# Education in the 21<sup>st</sup> century – Entrepreneurship and specialists' education in Poland in the context of enhancing employment chances

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### Agenda

- Higher education in Poland
- Polish Graduate Tracking System
- Analysis examples: factors affecting graduates' labour market performance

Higher education in Poland

## Educational expansion

- Massification of higher education:
  - 0.4 mln in 1990; 1.93 mln in 2006; 1.35 mln in 2016
  - Net enrolment rate grew from 10% to 40%.
- Labour market issues in public debate
  - Rising number of unemployed higher education graduates
  - Skills mismatch
  - Rising inequality of graduates' labour market outcomes
  - Limited labour market opportunities
- Graduate tracking
  - 2010-2014 University of Warsaw and Educational Research Institute design the methodology and tools for graduate tracking with administrative data
  - 2014 Establishment of Polish Graduate Tracking System (ELA)

# ELA Polish Graduate Tracking System

#### Polish Graduate Tracking System – data sources

POL-on The national register of students and graduates	Social Insurance Institution (ZUS)	Central Statistics Office (GUS)
<ul> <li>Personal ID (PESEL)</li> <li>Graduation date</li> <li>Characteristics of studies: <ul> <li>HEI, institutional control, department</li> <li>Programme</li> <li>Level</li> <li>Mode of studies</li> </ul> </li> <li>Information on further academic education.</li> </ul>	<ul> <li>Personal ID (PESEL)</li> <li><u>Monthly</u> social insurance contributions.</li> <li>Status in the labour market (i.e. salaried worker, self-employed, unemployed, on maternity or parental leave).</li> <li>Contribution calculations basis (<i>Pol. podstawa wymiaru składki</i>)</li> <li>Information on the employer.</li> </ul>	<ul> <li>Data describing local labour markets:</li> <li>Average gross salary in each <i>powiat</i> (equivalent to county, district or prefecture)</li> <li>Unemployment rate in each <i>powiat</i> (equivalent to county, district or prefecture) or prefecture)</li> </ul>

### ELA - research organisation



# Labour market performance indicators

- Dimensions of labour market performance:
  - time spent looking for a job;
  - job stability (periods of unemployment, types of contracts, time with specific types of contracts, number of employers);
  - wages
- Classes of indicators:
  - Absolute (e.g. wage in PLN, number of months spent looking for a job)
  - Relative graduates' wages and risk of unemployment are divided by the average wage and the unemployment rate in their place of residence respectively (based on monthly records).

Relative Indicator of Wages =	Individual wage	
	Average local wage	

## Comparability in time and space : Relative Indicator of Wages



#### Polish Graduate Tracking System http://ela.nauka.gov.pl/en/



What affects employment chances of Polish graduates?

# Employment chances – probit models

- Population Master level 2014 graduates, n=150k (covered population)
- 8 models one model every 3 months after graduation
- Dependent variable: dummy variable indicating whether a graduate has a steady job, i.e. an employment contract or self-employment
- Independent variables:
  - Sex
  - Age category informs on age category in the year of graduation; categories are 25 or less and 26 or more
  - Place of residence (over 500 000 citizens (large city); smaller than 500 000 but the city is a separate county (medium city); small town or village; unknown place of residence)
  - Form of studies (part-time vs full-time)
  - Type of HEI
  - Field of study (humanities; medical and health sciences; natural sciences; agricultural sciences; social sciences; exact sciences; technical sciences; arts)
  - Studying after graduation
  - Pre-graduation job experience a dummy variable; informs if the graduate had any employment contract or was self-employed during a few months before graduation.

#### Model parameters



### Model parameters – field of study



- Medical & health sciences (vs humanities)
- – Technical sciences (vs humanities)
- --Social sciences (vs humanities)
- Agricultural sciences (vs humanities)
- Exact sciences
   (vs humanities)
- Natural sciences (vs humanities)
- ---Arts (vs humanities)

# Employment rates – discipline of study in technical sciences



Where does the gender employment gap among graduates come from?

# Share of employed male and female graduates during the first 8 quarters after graduation

Sex		
Quarters after graduation	Male	Female
Quarter 1	59%	54%
Quarter 2	67%	62%
Quarter 3	71%	67%
Quarter 4	74%	69%
Quarter 5	77%	73%
Quarter 6	78%	75%
Quarter 7	80%	77%
Quarter 8	81%	78%

Share of employed male and female graduates of <u>non-technical</u> studies during the first 8 quarters after graduation

Sex		
Quarters after graduation	Male	Female
Quarter 1	54%	54%
Quarter 2	62%	62%
Quarter 3	67%	67%
Quarter 4	70%	69%
Quarter 5	73%	73%
Quarter 6	74%	75%
Quarter 7	77%	77%
Quarter 8	78%	78%

Probit model parameters for sex in the full population models and models for the population without technical studies

Population in model Quarters after graduation	Full population	Without technical studies
Quarter 1	-0.1	0.0
Quarter 2	-0.1	0.0
Quarter 3	-0.1	0.0
Quarter 4	-0.1	0.0
Quarter 5	0.0	0.0
Quarter 6	0.0	0.0
Quarter 7	0.0	0.0
Quarter 8	0.0	0.0

Employment rate among male and female graduates of <u>technical</u> studies during the first 8 quarters after graduation



# Share of women among graduates of selected disciplines of technical studies

Discipline of technical studies	Percentage of female graduates	
Automatic Control and Robotics	5%	
Electrical Engineering	5%	
Electronics	11%	
Computer Science	11%	
Mechanics	16%	
Environmental Engineering	53%	
Geodesy and Cartography	55%	
Chemical Technology	71%	
Architecture and Urban Planning	73%	
Biotechnology	79%	
Total	36%	

Employment rate among male and female graduates of disciplines of technical studies (ordered by the feminisation rate)



### Future system development

- Further development of the ELA system:
  - New data: complete study history & and complete pre-graduation employment records.
  - Tracking of doctoral students
- New Polish Integrated Analytic Platform:
  - Population registers
  - Educational databases
  - Health records
  - Tax registers
  - Social security registers

# Thank you

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