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THE DISABILITY INCOME GAP: HOW DOES THE LEVEL OF EDUCATION AFFECT THE INCOME SITUATION OF PEOPLE WITH DISABILITIES?

LUKA DOCHODOWA OSÓB Z NIEPEŁNOSPRAWNOŚCIAMI: JAK POZIOM WYKSZTAŁCENIA WPŁYWA NA SYTUACJĘ DOCHODOWĄ OSÓB Z NIEPEŁNOSPRAWNOŚCIAMI?

This paper investigates the disability income gap, considering educational attainment for 2010 and 2019 based on microdata from the Luxembourg Income Study for Austria, Germany, and Poland. Using the Dagum density function to model net monthly individual income, selected characteristics of income distribution were determined, together with the Gini coefficient and the proposed measures of the disability income gap. To assess the distance between the income distribution of individuals with and without disabilities in the years under consideration, the Bhattacharyya distance was calculated. The added value of the article is the proposal of a new approach to the study of financial disadvantage by using the disability income gap, which allows for a broader analysis of the financial situation of people with disabilities. The conducted research confirmed that individuals with disabilities consistently face worse financial conditions. Moreover, the indicated disability income gap increases at higher education levels. This counterintuitive finding suggests a labour market disadvantage, as highly educated individuals with disabilities tend to experience relatively larger income disparities. Based on the Bhattacharyya distance, it was found that over time, differences in income distribution between people without and with disabilities decreased in Austria and Germany but increased in Poland. Nonetheless, considering the income distributions of individuals who possess higher educational attainment, it should be noted that the distance between the density function between individuals with and without disabilities has increased in all countries. Income inequality patterns varied: Austria and Germany saw lower inequality measured by the Gini coefficient among people with disabilities, while Poland observed higher inequality.

Keywords: disability income gap; educational attainment; income distribution; people with disabilities on the labour market; income inequality

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Artykuł bada lukę dochodową osób z niepełnosprawnościami (uwzględniając ich poziom wykształcenia) na podstawie mikrodanych dla Austrii, Niemiec i Polski dla roku 2010 i 2019, pochodzących

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z Luxembourg Income Study. Wykorzystując funkcję gęstości rozkładu Daguma dla miesięcznego dochodu netto, wyznaczono wybrane charakterystyki rozkładu dochodów, współczynnik Giniego oraz miary luki dochodowej osób z niepełnosprawnościami. Aby ocenić odległość między rozkładem dochodów osób z niepełnosprawnościami i osób pełnosprawnych w badanych latach, obliczono miarę odległości Bhattacharyya. Wartością dodaną artykułu jest propozycja nowego podejścia do badania dyskryminacji finansowej z wykorzystaniem luki dochodowej osób z niepełnosprawnościami, co pozwala na szerszą analizę sytuacji finansowej osób z niepełnosprawnościami. Przeprowadzone badania potwierdziły, że osoby z niepełnosprawnościami borykają się z gorszą sytuacją finansową. Co więcej, wykazano, że luka dochodowa osób z niepełnosprawnościami zwiększa się wraz z poziomem wykształcenia. To sprzeczne z intuicją ustalenie sugeruje niekorzystną sytuację na rynku pracy, ponieważ osoby z niepełnosprawnościami z wyższym wykształceniem doświadczają relatywnie największych dysproporcji w dochodach. Na podstawie miary odległości Bhattacharyya stwierdzono, że z czasem różnice w rozkładzie dochodów między osobami sprawnymi i z niepełnosprawnościami zmniejszyły się w Austrii i Niemczech, ale wzrosły w Polsce. Niemniej jednak, biorąc pod uwagę rozkład dochodów osób z wyższym wykształceniem, należy zauważyć, że odległość między funkcją gęstości dochodów między osobami z niepełnosprawnościami i osobami sprawnymi wzrosła we wszystkich krajach. Wzorce nierówności dochodów były zróżnicowane: w Austrii i Niemczech odnotowano niższy poziom nierówności mierzony współczynnikiem Giniego wśród osób z niepełnosprawnościami, podczas gdy w Polsce zaobserwowano wyższy poziom nierówności.

Słowa kluczowe: luka dochodowa osób z niepełnosprawnościami; poziom wykształcenia; rozkład dochodów; osoby z niepełnosprawnościami na rynku pracy; nierówności dochodowe
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I. INTRODUCTION

Disability entails a range of multifaceted consequences for affected individuals, spanning biological, psychological, social, and economic domains. These consequences often interact with each other, shaping the overall impact of disability on a person's life. Individuals with disabilities constitute a group at increased risk of poverty and social exclusion, both from an objective perspective, measured by the level of income or the standard of apartment equipment, and from a subjective perspective, understood as the perception of one's own financial situation (Bakalarczyk, 2020; Clausen & Barrantes, 2020; Ćwiek et al., 2022; Pinilla-Roncancio et al., 2020; Ulman, 2011). Households that include at least one person with disabilities have on average worse living conditions and accumulate less wealth than households of people without disabilities (Mitra, 2018). According to Pinilla-Roncancio and Alkire (2020) in five out of 11 low- and middle-income countries people living in households with members with disabilities face higher level of poverty measured using Multi-dimensional Poverty Index. Moreover, it was found that differences between the levels of poverty were larger in middle-income countries.

The worse average financial situation of people with disabilities is caused, on the one hand, by their lower economic activity compared to other people, and, on the other hand, by lower remuneration. This situation is also attributable to the lower educational attainment of persons with disabilities compared

to the general population (Eurostat, 2024). Another significant factor is the severity and type of disability, which determine individuals' capacity to participate in the labour market and lead to the concentration of persons with disabilities in specific sectors of the economy, thereby contributing to reduced salary levels. The phenomenon of certain groups of workers (e.g. people with disabilities, women, minorities) being concentrated in specific sectors of the labour market, causing a 'crowding' effect and leading to differences in earnings and working conditions, is described in the literature as the crowding hypothesis (Bates & Fuschfeld, 2005; Small, 2022; Solberg, 2005). According to the European Union Statistics on Income and Living Conditions (EU-SILC) in 2023, in the European Union countries the economic activity rate of people with disabilities was on average 14.4% lower than in the group of non-disabled (Eurostat, 2024). The obstacles preventing people with disabilities from taking up work include those related to the labour market, such as a small number of job offers, the lack of a transparent and stable system of subsidizing the employment of people with disabilities over time, and even the reluctance of employers. As research shows, many employers have concerns about the ability of individuals with disabilities to work, starting from the number of qualified potential workers, through the performance and the cost of accommodations to the impact of people with disabilities on staff (Bonaccio et al., 2020). On the employees' side, obstacles may include: lack of motivation, recipient attitude, lack of self-confidence or communication exclusion (Garncarz & Żak, 2019; McKinney & Swartz, 2021; Stec, 2019). Nevertheless, Ali et al. (2011) based on General Social Survey with 2,777 respondents, indicated that individuals with disabilities report readiness to work and do not express different preferences over the job characteristics. According to research of Jones et al. (2014), based on the Household, Income and Labour Dynamics in Australia (HILDA) Survey (2001–2008), people with disabilities often work in low-prestige and poorly paid positions. Kaye et al. (2011) indicated lack of awareness of disability, fear of legal liability, and concern over costs as key barriers to employing people with disabilities. According to research conducted by Mitra and Kruse (2016) based on data from the 2010, 2012 and 2014 Displaced Worker Supplements of the Current Population Survey in the United States, workers with disabilities were more likely to experience an involuntary job loss than people without disabilities. This difference was 75% for men and 89% for women. Lindstrom et al. (2020) confirm that women with disabilities have greater difficulties in entering the labour market. According to research based on a national survey in Canada, it was found that people with disabilities experience lower employment quality in the form of instrumental or precarious employment (Shahidi et al., 2023).

Employees with disabilities experience worse treatment not only in terms of employment conditions, but also financially. According to the Equality and Human Rights Commission, the disability pay gap in the period 1997–2014 was 13% for men and 7% for women with disabilities, with the size of the pay gap varying depending on the nature of the disability (Longhi, 2017). The findings of Kruse et al. (2018) confirm that only part of the disability pay

gap results from productivity-related job requirements. The remaining part reflects potential discrimination. Based on data from the American Community Survey (2008–2014) they stated that the discrimination-related pay gaps are largest for people with cognitive and mobility impairments the most. This problem affects people with hearing impairments the least. In a subsequent study, Krause et al. (2024) documented employment and earnings gaps related to specific disabilities and limitations using data from the 2017–2021 American Community Survey, as well as data from the 2014 Survey of Income and Program Participation data. The study found that almost all activity limitations and impairments are associated not only with lower employment but also with lower earnings. Particularly low employment was found among people with mobility impairments, while especially low earnings were observed among workers with cognitive impairments. The study concluded that assistive technology accommodations can improve the employment rate of people with disabilities to some extent. To achieve maximum benefit, it is important to work with users to understand their specific needs and identify creative and inclusive solutions.

All of the studies mentioned above point to the disadvantage experienced by people with disabilities as a result of the pay gap. However, these approaches do not fully characterize the financial situation of people with disabilities, because remuneration is only one component of income. Disadvantage in remuneration results in a poorer income situation for people with disabilities. Jajtner et al. (2020) used data from the Annual Social and Economic Supplement to the Current Population Survey and the work limitation disability measure to estimate decomposable generalized entropy measures of income inequality, as well as the progressivity of government transfers and disability payments. They found that inequality within the group of households with people with disabilities was around 30% higher than inequality within the group of households without work limitations. Additionally, the situation is made worse by the fact that people with disabilities need additional resources to achieve the same standard of living as non-disabled people, as a result of differences in needs, including health needs (Ćwiek & Wałęga, 2023; Mitra et al., 2017; Zaidi & Burchardt, 2005). Hence, this article fills a research gap by describing the income distribution and inequalities among people with disabilities compared to non-disabled people, thereby allowing the disability income gap in selected European countries to be determined.

Bearing in mind the above premises, a research problem was addressed and formulated as a set of questions: (1) What differences can be observed in the income distribution between people with disabilities and individuals without disabilities? (2) How is disability associated with the level of income inequality? (3) How do differences in income levels and income inequality among people with and without disabilities change over time? (4) Is the level of educational attainment related to the income distribution and the level of income inequality among people with disabilities compared to people without disabilities? The main aim of the article is to assess the disability income gap in relation to the level of education in selected European countries. Further-

more, detailed objectives of the study were defined: (1) to estimate income distributions among people with and without disabilities in selected European countries; (2) to assess the level of income inequality according to the presence or absence of disability; (3) to assess changes in income distributions and income inequalities among individuals with and without disabilities over time; (4) to compare income distribution and the level of inequality among people with and without disabilities according to the level of education attainment. The added value of the article is the proposal of a new approach to the study of financial disadvantage by using the disability income gap, which allows for a broader analysis of the financial situation of people with disabilities.

In order to characterize the differences in the income levels of people with and without disabilities, descriptive characteristics based on Dagum density functions, as well as the disability income gap and the Gini coefficient were calculated for different levels of education and overall. The calculations were made on the basis of microdata from 2010 and 2019 from the Luxembourg Income Study (LIS) database, which allowed the dynamics of the disability income gap to be assessed. The analyses were conducted for Austria, Germany, and Poland. The selection of these countries is not intended to provide a representative set of European welfare state models but rather to offer a focused comparative perspective on selected national contexts. Austria and Germany were included as examples of countries sharing a broadly similar Central-Western European welfare state model, characterized by well-developed institutional support for the employment of persons with disabilities, including quota systems for employers and extensive vocational rehabilitation and reintegration instruments. Their inclusion allows for an examination of differences within a relatively homogeneous institutional framework. Poland was selected as a contrasting case representing a Central-Eastern European country that has undergone significant institutional transformation following EU accession, with substantial changes in labour market policies and support mechanisms for persons with disabilities, as well as heterogeneous employment outcomes. All countries included in the analysis are geographically proximate, which limits the influence of spatial factors. Comparing these three countries makes it possible to examine the impact of different policy arrangements and levels of economic development on income disparities between persons with disabilities and those without disabilities.

The year 2010 was selected as the reference point, as it immediately followed the global financial crisis of 2008–2009 and coincided with the publication of the European Disability Strategy 2010–2020 (European Commission, 2010), making it a natural benchmark for assessing the effects of policies in subsequent years. In contrast, 2019 represents the last full year prior to the COVID-19 pandemic. The comparison between 2010 and 2019 allows for an assessment of trends and policy effects under ‘normal’ economic conditions, that is, without pandemic-related disruptions, and captures the long-term outcomes of disability-related policies. To visualize the differences discussed, graphs of theoretical distributions of income density functions were prepared for the cross-sections considered.

II. DATA AND RESEARCH METHODS

The research on the disability income gap was conducted on the basis of microdata from the Luxembourg Income Study from 2010 and 2019. The study covered total net monthly individual income and net monthly individual income by level of education. The variable ‘disability’ indicates whether a person has a certain degree of physical or mental permanent disability, defined as a health condition that permanently limits an individual’s ability to perform basic activities, even if the limitation is partially alleviated by assistive devices or a supportive environment. Three levels of educational attainment were distinguished – primary, secondary and higher education. The research was conducted for three European countries – Austria, Germany, and Poland. The article compares three countries with different levels of development and contrasts two time points, allowing not only a cross-sectional comparison but also for an analysis of changes over time. The dataset for 2010 ranged from 10,534 observations in Austria and 25,766 in Germany to 66,100 in Poland. In 2019, the dataset contained 9,689 observations in Austria, 25,151 in Germany, and 61,157 in Poland. In 2010, the percentage of people with disabilities was 10% in Austria, 12% in Germany, and 11.5% in Poland. In 2019, the figure was 10% in Austria, 11.5% in Germany, and 11% in Poland.

The Dagum model was used to describe the income distribution, as it is considered one of the three-parameter income distributions that best fit the empirical data (Kleiber & Kotz, 2003; Trzcńska & Ćwiek, 2025). The advantage of using the theoretical income distribution is the possibility of estimating models despite the presence of missing data. The density function $F(y)$ and the cumulative distribution function $F(y)$ of this distribution may be written as follows:

$$f(y) = \frac{cb \exp(-a)y^{-(b+1)}}{[1 + \exp(-a)y^{-b}]^{c+1}}, \quad (1)$$

$$F(y) = \frac{1}{[1 + \exp(-a)y^{-b}]^c}, \quad (2)$$

where α , b , c are parameters estimated using Maximum Likelihood Estimation (MLE). To determine the degree of fit of the theoretical distribution to the empirical one, the distribution similarity coefficient W_p , as a goodness-of-fit measure, was calculated. For the empirical data arranged into a grouped frequency distribution with s -class intervals, it can be calculated according to the following formula (Vielrose, 1960):

$$W_p = \sum_{j=1}^s \min \{n_j, \hat{n}_j\}, \quad (3)$$

where n_j and \hat{n}_j represent empirical and theoretical relative frequencies, respectively. The bigger the value of W_p ($0 \leq W_p \leq 1$) the greater the consistency of the compared distributions. For the estimated income distributions, all

similarity coefficients exceeded 0.9, which is considered to indicate a good fit to the empirical distributions. The Gini coefficient was calculated according to the formula:

$$G = \frac{\Gamma(c)\Gamma(2c+\frac{1}{b})}{\Gamma(2c)\Gamma(c+\frac{1}{b})} - 1, \quad (4)$$

where $\Gamma(p)$ is Euler's Gamma function.

To assess the size of the disability income gap, two indicators were calculated: the disability income gap based on the mean and the disability income gap based on the median. The first indicator was calculated as the difference between the mean income of non-disabled people and people with disabilities expressed as a percentage of the mean income of non-disabled people. The disability income gap based on the median was calculated as the difference between the median income of non-disabled people and that of people with disabilities expressed as a percentage of the median income of non-disabled people.

To evaluate the changes in the income distribution of people with and without disabilities that occurred between the years under consideration, the Bhattacharyya distance (d_b) was used. It is based on a comparison of the density functions of two distributions according to the following formula (Bhattacharyya, 1943):

$$\rho = \int \sqrt{f_1(y) * f_2(y)} dy, \quad (5)$$

$$d_b(f_1, f_2) = -\ln \rho, \quad (6)$$

where $\rho \in [0, 1]$. The Bhattacharyya distance takes values from the interval $0 \leq d_b \leq \infty$. The value of zero means that the distributions overlap, in other words, that they are identical. The higher the value of this distance, the more the tested distributions differ from each other. The analysis is descriptive in nature and focuses on comparing income levels between people with disabilities and people without disabilities. Due to the very large sample sizes, formal significance testing would have limited interpretative value, as most differences would be statistically significant due to the high statistical power. Instead, the emphasis was placed on the magnitude and social and economic relevance of the observed differences, which have important social and economic implications.

III. RESULTS

1. Austria

As evidenced by the results of the study, in Austria in 2010 income was positively correlated with educational attainment in both groups of individuals, that is, those with and without disabilities. Detailed characteristics of net

monthly individual income and density functions illustrating income distributions for the studied populations are provided in the Appendix.¹ For non-disabled people, the mean income of those with secondary education amounted to 183% of the mean income of individuals with primary education. In the case of people with disabilities, the premium for secondary education was lower and amounted only to 53%. Nevertheless, obtaining higher education was associated with a 63% higher average income compared to the secondary education level among non-disabled people and a 46% higher average income among people with disabilities. Income inequality measured using the Gini coefficient indicated higher inequality among individuals without disabilities, regardless of education level, which was due to higher incomes in the fourth quartile in the group of non-disabled people. Lower inequality among people with disabilities does not necessarily imply a better financial situation, as it may reflect generally lower income levels across the distribution rather than more favourable income conditions.

In 2019, both in the group of people with disabilities and in the group of those without disabilities, the premium for obtaining secondary education increased compared to 2010. In the group of non-disabled people, the mean income of those with secondary education amounted to 192% of the mean income of individuals with primary education, while in the group of people with disabilities this relation was 160%. Obtaining higher education resulted in an average increase in income by 56% for non-disabled people and 63% for people with disabilities. However, it should be mentioned that despite the higher premium for attaining higher education, individuals with disabilities who graduated from higher education received, on average, a lower income than non-disabled people, because this percentage increase started from a lower baseline value.

To show the difference in individual income between people with and without disabilities in Austria, the disability income gap based on the mean and the median was calculated. The results are presented in Table 1. The largest differences concern the general population, regardless of education level. In 2010, people with disabilities earned an income 27% lower than non-disabled people. In the case of median income, this difference was slightly smaller, amounting to 25%. Differences in average income between people with and without disabilities increased with the level of education. While in the case of primary education, people with disabilities achieved almost the same average income as non-disabled people, in the case of secondary education, people with disabilities had, on average, a 16% lower income, and in the case of higher education, this difference was 25%. In the case of median income, the differences were constant and amounted to approximately 17%, but in the case of primary education, a higher median income was observed among individuals with disabilities.

¹ Appendix is available at <https://doi.org/10.14746/rpeis.2026.88.2.12>

Table 1

Disability income gap in net monthly individual income in Austria
by level of education, 2010 and 2019

Level of education	Disability income gap based on the mean	Disability income gap based on the median	Disability income gap based on the mean	Disability income gap based on the median
Primary education	-0.74%	-17.39%	0.48%	-4.44%
Secondary education	15.51%	15.71%	16.95%	18.57%
Higher education	24.54%	17.18%	13.28%	27.69%
Total	27.00%	24.60%	25.56%	25.39%

Source: the authors' own calculations based on the Luxembourg Income Study.

In Austria in 2019, the average income of people with disabilities was 26% lower than that of non-disabled people. A similar difference was observed for median income. Compared to 2010, the differences in the median income for secondary and higher education increased significantly, to 19% and 28%, respectively. In turn, the median income among people with primary education is 4% higher among people with disabilities.

2. Germany

In Germany, an increase in income was also observed with increasing educational attainment in both groups under consideration, namely individuals with and without disabilities. For non-disabled people, the mean income of those with secondary education amounted to 179% of the mean income of individuals with primary education. In the case of people with disabilities, the advantage associated with secondary education was lower and equalled only 55%. Moreover, obtaining higher education was associated with a 91% higher average income compared to the secondary education level among non-disabled people and a 65% higher average income among people with disabilities. Income inequality measured using the Gini coefficient indicates higher inequality among non-disabled people, regardless of education level. This is probably due to the presence of high or very high income values in this group.

A comparison of the income characteristics of individuals with and without disabilities in Germany between 2010 and 2019 indicates that among non-disabled individuals, the income advantage associated with education declined over this period. The difference between the average income of people with secondary education and the income of people with primary education decreased from 79% to 75%. In the case of the difference between the income of

people with higher and secondary education and that of people with secondary education, it decreased from 91% in 2010 to 86% in 2019. In the group of people with disabilities, the difference between the income of people with secondary education compared to people with primary education also slightly decreased (from 55% in 2010 to 53% in 2019). However, the relation between the income of people with higher education and that of people with secondary education increased. In 2019, the average income of individuals with higher education amounted to 168% of the average income of those with secondary education, whereas in 2010 this ratio was 165%. The level of income inequality measured by the Gini coefficient increased in both groups under consideration.

Table 2 includes the disability income gap based on the mean and the median in Germany. In 2010, people with disabilities achieved an average income that was 25% lower than that of non-disabled people. In the case of median income, this difference was at a similar level and amounted to 26%. Differences in average income between people with and without disabilities increased with the level of education. While people with disabilities with primary education earned almost the same average income as non-disabled individuals, those with secondary education earned about 13% less, and among people with higher education, the gap increased to 25%. When it comes to median income, an interesting situation was noted. Among people with primary education, individuals with disabilities were observed to have a 17% higher median income, whereas among those with secondary education, a higher median income (also by 17%) was recorded for non-disabled individuals.

Table 2

Disability income gap in net monthly individual income in Germany
by level of education, 2010 and 2019

Level of education	Disability income gap based on the mean	Disability income gap based on the median	Disability income gap based on the mean	Disability income gap based on the median
	2010		2019	
Primary education	-0.17%	-17.04%	8.76%	6.76%
Secondary education	13.29%	16.89%	20.59%	18.97%
Higher education	24.89%	23.73%	28.47%	22.55%
Total	24.70%	26.40%	27.40%	22.06%

Source: the authors' own calculations based on the Luxembourg Income Study.

In 2019, the income gap for people with disabilities increased. Overall, people with disabilities obtained an average income 27% lower than that of non-disabled people. These differences also increased with the level of educa-

tion. Individuals with disabilities with primary education had an income 9% lower than non-disabled people. In the case of people with secondary education, the disability income gap was 21%, while among those with higher education, it was as much as 27%.

3. Poland

In the case of the income characteristics of individuals with and without disabilities in Poland in 2010, an increase in income was also observed with higher levels of education. For non-disabled individuals, the average income of those with secondary education amounted to 159% of the average income of individuals with primary education. In the case of people with disabilities, the income advantage associated with secondary education was lower and amounted to only 35%. However, obtaining higher education was associated with a 65% higher average income among non-disabled people and a 73% higher average income among people with disabilities. Income inequality measured using the Gini coefficient indicates a similar level of income inequality in both groups under consideration.

Comparing the results obtained in Poland in 2019 to the characteristics from 2010, it can be concluded that, in both groups under consideration, the differences between the average income of people with different levels of education decreased. The largest decrease in the difference concerns the comparison of income of people with higher and secondary education. Among people with disabilities, it was as many as 15 percentage points (from 73% in 2010 to 58% in 2019), and among non-disabled people, 13 percentage points (from 65% in 2010 to 52% in 2019). The level of income inequality measured by the Gini coefficient decreased in both groups under consideration. However, among individuals without disabilities the value of change was greater.

Table 3 shows the disability income gap based on the mean and the median in Poland. In 2010, people with disabilities achieved an average income that was as much as 43% lower than that of non-disabled people. In the case of median income, this difference was at a similar level and amounted to 41%. The largest differences in average income between people with and without disabilities were observed for people with secondary education (33%) and higher education (30%). In the case of people with primary education, people with disabilities achieved an average income that was 22%.

In 2019, the income gap for people with disabilities decreased slightly and amounted to 41%. The greatest improvement in the situation of people with disabilities compared to those without disabilities was observed for people with secondary education: the disability income gap decreased from 33% to 31%. Nonetheless, in the case of people with primary education, income differences between people with and without disabilities widened: in 2019, individuals with disabilities had an average income of 23% lower than that of non-disabled people.

Table 3

Disability income gap in net monthly individual income in Poland
by level of education, 2010 and 2019

Level of education	Disability income gap based on the mean	Disability income gap based on the median	Disability income gap based on the mean	Disability income gap based on the median
	2010		2019	
Primary education	21.79%	20.23%	22.70%	20.35%
Secondary education	33.45%	37.40%	31.30%	33.17%
Higher education	29.91%	27.03%	28.21%	26.62%
Total	43.12%	41.05%	40.90%	40.14%

Source: the authors' own calculations based on the Luxembourg Income Study.

4. Differences in income distributions between people with and without disabilities in the countries under analysis

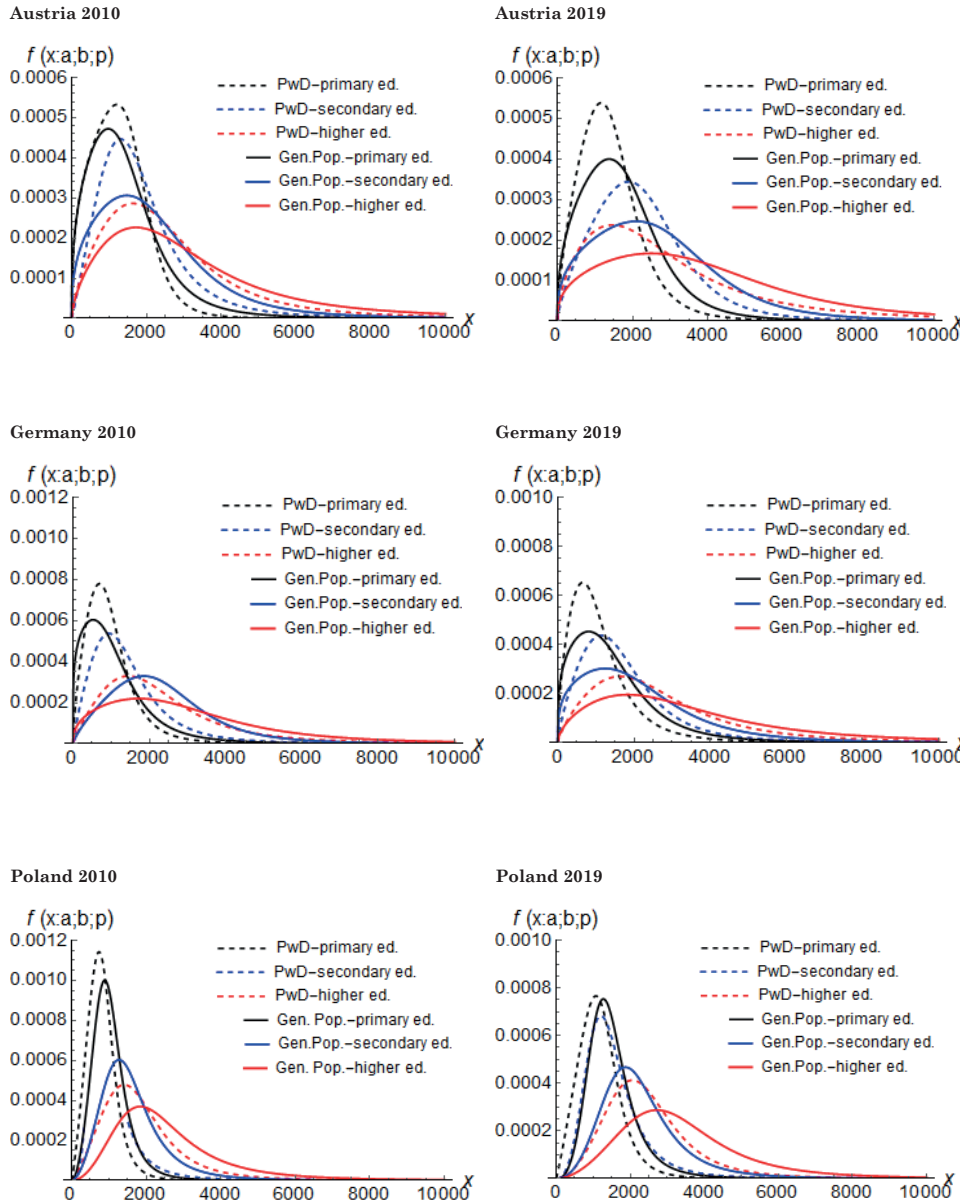
The income distributions, whose key characteristics are presented in the preceding tables, are depicted graphically in Figure 1. The charts illustrate the income distribution for individuals with and without disabilities, in Austria, Germany, and Poland, for different levels of education, across the years 2010 and 2019.

The presented distributions of income density functions confirm the previously drawn conclusions about the lower average income of people with disabilities. The common conclusion visible for each country is that the income distributions of individuals with disabilities are much narrower and shifted to the left, towards lower values, compared to the distributions of non-disabled people. The observed narrowness of distributions for people with disabilities means that most people's incomes are contained within a narrow, limited range. This also indicates an extreme right-sided asymmetry in the income distribution of people with disabilities. This outcome is to be expected, since income distributions are usually characterized by right-sided asymmetry. The rule is that in a society only a small percentage of the population achieves a high income compared to the average or median. However, in the case of the income distribution of people with disabilities, it can be seen that this asymmetry is much greater than in the case of the income distribution of non-disabled people.

In the last step, the Bhattacharyya distance, describing the distance between the income distributions of people with and without disabilities in 2010 and 2019, was calculated (Table 4). The largest distances between distributions were observed in Poland, both for the distribution of total income and for

Figure 1

Income distributions of people with and without disabilities
in 2010 and 2019 in the countries considered by level of education



PwD – People with disabilities. Gen.Pop – General population.

Source: the authors' own calculations based on the Luxembourg Income Study.

the distributions determined by the level of education. In the case of the total population, the distance between the distributions of non-disabled people and disabled people with disabilities is twice as large as in Austria and Germany. The greatest distance concerns individuals with secondary education. This confirms previous research results regarding the disability income gap.

Table 4

Bhattacharyya distance between distributions of net monthly individual income by level of education and disability status, 2010 and 2019

Level of education	Austria	Germany	Poland
		2010	
Primary education	0.0211648	0.0313602	0.0337121
Secondary education	0.0218410	0.0296794	0.0915849
Higher education	0.0423615	0.0444012	0.0490345
Total	0.0420753	0.0516371	0.1063130
		2019	
Primary education	0.0213626	0.0166033	0.0441780
Secondary education	0.0219983	0.0238691	0.0867543
Higher education	0.0769208	0.0630911	0.0589405
Total	0.0405971	0.0384260	0.1153500

Source: the authors' own calculations based on the Luxembourg Income Study.

In 2019, for Austria and Germany, the distance between the income distributions of individuals with and without disabilities decreased, with a greater change in distance observed in Germany. Taking into account the level of education, it turns out that the distance between income density functions decreased only in Germany for people with primary and secondary education. In turn, in Poland, the distance between income distributions increased for people in general and also for individuals with primary and higher education.

IV. DISCUSSION

The conducted research allowed for a detailed analysis of the existing disability income gap in selected European countries in 2010 and 2019. Importantly, the presented research allowed for a comparison of income distributions, including the distances between them and the level of inequality. The obtained results confirmed the worse income situation of people with disabilities compared to people without disabilities in all surveyed countries, which is consistent with the state of knowledge presented in the literature on the

subject (Ćwiek et al., 2022; Ulman, 2011). It has also been shown that the disability income gap widens with higher levels of education. This finding may appear counterintuitive, as lower income among some people with disabilities is often attributed to insufficient qualifications. However, individuals with disabilities who have higher education seem to experience the greatest income disadvantage. It should therefore be presumed that differences in earnings are at least to some extent the result of the unfavourable situation of people with disabilities on the labour market and their low bargaining position (Bonaccio et al., 2020; Lindstrom et al., 2020; Mitra & Kruse, 2016).

However, there are no clear conclusions regarding the level of income inequality among people with disabilities compared to individuals without disabilities. The lower income inequalities observed among persons with disabilities in Austria and Germany, compared to higher inequalities in Poland, can be linked to differences in national welfare state arrangements and labour market institutions. Austria and Germany operate more comprehensive systems of income protection and labour market integration, including compulsory employment quotas, wage subsidies, and vocational rehabilitation programmes, which help to reduce income dispersion within the population of persons with disabilities (Glumann et al., 2025; Gruber et al., 2014; Hiesinger, 2022; Reims & Schels, 2022). In contrast, the higher inequality observed in Poland may reflect the more limited redistributive capacity of the social protection system, lower benefit adequacy, and restricted access to high-quality supported employment, resulting in greater income dispersion among people with disabilities (Kocejko & Głab, 2025; Kubicki & Roszewska, 2022). Higher income inequality among persons with disabilities has also been documented outside Europe, including in the United States over the period 1981–2018 (Jajtner et al., 2020), suggesting that this pattern is not country-specific but linked to broader institutional and labour market mechanisms. Considering changes in income inequality within the group of persons with disabilities, the increase in the Gini coefficient in Austria and Germany, particularly among individuals with higher education, suggests growing differentiation in labour market outcomes within this group. This may indicate that highly educated persons with disabilities benefit more from inclusive labour market policies, while others remain in lower-paid or sheltered employment. In Poland, the decline in inequality, except among individuals with primary education, may reflect income compression driven by relatively uniform disability benefits rather than improved labour market inclusion. The persistence of higher inequality among those with primary education highlights the continued vulnerability of persons with disabilities with low human capital and points to the need for more targeted activation and skills-oriented policies, as well as policies directed at reducing the barriers that people with disabilities face in the education system.

Based on the Bhattacharyya distance, it was found that over time income differences between persons with and without disabilities decreased in Austria and Germany but increased in Poland when income distributions were analysed without differentiation by educational attainment. When the level of

education is taken into account, the distance between the income distributions of persons with and without disabilities increases in all countries for individuals with higher education. This indicates that individuals with disabilities with higher education experience the greatest degree of income disadvantage, and that this unfavourable situation has intensified in recent years. Taken together, the results based on the Bhattacharyya distance and the Gini coefficient consistently point to increasing stratification within the population of persons with disabilities, particularly along educational lines. Importantly, this pattern is observed across countries implementing different social policy models, suggesting that higher educational attainment alone does not eliminate income penalties associated with disability.

The observed problem is crucial both from the point of view of the individual who is treated unfairly and from the point of view of society as a whole. The observed trends lead us to assume that in the future the number of people with disabilities in developed countries will increase as a result of population ageing (Gu et al., 2021; Keating, 2022). Therefore, it is necessary to review existing legislative solutions aimed at ensuring equal access to employment for people with disabilities in terms of their effectiveness. Supporting people in taking up professional activity is also one of the recommendations of the Final Report on the study of the needs of people with disabilities (Sochańska-Kawiecka, 2017). Importantly, professional work is, in addition to being a source of income, also a path to inclusion in social life. It seems, however, that in addition to aid programmes for people with disabilities, social education of entrepreneurs is also necessary, aimed at reducing prejudices against the employment of people with disabilities, which could ultimately help reduce the scope and scale of earnings inequalities. Finally, to create the best possible working conditions for people with disabilities, it is important to understand specific needs and recognise creative and inclusive solutions (Narenthiran et al., 2022; Tagliaro et al., 2024). Accessible design of the workplace concerns not only people with mobility limitations but also employees with mental health problems and neurodivergent employees (Zaniboni & Toftum, 2023).

The conducted research is not free from limitations. First of all, the analysis does not take into account the type and level of disability. Detailed knowledge in this area could be particularly useful for decision-makers in developing detailed aid programmes. It should also be noted that the analysis was carried out taking into account the level of income, assuming that income is the economic category that allows needs to be satisfied. However, the study does not answer the question to what extent the observed income gap is the result of the pay gap and what impact social benefits have on income inequality. The indicated limitations constitute a direction for future research. Considering recent socio-economic developments, such as the increasing prevalence of remote and flexible work, rising living costs, changes in social benefits and disability support policies, and the economic impact of the COVID-19 pandemic, the analysis should be repeated using current data to assess whether the observed patterns in the income situation of people with disabilities remain valid.

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