



Low-Wage Employment in Czechia: A Sticky, Double Disadvantage

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Abstract:

This article is concerned with low pay in Czechia. Employing pooled longitudinal EU-SILC data for 2004–17, it analyses the patterns of low-wage employment, and, accounting for both observed and unobserved heterogeneity among workers and endogeneity in the initial conditions, it estimates the degree of state dependence in low-wage employment. We argue that the low-paid in Czechia suffer from a double disadvantage in terms of having low wages compared to the country standard, which has been, over the long-term, much lower when compared to Western European countries. Moreover, our results indicate that low pay exhibits a significant degree of state dependence: having a low-paid job substantially increases the likelihood of staying low-paid in the future, irrespective of individual characteristics. Furthermore, women have a significantly higher probability of receiving low pay in Czechia; other significant individual factors predisposing workers to earn low wages in Czechia include low education and higher age.

Keywords: Low-wage employment, low pay, low pay persistence, EU-SILC data

JEL codes: C23, J31, J69

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1. Introduction

Low-wage employment has been a growing concern among policymakers in European countries. In the context of the growing wage and income inequality registered in developed countries in recent decades (Lucifora, 2000), the large proportion of employees working for low wages and with incomes below the poverty line has become an issue of increasing importance.

In 2018, 9.4% of all employees lived in households classified as poor inside the EU-28; it was less in Czechia at around 3.4%. Although low-wage work and poverty are theoretically and methodologically different concepts (poverty refers to household level, whereas low-wage work is an individual phenomenon), they are largely interrelated. Rising low-wage employment increases the risk of poverty at the household level (Clark and Kanellopoulos, 2013). In addition to the close relationship to poverty, the phenomenon of low wages in Czechia has another important and very current close connection: steadily increasing household indebtedness (Rajl, 2019), with an alarming one-tenth of Czechs having been distressed.² Lastly, low pay may increase workers' incentives to join (at least partially) the shadow sector to avoid taxes and thus increase net wages. Involvement in the shadow economy may further deteriorate the working and living conditions of workers due to less coverage from employment protection legislation, unemployment or pension insurance, and so on.

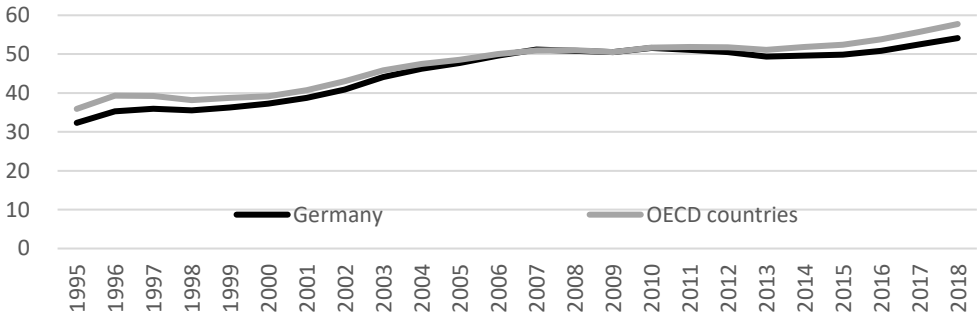
Indicators used to measure low-wage employment (similar to poverty) are often defined relative to a countrywide statistical threshold. According to Eurostat data, 15.1% of all employees worked for low wages in Czechia in 2018 (defined as less than two-thirds of the hourly median wage).³ The low-pay incidence in Czechia has, over the long term, hovered above the EU average. In neighbouring Germany, for instance, the share was much higher, at 20.7% in 2018. However, the generally low, aggregate wage level in Eastern European countries means that the living standard of their low-paid populations is incomparable to those of Western European countries (Myant, 2018). The average wage in Czechia in relation to that of Germany and OECD countries is depicted in figure 1. After steady growth since the beginning of the transformation period, the speed of convergence towards Western European standards has slowed over the last decade. The average Czech wage hovered around 50% of

² Open Society database (www.mapaexekuci.cz).

³ Throughout the text, the terms 'low pay' and 'low wage' are used interchangeably and refer to the same phenomenon.

the German average between 2006 and 2015. Afterwards, weak growth was recovered, and Czechia’s average wage level had only risen to 54% of the German average by 2018.

Figure 1. Average wage in Czechia as share of average wage in Germany and OECD average, 1995–2018 (%)



Source: OECD (2020), Average wages (indicator). doi: 10.1787/cc3e1387-en, author’s calculations.
Note: Calculated from average wages in USD purchasing power parities.

Consequently, not only is the share of low-paid generally high in Czechia, these workers additionally enjoy generally low wages compared to the standard in developed countries, representing a double disadvantage. In such a situation, the comparative ability of the relative employment indicator for low wages is misleading and may give a false impression of a high standard of living.⁴

According to Lucifora, McKnight and Salverda (2005), the well-being of low-paid employees and their standard of living is generally determined by three factors: (i) overall wage level, (ii) inequality in the distribution of wages and (iii) the degree of wage mobility. Wage mobility may affect wage inequality and is also reflected in the degree of low-pay persistence. Bachmann, Bechara and Schaffner (2016) studied wage inequality and wage mobility in Europe between 2004 and 2011. They show that Czechia has a modest level of both wage inequality and mobility when compared to other European countries. Further, the authors show that, generally, earnings persistence is higher in both tails of the distribution in Europe compared to the middle. However, they do not provide detailed estimates on earnings persistence in the countries of Central and Eastern Europe (CEE) despite reporting substantial cross-country differences in wage mobility across European countries.

When considering the situation of low-paid workers, one of the key issues is whether working in a low-paid job is a long-term and persistent state affecting specific groups of workers or

⁴ Similar to the very low at-risk-of-poverty rate in Czechia.

rather a short-term, transitory situation. For some workers, low pay may transitorily occur at the start of their careers, compensate for lack of experience and act as a pathway to future, better-paying jobs. Similarly, some workers may experience low pay as a random event during their work careers. Nevertheless, for some groups of workers, a low-paid job may represent a permanent ‘trap’ that is difficult to escape. In order to understand the nature of low-wage employment, it is crucial to know whether low pay is a result of some specific (either observable or unobservable) worker characteristics that make them more prone to having low-paid jobs or whether the experience of having a low-paid job has a direct causal effect on the likelihood of staying in low-wage employment in the future. While the first option refers to the heterogeneity of individuals, the second—low-pay persistence—relates to state dependence. Estimating the persistence of low pay in the particular case of Czechia is the main subject of this study.

The empirical evidence on low-wage employment in the CEE to date is limited in comparison to the large amount of literature in Western European countries. In this sense, the article adds to the relatively scarce research on low-wage employment in CEE post-transition countries and represents one of the first attempts to estimate the nature and extent of low-pay persistence in Czechia. This article also provides new insights into the characteristics of the low-wage population in Czechia, which are useful for social policy considerations regarding the fight against poverty and in-work poverty. Furthermore, knowing who low-wage earners are and what factors drive low pay is crucial for the formulation of any strategy to increase low wages in the country.

Following the methodological approach of Clark and Kanellopoulos (2013), we use longitudinal data from the European Union Statistics on Income and Living Conditions (EU-SILC) for 2004–17 to estimate the main factors associated with a low-pay status and its persistence as regards genuine state dependence. Our results indicate that low pay exhibits a significant degree of state dependence in Czechia: having a low-paid job significantly increases one’s likelihood of staying low-paid in the future, irrespective of individual characteristics.

The article is structured as follows. The next section reviews the results of recent literature on low-pay persistence. We then discuss the definition of low pay, our approach and the data employed. The next section describes the development of low-wage employment in Czechia, its main characteristics and raw persistence over time. After providing an outline of the

methodological background for our model estimations, we present the results. The final section concludes.

2. Literature review

While low pay may be related to many serious social issues, such as poverty or over-indebtedness, it may be a lesser problem when employment in low-wage jobs is a transitory state serving as a ‘stepping stone’ towards better-paying jobs. This, however, often does not seem to be the case in many countries. Instead, low pay is a persistent and recurring state for a significant share of workers (Clark and Kanellopoulos, 2013), representing a ‘dead end’ rather than a stepping stone. Mason and Salverda (2010) in this sense refer to low-paid jobs as ‘sticky jobs’. Low pay may signal that a worker’s productivity is low to potential employers and can negatively affect future prospects in a similar way to an unemployment trap. Not only do low-paid workers tend to remain in similar jobs, they are also more likely to enter unemployment or inactivity. Stewart (2007), using British data, showed that low pay and unemployment have comparable effects on future employment prospects. In this sense, low-paid work may not be an effective tool to fight poverty as workers become ‘stuck’ to low-paid jobs, which become a pathway to long-term, in-work poverty.

Previous literature generally found a significant degree of low pay persistence both in the case of studies on particular countries and in a cross-country framework, although they differ in evaluating the importance of personal or job-related determinants. Stewart and Swaffield (1998, 1999) revealed a significant low pay persistence in the UK data that was higher for women and lower for workers employed in large firms and members of trade unions. Similarly, Asplund et al. (1998) report that the effect of occupational factors is larger than the individual characteristics of low-paid workers in Denmark and Finland. In the same vein, Cappellari (2000) reveals significant state dependence in low pay using Italian data and shows that job-related factors are more important drivers of low-pay persistence compared to individual characteristics.

In contrast, Sloane and Theodossiou (1998) found out that individual characteristics, such as age, education and marital status, are important factors explaining differences in low-pay persistence; however, job-related factors also play some role. Mosthaf, Schnabel and Stephani (2011) confirm substantial low-pay persistence in Germany and show that upward wage mobility is higher for male, younger and higher educated low-wage earners, with occupational characteristics also affecting the probability of escaping low pay. Silva et al. (2018) examined

the duration of a low-wage situation on Portuguese data and concluded that female, less educated and older workers tend to stay longer in low pay. The size of the company and regional effects also played a role. Other studies generally confirm the persistence of low pay in European countries, with varying accents on different factors (e.g., Bazen, 2001; Vieira, 2005; Deding, 2002; Cuesta, 2008).⁵ Clark and Kanellopoulos (2013) conducted a cross-national analysis of ECHP data for 12 Western European countries between 1994 and 2001 so as to estimate the extent of state dependence in low-paid jobs for male workers. Their results suggest statistically significant positive state dependence in all the countries, although its magnitude varied.

As regards the limited number of studies in CEE countries, to our best knowledge, Kiersztyn (2015) represents the only available study. The author analysed long-term development in the persistence of low wages in Poland between 1988 and 2013 and concluded that the experience of low-paid employment increases the likelihood of being low-paid five years later, even after controlling for the characteristics of workers and the effects of economic development. Furthermore, a significant effect of business cycle developments was revealed with outflow from low pay being higher in periods of economic boom.

3. Definition and data

The definition of low-wage work is not uniform in the literature (see, e.g., Grimshaw, 2011; Keese, Puymoyen and Swaim, 1998; OECD, 1996). In general, there are three ways to define low-paid work: through (i) absolute wage levels, (ii) relative wages or (iii) a fixed share of employees in the distribution of income (e.g., the bottom 20% of employees).

The first definition, in absolute wage levels, is often used to highlight the link between poverty and low wages (e.g., Cooke and Lawton, 2008), but its variation over time and between countries, preventing comparisons, is a disadvantage. The second, relative and most frequently used definition (also employed in OECD reports) better allows for international comparisons and also takes into account the fact that relative income has both social and economic aspects: companies make their investment and production decisions on the basis of the relative price of individual production factors, while employees care about their relative income as a reflection of their social status. The main issue is how exactly should the relative limit be set, from what amount (median or average wage) and on which sample of the

⁵ Low-pay persistence seems to be lower in United States compared to Europe (see, e.g., Holzer, Lane and Vilhuber, 2004), which may be related to higher job mobility in the US.

working population (all employees, full-time employees). The third method of definition is used less often (e.g., Sloane and Theodossiou, 1994; Clark and Kanellopoulos, 2013) and serves mainly to monitor the relative disadvantage of low-pay penalties between countries and over time (Grimshaw, 2011). Following the OECD approach, we use the relative indicator of the share of full-time employees working for a wage lower than two-thirds of the national median to measure the extent of low-paid work.⁶

For each of these definitions, utilisation of gross or net wages is possible. Gross earnings are the most frequently used as they are close to a textbook definition of the price of labour and capture the market evaluation of employee productivity.⁷ Wage may be further measured on an hourly or monthly basis. The use of a monthly (or weekly, annual) wage is in line with the concept of estimating a certain financial amount that enables the coverage of basic needs. However, the monthly wage depends on hours worked, which may vary between demographic groups and also evolve over time. As a result, its use does not allow for the analysis of part-time employees. It is also necessary to emphasise that the concept of low-paid work by definition excludes the self-employed, who often represent an even more vulnerable form of employment.

To study low pay and its persistence, longitudinal data on economic activity and wages are crucial.⁸ We employ household EU-SILC survey data covering the 2004–17 period.⁹ EU-SILC is a household survey harmonised across all EU member states that has been compulsorily conducted annually since 2005. EU-SILC is not a classical longitudinal dataset but a four-year rotating panel, and the number of individual observations over time is limited. It also has some limitations in terms of wage measurement (Iacovou et al., 2012; Jenkins and Van Kerm, 2014)¹⁰ which are typical of surveys at the household level. Compared to data from surveys based on company records commonly used for official wage statistics, wages in household surveys are usually underestimated. However, the statistical bias increases with wages

⁶ While the OECD works with hourly wages, we use monthly wages.

⁷ Some studies also work with net wages (e.g., Cappellari 2000).

⁸ At the micro level, the limited availability of internationally comparable data on individual incomes in CEE countries represents a relatively significant obstacle to the analysis of low-paid work. Studies for Western European countries often use the European Community Household Panel (ECHP) or the Structure of Earnings Survey (SES). The SES has several limitations for use in low-paid labour research (Lucifora et al., 2005): it completely omits the agricultural and public sectors as well as small businesses with less than ten employees, has no longitudinal component and lacks information on household levels. The ECHP ended in 2001 and did not cover Czechia at all.

⁹ We use data from the Eurostat, cross-sectional EU-SILC—Cross UDB 2005–17 and longitudinal EU-SILC—Long 2008–17, March 2019 version.

¹⁰ See discussions in Maitre et al. (2012) or Bachmann et al. (2016).

(Večerník and Mysíková, 2016), which implies a lower bias in analyses related to poverty and low wages. To eliminate possible distortions resulting from these limitations, we use the strategy described in Engel and Schaffner (2012; followed by, e.g., Goraus-Tańska and Lewandowski, 2019). For the purposes of our research, the use of EU-SILC is appropriate since it is a data source utilised for the official calculation of poverty indicators by Eurostat and thus enables examination of the relationship between low wages and poverty.

The data presents annual income variables and monthly economic activity during year t , while job characteristics and current economic activity relate to the survey collection time $t+1$.

The data contains information on yearly gross wages in t ; gross monthly wages are calculated according to the number of months worked in period t .¹¹ For the panel model specification, we utilise the information for four consecutive years available in the longitudinal datasets, so we have four observations per an individual.¹² The sample is limited to workers 16 to 64 years old who reported full-time (dependent) employment throughout the whole year t .¹³ We eliminated individuals who received any sickness benefits in period t as this biases the construction of their monthly wage variable considerably. This leaves an average 3,300 individuals per year (for details, see the last column of table 1).

4. Low-pay characteristics and transitions

According to the Eurostat dataset comparable across countries (based on the Structure of Earnings Survey), Czechia has an about-average share of employees working for low wages. As shown in figure 2, the incidence of low-wage employment was 18.7% in 2014—higher than the EU-28 average of 17.2%. In 2014, Czechia's position in EU countries, ranked according to the incidence of low-wage employment, was around the middle. Most of the remaining CEE countries exhibited a higher incidence, with the exception of Slovenia, Bulgaria and Hungary. Generally, Western European countries had lower figures than CEE countries. However, the low-pay incidence in Czechia decreased substantially in the following

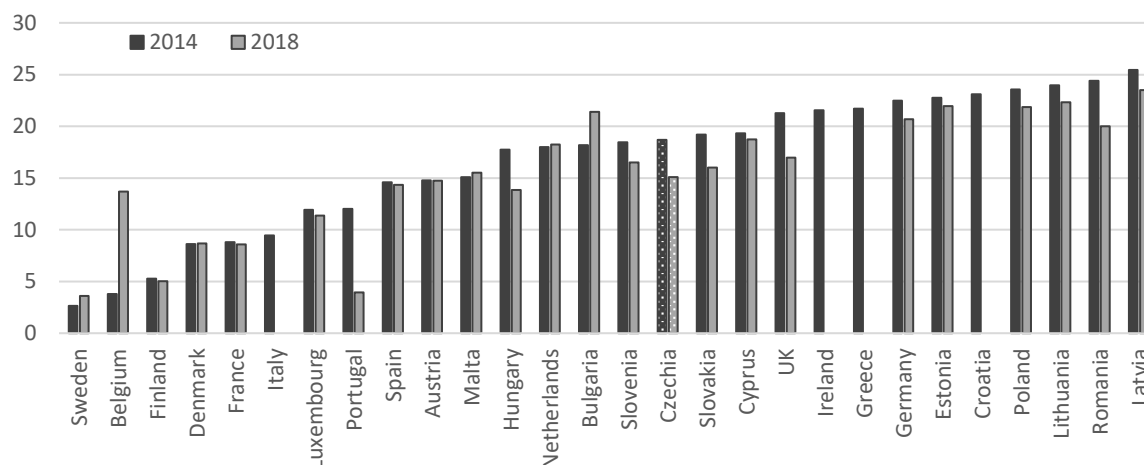
¹¹ Hourly wages are unavailable due to the lack of data on the number of hours actually worked.

¹² However, once low-pay persistence is analysed, lagged variables are used, which leaves three observations per individual.

¹³ We do not consider part-time workers as their exact number of hours worked in period t is not available in the data. However, the share of part-time employment in Czechia is very low (Fialová, 2017). In line with previous research, we exclude a highly heterogeneous and very small group of workers employed in category ISCO 0 (armed forces occupations).

years, such that by 2018, it only had a low pay incidence of 15.1% and had slightly improved its situation compared to other countries.¹⁴

Figure 2. Low-pay incidence in European countries, 2014 and 2018 (%)



Source: Eurostat, table [EARN_SES_PUB1S__custom_164795].

Note: Low-pay is defined as a wage lower than two-thirds of national median gross hourly earnings, referring to all employees (both full-time and part-time, excluding apprentices) working in enterprises with ten employees or more, covering all sectors of the economy except agriculture, forestry and fishing as well as the public administration and defence.

The trend of decreasing low-pay incidence after 2014 is also evident in our sample of EU-SILC data. The figures, together with transition probabilities, are displayed in table 1, while table 2 offers a detailed picture of low pay incidence across different socio-demographic subgroups. The share of employees working for low wages was around 18% in 2004–6 and afterwards declined to 16–17%, the level it hovered at until 2016 (table 1, col. (a)). 2017 witnessed a significant fall in the incidence of low pay to 14%. Figure 3(i) offers a picture of low-pay incidence together with unemployment rate developments, and it suggests a positive link between the business cycle and the share of employees being paid low wages.

Table 1. Transition probabilities of low pay

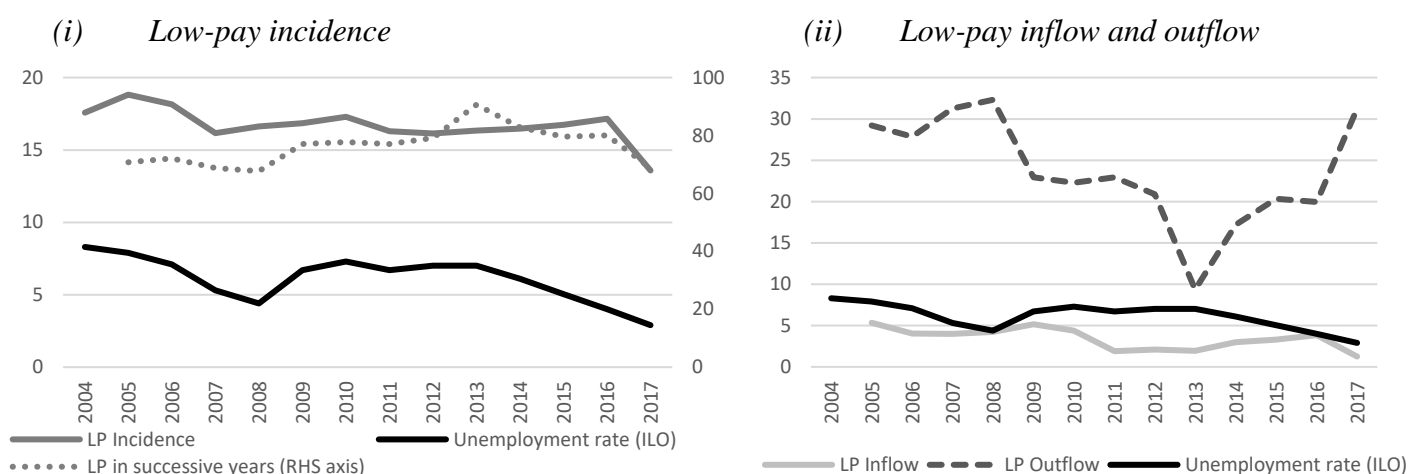
	LP Incidence $Pr(LP_t = 1)$ (a)	LP in successive years $Pr(LP_t=1 LP_{t-1}=1)$ (b)	LP Inflow $Pr(LP_t=1 LP_{t-1}=0)$ (c)	LP Outflow $Pr(LP_t=0 LP_{t-1}=1)$ (d)	LP Persistence Ratio (e) = (b)/(c)	LP Persistence Ratio (f) = (b)-(c)	N (g)
TOTAL	0.169	0.761	0.035	0.239	21.714	0.726	43357
2004	0.176
2005	0.188	0.708	0.053	0.292	13.263	0.655	2255
2006	0.181	0.721	0.041	0.279	17.801	0.681	3812
2007	0.162	0.687	0.040	0.313	17.196	0.647	5180

¹⁴ Data for all countries has not been made available yet, which prevents the calculation of an EU mean value.

2008	0.166	0.677	0.042	0.323	15.981	0.635	4066
2009	0.168	0.771	0.052	0.229	14.941	0.719	3634
2010	0.173	0.777	0.044	0.223	17.721	0.734	3566
2011	0.163	0.771	0.019	0.229	40.165	0.751	3981
2012	0.161	0.791	0.021	0.209	37.911	0.770	3598
2013	0.163	0.906	0.019	0.094	46.617	0.887	3393
2014	0.165	0.828	0.030	0.172	27.592	0.798	3215
2015	0.167	0.797	0.033	0.203	24.133	0.764	3364
2016	0.172	0.801	0.038	0.199	20.873	0.762	2146
2017	0.136	0.688	0.013	0.312	54.912	0.675	1147

Source: EU-SILC longitudinal data 2005–18, author’s calculations

Figure 3. Transition probabilities of low pay and unemployment rate (%)



Source: EU-SILC, Czech Statistical Office, authors’ calculations

Table 2. Low-pay incidence within particular groups (%)

Total full-time, full-year working population		16.9
Gender	Men	8.3
	Women	28.0
Age	16–24	30.1
	25–29	13.2
	30–34	12.7
	35–39	14.9
	40–44	15.4
	45–49	16.9
	50–54	19.9
	55–64	17.5
Education	Primary	48.6
	Secondary	18.4
	Tertiary	2.4
Household characteristics	Sole earners	15.7
	Not sole earners	17.0
	With dependent children	14.7
	Without dependent children	17.9

	Poor	62.5
	Not poor	15.8
Region	Prague	6.6
	Central Bohemia	13.4
	Southwest	16.1
	Northwest	21.1
	Northeast	18.1
	Southeast	18.6
	Central Moravia	19.4
	Moravian-Silesian	19.5

Source: EU-SILC pooled longitudinal data 2005–18, authors' calculations

Note: The low pay threshold is two-thirds of the sample's median gross earnings of full-time, full-year employees for each year. Figures are calculated on a sample pooled across 2004–17 and represent percentage shares of workers in a given category earning less than the full-sample low-pay threshold.

The share of employees paid by low wages was highly differentiated across socio-demographic subgroups (table 2). Low-paid work is much more a female phenomenon than male since the share of women paid by low wages (28%) was more than three-times higher than the share of men (8.3%). The youngest employees, aged 16–24, had a comparably high low-pay incidence (30.1%), much higher than any other age group. In contrast, the lowest incidence of low pay, around 13%, was registered in age categories 25–34. The share of employees paid by low wages then rises with increasing age. Older workers aged 50–54 have the second highest incidence of low pay (after the youngest workers), followed by employees aged 55–64. The negative relation between low-pay incidence and educational attainment is in line with economic expectations. Nevertheless, the differences are striking: While almost half of employees with only primary education receive low wages, less than 18.4% of employees with secondary education and only 2.4% of those with tertiary education are low-paid.

As regards the household characteristics, the share of low-paid among household sole earners is slightly lower than among those who are not sole earners (15.7% vs. 17.0%). This suggests that, on the household level, low wages are often complemented by another source of work income. Low pay incidence is lower for employees with dependent children (younger than 15 years), but again, the differences are not so profound (14.7% vs. 17.9%). Finally, the most striking differences are for employees living in poor households and those living in households not classified as poor. While 62.5% of poor employees work for low wages, only 15.8% of those who are not poor receive low wages. This confirms the existence of a positive link between low pay and poverty. However, the link is not straightforward as one of the most important drivers of poverty is the absence of any work and work income. As suggested by the OECD (1998), the majority of low-paid workers live in medium- or high-income

households. Our data confirms this finding: 92% of low-paid employees did not live in poor households, and the proportion of the low-paid living in poor households was 8% only.

There were large differences in the incidence of low pay between Czech regions: the lowest figures were observed in the capital region, Prague, due to its substantially higher overall wage level. On the contrary, the highest shares of the low-paid were in the Northwest, a region suffering from high unemployment and low wages. Generally, low pay is more prevalent in the regions of Moravia compared to Bohemia.

Table 1 also presents low pay probabilities and transitions in the examined period in detail. While column (a) describes raw probabilities, that is, the incidence of low pay not taking into account the status of the individual in the previous period, columns (b–d) present conditional probabilities given the status in the previous period. Column (b) shows the probability of being low-paid in period t conditional upon being low paid in period $t-1$, in other words, remaining in low pay for two successive years. This probability is much higher than the raw figures in column (a); the figure on pooled data equals 0.761. That means that a low-paid worker has 0.761 probability of staying in a low-paid job the following year. The estimated conditional probability increased after the 2008/2009 financial crisis, peaked in 2013 (a period of economic recession in Czechia) and decreased thereafter. Column (c) describes the inflow into low pay, that is, the conditional probability that a worker who was not in a low-paid job will end up in a low-paid job the following year. Clearly this probability is much lower compared to the probability of initially low-paid workers in column (b)—it is only 0.035 in pooled data. Also, the probability that an initially low-paid worker will exit the low-pay status and find a better-paying job in the following period (col. (d)) is much lower, at 0.239, than the probability of staying low-paid. The outflow from low-paid employment exhibited large volatility in the examined period and seems to be highly negatively sensitive to business cycle developments (figure 3, panel (ii)).

Columns (e) and (f) of table 2 quantify the perspective on low pay persistence. Column (e) estimates how many times more likely it is for the low-paid to stay low-paid in the following year than for the not low-paid to enter low pay. Column (f) shows how much more likely (expressed in probability points) the low-paid are to stay low-paid than the not low-paid are to become low-paid.

Both these ratios indicate that the low-paid workers in period t are substantially more likely to be low-paid in the subsequent period $t+1$ than are those workers who are not low-paid in t .

These raw estimates thus indicate a significant persistence in low pay. The question then remains, what are the driving factors of this persistence? The following analysis aims to reveal the degree to which low-pay persistence is the result of worker heterogeneity on the one hand and true state dependence on the other hand.

5. Methodology

Our approach follows the previous research of Clark and Kanellopoulos (2013) on Western European countries. Bachmann et al. (2016) show that wage inequality is to a large degree determined by unobservable characteristics in Czechia. Accounting for both observed and unobserved worker heterogeneity is also necessary to estimate state dependence. For this purpose, a dynamic random effects probit model is utilised that has the following form:

$$LP_{it} = \gamma LP_{it-1} + \beta X_{it} + \delta \bar{X}_i + \alpha_i + u_{it}, \quad (1)$$

where LP_{it} is a binary dependent variable that equals to 1 if an employee's wage fell below the two-thirds median threshold in period t , LP_{it-1} is a lagged dependent variable, X_{it} is a vector of explanatory variables and \bar{X}_i is an additional regressor representing the means of all time-variant variables, variables employed to reflect the potential correlation between the explanatory variables and the unobserved heterogeneity (Mundlak, 1978). Furthermore, α_i is the individual specific constant unobserved heterogeneity, and u_{it} is the unobserved error term. Subscript t refers to the period of an individual's observation and takes the values of $\{2, 3, 4\}$.

The control variables included in vector X_{it} are commonly used in this type of research and capture the effect of both demand and supply side factors in the wage setting process. They cover a male dummy and dummies for age at five-year intervals (ages 16–24 and 55–64 cover ten-year intervals due to the low number of observations), marital status, education (secondary and tertiary), years of work experience and its square, type of occupation (ISCO) and degree of urbanisation in the area of residence (medium and thinly populated areas). We also add the regional rate of unemployment (NUTS-2 level, persons aged 20–64, from Labour Force Surveys) to account for trends in the regional macroeconomic environment since low-pay dynamics and unemployment trends show correlation.

The model also needs to tackle the initial conditions problem, that is, the potential endogeneity of the starting state, meaning that L_{i1} may be correlated with unobserved heterogeneity α_i . In order to account for both unobserved heterogeneity and the initial

conditions problem, we employ an approach proposed by Orme (1996), who provides a feasible solution (for a detailed discussion, see Clark and Kanellopoulos, 2013). Orme’s method involves a two-stage estimation procedure. In the first stage, the probit estimation of the probability of being low paid in the initial period is made by employing the data for the first period only (i.e., the ‘initial condition’). In the second stage, a generalised residual from the first stage model is substituted into a dynamic random effects probit model for the remainder of the data.

6. Results and discussion

Table 3 shows the marginal effects¹⁵ on the probability of being low paid, with column (a) representing the baseline estimates obtained by Orme’s procedure. The figures show that men have a significantly lower probability of low pay; they are about 9.1 percentage points less likely to earn low wages than women. Education and work experience are other significant factors reducing low pay probabilities, in accordance with human capital theory. Workers with secondary education are about 3.6 percentage points less likely to be low paid compared to those with only primary education; a tertiary education degree reduces this probability by 7.8 percentage points. Further, the type of occupation seems not have a significant effect, with the exception of a weakly significant positive estimate in the ISCO 4 (clerical support workers) category having higher probabilities of low pay than the ISCO 1 (managers) reference group.

Table 3. Results of dynamic random effects probit model on low-pay probability

	<i>2/3 sample median</i>	<i>2/3 national median, wage sphere</i>	<i>2/3 national median, salary sphere</i>	<i>1/2 sample median</i>	<i>1st quartile</i>	<i>1st–3rd deciles</i>
	(a)	(b)	(c)	(d)	(e)	(f)
Low-paid <i>t</i> -1	0.116***	0.13***	0.164***	0.016***	0.193***	0.211***
Male	-0.091***	-0.105***	-0.199***	-0.014***	-0.189***	-0.254***
Age 16–24	0.000	0.004	0.024	-0.006***	0.011	0.005
Age 25–29	-0.009	-0.014	-0.012	-0.006***	-0.024*	-0.028*
Age 30–34	-0.006	-0.003	-0.01	-0.002*	-0.016*	-0.016
Age 40–44	0.009*	0.007	0.016*	0.001	0.02**	0.018*
Age 45–49	0.01*	0.016**	0.025**	0.003*	0.028***	0.029**
Age 50–54	0.019***	0.03***	0.039***	0.004**	0.043***	0.045***
Age 55–64	0.015*	0.023**	0.028*	0.005**	0.031*	0.04**
Married	-0.002	-0.003	-0.013***	0.000	-0.014***	-0.023***
Secondary education	-0.036***	-0.044***	-0.086***	-0.003***	-0.084***	-0.1***
Tertiary education	-0.078***	-0.103***	-0.203***	-0.008***	-0.192***	-0.261***

¹⁵ In the second stage of the Orme model, marginal effects may be interpreted as conditional upon values of the explanatory factors in the initial period (Clark and Kanellopoulos, 2013).

Experience	-0.009***	-0.007**	-0.019***	-0.002**	-0.012**	-0.014**
Experience sq.	0.000**	0.000	0.000**	0.000**	0.000**	0.000**
ISCO2	0.021	0.004	0.031	-0.004	-0.001	0.006
ISCO3	0.05	0.04	0.053	0.002	0.053	0.056
ISCO4	0.05*	0.043	0.081**	-0.006	0.073*	0.065
ISCO5-6	0.038	0.028	0.064*	-0.005	0.045	0.037
ISCO7	0.023	-0.004	0.016	-0.006	0.006	-0.008
ISCO8	0.033	0.011	0.03	-0.007	0.02	0.028
ISCO9	0.039	0.018	0.022	-0.002	0.001	0.003
Densely pop. area	-0.023	0.002	-0.081*	0.000	0.035	-0.036
Medium pop. area	0.007	0.022	0.079**	-0.003	0.08**	0.072*
Regional unemployment rate	0.004***	0.002***	0.007***	0.001***	0.004***	0.006***
Generalised residual	0.059***	0.07***	0.148***	0.011***	0.133***	0.181***
Log pseudolikelihood	-7925.0	-8332.9	-10512.0	-3315.6	-10280.6	-11384.7
Wald chi2	5197.86	5708.61	5785.17	1815.66	6342.03	6425.76
Low-pay incidence, pooled	0.169	0.190	0.268	0.047	0.250	0.300

Source: EU-SILC pooled longitudinal data 2005–18, authors' calculations

Note: Dependent variable: Low pay status in period t . Definition of low-pay threshold given in column headings. Marginal effects from the Orme model reported, ***/**/* statistically significant at 1%/5%/10% levels respectively. The model allows for correlation between the explanatory variables and the unobserved heterogeneity by covering the mean of the explanatory variables (not reported) over time. The results of the first stage estimation are not reported. Sample size: 42,197 observations, 18,135 individuals.

Somewhat surprisingly with regards to human capital accumulation theory, the youngest workers do not have a significantly different probability of low pay compared to the reference category of workers aged 35–39. This outcome suggests that low pay is primarily not a phenomenon of young workers in Czechia, who accept lower wages at the beginning of their careers to compensate for lack of experience. In the case of young workers, the validity of the stepping stone hypothesis would be more likely expected than for older workers, where low pay may be more likely a kind of dead end. In this sense, our results show that having a low-paid job is more likely for workers older than 40 years, and the low-paid likelihood increases in age categories so that workers older than 50 years are about 2 percentage points more likely to be low-paid compared to those 35–39 old.

Variables referring to degree of urbanisation of place of residence do not prove significant in our estimation. In contrast, regional unemployment rate developments have a significant positive impact, indicating that higher unemployment in a region increases the low-pay probability of workers. The estimate by generalised residual, which may be considered a test of endogeneity of initial conditions, is significant and positive. That means that controlling for initial conditions is necessary for estimating state dependence.

The degree of true state dependence in low pay regardless of individual or job characteristics is expressed in the dynamic marginal effect by low-pay status in $t-1$ (first row of table 3). The effect is positive and significant, which indicates that having a low-paid job in period $t-1$ significantly increases the probability of being low-paid in period t , and the magnitude of the effect is about 12 percentage points. This result confirms the existence of genuine state dependence in low pay in Czechia. The outcome is in line with the results of Clark and Kanellopoulos (2013) for Western Europe.

Apparently, accounting for observed and unobserved factors as well as for endogeneity of initial conditions is important in studying low pay. In the raw data, low-pay persistence was 0.726 (column (f) of table 1). When controlling for observable factors in a simple probit regression on pooled data, the marginal effect of low-pay status in $t-1$ drops to 0.553 (eq. 1 without term α_i ; results not reported). Consequently, when controlling for unobservable characteristics as well in a panel probit regression, it declines further to 0.238 (eq. 1 without the generalised residual from the first stage of Orme's procedure; results not reported) and then, finally, to 0.116 when the endogenous initial selection is controlled for (baseline estimation of eq. 1, column (a) of table 3).

Columns (b)–(f) of table 3 offer the results of robustness checks on our estimations, utilising five different alternative measures of low pay. Firstly, we use the low pay threshold defined as two-thirds of national median in the wage sphere and salary sphere instead of the sample median (the national median is higher than in the survey sample and is associated with higher figures of low-pay incidence).¹⁶ Next, we modify the threshold to one-half of the sample median wage. Lastly, we define the low-paid population as those earning wages within the first quartile and first three deciles of the wage distribution.

The results of the robustness checks generally confirm the baseline estimates with some minor differences, mainly stemming from the different size of the low-paid sample, which also affects the degree of persistence. The lowest persistence is found in the sample where low-pay threshold is defined as one half of the sample median, which implies a rather low incidence of low pay (4.7% only; see the last row of table 3). Generally, the larger the low-paid population

¹⁶ Wage sphere and salary sphere, defined by the official statistics of The Average Earnings Information System (ISPV), correspond with the business sector and state sector. The wage sphere has a substantially lower median value than the salary sphere in Czechia (for instance, in 2019, the wage median was CZK 30,158 in wage sphere and CZK 36,433 in salary sphere).

defined by a particular threshold, the greater the degree of persistence. Nevertheless, significant state dependence was revealed under all definitions employed.

7. Conclusion

In this article, we analysed the extent of low-wage employment, its nature and its persistence in Czechia, a post-transition country of Central and Eastern Europe. For this purpose, we use a pooled longitudinal dataset from the EU-SILC survey covering 2004–17. We examine the determinants of low pay at the individual level and, after controlling for both the observed and unobserved heterogeneity of workers and endogeneity of initial conditions, we estimate the degree of low-pay persistence in the sense of state dependence.

Our findings indicate that having a low-paid job significantly increases the probability of being low paid in the next period and the magnitude of the effect is about 12 percentage points. The existence of state dependence was confirmed by estimations made with various low-pay thresholds employed. That means that low-paid jobs to a certain degree predispose workers to stay low-paid in the future, regardless of personal or job characteristics. The most important personal characteristics that affect the likelihood of low pay are lower education and higher age. Furthermore, women have significantly higher probability of low pay than men. In contrast, the type of occupation does not seem to have a significant effect.

Our results have several policy implications. Firstly, the role of education and qualification is crucial to fighting low wages in Czechia. Higher education attainment significantly increases the chances of workers leaving low-paid jobs. Secondly, it is not primarily young workers who are in danger of getting stuck in low-paid jobs: older workers have a higher likelihood of being low-paid. Here, training and increasing the qualification of older workers play a prominent role in leaving the low-wage situation. Thirdly, our results support the relevance of policies promoting equal pay for men and women. Czechia exhibits one of the greatest gender wage inequalities among EU countries, and the lower wages of women are also reflected in their higher likelihood of being low-paid compared to men. The data also suggests the existence of a positive link between low pay and poverty, which is, however, not straightforward since the vast majority of low-paid workers in Czechia do not live in poor households. Nevertheless, low pay may turn into a pathway to long-term in-work poverty and social exclusion for those workers who are persistently trapped in low-paid jobs. The degree of low-pay persistence may be to a certain extent related to a country's labour market institutional framework (Clark and Kanellopoulos, 2013), similar to other labour market

outcomes. However, identifying the particular institutional factors that exert an effect is left for future research.

To our best knowledge, this article represents one of the first studies on low-pay persistence in the CEE region. Our results suggest that the degree of low-pay persistence in Czechia is comparable to some Western European countries as estimated by previous research. While there are substantial cross-country differences in wage mobility across European countries (Bachmann et al., 2016) and income inequalities in Czechia are generally low, further comparative research on the CEE would bring more insights into patterns of low-wage employment in this region.

8. References

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