevel models are developed in the paper (both intercept and coefficient slope models). There has been found only a restrained set of empirical findings that are robust to all model specifications and all country groups. A lower proportion of early leavers from education as well as higher public expenditure on R&D are the only country level policy measures that stimulate regional growth under all our empirical models.

In the area of education, the tertiary educational achievements represent a significant stimulus for regional growth only in NMS, while the positive influence of the primary and secondary educational achievements is significant only in the NMS and only when determinants in the ICT area are also included in the model. These results suggest that better educational achievements matter for a higher regional growth only in the NMS, while in the OMS they carry no significant effect.

At regional level, employing more people in the technology sector stimulates regional growth, but only in OMS. This finding should be correlated with the higher technological development of OMS compared to NMS, under the reference period of time. Still at regional level, a lower Internet usage, as well as higher E-commerce usage, enhance regional economic growth. This finding not only underlines the positive impact of ICT on economic growth, as confirmed by other studies (Hanclova et al., 2015), but also suggests the importance of regional policy measures, compared to the national level ones, in stimulating regional growth.

The paper concludes is that **only a mix of regional-national policy measures in education/ ICT could accelerate regional economic growth in the** EU. Only a hierarchical model with time occasions nested in regions and regions nested in countries could reveal the impact of the two types of policy measures. When looking back at the last 17 years, important

discrepancies still exist between NMS and OMS, and this is reflected in the impact of policy measures as well. *Discouraging early leavers from education, **increasing expenditure on R&D** and enhancing the ICT development help boosting regional growth in both NMS and OMS, but the **regional educational attainments** are effective in NMS, while extending the technology sector is more effective in OMS. This finally leads to the conclusion that the EU regional policy is a key policy in stimulating regional growth.*

The public health policies have been approached in the paper "**Comparative Examination of Self-Perceived Health and Other Measures of the Quality of Life across the EU-27**" published in **Social Indicators Research** (2017). Recently, the health-related quality of life has become a highly relevant research issue for the *EU policy-making*. In particular, the subjective measures have gained popularity along with the availability of comparable data in all EU Member States. Also, *strengthening health-related common actions has recently become a priority at the EU level in the framework of Health 2020, which is the new European health policy.* Its aim is to support action across governments and society, to significantly improve the health and well-being of populations, reduce health inequality and ensure centred health systems for the people (WHO, 2012). *Improving health for all and reducing health inequalities are among the strategic objectives of the Health 2020 policy.*

This paper focuses on self-perceived health, because this is not only a key measure of the health-related quality of life, but it is also indicative for what should be the primary goal of health care intervention, in the sense of WHO's definition of health (1948). Beside self-perceived health, other two measures of the quality of life are comparatively examined here, so as to allow to finally derive policy recommendations. More specifically, the main objective of this paper is *to find out whether **a set of common governmental policies adopted by the EU-27 Member States could effectively target both the improvement of self-perceived health across all income quintiles and the improvement of other quality of life measures.*** Effective policy measures considered here are those policies aiming at the improvement of self-perceived health, without negatively affecting other measures of quality of life or the self-perceived health of a certain income group. In the field of health economics, where the concept of "self-perceived health" is very popular, most studies focusing on this variable have a microeconomic focus. In contrast to them, this paper takes a macroeconomic approach by examining this variable aggregated at the EU-27 country level. To answer this research question, an empirical analysis was conducted in two steps. First, the determinants of self-perceived health across the income quintiles were comparatively examined by means of five separate models. This allowed finding out whether a set of common policy measures could facilitate better health for all or at least for the bottom income quintiles without causing side effects for other income groups. Second, a

subset of significant determinants of self-perceived health found during the previous step was comparatively analyzed along with the determinants of other quality of life measures. This will reveal the policy measures which are effective not only across the income quintiles, but also across different quality of life measures, including self-perceived health.

The analysis is conducted in the EU-27 area, from 2003 to 2012, based on Eurostat data, and develops into two stages, according to the research issues presented above. First, the aggregated levels of self-perceived health set against the five income quintiles are explained by a number of potential determinants. In the second step, the variables "self-reported unmet need for medical examination or treatment", and "inability to make ends meet" are comparatively set against self-perceived health, according to a set of common determinants. A number of dynamic panel regression models using the Arellano-Bond one-step difference GMM estimator are applied in the empirical section. This technique allows overcoming the econometric problems associated to our working dataset.

The upward income transitions, the increase of labour expenditure and the access to tertiary education are the only policy measures found to significantly improve the self-perceived health of most income quintiles without causing negative side effects for the others. In the literature, in comparison with the labour expenditure and the access to tertiary education, much less attention has been paid to income dynamics. In this light, our study adds empirical evidence to an under-explored research issue. *Reducing poverty and improving the access to medical services are found to generate additional positive effects just for the lowest income quintile.* Reducing income inequality and stimulating economic growth trigger additional positive effects only for middle income quintiles. Our analysis confirms the reverse relationship between income inequality and economic growth, but produces contrary results with regard to the impact of economic growth. The explanation could be that, in contrast to most studies examining this issue, our analysis examines self-perceived health when this is disaggregated upon income quintiles. The self-rated health of the highest quintile particularly improves by facilitating the access to medical services and stimulating the ability to face unexpected expenses.

Like other research on the advanced healthcare system in some developed countries, especially the US, our research also shows that **increasing health expenditure is likely to lead to the decline of self-perceived health for all income quintiles**. In our case, this suggests that the Europeans spend more but feel worse.

Health and well-being are important objectives on the EU agenda (see the Health Youth Initiative), but what mix of European policies would be able to ensure rising well-being, improved access to medical services and increased self-rated health in the EU-27 area at the same time? Or, what measures would allow improving at least one well-being indicator without

producing negative side effects for another indicator? The answer provided by our analysis at this point is that the improvement of the overall level of well-being is an idealistic aim that can only be partially targeted by policy measures. This is because different measures of well-being and health status should be addressed by specific policies, which unfortunately often generate negative side effects on different population categories or on other measures of well-being.

Based on our data, *attaining tertiary education and **increasing labour expenditure** are the only effective policy measures which contribute to the increase of the population's levels of well-being* in the sense of improving some indicators of well-being, without generating negative outcomes for the others.

To sum up, based on our data, there are **only two policy measures** able to target both the improvement of self-perceived health across all income quintiles and the improvement of self-perceived health along with other dimensions of well-being: encouraging access to tertiary education and increasing labour expenditure. Moreover, they do not produce any negative side effects for any income group or well-being measure.

The **general policy recommendation** that can be derived from our set of empirical findings could be summarized as follows: (1) The effectiveness of a set of health policy measures should be analyzed in relation with several dimensions of well-being and health, to account for their multidimensionality and negative side effects that they could involve (2) In the broad field of well-being and health policy, the effects of a policy measure should be approached and explained in conjunction with other policy measures (3) the side effects of policy measures in the field of well-being and health should always be included into the analysis of their effectiveness.

Another topic under this section that is reflected by my publications is the defense expenditure. The paper **"Impact of Defense Expenditures on Economic Growth"** was published in the **European Research Studies Journal** (2020a).

*More **public expenditure in the military sector** leads to crowding out of private investment and less investment on public goods like health, education, and scientific research.* Thus, from both the short-run and the long-run points of view a decline in military spending will attain the primary objective of development, that is, to benefit people. A possible beneficial effed of **defense expenditure** lies in its role in creating effective demand when there is slack in the economy. Within the Keynesian framework of macroeconomic analysis, government expenditure on goods and services including defense is an important force in the determination of output and employment. From this perspective, military spending or any other form of government spending has the potential of achieving full employment output.

The paper includes a descriptive as well as a quantitative analysis. wIn the empirical section we use a simple FGLS (feasible GLS) model to explain the impact of several potential explanatory variables on arms exports. Different models are separately built for three distinct groups of countries. According to the models' estimates, higher arms imports are positively correlated to higher arms exports and to a lower public debt. The total exports and imports carry different effects across the NATO and non-NATO countries. For instance, higher imports are associated to higher arms exports in the Non-NATO countries, and to lower arms exports in the NATO countries. In turn, the total exports could be a determinant of arms exports only in the NATO countries (which also reflect in the model which includes all countries).

The correlation between higher defense expenditures and higher arms imports in NATO countries is not a significant one, and it appears that for the time period analyzed higher defense expenditures have not materialized in higher arms imports. The findings are not surprising, considering that, although the 2% of GDP mark has been in place in NATO for many years, there were no incentives or coercive measures to increase the defense expenditures. The situation has changed only starting with 2015, as new threats have emerged for the NATO countries and following the policy of Donald Trump to pressure the European NATO members to increase their defense expenditures.

The real issue is what an "adequate" amount of military spending really is, given that every extra dollar spent above the necessary level is a clear loss for the economy. This principle comes from the so-called Guns and Butter Effect, whereby analyzing marginally it is evident that for every increase in defense expenditures, other expenditures in the public sector will be affected. In a democracy, this issues of the Guns and Butter Effect is debated by publicly elected officials and changes year to year. For example, military spending in the US has been declining as military engagements abroad wrap up. In non-democratic nations, however, the level of adequate spending is decided by a select few and may come at even a greater cost to the country's citizens.

The public policies required to enhance the reduction of digital divide in the EU area has been also studied, as reflected by the publication „**New insights from a multilevel approach to the regional digital divide in the European Union**"- **Telecommunications Policy** (2018). Despite the consistent, diverse and growing strand of literature on digital divide, the regional digital divide has seldom been investigated. The innovative contribution that this paper could bring to the literature is the explanation of the regional digital divide within the EU by both regional- and country level socio-economic factors, and not only by regional factors. In comparison with a series of country-level studies which undertake regional and smaller scale

analyses of factors that contribute to digital divides, such as assessments of the capability of digital telecommunications infrastructure, this paper examines the panel of 28 EU countries.

Moreover, the paper doesn't examine the factors of the regional digital divide at a single point in time, but the dynamics of these relationships over a timespan of 16 years (2001-2016). In order to reveal the influence of both regional- and country level factors on the regional digital divide in a dynamic perspective, the multilevel analysis is used as econometric framework here, and more specifically the three level random slope model is found to be the model that best fits our hierarchical data.

In the empirical analysis, two variables are used in parallel as indicators of the regional digital divide, i.e. one belongs to the group of second-order digital divide indicators (use of Internet), and another to the group of third-order digital divide indicators (use of e-commerce). This comparative examination allows finding whether the policy measures found to be effective in bridging the second-order digital divide, are also effective in targeting the third-order digital divide.

The analysis is carried out by using a three level random slope model with covariates, which belongs to the class of multilevel models. By clustering years (or repeated measurement occasions) at Level 1, the model allows explaining the dynamics of the relationships between two regional divide indicators and a set of common explanatory variables. In comparison with a cross-sectional model, our approach provides a more comprehensive picture of the regional digital divide in the EU.

The rationale behind our multilevel approach can be shortly described as follows. As regionalisation tends to play an increasingly important role in explaining most disequilibria and disparities within the EU, a better understanding of the digital gap in the EU, as well as the formulation of effective policy measures, would require using (1) regional measures of the digital divide, (2) a mix of regional- and country level explanatory variables, and (3) incorporation of the time dimension.

The empirical results indicate that at the regional level, the impact of education variables is constant across the two models. A lower number of students in all levels of education, as well as a higher number of persons who have successfully completed tertiary studies, is associated to a higher degree of both the Internet and e-commerce usage, which is in line with the literature. The lack of significance that the lifelong learning variable has in the explanation of the Internet usage lies in the fact that people are generally involved in lifelong learning programmes later on in their lives, while the Internet usage represents an ability acquired much earlier. Moreover, the participants in such programmes are more likely to keep up with the fast developments in ICT, and therefore to be e-commerce users. At the regional level, the economic growth has a positive

and powerful effect on both the Internet usage and e-commerce usage, indicating that this regional factor plays the most important role in shaping the digital divide.

At the country level, the most powerful determinant of both the Internet and e-commerce usage is the **governmental R&D expenditure**. *Therefore, increasing the proportion of R&D expenditure in the GDP substantially helps reducing the digital divide.* The national economic growth is found to have a low and negative impact in both models 1 and 2, which is in contrast with the findings at the regional level. This lies in the fact that on the road of the economic convergence process, the most developed EU countries, where the digital divide is relatively lower, had rather low levels of economic growth from 2001 to 2015, in comparison with the lesser developed EU countries.

Apparently surprising, the country level economic growth doesn't generate positive effects on the regional Internet and e-commerce usage. It has only a slight positive effect on e-commerce in the OMS, while carrying negative effects for both the Internet and e-commerce usage in the NMS. In our view this is an interesting result that, corroborated with the previous finding about the influence of the regional economic growth, may lead to the following conclusion: the positive effects generally induced by the country level economic growth in the national economy is not powerful enough to spread across all regions within the NMS when the issue of interest is the closing of digital gaps. Alternatively, the related redistribution mechanisms or channels do not allow the achievement of this regional level objective, so that finally only the regional economic growth could be seen as being an effective policy measure. Or, not any kind of economic growth helps reducing the digital gap.

The paper concludes that at the NUTS 2 regional level, enhancing economic growth and increasing tertiary education achievements are the most important common policy measures that could help reducing the digital divide in the NMS and OMS. *At the country level, the only common policy measure consists of increasing the governmental R&D expenditure.* To a lesser extent, discouraging early leaving from education and training is also likely to significantly produce positive effects in reducing the digital divide in both the NMS and OMS.

The main policy recommendations that can be derived from our empirical results are threefold. First, in comparison with the country level approach, the regional approach to the digital divide provides more useful insights for policy makers because it takes into account the regional economic and social heterogeneity within and across the EU countries. Second, bridging the digital gap in the EU requests a mix of regional and national policy measures. Third, the effects of "traditional" factors usually found to closing the digital divide in the literature, might be reverse when moving the analysis from the country level to the regional one. Nevertheless, according to our paper, stimulating regional economic growth, increasing the regional tertiary

education attainments, **boosting governmental R&D expenditure**, and discouraging early leaving from education and training are **policy measures that could successfully reduce the regional digital divide in the EU**, even after controlling for the regional economic and social heterogeneity.

A forthcoming paper is „**A regional approach to foreign policy attitudes, poverty and ethnicity in Moldova" (Plos One, 2021)**. The paper intends to fill a gap in the literature by examining the foreign policy attitudes in Moldova, from a regional perspective. The paper adds new empirical evidence to the literature which relies almost exclusively on studies of American foreign policy opinions, but it also contributes to the literature in other ways. First, it provides a regional perspective to the analysis of foreign policy attitudes, which perfectly fits the challenging Moldova's ethno-geopolitical context. Second, it relates public opinions on foreign policy to poverty by a multidimensional approach, as to also address the social issues in Moldova – one of the poorest countries in Europe. Upon our knowledge, the link between foreign policy attitudes and poverty has not been explored so far. To accommodate the regional dimension of the dataset, random intercept logit models are used in the empirical section, where the regional foreign policy attitudes are explained upon regional- and individual level characteristics. In addition, the Item Response Theory is used to construct a scale of deprivation.

The geopolitical deadlock between Russia and the EU, the unresolved conflicts over Transnistria, and the ethnic divide are the main coordinates on the Moldova's foreign policy agenda. The downward spiral of these drawbacks has unsystematically channelled an increasing wave of discontent toward the main actors of the Moldova's foreign policy, who are differently perceived by population either as catalysts or as opponents of the long term well-being and economic development. Federalisation, one of the foreign policy measures analysed here, represents for Moldova more than an alternative form of local government. In the context of ethnic conflicts spread all over the country, federalisation can be rather considered a pro-Russian foreign policy measure that would weaken the country and would threaten the prospects of EU membership. This is so because federalisation would give Transnistria a bigger political power, which may tip the political balance to Moscow. In the framework of federalisation, the strengthening of district competences would facilitate international powers to influence and control the Moldovan districts. In the light of the above considerations, the federalisation policy measure would be regarded as being in opposition with both the EU membership and the unification with Romania.

The empirical analysis uses data drawn from the 2017 wave of the Barometer of Public opinion in Moldova. This public opinion poll is a research program developed by the Moldovan Institute for Public Policy, on an annual basis, since 1998. The data collected by the Barometer

cover areas like political choices, quality of life, and perception of economic, social and political measures adopted by the Moldovan government. The main focus of this paper is to explain the Moldovans *regional* foreign policy attitudes, so that four variables represent our main variables of interest, of which three are suggestive for the foreign policy, and another one for the domestic policy, the latter being taken as a reference model. The three foreign policies have been selected according to the literature, as to be representative for "militant internationalism", "cooperative internationalism", and "isolationism".

In comparison with lower levels of educational attainments, individuals with higher levels are found to be more supportive for the "cooperative internationalism" and federalization, but not for "militant internationalism" as well. The result is largely confirmed by the empirical evidence collected over time from US. Different channels have been advanced in the literature as mechanisms explaining the relationship between education and (foreign) policy attitudes or political trust.

Higher educated people have been found to generally support internationalist policies, while the less educated have been identified as supporting the isolationist policies (Hughes, 1978). Despite the rich empirical evidence suggesting that the highly educated were in favour of militant internationalism in the 1970s, this association has weakened over time. Still, some evidence confirms that education is directly associated to the militant internationalism, and indirectly related to cooperative internationalism.

The relationship between foreign policy attitudes and poverty was at the core of empirical investigation. Different types of poverty indicators have been comparatively analysed, and to facilitate a broader conceptualisation of poverty, a score of deprivation (multidimensional poverty) has been derived from a number of seven deprivation items. Compared to the other poverty measures, deprivation is found to be the only one being significantly related with negative foreign policy attitudes in three models (excepting federalisation). We place this finding in the framework of the "centre-periphery theory", interpreted under the umbrella of peripheralization, which emphasizes the political scepticism of the "social" periphery, represented here by the deprived population.

The usefulness of the paper results go beyond the area of the domestic policy design. In the last decades, the role of public opinion in the structuring of EU foreign policy has increased and has become more complex, as a consequence of the growing role of the European foreign and security policy facing more and more challenges without and within the EU borders. Moldova is a potential new candidate for EU membership. In this light, understanding the foreign policy attitudes in Moldova could provide valuable insights for the EU policy makers, analysts and strategists. Equally, exploring a new dataset on a non-EU country oscillating

between Russia and the EU could provide new insights over a small country, insufficiently explored in the international literature.

The links between foreign policy attitudes, ethnicity, regionalism and poverty in Moldova could be further examined in more details, and one theory allowing to capture all these issues into a unitary framework could be the "centre-periphery" theory. This could be a future direction in the analysis of foreign policy attitudes in Moldova that can bring additional empirical insights with useful implications in the economic and social policy area.

Professional achievements

My experience with this topic mainly relates to the **elaboration of a set of public policies** in the framework of the Prometeus grant at the University of Cuenca (Ecuador), and also as associated researcher at the Institute for Economic Forecasting (Bucharest).

During the period of time that I spent in Ecuador (in the last five years), I initiated a series of collaborations with Ecuadorian institutions and research institutes. The professional experience that I accumulated in Romania and EU was helpful for them to participate in different projects, most of them having the government as main beneficiary. The interest of government was to identify a set of public policies allowing/ supporting the process of transformation, i.e.supporting the country to completely change the production matrix, and to move from the status of oil and row material exporting country. The education and social policies were the governmental policies that I involved the most.

Another long term collaboration I have with the Institute for Economic Forecasting (IPE, Bucharest). Each year I take part to the elaboration of a broad monography/ contribution, which along witgh the other contributions received from other research institutes (from the National Institute of Economic Research), are sent to the government, to better design public policies. The monetary policy is the main topic on the IPE research agenda.

Chapter 2. Contributions to the field of Income redistribution and social policy

Research output

In my early stage career the scientific activity was focused to a large extent on the analysis of social issues, such as the income redistribution, social policy, social inequality and deprivation. This research orientation, which in fact was the extension of my postdoctoral work, was one of the main pillars in my recent research work as well. I will briefly present and rely by a unitary approach the most significant empirical results that I got over time, with a particular focus on my recent contributions.

At present, the European Union has to face a spiral of economic and social problems that have cumulated over time, especially after the global economic crisis that hit the world in 2007. The weak growth prospects in the long term, the rise of inequality and unemployment affecting especially youth, and the poor shape of public finances are challenges for the EU cohesion policy, but in the same time they represent the reasoning for the configuration of new EU social policies. The experience of Old Member States facing long term high budgetary deficits since 2009-2010 has shown that instead of supporting inefficient economic sectors by fiscal policies, the national, regional and EU level- policies must stimulate the sustainable growth and economic convergence. In this new context, the EU institutes, as well as the regional, national and local institutes must collaborate and strengthen their role in promoting long-term pro-growth policies and reducing inequality and poverty, which are indirectly induced by the achievement of economic goals.

The adoption of pro-growth policies in general, and especially during any kind of global/ European economic crisis, must tackle the underlying economic and social imbalances accompanying the crisis in the EU economies. For instance, in the decades before the 2007 crisis, the economic growth produced just few jobs, widened income inequalities and reduced the weight of wages in national income in most of EU countries. The future economic growth needs therefore an employment-oriented framework to support acceleration of the job rich recovery.

In the aftermath of the global economic crisis, the European Union is in train to conceive and to follow a new growth model, based on innovation, sustainable growth and regional endogenous growth assets, aimed to ensure smart, sustainable and inclusive growth. This new model imposes the improvement of coordination between the national, regional and EU-level institutions and the strengthening of the role played by regions, cities and local institutions (also mentioned in the Europe 2020 strategy). But a stronger and new cohesion policy is also needed to support the social disequilibria generated by the new concept of growth.

The income redistributions is approached in the paper entitled **„A multidimensional approach to the inclusiveness of the economic growth in the New Member States"** **(Romanian journal of Economic Forecasting, 2014)**. The paper analyzes the responsiveness of different dimensions of multidimensional poverty to economic growth in the New Member States, from 2000 to 2011. At a descriptive level, the paper studies the inclusiveness of economic growth by calculating and graphically representing a set of growth elasticity to different poverty measures, as well as the set of public policies required to address this problem. *The expenditures with social protection and in general the public expenditure are at the core of this paper which looks to ultimately check the relationship between income redistribution and some public policies in the conext of the (pro-poor) growth*. As stated in the paper Introduction, the paper main idea ist hat, to empower the poor, the economic growth should focus on the productive employment and not on direct income redistribution (Ali and Zhuang, 2007; Anand et al., 1993). Therefore, not any type of economic growth produces positive effects for all social classes and citizens, as expected by the majority of population. Panel data regression models are used in the empirical section to discuss the determinants of economic growth.

The most important empirical results of the paper can be summarized as follows: First, the material poverty reduction is found to be the most responsive to income growth, while the subjective poverty reduction is found to be inelastic to economic growth, also because it requests a longer period of time for adjustments. Second, the degree of poverty responsiveness to income growth differs between countries and upon the poverty measure considered. Slovak Republic is the only NMS having high growth elasticity to all poverty measures. Bulgaria, Poland, Lithuania and Latvia should pay more attention at the way that income growth benefits spread into the society, because in their case the material and income poverty rates have increased over time, in spite of their economic growth. Estonia should be more concerned with the citizens' perception of poverty, because this is more dramatic than the objective poverty and therefore than the real situation. Moreover, a long duration of work activities is associated to lower levels of subjective poverty, maybe because they generate higher incomes. Corruption is found to have a positive effect on subjective deprivation because it might be seen as being helpful in making people's ends meet. **Higher expenditures on social protection** result in higher levels of subjective poverty, because this source of income is always seen as inadequate to the needs. The inequality plays an important role in the relationship between poverty and economic growth. In line with the literature, the paper finds that the growth elasticity of poverty is larger for the group of countries with the smaller Gini coefficients.

The final conclusion of the paper is that *policy makers have a difficult task in the NMS area when building social policies, because targeting different dimensions of poverty requests*

different social policies and actions, which sometimes could have undesirable effects on the other dimensions. Decreasing the level of subjective poverty could also be difficult to policy makers, given that the citizens' perceptions do not always have objective bases.

In the paper entitled "**Explaining the dynamics and drivers of financial well-being in the European Union" (Social Indicators Research, 2015a)**, I have analyzed the dynamics and determinants of **financial well-being** in the EU-27 area, by comparatively examining its objective and subjective dimensions, based on Eurostat aggregated data.

The paper discusses a well-debated topic in the literature on public finance – **the income redistribution and public policies**. In the literature on well-being most papers deal with analysing different dimensions and causes of well-being (e.g. Diener, 2006; Dolan et al., 2008; Kusago, 2008; Fleche et al., 2011), but only one paper approached financial well-being in the past (van Praag et al, 2003). As stated in the paper, it is widely acknowledged that improving the well-being of citizens is one of the most important concerns of any government. *But this goal always requires assuming the trade-off between conducting generous social policies to reduce poverty and income inequality on the one hand, and applying restrictive monetary and fiscal policies to ensure the budgetary revenues needed to support the social policies, on the other hand.* In any case, the economic growth is the most important provider of well-being for all social layers, and especially for the vulnerable groups and the poor. But not all social layers benefit from economic growth to the same extent. When economic growth cannot be directed toward the vulnerable and the poor, then **redistribution policies** are needed to ensure the social equilibrium at national level.

The paper finds that *social protection expenditure helps the transitions to one decile up, while the labour market policy expenditure has more powerful effects, stimulating only the transitions to more than one income decile up*. Economic growth and tertiary education contribute only to the large income transitions, being an impediment for small income transitions. *When targeting the financial SWB, social protection expenditure is found to be a better governmental instrument in comparison to the labour market policy expenditure*. Economic growth allows improving economic strain (SWB), while social inequality worsens it. In comparison to earlier studies on financial well-being, this paper is in line with those finding a positive relationship between well-being and income (e.g. Stevenson and Wolfers, 2008) and also with those finding a significant effect of social inequality and inflation on SWB. The main contribution of the paper to the literature consists in comparatively examining the determinants of the objective and subjective dimensions of financial well-being, based on aggregated Eurostat data and also based on separate estimations of the two dimensions of well-being, with a view to providing useful insights for policy purposes in the EU-27.

The paper concludes that the improvement of the overall level of financial well-being within the EU-27 is a difficult task, given the multidimensional nature of well-being. Although, as shown in the paper, most EU institutions or international research groups suggest shifting the focus of governmental policies from the monetary field to the "multidimensional" well-being, this attempt could raise controversial debates about the successfulness of policy interventions. *Most governmental policies targeting the improvement in well-being generally target in fact one specific dimension of well-being and generate significant side-effects on other dimensions of well-being or on the social inequality and poverty risk.* Moreover, the interventions' effects are slightly or even significantly different when moving from one group of countries to another which shows that a unique set of governmental policies would not be effective for raising the overall level of financial well-being in EU-27. However, the divergent economic paths followed by the EU-27 countries after the sharp economic decline in 2010, have hampered the process of real convergence inside the EU which claim for national and regional solutions, at least in the short term.

The aim of my postdoctoral studies followed at the CEPS/ INSTEAD research institute in Luxembourg was to bring an innovative contribution to the measurement of deprivation/ social exclusion, and with this new contribution to publish at least one paper in an ISI-indexed journal. Four years of research have been spent to understand the methodological area of the Item Response Theory (IRT) method, to use it into the analysis and measurement of deprivation, and finally to apply it at this research question as to reveal new features, that cannot be derived from alternative approaches.

My contribution to the literature of deprivation was the application, adaptation and development of the IRT methodology in the context of deprivation analysis. Even though previously Cappellari and Jenkins (2007) have first applied this method to the same research question, my first paper on this topic reveals some mistakes done by them, and also develops and applies new features of this methodology. This first paper , which is co-authored with Alessio Fusco who actually works as senior-researcher at the CEPS/ INSTEAD institute, is called "**Item response theory and the measurement of deprivation: evidence from Luxembourg data" (Quality and Quantity"**, 2013c).

First, the paper applies the IRT as a traditional technique of educational and psychological measurement. Its application to the analysis of deprivation can be traced back to authors including Gailly and Hausman (1984) and Dickes (1989). See Cappellari and Jenkins (2007) and Fusco and Dickes (2008) for recent applications. These papers make use of IRT mainly for measurement models in order to derive deprivation scales; in addition, Cappellari and Jenkins (2007) use IRT for explanatory models when analysing the determinants of deprivation.

43

The growing importance of material deprivation in the field of poverty research has led to the proposal of a wide variety of techniques to measure deprivation (see e.g. Kakwani and Silber 2008). The main task usually consists of summarising the information available from a set of categorical items of deprivation. In this paper, deprivation is conceptualised as a latent construct, which needs to be derived from a number of manifest deprivation indicators. In this context, we argue that Item Response Theory (IRT), an extension of Classical Test Theory (CTT) with historical roots in mathematics and psychology, provides a suitable methodological framework for the analysis of deprivation.

The focus of our paper was an investigation of the advantages of the IRT framework when measuring deprivation. In addition, in this paper we extend the work already done in this respect by comparing the one- and two-parameter IRT models, emphasising the importance of item selection through the application of the Mokken Scale Procedure and introducing other IRT tools such as the Item Characteristic Curve. The paper was structured as follows. The concepts and methods are described in Section 2. Section 3 describes the data from the "Liewen zu Lëtzebuerg" Luxembourg socioeconomic panel (PSELL-3), and results and analysis are reported in Section 4. Finally, Section 5 summarises the main findings and provides a final discussion.

The analysis of this paper uses data from the "Liewen zu Lëtzebuerg" Socio-Economic Panel (PSELL-3), which is the Luxembourg component of the EU-Community Statistics on Income and Living Conditions data set (EU-SILC). PSELL-3 was launched in 2003, with an initial sample of 3500 households that were representative of the population living in private households in Luxembourg. In this paper, we focus on the fourth version of PSELL-3, conducted in 2006, and the unit of analysis is the household.

Deprivation can be considered as a latent concept that must be inferred from its manifest indicators. The responses of individuals to deprivation item questionnaires constitute the manifest or observed indicators. Deprivation is usually assessed by collecting data on the extent to which households possess certain commodities, engage in certain activities or are subject to financial pressures (Whelan 1993).

The steps leading to the calculation of a measure of deprivation with the IRT are the choice of the relevant dimensions/domains and the set of elementary indicators representing them, the evaluation of deprivation using each of these items and dimensions, the aggregation of the elementary indicators into a composite index for each dimension and, if considered relevant, the aggregation of the different dimensions into an overall index of deprivation (Chiappero Molenaar et al., 1995; Nolan and Whelan 1996). In this paper, after introducing the link between items testing and items selection, we focus on the step of aggregation of different items of

deprivation into a synthetic index of multiple deprivation through the use of IRT models, and then explain how the analysis of the determinants can be carried out.

Both theoretical and empirical requirements apply to the construction of a reliable scale of deprivation. The selection of the relevant domains and items to measure deprivation should be done initially on the basis of theoretical criteria, in order to operationalise the concept of deprivation. This important issue lies outside of the scope of this paper (see e.g. Alkire 2001). From an empirical point of view, potential items of deprivation must fulfil a set of assumptions and requirements in order to ensure that they refer to the same latent construct. Some IRT models require very restrictive set of assumptions (e.g. the Rasch model), whereas others are less restrictive (e.g. the two-parameter IRT). In all cases, IRT models rely on a set of fundamental hypotheses (Hardouin 2005):

•   Unidimensionality of latent trait: the first central assumption of an IRT model is that the items measure a single latent trait. This hypothesis implies that a single dominant trait determines the probability of item endorsement.

•   Local independence: the second central assumption is that of local independence. According to this assumption, once dominant factors are controlled for, item pairs should not be associated. Local independence relates to unidimensionality in the sense that no other characteristic of the individual influences the response probabilities.

•   Monotonicity: the third assumption states that the probability of presenting a disadvantage is a non-decreasing function of the latent trait; the higher the position of an individual on the latent trait, the higher their probability of responding correctly to a given item.

Testing the fulfilment of these fundamental hypotheses allows, indirectly, identification of a set of items meeting the IRT requirements. This can be considered as a selection procedure. Some authors attribute great importance to this question (e.g. Hardouin 2005 or Fusco and Dickes 2008), while others do not place much emphasis on it (e.g. Cappellari and Jenkins 2007).

Although according to the deprivation literature both the one- and the two-parameter IRT models enjoy the general advantages of latent models over the traditional models, there are some differences between them. By adding an item discrimination parameter, the two-parameter IRT model relaxes the strong assumption of equi-correlation imposed by the one-parameter IRT model, and often provides a better fit. There are rare cases where this is not the case. In this paper, we applied the one and two-parameter IRT models using two different sets of deprivation items. In the case of the global scale of deprivation, the likelihood ratio test shows a better fit for the two-parameter IRT, while in the case of the financial stress scale, the one-parameter IRT model better fits the data. These empirical findings suggest that the two-parameter IRT does not always bring an improvement over the one-parameter IRT, although this is rare. However, the

choice between the one- or two-parameter IRT models should also be based on theoretical considerations. For example, when studying the cumulative nature of economic and social disadvantages in order to describe deprivation, a one-parameter IRT, such as the Rasch model, can be considered to be the better choice (Fusco and Dickes 2008). Finally, when studying the determinants of deprivation, it was found that the two IRT models provide similar conclusions.

The measurement of deprivation via IRT can be extended in many directions, at both cross-sectional and longitudinal levels (see the last section of this habilitation thesis). At a cross-sectional level, multidimensional IRT allows the derivation several scales of deprivation (such as monetary and non-monetary) from a set of items, and a number of models (for example, polytomous IRT models) could be used to describe and summarise types of data other than dichotomous ones. IRT can also be used to evaluate differential item functioning or the non-equivalence of measurement items across groups of people, by examining the probabilities of item endorsement across these groups. The extension of IRT at a longitudinal level could take several directions, and may provide insights into the process of change over time.

The IRT methodology has been also used in other papers focused on social issues and social policy, such as **"On Testing and Estimation in the Economic Measurement, when using Item Response Models"** (WSEAS Transactions on Business and Economics, 2008a).

The concept of welfare state was explored in the paper **"Peculiarities of the Romanian welfare state**" (**Bulletin of the Transilvania University of Brasov**- Series V Economic Sciences, 2012a).

The EU countries follow different welfare regimes, which makes it difficult the association of the EU with a single welfare regime. In this multidimensional framework, Romania must find a national identity as regards the welfare regime. This should be related to the rapport between disposable resources and social needs. The inclusion of a country into a welfare regime is not a precise and objective attempt, because it has a relative and multidimensional nature. *The quality of health, education and social protection services, as well as unemployment, inequality and social exclusion are just few dimensions of social welfare*. This *paper looks at the peculiarities of the EU welfare regimes by analyzing the similarities and discrepancies between them, in order to place Romania into a welfare regime category.*

Romania entered the European Union in 2007. **Robust and consistent social policies** have been developed in Romania after the Second Great War, when, during the communist regime, the state conquered the entire free market. Therefore, social services became a matter of the state, which gained complete control in this area. Given that a democratic system has prevailed after 1989, the architecture of the social sector has changed and the social policies have adapted to a new structure.

If we were to include Romania in one of the social patterns presented in the previous sections, we would reach the conclusion that Romania fits the model of the rudimentary welfare state. The inclusion of Romania into this model can be explained by the fact that the Romanian government has provided poor social services across years, which have been unable to support a high or at least decent standard of living, according to the European social policy.

Romania cannot be included in the social welfare state type, because the state is still unable to cover the entire population's needs. Furthermore, Romania cannot be included in the category of liberal welfare states because the private social services market is poorly developed here. The main reasons behind the poor Romanian social services are corruption, decreasing workforce, economic difficulties and poor infrastructure. It is for these reasons that, even though the state strongly interferes in the social policies area, it has failed to cover the full market share in this domain. In the past five years, the private social services have entered the Romanian social services market. Though they were first rejected by the population, they have gradually been accepted and nowadays they are widespread especially in the field of insurance and health services. The private education and pension services have also gained importance on the Romanian social services market. All over the world where the government has not been able to totally cover the social services market, nongovernmental organizations interfere on the market, helping those in need of social services. Such an organisation that has developed over the past years in the health sector is SMURD. Providing emergency health services all over the country, SMURD is one of the top Romanian social services providers, demonstrating that the social policies market is still opened for improvement in Romania. The governmental health policy is conducted by authorities according to the national priorities and the public financial system.

The health system confers Romania the worst position in the EU. In order to improve it, the public expenditure and programmes in health should take into consideration two major facts: the population aging process and the importance of health-specific prevention activities. The natural aging process requests specific health services for the aging population, which are absent at present in Romania. This process will also involve the increase in the total health public expenditure and the increase in the share of health expenditure for the elderly into the total health expenditure. As the **public health budget** is always constrained by Romania' restrictive economic and social governmental policies, special attention should be particularly given to the elderly. But this seems to become a reality only in the far future. Following the way of the European Union in the field of social policy, it is likely that Romania will further develop its social services, until they reach the performance of the EU social policy. In the years to come, Romania has to continue developing the services sector, trying to adopt the patterns that have worked in well developed countries like France, Germany or Sweden. Another important

direction of development is the **extension of private social services** until they cover a considerable part of the entire social services market. But the development of social services must be well determined at a regional level. This is important because the penetration of private services on the social services market leads to the increase of income inequality.

Professional achievements

My experience with this topic mainly relates to the courses *European Social Policy* and *Social Security* that I teach for bachelor students.

A short description of the **course European Social Policy** is presented next, as to suggest the value-added transferred through this set of lectures to the bachelor students. The European social policy has not been an initial aim for the EU Member States, but rather a subsequent policy that has gradually expanded to support the economic objectives of the EU. Across years, the European social policy has been subordinated to the Member States' national strategies and frameworks, being unable to mobilize large-scale resources redistribution within the EU. The Commission and European Parliament strengthened the role of social policy in the integration process, especially during the 80's, as coordinators of social affairs at the EU level. Since the social policy was not the primary goal of the EC, the development of a "European" social policy was rather slow. The increasing inequalities within and between MS in the '60s and '70s, debated with the occasion of the Hague conference (1969) and Paris summit (1972), have reflected the lack of a sustained common action in the social field. Later in the history of the EU development, each wave of enlargement moved the interest to the particular interests of the newest MS. For instance, the entry of Austria, Sweden and Finland (1995) brought the *welfare state* in the EU attention, which had a positive effect for the European social policy.

In recent years, the trade-off between slower economic growth and greater social security has pushed the European social system in a severe crisis. Beside the demographic factors such as the population aging process, this crisis has been enhanced by economic and social factors, e.g. unemployment and migration. In fact, the structural unemployment, especially among the young, together with the generous welfare payments is the most significant costs of the European welfare state. The welfare state is itself in crisis. The increase of the cost of medical security services and retirement security made unsustainable most of EU welfare states. New solutions are therefore needed.

This course is aimed to describe the process leading to the design of the European social policy, and the challenges that the European social model must face in the global economy. One of the pillars of the European social policy is the European welfare state. The course also

introduces the EU welfare regimes, underlying the similarities and differences among the EU countries and between them and other countries in the world.

I also have taught a series of courses on the topic of the European Social Policy at **the Jean Monnet summer schools** organized by our faculty in the framework of the Jean Monnet contracts (Modules, Chair, and Centre of Excellence) that were conducted in our university.

At Transilvania University of Brasov, I annualy supervise around 15 students in developing and writing their dissertation thesis after completing the bachelor and master studies. Some of them choose subjects in the area of the European social policies and therefore I coordinate their work to prepare original, correct and well-structured contributions.

Moreover, as presented in Introduction, my last achievement in education was the postdoctoral studies at the LISER research institute in Luxembourg. Although in the first two years of my Ph.D. studies I strongly focused on the theoretical aspects of poverty, catching especially the philosophical and economical explanations of this phenomenon, the years to follow have allowed me to discover several measurement methodologies, as well as the study of social policy and welfare state. As a prolongation of the Ph.D. thesis, the postdoctoral studies focused less on theoretical aspects, and more on the methodological, empirical and policy-related ones. The challenge of the postdoctoral thesis was to develop and apply innovative methodologies to measure income redistribution, social inequality, deprivation and social exclusion, as a basis for designing effective social and economic governmental policies. The empirical results were equally important, because the Luxembourg government was particularly interested that time to get a realistic picture of deprivation and social exclusion in Luxembourg, in comparison with other EU countries, in order to improve the set of public policies, especially the social policies.

During the various grants, research contracts and positions that I held over time at the LISER research institute in Luxembourg, I have worked and studied in great details the group of econometric models GLLAMM (Generalized latent linear and mixed models) using the software package STATA. This methodology was very useful when studying social phenomena such as poverty, income redistribution and social exclusion, being therefore applied in several research papers.

Chapter 3. Contributions to the field of International Finance and Financial Markets

Research output

The academic and scientific activity on this topic of research was strongly enforced in my early career as well as in recent years by the collaboration with three international research institutes - The Institute for Economic Forecasting within the National Institute of Economic Research (INCE), the GIER research team within Cuenca University of Ecuador, and Halle Institute of Economic Research (Halle, Germany).

From 2010 to 2011 I have been associated senior researcher fellow at Halle Institute of Economic Research. The aim of this collaboration was first, to write collaborative projects and papers together with the institute employees, and second, to establish a connection between that institute and my home university. The topic of the collaborative the research was to develop and to apply nonparametric models to the analysis of the real economic and financial convergence in the EU area. To answer this research issue, I presented a series of research seminars on this topic at the Halle Institute, I published a paper in their series of Discussion papers on the topic of economic convergence (Raileanu Szeles, 2011), and then I published a an improved version of the Discussion paper into an ISI-ranked journal. I have continued the collaborative work in the following years, so that under the umbrella of the EACES organization we have organized together a workshop in Brasov, and we have participated together in several international conferences. More recently, I have moved from the analysis of economic convergence to the study of financial convergence (Răileanu Szeles, 2015).

The collaboration with the Romanian Institute for Economic Forecasting (IPE) has started in 2012 by participating to the elaboration of research papers together with other IPE researchers, and also by entering the Scientific Board of the ISI journal "Romanian Journal of Economic Forecasting", which is hosted by the Institute.

Most researchers at IPE work on topics in the area of Financial Markets, so by the interaction with them in many research-types activities and events has slightly catalyzed my research interest to the field of financial markets. Due to this collaboration, I facilitated the emergence of a series of annual international conferences organized by Transilvania University of Brasov and IPE.

One of the most important results of the collaboration with the IPE researchers is that I improved the methodology (quantitative analysis) specific to the research topics in Finance/ Financial markets. This is also the consequence of reviewing a number of papers in this area, submitted at the RJEF journal, which allowed me permanently being in contact with latest topics and methods applied in the analysis of financial markets.

A significant strand of my research activity developed under this topic was aimed to investigate the degree of economic and financial convergence in the EU-27 and different groups of countries within the EU-27 (such as the NMS) using different time spans (e.g. before and after the global economic crisis) and different methodologies. The analysis of financial convergence was performed by studying the dynamic of the governmental bond yields using different methodologies. Prior to move from the study of economic convergence to the analysis of financial convergence, a set of specific (convergence) methodologies was deeply examined. In addition, although the economic convergence is not a standard topic in Finances, the conditional convergence was investigated by variables from the field of public finances, such as public debt, public expenditure, or the budgetary deficits.

One of the topics approached in the area of International finance and financial markets is the **financial integration** (with regard to governmental bonds). The literature of financial integration is not as broad as it is the literature of economic convergence, but generally applies the same methodological instruments to assess the stage of convergence on different segments of financial market. There is no standard methodology to assess the degree of financial integration, because the area of investigation is a broad one, involving the analysis of various aspects, such as the nature, intensity and effectiveness of barriers to international capital flows or the investments opportunities. However, most papers rely on the Baele et. al. approach (2004), who advance three categories of financial integration measures: (i) price-based measures (yields-based or country effects measures), (ii) news-based measures, and (iii) quantity-based measures.

The financial integration was analysed in the **paper „Nonlinearities and divergences in the process of European financial integration"** (**Economic Modelling**, 2015b). The aim of this paper was to show that the bond yields distribution is not constantly unimodal across years and countries, and also to identify the formation of convergence clubs in the process of financial integration. The nonparametric approach (in particular Quah, 1997) is the one followed in this paper because it allows capturing the nonlinearities and divergences emerging in the European financial integration. This paper follows a nonparametric approach to analyze the degree of financial integration in the EU-27 area, and the nonlinearities and divergences occurring in this process in the short, medium and long term. In subsidiary, the nonparametric methodological framework is compared to the empirical insights provided by a "traditional" linear method in order to assess the usefulness of nonparametric methods when studying the process of European financial integration.

The analysis of financial convergence was developed into three steps: the three steps undertaken in the empirical analysis, i.e. (1) the analysis of multimodality of the bond yields

distribution, (2) the nonparametric analysis of the bond yields dynamics in the EU and NMS, and (3) the beta convergence regression analysis, which is ran for comparative purposes.

The multimodality of bond yields distribution is examined in this paper based on the *dip* statistic, which has been proposed by Hartigen J.A. and Hartigen P.M. (Hartigen and Hartigen, 1985). The *dip* test calculates the maximum difference between the empirical distribution function (F) and the unimodal distribution function (F$_n$) that minimizes that maximum difference. It gives insights to the distribution multimodality, in the sense that a large *dip* value suggests the presence of multimodality in the distribution under analysis.

In this paper, the distribution of governmental bond yields in EU is analyzed by representing probability density functions in a nonparametric form, using kernel functions. The kernel density estimators allow improving the representation based on histograms, which are not smooth, and which depend on the width of the bins and the end points of the bins, by cantering a kernel function at each data point.

In Fig.3 the stochastic kernel represents the conditional density by which a part of the distribution of bond yields in 2000 ends up as another part of the distribution in 2009. The highest peak of the stochastic kernel indicates the transition followed by most countries from 2000 to 2009. In this case, the most probable transition was, in relative terms, from low levels of governmental bond yields in 2009 to high levels in 2009. The countries exhibiting high levels of bond yields in 2000 continued to have high levels in 2009, as well. These countries form together a much lower subsequent mode into the density distribution.
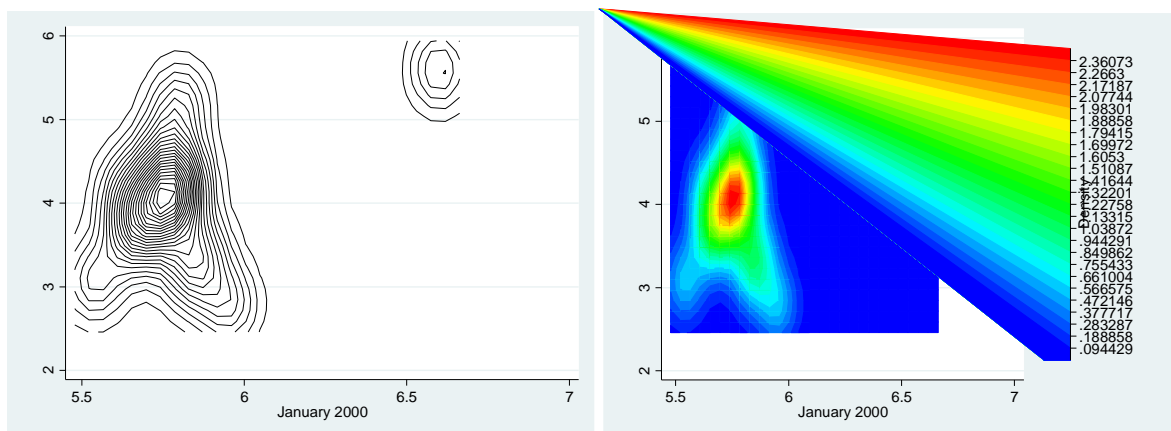
Fig.3 Stochastic kernel
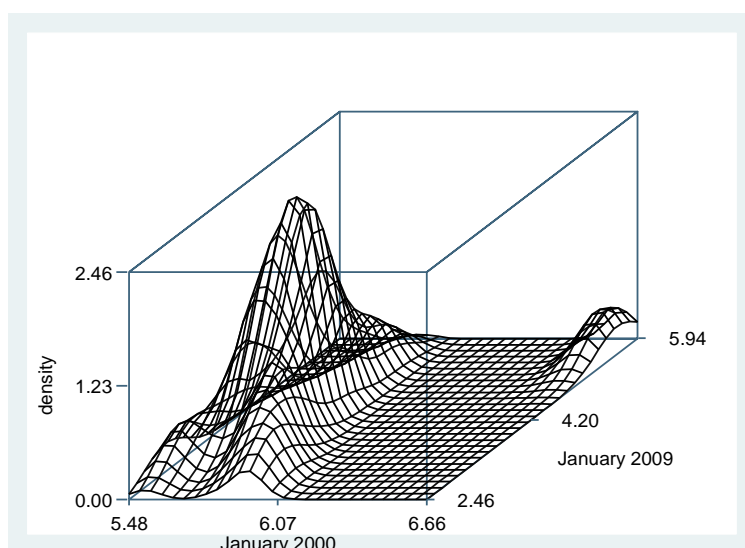
For a better perception of the convergence clubs emerged into the density distribution between 2000 and 2009 at the EU-27 level, Fig.4 presents the bi-dimensional contour plots of stochastic kernel.

Fig.4 Stochastic kernel, EU-27, 2000-2009

Contour plot

The contour plots suggest the formation of a very small secondary club into the density distribution. With this second mode, which explain the formation of a second convergence club, the distribution cannot be characterized as unimodal, but given that the second mode is characterized by a lower density, we conclude that the process of financial integration was a progressive one, but not a perfect one, from 2000 to 2009.

From 2009 to 2013 the global financial crisis is the factor explaining the changes arising in the yields distribution. The stochastic kernel graphs indicate a number of transition patterns which give birth to several convergence clubs. The highest peak in the density distribution indicates the most probable transition and corresponds in this case to the group of countries which had relative low levels of bond yields in 2009 and in 2013 as well. The other modes emerging in the yield distribution denote other types of transitions, such as from low yields in 2009 to high yields in 2013, or from high yields in 2009 to low levels in 2013.

When studying the transition from January 2000 to January 2013, a number of three convergence clubs emerge in the density distribution. Two of them are very close and include two sub-groups of countries that started together in 2000 in the first half of the yields distribution and ended in 2013 in two separate groups which are very close and still located in the first half of the yields distribution. However, the third convergence club is far away and much smaller compared to the other two. This group refers at the countries which continue to stay in the second half of the yields distribution in 2013, where they also were in 2000. This kind of transition suggests the lack of financial convergence even when extending at maximum the period of analysis. Moreover, the three-dimensional plot indicates the decline of the convergence

since the low bond yields group has split across years, giving birth to two convergence clubs from 2000 to 2013.

The beta regression model (parametric model) is applied as well in this paper, to get additional insights to the patterns of financial integration. The coefficient of the variable denoting the spread between the yield on a local asset and a benchmark asset (German governmental bond market) is negative and weakly significant. The beta value is theoretically indicative for a low and monotonous level of convergence, but given the low negative value of the beta coefficient as well as the low significance level of this estimate, the achievement of financial convergence could be interpreted as being doubtful. However, the results of the parametric model and those of the nonparametric one could be seen as being contrasting because the linear model does not clearly suggest the lack of financial convergence.

In conclusion, the pre-crisis period is found not to be the time of full integration (as also underlined by Abod et. al., 2009), because the empirical analysis has revealed that the bi- and multimodality are permanent states in our analysis. Contrary to the ECB (2007-2013) which claims that the increase of yield spreads emerging within the euro zone is not a sign of the decline in the process of financial integration, our paper suggests that the divergences arising and developing in the bond yields distribution, especially after the start of the financial turmoil, are indicative for the lack of financial integration. The comparative analysis of financial convergence on different time spans, as well as the number, dimensions and dynamics of convergence clubs occurring in the yields distribution suggests the deterioration of the process of financial integration over time. This global picture in the long term over the financial integration is still affected at a large extent by the financial crisis.

In comparison with the actual stage of the literature, our paper regards not only the euro area countries or the NMS area, but the whole EU-27 country dataset, providing new empirical insights to the literature by using a large dataset (monthly data on EU-27, from 2000 to 2013) and by applying a nonparametric approach. This approach is able to provide different and more reliable results in comparison with the traditional parametric framework. In the methodological field, the paper shows that the traditional beta convergence approach could lead to doubtful results when being applied to processes characterized by nonlinearities, as it is this case, where the beta coefficient is indicative for a low and weakly significant convergence process.

The same topic of financial integration in the EU was also approached in other papers, such as "A nonparametric approach to the financial convergence in the European Union", Theoretical and Applied Economics (2010a).

Another topic of research is related to the main course that I teach for undergraduate students – the field of international finance. One paper that I have recently wrote on this topic is

"Globalisation, economic growth and covid-19. Insights from international finance" **(Romanian Journal of Economic Forecasting, 2020b)**. The main topic of this paper is financial globalisation. **Financial globalisation** is strongly related to economic globalisation, being defined a long time ago as "the infrastructure of the infrastructure" (Cerny, 1993). In a modern perspective, financial globalisation is associated with the increase of capital mobility, intensification of the activity of international financial institutions, development of new financial products incorporating high levels of risk, the gradual elimination of restrictions on capital inflows, and the increasing preference for using floating exchange rate regimes all over the world.

The empirical analysis conducted in this paper was aimed to examine the economic impact of the EU country participation to the globalisation process, by a set of fixed- and variable coefficients regression models, on Eurostat data running from 2008 to 2019. The main variables of interet are

→ Intra-mural Business Enterprise R&D Expenditures in Foreign Controlled Enterprises,

→ Value added in foreign controlled enterprises (FCE).

In the first step of our analysis, the influence of a set of globalisation indicators on economic growth is analysed by a panel regression model estimated by the generalized least squares (GLS) model with heteroskedastic and uncorrelated errors. Three different groups of countries are separately analysed. Overall, the regression coefficients look almost similar across all models, which suggests the closeness of economic conditions in the EU-11 and EU-17, as a result of their economic and financial convergence.

On short, our results have shown that a higher employment rate in FCE doesn't hinder growth, but in turn a higher value added obtained in these enterprises is associated with the economic decline, and only in the Newest 11 Member States. One explanation supporting this finding could be that, compared to EU-17 countries, the labour force is cheaper in the EU-11, and in addition the privatisation process has facilitated the relocation of many multinationals in the post-communist economies.

In the second part of empirical analysis we apply varying coefficient models on the same set of data, to test the differences in the economic impact of globalization across the EU-28. Only some empirical findings will be emphasized here. For instance, a higher participation of FCE to the national economy, as indicated by the higher level of employment in FCE, was found to result into a higher level of economic growth in most EU-11, i.e. Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Estonia (EE), Spain (ES), Croatia (HR), Hungary (HU), Lithuania (LT), Malta (MT), Poland (PL), Romania (RO) and Slovakia (SI), but not in Latvia (LV) as well.

Basically, in all these countries, economic growth was positively influenced by the employment in FCE.

Another model with variable coefficients examines the FDI (FDI_{ij}) in year *j*, country *i* upon a set of fixed effects explanatory variables (*Economic_growth$_{ij}$, ln_value_added_FCE$_{ij}$, hightech_trade$_{ij}$*) and variable effects explanatory variables. This time, the participation of FCE in the national economy is examined through the value added FCE (as % in total value added). According to our expectations, a higher value added obtained in FCE is likely to stimulate the FDI inflow in the guest country. In contrast, if we analyze the participation of FCE in the national economy as proportion of the FCE employment in total employment, we get that it generates a negative effect on the FDI inflows in most countries, excepting Cyprus (CY), Greece (EL) and Luxembourg (LU). In Romania, the negative effect is even stronger than in the other countries, which could be explained by the lack of trust in the quality of local labor.

The main findings of our paper can be summarized as follows: *The dependency of national economy upon the foreign capital, which is in general managed in the framework of governmental policies encouraging the inward FDI, could lead to negative effects in the local economy unless being compensated by the strengthening of local capital*. However, the positive effects induced by the FDI inflows in the host country is not doubted here, being one of our empirical findings. Increasing the employment in foreign controlled enterprises could weaken the local capital because it basically deprive the local industry in terms of qualified labor, which can be seen as a prerequisite for economic growth and development. The EU statistics (Eurostat dataset) show that Romania has a level of employment in foreign controlled enterprises above the EU average, and this particularly justifies the increased attention toward this issue. The effect of increasing the governmental consumption on economic growth is negative for most countries, excepting Romania. To produce a positive effect, the governmental consumption should be oriented toward income/growth generating activities, and in this light Romania seems to be a good case. The positive effect of employment in foreign controlled enterprises on the growth is stronger in EU-11 than in EU-17, while the negative effect of the value added in foreign controlled enterprises prevails only in EU-11.

The ultimate goal of this paper was to anticipate whether protectionist measures are really needed in the context of global crises (such as Covid-19), given that globalization differently hits countries. As higher value added obtained by **foreign controlled enterprises** catalyzes inter alia the FDI inflows but hinder economic growth, it is obvious that the national, regional and EU-level FDI policies should take a closer look to the foreign capital and the consequences of its expansion. In addition, higher employment in this kind of enterprises (measured as % in total employment) is found to stimulate economic growth, but not the FDI as well. These simple

mechanisms explain a small part of economic growth, often resulting in different implications across the EU countries.

The main limitation of our study relies on the data availability. At the moment of writing this paper, the economic effects of the COVID-19 pandemic cannot be measured or even accurately predicted yet, so that it is unclear to what extent those countries which are more involved in the globalization process, are more hit by this sanitary crisis or suffer more negative economic consequences. The years to come will shed light on this research issue.

Globalization is not riskless, and the benefits resulting from a deep participation to this process are often accompanied by negative side effects that tend to occur especially during crises. Given that emerging economies, such as the EU New Member States, suffer from higher economic vulnerability, they usually take advantage sooner of the globalization benefits, but equally are sooner hit by its negative side effects. National policies adopted in the EU area should therefore complement the EU common policies and actions, to overcome especially in the short term, the globalization negative effects.

Still very recently (2020), another paper was published in the field of financial markets - **Transmission of Monetary Policy to Asset Prıces: Evidence using Stochastic Volatility Models** in **Transformations in Business & Economics (2020c)**. The paper was published in the journal's section entitled *Economic assessment of selected problems in the financial sector* and it was aimed to investigate the **stock market reaction to a contractionary monetary policy shock using vector autoregressive models with stochastic volatility**. The empirical exercise was applied to **Romanian financial markets data**. Model comparisons shown that the VAR model with fat tail and heteroscedasticity in innovations are more useful in modelling data compared to the time-varying coefficient model with stochastic volatility. There is clear evidence that structural shocks associated with industrial production, inflation and asset prices are characterized by a non-normal density. The results show that the contractionary monetary policy may fail to reduce the asset price bubble, as stated by the theory of rational bubbles in stock prices.

The paper's starting point was the financial crisis which has been associated with asset prices steep decline in value and a sharp fall in economic activity, with drastic effects on macroeconomic stability. Central banks, were forced in this context to counteract through monetary policy. In the literature there are two theories regarding the reaction of asset prices to raising interest rate: the traditional view say that the monetary shock have a positive effect on the market reducing the prices; and the rational asset pricing bubble theory that doubt the effectiveness of the monetary policy, arguing that the effect may even be unexpected growth of the bubble (Gali, 2014; Galí and Gambetti, 2015). The paper's objectives can be achieved by

constructing models with stochastic volatility and variable coefficients (TVP_VAR) pioneered by Primiceri (2005). The paper in fact examines the monetary policy effects on stock market using impulse response functions based on TVP_VAR and TVARSVOL. Specifically the dynamic responses of stock prices to the monetary policy shocks are investigated based on the estimated models. In the paper, the interest rate and the exchange rate are the proxy variables for monetary policy. In the empirical application, the datasets consist of monthly economic and financial variables for Romania, including the exchange rate, the interest rate and the BET index. The period starts from January 2000 to July 2015.

The estimated models are VARs with stochastic volatility. The explanatory variables are industrial production index, consumer price index, the overnight interest rate in the interbank market and the exchange rate, as proxy variables for monetary policy; and the interest rate spread between high-yield bonds and the 10-year Government bond, which can represent the risk channel. The specification is selected in order to capture nonlinearities of the dynamics between variables (both gradual shifts and sudden changes) that are expressed as time-variation linear equations for the coefficients. This is important especially for developing countries that witness recurrent structural breaks.

The short-term effect of the monetary policy, as responsiveness to an unexpected movement in the interest rate or exchange rate, is measured by simulating a positive shock. Differently from a standard VAR model, the impulse responses are computed for all points in time because we have estimated coefficients for each t. The VAR(2) are estimated using simulated data by drawing 50,000 Gibbs samples after discarding the initial 47,000 as burn-in to obtain convergence.

Figure below shows the impulse responses of the macroeconomic variables and the stock prices to the contractionary monetary policy shock of interest rate.

Fig.5. **Responses to monetary shocks. Posterior median of distribution. A. TVP-VAR; B. TVARSVOL**

A.   B.
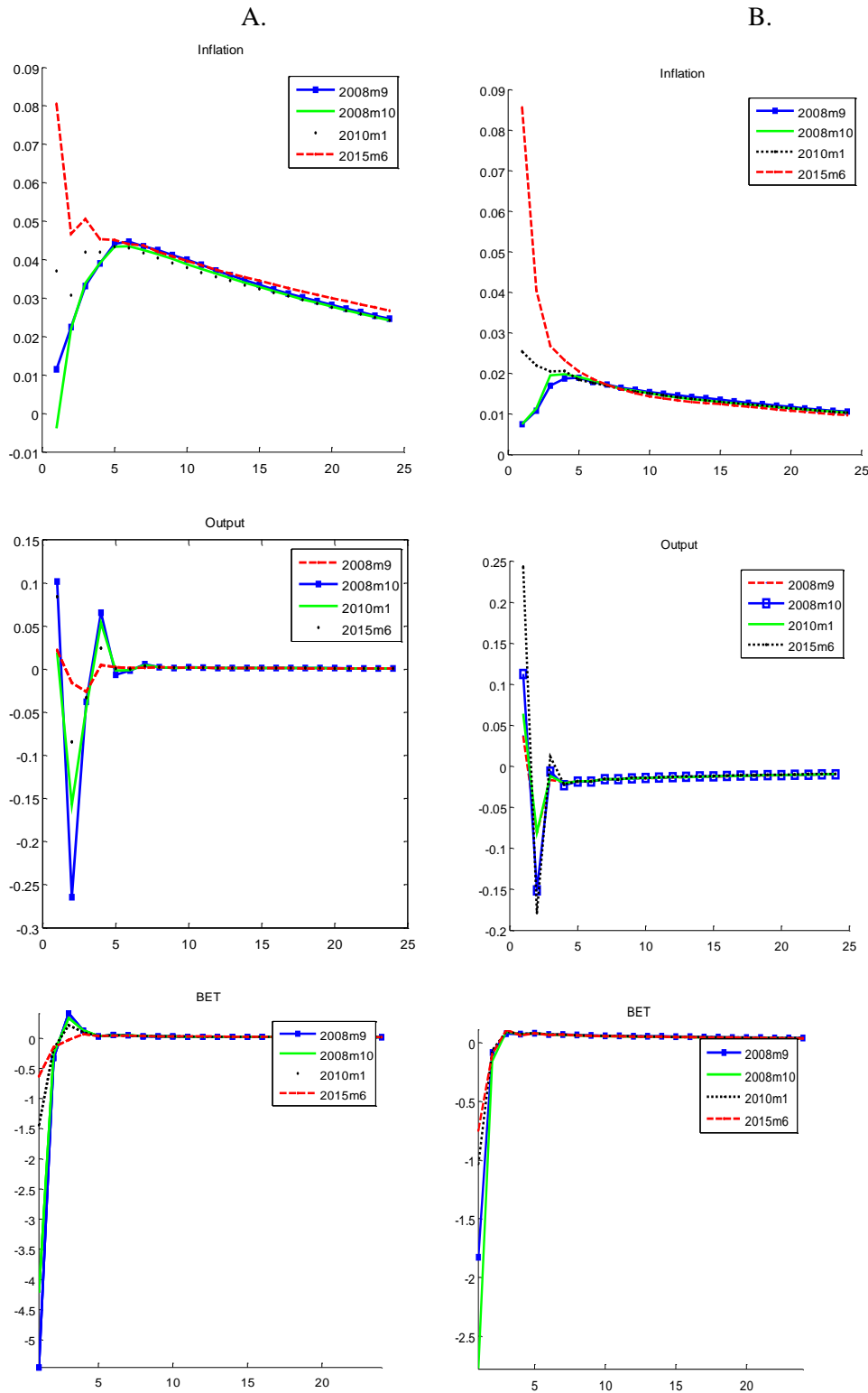
It can be seen that during the crisis the immediate response of stock prices to the contractionary shock is negative, decreasing the prices but then increases after two month, while changes little over the 2010 to 2015 period. The observed stock prices is the sum of fundamental and bubble components and the reaction of fundamental component is expected to be negative. So, we can interpret the positive response of the price as an increase in stock prices bubbles and

consequently an empirical evidence in favor of rational asset pricing bubble theory. This behavior is more pronounced for TVP_VAR model.

The main conclusion of the paper was that the analyses of monetary policy effects on stock price are in line with the rational asset pricing theory, which predicts the stock prices may raise in response to the contractionary monetary policy.

Other papers in the field of Finances-Financial Markets have been published in indexed journals (not WOS indexed) or Conference proceedings, as the results of attending international conferences.

Some papers have been presented and then published with the occasion of participating in the international conference Business Excellence, co-organized by Transilvania University of Brasov. One of them is entitled „**From Financial Turmoil to Economic Recession"** (Raileanu Szeles, 2008b) and it was published in a Special Issue of the journal Review of Management and Economical Engineering. This paper was aimed at analyzing the impact that the financial turmoil started in the US in 2007 had on the European economies and to also envisage its future consequences. The analysis comparatively examines the dynamics of GDP, inflation and economic growth in the emerging European countries, advanced European countries and the US.

In the world advanced economies, the economic growth decelerated toward the end of 2008, as a reaction of the decline of the **US subprime mortgage market**. At the end of 2007, the mortgage credit growth has already moderated in Europe and the general slowdown was in train before the onset of the crisis. This decline caused here the growth deceleration in the fourth quarter and early 2008. At the same time, the rate of inflation rose mostly due to the increase in the global commodity prices.

The sharp decreases in the house prices and the financial turbulence leaded the US economy to the brink of recession in 2008. This may have serious consequences also on the European economies, as the US is an important trading partner for many European countries, such as Ireland and UK. In this sense, the historical evidence has proven that the financial links can represent a more important channel of transmission than trade. Therefore, 1 percentage point decline in US growth reduces growth in Europe by about ½ percentage point. Indirectly, the slowdown of growth in the European advanced economies could weaken growth in the emerging economies by ¼ percentage point. The spillovers may be even greater in case of a US recession.

The paper mentions the IMF analyses which conclude that the financial crisis may reduce real growth in Europe by about ¾ percentage point in both 2008 and 2009 relative to a baseline without financial shocks. Still, that time there was a lot of uncertainty about the impact of the financial turbulence on growth. The crisis in the US was not over yet and some claimed that the slowdown will be deeper, causing greater spillovers to the rest of the world. If the banks

continue to lose money, the credit will become more and more restrictive and this will have a negative impact on the economic growth. That time, the house price booms represented a particular aspect of the global crisis. Some European countries have experienced a significant decline in the house prices that year, while in other countries the growth rates have come down. The most affected by this decline were Ireland, UK and Spain, because here the house prices significantly increased over the past decade. Even so, the effect of house prices on consumption was very small in Europe, compared to the US because equity withdrawal was less prevalent in Europe.

The financial turmoil is also deeply related to the imbalances in some of the countries with high external deficits and/ or external debt, because those countries are more exposed to the global crisis than the rest. In this category, Romania is definitely included, although it has not been affected yet by its negative consequences at a large scale, as it is the case of other countries at present.

Before the crisis, in the emerging countries the fast growth (2000-2005) has been accomplished by rising current account deficits and high levels of external debt. As the increasing external imbalances are considered to be the most serious problem in these economies, the financial institutes, particularly the International Monetary Fund, has recommended macroeconomic policies and structural reforms aimed at addressing the imbalances. The monetary and fiscal policies should be tightened to target the same objectives. The monetary policy therefore plays an important role especially in those countries where the exchange rate stability continues to be a macroeconomic objective.

Inflation was predicted to rise in the whole Europe, not only in the emerging economies. Some have argued that this may be an effect of the increase and very high volatility in the level of oil prices. Oil prices are even more responsible with the rise of inflation in the emerging countries than in rest, because here they accounts for a higher proportion of the consumption basket. This evidence can be explained by the fact that in the emerging economies, food prices have a great proportion in the consumption basket. As oil prices are indirectly reflected into the food prices, which have dramatically increased in 2007 and 2008, they represent the most important cause of the inflation growth that time.

Last years, in the emergent countries, economic growth was higher than in other European countries, mainly due to a great increase in the domestic demand. In the same time, the current account deficit and inflation have sharply increased, in the context of the overheating economy. The most responsible with the inflationary pressures are food and energy. In some countries, such as Romania, the fiscal stimuli have caused additional pressure and wage

increases over the real productivity. On short, this was the picture of the European emergent economies during the crisis.

Since the early 2007 onwards, the economic activity moderated in number of countries like Turkey and Hungary, mostly due to the tightening of fiscal and monetary policies. In the same period, Estonia, Latvia and Lithuania had to face the decline of house prices due to the restrain of credit activity, which has substantially decelerated the economic growth. In September 2008 Lithuania officially announced the start of recession.

Paper concludes that it is hard to assess the way from financial turmoil to recession, especially when the financial crisis is not over yet. The financial crisis in 1929-1933 has revealed that the start of recession gives certain signs such as the increase of oil and food prices. On the other side, according to the business cycle theory, a global economic recession may occur.

Another paper presented at the Business Conference conference was also included into the ISI-ranked Proceedings of the 5th International Conference on Business Excellence (15-16 October 2010 Brasov, Romania) - „**The future of the European Monetary Union after the global economic crisis**" (Raileanu Szeles, 2010d).

This paper was aimed at *analyzing the effects of the global economic crisis on the sustainability and future of Euro currency and also to prefigure the changes needed to ensure the performance and enlargement of Euro zone in future*. The idea of the paper was that the 2007-2008 global economic crisis has revealed the weaknesses of the Euro zone economies and of the Euro zone itself. The paper also comparatively examines in subsidiary the scenarios of the Euro post-crisis trajectory.

The **financial turmoil** that swept up the whole world economy in 2008 has proven to cross the borders of a simple economic crisis, being a threat for the Euro currency in the competition with the US dollar, as well as for the future of the Euro Monetary Union and for the prospects of its enlargement in the years to come. Not only are the EU authorities, but also other countries, concerned that the Greek government will be not strong enough to implement the austerity measures suggested by the IMF and euro zone countries, after the explosion of public debt in 2009. The debt contagion spreading from Greece could undermine the global economic recovery and the Euro success.

The biggest economic crisis in the world history as it was considered to be, after the '30-'33 crisis, has pushed up the public debt and public deficit in the EMU and EU countries above the limits imposed by the nominal convergence criteria. In the EMU countries, the Southern EU countries and the so called "PIIGS" (i.e. Portugal, Ireland, Italy, Greece and Spain) group had to deal with the hardest macroeconomic conditions, while Luxembourg, Finland, Netherlands and Austria had adopted restrictive fiscal measures to control the public expenditures. In 2010,

outside the EMU, Denmark and Estonia were still fulfilling the Maastricht criteria. The Baltic countries, Poland, Bulgaria and the Czech Republic had public debts below the level of 60% from the GDP, but their budgetary deficits exceeded the level of 3% of GDP. Overall, that time it seemed that the major concern of all EU countries after the global economic crisis is the public deficit.

In 2010 the traditional international conference of the Faculty of Economic Sciences and Business Administration within Transilvania University (SIMPEC) was organized together with the Jean Monnet conference. The paper that I presented at this conference is entitled "**Discussing the effects of financial openness in the CEECs**" (Raileanu Szeles, 2010c) and was published then in the Bulletin of the Transilvania University of Braşov Series V: Economic Sciences.

This paper was aimed at analyzing the macroeconomic benefits and drawbacks of financial globalization in the CEE area. First, the literature on financial openness and its impact on consumption, economic growth and poverty are examined, in order to see whether the empirical findings are consistent or rather divergent. Then, the paper analyzes the necessity and consequences of the financial integration in the CEE area, with a particular focus on the challenges imposed by the global financial crisis which hit the CEECs in 2008. The paper concludes on the role played by financial globalization in the world.

Financial globalization has become a hot debated concept in the last decade, with a broad area of meanings, benefits and costs. Until the start of financial crisis in 2007**, financial liberalization** was very often invoked as being a stimulant of economic growth for developing/ emerging countries. But the fast expansion and propagation of financial crisis from the US to other continents has been undoubtedly associated with the financial openness. This has raised questions about the real impact that the financial openness carries at both national and global level, and also has shown that additional empirical work is needed to address these questions.

In the context of the growing merchandise trade, the autarchic development is not anymore possible. The trade openness becomes a stimulus for financial openness, which is sometimes seen as a pre-requisite of financial development. Importation of foreign best practice, expanding diversification opportunities and efficiency-enhancing competitive effects are examples of how the financial openness can improve the domestic financial system.

In literature there is little systematic evidence that financial opening has positive effects on economic growth and poverty alleviation. The experience of the last global financial crisis has indicated that *financial openness might increase the frequency and severity of economic crisis*. Despite this negative perspective on financial openness, the developing countries continue to undertake measures towards this direction.

A considerable number of empirical studies applied on emerging economies have been conducted in the field of financial integration. They basically look to find a relationship between the financial integration and consumption volatility, on a side, and between financial integration and economic growth, on another side. The results are sometimes divergent or not significant. For instance, Kose, Prasad and Terrones (2003) find that the ratio of consumption volatility to income increased in the case of the financially integrated emerging economies, in the 1990s. In another study (2003b), they demonstrate that consumption correlations across countries remain almost stable in the 1990s, despite of the deepening of financial integration in that period of time. Buch, Prasad and others (2003) and, Fujiki and Terada-Haiwara (2007) find that increased financial integration is not associated with consumption volatility on long term.

When measured through a rise in the international capital mobility, the financial integration leads to restrictive and disciplinary monetary policies, because the substitutability of international financial assets reduces the effectiveness of expansive monetary policies. Thus, the inflationary pressures are reduced and the monetary policy becomes able to target inflation.

The causal relation between financial openness and economic growth is controversial because the question is whether the economic growth determines financial development or the financial development is caused by growth. When considering a long period of time, the relation between them is a spiral one. Anyway, the effects of financial globalization on economic growth cannot be analyzed as a direct relationship because the benefits of financial globalization are visible only on long term, and even so, it is difficult to measure the exclusive explanatory power of the financial openness variable itself. Anyway, when empirically studying those relations, the results are inconclusive and not robust (Kose and others, 2006). They suggest that the benefits are hard to detect with macroeconomic data and techniques.

From theoretical considerations, the financial openness helps the emergent countries to develop, being therefore a need at a certain point in their economic trajectory. The first reason is that the foreign direct investments in particular and the foreign capital in general, are factors of economic growth and domestic investment. In the absence of investment funds from abroad and also in the context of low domestic savings and weak domestic financial markets, the economic growth and development are seriously constrained. But the foreign capital inflows are risky in the sense that they must be accompanied by effective and appropriate macroeconomic policies and prudential regulations.

But not always the foreign funds are really necessary for economic development because, first of all, the investment demand in that country could be very weak (due to low social returns, for instance). Also, the real appreciation of the real currency could discourage the private

investments. Therefore, the effects of capital inflows on growth and consumption could be indeterminate.

In the CEECs, liberalization of capital accounts was realized through domestic macroeconomic policies, at the initiative of national governments, but with the consultative support of the IMF. Integration of these countries in the European Union has generates positive effects for their economy, such as the increase of the FDI volume and capital inflows. But the financial openness has also exposed them to a greater volatility to the external shocks. As long as their financial markets will continue to be underdeveloped, compared to the rest of EU, the output volatility will remain higher in the CEECs than in the EU. The risk of a greater openness of the capital account is that the monetary policy will lose flexibility and the fiscal policy will become the only additional instrument to deal with conflicting and external priorities.

In 2008, the global financial crisis raised a big question about the appropriateness of the transitional growth model adopted by the CEECs, particularly about the trade and financial openness and their consequences. But despite the negative predictions, the financial systems did not collapse. Anyway, there is a strong demand now for recalibrating their growth model, instead of replacing it with a new one. An interesting peculiarity of the CEECs regards the ownership of commercial banks. In the CEECs, most of commercial banks have been sold to big finance houses from developed EU countries. This carried both positive and negative implications for these economies. First, during the economic boom, financial integration stimulated economic growth in the CEE area, which was not the case of all emerging countries. Later, during the financial crisis, West European banks did not withdraw all funding from their CEE subsidiaries overnight and therefore there were no big banking crisis in the Eastern Europe. The „Vienna Initiative" also helped the CEECs to prevent a run of the foreign finance houses for the exit. Overall, even though the foreign banks fuelled unsustainable credit booms, the EBRD claims that countries with a higher share of foreign bank ownership did relatively better in the crisis than those with shaky local institutions that relied on short-term liquidity from abroad.

The financial crisis shows that the financial globalization must be sustained by home country supervision and especially by stronger cross-border regulation. For instance, Austria and Sweden did not act prudentially when their banks were getting up to Latvia or Hungary. Also, the CEE host countries must strengthen local capital markets.

A particular feature of the CEECs economies before and after the crisis was the high volatility of exchange rates. From 2008 to 2009 the zloty depreciated by over 50% against the euro, the forint by almost 40%, the Czech koruna by almost 30% and the Romanian leu by 25%. This has raised the cost and risk of credit. But since March 2009, the regional currencies have appreciated again.

Participation of the CEECs to the financial globalization is strongly related to their participation into the European Union, but also to the prospects of becoming a part of the European Monetary Union. The CEECs financial integration has thus an historical inevitability. Now, the most important objective in the CEE area is the achievement of the nominal convergence criteria in order to be able to enter the Euro area. One condition is to join the ERM 2 exchange rate system two years before to move to EMU. This monetary arrangement fixes central parties for their currencies around Euro, whose fluctuation are limited at 15%. The severe consequences of the financial crisis make more difficult now, than in the past, the achievement of nominal criteria. The paper finds that the limit imposed for the budgetary deficit seems to be impossible to be reached by most of EU countries and that a new strategy for the EMU enlargement is therefore strongly needed. The paper also discusses the solution of relaxing or changing the actual nominal convergence criteria.

A particular interest was devoted to the analysis of the European Monetary Union. Although several papers address this topic of a great interest for Romania, I will descrive only the most cited one (49 citations) - **„Real Convergence in the CEECs, Euro Area Accession and the Role of Romania**" (**The European Journal of Comparative Economics,** 2010b).

The paper has an empirical focus, namely to measure the state of regional convergence of the ten new EU member states (EU10) stemming from the former Communist regime, i.e. Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia. The paper contributes to the growing literature in the field, including the two new additions to the EU, namely Bulgaria and Romania, which were often omitted in previous studies concerning convergence. We believe that in the context of an enlarging EU and EMU, the empirical investigations of regional convergence become increasingly important.

Despite of the impressive number of empirical studies aimed at stating absolute and conditional convergence in the EU at different stages of its enlargement, the literature on regional convergence in the CEE is still poor and divergent at some points. Since the CEE countries share a number of common peculiarities arising from their communist roots, the regional convergence might be an issue of interest, also in the light of the future participation of the CEE countries at the EMU. The analysis of GDP growth and its determinants is approached in a longitudinal perspective and uses panel data models which are applied on a period of 11 years. To get robust results, but also to allow including endogenous explicative variables of growth, several estimation methods have been compared, in the framework of the fixed effects regression models.

Hopes of **adopting the euro sooner**, in order to benefit from its stimulating effects at macro and microeconomic level, have vanished in the face of the crisis, with governments of

CEE countries trying to take short-term measures for putting the economy back on track. The crisis has stopped the economic boom of several CEE economies. The rise of unemployment, the drop in investments and the rigidity of financial markets are among the effects that will most probably delay the entry of candidate countries to the euro area for a while. Nevertheless, the economies of new member states have not lost their attractive elements for foreign investors, such as a well-educated workforce, closeness to Western markets and potential for productivity growth. Thus, it can be anticipated that the slowdown of the convergence process due to the crisis will not be an obstacle for investors, and these countries will recommence the race of catching-up.

The paper shows that for Romania, **the goal of monetary policy** in the last few years has been focused on preserving macroeconomic stability combined with reform measures that should bring the country in line with convergence to the euro area. Romania has found itself in a difficult position once the financial crisis broke out, with public deficit mounting in the last two years in spite of the high growth rate registered. This growth has been made possible though by backing from foreign banks. Romanian affiliates of these banks became used to external financing and the current account deficit has risen, making the Romanian economy vulnerable to the effects of the financial crisis, as the Central bank governor repeatedly stated. The accelerated drop of private capital flows to Romania since the end of 2008 and during 2009 led to a decrease of economic activity, a reduction in external trade, significant exchange volatility and a higher cost of credit. The Romanian Central Bank initially set 2014 as the year of entering the euro area.

It is well known that economic growth can be stimulated by increasing the amount and types of capital and labour used in production and also by combining them in an efficient way. The contribution of labour to the GDP growth can be measured through the growth of labour productivity.

The GDP growth rate is the central piece of our analysis because is able to highlight the degree of conditional and unconditional convergence and the factors underlying this process. According to the convergence theory, the main factor explaining the GDP growth is the initial level of per capita GDP. In order to assess the absolute/ conditional convergence in the CEE region we expect to find a negative relationship between the two indicators (see figure 2). The inflation, governmental debt, gross capital formation, household final consumption and exchange rate are other explicative variables included in the econometric models.

We expect to find positive relationships between the economic growth on a side and the gross fixed capital formation, population growth and inflation on the other side, as well as a negative relationship between growth and exchange rate. The impact of governmental debt on growth is not the same for the whole dataset. It mainly depends on the size of debt and type of

receptor country. In general, large debt stocks negatively affect growth while low levels of debt stimulate growth. Therefore, it might be presumed that a small governmental debt could enhance economic growth.

The paper finds both unconditional and conditional convergence in the CEE region. Despite of the economic gap that Romania has in comparison with the rest of the CEE countries, its presence in the CEE group enhances the regional economic convergence. This is a relevant finding, given the weak evidence for conditional convergence within CEE or among the transition countries in the literature.

As resulted from our empirical section, the absolute convergence becomes significant only when including Romania in the CEE countries. The presence of EMU group as the 11th member of our sample significantly deepens the convergence process. The unconditional convergence is significant, independent on the Romania's presence among the CEE countries. When considering Romania as a part of CEE, the evidence of conditional convergence becomes even stronger. To sum up, the conditional convergence within the CEE area has been assessed in our paper using a number of four estimation methods, in order to get robust results. According to all of them, the labour productivity and trade openness are the most important determinants of economic growth, having a positive and important role in fostering the regional economic convergence. The exchange rate has a weaker significance and is in a negative relationship with growth. When the endogeneity is controlled for in the GMM models, the household final consumption is found to be positively related to growth. Governmental debt also has a weakly significant but positive impact on growth. For the rest of explicative variables, the estimation methods lead to different or insignificant results. Anyway, they explain to a lower extent the GDP growth and have just a lower impact in the conditional convergence process. The sensitivity of results to the estimation methods is partially due to the data availability and limitations in the case of transition countries and also to the low number of observations in the sample. The paper concludes that the CEE countries have experienced convergent economic growth in the last decade, which was mainly driven by labour productivity and participation to the international trade. Moreover, Romania will continue its prudential monetary policy and tighten the fiscal measures so as to get over the crisis and stay in line with its convergence requirements to the euro area. A faster adoption of the euro, supposing nominal convergence criteria will be met earlier than the self-imposed target of 2015, would be dangerous and not feasible with real convergence missing.

The bankrupcy risk is another topic that was approached, in relation with the financial markets stability, in the paper „**Introducing an innovative mathematical method to predict the bankruptcy risk. Measures for the financial markets stability**" (Proceedings of the 10th

WSEAS International Conference on MATHEMATICAL and COMPUTATIONAL METHODS in SCIENCE and ENGINEERING, 2008c).

This paper is concerned with examining the econometric models explaining the cases of bankruptcy and predicting the risk of falling in bankruptcy. All econometric statistical methods used in the measurement of bankruptcy risk basically aggregate some financial ratios into an index of bankruptcy, at a static or dynamic level. The paper is innovative in the sense that it proposes a new methodology to measure the bankruptcy risk.

In the framework of the fuzzy sets theory, the bankruptcy risk can be analyzed through a membership function. This function establishes a link between each company and the sets of "healthy" or "risky" firms. The membership function can be constructed in many forms. Bankruptcy risk may be seen as a latent variable in the sense that it cannot be directly observed, but can be derived from other indicators e.g. financial ratios, which are observed and directly measured. Traditionally, the bankruptcy risk is measured as the weighted sum of financial indicators. But this approach does not take into account the fact that bankruptcy is a latent variable that can involve large measurement errors. Item response theory, also known as latent trait theory, could be another measurement option.

Bankruptcy and prediction models are largely used in auditing, large corporate transactions, investment decision making and in the judiciary setting. Improving and innovating the analysis and measurement of bankruptcy risk is highly required, especially in the context of globalization, which may have negative effects especially on the financial markets. Predicting the financial risks may prevent not only bankruptcies but also the transmission of financial crisis by the banking channels, due to the global economy.

Academic activity

Since the year 2000 I teach the course "International Finance" for bachelor students, being member of the Department of Finance, Accounting and Economic Theory of the Faculty of Economic Sciences and Business Administration (FSEAA). Since 2005 I became interested by the field of Financial markets and investments, as a consequence of several professional courses/ trainings attended in early 2000. During the whole functioning of the master study program MBA at Transilvania university of Brasov, I taught the discipline entitled Financial Investment. Since 2005, I teach the course "Financial Investment and Portfolio Management" at three FSEAA master programs. To provide valuable and useful specialised information to my students, I have collaborated over time with local institutions and companies acting in the field of financial investments, such as persons involved in the management of commercial banks, representatives of local branches of investment companies, brokers etc. Some of them were

invited to give occasional lectures, while others provided fellowships or even jobs in finance or finance-related areas to my (master) students. I also was invited in last years to teach a course on "Financial investment" at the CECCAR professional accounting association.

Basic, as well as advanced knowledge on financial markets, institutions, securities, mechanisms, produscts and operations are all taught as sections of my basic, intermediate and advance courses in this field.

Beside the course of Financial Investment (which is taught for different master students cohorts, under slightly different names), I also teach the course International Finance for bachelor students enrolled at two study programs: (1) Finance and Banking, and (2) International Economic Relations.

I use to yearly coordinate roughly 10-20 disertation papers (bachelor and master) at the Finance and Banking bachelor and master study programs.

In fact most of my teaching activity is in the general field of Finance, and this a very strong incentive to write an habilitation thesis in this field as well.

To improve the quality of the teaching activity and especially the accumulation of knowledge by students, I published five books in the field of Finances over my entire career. The most recent one is entitled "**The European cohesion policy"** (forthcoming, 2021 spring), and will be published with the Publishing House of Transilvania University of Brasov, being used as teaching material for all my bachelor courses. The second, **„International Financial Relations"** (Raileanu Szeles, 2006) was published with the publisher Lux Libris and addresses students studying the discipline International Finance/ International Financial Relations. The third, **„International finance"** (Raileanu Szeles and Miron, R., 2011) which is published with the Publishing House of Transilvania University of Brasov, has the same audience as the latter.

In 2013 I edited and co-authored a book in English, published with the prestigious international house Palgrave McMillan, entitled **„Re-examining EU policies from a global perspective. Scenarios for future developments"**. The European policies selected to be analyzed in this book are currently among the most debated and controversial ones. The authors identify a close turning point into their functioning, determined by the global economy, which requests a new approach and design, adapted to the new economic, social and demographic context. A short description of each chapter is provided below. The ***European monetary policy*** is one of the chapters written by me. The European monetary policy and the launching of the Euro represent key steps into the process of European integration. This chapter begins with a historical perspective on the European Monetary Union and then continues with the main achievements and challenges of the Euro zone over time, in the context of the global economy. The theoretical foundation of the Euro, examined here by the optimum currency area theory,

allows us explaining the sustainability of the euro in the long term. The actual stage of the economic and financial convergence, the achievement of the nominal convergence criteria and the weaknesses of the euro area facing the challenges of the global economic crisis are also examined. The chapter ends with advancing several euro perspectives and enlargement scenarios.

The main issues approached in the other chapter written by me are the **European welfare states and social policies.** They are the basis of the actual architecture of the European welfare system, explaining the failure of the generous European traditional welfare states, the reforming process and the critical points still requiring common and national solutions. After presenting the main steps undertaken in the development of the European social policy, the European welfare state models and the European social model are critically examined in this section. The chapter also presents the economic and demographic challenges of the current European social policy, and their implications on the sustainability of this system, with a special focus on the aging process and pension systems in the EU. Different national reforming paths are comparatively analyzed and, in the end, future challenges for the European social policy are also advanced.

In addition, I also co-authored a book issued in the framework of the Jean Monnet Module grant that I was awarded in 2009, entitled "Economic European Integration" (2012b). The book is written in Romanian and it focuses on the EU economic policies, with a great emphasis on the *European monetary policy*. The book incorporates the handouts of lectures, the feedback from students and the teaching material prepared for this course in the period 2010-2011. This added value enhances the quality of the book and makes it answering to the students need. It has been used as teaching material since 2012 onwards, and additionally it has been sent to other universities and research institutes for dissemination and examination.

The book is written for the academic world, researchers, but also public institutions, governmental bodies and civil society institutions with interests in the field of the European integration studies. Basically, the target audience is represented by those who want to improve their knowledge in the field of European policies, to stay connected to the latest developments in this field and to become aware of the new threats and challenges launched by the global economy.

The idea behind the presentation of European policies following the same structure is that the new European development model, which stems from the difficulties posed by the current global economic crisis, should envisage and respond to the challenges addressed by the changing global economy. This requests new, reformed European policies, aiming to support a sustainable inclusive green economic growth leading to economic development and better living conditions for European citizens. Acknowledging the necessity to rebuild the European policies and the

European integration process in the aftermath of the global economic crisis is an important step toward a new phase of EU enlargement and development.

Since the year 2019 I hold the position of **Jean Monnet Chair on EU regional (cohesion) policy, granted in the framework of a Jean Monnet contract funded by the European Commission**. Although the cohesion policy is not a topic in Finances, *the EU investment and structural funds are at the core of my Jean Monnet contract*, by which I have to teach this new discipline at several study programs inside Transilvania University of Brasov. The EU budget and its budgetary principles and proceedure, and the EU expenditure and revenues are other topics debated at the Jean Monnet courses.

Beside all reasonings underlined above, I am **the coordinator of the master programme "Financial and Banking Management"** at the Faculty of Economic Sciences and Business Administration within Transilvania University of Brasov. To raise interest for this programme provided by our faculty, each year I try to adapt its curricula upon the latest changes occurring at the national and European level, and also by considering the curricula followed by the most prestigious national and European universities. Participating into the Ph.D. programme of Finances developed within my department would definitely complete my career and would also allow me improve my management and teaching activity at the master and bachelor study programs.

(B-ii) The evolution and development plans for career development

If being accepted in the Interdisciplinary Doctoral School of Transilvania University of Brasov (Specialisation Finance), I plan to focus more in future on **Finance** in both my academic and research activities. I consider that this finance-oriented activity will allow me contributing to the prestige and results of the Finance Ph.D team.

I will start by mentioning few steps that I plan in the next future related to the development of my academic activity (mostly teaching). Firstly, I plan to improve my advanced knowledge in the field of International Finance-Financial Markets, as to deliver better lectures and seminars. New chapters will be introduced, especially those which can create a kind of bridge between the master program and the Ph.D one. This attempt will facilitate the approach of new topics, in line with the current trends in Finance, at the Ph.D school. Equally, the curricula and structure of courses should be adapted to the new post-Covid realities in Economics and Finance.

The very fasts developments in the area of digitalisation requires immediate responses from universities, as to provide knowledge and abilities required by the changing labor market. Structural changes are expected to occur especially in the vaste space of Finances, with regard to the formation of new competences and abilities specific to the digital economy. The main local employers for our graduates in Finance and Banking (undergraduate, master and Ph.D levels) are commercial banks, the financial departments of multinational companies, and the financial public institutions (such as ANAF). The traditional jobs in Finance and Banking tend to become fewer over time due to digitalisation that affects at a higher extent the main local employers. In this context, the curriculas should change, with greater emphasize on *financial technology, cryptocurrencies, entrepreneurship, risk management etc. – topics that currently have at present a very limited exposure at all our Finance and Banking study programes*.

In other words, preparing a fertile ground at the undergraduate and master levels, will generate positive effects later on, for the doctoral school on Finance. This will represent a serious effort that I will undertake in next years, as professor, (hopefully) Ph.D. supervisor, as well as academic coordinator of the "Financial and banking management" master program.

Still in the academic field I plan to continue applying for national and international grants and educational contracts, to continuously improve my teaching activity, to supervise students to write their dissertation theses on interesting and challenging topics, and to participate in national and international competitions on Finance-related issues, as well as to continue publishing books for undergraduates and master students, to help them better accumulating knowledge in my field of teaching. This is a very general plan.

But the most important academic objective for the next years is to become a member of the Interdisciplinary Doctoral School of Transilvania University of Brasov in the specialisation Finances, and then to contribute along with my colleagues to developing it, by coordinating very good disertations and by stimulating the excellence in research. To achieve this objective, we have to encourage postgraduates to be interested of research activities, eventually with the aim to work later in the academic environment or in research. In this sense my major interest is to supervise high-quality Ph.D. theses, i.e. theses advancing well-documented innovative and original contributions to the literature. Among the solutions thought by me at this point I mention just very few - to put much emphasis on research in the last year of postgraduate studies, to involve postgraduates into research projects and to encourage them to participate at national and international research events (e.g. conferences, competitions, workshops). Raising the postgraduates' interest for the Ph.D. programme would allow a rigorous selection of the Ph.D. candidates, and in my opinion this is a pre-condition for a successful Ph.D. programme.

After starting and consolidating my position and contribution to the Finance- Ph.D. programme, I plan to raise funds for establishing a partnership with an international foreign Ph.D program, or to develop a joint Ph.D. school. This will happen if my colleagues in the Ph.D. school will agree my proposal, and will consider it as an opportunity. This kind of "educational" funds are currently available under the Erasmus plus programme, or under the new Horizon one. I have undertaken one step ahead in this regard, and I have already established good connections in this sense with several universities (e.g. Maastricht University), which would be interested to participate in this type of joint programme.

My strong collaboration with University of Cuenca (Ecuador), initiated in the framework of a Prometeus teaching fellowship in 2014, allows me identifying a group of potential candidates for the Finance Ph.D. school. Internationalization is a key-strategy in rising the visibility as well as the prestige of the doctoral school all over the world. This is also in line with the main pillar of the long term strategy of Transilvania University of Brasov. The Latin America could generate a constant mass of candidates over time, especially that in Ecuador, for instance, there is no doctoral school in economic sciences or business.

The topics that I will propose for the Ph.D. theses will be in the fields of International Financial Relations/ Financial markets/ International Finance/ Social Policy and other public policies. Some examples could be:

- The analysis of stock market reactions to different (monetary policy) shocks using vector autoregressive models with stochastic volatility
- The stock market volatility in the context of different economic crises
- Reconfiguration of welfare state in the EU

- The impact of digital economy on financial markets
- Social policies (and other public policies) supporting the green transition and the digital transition
- Social impact bonds
- Behavioural public policies
- Open innovations, technological progress and public policies

In the end, I will encourage students publishing chapters of their dissertation theses into prestigious international ISI journals, for an increased dissemination of their results. At this step, I will help them to learn writing good research papers. Also, I will involve in the organisation and coordination of Ph.D. students, eventually to include Ph.D. sessions as permanent sections of the International conference ISEG, which is a series of conferences organized by Transilvania University of Brasov (Faculty of Economic Sciences and Business Administration) together with the Institute for Economic Forecasting (Bucharest).

Welfare states reshape market inequalities into a secondary income distribution. Recent investigations argue that there is a retrenchment of the welfare state since about the mid 1980s. My future research work in the field of social policy-welfare state will aim at a cross national comparison of the impact of the public policy patterns of different welfare regimes on the social position of the middle classes. Furthermore, a closer analysis of specific policy fields could describe in detail which and how public policies caused growing insecurity of the middle class position. Several realms of social policies should be analyzed in order to understand the effect of public policy on inequality. The analysis of this topic will indicate how differences between welfare state regime types and their protection of the middle classes. Furthermore, it will allow answering the question whether it is still true that European welfare states protect the middle better than the liberal ones. Or, do regimes still differ in their policy patterns or did economic openness promote a trend towards convergence of social policy strategies? What is the impact of the fiscal structure on patterns of social inequality? How are different welfare regimes reacting to recent economic trends? This kind of research would address the mechanisms of how social policies could negatively affect middle classes even if it is usually assumed that cuts in social benefits can hardly be imposed against the majority of voters. Or, to what extent is there a connection between decreasing middle classes and the politics of retrenchment of the welfare state?

Another paper that I plan to write is about the longitudinal application of the IRT method in finances (the calculation of bankruptcy risk, which is itself a latent measure). With the IRT method, the analysis of bankruptcy risk for instance will be improved since it would incorporate the accurate selection of items as to provide a reliable scale of bankruptcy risk indicators This

would be an innovative extension of my previous papers published in ISI and BDI- ranked journals on the use of IRT method in the cross-sectional measurement of deprivation.

As mentioned in a previous section, the item response theory models are complex measurement models which are used in the analysis of latent categorical variables based on a set of response items. Initially they have been developed in the framework of education testing and psychometrics, where the variables of interest are latent, and only in recent years they have been adopted as new measurement tools in medicine, psychology, economics and social sciences.

In the welfare literature, the IRT models have only recently been applied to the analysis of deprivation and wealth. Given the latent and multidimensional nature of social phenomena such as deprivation, wealth and social exclusion, whose composite measures are inferred from a set of descriptive items, the IRT or the latent trait models are statistically superior measures in comparison with the traditional sum-score. Moreover, the social latent measures are categorical, so that the use of principal component analysis and linear OLS regression is inappropriate.

Most IRT models can be formulated as hierarchical generalized linear models (HGML), the latter being used to model the responses of individuals nested within hierarchical settings. This formulation permits including both item-level and person-level covariates into the model, as well as a third level to the model, e.g. the longitudinal level. With the multilevel approach, IRT models allow estimating individual growth trajectories by letting the growth parameters to vary across individuals. A particular set of IRT models are the longitudinal models which allow measuring individual differences in change over time. The choice of using longitudinal IRT models in the economic and social modeling of dichotomous and polychromous data could rely on the possibility to estimate individuals' growth trajectories and the variation in the parameters describing those trajectories. Longitudinal data can be analyzed using the multilevel approach, by considering the panel waves (also called occasions) as level-1 units and subjects as level-2 units. Because this longitudinal approach should accommodate within-cluster dependence, the fixed effects models are usually preferred.

Another topic of interest for my future research work is to integrate the wavelet decomposition and neural networks in forecasting different financial measures, such as (index) stock prices dynamics.

The neural network and the wavelet analysis belong to the category of nonparametric methods traditionally used to forecast GDP. In contrast to the parametric methods, the nonparametric ones avoid making a priori specification on the distribution of the time series and on the link function, and could determine better forecasts.

Applied to the forecasting of stock prices time series for the European Union South-Eastern countries, the discrete wavelet decomposition and neural network techniques involve

following five steps: (1) Decomposition of time series to identify noise and deterministic components; (2) Separate deterministic components in series by testing the significance of discrete wavelet analysis; (3) Using the neural network analysis to forecast deterministic components in the forecasted series; (4) Description of the random characteristics of noise data by statistical techniques, and (5) Deriving the final forecasting results.

In the methodology presented above, the approximate component suggests the trend into the stock series, and the noise represents a kind of variance. Excluding the noise from the time series in the forecasting analysis improves the performance of forecasting. In order to test the effectiveness of this methodology, I could compare the estimates of this approach to the results including the noise.

Another topic that I would like to approach in near future is the identification of the optimal mix of public policies aiming to address the economic vulnerability arising from a set of macroeconomic imbalances. Recent years have witnessed a widespread interest to mitigate economic vulnerability to different types of external shocks, the 2007-2008 global economic crisis and the subsequent euro area crisis, as well as the 2020 Covid-19 crisis being of major concern for most EU countries and citizens.

With this uncertain and turbulent perspective over the global economy, vulnerability becomes a permanent matter of concern for all countries, especially for emerging economies. In general, countries, regions and households are differently affected by same shocks or crises, and this raise questions about the ability of people/ countries to recover from the damage or welfare losses resulting from an adverse shock, as well as about the process of resilience. Vulnerability has become a popular interdisciplinary concept, being approached in the framework of various disciplines such as environmental change, economics, sociology, anthropology, psychology, development studies, food security, health, geography, and disaster management.

A large body of literature was lately devoted to the analysis of vulnerability, but almost all contributions approach vulnerability by sector or discipline. The risk of a country economic decline facing external shocks (macroeconomics), the household's risk to suffer a welfare shock and to therefore fall below a socially minimum level (microeconomics), the inability to cope/ resist/ recover from a natural disaster (disaster management), from a changing environment (anthropology), from flood and epidemics (livelihoods), or the probability to be at the risk of poor physical, psychological and/or social health (health), they all can be framed into the space of vulnerability. The risk emanating from different sources, such as economic change, disease and conflict, and the final aim of human security (generally referred to as resilience) are at the core of the vulnerability concept.

The importance of research on EV goes now much beyond the scientific goal. During and in the aftermath of such crises, some people being ex-ante at risk of poverty or even non-poor enter into poverty, while others do not. Understanding why individuals who are equally exposed to the same risk suffer consequences of different types and intensities, and what are the "critical" thresholds of region and country level EV that accentuates even more individual EV are of a great importance for rethinking effective regional and macroeconomic policies aimed to (1) enhance individual and community resilience and (2) to decrease EV. Even in the single space of social sciences, economic vulnerability (EV) remains a relative concept, whose definition is generally formulated in the broadest sense, and its measurement is relative. An individual, household or community is vulnerable when experiencing a level of wellbeing below a socially accepted threshold, but the threshold could be different between countries. At macroeconomic level, EV refers at the exposure of an economy to exogenous shocks arising out of economic openness, while economic resilience is the ability to recover from the effect of such shocks by effective governmental policies and good governance.

In the area of social policy, I plan to developing a related topic - examining the impact of regional and national policy measures on the poverty transitions in Romania, based on a series of round cross-sectional data. Examining the effect of the economic and social policy measures on the poverty dynamics and poverty transitions could give insights to the effectiveness of policies, as well as the dynamics of poverty, but it could be seriously constrained upon the availability of panel microdata. Due to the lack of panel microdata, the literature on poverty dynamics in Romania is rather scarce. Recently, new methodologies allowing the analysis of poverty transitions, based on several rounds of cross-sectional data (when panel data are not available) have emerged (Dang et al., 2013). The main methodology used to analyze the movements in and out poverty is based on Dang et al. (2013) methodology which allows using repeated cross-sections of survey data to make inferences about movements in and out of poverty, and also on the out-of-sample imputation methodology for small-area estimation of poverty. The analysis of the poverty determinants could use probit/ logit models. When introducing regional level determinants, beside those at the individual level, a hierarchical linear model will be used as to accommodate the multilevel structure of data (individuals nested in provinces, and provinces nested in cantons). With the hierarchical linear model, we can examine the effects of the canton- and province level policy measures on poverty. At the end of this analysis, we expect to find aut (1) what kind of public policy measures are more effective in hitting all types of poverty transitions, and if there is an optimum mix of measures – effective in reducing in the same time all types of poverty transitions; (2) What was the dynamic of poverty and of each of its sub-types in the last years, as well as the effect of past policy measures; (3) Whether the regional level- or

national policy measures are more effective in alleviating poverty, and (4) Policy recommendations for future.

Finally, I have to recall again my fruitful collaboration with University of Cuenca (Ecuador), and my affiliation to the GIER research group. I plan to continue this long term collaboration, and upon the latest discussions, a new research topic has emerged – reforming the social policy in Ecuador, based on the ENEMDU cross-sectional data. Social inequality has often been found as a major characteristic of the Latin America's countries. A number of 16 countries out of a total of 18 experienced a decline in their Gini coefficient from 0.55 in the early 2000s to 0.496 in 2012. The main determinants of this positive dynamic are considered to be: (1) the reduction in hourly labor income inequality caused by the fall in the skill premium; (2) the progressive government transfers and income growth, especially in the lower deciles of the income distribution. The relationship between the oil consumption and the real GDP in Ecuador has been examined by using tests for unit roots, co-integration and Granger-causality. The literature indicates that in Ecuador the economic growth leads to oil consumption without any feedback effects, so that the oil conservation policies can be initiated without deteriorating economic side-effects in Ecuador. Ecuador must adapt its economic structure to the new international context, as to facilitate sustainable growth as well as to maintain the social advances achieved in the past. The public investment cannot act as a driver of economic growth, so that stimulating private-sector investment should become the main pillar of the economic development in near future. Moreover, promotion of economic diversification, ensuring providing of social services for the vulnerable population and improving access to and quality of infrastructure represents the action framework agreed upon by the Government of Ecuador and the World Bank Group within the Country Engagement Note.

To present and disseminate the results of my research on the two topics above, I plan to attend high-level international conferences, such as the annual meetings of IARIW (International Association for Research in Income and Wealth) or the International Association for Applied Econometrics (IAAE). I also plan to meet new academics and researchers from prestigious research institutes and universities, and to develop collaborative research. I plan to continue publishing in highly ranked ISI journals (with influence scores>1) and to continue applying for external funding to support my research plans.

In order to stimulate collaborative research and to increase visibility of the research output produced within our Ph.D. school, I plan to attract funds to settle up an international research network based in our Ph.D. Finance group, upon the model that I experienced in Luxembourg (at the research institute LISER). With the former European programme IRISS they

attracted into their institute an impressive number of foreign junior and senior researchers/ professors for short study visits (up to one month- maximum three months), based on a rigorous selection. The visitors entered into collaborative research projects or were involved in common research papers with the institute's researchers, and therefore the institute gained a high visibility all over the word. Moreover, the research seminars weekly organized in the framework of this programme made possible the exchange of ideas among the local and the foreign researchers and was an effective tool to get new and advanced knowledge.

Beside the research and academic plans presented in this section, there are many other challenging ideas that I have with regard to the future coordinates of my research and academic activity. I am convinced that I will continue the series of professional achievements in both the academic and research activity.

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