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Warsaw, 30th October 2014

SUMMARY OF PROFESSIONAL ACCOMPLISHMENTS

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1. Information about the education and employment

Having graduated from the Warsaw high school named after S. Staszic, I began my studies at the Warsaw School of Economics in 1997, at the major of Quantitative Methods and Information System; I graduated a year before the term and obtained a distinction diploma. During my studies, upon obtaining an Erasmus scholarship, I studied at the Katholieke Universiteit Braabant in Tilburg (the Netherlands) for one semester.

In 2008, in the Collegium of Economic Analysis of Warsaw School of Economics i defended my PhD thesis entitled *"The econometric analysis of sources of loss frequency diversification in the portfolio of communication insurance, based on panel data"*, prepared under the scientific supervision of prof. dr hab. Maria Podgórska.

I began my professional work in 2001 as an assistant in the Econometrics Institute of Warsaw School of Economics, where I have worked until now (since 2009, I hold position of an assistant professor).

From October 2002 to March 2013, I was employed additionally at the Warsaw Management University at the position of assistant professor (before I obtained my PhD title, this was the assistant position); I performed mostly the educational and organisational duties.

2. Scientific accomplishment presented for assessment

In my studies, macroeconomic modelling has an especially significant place; this includes: (1) econometric methods of economic growth, convergence and foreign trade analysis, (2) atheoretical modelling of economic growth and other basic macroeconomic indicators. This is reflected in the selection of publications presented for assessment as a habilitation accomplishment entitled "The methods of panel econometrics and Bayesian averaging of estimates in macroeconomic analyses, with special consideration of convergence". The following cycle of publications is included in the habilitation accomplishment:

1. Próchniak M., Witkowski B. [2013], *Real β Convergence of Transition Countries – Robust Approach*, Eastern European Economics, vol. 51, no 3, pp. 6-26, [IF 0,380]

2. Próchniak M., Witkowski B. [2012], *Konwergencja gospodarcza typu β w świetle Bayesowskiego uśredniania oszacowań [β-type economic convergence: Bayesian averaging perspective]*, Bank i Kredyt, vol. 43, no 2 (2012), pp. 25-58

3. Próchniak M., Witkowski B. [2013], *Time Stability of the Beta Convergence among EU Countries: Bayesian Model Averaging Perspective*, Economic Modeling, vol. 30, pp. 322-333 [IF 0,834]

4. Próchniak M., Witkowski B. [2014], *On the Stability of Catching Up Process among the Old and New EU Member States: Implications from Bayesian Model Averaging*, Eastern European Economics, vol. 52, no. 2, March-April 2014, pp. 5-27 [IF 0,380]

5. Próchniak M., Witkowski B. [2013], *The analysis of the impact of regulatory environment on the pace of economic growth of the world countries according to the Bayesian Model Averaging*, National Bank of Poland Working Papers, No. 165

6. Próchniak M., Witkowski B. [2014], *The legendary 2% convergence parameter: flexible or fixed?*, Roczniki Kolegium Analiz Ekonomicznych nr 34, pp. 227-243

7. Witkowski B. [2013], *Odporność w przestrzennych modelach konwergencji dla danych panelowych* [*On the robustness in spatial panel data models of convergence*] in: *Rola Informatyki w naukach ekonomicznych i społecznych. Innowacje i implikacje interdyscyplinarne* [*The Role of Informatics in Economic and Social Sciences. Innovations and Interdisciplinary Implications*], vol. II, ed. Z. Zieliński, pp. 65-75, Wydawnictwo WSH, Kielce

8. Witkowski B. [2014], *Spatially weighted model of β-convergence with eurozone-corrected weights* in: *Perspektywy i wyzwania Integracji Europejskiej* [*Perspectives and calls of the European integration*], ed. K.Opolski, J. Górski, pp. 47-56, WNE UW, Warsaw

9. Śledziewska K., Witkowski B. [2012], *Światowy kryzys gospodarczy a handel międzynarodowy*, Ekonomista, nr 4/2012, pp. 427-448 [IF 0,141]

10. Białowolski P., Kuszewski T., Witkowski B. [2014], *Bayesian Averaging of Classical Estimates in Forecasting Macroeconomic Indicators with Application of Business Survey Data*, Empirica. Journal of European Economics, vol. 41 issue 1, pp. 53-68 [IF 0,160]

The majority of the publications presented for assessment as a habilitation accomplishment was prepared in a co-authorship[1] with authors specialising in macroeconomics and international economy, which results from the rule that I always

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[1] Details on the participation of individual authors in the preparation of the publications written in co-authorship are indicated in the attached statements and in the attached list of scientific achievements.

implement in my research work: the rule of not limiting the empirical research layer to just illustration. I find it very important to be able to reach original conclusions that are an addition to the scientific discussion on the economic reality by using real data and relation to real economic problems and by means of modern methods, also those developed by me. .

In my analyses, studies on economic convergence play a significant role. The subject of convergence, and especially the beta-type convergence, is the subject of analyses in the modern aspect since 1990-ies. Numerous authors have verified its presence and intensity in an absolute or indirect aspect, usually using a regression proposed by Barro and Sala-I-Martin[2]. In the works prepared in the last century (and also in many later papers), the convergence was estimated based practically on just review data, due to the problem of estimation of dynamic models based on panel data. Once the dynamic estimator of Arellano and Bond's[3] that solves the problem was formulated, the approach based on panel data got popular. However, as late as on the beginning of this century, owing to the use of system estimator by Blundell and Bond[4], the obtained estimations seem reliable, since a significant bias connected with the use of Arellano-Bond estimator can be avoided in case of a strong autoregression. Hence, the development of spatial Econometrics methods led to their use in this field. However, there still remains a problem of significant discrepancy in the conclusions drawn by individual authors. A part of this discrepancy can be explained in terms of differences with respect to the analysed period or group of countries (or possibly regions), but even with respect to the same or similar group observed over a similar period, the literature results do not lead to conclusions that could be treated as equivocal. In most of the works (although not in all the works), a lack of absolute convergence is found, and the possible presence of indirect convergence is confirmed in a part of the studies, although with different intensity. Although the analyses are based on Solow's model and the general nature of growth factors is not in dispute, their operationalisation itself can be obtained in different ways. As a consequence, the number of considered variables determining the growth factors in convergence models presented in the literature has reached several hundred, and the choice of a given subset depends on data availability and subjective decision of the researcher.

[2] R. Barro, X. Sala-i-Martin (1992), *Convergence*, Journal of Political Economy, vol. 100(2), p. 223-251.
[3] M. Arellano, S. Bond (1991), *Some tests of specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations*, The Review of Economic Studies, vol. 58, no. 2 (April 1991), pp. 277-297.
[4] R. Blundell, S. Bond (1998), *Initial conditions and moment restrictions in dynamic panel data models*, Journal of Econometrics 87(1998), pp. 115-143.

The subject of two publications that open the cycle,[5] [1] „*Real β Convergence of Transition Countries – Robust Approach*" and [2] „*Konwergencja gospodarcza typu β w świetle Bayesowskiego uśredniania oszacowań*" was to study the occurrence and potential intensity of beta-type convergence using a Bayesian Model Averaging (BMA), without narrowing the analysis to a chosen, single regression(s). In these publications, I have confirmed the thesis that the basis reason for discrepancies in empirical conclusions on the convergence are the differences in the choice of control variables that in Barro's regression model are of economic growth factor nature. Moreover, I have presented a criticism of initial "resistant" approaches, especially of the approach proposed by Leamer[6], the *extreme bound analysis* (EBA), which is not flexible enough in most cases. When the publications [1] and [2] were being prepared, some publications on use of BMA in modelling of GDP convergence could be found in the literature, however, these were based on cross-sectional data. Especially, such of a nature was a work crucial for the development of this research area, written by Sala-I-Martin, Doppelhofer and Miller[7], where one of Bayesian averaging models known as *Bayesian Averaging of Classical Estimates* (BACE) was used; this model can be used when the model parameters are determined using the OLS estimator. In the publications [1] and [2], a model based on panel data, not on cross-sectional data is considered. A dynamic character of convergence model with a relatively low number of period requires appropriate assumptions or appropriate estimation approach. In the discussed articles [1] and [2], I have proposed and justified the assumption of identical *steady states* for the individual countries, which results in elimination of individual effects from the model and allows the use of a OLS estimator, which is unbiased in this situation, even with a limited time dimension and spatial panel. Taking into account a significant number of considered growth factors justifies the assumption of *steady states* homogeneity. One must bear in mind that the concept of *steady states* has a nature f just *ceteris paribus*, which in consequence results in the chance of the assumption to be actually valid being higher when the number of considered growth factors exogenised from the *steady states* by *explicite* implementation into the model is higher. Moreover, in the discussed articles, the resistance of the obtained results against the assumption about the number of growth factors in the actual (unknown) relation was studied.

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[5] The sequence of presentation and discussion of the publication results from the sequence of their preparation, which is not always the same as their publishing date; this results from a relatively long publishing cycle of some journals – for example, in the case of the first mentioned paper, the period between the acceptance of the publication and the actual print was two years.

[6] E. Leamer (1983), *Let's take the con out of econometrics*, American Economic Review, no. 73, pp. 31-44,

[7] X. Sala-I-Martin, G. Doppelhofer, R. Miller (2004), *Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach*, American Economic Review, vol. 94(2004), issue 4, pp. 813-835.

Publication [1] covers the analysis based on a group of 25 countries that underwent an economic transformation (in the years 1960-2009), whereas the publication [2] presents the conclusions for a broader group of 127 countries observed in the years 1970-2009 (all those where it was possible to obtain relevant statistical data). The results presented in paper [1] indicate the presence of indirect convergence in the group of transformation countries, whereas the estimated rate is slightly lower than the level indicated in the literature (it is about 1.5-2% p.a.). Among factors stimulating the convergence phenomenon, EU enlargement is mentioned, and Croatia EU accession in order to obtain a faster convergence rate in the region (which, as we know, has become a fact[8]) is suggested as a „policy implication". Then, in the group of 127 countries analysed in the publication [2], a hypothesis of conversion clubs is confirmed: the rate of indirect convergence estimated for such a heterogeneous group of countries is about 1.3% p.a., hence it is lower that estimated for the group specified in the publication [1]. This means that in a set of more homogeneous units (just as the post-transformation countries mentioned in the previous article) the convergence rate is higher. Hence, as a consequence, even ceteris paribus convergence rates in the considered group of countries and subgroup of post-transformation countries are different, and the steady states for the post-transformation countries and for the wider group of world countries described in publication [2] cannot be treated as identical. Of course, this results mainly from the fact that an actually idealistic assumption about unlimited possibilities of technical thought and workforce flow is not fulfilled.

A conclusion of non-adequacy of the assumption of homogeneous steady states resulting from comparison of the previously obtained results was consumed in papers [3] „Time Stability of the Beta Convergence among EU Countries: Bayesian Model Averaging Perspective" and [4] „On the Stability of Catching Up Process among the Old and New EU Member States: Implications from Bayesian Model Averaging". These articles deal with the analysis of convergence processes in the group of European countries. Since even in such a small and homogeneous group, the indicated assumption can raise doubts, I proposed to replace the previously used pooled model with a model with individual effects. The panels considered in the study are relatively long – in the group of "old" EU15 countries, a period of 1972–2010 is taken into account, and after its enlargement to the full (at the time of preparation of the manuscript) group of countries EU27, the analysed period covered the year 1993–2010. Nevertheless, the series comprising the panel (especially in the EU27 group)

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[8] Due to a long publishing cycle, EU enlargement by Croatia took place only 2 months after the formal publication of the text, although in fact this was two years after the article was accepted for print.

should still not be perceived as long enough to let the property of asymptotic unbiasedness of the *fixed effects* estimator with $T \to \infty$ justify its use, hence a system estimator of Blundell and Bond was used in the work. At the same time, however, just like in other works, I proposed to use the Bayesian algorithm of estimation averaging to solve the problem of subjectivism upon the choice of growth factors. When I was working on articles [3] and [4], this solution was not used for estimates obtained using this estimator. Due to the fact that Blundell and Bond estimator is in fact an estimator of a generalised method of moments, this required the use of an appropriately prepared script, the construction of which used the a posteriori property of probability showed by Kim (2002)[9]. Moreover, due to a relatively long study period and the fact of occurrence of crisis on the international markets in that time, I proposed to allow non-stability during the modelled relation. Especially, I allowed the non-stability of convergence rate and of relation between the growth factors that can be instruments of financial politics and the economic growth, by introduction of three moments of potential structural breakage reflecting approximately the moment of economic transformation in the majority of post-socialist countries, the Russian crisis and accession of the largest group of countries to the EU. The results presented in article [3] indicate the presence of a much faster convergence rate in EU countries that – as it is most often indicated – in a wider group of world countries; at the same time, they suggest that this rate is higher in the whole EU27 group than in the limited group of EU15. On the other hand, the assumption that convergence rate can differ significantly over time was not confirmed. The acceptance of non-stability over time had its meaning: significant differences were found with respect to the influence of individual growth factors considered over different periods on the economic growth. At the same time, one must note, however, that the analyses of economic growth at the applied level enforce a kind of a compromise between the macroeconomics theory and Econometrics. On one hand, the phenomena of economic growth make sense over moderate and long periods and such is their nature, and they should be perceived as such; dividing the analysed time series into short, e.g. one year periods can lead to erroneous conclusions due to the presence of business cycles or incidental changes. On the other hand, the estimator properties in the case of short series are quite weak and the risk of obtaining random results increases significantly. Hence, in the publication [4], the attempt to fulfill requirements of both, the economic rationality and quality in statistical sense, was made by dividing the time series into a 3-year periods. The article compares the results discussed in article [3] obtained

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[9] J. Y. Kim (2002), *Limited information likelihood and Bayesian analysis*, Journal of Econometrics, 107, pp. 175-193

based on annual data and the results obtained based of series divided into a 3-year sub-periods, also in the aspect of assessment of resistance of the applied solutions. As indicated, the differences in the obtained results are not big enough to perceive the considered approaches as mutually excluding, but, on the other hand, they are marked enough to be worth considering. It seems that the results presented based on three-year periods are more reliable, since they have a stronger theoretical (macroeconomic) justification. Atypically high estimations of convergence parameters are worth noticing. This result can be slightly disturbing on one hand, and bring a once popular estimator of Arellano and Bond into mind. Its use could lead to a conclusion of a faster that actual convergence rate due to the feature of bias in the finite (in time sense) sample, especially when the autoregressive process was very strong. However, such a situation does not take place when Blundell and Bond estimator is used, and the issue of the obtained high estimates of convergence pace would be discussed after article [8] is discussed.

In article [5] *"The analysis of the impact of regulatory environment on the pace of economic growth of the world countries according to the Bayesian Model Averaging"*, I proposed another solution of the conflict between the length of individual periods composing the time series and the number of such periods. Like in other works, a procedure of Bayesian model averaging was used to solve the problem of the "excess" of growth factors, and an estimator constructed similarly as the system estimator of Blundell and Bond was used to estimate the individual equations. The analysis presented in the publication is based, however, on the proposed concept of a panel with "partially overlapping observations". Let us consider a panel of series of length T. Then, an observation of a single period τ ($\tau<T$) of the length s would be defined by a period covering the years from τ to $\tau + s - 1$. For example, for $s=5$, the observation of period $\tau = 1$ would be based on data from the first 5 years covered with the panel, i.e. the years $1,...,5$, and the observation for $\tau = 2$ would be based on data from initial periods $2,...,6$. Seemingly this operation, apparently increasing the number of observations used in the estimation as compared with the traditional approach, appears to duplicate the obtained information. However, this is not the case: the GDP in the i-th country in the year t is used just like in the classical approach, but twice: once as a current value and once as a delayed value, and for observation in the period τ, the values of GDP in the intermediate periods i.e. those composing the observation in the period τ but included inside the considered period, are not used. Hence, using appropriate instrumentalisation requiring a proper modification with respect to a classical approach using a system estimator of Blundell and Bond, it is possible to use the available data more effectively in the process of the model

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estimation, of course under the necessary condition of assessment of the issue of potential autocorrelation of the random factor. Again, the study of analysis of beta-type economic convergence based on a regression model of Barro type estimated on panel data is the subject of the article. A group of analysed countries covers three separately considered populations: a group of EU countries, a group of post-socialistic countries and a group of all world countries. Moreover, from the economic side, two important issues not dealt with before are included in the work. Firstly, indicators defining the institutional environment were included among the growth factors. Variables determining this group of characteristics were already taken into consideration in analyses of economic growth performed by other authors, however this articles allows a non-linearity of relationship between the variables of institutional environment and the economic growth. This procedure, as it can be shown, is purposeful: in the case of a part of the considered indicators, a non-monotonous shape of the relationship can be observed. This fact has an economic justification. For example, with respect to the indicators of economic freedom especially in the period of an economic crisis one can expect an especially strong economic growth in the group of countries with the highest freedom, but also in the countries with the most limited freedom; the latter group includes mostly the countries where the economy is based on oil extraction. Secondly, the article attempts to determine whether the characteristics of institutional environment themselves or their dynamics should be treated as a stimulus of economic growth. Can we then expect that a country with, for example, a high level of economic freedom would benefit appropriately from that freedom or, from a one-time dynamics of economic growth, a better result could be obtained by a country where the freedom level is generally low but would improve in the considered period. The results presented in the paper indicate the presence of both mentioned effects. This confirms the significance of most elements of the regulatory environment with the operationalised considered indicators of Heritage Foundation, Fraser Institute, EBRD and the World Bank for the economic growth. The increases in the freedom of economic operations, quality of economic policy and quickening the structural market reforms play a significant role and should be treated with priority as factors that have a potential beneficial effect on the dynamics of economic growth. Finally, based on the obtained results, the article indicates the significant differences within the scope of influence of the factors of institutional environment that describe the same categories but are prepared by different organisation. It turns out that their detailed construction can have a very strong influence in some cases on the obtained results. Particularly, the conclusions on the influence of economic freedom confirm the justness of a concept of the Solow's model expanded by an institutional factor (as per the

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proposition by Hall and Jones of 1999[10]). This can be treated as an additional productive factor, the productivity of which is the highest in the countries with the lowest initial level. This should be an important argument for the countries of low level of freedom within this scope, since it may be expected that even slight changes in this group of countries should have an exceptionally beneficial effect on the GDP dynamics.

In the paper [6], *"The legendary 2% convergence parameter: flexible or fixed?"*, I proposed to combine the previous concept of considering an instability of the modelled relation over time with the use of panel-natured data with partially overlapping observations. A group of EU28 countries was analysed for beta-type convergence. The work presents a method of convergence parameter estimation with allowing its annual variability, and the use of panel with partially overlapping observations allows basing the analysis on 5-year periods that were distinguished from the whole series of data from the years 1992–2012. Apart from conclusions relating to the meaning of individual growth factors, the results indicate that although the convergence process is not fully stable in the considered period, its variability is so small that the omission of instability (which takes place in most empirical studies) should not lead to false conclusions. However, on the other side, allowing the instability enables us to notice an interesting effect of intensification of the convergence processes in the crisis periods: as the result show, the pace with which the less-developed countries are able to "chase" the higher-developed countries is the highest in those years. This can explained mostly in terms of dependence from the external demand, much higher in case of highly developed economies that are usually the net exporters than in case of economies with lower level of development.

In publications [7] *"Odporność w przestrzennych modelach konwergencji dla danych panelowych"* and [8] *"Spatially weighted model of β-convergence with eurozone-corrected weights"*, spacial Econometrics methods were used to study GDP convergence. In the first of the mentioned papers, I proposed to use the procedure of Bayesian averaging to estimate parameters in spatial models. In the work, a convergence model was analysed, however, presence of relations of a spatial nature resulting from the first law of Tobler for geography[11] are allowed. Three detailed specifications of a general model of Cliff and Ord[12] were considered: a spatial Durbin model (SDM), spatial autocorrelation model (SAR) as well as a

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[10] R Hall, C. Jones (1999), *Why Do Some Countries Produce So Much More Output Per Worker Than Others?*, The Quarterly Journal of Economics, vo. 114, no 1, pp. 83-116.
[11] W. Tobler (1970), *A computer movie simulating urban growth in the Detroit region*, Economic Geography, 46(2), pp. 234-240.
[12] A. Cliff, J. Ord (1973), *Spatial autocorrelation*, Pion, London.

model without spatial relations, embedded in a general specification of Cliff and Ord. Matrices of the first neighbourhood modified for countries sharing a sea border were used to construct the weight matrices. The data set included a panel of 27 European countries observed over the years 2001–2008. Due to the fact of using the method of the greatest reliability for estimation, a variation of the general BMA requiring software for this case *Bayesian Averaging of the Maximum Likelihood Estimates* (BAMLE) was adequate for this instance. Its use allowed the formulation of conclusions within the scope of relationship between the growth factors and the GDP growth itself. In the paper, I have shown that omission of important spatial relationships can lead to obtaining inadequate results without agreement with the reality, although in the discussed case, the differences between the approach that takes the spatial relationships into consideration and the one that does not consider such a relationship were of quantitative, not the qualitative nature.

In turn, the objective of the work [8] *"Spatially weighted model of β-convergence with eurozone-corrected weights"* was to choose the meaning of the construction of weight matrix itself. In most literature cases, two approaches to the weight matrix construction in the models of spatial Econometrics can be encountered: based on neighbourhood issues (like in the previously discussed paper [7], or based on geographical distance between the considered objects. In few cases, the authors decided to use a different kind of weights, based on economicly-understood distances, like a volume of international trade in the considered pair of countries, the difference between their development levels measured by GDP *per capita* etc.[13] In the article [8], data on EU28 countries from the years 1993–2013 were used to estimate the GDP convergence model with spatial relationships. Based on a panel created in such a way (with 3-year periods), an SDM (Spatial Durbin Model)-type spatial model of GDP convergence of was estimated. In the publication, I have proposed to use a non-standard matrix as a weight matrix; the construction of the matrix included the information about (geographical) distance between two main cities of the considered countries, as well as the issue of their possible co-membership in the eurozone. One of the objectives of the work was to study whether membership in the eurozone can intensify the convergence processes among the member states, and if yes, than to which degree. Due to the fact that combining these two elements in a weight matrix requires their appropriate weighing, an optimal set of unknown weighing parameters was chosen by optimisation of a Bayesian information criterion with relation to their value. The constructed model has a nature of indirect conversion, hence, also

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[13] Such an attempt was made among other in the article *"Alternative Weighting Schemes in Spatial Analysis of GDP Per Capita Convergence"*, that in under revision at the time of submitting this application.

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conclusions with respect to the influence of other growth factors included in the considered functional form on the economic growth can be drawn. The obtained results indicate the presence of convergence and – in some cases – a non-obvious influence of the considered growth factors on the GDP dynamics. Here, a result obtained in the work, suggesting a negative relationship between the dynamics of economic growth and the level of economic freedom in the neighbouring countries is worth noting. In the previously described articles, a big significance of a given country's economic freedom level for the economic growth pace. Now, the obtained result allows a conclusion about the effect of capital and initiative attraction by neighbouring countries in the case when the economic freedom level in geographically-close countries is higher than in the given country. Such an effect seems to be a natural consequence of liberalisation of human and physical resources transfer due to globalisation; in a longer horizon, this is a desirable effect and should result in a tendency for general increase in the level of economic freedom. At the same time, based on the obtained results, an adequacy of considering a mutual membership in the eurozone in individual pairs of countries during the construction of weight matrices can be stated. On the meta-level, this is equal to the adequacy of weight matrix corrections (or, going a level lower, the neighbourhood matrix) constructed based on a criterion of geographical distance by accounting for international agreements between those countries. This results from the fact that the meaning of such agreements can be as significant as the meaning of the geographical distance itself, especially when a decreasing significance of geographical distance for the total transaction costs upon potential trade exchanges is accounted for.

In the literature, there is a general belief that the GDP convergence is about 2% p.a. – this number is sometimes referred to, a bit sarcastically, as the *"legendary"* 2%. However, the literature included statements that such a convergence estimate is of absolute nature, and that including an appropriate number of growth factors, hence a change of thinking about the convergence in a model – not like an absolute convergence, but an relative convergence – leads to conclusions about a significantly higher convergence p.a. value. This is a result of extracting additional factors and, as a consequence, of homogenisation of the considered group of countries (due to exogenisation still new factors that differentiate the countries) and the equilibration of the development level will be the fastest in the theoretical homogeneous group. An estimation of individual convergence models with a chosen set of explanatory variables can, in numerous cases, lead to a significantly different results with this respect. At the same time, in the case of more homogeneous groups (specific "convergence clubs"), the use of Bayesian averaging, and hence objectivisation of results by elimination of the "final"

step of "unnecessary" variable elimination, which probably takes place when many articles are created, leads to the conclusion that convergence processes take place probably with *ceteris paribus* faster pace. In my view, this is an important conclusion at the empirical level, resulting from my research accomplishments.

In the works [1] – [8], numerous issues appeared, including the issue of influence of various economic growth factors on the pace of the growth, and the possible different shape of the relationship in the period of economic crisis, and on the other hand – the problem of adequacy of using the fact of being bound with an international agreement (in the discussed case, this is related to the common currency) upon construction of a model describing the GDP growth. In the publication [9] „*Światowy kryzys gospodarczy a handel międzynarodowy*", the above mentioned issues are analysed from the point of view of their influence on the international trade intensity. The article presents the results of an estimation of a gravity model, estimated using a Hausman-Taylor estimator based on a group of data about almost all world countries observed in the years 1995–2010 – the use of panel Econometrics methods in modelling of macroeconomic relationships is the first element binding publication [9] with publications [1]–[8]. The analysis covered the period from before ans during the last financial crisis; hence, to account for its possible influence on the shape of the modelled relationships, interaction effects of the considered factors were introduced, just like in the works [3] and [4]. They can – according to the theory of gravity models – influence the intensity of international trade significantly. The obtained results indicate the adequacy of such a procedure. In the case of factors like the level of economic development of both countries involved in a trade exchange and its difference, as well as the fact of binding with a trade agreement or a co-membership in a currency union, the shape of the modelled relationship in the years of intensive crisis (2009) and just after it (2010) was different than before the crisis and should be perceived as additionally sharpened. A high development level and a small difference in this aspect between the two countries were a stimulus intensifying the exchange, but the strength of the stimulus in the crisis period was *ceteris paribus* higher that before the crisis. On the other hand, in the crisis periods, the intensity of trade between the countries bond with a monetary union and by trade agreement was weaker, These effects do not have a universal nature: the analysis performed with division to developed countries, developing countries and transformation countries offers slightly different conclusions, suggesting to use a separate analysis for individual *trade clubs*, similarly like in the case of GDP convergence where currently the so-called convergence clubs are analysed separately.

In articles [1]–[8], the economic growth was looked at from the convergence perspective, but the last of the articles presented for assessment within the scope of the cycle is dedicated to the subject of modelling GDP growth, as well as inflation and unemployment rates, with use of – in contrast to the previous 8 publications – an atheoretic approach, not an approach originating from a grounded macroeconomic model . The development of macroeconomics has led to creation of very sophisticated models, both for the estimation and for the interpretation. These differ with respect to the prognostic efficiency, but regardless of it, preparing forecasts based on these models is often very time-consuming and it requires numerous data and numerous assumptions. In article [10] *"Bayesian Averaging of Classical Estimates in Forecasting Macroeconomic Indicators with Application of Business Survey Data"*, a three-equation recurrence model was discussed. Individual model equations determine the values of GDP growth, unemployment rate and inflation rate, and delays of endogenous variables and values of indicators originating from economic downturn tests were included among explanatory variables. Article [10] is connected with the previously discussed papers by both, the subject (modelling of economic growth) and by the applied models. I proposed the use of Bayesian model averaging to estimate the model; however this time, in its non-classical "frequency" form (sometimes referred to as *frequency model averaging*; FMA). Contrary to the typical Bayesian averaging, the idea of the algorithm use is not based on determination of assessments of individual parameters as means weighed using weights proportional to appropriate probabilities a priori. It uses a posteriori *relevance* probabilities of individual variables in the estimated equations to decide whether to keep them in the model or to eliminate them. As a result, the use of FMA is aimed at choosing variables for the final model, where the estimation is made on the set of variables limited as described above, where a static co-linearity was eliminated and an attempt to account for all types of seasonality (deterministic, stochastic, both) was made. A quarterly date was used, both in the scope of downturn indicators introduced as regressors, and the macroeconomic indicators. The fact that downturn indicators are published earlier than quarterly macroeconomic data allows the use of the model to determine the forecasts of macroeconomic indicators without the necessity to use or assume the values of any exogeneous variables, and the trials made using the model indicated the correctness of forecasting comparable to that obtained using complex models without the feature of atheroreticality[14].

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[14] The approach discussed in the article was a subject of further research prepared for publication within the scope of a paper currently under review: Białowolski P., Kuszewski T., Witkowski B., *Dynamic Factor Models*

To sum up, I perceive the following accomplishments as especially significant in the publication cycle presented for the assessment:

1. The use of methods based on the Bayesian model averaging in macroeconomic averaging. Especially, when I was beginning my work on the first articles from the presented cycle, there were no publications in the literature, where the discussed procedure would be applied using the panel data.

2. The development of non-classical Bayesian model averaging (general BMA, not BACE) with application of convergences based on dynamic panel models.

3. The first in the literature proposition to use Bayesian model averaging in the analysis of spatial data.

4. A proposition to economic distance (not geographical distance only) for construction of weight matrices in spatial models.

5. The use of panels with partially overlapping observations and consideration of non-stability of the processes over time, and comparison of the results with results obtained in the "traditional" way.

6. Expanded approach to a gravitational model, accounting for instability during the shock periods on the international market.

7. Application of atheoretical models estimated using a Bayesian model averaging with a prognostic use in economics.

8. A contribution to a scientific discussion in the intensity of convergence and the influence of different factors of economic growth on the growth dynamics in very diversified and numerous groups of countries.

3. Further scientific achievements

The list of my publications after PhD and the earlier period is provided in the attached list of publications. In that document the number of MNiSW points is provided for each publication and in the case of papers published in the journals ranked in the JCR the impact factor is given as well (5-year IF if available, regular IF otherwise).

Before achieving the PhD my main research interests were concentrated on the problem of econometric modeling of insurance – initially in reference to the entire market (position II.A.4 of the attached list of publications), while later mostly in reference with the modelling

& Bayesian Averaging of Classical Estimates in Forecasting Macroeconomic Indicators with Application of Survey Data, NBP Working Paper series, in print.

of loss frequency in automobile insurance, especially with the use of innovative panel data based methods (positions II.A.3, II.B.1). After PhD I was intensely working on this subject for another year, however I was mostly concentrated on the issue of information asymmetry (positions I.B.5, I.C.8). However, three main topics started to dominate my later research: (1) analysis of economic growth and convergence, (2) atheoretical methods of modeling of GDP growth and other main macroeconomic indicators, (3) modeling of the international trade.

My interest in the first of the above mentioned topics started before PhD (II.A.2, II.B.2-II.B.5), however it was in the 2010-2011 period when my co-operation with the World Bank that inspired me to deepen my research, especially considering the use of Bayesian averaging and the use of panel data econometrics in the field of real GDP convergence and growth, allowing for the instability of the relation of interest (I.A.1, I.A.2, I.A.5-I.A.7, I.A.10, I.B.1, I.B.3, I.C.1, I.D.2, I.F.3). Thanks to participation in the *Spatial Econometrics Advanced Institute* in 2010, over subsequent years I was able to develop my interest in the problems regarding spatial relations. I have made use of that among others in publications I.A.4, I.A.8, III.5. Currently I am a working in a National Centre of Science research grant as well as planning to expand the research by initiating studies on the nominal convergence.

The topic of atheoretical models of the basic macroeconomic indicators first appeared in my research in 2010 in publication I.C.9 when I started the co-operation with future co-authors. Its aim was to develop models, whose main aim was to provide maximally accurate forecasts of the main macroeconomic indicators. Further research results were published in papers I.A.3, I.B.4, I.C.2, I.C.5, while currently research on the developed versions of the models and their estimation within the frame of the National Bank of Poland research grant has finished. Due to the atheoretical nature of the proposed solutions, the way that the variables for the final functional form of the model were selected plays a key role. Within this frame it was particularly important to apply the solution based on a variant of Bayesian model averaging, which by itself is an important link with the previous research topic. The economic situation indicators were broadly used as potential predictors in the equations of GDP growth, inflation and unemployment. Their properties were the subject of research which I performed and described in paper I.C.7.

The third of the above mentioned research topics was initiated in my research as a result of co-operation with international economics specialists. With the use of panel data analysis I worked on construction and estimation of various gravity models and the analysis of the influence of trade unions on international trade as well as the factors that define the probability of making a trade union themselves (papers I.A.9, I.B.2, I.C.3, I.C.6, I.D.3, I.F.2).

Currently I am the main researcher in the research grant in this research field, initiated in 2014.

The common thing of different research projects that I performed in similar yet different research fields was the application of Bayesian averaging and panel data analysis. Apart from the above mentioned main research fields, other papers which make use of the aforementioned methods in different applications. Papers I.C.10 and II.A.1 are devoted to the possibilities of use quantitative analysis (in particular based on panel data) in psychometrics. Paper I.F.1 is devoted to the labour market analysis and presents an empirical verification of Okun's law, while I.C.4 concerns the economic inequalities – the methods and models from the aforementioned group are applied in these papers. They are also present in papers III.2 and III.4 which came out as a result of the Central Bank of Poland research grant and they are devoted to the problem of econometric modeling of cash-free transactions with the use of panel data. I have also made use of my experience in panel data modeling while preparing the didactical publications I.E.1 and III.6 as well as for scientific edition of I.G.1-I.G.4.

4. Statistics of research

1. My publications after PhD cover the following (prepared individually or in co-authorship):

- 22 articles in journals (national and international), including 10 in English and 5 in journals ranked by JCR,
- 5 chapters in monographs, including 4 in English,
- 4 working papers in prestigious series of the World Bank and the National Bank of Poland,
- scientific edition of 4 monographic editions of Annals of KAE SGH,
- 1 chapter in a handbook.

Furthermore, under review or in print are the following:

- 4 articles (all in English),
- 2 teaching publications (a handbook and an exercise set),
- 1 working paper.

2. My publications before PhD cover the following (prepared individually or in co-authorship):

- 4 articles,
- 6 chapters in monographs, including 4 in English,
- 2 translations.

3. Parametric description of my publications can be summarized by:

- Hirsch index according to *publish or perish*: 5 (excluding self-citations),
- Number of citations in WoS: 3,
- Total impact factor for publications: 1.895
- Total numer of MNiSW publication points: 240,5 (without the co-authorships correction[15]: 295), including:
    - after PhD: 190 (without the co-authorship correction: 234),
        - for journal publications:167 (without the co-authorship correction: 211),
        - for chapters in monographs: 23
    - before PhD: 50,5 (without the co-authorship correction: 61),
        - for journal publications: 27 (without the co-authorship correction: 33),
        - for chapters in monographs: 23,5 (without the co-authorship correction: 28).
- Total numer of conference presenatations (at least the national stage) and research seminars: 37, including:
    - after Phd: 31, including:
        - in English: 23,
        - at foreign conferences: 7,
        - at international conferences in Poland: 4,
        - at research seminars: 6, including 2 foreign,
    - before PhD: 6, including:
        - in English: 1,
        - at foreign conferences: 1,
        - at international conferences in Poland: 1,

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[15] According to the rules of the Ministry, in the case of articles prepared in co-authorship the full numer of points is granted while articles are co-authored with authors holding affiliation different from KAE SGH and partial proportional points are granted in the case of co-authors holding affiliation at KAE SGH.

5. Conferences and grants

In this part of the self-presentation I mention the conferences and selected research seminars which I participated in after PhD, mentioning the presentations I co-authored. In the case of conferences where I presented more than one paper, those are mentioned as semarate positions in the list. Bolded font is used to emphasize the international conferences. All the others were national conferences. My contribution in each case was proportional, that is 50% in the case of co-authorship with one other author and 33% in the case of authorship with 2 other persons.

2014
1. Perspectives and Challenges of European Integration, organized by: WNE UW & NBP, Warsaw; paper *Spatially weighted model of beta convergence with Eurozone-corrected weights*

2. Perspectives and Challenges of European Integration, organized by: WNE UW & NBP, Warsaw; paper *The impact of common currency on card payment*, co-author: Ł. Goczek

3. Metody Ilościowe w Badaniach Ekonomicznych [*Quantitative methods in economics*], organized by: SGGW, Warsaw; paper *Alternatywne systemy wag w analizie konwergencji przestrzennej poziomów PKB per capita* [*Alternative weighting schemes in the analysis of spatial convergence of the GDP per capita*], co-author: M. Próchniak

4. **Forum for Economists International 4th Global Conference**, organized by: Forum for Economists International, Amsterdam; paper *Unstable convergence or regional convergence clubs? New evidence from panel data*, co-author: M. Próchniak

5. Modelowanie danych panelowych: teoria i praktyka [*Panel data modelling: the theory and practice*], III edition; organized by: The Institute of Econometrics Warsaw School of Economics, Warsaw; paper *The legendary 2% convergence parameter: flexible or fixed?*, co-author: M. Próchniak

2013
6. **Research Seminar of the New Economic School & High School of Economics**, organized by: NES & HSE, Moskwa; paper *Institutions and economic growth: in search of robustness*, co-author: M. Próchniak

7. **Victoria University of Wellington, The School of Economics and Business, 2013 Seminar Series**, organized by: VU Wellington, New Zealand; paper *On the Influence of the Regulatory Environment on Economic Growth*, co-author: M. Próchniak

8. Rola informatyki w naukach ekonomicznych i społecznych. Innowacje i implikacje interdyscyplinarne [*The Role of Informatics in Economic and Social Sciences. Innovations and Interdisciplinary Implications*], organized by: WSH Kielce; paper *Odporność w przestrzennych modelach konwergencji dla danych panelowych* [*On the robustness in spatial panel data models of convergence*]

9. **Warsaw International Economic Meeting (WIEM)**, organized by: WNE, Warsaw University, Warsaw; paper *Institutions and GDP Growth: Empirical Evidence Based on Bayesian Model Averaging with Nonlinearities*, co-author: M. Próchniak

10. **Economic Challenges in Enlarged Europe, ed. 2013**, organized by: Tallinn Technical University, Estonia; paper *The Application of Bayesian Model Averaging in Assessing the Impact of the Regulatory Framework on Economic Growth*, co-author: M. Próchniak

11. **Economic Challenges in Enlarged Europe, ed. 2013**, organized by: Tallinn Technical University, Estonia; paper *The impact of innovative R&D expenditures on regional development: Polish foresight program perspective*, co-author: M. Bernardelli

12. V Konferencja Naukowa „Modelowanie i Prognozowanie Gospodarki Narodowej [*Modeling and Forecasting the Economy*], organized by: Uniwersytet Gdański, Sopot; paper *Wpływ otoczenia regulacyjnego na tempo wzrostu gospodarczego: analiza ekonometryczna przy wykorzystaniu Bayesowskiego uśredniania oszacowań* [*On the Influence of Regulatory Environment on GDP Growth: Econometric Analysis with the Use of Bayesian Model Pooling*], co-author: M. Próchniak

13. Modelowanie danych panelowych: teoria i praktyka [*Panel data modelling: the theory and practice*], II edycja; organized by: The Institute of Econometrics Warsaw School of Economics, Warsaw; paper *Regulations and Economic Growth: Some Empirical Evidence Based on the Bayesian Model Pooling*, co-author: M. Próchniak

2012

14. **13th IWH-CIREQ Macro-econometric Workshop: Macroeconomics and Panel Data**, organized by: CIREQ, IWH & Martin Luter Universitaat Halle-Wittenberg, Halle (Saale); paper *On the Stability of Catching Up Process Among the Old and New EU Member States: Implications from Bayesian Model Averaging*, co-author: M.Próchniak

15. Badania Koniunktury – Zwierciadło Gospodarki, konferencja naukowa z okazji 40-lecia działalności IRG Warsaw School of Economics [*Survey Data: Mirror of the Economy*], organized by: IRG Warsaw School of Economics, Warsaw; paper *Bayesowskie uśrednienie klasycznych oszacowań w prognozowaniu wskaźników makroekonomicznych z użyciem danych z testów koniunktury* [*Bayesian Averaging of Classical Estimates in Forecasting Macroeconomic*

Indicators Using Business Survey Data], co-authors: P. Białowolski, T. Kuszewski

16. Perspectives of Economic and Monetary Integration in the World Economy. Where is the Eurozone Heading?, organized by: WNE UW i NBP, Warsaw; paper *Eurozone and trade in goods*, co-author: K.Śledziewska

17. **31st CIRET conference**, organized by: CIRET (Centre for International Research on Economic Tendency Surveys), Vienna; paper *Bayesian Averaging of Classical Estimates in Forecasting Macroeconomic Indicators Using Business Survey Data*, co-authors: P. Białowolski, T. Kuszewski

18. **Economic Challenges in Enlarged Europe, ed. 2012**, organized by: Tallinn Technical University, Estonia; paper *On the stability of the β convergence among EU countries*, co-author: M. Próchniak

19. Modelowanie danych panelowych: teoria i praktyka [*Panel data modelling: the theory and practice*], organized by: The Institute of Econometrics, Warsaw School of Economics, Warsaw; paper *Bayesian model averaging in modeling GDP convergence with the use of panel data*, co-author: M. Próchniak

20. Modelowanie danych panelowych: teoria i praktyka [*Panel data modelling: the theory and practice*], organized by: The Institute of Econometrics, Warsaw School of Economics, Warsaw; paper *Kryzys 2009 a handel światowy* [*The 2009 crisis and the global trade*], co-author: K. Śledziewska

21. Modelowanie danych panelowych: teoria i praktyka [*Panel data modelling: the theory and practice*], organized by: The Institute of Econometrics, Warsaw School of Economics, Warsaw; paper *Wykorzystanie uśrednionych modeli Bayesowskich do badania czynników wpływających na poziom nierówności dochodowych w wybranej grupie krajów* [*On the use of Bayesian model averaging in the income divergence factors analysisin in selected countries*], co-author: K. Sławińska

22. Europe in the World Economy Beyond the Sovereign Debt Crisis, organized by: IGŚ, Warsaw School of Economics, Warsaw; paper *Does monetary integration effect on EU's trade change during economic crises?*, co-author: K. Śledziewska

23. **Warsaw International Economic Meeting (WIEM)**, organized by: WNE, Warsaw University, Warsaw; paper *Does monetary integration effect on EU's trade?*, co-author: K. Śledziewska

24. **Warsaw International Economic Meeting (WIEM)**, organized by: WNE, Warsaw University, Warsaw; paper *Beta convergence stability among old and new EU countries: The Bayesian model averaging perspective*, co-author: M. Próchniak

25. Warsaw Economic Seminars, organized by: WNE Warsaw University, Warsaw; paper *Does monetary integration effect on EU's trade change during economic crises?*, co-author: K. Śledziewska

2011   26. **Warsaw International Economic Meeting (WIEM)**, organized by: WNE, Warsaw University, Warsaw; paper *Does monetary integration affect EU's trade?*, co-author: K.Śledziewska

27. IV Konferencja Naukowa „Modelowanie i Prognozowanie Gospodarki Narodowej [*IV Scientific Conference „Modeling and Forecasting the Economy"*], organized by: Uniwersytet Gdański, Sopot; paper *Prognozy podstawowych wskaźników makroekonomicznych z użyciem danych z testów koniunktury* [*On the forecasting of the main macroindicators with the use of survey data*], co-authors: P. Białowolski, T. Kuszewski

2010   28. **30th CIRET conference**, organized by: CIRET (Centre for International Research on Economic Tendency Surveys), New York; paper *Business Survey Data in Forecasting Macroeconomic Indicators with Combined Forecasts*, co-authors: P. Białowolski, T. Kuszewski

29. **ETSG 2010 conference**, organized by: ETSG (The European Trade Study Group), Lozanne; paper *Does monetary integration affect EU's trade?*, co-authors: E. Czarny, K. Śledziewska

2009   30. V National Conference „Zagadnienia aktuarialne – teoria i praktyka" [*Information asymetry in polish automobile insurance market*], organized by: The Institute of Econometrics WARSAW SCHOOL OF ECONOMICS, Warsaw; paper *Asymetria informacyjna na polskim rynku ubezpieczeń komunikacyjnych*

31. Research Seminar, organized by: WNE Warsaw University, Warsaw; paper *On the claim severity modeling in automobile insurance with panel data*

The following list covers grants and research projects I participated in after PhD with the role in each project.

A. Grants within national competitions

1. *Realna konwergencja dochodowa: wielowymiarowa analiza ekonometryczna z próbą identyfikacji punktów zwrotnych przy wykorzystaniu Bayesowskiego uśredniania oszacowań – przyczynek do teorii* [*Real convergence: multidimensional analysis with an attempt to identify turning points with the use of Bayesian model averaging – building up the theory*], National Center of Science research grant; nr DEC-2012/07/B/HS4/00367, main researcher; project started in 2013

2. *Znaczenie Wspólnej Polityki Handlowej państw Grupy Wyszechradzkiej* [*The meaning of common trade policy of the Visegrad countries*]; National Center of Science research grant, nr UMO-2013/11/B/HS4/01040; main researcher; project started in 2014

3. *Determinanty rozwoju obrotu bezgotówkowego* [*The determinants of cashless transactions development*] The Central Bank of Poland Research Grant within the research grant 2014 competition; main researcher; 01.01.2014-31.10.2014

4. *Prognozowanie podstawowych wskaźników makroekonomicznych z wykorzystaniem uśredniania Bayesowskiego oraz modeli czynnikowych w oparciu o dane z testów koniunktury* [*Forectasting main macroeconomic indicators with the use of Bayesian averaging and factor models based on the economic survey data*]; The Central Bank of Poland Research Grant within the research grant 2014 competition; main researcher; 01.01.2014-31.10.2014

5. *Analiza wpływu otoczenia regulacyjnego na tempo wzrostu gospodarczego krajów świata z wykorzystaniem Bayesowskiego uśredniania oszacowań* [*Analysis the influence of institutional environment on the rate of economic growth with the use of Bayesian model averaging*]; The Central Bank of Poland Research Grant within the research grant 2013 competition; head of the project; 01.01.2013-31.10.2013

6. *Realna konwergencja oraz wpływ polityki pieniężnej na wzrost gospodarczy krajów Unii Europejskiej: analiza stabilności czasowej i próba identyfikacji punktów zwrotnych z użyciem metod Bayesowskich* [*Real convergence and the influence of monetary policy on the economic growth of EU countries: time stability analysis and an attempt to identify turning points with the use of Bayesian methods*]; The Central Bank of Poland Research Grant within the research grant 2012 competition; main researcher; 01.01.2012-31.10.2012

7. *Wpływ integracji monetarnej na wymianę towarową w warunkach kryzysu gospodarczego* [*On the influence of monetary integration on trade under the conditions of economic crisis*]; The Central Bank of Poland Research Grant within the research grant 2010 competition; main researcher; 01.01.2010-31.10.2010

B. Other grants

1. *Ekonometria panelowa w badaniach przestrzennych* [*Panel data econometrics in spatial research*], Young researchers grant at Warsaw School of Economics; Head of the project and the main executor 03//BMN/09/12

2. *Zastosowanie metod ekonometrii przestrzennej* [*On the use of spatial econometrics*], Young researchers grant at Warsaw School of Economics; Head of the project and the main executor 03/E/0022/10

3. *Asymetria informacyjna w ubezpieczeniach komunikacyjnych* [*Information asymmetry in automobile insurance*], Young researchers grant at Warsaw School of Economics; Head of the project and the main executor 03/E/0021/09

4. Participation in 8 statutory research grants at Warsaw School of Economics as executor

6. Other academic activity

After obtaining the Ph. D. degree I have participated in of various academic activities, among which I value the most:

1. Participation in the reviewing procedure

Repeatedly I reviewed articles for journals such as National Economy (approx. 10 articles), Contemporary Economics (4 articles), Economic Modelling, Annals of the Collegium of Economic Analysis (4 articles), Research in Economics and Business: Central and Eastern Europe, Quantitative Methods in Economic studies (5 articles), Journal of Management and Financial Sciences, Journal of Banking and Financial Economics, British Journal of Economics, Management & Trade, Statistical Review, Research in Applied Economics (6 articles).

2. Participation in editorial committees

From 2012, I am a member of the Editorial board of Applied Research in Economics, published by the Institute in the US Macrothink. In addition, I was editor or co-editor of volumes of Annals of the Collegium of Economic Research School of Economics. These volumes are of monographic character and were devoted to the analysis of panel data methods.

3. Conference on "Modeling panel data"

I do mention this conference also as an organizational achievements, but I consider it also an important academic achievement. From 2012, the conference is held annually (in May), and so three editions have taken place. Conference filled a niche that was lacking in

Poland as a platform of exchanging ideas and experiences on the field of panel data analysis. I am the originator of the conference and designed the structure and principles of its academic activities, I have taken part in the process of reviewing papers and the selection and editing of publications, participated in the commission assessing the research papers prepared by a young scientist in order to choose the best one. The conference is well recognized, especially among young scientists, partly because there is no participation free (it is one of the few, if not the only conference in Poland with no conference fee). The conference also gained recognition among the leading Polish econometricians - from the third edition was held under the patronage of the Committee of Statistics and Econometrics, Polish Academy of Sciences.

4. Foreign internships and training

I consider participating in foreign internships and training as an an important factor of my academic developmentIn July 2010, I attended a monthly training course organized by the Spatial Econometrics Association Fri. Spatial Econometrics Advanced Institute at the University La Sapienza in Rome. The effect of participation in this training was my fascination "at first sight" in methods of spatial econometrics, which since that time are the subject of my research and have been used, among others, in the work submitted for assessment as my habilitation achivement.

In 2013 I took part in a two-month research and teaching internship at Victoria University in Wellington (New Zealand), during which I participated in classes and lectures in the School of Economics and Business, struck up a scientific cooperation with academic staff and presented the results of my research at a scientific seminar.

5. Cooperation with the World Bank

Repeatedly I worked with the World Bank in conducting research. The result of this collaboration was to, inter alia, the creation working paper (listed in autoreferacie co-authored with K. Richter), and previously also involved in the preparation of the development of the Golden growth. Restoring the luster of the European economic model [The World Bank, 2012].

7. Cooperation with business and state institutions

I consider cooperation with public and private sector institutions within the frame of research for economic practiocioners. After PhD, I participated in number of projects that linked the applied research with practice. The most important in my opinion were the following:

1. Construction and estimation as well as forecastin of the flow of rents paid by PZU SA, which enabled for correct calculation of reserves. Ordered by: PZU SA, 2008.

2. Construction and estimation of a model that allowede for forecasting of the main macroeconomics factors that enabled for correct adjustment of fees paid by the banks to the Bank Guarantee Fund. Ordered by: Bank Guarantee Fund, 2009.

3. Co-creation of the model of efficiency of spendings on advertising campaigns in media that allowed for the computation of their efficiency. Ordered by: The Media Auting Institute, 2010.

4. Project of the educational module that enabled visualization of the dynamics of economic phenomena with the use of macroeconomic and social data in the educational portal of the National Bank of Poland. Ordered by: the National Bank of Poland, 2010.

5. Construction of the model of Polish insurance market in the context of insurance premia in automobile insurance that enabled for forecasting of the premia in the market. Ordered by: Insurance Guarantee Fund, 2013.

6. Proposal, construction and estimation of the model that described the influence of the expenditures on R+D in modern technologies on the rate of regional development within Polish Foresight Program. In the project I worked on the model of the relations of investment in modern technologies and the relative change of the GDP / value added depending on the distribution of the invested means on the regional level. The aim of the analysis was to enable local decision maker to optimize the decision regarding allocation of the possessed means assigned for the investment in R+D. Currently the model has been applied to the case of Silesia and Lodz regions. Ordered by: Social Academy of Science, 2013.

8. Achievements in the field of teaching

Over the 13 years of work at Warsaw School of Economics I taught the following courses at the undergraduate, graduate and doctoral level: Econometrics, Applied econometrics, Microeconometrics, Panel data econometrics, Data analysis with Stata, Loss distributions, Reinsurance (in Polish), Econometrics and Applied econometrics (in English). In the 2011/2012 academic year I coordinated the "Economterics" course at Warsaw School of Economics.

In Warsaw School of Economics I promote both the undergradutate and the graduate students: so far I have promoted 14 master and 8 bachelor theses. The thesis written by Marta Ratyńska, which I supervised, was granted the 3rd award in the 9th edition of the Spokesman of the Insureds Rights for the best undergraduate, graduate and doctoral theses in the field of insurance. Currently I am supervising 3 master and 3 bachelor theses. I have also been a reviewer of a numer of theses written at Warsaw School of Economics.

Students' opinions about the courses which I teach are usually very positive. Owing to that, in 2010 I was in the "TOP10" list of the Warsaw School of Economics' lecturers.

The course „Econometrics of panel data", which I have been constantly teaching at Warsaw School of Economics since 2003 is what brings me special satisfaction. It used to be the first complete lecture devoted to analysis of panel data in Poland when it was first offered. In 2004 I was granted the Warsaw School of Economics' Rector's award for innovativeness in the field of teaching in 2004 (for introducing the "Panel data econometrics" and "Data analysis with Stata" courses). Another symptom of the innovativeness of mine in the field of teaching is my active participation in the "Innovative WSE" project within the frame of which I prepared numerous case studies available in the WSE bank of case studies in 2011-2012.

Publishing is of big importance in my teaching. In 2006 PWN published in Polish the first modern western handbook of econometrics, "Econometrics" by G.S. Maddala, which I co-translated (with the contribution of 49%). Furthermore, I am an author of the chapter devoted to panel data analysis in the only Polish complex handbook on microeconometrics edited by Marek Gruszczyński, as well as the co-author of an exercise book in microeconometrics. Together wuth Barbara Kowalczyk I co-authored the „Mathematical Statistics for Management", handbook, which is ready for print at the WSE.

Outside the Warsaw School of Economics my teaching activities consisted in a number of things. The first of them is teaching quantitative methods in economics subjects for undergraduate and graduate studies at other universities, including the school of mathematics

and information science at Warsaw Technical University, as well as at private universities in Warsaw.

Secondly, I provide a numer of trainings and courses to various institutions of the public and private sector. Most of them were devoted to more advanced topics in quantitative methods (in particular econometrics) and data analysis. The institutions I used to co-operate with include the National Bank of Poland, Bank Guarantee Fund, The Institute of Oncology, the World Bank, Polish Post, Slovak Institute for Fiscal Studies, commercial banks, media market institutions.

Thirdly, I teach at postgraduate studies. Since the beginning of their existence in 2010, I have been one of the two teachers at the „Practical statistical methods" postgraduate studies offered by the Institute of Economic Sciences of the Polish Academy of Science.

I am also involved in the project of scientific seminars for a group of the best PhD students in economics in Poland, organized by the CASE (*Centre for Social and Economic Research*) group.

Both in research and teaching I often make use of the Stata software, which gains increasing popularity in Poland. I popularize it during courses and make use of it during my classes offered to the students of the Warsaw School of Economics. In 2012 I was a member of the jury in the competition for the best paper written with the use of Stata software by a student during Polish Stata Users Group Meeting.

I put great emphasis on the internationalization of my teaching. I have twice participated in the "Global SGH" project, visiting within the frame of the teaching visits financed by the project Toulouse Business School, campus Barcelona, Spain (in March, 2013) and HSE the High School of Economics, Moscow, Russia (in November, 2013), although I also used the occasion in Moscow to provide a research seminar. Currently over 50% of the courses that I teach are given in English (courses: Econometrics, Applied econometrics).

9. Organizational achievements

As my main organizational achievement I consider the national conference „Panel data modelling: theory and practice", which is organized annually since May, 2012. That is the only conference devoted to this subject in Poland. I "invented" this conference and I also am the head of the organizing committee since the first edition. In each of the editions more than 30 papers were published and more than 100 scholars from over 20 research institutes and

universities participated. The outcome of the conference each time is a reviewed publication and the conference materials on a CD-ROM.

My organizational activities at Warsaw School of Economics include mostly membership in the senate of the university (in result of election) in the second part of the 2008-2012 cadency and the 2012-2016 cadency. In the council I represent the employees of the Collegium of Economic Analyses without habilitation. Also I have been a member of the Council of the Collegium of Economic Analyses (cadency 2008-2012). In 2013 I was a member of the council of young researchers of the Collegium of Economic Analyses.

10. Awards and distinctions

In 2010, in the Polish national contest for the best Master an PhD thesis organised by PZU SA., I obtained the first prize for my PhD thesis.

I was awarded with the Rector of Warsaw School of Economics 6 times:
- 2nd degree (team award) for organisational achievements (2013),
- 2nd degree (individual award) for scientific achievements (2009),
- 2nd degree (team award) for educational achievements (2007),
- 1st degree (team award) for scientific achievements (2007),
- 3rd degree (team award) for educational achievements (2005),
- 2nd degree (team award) for educational achievements (2004).