

# Personality, cognitive skills and earnings: evidence from the Polish follow-up study on PIAAC

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# Motivation

- Much of the variance of individual wages remains unexplained (Bowles, Gintis, and Osborne 2001)
- No evidence on heterogeneous returns to cognitive skills depending on personality
- Limited evidence on the role of personality on the labour market in the Eastern Europe

# Personality traits: channels of influence

- **Conscientiousness:** tendency to be organized, responsible, and hardworking
  - related to higher productivity (Cubel et al. 2016), performance in on-the-job training (Barrick and Mount 1991) and supervisors' rating of workers' performance (Caligiuri 2000)
- **Neuroticism:** emotional instability, vulnerability to stress and a lack of self-confidence
  - Motivation theory: individuals have imperfect knowledge of their own ability and ability and effort are complements; thus higher self-confidence leads to higher motivation and use of skills (Bénabou and Tirole 2002).
  - related to lower productivity) and to lower competitiveness (Müller and Schwieren 2012)

# Personality traits: channels of influence

- **Agreeableness:** tendency to act in a cooperative, unselfish manner
  - valued in occupations requiring client service or team work
  - self-selection into occupations (Cobb-Clark and Tan 2011)
  - wage bargaining outcomes: agreeable individuals accept unfair offers more often
- **Openness to Experience:** the tendency to be open to new aesthetic, cultural, or intellectual experiences
  - valued in some occupations in others not
  - self-selection into occupations (Cobb-Clark and Tan 2011)
- **Extraversion:** an orientation of one's interests and energies toward the outer world of people and things rather than the inner world of subjective experience
  - broad social networks

# Personality traits & wages: empirical evidence

- **Conscientiousness** is positively related to wages (O'Connell and Sheikh 2011; Heineck 2014).
- Wage penalty for **neuroticism** (Mueller and Plug 2006; Nyhus and Pons 2005; O'Connell and Sheikh 2011; Drago 2011; Heineck and Anger 2010; Cunningham et al. 2016)
- Wage penalty for **agreeableness** (Mueller and Plug 2006; Nyhus and Pons 2005; O'Connell and Sheikh 2011; Cunningham et al. 2016).
- Mixed evidence on **openness**
  - wage premium for openness (Mueller and Plug 2006; O'Connell and Sheikh 2011; Heineck 2014; Cunningham et al. 2016)
  - Hump-shaped relationship between earnings and openness (Rammstedt, Danner, and Lechner 2017)
- No link between **extraversion** and wages in most of the studies
- In Poland: wage premium for conscientiousness and wage penalty for agreeableness and neuroticism (Palczyńska and Świst 2016)

# Personality traits & wages: gender differences

- Heterogeneous effects of personality on wages for men and women (Nyhus and Pons 2005; Judge et al. 2012)
- Differences stem from different social **expectations towards genders**: counterstereotypic behaviour is often subject to social and economic sanction (e.g. Rudman and Fairchild 2004). The sanctions may include:
  - limited opportunities for promotion
  - reduced recognition
  - worse interpersonal relations

# This paper

- provides evidence on the returns to personality traits, separately for women and men in Poland
- explores the possibility that the returns to cognitive skills on wages might vary depending on the personality of an individual

# Expectations

- agreeableness and neuroticism are negatively associated with wages, though there might be differences by gender;
- conscientiousness is rewarded, again with possible gender differences;
- openness may or may not be related to wages;
- extraversion is not related to wages;
- neurotic individuals have lower returns to their cognitive skills.



# Data

- **Data sources:**
  - Polish Follow-up Study on PIAAC (postPIAAC)
  - Cognitive skills: OECD Survey of Adults Skills (PIAAC)
- **Time:** PIAAC-OECD 2011/2012, postPIAAC 2014/2015
- **Sample:** Paid workers excluding self-employed, 18-68 years old (n = 2047)
  
- **Cognitive skills measures:** numeracy
- **Personality measures:** Big Five Inventory-Short (BFI-S) (Gerlitz and Schupp 2005) - 15 self-reported items
- Measurement properties of the Polish version assessed in: Palczyńska and Świst 2016

# Methodology

$$\ln y_i = x_i' \beta + z_i' \delta + u_i$$

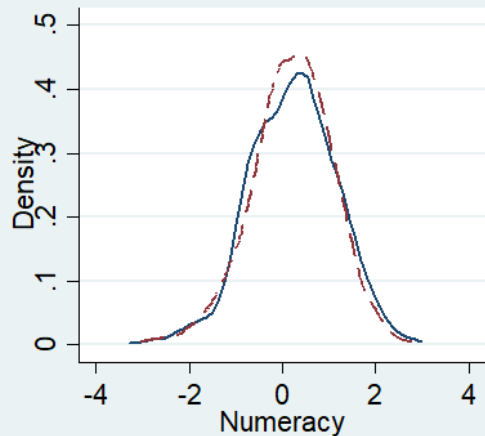
$y_i$  is individual  $i$ 's gross hourly wage

$x_i$  is a vector of individual characteristics related to earnings

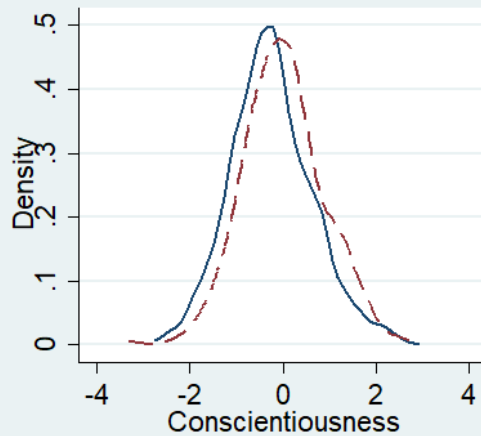
$z_i$  is the vector of respondent's personality traits and cognitive skills

- Separate models for women and men
- Additional specification: interactions between personality and cognitive skills
- Heckman's selection model to account for sample selection bias (Heckman 1979). The exclusion restrictions: respondent's female and male guardians were working when he or she was sixteen years old and a dummy for having children 6 years old or younger.
- The model is fitted with maximum likelihood; all models use weights accounting for survey design.

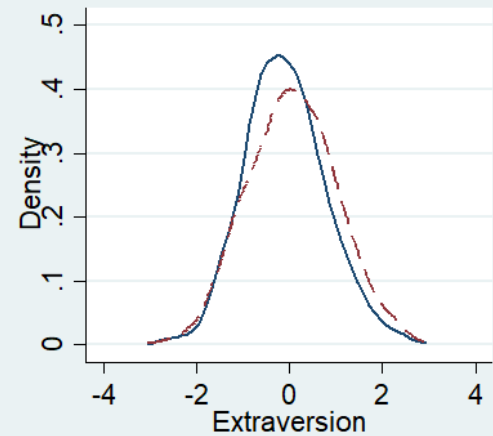
# Traits distributions



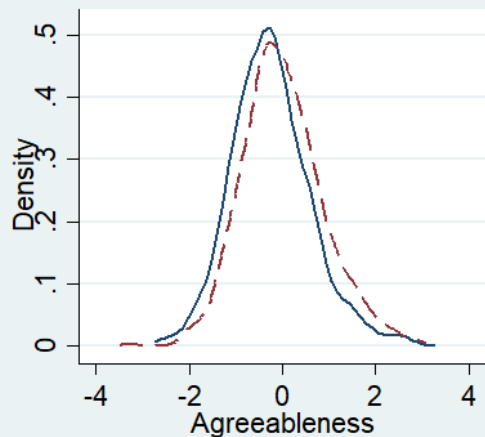
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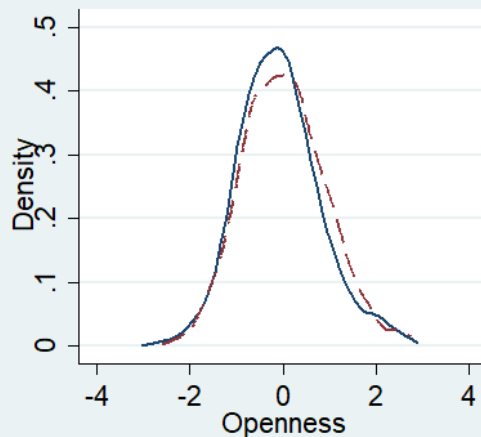
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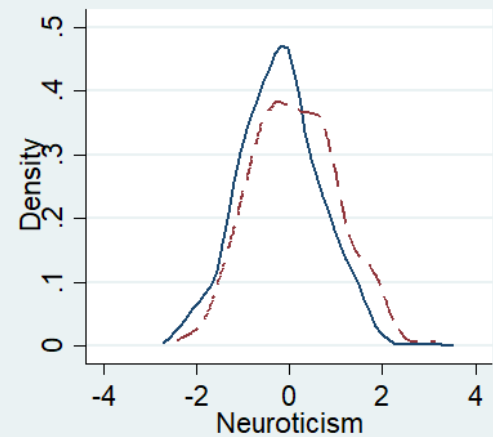
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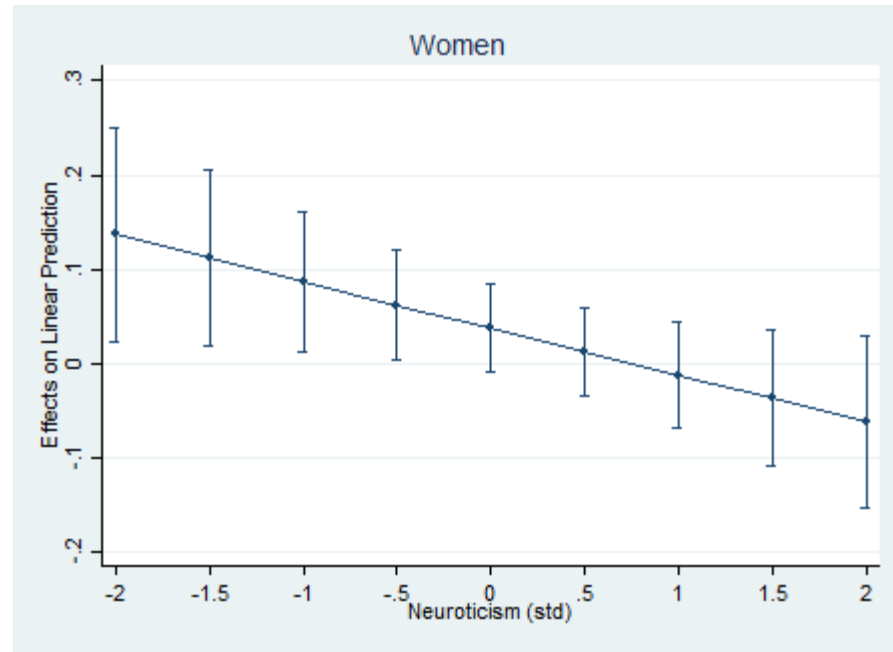
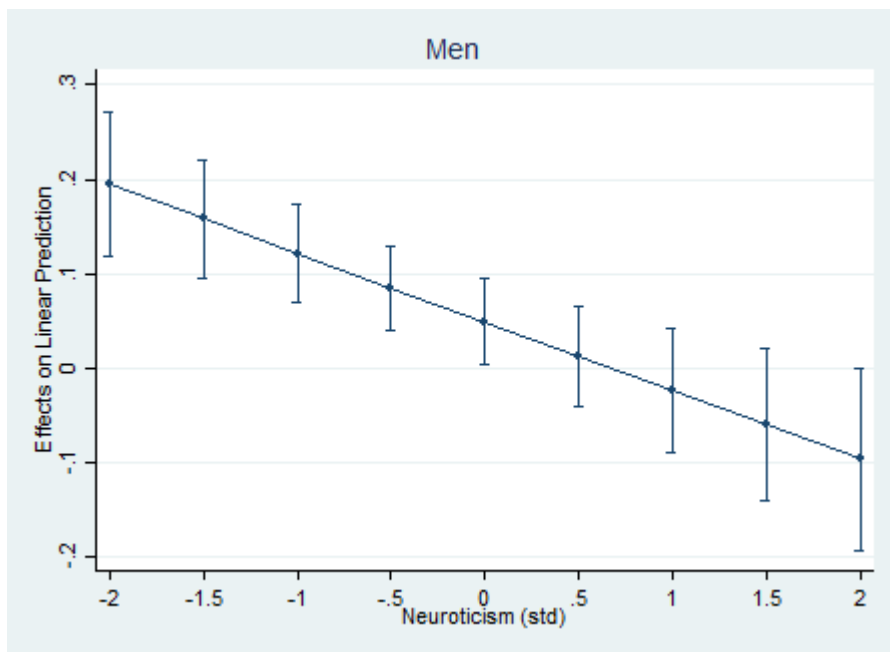
# Results (1)

	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
Numeracy	0.103	0.020	0.043	0.045 <sup>+</sup>
Conscientiousness	0.172	0.158 <sup>**</sup>	0.117 <sup>*</sup>	0.168 <sup>**</sup>
Extraversion	-0.015	0.015	0.015	0.021
Agreeableness	-0.179 <sup>**</sup>	-0.151 <sup>**</sup>	-0.155 <sup>**</sup>	-0.160 <sup>**</sup>
Openness	0.032	-0.016	0.009	-0.028
Neuroticism	-0.057	-0.051 <sup>*</sup>	-0.035 <sup>+</sup>	-0.057 <sup>**</sup>
Numeracy # Con			-0.005	-0.027
Numeracy # Ext			-0.022	0.040
Numeracy # Agr			-0.054	-0.008
Numeracy # Opn			0.091 <sup>+</sup>	-0.052
Numeracy # Neu			-0.073 <sup>**</sup>	-0.050 <sup>*</sup>
Control variables	+	+	+	+
Observations	1094	953	1094	953

Notes: <sup>+</sup>  $p < 0.10$ , <sup>\*</sup>  $p < 0.05$ , <sup>\*\*</sup>  $p < 0.01$ , <sup>\*\*\*</sup>  $p < 0.001$ . Control variables: age, age squared, years of education, 1-digit ISCO. ISCO=0 excluded, top and bottom 1% of wage distribution excluded. First PV (plausible value) for numeracy. Logarithm of wages. Numeracy and non-cognitive skills are standardised.

## Results (2) - effects of numeracy on wages

Average marginal effects of numeracy on wages by neuroticism level for men (left pane) and women (right pane)



The returns to numeracy are significantly different from zero for values of neuroticism around the mean or below.

# Sensitivity analysis

- **Non-linearity**
  - Women with intermediate level of extraversion have the highest average wages
  - No convincing evidence for non-linearity in other personality-income relationships
- **Tenure with the current employer:** potentially personality traits are unobserved during recruitment process and only over time employer becomes aware of employee's traits and potentially rewards them
  - Only the relationship of extraversion with wages for women is moderated by tenure

# Conclusions

- Personality matters for the individual LM success in Poland
  - Personality traits more malleable in adulthood than cognitive skills but the choice which traits should be fostered poses difficult dilemmas
  - Individuals could start adopting their behaviour to the situation, instead of changing their behaviour completely (Judge et al. 2012)
- Neurotic individuals have lower returns to cognitive skills
  - To get unbiased estimates of the returns to cognitive skills one needs to account for personality traits
- No substantial gender discrepancies in the personality associations with wages
  - No indication of different standards of evaluation of women and men in Poland

Thank you!

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