Testing for Labour Market Segmentation in Europe

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Introduction

Introduction

- division of labour markets into separated groups with different earnings and stability patterns
- based on segmentation literature (Doeringer and Piore, 1971; Piore, 1973; Bulow and Summers, 1985; McCausland and Theodossiou, 2005), however recent empirical tests are rather rare (Theodossiou, 1995; Leontaridi, 2002; Polavieja, 2003; Davia and Hernanz, 2004; Constant and Massey, 2005; Bispo, 2007; Garz, 2013)
- frequently claimed in the literature despite the lack of empirical evidence
- testing for the existence of separate labour market segments
- comparative view with panel data

Theory

Literature and theoretical concepts

Segmented labour market approach - non-competing groups instead of single competitive labour market (Mill, 1885)

- Labour market is divided into non-competing segments with different returns to human capital investments, because institutional settings prevent workers from benefiting equally from education and training.
- Restricted mobility between segments prevents competitive pressures to equalize these wage differentials.
- SLM approach questions the neo-classical view with the direct linkage between wages and workers productivity (resulting from human capital endowments (Becker, 1964; Mincer, 1974)).
- Distinction between 'good' and 'bad' jobs is not based on individual differences in productivity.

Dual labour market theory

Theory of dual labour markets (Doeringer and Piore, 1971) - labour markets are divided into separated segments
Core element - **Internal labour market** (Dunlop, 1957; Kerr, 1954):

- emerging as a result of three factors: enterprise-specific skills, on-the-job training and custom (sunk costs),
- ruled by administrative principles, not according to the neo-classical theory,
- protecting workers from uncertainty related to production (stable vs. variable product demand) and from external wage pressure,
- efficiency wages (Shapiro and Stiglitz, 1984) are paid in order to prevent workers from shirking.

Dual labour market theory

Primary segments then consist of several internal labour markets, whereas secondary segments are ruled by competitive pressures.

- The secondary segment wages are below those of the equally productive primary segment wages - since detection of shirking is easier to perform in secondary segments and applying for a job in primary segment by accepting lower wage would not be accepted by those firms beacaue of non-shirking condition (Bulow and Summers, 1985; McCausland and Theodossiou, 2005).
- Returns to human capital investments (schooling, experience) are lower or negligible in the secondary segment.
- The primary segment can be further divided into upper and lower primary segment distinguished by flexibility patterns (Piore, 1973).
- This separation is further preserving the socio-economic inequality (Piore, 1973).

Dual labour market theory

Primary segment (upper and lower) - high wages, fringe benefits, good working conditions, employment stability, chances of advancement, equity, and due process in the administration of work rules.

Secondary segment - low wages, poor working conditions, high labour turnover, little chance of advancement and often arbitrary and capricious supervision (Doeringer and Piore, 1971).

Research Question

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- Is the labour market in European countries divided into separate segments with restricted mobility and different stability patterns in which different wage setting mechanisms are at work?

Hypothesis

- The labour market is divided into several segments corresponding to previous definitions: the upper and lower tier primary segment as well as secondary segment.
- The implications of the human capital theory does not apply to secondary segment - the returns to schooling/experience/tenure in the secondary segment are significantly lower or non-significant even after controlling for preselection according to individual characteristics.

Method

Testing for the labour market segmentation

Testing for the labour market segmentation is based on three core aspects derived from the previous theoretical considerations:

- existence of clearly identifiable labour market segments,
- wage differentials, which cannot be explained by the human capital theory,
- mobility barriers between those segments (by assumption).

Testing for the labour market segmentation

Operationalisation:

1. Classify employees into segments
   - Cluster Analysis (Boston, 1990; Davia and Hernanz, 2004)
2. Estimate separate wage equations for each segment (Leontaridi, 2002; Davia and Hernanz, 2004; Constant and Massey, 2005; Garz, 2013)

   Problems:

   - possible truncation bias resulting from estimating separate equations when assignment into clusters according wage levels (Leontaridi, 1998)
   - unequal distribution of individual characteristics between segments - preselection
   - endogeneity of education in earnings equation

Data:
EU-SILC longitudinal (2005-2014) - individuals aged 16-65, exclude people out of labour force and self-employed during the whole observation period (4 years)

Testing for the labour market segmentation

Avoiding truncation bias

- assignment into clusters according to different criteria - not using income variable (Leontaridi, 2002).
- switching regressions - two wage equations and a model explaining the probability of segment attachment estimated simultaneously (Dickens and Lang, 1985; Davia and Hernanz, 2004; Garz, 2013).

Controlling for pre-selection

- coarsened exact matching Iacus et al. (2011, 2012) - preprocessing data with non-parametric matching in order to obtain balanced sample in terms of individual characteristics (age, gender, education, experience - P.26,27), also reducing the model dependence (Ho et al., 2007)

Treating endogeneity

- Hausman-Taylor Estimator (Hausman and Taylor, 1981)

Cluster Analysis

- Clustering variables - transitions between economic activity:
  - 7 categories: full-time employed, part-time employed, full-time self-employed, part-time self-employed, unemployed, student and other inactive observed on a monthly basis (rotational design - 4 year period),
  - each month single variable - coded as dummies,
  - selected method then reduces the number of unique combinations during the observation period (Halleröd et al., 2015).

Cluster Analysis

- **k-median clustering** - minimises the distance between points around medians within each cluster (partitioning method)
- distance measure - Pseudo-Gower Distance (Gower, 1971)
- k - the number of clusters prior to clustering (2-10)
- run algorithm several times and test the most plausible k using Calinski-Harabasz Index (Caliński and Harabasz, 1974)
- using median instead of mean to reduce the influence of outliers

Segments - Descriptive Statistics

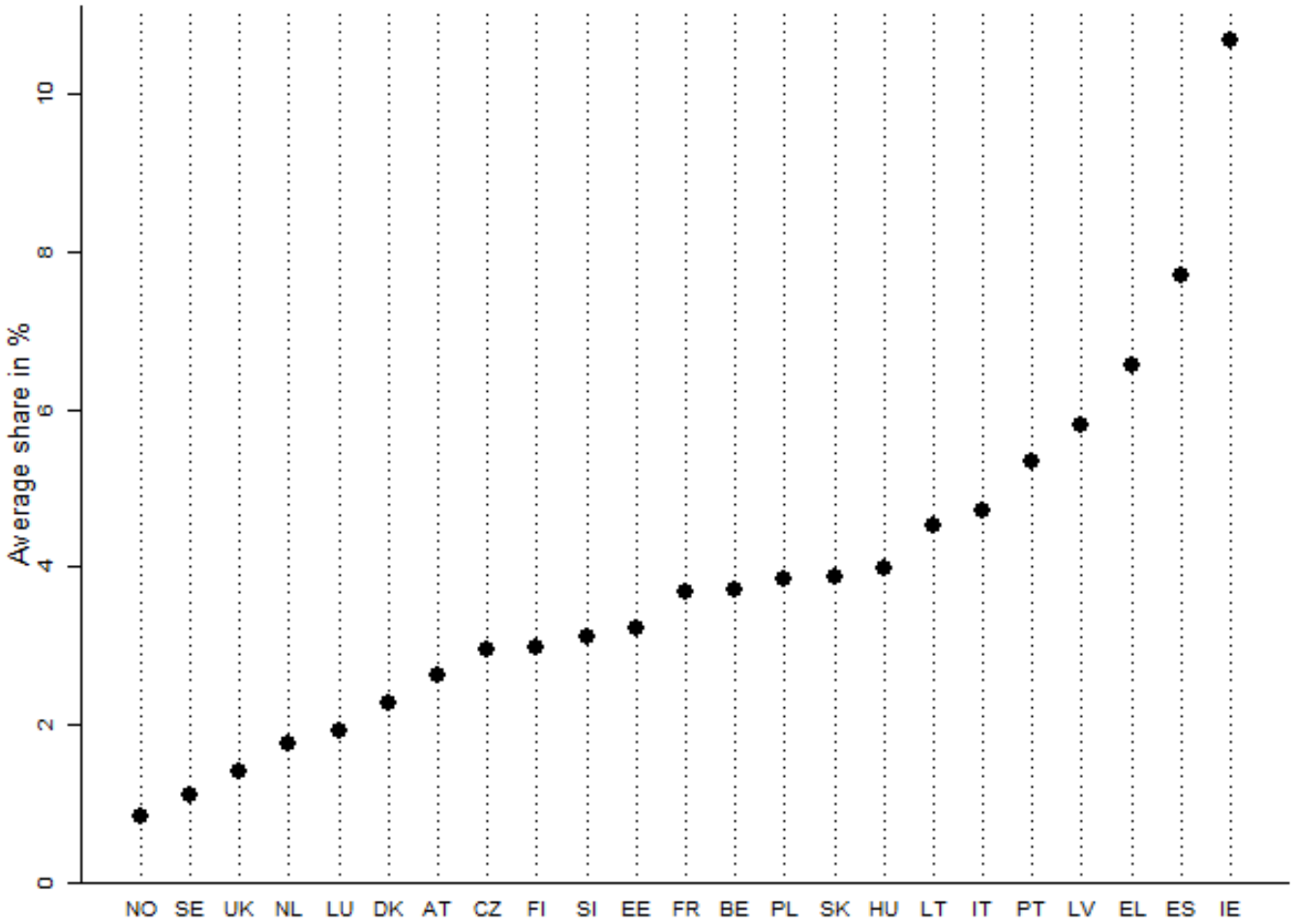
Characteristic		Upper Primary	Lower Primary	Secondary
Total	*N*	*206,269*	*53,122*	*18,479*
Total share	%	74.2	19,1	6.7
More than two interruptions	%	8.2	42.5	84.5
Permanent contract	%	59.7	28.4	2.5
Employed the whole period	%	72.8	31.7	0
Employed full-time more than 36 months	%	50.4	3.0	4.8
Employed part-time more than 36 months	%	0	22.4	0.5
Students/in training more than 36 months	%	1.6	2.8	3.9
Self-employed more than 36 months	%	1.6	4.6	5.8
Out of LF or unemployed for more than 36 months	%	1.9	24.3	47.1
Unemployed for more than 36 months	%	0	0	22
Average/median income	€	10.5/7.1	14.1/10.1	6.8/4.0

Upper-Primary: individuals who were mostly full-time employed for the whole reference period with low number of interruptions (unemployment or inactivity) and highest share of permanent contract workers

Lower-Primary: individuals who were changing between part-time employment and inactivity status (housework, disabled or unable to work, entering retirement) also experiencing some periods of interruptions with high shares of temporary contract workers

Secondary: individuals who were frequently changing between activity status forms and experienced several periods of interruptions, with lowest income as well as the share of permanent contract workers and with highest shares of temporary contract workers

Average share of secondary segment workers by country



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Estimating Returns to Human Capital Investment

- with preprocessed data in order to estimate returns to human capital (education, experience)

$$lnW_{it} = \beta_1 educ_{it} + \beta_2 exper_{it} + \beta_3 exper_{it}^2 + \beta_4 occup_{it} + u_i + \varepsilon_{it} \quad (1)$$

where lnW_i is the logarithm of individual's gross or net hourly wages, $educ_{it}$ is schooling level, $exper_{it}$ are years of experience and $occup_i$ is the occupation class associated with the i-th individual in time t. β_1, β_2, β_3, β_4 are then vectors of parameters and u_{it} and ε_{it} are between and within entity errors respectively.

- to estimate time-invariant or slowly changing (education, experience) individual effects use **Random Effects Model**
- Hausman-Taylor Estimator (Hausman and Taylor, 1981) to take into account correlation of unobserved characteristics and regressors
  - making use of time-variant variables - health status and unemployment last year (estimating their own coefficients as well as using them to instrument education)

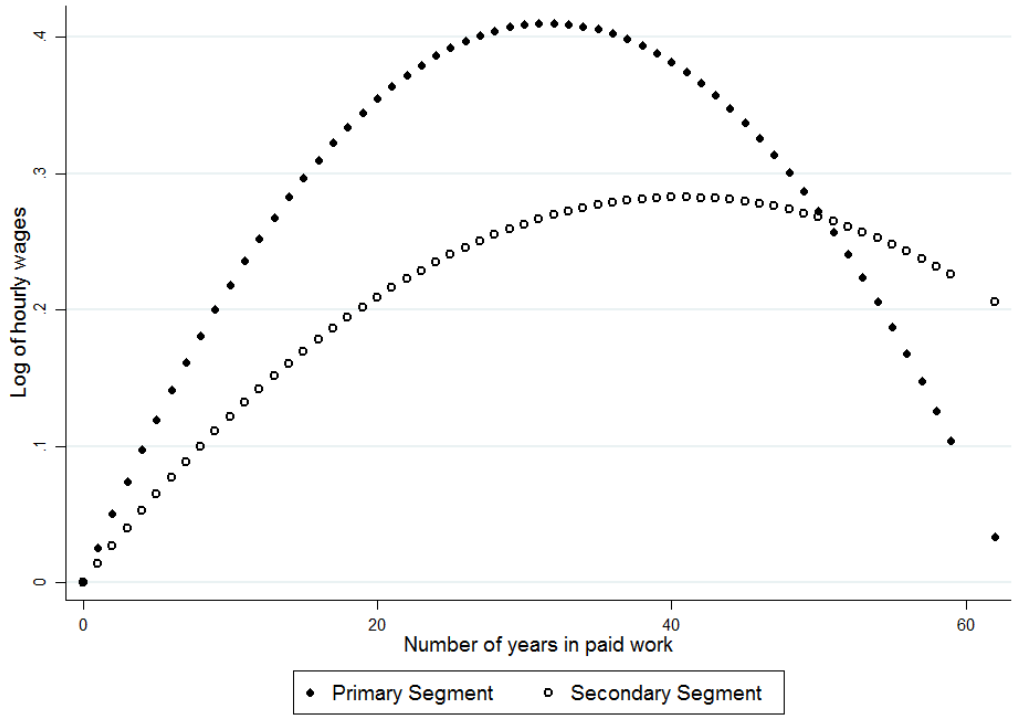
Preliminary Results

Preliminary Estimation Results

	Primary Segment			Secondary Segment		
	(1) OLS	(2) RE	(3) HT	(1) OLS	(2) RE	(3) HT
	Dependent variable log of gross hourly earnings					
Female	-0.181***	-0.180***	-0.186***	-0.106***	-0.109***	-0.121**
	(0.00226)	(0.00342)	(0.00398)	(0.0259)	(0.0282)	(0.0365)
Education						
Lowersecondary	0.0501***	0.0261***	0.0311**	0.00622	0.0197	0.331
	(0.00421)	(0.00521)	(0.00962)	(0.0489)	(0.0517)	(0.200)
Upper secondary	0.165***	0.167***	0.239***	-0.00363	-0.00778	0.200
	(0.00405)	(0.00538)	(0.0117)	(0.0470)	(0.0499)	(0.223)
Tertiary	0.348***	0.409***	0.601***	0.128*	0.134*	0.378
	(0.00494)	(0.00651)	(0.0137)	(0.0538)	(0.0572)	(0.254)
Experience	0.0268***	0.0253***	0.0259***	0.0119***	0.0119***	0.0139**
	(0.000296)	(0.000392)	(0.000476)	(0.00335)	(0.00355)	(0.00468)
Experience^2	-0.000433***	-0.000411***	-0.000410***	-0.000180*	-0.000171	-0.000170
	(0.00000757)	(0.0000101)	(0.0000123)	(0.0000846)	(0.0000898)	(0.000118)
Bad health			-0.0642***			-0.0785
			(0.00529)			(0.0605)
Unemployed last year			-0.0693***			-0.00769
			(0.00442)			(0.0245)
Constant	2.107**	2.245***	2.458***	2.458***	1.239***	0.788***
	(0.0156)	(0.0182)	(0.146)	(0.380)	(0.376)	(0.799)
Observations	509,057	638,283	464,740	7,822	7,822	5,254
R^2	0.866			0.740		
F	38,621.7		11564.4	271.4		136.6
Chi^2		927,532.4	1,006,101.5		10,770.6	10,928.8

OLS: ordinary least squares, RE: random effects model, HT: Hausman-Taylor estimator
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Returns to Experience by Segment



Thank you for your attention!

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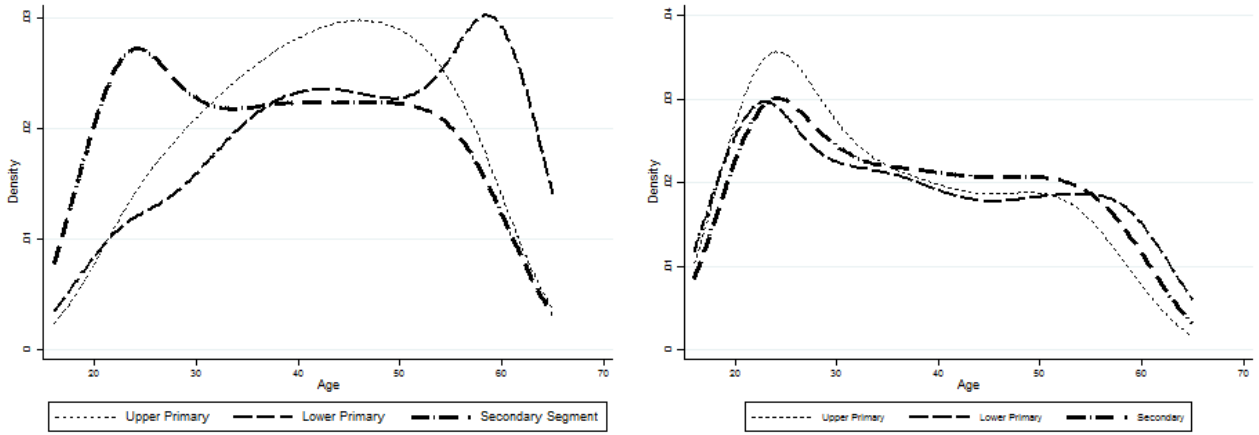
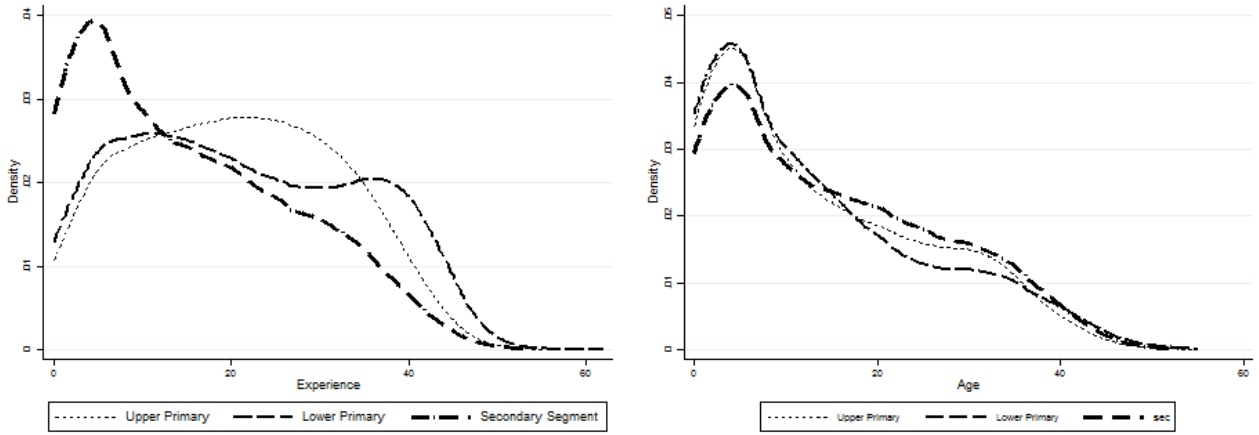
Appendix

Matching - Balancing Properties

Distribution of age before and after matching



Distribution of experience before and after matching



Matching - Balancing Properties

Variable		Upper Primary	Lower Primary	Secondary
Highest Level of ducation			pre/post matching	
Primary	%	5.7/10.1	10.6/11.5	12.4/9.8
Lower Secondary	%	12.8/22.5	18.3/26.1	27.0/21.3
Upper Secondary	%	52.3/52.7	49.1/50.2	47.6/52.8
Tertiary	%	29.1/14.6	21.6/12.0	12.6/15.9
Gender				
Female	%	43.5/51.8	74.97/83.2	47.1/55.4

Segments - Restricted Mobility

- Less job changes in secondary segment;
  - primary segment workers experience more changes due finding a better job,
  - secondary segment workers show more changes due to the end of temporary contract, closure or having children,
  - equal distribution of job changes due dismissal.
- Higher upward mobility within primary segment;
  - upper primary: unemployment - employment,
  - lower primary: other inactive - employment),
- Highest downward mobility within secondary segment (employment - unemplyoment).

Development of secondary segments over time by country