

Załącznik nr 4.

Description of scientific achievement

dr Ewa Gałęcka-Burdziak

1. Information on education and employment

Education:

- 2013 – PhD in Economics awarded at Collegium of Economic Analysis in Warsaw School of Economics. Title of dissertation: „*Mechanisms of labour market matching of job seekers and vacancies*”, supervised by: prof. dr hab. Marek Góra, defended with honours
- 2008 – 2012 – PhD studies at Collegium of Economic Analysis in Warsaw School of Economics
- 2008 – Master’s degree in: International Relations, Faculty of Economics and Sociology, University of Łódź. Title of dissertation: „Dopasowania podażowej i popytowej strony rynku pracy. Analiza na przykładzie Polski w latach 1998-2007” (“Labour market matching models – theoretical analysis with empirical verification for Polish labour market in the time period 1998-2007”), supervised by: prof. dr hab. Eugeniusz Kwiatkowski

Employment:

2012 – now – Warsaw School of Economics, in the time period 08.2012 – 09.2013 employment in the research project, since 10.2013 Assistant Professor at Department of Economics I, Collegium of Economic Analysis

A summary of educational and professional career:

I studied International Relations at the Faculty of Economics and Sociology at the University of Łódź in the time period 2003-2008. Since the beginning of the third semester I studied on the basis of individualized course of study adding the subjects from other fields. I received scholarship founded by MNiSW three times during the studies, and I was granted a Rector’s scholarship once. I published my first research articles during the master studies. In 2007, I received an award Primus Inter Pares 2007 in lodzkie voivodeship in the competition for the best student in Poland Primus Inter Pares Student of the Year 2007 organized by Primus Inter Pares Association and Niezależne Zrzeszenie Studentów. In 2008, I participated in the national final of the Competition for the Best Student in Poland 2007 organized by Zrzeszenie Studentów Polskich. During the studies at the University of Łódź, in the time period June 2006 – April 2009 I was a member of the Scientific Association Collegium Invisible. Prof. dr hab. Eugeniusz Kwiatkowski and prof. dr hab. Marek Góra were my tutors in the academic years 2006/2007 and 2007/2008 respectively. Also during the studies in 2008, I participated in the research project „Pytania o rozwój – wybór publiczny w polityce społeczno-gospodarczej państwa” (“Questions for development – public choice in socio-economic policy”) conducted by Institute for Structural Research. I completed my studies with

very good note and defended my master's dissertation titled „Dopasowania podaŹowej i popytowej strony rynku pracy. Analiza na przykłádzie Polski w latach 1998-2007” (“Labour market matching models – theoretical analysis with empirical verification for Polish labour market in the time period 1998-2007”) supervised by prof. dr hab. Eugeniusz Kwiatkowski. I was honoured with the first prize for my master's dissertation in the competition organized by Polskie Towarzystwo Ekonomiczne Branch in Łódź for the best master thesis in economics defended in the academic year 2007/2008. I was honoured with an award “Medal Za chlubne studia” for my studies at the University of Łódź.

In October 2008 I started my PhD studies at the Collegium of Economic Analysis in Warsaw School of Economics. During the studies, I received three times Rector's scholarship and I was granted a scholarship in the project „WeŹ stypendium – dla rozwoju” conducted in Warsaw School of Economics, and co-financed from European Social Fund. During PhD studies I was highly engaged in involved in the research, administrative work, and classes (in the subjects microeconomics and macroeconomics in Polish and English) in the Department of Economics I. I participated as a research team member or as a Principal Investigator in the research projects and grants. In 2012 I started my dissertation procedure, and in June 2013 I defended with honours my PhD thesis titled „*Mechanisms of labour market matching of job seekers and vacancies*” written under the supervision of prof. dr hab. Marek Góra. I was honoured with a third prize for my PhD thesis in the XVth edition of the competition for the best master and doctoral theses from labour and social policy economics Institute of Labour and Social Studies.

I have been working in Warsaw School of Economics since August 2012, in the time period August 2012 – September 2013 in the research project Kalkulator Kosztów Zaniechania (“Omission cost calculator”), and since October 2013 as an Assistant Professor at the Department of Economics I in Collegium of Economic Analysis. I conduct classes in microeconomics, macroeconomics, labour economics and seminar in economics.

2. A summary of research interest and research conducted prior to and after getting the doctor's degree

My research interest concerns unemployment, and the three main research topics are: (1) **labour market matching**, (2) **activity (non-participation) of the workers marginally attached to the labour market**, (3) **non-traditional pathways to non-participation of the older workers**. My research within the first topic concerns various aspects of the labour market matching process taking place between demand and supply. I analysed the character of the matching process (how does it take place, between what kinds of the labour market participants), the impact of the data spatial and temporal aggregation on the quantitative description of the matching process, and potential determinants of the matching process (including the labour market policy, the level of socio-economic development, demographic variables). I also accounted for multi-dimensional worker flows in the labour market (especially between labour force and non-participation), which determine the number of job seekers, so in a consequence they affect the job creation process. The second thematic area refers to workers marginally attached to the labour market. In particular I examined worker flows between labour force and non-participation which, according to the business cycle phase, reflect either added or discouraged worker effect. I tried to identify fractions of the labour force who experience the above mentioned effects and what determinants of these effects are. The third research topic

concerns non-traditional pathways to old-age non-participation taking place not from employment. I am especially interested in the role of public employment offices, and the impact of labour market policy implemented by means of the public employment offices.

I use various types of data from numerous sources, both national and international. In principle, I use individual data from Labour Force Survey, data published by Statistics Poland (GUS) and Eurostat, data from SHARE dataset, and administrative individual data from Syriusz database. Especially the last source of data is rarely used in the research, nevertheless these data due to their characteristics constitute valuable source of the research of certain economic phenomena. I employ various statistical and econometric research methods. Combination of various data sources and quantitative methods allows obtaining robust and precise picture of the studied economic problems.

2007–2013 (prior to getting the doctor's degree)

I published my first articles during master studies at the University of Łódź (articles 1-3). Subsequent articles were written during the masters studies, but published once I graduated from the University of Łódź (articles 4-6).

1. Gałęcka E., 2007, Zastosowanie funkcji dopasowań do analizy efektywności rynku pracy („Application of the matching function in examining the efficiency of the labour market”), *Wiadomości Statystyczne* 10: 43-52.
2. Gałęcka E., 2008, Hiszpański rynek pracy w Unii Europejskiej („Spanish labour market in the European Union”), *Ekonomista* 3: 399-412.
3. Lewandowski P. (ed.), 2008, Pytania o rozwój – wybór publiczny w polityce społeczno-gospodarczej państwa („Questions for development – public choice in socio-economic policy”), Instytut Badań Strukturalnych (Gałęcka E., part of the report regarding education).
4. Burdziak A., Gałęcka E., Kuchta Z., 2008, Próba dostosowania funkcji produkcji względem procesów produkcyjnych wybranych krajów europejskich („The attempt to adjust the production function to production processes in the selected European countries”), [w:] Dokurno Z., Graczyk A. (ed.), *Dokąd zmierza współczesna ekonomia* („Where does modern economy aim”), Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, 40-48.
5. Gałęcka E., 2008, Sytuacja ludzi młodych na rynkach pracy w integrującej się Europie („Young workers in the labour markets of the integrating European Union”), [in:] Gawrońska-Nowak B. (ed.), *Efekty Integracji Europejskiej w wybranych sektorach gospodarki* („Results of the European Integration in the selected sectors of the economy”), Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 14-30.
6. Gałęcka E., 2008, Model rankingowy funkcji dopasowań („Ranking model of the matching function”), [in:] Balcerzak A., Rogalska E. (red.), *Konkurencyjność gospodarki Polski* („Competitiveness of the Polish economy”), Wydawnictwo Adam Marszałek, Toruń, 98-107.

Articles 1, 2 and 6 tackle the problem of the functioning of the labour market, and in principle the problem of labour market matching process that generates job matches. I analysed how the process takes place, that is which model (random or stock-flow) most properly describes the job creation process and whether the trade occurs between stock or flows of agents. Articles 1 and 6 referred to Poland and the quantitative analysis was based on aggregate administrative

data. In the article no. 2 I characterized the labour market in Spain. In publication no. 3 I prepared the report the concerned public debate on education in Poland. It was created within a project conducted by Institute for Structural Research titled „Pytania o rozwój – wybór publiczny w polityce społeczno-gospodarczej państwa” (“Questions for development – public choice in the socio-economic policy”) co-financed from the European Union funds 2005/017-488.01.01. In the article no. 5 I performed comparative analysis of the situation of the young workers in the European Union. Finally, in the article no. 4 we analysed production process from macroeconomic perspective.

During PhD studies I continued my research on the labour market matching process, nevertheless I extended my interests over new research topics as well, like: equilibrium unemployment, worker flows, unemployment benefit, employment forecasting. In this time period I published following papers:

7. Gałęcka-Burdziak E., 2010, Modele łączenia uczestników rynku pracy – aplikacja funkcji dopasowań dla polskiego rynku pracy („Labour market matching models – application of the matching function to the labour market in Poland”), *Ekonomista* 3: 395-408.
8. Gałęcka-Burdziak E., 2010, Naturalna stopa bezrobocia – rozważania teoretyczne („Natural rate of unemployment – theoretical considerations”), [in:] Sztudynger J.J., Baranowski P. (ed.), *Wybrane problemy funkcjonowania gospodarczego i integracji ekonomicznej* („Selected problems of the economy and economic integration”), Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 7-17.
9. Gałęcka-Burdziak E., 2010, Krzywa Beveridge’a dla Polski w latach 1992 – 2009 („The Beveridge Curve for Poland during 1992 – 2009”), *Studia Ekonomiczne Regionu Łódzkiego* 3: 9-19.
10. Gałęcka-Burdziak E., 2011, Znaczenie zasiłków dla bezrobotnych dla przepływów z bezrobocia do zatrudnienia („The impact of unemployment benefit on the outflow from unemployment to employment”), *Polityka Społeczna* 9: 17-21.
11. Gałęcka-Burdziak E., 2011, *Efekty discouraged workers, on-the-job search i out-of-labour force search* na przykładzie polskiego rynku pracy („Discouraged worker effect, on-the-job search and out-of-labour force search in the labour market in Poland”), [in:] Kotlorz D. (ed.), *Współczesny rynek pracy (wybrane problemy)* (“Contemporary labour market (selected problems)”), Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, Katowice, 53-65.
12. Gałęcka-Burdziak E., 2011, Rozwiązania stosowane w zakresie prognozowania zatrudnienia według zawodów w innych krajach („Forecasting employment in occupational breakdown in other countries – theoretical analysis”), [in:] Kryńska E. (ed.), *Prognozowanie zatrudnienia według zawodów – dorobek teoretyczny i wdrożeniowy – świat i Polska* („Forecasting employment in occupational breakdown – survey of the theoretical and empirical analysis, other countries and Poland”), Instytut Pracy i Spraw Socjalnych oraz Centrum Rozwoju Zasobów Ludzkich, Warszawa, 12-50.
13. Gałęcka-Burdziak E., 2011, Prace badawcze w zakresie prognozowania zatrudnienia według zawodów w Polsce („Forecasting employment in occupational breakdown in Poland”), [in:] Kryńska E. (red.), *Prognozowanie zatrudnienia według zawodów – dorobek teoretyczny i wdrożeniowy – świat i Polska* („Forecasting employment in occupational breakdown – survey of the theoretical and empirical analysis, other

- countries and Poland”), Instytut Pracy i Spraw Socjalnych oraz Centrum Rozwoju Zasobów Ludzkich, Warszawa, 51-78.
14. Desperak M., Gabrielczak P., Jaros R., Krajewski P., Gałęcka-Burdziak E., 2011, Rekomendacje dotyczące potrzeb w zakresie szkolnictwa zawodowego na pozostałych obszarach województwa dolnośląskiego, ze szczególnym uwzględnieniem terenów wiejskich („Recommendations on vocational educational needs in other parts of the Lower Silesian Voivodeship, especially in rural areas”), Instytut Nauk Społeczno-Ekonomicznych.
 15. Gałęcka-Burdziak E., 2012, Labour Market Matching – the Case of Poland, *Bank i Kredyt*, 3: 31-46
 16. Gałęcka-Burdziak E., 2012, Odpiływy z bezrobocia do zatrudnienia – analiza przepływów z wykorzystaniem regresji logistycznej („The outflow from unemployment to employment – the logisitic regression approach”), [in:] Harasim J. (ed.), *Współczesna gospodarka – wyzwania, dylematy, perspektywy rozwoju* („Contemporary economy – challenges, dilemmas and options for development”), *Studia Ekonomiczne Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach* 93: 33-41.
 17. Gałęcka-Burdziak E., Kubiak P., 2012, Skuteczność poszukiwania zatrudnienia a prawo do zasiłku dla bezrobotnych w Polsce przed i po 2010 roku („The job search effectiveness in the light of the unemployment benefits system before and after 2010”), *Polityka Społeczna* 10: 26-32.
 18. Gałęcka-Burdziak E., 2012, Elastyczność funkcji dopasowań na rynku pracy w Polsce („Elasticity of the matching function in the labour market in Poland”), *Gospodarka Narodowa* 4: 109-126.
 19. Baranowski P., Gałęcka-Burdziak E., Górajski M., Malaczewski M., Szafranski G., 2013, *Inflacja a mechanizmy aktualizacji cen* („Inflation and the mechanisms of price adjustment”), Wydawnictwo Uniwersytetu Łódzkiego, Wydawnictwo Naukowe PWN, Łódź.

In the articles 7, 15 and 18 I examined the labour market matching process taking place in Poland, and I accounted for the temporal aggregation bias in the data. The research was performed in reference to the doctoral dissertation. Moreover, articles number 18 and 19 were products of the project: *Modelowanie i prognozowanie inflacji w Polsce przy pomocy modeli z endogeniczną częstotliwością zmiany cen* (“Modelling and forecasting inflation in Poland with models with state-dependent pricing” N N111 209439 financed in the 39 competition of the Komitet Badań Naukowych, MNiSW) realized by Department of Econometrics at the University of Łódź. In the project I was a researcher, and I analysed how the labour market can be included in general equilibrium models with state-dependent pricing. I also analysed equilibrium unemployment, in light of Diamond-Mortensen-Pissarides model and the Beveridge’s curve for Poland (publications 8 and 9).

I also studied worker flows between states in the labour market from microeconomic perspective. I identified the determinants of the likelihood of transitioning from unemployment to employment (publication 16) and from unemployment to non-participation (publication 11). The research was based on individual LFS data, and also accounted for the impact of unemployment benefit on likelihood of transitioning from unemployment to employment (publications 10 and 17).

During the PhD studies I also participated in research projects. I was a researcher in a project conducted by Institute of Labour and Social Studies „Opracowanie zintegrowanego systemu prognostyczno – informacyjnego umożliwiającego prognozowanie zatrudnienia” (“Creating integrated employment forecasting system”), which was co-financed from the European Union funds. I contributed to the project by means of theoretical considerations on forecasting employment in Poland and other countries (publications 12 and 13). Next I participated as a researcher in a project „Kalkulator Kosztów Zaniechania – wprowadzenie innowacyjnych rozwiązań na Mazowszu w zakresie polityki społecznej, w obszarze analizy kosztów braku podejmowania działań aktywizująco wspierających” („Omission cost calculator – implementing innovative solutions to social policy in Mazowsze, activating actions’ omission costs analysis”) conducted in consortium in, among others, Warsaw School of Economics. I was in charge of the research concerning the problem of homelessness and I was working on creating the omission costs calculator. Publications presenting the project findings were published after I got the doctor’s degree. I also participated in a project „Diagnoza potrzeb edukacyjnych – rozwój rynku pracy województwa dolnośląskiego poprzez dostosowanie oferty szkolnictwa zawodowego” (“Educational needs diagnosis – development of the Lower Silesian voivodeship labour market by adjusting vocational education system offer”) conducted within PO KL funds. I contributed to the report by formulating policy recommendations on vocational education needs (publication 14). In 2009, I participated in a project ESCIRRU – Economic and Social Consequences of Industrial Restructuring in Russia and Ukraine conducted by CASE – Center for Social and Economic Research, where I prepared data for computational analysis.

In December 2012 I was granted a research project in the Preludium competition, financed by National Science Centre “Znaczenie przepływów pracowników pomiędzy zasobami na rynku pracy” („Significance of job seekers flows between states on the labour market”) (DEC-2012/05/N/HS4/00194). During realization of the project, in May 2013, I was a research stay at the Universidad Pablo de Olavide, Sevilla and Universidad de Sevilla in Spain. During the stay I analysed the problem of data temporal aggregation in modelling labour market matching process and I presented the results of my research during the seminar (publications presenting the results of the research project were published after I got the doctor’s degree).

Additionally, since 2010 I have collaborated with BIEC (Bureau for Investment and Economic Cycles in Warsaw). I prepare monthly reports on short-term forecasts of the unemployment rate Wskaźnik Rynku Pracy (“Labour Market Indicator”).

2013–2018 (after getting the doctor’s degree)

After being awarded doctoral degree I continued research on the topics already mentioned and within new research areas. Moreover, I conducted most of the research within research projects, where I was predominantly a Principal Investigator.

I continued research on the **labour market matching process**. Within a grant financed in the Preludium competition by NCN “Znaczenie przepływów pracowników pomiędzy zasobami na rynku pracy” („Significance of job seekers flows between states on the labour market”, grant received before getting the doctor’s degree) and an international research grant „Data spatial aggregation in labour market matching” financed in the GDN Regional Research Competition by CERGE-EI I analysed how the trade between demand and supply occurs, and what is the impact of stocks and inflows of agents in the labour market trade mechanism. I accounted for the temporal and spatial aggregation in the data and used various time series econometric

methods. In the analyses I referred to various types of job seekers and worker flows between states in the labour market, especially from and to the labour force, and to job offers' market in Poland. Moreover, I have made attempts to identify the impact of certain potential determinants of the efficiency of the labour market matching process, what is especially relevant when formulating policy recommendations aimed at improving functioning of the labour market. The results of this research were published in the articles: [1.1], [1.2], [1.3], [1.4], [2.1], [2.2], [2.3], [2.4], [2.5] (Table 1).

The research on worker flows between states in the labour market entailed studies on labour market inactivity of the workers marginally attached to the labour market. The research on this topic started within a project financed in Preludium competition and is being currently continued within a project, which I lead, titled „Cykliczność zmian aktywności zawodowej ludności. Analiza efektów dodatkowych/zniechęconych pracowników” („The cyclicity of the labour force participation. The added/discouraged worker effect analysis”) and financed by NCN in Sonata competition. So far, in the research I identified and characterized fractions of the population who experience **added** or **discouraged worker effects**, what was exposed in publications [4.1], [4.2], [4.3], [4.4], [4.5], [4.6], [4.13] and [4.14] (Table 2), where articles [4.3] and [4.4] are the so far results of the Sonata project.

I have used individual administrative data from Syriusz dataset since 2015. The data refer to unemployed individuals registered with public employment offices in Poland. So far, I have examined the **unemployment duration, multiple registered unemployment spells, and non-traditional pathways to old-age non-participation**. Most of this research I performed within statutory research of my Department. Some of the results are presented in the articles [4.10], [4.11] and [4.12] (Table 2). These findings, along with the findings of the statutory research devoted to young scientists (the research on the determinants of the labour force participation of older workers based on SHARE dataset), were used to prepare the project proposal in a Sonata Bis competition, which is currently under review in National Science Centre.

The research on labour market matching mechanism of job seekers and vacancies was connected to the research on the structure of the effective labour supply and the job offers market. Apart from analysing vacancies (above mentioned publication [2.3] in Table 1) I co-created the web application – Job Calculator, which is described in the publication [4.9] (Table 2).

The project „Omission cost calculator” dealt with certain social policy problems. I participated in this project before getting the doctor's degree, but the project's results were published after I received the degree: [4.7] and [4.8] (Table 2). I examined the **problem of homelessness** in Poland.

3. Scientific achievement presented for evaluation as discussed in Art. 16, Item 2 of the Act of 14 March 2003 (Journal of Laws [Dz. U.] No 65, position 595 with later changes)

As a scientific achievement, I submit for evaluation a series of thematically connected publications, which I entitled “**Labour market matching process of job seekers and vacancies – its characteristics, determinants and quantification problems**”. The series includes nine articles. Seven of these publications were written in English, four of them were

published in journals indexed in the JCR list (the IF presented in Table 1 below refers to the year of publication).

Table 1: List of publications contributing to the scientific achievement „ Labour market matching process of job seekers and vacancies – its characteristics, determinants and quantification problems”.

| No | Publication | My share | IF according to Web of Science | MNiSW points | SCImago Journal Rank (SJR) |
|--|--|----------|--------------------------------|--------------|----------------------------|
| 1. ARTICLES PUBLISHED IN THE JCR LISTED JOURNALS (A LIST) | | | | | |
| 1.1 | Antczak E., Gałecka-Burdziak E., Pater R., 2018, Unemployment and vacancy flows in spatial labour market matching at the regional level. The case of a transition country, <i>Journal of Applied Economics</i> , 21:1, 25-43 | 34% | 0,375 | 20 | Q2 (0,235) |
| 1.2 | Antczak E., Gałecka-Burdziak E., Pater R., 2018, What affects efficiency in labour market matching at different territorial aggregation levels in Poland?, <i>Bulletin of Economic Research</i> 00:0, 0307-3378 | 34% | 0,264 | 15 | Q3 (0,291) |
| 1.3 | Gałecka-Burdziak E., 2017, Randomness or stock-flow: Which mechanism describes labour market matching in Poland?, <i>Baltic Journal of Economics</i> 17:2, 119-135 | 100% | 1,00 | 15 | Q2 (0,282) |
| 1.4 | Gałecka-Burdziak E., 2017, Did the labour market matching efficiency change in Poland in 2003-2008?, <i>Argumenta Oeconomica</i> 2(39), 91-110 | 100% | 0,178 | 15 | Q4 (0,105) |
| 2. ARTICLES PUBLISHED IN OTHER JOURNALS | | | | | |
| 2.1 | Gałecka-Burdziak E., 2016, Aggregate Matching in Spain: Time Series Analysis Using Cointegration Techniques, <i>Contemporary Economics</i> , Vol. 10, No. 1, 5-12 | 100% | x | 15 | x |
| 2.2 | Gałecka-Burdziak E., 2016, Underestimated or overestimated: the matching function elasticities biased by worker inflows and outflows, <i>Ekonomia. Rynek. Gospodarka. Społeczeństwo</i> , 47: 7-21 | 100% | x | 13 | x |
| 2.3 | Gałecka-Burdziak E., Pater R., 2015, Ile jest wolnych miejsc pracy w Polsce? (<i>How many vacant jobs are there in Poland</i>), <i>Gospodarka Narodowa</i> 5, 171-186 | 50% | x | 14 | x |

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|-----|---|------|---|---|---|
| 2.4 | Gałecka-Burdziak E., 2014, Skąd się wywodzi napływ do zatrudnienia? (<i>Where does the employment inflow come from</i>), Acta Universitatis Lodzianis. Folia Oeconomica 3(303): Makroekonomia gospodarki Polski na tle Unii Europejskiej, 187-199 | 100% | x | 6 | x |
| 2.5 | Gałecka-Burdziak E., 2015, Aggregate labour market matching in Poland, International Journal of Economics and Business Research, vol. 9 no. 4, 393-402 | 100% | x | x | x |

The main goal of the conducted research was to precisely describe the character of the labour market matching process. I examined the character of the trade between job seekers and vacancies, accounted for various problems that may generate bias in the results (like data temporal and spatial aggregation or worker flows in the labour market) and identified determinants of the efficiency of the matching process. Job seekers and job vacancies are engaged in trade that generates job matches. Complicated matching process is resource-consuming and time-consuming and it is quantified by the matching function (Petrongolo and Pissarides 2001). The research on labour market matching originates in 1970s, when the Beveridge curve was intensively studied. This curve reflects various combinations of the inputs of agents in the labour market that create the same amount of job matches. Empirical data were used to verify whether the labour market oscillated around the downward sloping Beveridge curve, what would reflect cyclical variations in the economic activity, or whether reallocation shocks took place and the curve shifted towards or against the coordinate origin. These considerations were formalized in the models of the Beveridge curve and the matching function (Blanchard and Diamond 1989, 1990a, 1990b) and the Diamond-Mortensen-Pissaridesa general equilibrium in the labour market model (Mortensen and Pissarides 1994; Pissarides 1990). In each case, the job creation process was quantified by the aggregate matching function.

The so far conducted research to large extent has focused on the empirical usefulness of the matching function, microfoundations, theoretical models describing the trade between job seekers and vacancies, and sources of the potential bias in the parameters' estimates. Petrongolo and Pissarides (2001) made a literature survey, which leads to a conclusion that **random model** was most often used to describe the matching process. Agents are matched randomly as there is imperfect information in the labour market (Blanchard and Diamond 1994). Blanchard and Diamond (1994) proposed a **ranking model** which is based on random matching, but unemployed job seekers are ranked according to the job search duration. Such an assumption is to reflect a short list often prepared by recruiters in companies hiring new workers. **The stock-flow model** in turn makes radically different assumptions compared to random model (compare Coles and Smith 1998; Gregg and Petrongolo 2005). Here, the perfect information is assumed in the labour market, what is supposed to reflect the fact that job seekers at first scan a lot of job offers. Then, they apply for selected job posts, and if a job offer is turned down, reconsidering it is less likely then looking for a new job offer. In the equilibrium, the matching process takes place between the stock of agents on one side of the labour market with the inflow of new potential trading partners on the other side of the labour market. Unemployed job seekers, who enter the market, at first look through available job offers (the stock), and if the

job match does not take place, they become a part of a stock and wait for the inflow of new vacancies. In the literature one can also find the **job queuing model** (Shapiro and Stiglitz 1984), which to some extent compiles random and stock-flow approaches. The model is to reflect high discrepancies between demand and supply, and in principle the insufficient number of available job offers. In result, all job offers are instantaneously covered, and those unemployed individuals who did not find a job match have to wait for new vacancies. Hence, the trade occurs randomly between job seekers and new vacancies, and the demand clears every period. Previous research has primarily applied random model to describe the labour market matching process from macroeconomic perspective. **There are few papers that examined the relevance of other theoretical models, especially the stock-flow model**, in describing the matching process. It is worth mentioning at least the following papers: Coles and Smith (1998), Gregg and Petrongolo (2005), Ebrahimi and Shimer (2010), Álvarez de Toledo et al. (2008), Coles and Petrongolo (2008) and Andrews et al. (2013).

Merits of the matching function are connected to the interpretability of the parameters' estimates. A few types of functions were employed in the previous literature, but usually the matching function of a Cobb-Douglas form is estimated (Petrongolo and Pissarides 2001; Stevens 2002). In such case, parameters can be interpreted as the elasticities of the dependent variable with respect to exogenous variables. The values of these estimated parameters are then the basis of the formulated qualitative conclusions and policy recommendations. The **literature indicates that the following aspects can generate bias in the quantification of the matching function**: characteristics of the labour market, **data temporal and spatial aggregation**, **worker flows** and **determinants of the matching process efficiency**; moreover one can refer to the problem of endogeneity, workers heterogeneity and mismatch between demand and supply (Borowczyk-Martins et al. 2013; Münich and Svejnar 2009; Petrongolo and Pissarides 2001).

Data temporal aggregation is the first source of potential bias in the matching function parameters' estimates. The problem arises because continuous economic process is described by variables in discrete time. Coles and Smith (1998) proposed an example. A job offer is published at the beginning of a month and is not covered till the end of it. At the end of the same month a new job seeker arrives in the labour market. Monthly data will treat both the vacancy and the job seeker as inflows, although from the job seeker point of view the vacancy has been already available in the market so it is a part of a stock. The problem of temporal aggregation in the data is considerable, when we account for the fact that many agents in the market trade instantaneously after arriving in it. They are not reflected in the end of period stocks then, and the stocks do not reflect actual number of trading partners in the given time period. In result, data temporal aggregation causes underestimation of the impact of stock variables and overestimation of the impact of inflow variables in the job creation process (Gregg and Petrongolo 2005; Petrongolo and Pissarides 2001). Burdett et al. (1994) proved that bias in the parameters' estimates depends on data frequency and it can be relatively small in case of monthly data. Gregg and Petrongolo (2005) and Coles and Petrongolo (2008) proposed two models that account for temporal aggregation bias in the data in labour market matching. Their comparative advantage rests on the fact that they include the inflow variable as a determinant of the stock value during the analysed period. Coles and Petrongolo (2008) indicate that only their model fully accounts for the problem of data temporal aggregation, even in a random framework. This solution is based on computing the number of available matching partners in every moment, so the inflows can match directly with the stocks (in a stock-flow model), and

they determine the size of the pool of agents. **Research on labour market matching taking into account the problem of temporal aggregation in the data is, however, relatively scarce in the literature** (apart from main exceptions: Álvarez de Toledo et al. 2008, Gregg and Petrongolo 2005, Coles and Petrongolo 2008). Moreover, previous research has not fully investigated the job queuing model.

The aggregate matching function assumes homogenous labour market at a certain geographic level. Hence, the model directly **does not account for potential interactions between local labour markets**, what may cause bias in the quantitative findings (Petrongolo and Pissarides 2001). Burda and Profit (1996) were the first to examine the impact of regional interdependencies on the matching function stability. They confirmed that unemployment in adjacent areas affected the matching process in the given market. Moreover, the direction of the impact was distant-dependent. Shorter distances produced positive external effects, whereas longer distances – negative effects. These findings were further studied by Burgess and Profit (2001), who examined regional interdependencies in labour market matching process while taking into account the cyclical volatility of this impact. The results also indicated that high unemployment in surrounding markets increased the matching rate of vacancies in the given market, but decreased the outflow from unemployment. On the other hand, large amount of vacancies increased the matching rate of both vacancies and unemployed. Similar conclusions of the positive impact of the vacancies and negative impact of the unemployed individuals from adjacent markets on the matching process in the local labour market were formulated by Ilmakunnas and Pesola (2003) and Kosfeld (2007). In the literature, **there lacks, however, research of the impact of inflow variables (of job seekers and vacancies) on the matching process in the local labour markets while taking into account regional interdependencies**. I have not also come across the research which would base the study of regional interactions on commuting behaviour.

Worker flows and various types of job seekers are the next aspects that may affect the quantitative results of the research on labour market matching process. It is worth mentioning at least on-the-job search and associated job-to-job moves, out-of-labour force search, and discouraged worker effect and the outflows from unemployment to non-participation. If the above mentioned various types of job seekers and workers flows are (not) taken into consideration the matching function parameters' estimates may be biased, what affects qualitative conclusions on relative importance of particular types of agents in generating job matches. Galuščák and Münich (2007) and Petrongolo and Pissarides (2001) analysed the direction of the bias in the matching function elasticities with respect to stock and flow variables while accounting for the on-the-job search and discouraged worker effects. Broersma and van Ours (1999) investigated how to measure the job seekers pool. Nevertheless, **there lacks research that simultaneously accounts for various types of worker flows (in different directions) and various types of the job seekers** in particular labour market matching modelling frameworks.

The labour market matching process is time-consuming and generates costs for both sides. It depends on the number of agents available for match in the labour market and on **other socio-economic factors that affect the efficiency of the trade process**. Augmented matching function and stochastic frontier analysis are two most common approaches used to deal with this issue (Puhani 1999; Ilmakunnas and Pesola 2003). The augmented matching function explicitly verifies how certain factors affect the matching efficiency. The stochastic frontier

analysis focuses on determinants of the inefficiency; it is a more general approach. The literature on the matching process efficiency indicates some common findings. The efficiency improves with the level of economic development (Münich et al. 1999), population density (Coles and Smith 1996) and over the business cycle (Anderson and Burgess 2000; Fahr and Sunde 2001). The efficiency deteriorates with unemployment duration (Burgess 1993; Lehmann 1995), and with spatial autocorrelation; it is also lower between travel-to-work areas than within them (Burda and Profit 1996; Fahr and Sunde 2005; Coles and Smith 1996). Other factors that affect the efficiency of matching are: demographic characteristics, occupation and education (Ibourk et al. 2004; Fahr and Sunde 2001; Abid and Drine 2011), as well as regional and sectoral specificity (Altavilla and Caroleo 2013; Broersma and van Ours 1999; Fahr and Sunde 2005; Robson 2006). Previous research concerning Polish labour market was usually conducted at the NUTS-2 level (voivodeship), most often by employing the augment matching function concept (compare for example Kubiak 2005; Kucharski and Tokarski 2003). Moreover, Tyrowicz (2011) and Jeruzalski and Tyrowicz (2013) applied the stochastic frontier analysis at the counties level (NUTS-4 level). Their results proved the determining role of the labour market demand in the matching process, whereas the impact of unemployment structure, active labour market policies or functioning of the public employment offices were less important. The survey of the previous research leads to a conclusion of still insufficient knowledge on the impact of particular **socio-economic variables on the efficiency of the matching process while accounting for data spatial and temporal aggregation**. In principle, there is a niche in the research on local labour markets, from various regional perspectives, in different time horizons. Few articles referred to the labour market in Poland.

The scientific achievement I submit for evaluation is a result of my participation in several national and international research projects, as a researcher and as a Principal Investigator. Together with my co-authors I aimed at contributing to the **knowledge on labour market matching process of job seekers and vacancies**. I conducted research to most properly and precisely **describe the matching process, and to assess the impact of the selected aspects that may generate bias in the quantitative findings**. I did the analyses to be able to formulate quantitatively based qualitative conclusions and policy recommendations aimed at improving the functioning of the labour market.

In particular, to date I have made contribution to research and knowledge in the following areas:

- 1) more precise **description of the labour market matching process of job seekers and vacancies** (comparative analysis of the random, stock-flow and job queuing models),
- 2) more thorough identification of the impact of **selected aspects potentially causing bias and thus affecting the quantitative properties of the matching function** (including **data temporal aggregation, data spatial aggregation, worker flows between states in the labour market**),
- 3) deepening the knowledge on other **determinants of the efficiency of labour market matching process** from regional perspective.

Below I briefly present my achievement in the three areas presented above.

1) Description of the labour market matching process of job seekers and vacancies.

The contribution to the literature was connected to the fact of performing **comparative analyses of the matching function models** in the labour market in Poland. The results of these

studies were primarily described in the articles [1.1], [1.2], [1.3] and [1.4], though particular articles concerned other aspects of the labour market matching process as well (what is described below). In the article [1.3] I focused on **description of the matching process between demand and supply to determine the impact of stock and inflow variables on generating the outflow from unemployment to employment**. Especially, examining the impact of inflow variables, while comparing theoretical models: random, stock-flow and job queuing, had not been pronounced in the literature before. Moreover, I used over-identifying specifications of particular equations to determine who matches with whom (stocks and inflows). I obtained robust results by employing data temporal aggregation models of Gregg and Petrongolo (2005) and Coles and Petrongolo (2008) (described above and in point 2a below). Quantitative results led to a conclusion that **job creation process in Poland taking place by means of public employment offices predominantly originates in the matching process between unemployment stock and inflow of vacancies. The trade between unemployment inflow and vacancy stock was less important**. Such results indicate that higher job posts creation should entail higher job creation from aggregate perspective. On the other hand, the fact the vacancy stock participates in the matching process confirms, that not all job posts are instantaneously covered once they arrive in the labour market. Non-negligible impact of the stock variables confirms that the matching process is time-consuming. Not all newcomers find a proper matching partner instantaneously when they enter the market, so they become a part of a stock in the next period. Moreover, the results proved that inflows do not match with one another. Goodness-of-fit and the fact that unemployed workers find a proper job offer among the old ones (stock) and new ones (inflow) indicate that **in reality both types of matching mechanisms: random and stock-flow coexist**. Some superiority of the random and job queuing models indicates the need to improve the information in the labour market. This should improve the labour market matching process. On the other hand, the explanatory power of the stock-flow model confirms heterogeneity of the demand and supply in the labour market. The quality of matching is important here, so actions directed at increasing the inflow of new agents to the labour market should make everyone better off and increase the matching rate of job seekers and vacancies.

The labour market matching process in the article [1.3] was studied at the country level and the results proved some superiority of the random approach but did not discard the explanatory power of the stock-flow approach. Similar findings were presented in the articles [1.4], [2.2] and [2.5]. On the other hand, the research at the lower level of data spatial aggregation indicated slightly different qualitative conclusions. Article [1.1] proved existence of all three matching frameworks, although formal testing indicated that stock-flow model prevailed. Moreover, the research using stochastic frontier estimation presented in article [1.2] also proved relevance of the stock-flow model.

2) Selected aspects causing bias and affecting the quantitative properties of the matching function

My research has contributed to the knowledge on selected aspects potentially causing bias and affecting the quantitative properties of the matching function. In particular I studied:

a. temporal aggregation in the data and its impact on description of the labour market matching process

I contributed to the literature by making **multiple analyses of the labour market matching process with usage of time series econometric methods, including temporal aggregation matching function models**. In the article [1.3] I examined the labour market matching process in Poland, taking place by means of the public employment offices. I applied solutions proposed by Gregg and Petrongolo (2005) and Coles and Petrongolo (2008) to do comparative studies. Moreover, I **proposed modifications to the both above mentioned models so they could be directly applied to the job queuing model**.

I also tackled the problem of temporal aggregation in the data while focusing on other aspects of the labour market matching mechanisms. I used Gregg and Petrongolo (2005) and Coles and Petrongolo (2008) models in the article [1.4] described below in point 3) when analysing the determinants of the efficiency of the labour market matching process.

I analysed potential time volatility of the matching process also in the articles [2.1] and [2.5]. The first article refers to Spain, whereas the second one – refers to Poland. In both cases I used time series econometric methods, like error correction models and VAR to examine the multidimensionality of the analysed phenomenon. The results indicated that the process is efficient and model quickly returns to equilibrium. Moreover, most of the results suggested that only one co-integrating vector was present, what legitimated conducting research in single dimension.

b. spatial aggregation in the data and its impact on description of the labour market matching process

The contribution to the literature in this subject matter especially resulted from **examining the labour market matching process on the local labour markets while accounting for interregional interdependencies**. In the article [1.1] prepared jointly with dr Elżbieta Antczak and dr Robert Pater we assumed that spatial interactions should be included into formal analysis of the matching process at more disaggregated labour markets, because local labour markets are not independent from each other. We examined random, stock-flow and job queuing models. Such approach allowed us identifying the impact of stocks and inflows of agents on the matching process in the adjacent markets. In the article [1.1] we used monthly administrative data for Poland for the time period 2003-2014 at county level (LAU-1). We based the spatial interactions analysis of the commuting behaviour. LAU-1 data proved significant worker flows between local labour market, as up to 50% of the flows occurred through one administrative border. In a consequence, we used in quantitative analysis the first order of contiguity matrix. We employed spatial econometric methods, and in particular a spatial Durbin panel fixed effects model with spatial error, which accounts for spatial autoregression, autocorrelation, and cross-regression effects; i.e., the impact of spatially non-lagged and lagged exogenous variables. Elhorst (2010) proved that this is the only model that produces unbiased estimates of parameters and correct standard errors. The results provided fixed effects with spatial error what allowed taking into account regional heterogeneity in the data, avoiding bias in the non-spatial effects and produced estimates of spillover effects.

The results proved that both agents already present in the market (stocks) and newcomers (inflows) engage in a labour market matching process, that is they create the outflow from

unemployment to employment. The explanatory power of the stock-flow model prevailed over random and job queuing frameworks and certain tests confirmed existence of spatial interdependencies and the necessity to formally include them into the quantitative analysis. Parameters' estimates indicated that vacancies from adjacent markets increased the matching rate of unemployed individuals in a given market, but the impact of a flow variable was higher than that of a stock variable. Unemployed workers, on the other hand, exerted negative externalities in the adjacent local labour markets, and similarly to demand side, the impact of a flow variable was higher than that of a stock variable. The findings indicate that unemployed individuals register with public employment offices but look for proper job offers at the local and adjacent markets. That is why they cause congestion effect. The job offers are published in a given public employment office and they attract unemployed workers from surrounding markets. That is why, their impact is positive. The negative externality caused by unemployed individuals in adjacent markets was larger than positive one caused by vacancies. This may be justified by relatively small number of job offers published in public employment offices, with respect to the number of registered unemployed workers and with respect to the overall job offers supply available in the economy.

Previous version of the article [1.1] was published as a working paper: Antczak E., Gałecka-Burdziak E., Pater R., 2016, Spatial labour market matching, CERGE-EI Working Paper no. 578. This paper includes also the results at subregions level (NUTS-3). The comparative analysis of the matching function models indicated more significant spatial interactions at the county level than at a subregion level. Moreover, quantitative analysis proved that not taking into account spatial interactions at the county level biases the results, but at the subregion level Moran's I was not statistically significant. There were some local interdependencies though. In a consequence, non-spatial panel model could be used to describe the labour market matching process at the NUTS-3 level without producing biased estimates.

c. worker flows between states in the labour market, and various types of job seekers (not only unemployed job seekers)

I contributed to the literature by analysing **the direction of the matching function parameters' bias when certain workers flows are (not) taken into account and there are various kinds of job seekers**. Moreover, I tried to **identify the structure of the employment inflow in the labour market in Poland**.

In the article [2.2] I analysed theoretically the direction and extent of the parameters' estimates bias for random, stock-flow and job queuing models. In the research I accounted for worker flows into various directions, what can reflect the phenomena of the out-of-labour force search or discouraged worker effect. Moreover, the study assumed various types of job seekers, and alternative definition of the labour market tightness index, what had not been analysed earlier. Theoretical conclusions were verified empirically by estimations of the matching function models with usage of various set of exogenous and endogenous variables. I also accounted for temporal aggregation in the data to obtain most precise results. The direction and the size of the bias rest on the assumptions made. If job seekers compete for the same job offers, the negative externalities arise, and the impact of unemployed individuals in the job creation process is overestimated, while that of the demand – underestimated. On the other hand, the construction of the right hand side of the matching equations leads to incomplete conclusions. If various kinds of job seekers apply for the same job offers, then they should also be reflected on the left

hand side of the matching function. This considerably complicates computations though. Empirical research confirmed to some extent theoretical implications, especially with respect to the supply side of the matching process. This probably originates in the fact that data on job creation actually reflect the number of matched job seekers and not job posts. Moreover, the number of job posts available in the public employment offices is substantially underestimated with respect to the overall job offers supply available in the economy.

Empirical analyses on the labour market matching process often regards the intermediation of the public employment offices. It is connected to data availability. If agents move across different parts of the labour market, they do not compete for the same potential matching partners, what should imply no bias in the quantitative results. Such argument applies to both demand and supply, as both job seekers and companies posting job offers use various job search and recruitment methods. In the article [2.3] we, I jointly with dr Robert Pater, **characterized the job offers' market in Poland in the time period 2007-2014**. We examined data from various sources (Statistics Poland – GUS, public employment offices, job offers posted on the Internet) and concluded that particular job offers in fact refer to different parts of the job offers' market. Moreover, volatility of the number of job offers differed depending on the source of data.

In the article [2.4] I examined the employment inflow. Simple job search models assume that only unemployed workers engage in job search activity. In reality, job seekers' pool is more heterogenous and on-the-job search, job-to-job moves and out-of-labour force search phenomena arise. The out-of-labour force search may also reflect added/discouraged worker effect depending on the business cycle phase they arise in (this aspect is described in more detail in part 4. Discussion of other publications). I used individual LFS data for the time period 2000-2010 and I extracted elements of the Markov transition matrix in quarterly perspective to characterize the volatility of the labour market in Poland. Nevertheless, the main goal of this study was to identify the structure of the employment inflow. I assumed that workers employed in two consecutive quarters and having a tenure in a given job in a second quarter shorter than three months actually experienced job-to-job moves. Quantitative results proved that the transitions from unemployment to employment were crucial in generating employment (50% on average in the time period 2000-2006), whereas the transitions from either employment or non-participation to employment had relatively equal share. There was, however, a qualitative change in 2007, and since then till the end of 2010 each flow constituted around 33% of the employment inflow.

3) Other determinants of the efficiency of labour market matching process from regional perspective

Main contribution to the literature concerned **testing the impact of a wide range of possible determinants of the matching process at different levels of data territorial aggregation: from NUTS-1 to NUTS-4 in Poland, from monthly and annual perspectives**. Jointly with dr Elżbieta Antczak and dr Robert Pater we conducted the research for Poland in the time period 2000-2014 and the results are presented in article [1.2] (previously published as a working paper: Antczak E., Gałecka-Burdziak E., Pater R., 2016, Efficiency in spatially disaggregated labour market matching, CERGE-EI Working Paper no. 575). We analysed the impact of particular determinants of the efficiency of the labour market matching process for three matching function frameworks: random, stock-flow and job queuing models. The results proved

that both stocks of 'old' agents and inflows of 'new' agents engage in a matching process and generate job matches. This means some superiority of the explanatory power of the stock-flow model in describing the matching process; the random model was rejected at each level of data spatial aggregation, whereas the job queuing model proved to be relevant at NUTS-3 level. Moreover, monthly data produced lower parameters' estimates than annual data, what would have proved that the process is time-consuming. Low parameter estimates would indicate decreasing returns to scale, what in turn means that the number of agents exerted negative externalities which hindered proportional changes in the number of matches in case of the increase in the number of agents available for match in the market. The estimated efficiency was time-volatile, it generally increased during the analysed time span, though the detailed results differed for monthly and annual data. More frequent data indicated that local labour markets were more efficient, but from annual perspective larger markets were more efficient. Such result would indicate that from annual perspective aggregate markets (treated as homogenous) suffered from lower structural mismatch. In short time horizon local markets expressed lower frictions.

Research revealed that different factors affect efficiency of the labour market matching process at particular levels of data spatial aggregation: GDP growth and new economic entities creation at NUTS-1 level; the same factors plus vocational and technical education at NUTS-2 level; GDP, ALMP (in general) and new economic entities at NUTS-3 level (this would be consistent with the research on the matching process analysed on the basis of commuting behaviour, what is examined in more detail in working paper: Antczak E., Gaflecka-Burdziak E., Pater R., 2016, Spatial labour market matching, CERGE-EI Working Paper no. 578); migrations at NUTS-4 level (what highlights the importance of the labour force spatial mobility). At NUTS-4 level ALMP improved the efficiency of the matching process, what is probably connected to the fact that this policy is primarily executed at the county level. Moreover, the labour market efficiency increased during expansion.

The results show that different measures of economic policy should be applied to improve the efficiency of the labour market matching at certain levels of territorial aggregation and in different time horizons. Hence the policy recommendation should take these findings into account. Particular types of policy are formulated and executed at different institutional and geographic levels. Hence taking into consideration the characteristics of the regional labour markets may lead to more adequate and effective labour market reforms aimed at increasing the efficiency of the labour market.

Efficiency of the labour market process was also analysed in the article [1.4]. I examined potential fluctuations in the process efficiency in Poland in the period 2003-2008. This time period reflects a movement along the Beveridge curve, what on theoretical basis should imply minor, if any, reallocation or efficiency changes. Nevertheless, substantial economic changes observed during that time questioned the assumption of the homogeneity of the matching process. I employed **augmented matching function concept for particular matching function models**, what had not been exposed in the literature before. Particular parameters' estimates were not statistically significant what supported the statement of no changes in efficiency of the labour market matching process during the analysed time span. Moreover, I examined mismatch between demand and supply. The final conclusion was that expansionary phase of the business cycle compiled with the substantial emigration (which resulted in the

change in registered unemployment pool structure) led to a large increase in job creation. This, in turn, entailed a decrease in labour market disequilibrium between demand and supply.

Summary of the achieved research results, their contribution to the literature and development of science as well as practical application

My research published in articles has contributed to the knowledge and literature on labour market matching process of job seekers and vacancies in the following aspects: 1) description of the matching process, and in particular identification between what kinds of agents it takes place; 2) description of how selected aspects affect the matching function which quantifies the matching mechanism: data temporal and spatial aggregation, worker flows; 3) description of the determinants of the efficiency of labour market matching process. I am convinced that my contribution was especially significant with respect to identifying the role of stocks and inflows of agents in generating job matches while accounting for temporal and spatial aggregation in the data and other determinants of the efficiency of the labour market matching process.

Conducted research concerning the labour matching process contributes to the literature as it combines certain theoretical and empirical qualities and is based on proper data. From theoretical perspective I compare existing models which describe the trade process between demand and supply. They are based on different assumptions and differently describe how job seekers and job vacancies are matched in pairs. Empirical verification of these models specify their usefulness in formulating qualitative conclusions. I employ various quantitative methods that lead to robust results: time series econometric methods (for example in the articles [2.1], [2.3] and [2.5]), including data temporal aggregation models (for example in the articles [1.3], [1.4] and [2.2]), spatial econometrics and panel econometrics methods (for example in the articles [1.1], [1.2]). I perform theoretical analysis (for example in the article [2.2]), though most analyses are empirical. I use adequate and representative datasets. The research is predominantly conducted from aggregate perspective, and it is based on the administrative data from public employment offices. Such approach allows conducting research in a chosen time horizon, using data of an adequate frequency. Nevertheless, I also use individual data from LFS (for example in the article [2.4]).

The findings of my research have practical implications and may serve for formulating quantitatively based qualitative conclusions and policy recommendations, aimed at improving functioning of the labour market. Results of the research on “Labour market matching process of job seekers and vacancies – its characteristics, determinants and quantification problems” leads to a conclusion that both ‘old’ agents (stocks) and ‘new’ agents (inflows) participate in the actual matching process (taking place by means of public employment intermediation). Some agents encounter a proper matching partner relatively quickly, others wait for a proper offer. The process itself is time-consuming and determined by various factors at particular levels from regional perspective. Hence the actions aimed at improving the information in the labour market and increasing the inflows of agents should improve the matching process. Moreover, various policy amendments at certain levels from regional perspective should improve the efficiency of the matching process. Formulated policy recommendations should account for spatial interdependencies between local labour markets, what in combination with labour force mobility (commuting behaviour and migrations) could also improve the matching process.

The articles making the scientific achievement “Labour market matching process of job seekers and vacancies – its characteristics, determinants and quantification problems” I prepared by myself (6 articles) and in collaboration with co-authors (3 articles). They were the scientists with similar research experience as mine.

4. Discussion of other publications

Apart from the publications, which I presented as part of my scientific achievement, after I was awarded my PhD I also published other studies (articles and working papers) in the field of labour economics and social policy, which are presented in Table 2 (MNiSW points from the year of publication).

Table 2: Other publications.

| No. | Publication |
|-----|--|
| 4.1 | Gałecka-Burdziak E., Pater R., 2016, Discouraged or added worker effect: which one prevails in the Polish labour market?, <i>Acta Oeconomica</i> , 66(3), 489-505, IF: 0,379, 20 p. MNiSW (A list), SCImago Journal Rank (SJR): 0,242 (Q3) |
| 4.2 | Gałecka-Burdziak E., Góra M., 2016, The impact of easy and early access to old-age benefits on exits from the labour market: a macro-micro analysis, <i>IZA Journal of European Labor Studies</i> , 5:18 |
| 4.3 | Gałecka-Burdziak E., Kucharski L., 2018, Zniechęceni i dodatkowi pracownicy na rynku pracy w Polsce („Discouraged and Added Workers in the Polish Labour Market”), <i>Ekonomista</i> 1, 103-115, 14 p. MNiSW (B list), SCImago Journal Rank (SJR): 0,172 (Q4) |
| 4.4 | Gałecka-Burdziak E., Gromadzki J., 2018, Polacy zniechęceni bezskutecznym poszukiwaniem zatrudnienia w Polsce - ujęcie zasobowe („Discouraged workers in Poland – the stock approach”), <i>Polityka Społeczna</i> 2, 1-8, 12 p. MNiSW (B list) |
| 4.5 | Gałecka-Burdziak E., 2015, Rezerwa siły roboczej? Aktywność ekonomiczna w Polsce („Reserve labour force? Labour market activity in Poland”), <i>Polityka Społeczna</i> , 2, 5-9, 12 p. MNiSW (B list) |
| 4.6 | Gałecka-Burdziak E., Kubiak P., 2015, Z czego wynika zniechęcenie bezskutecznym poszukiwaniem zatrudnienia? („Why do the unemployed people exit the labour market? Analysis of the discouraged worker effect”), <i>Polityka Społeczna</i> 11-12, 44-48, 12 p. MNiSW (B list) |
| 4.7 | Gałecka-Burdziak E., 2016, Ile w Polsce kosztuje bezdomność? („How much does homelessness cost in Poland?”), <i>Problemy Polityki Społecznej. Studia i dyskusje</i> 32(1), 33-46, 11 p. MNiSW (B list) |

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|------|--|
| 4.8 | Ruzik-Sierdzińska A., Błędowski P., Gałęcka-Burdziak E., 2014, Wybrane aspekty zaniechania działań pomocowych w przypadku bezrobocia, ubóstwa i bezdomności z perspektywy Kalkulatora Społecznego („Selected aspects of costs of inaction in case of unemployment, poverty, and homelessness”), Polityka Społeczna Numer tematyczny 3 Kalkulator Społeczny – Narzędzie Kalkulatora Kosztów Zaniechania w Polityce Społecznej, 10-15, 7 p. MNiSW (B list) |
| 4.9 | Bieć M., Gałęcka-Burdziak E., Pater R., 2018, Kalkulator pracy – użyteczne narzędzie do modelowania zależności na rynku pracy („Job Calculator – useful tool for labour market forecasting”), Wiadomości Statystyczne 7, 14-24, 12 p. MNiSW (B list) |
| 4.10 | Gałęcka-Burdziak E., Góra M., 2017, How Do Unemployed Workers Behave Prior to Retirement? A Multi-State Multiple-Spell Approach, CeRP WP N. 170/17 |
| 4.11 | Gałęcka-Burdziak E., Góra M., 2017, How Do Unemployed Workers Behave Prior to Retirement? A Multi-State Multiple-Spell Approach, IZA DP no. 10680 |
| 4.12 | Gałęcka-Burdziak E., 2016, Multiple unemployment spells duration in Poland, Collegium of Economic Analysis Working Paper no. 019 |
| 4.13 | Gałęcka-Burdziak E., Góra M., 2015, The impact of easy and early access to old-age benefits on exits from the labour market: a macro-micro analysis, CeRP Working Paper 152 |
| 4.14 | Gałęcka-Burdziak E., Góra M., 2015, Impacts of the availability of old-age benefits on exits from the labour market, IZA DP no. 9014 |

Publications enumerated in Table 2 refer to large extent to topics evolving from the labour market matching process, and in particular certain aspects analysed and published in the articles presented in the scientific achievement I submit for evaluation. I analysed workers marginally attached to the labour market, having in mind fluctuations in the labour market and worker (job seekers) flows between states in the labour market. Individuals marginally attached to the labour market are workers who do not meet all the requirements to be classified as unemployed. According to ILO definition of unemployment, the marginally attached workers are those who, for example, did not seek employment in the previous four weeks due to certain reasons (like belief that there is no job offer available for them), or were not ready to start working within the following two weeks. Such workers are treated as inactive, although they can be separated as a specific fraction of non-participants in the labour market. They are attached to the labour market to some extent and under certain circumstances can transition to the labour force. They can be treated as a reserved labour force then. Research on the labour force participation of the workers marginally attached to the labour market is connected to potential existence of the two effects: **discouraged worker effect** and **added worker effect**. The discouraged worker effect reflects the situation, when an unemployed worker discouraged due to unsuccessful job search stops further attempts and transitions to non-participation. Discouraged workers effect makes

labour force participation rates pro-cyclical from macroeconomic perspective. On the other hand, the added worker effect is analysed predominantly from microeconomic perspective and reflects the fact of increased labour force participation of the family members of a worker who lost a job or experienced decrease in income level. Increase in the labour force participation is to compensate loss in income at the household level. From macroeconomic perspective, the added worker effect should make labour force participation rates counter-cyclical (Finegan 1981; Gong 2010). The discouraged and added worker effects refer to workers marginally attached to the labour market, whose participation depends either on the situation in the labour market or is decided at the household level. Workers who experience above mentioned effects can be treated as reserved labour force, though they are classified as inactive. Reserves of the potential effective labour supply are important, especially when we account for advanced aging processes and shrinking labour force. Having in mind the above arguments it is important to identify fractions of the population who experience added/discouraged worker effect, and to identify determinants of these effects along the business cycle to be able to formulate policy recommendations aimed at increasing the labour force participation of these workers and their durable attachment to the labour market.

Previous research has proved that added/discouraged worker effects concern primarily selected fractions of the workforce, including older workers, young workers and females (Benati 2001; Filatriau and Reynes 2012). Gong (2010) analysed female labour force participation, and proved that added worker effect is more pronounced at the intensive than extensive margin. A few of my publications refer to workers marginally attached to the labour market. In article [4.5] I presented a literature survey, especially concerning definitions of the discouraged and added worker effects and previous empirical research. The main contribution of this study was the **estimation of the size of a problem in the labour market in Poland**. I used various measures of the pool of workers' marginally attached to the labour market and discouraged and added worker effects to estimate the impact of their reclassification to the labour force on the level of unemployment rate and labour force participation ratio. I accounted for discouraged workers, but also those who sought employment but were not ready to start working within a predefined time horizon. I, then, referred to the added and discouraged worker effects directly, and to the problem of workers marginally attached to the labour market. Computations indicated that such reclassification would result in increase in the labour force participation by 2 percentage points for males and 2.5 percentage points for females. The unemployment rate would increase by 2 – 3 percentage points for males and females respectively. The executed exercise indicates, that **workers marginally attached to the labour market constitute substantial reserved labour force**, which affects the labour market and the matching process, and it may be especially crucial when we account for the advanced aging processes.

More precise identification of the fractions of the population who experience discouraged worker effect with usage of the **stock analysis** is presented in the article [4.4]. In this article, jointly with mgr Jan Gromadzki, we **characterized the stock of the discouraged workers in age and sex breakdown in absolute and relative terms**. We recalculated the unemployment rate, while taking into account discouraged workers (the method was analogous to the one presented in the article [4.5]). The difference between regular unemployment rate and the one treating discouraged workers as a part of a labour force was the highest among older workers, what emphasizes the problem of low participation among older workers in Poland. The study on discouraged and added worker effects is also presented in the article [4.3]. Jointly with dr hab. Leszek Kucharski we employed the **flow approach methods to identify and characterize**

above specified effects in Poland in age and sex breakdown. In particular, according to the definition used in LFS questionnaire, by discouraged individuals we meant those workers who did not look for job because: (a) were convinced that they would not find proper job offer, (b) had already used all know job search methods. We assumed that the transition from the labour force to discouraged worker pool approximates the discouraged worker effect, whereas the inflow to the labour force from the discouraged worker pool approximates the added worker effect. The results confirmed earlier findings of the stock approach analysis that primarily females and older workers experience added and discouraged worker effects. Moreover, the size of the discouraged worker effect increased over time along the increase in the size of particular flows (to larger extent in case of young workers). The pool of the discouraged older workers was more stagnant. Articles [4.3] and [4.4] are products of the project financed in the Sonata NCN competition. Currently, within this project, we examine the asymmetry and non-linearity in the added and discouraged worker effects from macroeconomic perspective. From microeconomic perspective, in turn, the research team tries to identify the determinants of the added worker effect while accounting for the reason of the previous non-participation.

I also analysed selected aspects of the described effects earlier. In the article [4.6] together with dr Paweł Kubiak we examined **the determinants of the discouraged worker effect.** We based the research on the quarterly individual LFS data and estimated logit models using stock and flow approaches. In particular, we assumed that the outflow from unemployment to non-participation approximates the discouraged worker effect. We discussed potential bias that may arise from such an assumption, including the fact that discouragement can in fact prevent a worker from participating in the labour market in the first place (Van Ham et al. 2001). The quantitative results were consistent with literature indications: females and older workers were more like to withdraw from the labour market to non-participation. Moreover the parameter's estimate standing next to changes in the unemployment rate indicated that the probability of transitioning from unemployment to non-participation increased when unemployment rate increased, what would confirm the existence of the discouraged worker effect.

In the article [4.1] together with dr Robert Pater we **identified the discouraged and added worker effects in labour market in Poland from macroeconomic perspective.** In this paper we proposed a modified definition of the added worker effect from aggregate perspective. This effect, analogously to the discouraged worker effect, should implicate counter-cyclical properties of the labour force participation rates. Such feature reflects the fact that workers enter the market when the situation deteriorates, so their increased labour market activity may be a response to job loss of a breadwinner. We applied a range of methods to obtain robust results, some of them have never been used to solve this problem before. They included: spectral analysis, unobserved component model, time-varying parameter model and frequency domain regression. Females and males' participation rates generally experienced long-lasting one-directional changes. There was, however, a component of the activity rates that fell into the business cycle frequency and it implied that females behaved more cyclically than males. The **added worker effect prevailed over discouraged worker** in most of the business cycle frequencies. The later was more important in longer than 5-years cycles. The results also indicated non-linearity and asymmetry of the effects, what made them considerably stronger in contractions than in economic expansions.

I also examined the added and discouraged worker effect for selected age groups. In particular, in the article [4.2], written jointly with prof. Marek Góra, we focused on older workers. We

proposed a modified definition of the discouraged worker effect to identify the impact of the (soon) availability of the pension benefits on the probability of transitioning to non-participation. Previous version of this article has been published as a working paper reports: [4.14] and [4.14]. We examined the formulated problem from macroeconomic perspective, using threshold cointegration techniques to identify potential asymmetry in the size and duration of the effects, and from microeconomic perspective. In the later case, we specified logit models to characterize the impact of selected socio-economic variables on the probability of transitioning to non-participation by older workers. The results proved that **older workers often permanently leave the labour market and the (soon) availability of the pension benefits multiplies the likelihood of transitioning to non-participation (compared to unemployment benefits or social welfare benefits recipients).**

I have been working with individual administrative data from Syriusz dataset since 2015. Data refer to unemployed workers registered with public employment offices in Poland. So far, I have studied the phenomena of **multiple unemployment spells and labour force attachment patterns of the selected fractions of the unemployed individuals.** The first topic regards existence and focuses on determinants of the multiple registration of unemployed workers. It also accounts for duration of particular states (like unemployment, employment etc.). Preliminary results have been published in the working paper report [4.12]. In this article, I used data from five public employment offices and recurrent event data models (Prentice et al. (1981) model in particular), and I analysed the impact of the selected socio-economic factors on the likelihood of deregistration from the public employment office, while accounting for multiple unemployment spells. Within a second topic I have been examining the labour force attachment patterns of the selected fractions of the unemployment pool. Here, I focused on unemployment spells and contributory spells (including employment spells, ALMP programme spells) and non-participation spells. So far, I have focused on older workers and pathways leading to old-age non-participation. I have published one paper as two working papers [4.10] and [4.11], in which, jointly with prof. Marek Góra, we analysed **multiple unemployment spells and labour force participation of older workers within a period of a few years before a transition from unemployment to inactivity due to acquiring pension benefit rights.** We employed recurrent event data models, including Prentice et al. (1981) model. The results led to a conclusion that, unemployed individuals who are close to the point at which they are eligible to receive pension benefits actually 'wait' to fulfil these eligibility criteria, so in fact they deactivate sooner and remain outside the effective labour supply pool.

Having in mind the labour market matching process in Poland, jointly with prof. Maria Bieć and dr Robert Pater, we created the tool for simple macroeconomic simulations in the labour market – the Job Calculator (described in more detail in the section below: Expert activities and dissemination of research results). In the article [4.9] we **described the Job Calculator model and sample computations for the expected values of the unemployment rate.** Currently, we are developing a more sophisticated version of a model that allows for adjustments taking place in time.

I also conducted research on the selected topics from **social policy.** Quite often the labour market policy interacts with social policy, and to some extent these policies overlap with respect to least self-reliant workers in the labour market. I participated in the described below project „Kalkulator Kosztów Zaniechania” (“Omission cost calculator”) where I focused on the omission costs of the inaction with respect to homeless people. I built a **model describing**

stages of providing help to homeless people. Such model, along with analogous ones concerning unemployment and poverty, were described in the article [4.8] written jointly with prof. Piotr Błędowski and dr Anna Ruzik-Sierdzińska. In turn, in the article [4.7] I analysed costs that have to be born once homeless people receive help. The obligation of certain types of help originates in legal requirements. Additionally, I accounted for alternative cost of the non-generated income. Such compilation was to present **the level of required costs if certain activating actions that could have prevented homelessness were not performed soon enough.**

The topics of the **research I conducted evolved from the labour market matching process, through examining certain aspects of non-participation (especially those concerning identification of the reserved labour force), till identifying the reasons and characterizing the pathways to old-age non-participation.** Above presented publications are the result of my participation in a few research projects, as a researcher, and as a Principal Investigator. In many cases the one topic evolved into another. Apart from the research topics my contribution to the literature is also connected to the **methods I employ, there are novel ones (for example recurrent event data models) and data I use (especially individual administrative data from Syriusz database),** which are rarely used in the research).

Summary of my publications:

After getting the doctor's degree I published 18 articles (including 10 with co-authors, 5 in journals from JCR list, 9 in English), and 7 working papers reports (some of them were published, some are currently under review).

Parametric assessment of my publications (as of November 2018):

- Hirsch index according to Google Scholar: 5, H-index according to Web of Science: 1
- number of citations in: Web of Science: 2, Web of Science without self-quotations: 0; Google Scholar: 79, Google Scholar without self-quotations: 42
- total impact factor for publications after getting the doctor's degree according to JCR (by year of publication): 2,166
- total number of points for scientific articles published according to Ministry of Science and Higher Education list (without correcting for co-authors): 213
- total number of conference presentations: 18, including 14 in English, and 11 at international conferences abroad

5. Other research achievements

Participation in research projects

After getting the doctor's degree I participated in the following national and international research projects, as a researcher and/or principal investigator.

International projects:

- **„Data spatial aggregation in labour market matching”** – research project financed by CERGE-EI in GDN Regional Research Competition z CERGE-EI (in Czech Republic) (RRC15+35), 1.01.2015 – 31.12.2015. I was a Principal Investigator and a researcher, the research was conducted jointly with dr Elżbieta Antczak from University of Łódź and

dr Robert Pater from University of Information, Technology and Management in Rzeszow. The project results were firstly published as working papers: Antczak E., Gałęcka-Burdziak E., Pater R., 2016, Spatial labour market matching, CERGE-EI Working Paper no. 578 and Antczak E., Gałęcka-Burdziak E., Pater R., 2016, Efficiency in spatially disaggregated labour market matching, CERGE-EI Working Paper no. 575, and then as articles in journals from JCR list ([1.1] and [1.2]).

National projects granted in a competition:

- **„Cykliczność zmian aktywności zawodowej ludności. Analiza efektów dodatkowych/zniechęconych pracowników”** („The cyclicality of the labour force participation. The added/discouraged worker effect analysis”) – research project financed by National Science Centre in Sonata competition (DEC-2016/21/D/HS4/02808), 22.02.2017 – now (expected ending date: 21.02.2019). I am a Principal Investigator and researcher in this project. The project is conducted in international collaboration with prof. Emilio Congregado and his research team from Universidad de Huelva in Spain. Within this research grant, two articles have been already published: [4.3] and [4.4]. Additionally three articles are being prepared by a research team. So far obtained results were presented by a research team: dr Ewa Gałęcka-Burdziak, dr Robert Pater and mgr Jan Gromadzki during: research visit at Universidad de Huelva and Universidad Pablo de Olavide in Seville (Spain, title of the presentation: „Asymmetry and non-linearity in the discouraged/added worker effect”, presented by dr Ewa Gałęcka-Burdziak and dr Robert Pater and title of the presentation: „Added worker effect and reasons of wife’s inactivity” – presented by mgr Jan Gromadzki); and during the conference at the University of Łódź in June 2018 (title of the presentation: „Analiza istotności oraz trendów efektu dodanej pracownicy w Polsce” (“(In)significance and trends of the added worker effect in Poland”) – presented by: mgr Jan Gromadzki).
- **„Metoda ustawicznego monitorowania niedopasowania edukacyjnego na rynku pracy na szczegółowym poziomie”** (“Horizontal educational mismatch: a new method of measurement with application to Poland”) – research project financed by Ministry of Science and Higher Education in Dialog competition (DIALOG 0127/2016), conducted in the time period 28.06.2017 – now (expected ending date 27.05.2019). I am a researcher in the project, which is led by dr Robert Pater from University of Information, Technology and Management in Rzeszow. In the project the research team creates a tool directed at selected labour market institutions to analyse educational requirements formulated in job offers and to measure the extent of structural mismatch in the labour market (occupation, qualifications and competencies). Final reports and articles presenting the project findings are currently being prepared. So far obtained results were presented by the research team members during the research stay at the Universidad de Huelva and Universidad Pablo de Olavide in Seville (Spain, title of the presentation: „Horizontal educational mismatch A new method of measurement with application to Poland” – presented by dr Robert Pater) and during the conference at the University of Łódź in June 2018 (title of the presentation: „Determinanty mobilności kwalifikacyjnej, zawodowej i przestrzennej Polaków” (“Determinants of the qualifying, occupational and regional mobility of the Poles”) – presented by mgr Łukasz Cywiński).

- **„Znaczenie przepływów pracowników pomiędzy zasobami na rynku pracy”** („Significance of job seekers flows between states on the labour market”) – research project financed by National Science Centre in Preludium competition (DEC-2012/05/N/HS4/00194). I obtained the research grant in December 2012 (before getting the doctor’s degree), but it was conducted in the time period 6.02.2013 – 5.08.2015 (mainly after getting the doctor’s degree). I was a Principal Investigator and researcher in this project. The project was conducted in international collaboration with prof. Carlos Usabiaga from Pablo de Olavide University in Seville (Spain) and prof. Fernando Nunez from Universidad de Sevilla (Spain). The project findings were presented in ten articles: [1.3], [1.4], [2.1], [2.2], [2.4], [2.5], [4.1], [4.2], [4.5], [4.6] and two working papers [4.13] and [4.14], later published as an article [4.2]. The project results were also presented during the national and international conferences.

Research financed from university funds:

- **Statutory research:** I have led statutory research in the Department of Economics I, Collegium of Economic Analysis in SGH since 2015, I prepared following articles: (1) „Czas trwania bezrobocia rejestrowanego: badanie z wykorzystaniem metod analizy historii zdarzeń” (“Registered unemployment duration: survival analysis approach”) (2015, KAE/S15/26/15), (2) „Multiple unemployment spells duration in Poland” (2016, KAE/S16/18/16), (3) „Recurrent unemployment prior to retirement? A multi-state model analysis” the article prepared in collaboration with prof. dr hab. Marek Góra (2017, KAE/S17/26/17), (4) „Kalkulator pracy: proste narzędzie do symulacji sytuacji na rynku pracy” („Job Calculator: simple tool for labour market simulations”) the article prepared in collaboration with prof. dr hab. Maria Bieć and dr Robert Pater (2017, KAE/S17/25/17). Additionally, in statutory research conducted in 2014 jointly with dr Robert Pater we prepared the article (1) „Rynek wolnych miejsc pracy w świetle zmian sytuacji gospodarczej zapoczątkowanej w 2007 roku” („The job offers market in light of overall economic situation changes initiated in 2007”) (2014, KAE/S/26/14). The results of the research conducted within statutory research were used in a project proposal prepared for Sonata Bis competition from National Science Centre which is currently under review.
- **Young researchers and PhD students research funds.** Within this research framework, I led the following research topics: „Determinanty aktywności ekonomicznej w zależności od wieku jednostki” (“Determinants of the labour force participation depending on the age of the individual”) (2015, KAE/BMN15/12/15), „Determinanty aktywności zawodowej pracowników w wieku 50+” (“Determinants of the labour force participation of the workers 50+”) (2016, KAE/BMN16/13/16), „Health status and the labour force participation of older workers” (2017, KAE/BMN17/04/17). The results of this research were used in a project proposal prepared for Sonata Bis competition from National Science Centre which is currently under review.

Prizes, awards, research grants.

I was awarded with the following prizes, awards and grants:

- 2018 • diploma of recognition of the Rector's of the Warsaw School of Economics, for publishing the articles in journals from JCR list, in 2017
- 2017 • diploma of recognition of the Rector's of the Warsaw School of Economics, for publishing the article in journal from JCR list, in 2016
 - Warsaw School of Economics Rector's award for publishing the article in journal from JCR list (three times, for publications in 2016 and 2017)
 - Warsaw School of Economics Rector's award for obtaining a research grant „Cykliczność zmian aktywności zawodowej ludności. Analiza efektów dodatkowych/zniechęconych pracowników” („The cyclicity of the labour force participation. The added/discouraged worker effect analysis”) in Sonata competition founded by National Science Centre (DEC-2016/21/D/HS4/02808)
- 2016 • research grant „Cykliczność zmian aktywności zawodowej ludności. Analiza efektów dodatkowych/zniechęconych pracowników” („The cyclicity of the labour force participation. The added/discouraged worker effect analysis”) in Sonata competition founded by National Science Centre (DEC-2016/21/D/HS4/02808)
- 2015 • Warsaw School of Economics Rector's award for obtaining a research grant „Data spatial aggregation in labour market matching” founded by CERGE-EI in a GDN Regional Research Competition (RRC15+35)
- 2014 • research grant „Data spatial aggregation in labour market matching” founded by CERGE-EI in a GDN Regional Research Competition (RRC15+35)
 - START 2014 scholarship founded by Foundation for Polish Science
 - Warsaw School of Economics Rector's Award, 2nd degree (individual) for PhD dissertation
 - University of Łódź Rector Award, 2nd degree (team) for a book "Inflacja a mechanizmy aktualizacji cen. Studium dla Polski" („Inflation and the mechanisms of price adjustment”)
- 2013 • 3rd prize in the competition for the best PhD dissertation in labour economics and social policy organized by Institute of Labour and Social Studies

Major presentations in conferences abroad (own presentations otherwise indicated):

2018

- “2nd IZA/HSE Workshop: Ten Years after the Financial Crisis - Labor Market Adjustment in Emerging and Post-Transition Economies”, (Moscow, Russia, international conference), presentation of a paper: *Labour force attachment patterns of older unemployed workers: Analysis of the transition to retirement pathways*, October 2018

- „Labour Econometric Workshop 2018”, (Sydney, Australia, international conference), presentation of a paper: *Labour force attachment patterns of older unemployed workers: Analysis of the transition to retirement pathways*, August 2018

2017

- “29th Annual European Association of Labour Economists (EALE) Conference”, (St. Gallen, Switzerland, international conference, presentation of a paper: *How do unemployed workers behave prior to retirement? A multi-state multiple-spell approach* written jointly with prof. dr hab. Marek Góra, September 2017

2015

- “Applied Macroeconomics and Labour Economics”, (Sevilla, Spain, international conference), presentation of a paper: *Impacts of the availability of old-age benefits on exits from the labour market* written jointly with prof. dr hab. Marek Góra, November 2015
- “4th International Workshop on the Socio-Economics of Ageing”, (Lisbon, Portugal, international conference), presentation of a paper: *Impacts of the availability of old-age benefits on exits from the labour market* written jointly with prof. dr hab. Marek Góra, October 2015
- “XXX National Conference of Labour Economics”, (Cagliari, Italy, international conference), presentation of a paper: *Impacts of the availability of old-age benefits on exits from the labour market* written jointly with prof. dr hab. Marek Góra, September 2015
- “Global Development Network Workshop CERGE-EI”, (Prague, Czech Republic, international conference in relation to research project financed by CERGE-EI), presentation of a paper: *Data spatial aggregation in labour market matching* written jointly with dr Elżbieta Antczak and dr Robert Pater, August 2015
- “XI Jornadas de Economía Laboral”, (Barcelona, Spain, international conference), presentation of a paper: *Old-age benefits availability impact on the outflows from activity* written jointly with prof. dr hab. Marek Góra, July 2015
- „Globalization, Working Conditions and Health”, (Bordeaux, France, international conference), presentation of a paper: *Old-age benefits availability impact on the outflows from activity* written jointly with prof. dr hab. Marek Góra, June 2015
- “XVIII Encuentro de Economía Aplicada”, (Alicante, Spain, international conference), presentation of a paper: *Old-age benefits availability impact on the outflows from activity* written jointly with prof. dr hab. Marek Góra, June 2015

2013

- “XXXVIII Simposio de la Asociación Española de Economía”, (Santander, Spain, international conference), presentation of a paper: *Randomness vs. stock-flow. Which mechanism describes labour market matching in Poland?*, December 2013

Major presentations in national and international conferences (own presentations otherwise indicated):

2018

- V Międzynarodowa Konferencja ESPAnet Polska 2018, titled „Zmiany demograficzne, finanse publiczne, usługi społeczne - Trójkąt Bermudzki polityki społecznej?”, (Warsaw, Poland, international conference), presentation of a paper: *Aktywność zawodowa po okresach pozbawienia wolności* (Labour force participation after imprisonment periods) written jointly with prof. dr hab. Piotr Błędowski, dr Joanna Felczak and prof. dr hab. Marek Góra, September 2018
- „Wzrost gospodarczy - Rynek pracy - Innowacyjność gospodarki”, (Łódź, Poland, national conference), presentation of a paper: *Aktywność zawodowa po okresach pozbawienia wolności* (Labour force participation after imprisonment periods) written jointly with prof. dr hab. Piotr Błędowski, dr Joanna Felczak and prof. dr hab. Marek Góra, June 2018
- „XXXVI Ogólnopolska Konferencja Polityków Społecznych”, (Poznań, Poland, national conference), presentation of a paper: *Aktywność zawodowa po okresach pozbawienia wolności* (Labour force participation after imprisonment periods) written jointly with prof. dr hab. Piotr Błędowski, dr Joanna Felczak and prof. dr hab. Marek Góra, May 2018
- “Pensions Conference (PenCon 2018)”, (Łódź, Poland, international conference), presentation of a paper: *Labour force attachment patterns of older unemployed workers: Analysis of the transition to retirement pathways*, April 2018

2017

- „Wzrost gospodarczy - Rynek pracy - Innowacyjność gospodarki”, (Łódź, Poland, international conference), presentation of a paper: *Recurrent unemployment prior to retirement? A multi-state model analysis* written jointly with z prof. dr hab. Marek Góra, June 2017

2013

- “Warsaw International Economic Meeting (WIEM)”, (Warsaw, Poland, international conference), presentation of a paper: *Randomness vs. stock-flow. Which mechanism describes labour market matching in Poland?*, July 2013
- „Wzrost gospodarczy - Rynek pracy - Innowacyjność gospodarki”, (Łódź, Poland, national conference), presentation of a paper: *Znaczenie przepływów pracowników na rynku pracy. Skąd się wywodzi napływ do zatrudnienia?*, June 2013

International research stays, short courses, trainings:

2018

- NetCourse® 120, Statistical Graphics Using Stata (webinar)
- Universidad de Huelva, Spain and Pablo de Olavide University, Seville, Spain, research stay, research collaboration, presenting research findings of the research project in the Sonata competition financed by NCN, May 2018

- Humboldt-Universität zu Berlin, Niemcy, research stay, research collaboration with prof. Jochen Kluge, April 2018

2015

- Managing the research team, organizer: Foundation for Polish Science, training organized within the SKILLS programme
- Writing research articles – beginning / intermediate group, organizer: Foundation for Polish Science, training organized within the SKILLS programme
- Mentoring as a tool to individually support the scientist’s development, organizer: Foundation for Polish Science, training organized within the SKILLS programme
- NetCourse 101, Introduction to Stata (webinar)
- NetCourse 151, Introduction to Stata Programming (webinar)
- NetCourse 631, Introduction to Survival Analysis Using Stata (webinar)
- EViews Basic Certification: Introduction to EViews (webinar) and Working with Data in EViews (webinar)
- EViews Time Series Certification: Basic Time Series Analysis (webinar) and Least Squares and Time Series Regression (webinar)
- EViews Advanced Econometrics Certification: Single Equation Models (webinar) and Multivariate Analysis (webinar)
- EViews, Introduction to Programming (webinar)

2013

- Colegio Universitario de Estudios Financieros, Universidad Complutense de Madrid, research stay, presenting research findings at the seminar, the research stay organized and financed on the basis of invitation from prof. Roberto Morales Arsenal, November 2013
- Cass Business School, participation in EViews Summer School (organized by Timberlake Consultants Ltd), in the Preludium competition financed by NCN, July/August 2013
- Universitat Pompeu Fabra, Barcelona Graduate School of Economics, participation in: Labor Economics Summer School, presenting research findings at the seminar of the research project, in the Preludium competition financed by NCN, July 2013

Organization of conferences and research seminars.

I organized or co-organized conferences and research seminars. I was main co-organizer of the conference titled “Polish labour market: what do we learn about the unemployment patterns from the administrative individual data”, which took place in April 2016 in Warsaw School of Economics. It was national conference, nevertheless, invited researchers prof. Hartmut Lehmann from University of Bologna and prof. Jonathan Wadsworth from London School of Economics gave keynote lectures. In May 2018 I organized research seminar, at which invited

researcher dr Agnieszka Król from AstraZeneca, Innovative Medicines & Early Clinical Development gave a lecture on modelling recurrent events.

Currently, I am preparing the conference summarizing the findings of the research project titled „Cykliczność zmian aktywności zawodowej ludności. Analiza efektów dodatkowych/zniechęconych pracowników” („The cyclicity of the labour force participation. The added/discouraged worker effect analysis”) co-realized with researchers from Universidad de Huelva, in Spain. Prof. Emilio Congregado from Universidad de Huelva and prof. Carlos Usabiaga from Pablo de Olavide University in Seville will give keynote lectures during this conference on the topics tackled in the project. The conference will take place at the turn of January and February 2019.

Services for the academic community

My professional activity after getting the doctor’s degree includes following (most important) services for the academic community.

In 2013 I was a member of the Spanish Economic Association and attended annual conference. In 2017 I was a member of EALE (European Association of Labour Economists) and I participated in an annual meeting.

I supported the academic community by reviewing the articles to Polish and international journals (including those from the JCR list), like: *Applied Economics*, *Applied Economics Letters*, *Barometr Regionalny. Analizy i Prognozy*; *Bulletin of Economic Research, Environment and Planning C: Government and Policy*; *Gospodarka Narodowa*, *Studia Ekonomiczne*. I also reviewed the project proposal for the call in CERGE-EI Regional Research Competition.

I am also a member of the Team to implement the HRS4R Strategy and OTM-R Policy in Warsaw School of Economics. HRS4R (*The Human Resources Strategy for Researchers - HRS4R*) is the strategy to increase attractiveness of the work conditions and scientific career of the researchers. OTM-R is *Open, Transparent and Merit-based Recruitment Policy*. I coordinated work of two working teams and I participate in work on regular basis. Moreover, in 2018 I received diploma of recognition from Rector of the Warsaw School of Economics for high involvement in the preparatory work to apply for the „HR Excellence in Research” distinction for Warsaw School of Economics granted by European Commission.

Expert activities and dissemination of research results

I collaborate with BIEC (Bureau for Investment and Economic Cycles in Warsaw) since 2010. I prepare monthly reports, titled Wskaźnik Rynku Pracy (Labour Market Indicator), on short-term forecasts of the unemployment rate in Poland.

Since 2015, I am a member of the *Polish Pension Group*, the research team operating in Warsaw School of Economics, that focuses of pensions.

I, jointly with prof. dr hab. Maria Bieć from Warsaw School of Economics and dr Robert Pater from University of Information, Technology and Management in Rzeszow, created the web application: Job Calculator, in 2017. The Job Calculator can be found on the website:

www.sgh.waw.pl/kalkulatorpracy. The calculator is a tool that allows making simulations of the situation in the labour market, while accounting for overall economic situation. It serves academics, students and practitioners. The user specifies the expected rate of unemployment and the calculator computes how many job posts would have to be created and occupied so that the unemployment rate reaches new value. The tool is based on Labour Force Survey data and provides results in the horizon of one quarter. The numbers present overall result, the one that accounts for seasonality, with respect to long-term trend, the one that accounts for cyclicity, what is the main contribution of the model with respect to its American prototype. The tool is described in the publication [4.9].

Since 2017 I have participated in the above mentioned research project „Metoda ustawicznego monitorowania niedopasowania edukacyjnego na rynku pracy na szczegółowym poziomie” (“Horizontal educational mismatch: a new method of measurement with application to Poland”) financed in Dialog competition. The project is policy oriented. The main result of the project is going to be a newly created method that allows continuous monitoring of the degree of mismatch of the educational sector to the requirements of the labour market in Poland. Project results will provide detailed results on the degree of educational mismatch and will be used to formulate labour market policy recommendations. They will be directed at public employment offices and other labour market and educational institutions to provide information on how to collect and use information on qualifications and competencies of the unemployed workers and how to adjust educational programmes.

Moreover, in 2018, I participated as an expert in a research project „System prognozowania polskiego rynku pracy” (“Polish labour market forecasting system”) realized by the consortium of the Institute for Structural Research, Institute of Labour and Social Studies and University of Łódź financed from European Union funds. I prepared two reports on commission for University of Łódź titled: „Założenia prognozy na rok 2016” (“Forecast assumptions for the year 2016”) and „Założenia metodologiczne rozbudowanego systemu prognozowania” (“Theoretical assumptions of the forecasting system”), which will be used in further research on creating the forecasting system for the Polish labour market.

Teaching.

Within my teaching activity in the Warsaw School of Economics I taught courses both at the undergraduate and graduate levels, both during weekdays and weekend courses, in Polish and English, lectures and classes. I taught certain subjects before getting the doctor’s degree (during PhD studies) and after getting the doctor’s degree. Most of the courses I taught were based on my own materials and lecture scenarios, which were made available to students as notes and presentations. After getting the doctor’s degree my teaching activity workload was decreased: due to maternity leave (by 50% during two academic years), and due to the research grant in the Sonata competition financed by NCN (during the entire period of two years of conducting the research – by 50%).

I have been teaching the following courses (after getting the doctor’s degree):

- Microeconomics I (for undergraduate studies, classes in Polish, academic year 2013/2014, classes in English, academic year 2017/2018, 2018/2019)

- Microeconomics II (for undergraduate studies, lecture and classes in Polish, academic year 2014/2015)
- Macroeconomics I (for undergraduate studies, lecture in English, academic year 2014/2015, classes in Polish, academic year 2016/2017 and 2017/2018, classes in English, academic year 2016/2017)
- Macroeconomics II (for undergraduate studies, classes in Polish, academic year: 2013/2014)
- Labour Economics (for graduate studies, lecture in Polish, academic year 2015/2016, 2017/2018, 2018/2019)
- Seminar in economics (for graduate studies, lecture in Polish, academic year 2018/2019)

I also offer graduate and undergraduate seminars. I am a supervisor of two graduate (MA) theses. Additionally I gave guest lectures within master seminar at University of Information, Technology and Management in Rzeszow on how to write a thesis and a research article, and I gave a guest lecture on the subject Economics of the Labour Market at the Faculty of Economics and Sociology at the University of Łódź.

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