

Discussion Paper No. 02-34

**Intergenerational Poverty Dynamics
in Poland:
Family Background and Children's
Educational Attainment During Transition**

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Zentrum für Europäische
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Centre for European
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Non-Technical Summary

The transition from a centralised to a market economy in Poland has been accompanied by a deepening of inequality across households in terms of socio-economic status. The question arises whether this inequality is likely to get passed on over generations. If parental poverty has a large impact on the educational prospects of the children, poverty is likely to be transmitted to the next generation because a low level of education dramatically increases the risk of experiencing poverty in the sequel, thus leading to an undesirable poverty dynamic across generations. To analyse how the educational attainment of children in Poland is related to their family background and to assess the extent to which parental poverty is transmitted, we use data from the Polish Labour Force Survey (PLFS) covering most of the transition period from 1992 to 2000.

The results show that children's education is strongly related to their parents' education. The offsprings of self-employed seem to have better, those of unemployed worse educational prospects, all else equal. However, when controlling for personal characteristics such as sex, siblings, health status and the parents' human capital endowment, parents' labour income as well as household income and the parents' labour market situation are only weakly, though significantly, related to the educational attainment of children. Children from farming families seem to be educationally disadvantaged, less so for financial reasons than because of living in rural areas. The Southern provinces of Poland (Slaskie and adjacent voivodships) are those with the best educational prospects while Zachodniopomorskie (in the North-West) and Lubuskie (in the East) provide the worst educational opportunities. The negative impact of a large number of siblings often stated in the literature remains remarkably significant, as well as the better educational achievement of females compared to males.

We conclude that, if poverty transmission takes place between generations, this seems to be primarily caused by the inheritance of human capital from parents to children rather than by pure wealth effects.

Intergenerational Poverty Dynamics in Poland: Family Background and Children's Educational Attainment During Transition

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Abstract

In this paper, we analyse the intergenerational transmission of poverty from Polish parents to their children through children's educational attainment during the transition process of the 1990s. The relationship between family background and education is investigated using an ordered probit model of educational attainment with data from the Polish Labour Force Survey. The results show that children's education is strongly related to household structure, parents' education, city size, and region of residence. Household income and the parents' labour market situation have only a weak, though significant, effect on children's education. We conclude that, if poverty transmission takes place between generations, this seems to be primarily caused by the inheritance of human capital rather than by pure wealth effects.

JEL classifications: I21, P36

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1 Introduction

The transition process from a centralised to a market economy in Poland has led to a higher average standard of living within the population. However, transition has also been accompanied by a deepening of inequality across households in terms of socio-economic status. As economic differences between households in terms of their labour market access, educational background, region and other socio-demographic characteristics are suspected to prohibit the equality of socio-economic opportunities for children, this inequality might become even more severe for the next generation. Indeed, the family represents the crucial link that passes socio-economic endowments of the older generation (parents) to the younger one (children). In particular, if parental poverty has a large impact on the educational prospects of the children, poverty is likely to get passed on over generations because a low level of education dramatically increases the risk of experiencing poverty in the sequel. The transition process may exhibit a detrimental dynamic by which poor education and poor opportunities all over the life-cycle perpetuate across generations. The most disadvantaged families may be caught in a poverty trap, which may give rise to societal disruptions in the medium run.

The purpose of this paper is therefore to assess the extent to which parental poverty is transmitted to the next generation via the educational attainment of children in Poland. More precisely, we aim at identifying the link between an individual's socio-economic background as mainly provided by the family and his/her educational attainment throughout the transition period. Although the incidence of poverty in Poland as well as the effects of state transfers to relieve poverty have been extensively investigated on a general level by, for example, Golinowska (1996, 1997), Kotowska (1997, 1998), Szulc (1997) and the World Bank (1994, 1995), a microeconomic analysis of the relationship between family background and children's educational attainment during transition is still

missing. Available data sources such as the Polish Labour Force Survey (PLFS) provide information on the social situation as well as on the education level of all household members over the 1990s and therefore enable us to identify the characteristics of disadvantaged families and to investigate how these relate to the educational outcomes of children in such families.

In the remainder of the paper, we will first give a brief overview of the extent and structure of poverty in Poland. Then, we will outline the mechanisms by which poverty may be transmitted from parents to children through the educational achievement of children. In the fourth section, we will present our empirical analysis of the determinants of children's education using data from the Polish Labour Force Survey. After a description of the Polish education system, we provide an overview of the structure and the developments in enrolment rates and educational levels for our sample of the PLFS. Next, we apply an ordered probit model to investigate the relationship between family background and children's educational attainment on a multivariate basis and to identify in particular the role of the parents' financial or labour market situation. The paper concludes with a discussion of the results.

2 Poverty during transition

Although the transition to a market economy has had severe effects on the living conditions of the population through the lifting of price controls, the imposition of fiscal discipline and the cutting of subsidies on the prices of basic commodities (Okrasa 1999b), it has to be stressed that poverty, unlike open unemployment, is not a new phenomenon to Polish society. During the 1970s and 1980s, income inequality was already higher in Poland than in other middle- and eastern European countries (see Golinowska 1998 and references therein). Szulc (1997) argues that absolute poverty in Poland was higher in the 1980s than in the 1990s despite the increase in official unemployment¹. According to Keane and Prasad

¹ Unemployment jumped from being unreported to about 17 percent in 1993 (Okrasa 1999b).

(2002) as well as Sibley and Walsh (2002), the Gini estimate of income inequality hardly changed over the 1990s at the national level.

However, Golinowska (1997) states, that the 1990s are even though marked by an increase in inequality and hence in relative poverty. In 1994 wages and real income rose again for the first time since 1989 (Golinowska 1998). Nevertheless, mobility out of poverty was limited. The fraction of those who remained poor for two consecutive years according to the official social-minimum criterion² increased from 45 percent in 1988/89 to 72 percent in the recession period 1991/92 (Okrasa 1999b). During the growth period of 1993 to 1996, the percentage stabilized at about 60 percent³. That is, the pool of poor people seems to have been rather stagnant. In industrial regions, it consists mainly of (former) blue collar workers, as Kotowska (1997, 1998) shows. Despite the difficulties faced by industrial blue-collar workers, the most dramatic decline in average incomes in the early transition phase was observed in farmers' households (37 percent between 1988 and 1992) (Golinowska 1997). Moreover, households associated with agriculture had a greater risk of falling into long-term poverty than employee or pensioner households (Okrasa 1999b).

Poverty is also strongly related to unemployment. Of all households with at least one unemployed member, about 27 percent experience poverty according to the relative poverty line, whereas the share is 10 percent for families not affected by unemployment. The poverty rate is even higher if unemployment benefits are the main source of income (Golinowska 1998). Following Okrasa (1999b), long-term unemployment seems to be associated with chronic poverty.

According to the World Bank, regional variation in poverty incidence is not much pronounced, though existent. When analysing nine regions covering between four to eight voivodships (Polish regions), the capital city region exhibits the lowest

² A low-income threshold had been introduced in 1981 as equal to the 1980 social minimum. It was updated thereafter. The low-income threshold was quite similar to the relative poverty line of half-mean income.

³ Based on the relative poverty line of 50 percent of mean income in Poland for this period.

poverty incidence, whereas in the Southeast and Central-West regions it is highest. Differences were a bit more pronounced according to the human development index used by the United Nations. Accordingly, sub-regional disparities in human development increased in Poland between 1992 and 1995, though the pattern remained unchanged (United Nations 1998). The lowest level of human development was found in the Southeast and on the Baltic coast characterised by many rural areas, the highest in large urban centres. In addition, while controlling for regional fixed effects, Sibley and Walsh (2002) report measures of earnings inequality to be higher in regions that are more advanced in restructuring.

The poverty status of a household is strongly affected by the level of education achieved by the household head. For holders of a university diploma, the risk of falling into poverty is three times as low as for other households (Okrasa 1999a). Using the household budget survey data, the World Bank finds a strong inverse relationship between poverty and education level of the household head. Post-secondary or university education even seem to guarantee a living standard above the poverty line. At the lower end of the education scale, however, the World Bank finds that the poverty rates of various social groups are quite similar. The percentage of people below the poverty line ranges between 23 and 27 when the household head has only an elementary level of education no matter whether he is a worker or a farmer.

To summarise, the households who are most affected by poverty are those living in rural areas, headed by poorly educated people and with unemployed members (see also Okrasa 1999a and 1999b). Moreover, households who prove to be less successful in avoiding poverty are those with a high number of children. A World Bank study (Okrasa 1999b) states that long-term poverty is a generation-skewed phenomenon in the sense that the number of years in poverty grows with the number of children. Poland has an over-proportional share of poor children. Golinowska (1997) also shows that the poverty rate increases as the number of

children in the family gets higher. In 1996, the poverty rate measured by the minimum existence level criterion was 5.3 percent for families with 3 children, and 16 percent when the number of children exceeded 4. Overall, the transition process has considerably increased the social hardship of children (Golinowska 1996 and Unicef 1997).

The overall rise in disparities with respect to income as well as education across Polish families, accompanied by higher costs of education for families, leads to the fear that in the sequel children and young people will face increasingly unequal opportunities (Golinowska 1998). This problem is expected to be most severe for children with an agricultural background. Not only does the typical poor Polish family live in an agricultural region and have many children, but the children themselves also face worse educational prospects than their peers in urban areas, partly due to lower access to education institutions. The United Nations (1998) report that ‘young people of [rural] origin constitute half of the 19-24 age group, but only 2 percent of tertiary students of that age group‘.

Finally, there is evidence that the number of children is strongly related to the education level of the parents. More than 60 percent of parents with three and more children have no secondary education, whereas the overall average is 50 percent (Golinowska 1998). As mentioned above, the poverty status of a household depends on the education level of the household head. At the same time poverty is a question of the number of children and this is in turn related to parents‘ education. It thus becomes evident that the education of parents and children and other household characteristics reinforce each other, thereby creating a vicious circle of economic deprivation.

3 Children’s education as a mechanism of poverty transmission

The extent of poverty and the increase in unemployment arising with the transition process might have far-reaching consequences for the Polish society. To the extent to which poverty is transmitted from one generation to the next, the

transition process will have repercussions which go far beyond the transition period itself. Following the human capital theory of Becker (1964) and Mincer (1974), education is a key element which affects individual earnings prospects. In a broader perspective, educational attainment may be viewed as the primary key to socio-economic success. Indeed, persons with a higher level of education not only have higher earnings prospects when they work, but are also less likely to experience unemployment and social exclusion in general. This link between educational attainment and socio-economic outcomes has been confirmed by numerous empirical studies for a wide range of countries (see for instance a review of the related literature for Europe in Asplund and Pereira (1999)).

For Poland also, it has been found that poor educational achievement strongly enhances the risk of experiencing poverty (World Bank 1994, 1995). Consequently, if parental poverty – understood in a broad sense - has a large impact on the educational prospects of the children, it enhances children's future poverty risk and poverty is likely to be passed on over generations. Considering that the gains from education go far beyond the labour market and have a wide range of positive externalities (on health, criminality, see among others Mayer 1994), it is of substantial interest to analyse the extent to which family background affects one's educational prospects.

Family background may affect children's educational outcomes through various channels. First, children growing in families where the education level of the parents is high might have better educational prospects because they inherit to some extent the learning ability and some other cultural endowments of their parents. Thus, Becker and Tomes (1986), and more recently Ermisch and Francesconi (2001), point to the fact that part of a child's human capital is "inherited" through the transmission of genetic and cultural endowments from parents to children. The greater the degree of inheritability, the more closely related the human capital of parents and children are. Sociologists and psychologist insist on the role of peer effects, meaning that adults or peers to

whom children relate set norms of desirable behaviour and achievement (see Havemann and Wolfe 1995). Thus, educational attainment of the children is influenced by their social background through the transmission of ability as well as of certain patterns of behaviour, preferences and expectations which, to some extent, are internalised by children as standards and affect their cognitive and social-psychological development.

Moreover, parental background might affect offspring's educational outcomes through the availability of financial resources within the family. The acquisition of education may be viewed as an investment, since it entails costs⁴ in the hope that it will bring about enhanced earnings in the future (Becker 1964). For initial education, the investment has to be financed by the parents, who are supposed to have an interest in the well-being of their offsprings, i.e. to be altruistic to some extent. Thus, children's educational outcomes are dependent on intra-family transfers. In the presence of imperfect capital markets, and if the parents do not dispose of enough money - either because their wages are too low, or because they do not dispose of any earnings nor other sources of income - investment in education might be limited by credit constraints (see Rosenzweig and Wolpin 1993).

The positive correlation between family income and schooling attainment is well-documented in the literature, essentially for the United States (Solon 1992, Hill and Duncan 1987, Taubmann 1989) and has been widely interpreted as evidence of borrowing constraints⁵. If parental income also proves to be correlated with children's education for Poland, then the extent of poverty and unemployment,

⁴ The direct costs which might be associated with education, but also the opportunity costs caused by the time devoted to education which is diverted from the labour market and potential earnings.

⁵ However, recently, some studies (e.g. Cameron and Heckman (1998), Shea (2000)) have contested the causal nature of the link between family income and children's educational attainment, arguing that not parental income per se generates higher educational achievement, but rather learning ability, in the sense that the commonly observed effect of parental income would only reflect the correlation between parental income and parental ability, which, in turn, is correlated with children's ability.

for instance, should have repercussions on the educational attainment of the subsequent generations.

Not only the amount of family resources allocated to the children, but also the nature of these resources and the timing of their distribution influence children's attainment. Thus, children will also be affected by such decisions as the number of siblings, the region where the family lives or the family structure (Haveman and Wolfe 1995). Because they generally have fewer potential wage-earners, single-parents families have less access to financial resources than two-parent families (Boggess 1998). They also have less time to spend on their children, supervising their behaviour or assisting them in their school work. A working mother also has less time to devote to her children, but in this case, there is a trade-off between monetary and time resources, and the increased parental income associated with the mother's work might offset the reduction in child care time. In addition there is the cultural aspect of the mother's job status that might have an impact on (particularly female) children's education. Here, the evidence is contradictory, since Hill and Duncan (1987), for instance, find a negative relationship between completed education and mother's work hours, whereas Boggess (1998) does not find any significant impact of mother's employment on children's educational attainment.

There is little evidence on the impact of family background variables like parental education, occupational status or family structure for Poland. Among the few exceptions, Heyns and Bialecki (1993) examine the impact of socio-economic background, as measured by father's education and occupational prestige, on educational attainment for cohorts born between 1920 and 1969. The authors note, that traditionally, upward social mobility is low in Poland and children largely replicate the educational attainments of their parents, which is also argued by the United Nations (1998). Heyns and Bialecki (1993) find that the effect of parental status does not vary across cohorts, and that father's education is a far stronger variable in predicting the educational attainment of

Polish children than occupational variables. The authors conclude that the increase in access to education seems to result from a more widespread availability of schooling rather than from a change in the socio-economic determinants of educational success. This results contrasts with the analysis of the United Nations (1998), which, however, covers a different time period, namely the transition period. Indeed, according to the report of the United Nations (1998), even though the general level of education has increased in Poland since 1989, with a particularly strong expansion of enrolments in higher education, there is evidence that this educational expansion went along with an increase in social disparities in access to education. The report also points to an increase in regional disparities, since young people coming from rural areas have an increasingly difficult access to education at all levels.

4 An empirical analysis of children's educational outcomes

4.1 The Polish education system

In the following, the Polish education system is presented as it was organised throughout the transition period under consideration (see Figure 1). The exposition largely follows that of the Education Information Network in Europe (Eurydice 1999). In 1999, a reform of the education system has taken effect. Structural reforms at the primary level have already been introduced in 1999/2000 whereas the reform of the upper secondary education level will start in the school year 2002/2003. Since the data available to us only cover the pre-reform period, we will restrict our description to the old system. However, we will hint at changes where applicable.

Figure 1 here: The Polish education system

Pre-primary education

The first level of the Polish school system is the mandatory pre-primary education for children aged 3 to 6 in nursery schools and pre-school classes (oddziały przedszkolne) attached to primary schools. In the latter six year-old children have the right to complete a year of preparation for primary education.

Primary education

Primary schools are divided into two stages: the first stage (grades 1 to 3) offering elementary (block) learning and the second stage (grades 4 to 8) at which systematic teaching is provided. Children leave primary school at age 14. There is no leaving examination; children receive the primary school leaving certificate only (swiadectwo ukończenia szkoły podstawowej).

Secondary education

Secondary education covers the age group 15 to 18 or 19 (20). After the completion of the 8-year single structure primary school, pupils have a choice between the following schools:

- liceum ogólnokształcące (4-year general secondary education for students aged 15 to 19)
- liceum zawodowe (4-year general and vocational secondary education for students aged 15 to 19)
- liceum techniczne (4-year secondary education supplemented with general and general vocational subjects for students aged 15 to 19. This school type is comparatively new, established only in the school year 1995/96.)
- technikum (5-year vocational and technical secondary education for students aged 15 to 20)
- szkoła zasadnicza (3-year basic vocational education for students aged 15 to 18)

At the end of the first four types of schools⁶ pupils may take the matura examination (egzamin dojrzalosci), which gives them the right for admission to higher education. Graduates from upper secondary schools in Poland have a wide variety of educational possibilities at the level of tertiary education. Those who do not pass the matura examination or who were not accepted by higher education institutions, may continue their education in post-secondary schools. Basic vocational graduates receive the qualification of skilled workers.⁷

Post-secondary education

Post-secondary schools (szkola policealna), of 1 to 2.5 year duration, are considered as part of secondary education in the Polish classification because of the type of qualifications they offer. They prepare students for professional life. Students in these schools are trained as nurses, accountants, administrative personnel for enterprises and hotels, computer specialists or librarians. Those who have completed a course of study for a blue-collar occupation obtain the title of skilled worker (robotnik wykwalifikowany) in the acquired profession. Those who have completed a 2-year or 2.5-year course of study or a non-worker specialization obtain the title of technician (technik) or an equivalent title.

Higher education

There are various types of non-university and university higher education institution: Teacher training colleges, traditional universities (uniwersytet), technical universities (politechnika) and academies (akademia). At the end of 3 to 4 year higher vocational education, students are awarded the vocational qualification diploma and the title of licencjat or inzynier (both corresponding to bachelor, depending on the branch of study) which gives them access to the job market or to extended higher studies. Universities and university-type institutions with uniform master-degree studies of 4.5 to 6 year duration are entitled to award

⁶ These types of educational institutions will start to be replaced by Liceum profilowane with the school year 2002/2003 and will completely disappear in 2004 respectively 2005.

the professional titles of magister (master), magister inżynier (master-engineer), lekarz (doctor of medicine). Successful graduates can apply to do a doctorate.

Barriers in access to education / Public expenditures for education

Liberalisation and privatisation, as two systemic changes accompanying the transformation to a market economy, have had diverse effects on the merits and costs of education in Poland. While liberalisation of the labour market led to higher returns to education in terms of job prospects and wages, thus increasing the incentive to invest in education, privatisation of the education system resulted in a diversified quantity as well as quality of educational institutions, particularly outside urban areas (United Nations 1998). What has been diversified at the same time, however, is access to education which now more and more depends on the income level of the parents due to the decline of state expenditures and decentralisation of education services together with inadequate funding at the local level and an increase of the costs to be covered by children's parents. In 1992 state support for education was only 80 percent of that in 1989, in 1996 it amounted to 90 percent (United Nations 1998).

4.2 Enrolments and educational attainment during transition

In order to investigate the structure and the determinants of children's educational attainment in Poland, we use data from the Polish Labour Force Survey (PLFS) for the years 1992 to 2000. This way, we are able to cover most of the transition process with less emphasis on the early recession period, though.

The PLFS is conducted as a national panel survey every three months (Szarkowski and Witkowski 1994). After four preliminary quarters starting in May 1992, and repeated on ever the same sample of households, a rotation system has been introduced in May 1993. According to this system, in each quarter one completely new sample of housing units is selected by two-stage sampling. Each sample is used following a 2-(2)-2 rule, that is, a selected

⁷ With the school year 2002/2003 this institution will be changed to *szkola zawodowa* in the reformed school system.

household stays in the survey for two quarters, is out for the next two quarters and back again for another two quarters before it is finally discharged. The survey generally covers all persons aged 15 and above. The respondents fill in two questionnaires: the first one asks for general characteristics at the household level, registering all household members (including children) and gathering information on the housing circumstances and the family relations of all members. The second questionnaire covers only those persons aged 15 and above living in the household. It collects information on socio-demographic and labour-market characteristics at the individual level.

To draw a picture of the changes in the education of young people in Poland during the 1990s and to give a first illustration of the factors mentioned above that are potentially related to it, we are now going to present some stylised facts on enrolments and educational attainment.

Figure 2 here: Enrolment of 15-30 year-olds over time (1992-2000)

Figure 2 depicts the age-profile of participation in education in Poland⁸. The different curves correspond to the years of the survey ranging from 1992 to 2000. As expected, before the age of 15, almost all children are enrolled in education, and enrolment rates then start declining. The decline is characterised by several non-linearities, with one major drop in enrolments occurring above age 18 when basic vocational training is completed. Beyond the age of 30, nearly all individuals have left the education system. From the graphs, it is pretty obvious that enrolments have increased steadily over the past decade, at least until 1999 and particularly for the age range 18 to 24. This means that Polish people now study longer on average than they used to at the beginning of the decade, although, in 2000, the enrolment of 17 to 21-year olds has decreased again, even below the 1998 level for those of age 21. Under 18 and above age 24, however,

⁸ The precise question in the PLFS we refer to is: „Are you a student of a day school or university?“.

the pattern of educational participation has remained relatively stable over time. Lower secondary education has always been on the agenda for teenagers. It seems that there has been a constant upward shift in upper secondary and post-secondary education over the years, though. Whereas in 1992 only 84 percent of 18 year-olds and 20 percent of those aged 21 were studying, in 1999 the respective numbers amounted to 95 and 47 percent. Higher education enrolments only started to increase significantly in 1995, with yet another shift in 1999.

After having seen that participation in education has expanded during the 1990s and that average schooling duration has become longer, we are now interested whether this quantitative expansion of educational participation translated into a qualitative upgrade of educational attainment in the course of the transition from a centralised to a market economy. In addition, we want to get some first insights into the extent of intergenerational mobility and examine the correlation between the highest education level attained by individuals and some essential characteristics of their family background such as parents' education and income as well as the region of residence.

The PFLS does not ask questions on the respondents' parents. However, by means of a household identification number, it is possible to match individuals with their parents provided they live in the same household. Since the likelihood of having left the parental household and living on one's own rises with age, we focus on younger individuals. For the purpose of the analysis we have drawn a sample of individuals whom we could link to their parents, young enough to minimise sample selectivity problems, but at the same time old enough to have finished education or be about to finish it. After trying various ages for the definition of the sample, we have finally selected a sample of 21 year-olds, for which a reasonable proportion of which (about 65 percent) we are able to gather information on their family background. Since a non-negligible part of the 21 year-olds has not finished education at that age yet and is still enrolled in education, we need to take this into account. The PFLS provides information on

the highest degree obtained, and also whether the person is currently enrolled in education or not, though not the specific level of education the person is enrolled in. We combine this information to construct four levels of educational attainment, ordered by level, in the following way:

Table 1: Construction of the education level variable

Education level variable	Highest degree obtained	Enrolled
Level 4: Higher education	University Post-secondary/vocational/general school	yes or no yes
Level 3: Secondary education	Post-secondary school Vocational school General school Basic vocational school Elementary school	no no no yes yes
Level 2: Basic vocational education	Basic vocational school	no
Level 1: Primary education	Elementary school Less than elementary school	no yes or no

First of all, we examine the structure of the highest degrees obtained by our sample of 21-year-olds over the time period 1993 to 2000. Observations from the first wave gathered in 1992 could not be considered since no question concerning the highest level of education that the respondent had attained was asked in that year.

Figure 3 here: Highest education level of 21 year-olds over time (1993-2000)

From Figure 3, it appears that until 1997 the educational distribution is strongly concentrated around intermediate qualification levels. Thus, the bulk of young Polish people has received basic vocational education or upper secondary

education at most, while comparatively few people have attained higher education and even fewer people only hold a primary education degree. Considering developments over time, we can see that there has been an upward shift during the period observed, with a decreasing percentage of persons with poorer educational attainment and an increasing proportion of persons with a higher educational attainment. Looking more in detail, it seems that the educational distribution has remained rather stable until 1995 and that an educational upgrade has only occurred since then, presumably because of the expansion of private education institutions. In particular, the proportion of graduates from tertiary level institutions has increased particularly strongly. In 2000, almost a third of the generation born in 1979 has reached the university level. At the same time, the proportion of basic vocational certificate holders has decreased, especially since 1996. The proportion of 21 year-olds with completed primary education only has also decreased between 1996 and 1997 but is now slightly increasing again.

In the following figures, we examine the structure of educational attainment depending on certain characteristics. Hereby, we pool the data over the period 1993 to 2000 and observe the average educational distribution in this period for different groups of individuals. Figure 4 shows the difference between 21 year old men and women in terms of educational attainment.

Figure 4 here: Highest education level of 21 year-olds by sex (1993-2000)

Obviously, 21 year-old women have reached a higher education level than their male counterparts. As a matter of fact, the proportion of women with a higher education degree and with an upper secondary education degree is by far higher than among men, while the percentage of women having a basic vocational degree or having left school after primary education is significantly lower than for men. These differences may partly be due to the types of occupations young women and men choose, as most of the male-dominated jobs require only basic

vocational training whereas female-dominated occupations are typically preceded by general secondary education.

Figure 5 here: New voivodships of Poland

As we learned in Section 2, it seems that there exist some regional disparities in educational achievement. Therefore, we look at the distribution of educational attainment by region of residence in our sample of 21 year-olds over the time period 1993 to 2000. We thereby distinguish 16 provinces that approximately equal the new Polish voivodships after the territorial reform in 1999 (see Figure 5).⁹

Figure 6 here: Highest education level of 21 year-olds by voivodship (1993-2000)

As appears from Figure 6, overall, the distribution of education looks quite similar across regions, with the same concentration around intermediate qualification levels and comparatively few people with a very high or a very low education level. However, some provinces are outstanding. In the North-East, the proportion of tertiary level graduates is particularly low (Warminsko-Mazurskie is the only voivodship where it is below 20 percent), while the proportion of young people who completed primary education at most is highest. At the other end, the voivodship Slaskie in the South has the highest percentage of graduates from higher education and the lowest with only primary education, followed by Pomorskie in the North-West and the capital region Mazowieckie. Hence, there is not much accordance between these education levels and the picture drawn by the regional poverty rates of the World Bank report. Only the capital city region seems to combine low poverty with a high proportion of high level education.

⁹ New voivodship information is only given in the 2000 wave of the PLFS. For the preceding years we aggregated all old 49 voivodships to have a comparable measure. But as the new

Figure 7 here: Highest education level of 21 year-olds by city size (1993-2000)

More than region, the size of the city of residence seems to matter (see Figure 7). There is a clear and strong relationship between the number of inhabitants of the city of residence and the level of educational attainment. As a matter of fact, in large cities (with more than 100 inhabitants), the proportion of tertiary level graduates is about 3 times as high as in rural areas, while the percentage of 21-year olds who left school after primary education is only about half.

The proportion of children with a basic vocational degree at most is also particularly high in rural areas, while the proportion of young persons with upper secondary education is in general significantly lower than in urban areas, though about the same size as in big cities and not to the same extent as that of higher education graduates. This picture is most likely due to the supply of educational institutions dependent on city size. While universities are located in larger cities, rural areas are not so well endowed, at least in terms of public education institutions.

Since we are interested in the link between parental background and their offspring's educational outcomes, we now examine the correlation between some essential parental characteristics and the highest degree obtained by the children.

Figure 8 here: Highest education level of 21 year-olds by parents' education (1993-2000)

Figure 8 depicts the level of education of 21 year-olds depending on the education level of their parents. Here, parents' education refers to the education level of that parent holding the highest degree and is measured by four categories: primary, basic vocational, secondary and higher education. As parents of 21 year-olds have generally finished their education already, the differentiation is a bit

provinces are based on counties (powiaty) instead of old voivodships we could not always ensure in a 100 percent equivalence.

different from that of their children and the variable on the education level of the parents can easily be computed on the basis of the highest school degree reported. As appears from Figure 8, there is a clear positive correlation between parents' and children's education. While the numbers do not vary that much for upper secondary education, the percentage of youngsters with higher education but also primary and basic vocational education differ remarkably depending on the parents' human capital endowment. For instance, more than two thirds of the individuals with at least one parent having a higher education degree are themselves enrolled in tertiary level studies, while this applies to less than 10 percent of the sons and daughters of poorly educated parents (having completed at most primary education). Conversely, almost two thirds of the young persons whose parents have only completed primary education hold a basic vocational degree or less, while this concerns only 8 percent of those persons with highly educated parents.

Furthermore, we look at the relationship between parental income and children's educational attainment. Unfortunately, no information on total household income has been collected in the PLFS. However, we have information on parents' labour income, but also on the main source of income in the household. Figure 9 illustrates the relationship between children's highest degree and total labour income in the household. Due to a currency reform in Poland and due to high inflation rates, income is not easily comparable between waves. We therefore use a relative measure of income indicating in which tertile (33,33% quantile) of the earnings income distribution the household finds itself or whether the parents receive no labour income at all.

Figure 9 here: Highest education level of 21 year-olds by household labour income (1993-2000)

As can be seen from Figure 9, having parents who fall into the lowest labour income tertile is associated with a lower probability of achieving higher

education and a significantly higher probability of achieving only a basic vocational degree or less. Having parents who are in the highest labour income tertile does improve educational prospects compared to the middle tertile, but only very slightly. Those persons living in households with no labour income have slightly better educational prospects than those living in households of the lowest labour income tertile. This might be explained by the fact that part of the households without any labour income may receive income from other sources, for instance from self-employment or state transfers. In order to consider this issue, in Figure 10 we also examine the correlation between children's educational prospects and the main source from which households draw their income, as this information is also available in the PFLS.

Figure 10 here: Highest education level of 21 year-olds by main source of household income (1993-2000)

It appears that young persons living in households who draw their main income from unemployment benefits or from farm ownership face the worst educational prospects, with an extremely low probability of entering tertiary level studies and a particularly strong probability of completing primary education or basic vocational education at most. On the other hand, children in households having income from self-employment experience significantly better educational prospects. Sons and daughters of pension beneficiaries seem to have worse educational prospects than those of parents who dispose of labour income as a main income source.

4.3 Determinants of educational attainment

While these simple correlations between the education of children and their respective family background characteristics provide us with a first impression of the relations at work, they may as well be misleading in the interpretation of social inequality in educational attainment in Poland. Indeed, as conjectured

above, background variables may be interrelated and therefore reinforce each other. Given a negative correlation, say between the number of children and their educational prospects for instance, one might wrongly attribute the negative impact to the number of children while it actually stems from the fact that families with many children generally live in the countryside and this is, in fact, the relevant factor which negatively affects the educational prospects. Our analysis therefore aims at disentangling the respective impacts of the various factors on educational attainment. In other words, in our analysis of social inequality in educational attainment of young Polish people, we now test whether the links brought up by the empirical literature and partly confirmed by our figures still hold in a multivariate context. This will give us insights into true correlations as opposed to spurious correlations. For this purpose, we set up an econometric model of educational choice which accounts for the impact of various variables simultaneously.

In this model, we suppose that, for each individual, there exists an optimal amount of education he or she would ideally like to attain, given some constraints, and let us call E^* this desired level of educational attainment. E^* is a continuous variable which is not observable. What can be observed is the actual decision of the individual given some characteristics, i.e. the educational level E chosen among the J possible educational alternatives E_j which can be ranked according to their levels, with $j \in \{1 \dots J\}$ and $j=1$ corresponding to lowest and $j=J$ to the highest educational level. The observable educational choice depends on the desired level of schooling and on the opportunities available.

The decision on educational attainment is assumed to be rational in the sense that it maximises the net perceived utility for the individual, subject to some constraints. Note that it does not matter who in fact makes the decision, whether it is the individual himself or somebody else (the parents, for instance). What counts is the outcome of the decision among the possible alternatives. Let us suppose that, for each individual i , with $i \in \{1 \dots N\}$, the desired level of educational

attainment can be expressed as a linear function of a vector of individual characteristics x_i and a residual term ε_i . Thus, we have:

$$E_i^* = \beta x_i + \varepsilon_i$$

As mentioned previously, we do not observe the continuous variable E_i^* , but the discrete level E_i , which is defined to take a value E_{ij} , with $j \in \{1 \dots J\}$, if E_i^* falls within a certain range $[\mu_{j-1}, \mu_j]$:

$$\begin{aligned} E_i &= E_{iJ} & \text{if} & & \mu_J &\geq E_i^* > \mu_{J-1} \\ &E_{i(J-1)} & \text{if} & & \mu_{J-1} &\geq E_i^* > \mu_{J-2} \\ &\dots & & & & \\ &E_{i2} & \text{if} & & \mu_2 &\geq E_i^* > \mu_1 \\ &E_{i1} & \text{if} & & \mu_1 &\geq E_i^* > \mu_0 \end{aligned}$$

with $\mu_J = +\infty$ and $\mu_0 = -\infty$.

Therefore, the probability that an individual i opts for educational level E_{ij} given his/her characteristics x_i is:

$$\begin{aligned} \text{Prob} (E_i = E_{ij} / x) &= \text{Prob} (\mu_j \geq E_i^* > \mu_{j-1}) \\ &= \text{Prob} (\mu_j \geq \beta x_i + \varepsilon_i > \mu_{j-1}) \\ &= \text{Prob} (\mu_j - \beta x_i \geq \varepsilon_i > \mu_{j-1} - \beta x_i) \end{aligned}$$

Assuming that the residual terms ε_i are normally distributed with mean 0 and variance σ^2 , we obtain for all individuals $i \in \{1 \dots N\}$ and educational levels $j \in \{1 \dots J\}$:

$$\text{Prob} (E_i = E_{ij} / x) = \Phi\left(\frac{\mu_j - \beta x_i}{\sigma}\right) - \Phi\left(\frac{\mu_{j-1} - \beta x_i}{\sigma}\right)$$

where Φ is the cumulative standard normal distribution function.

This ordered probit model can only be identified up to a proportionality factor. Since we can only identify the ratio of the parameters with respect to σ , it is usual in such models to normalise σ to 1 (see Maddala 1983, p.23). The parameters β and the threshold values μ can be estimated by maximising the likelihood function:

$$L = \prod_{i=1}^N \prod_{j=1}^J \left[\Phi(\mu_j - \beta x_i) - \Phi(\mu_{j-1} - \beta x_i) \right]^{I_{ij}}$$

where I_{ij} is an indicator variable equal to 1 if the individual i opts for educational level E_j and 0 otherwise.

Maximising L boils down to maximising $\ln L$ since L is a positive function and $\ln L$ is a monotone increasing transformation of L . Thus, the model can be estimated by maximising the log-likelihood function:

$$\ln L = \sum_{i=1}^N \sum_{j=1}^J I_{ij} \ln \left[\Phi(\mu_j - \beta x_i) - \Phi(\mu_{j-1} - \beta x_i) \right]$$

Table 2 presents the estimation results of this ordered probit model applied to the sample of 21 year-olds from the Polish Labour Force Survey for whom we could link the information of their parents. The sample we have retained contains 4136 observations and covers the years between 1993 and 2000. The survey year 1992 could not be considered due to missing information on the completed education level. The dependent variable is the highest education level attained in four ordered levels as defined in section 4.2. To stick to the model notation, E_1 is the lowest level of educational attainment and is defined as primary education or less, E_2 corresponds to basic vocational education, E_3 to upper secondary education and the highest attainable education level E_4 is defined as higher education.

As explanatory variables in the vector of characteristics x_i , we use various indicators of individual features, family structure, parents' human capital and parental wealth. As far as individual characteristics are concerned, a dummy

variable for sex is intended to assess the nature and the extent of differences in educational opportunities for men and women. Another dummy variable controls for the fact that disability might reduce educational prospects. The number of children up to age 15 in the household is also included in the regression as an indicator of family structure. This way, we hope to identify whether the negative correlation often stated in empirical literature between the number of children in the family and poverty (see section 2) has for corollary a correlation between the number of children and the educational attainment of children.

We add further information on city size, people living in rural areas building the reference category in relation to which the coefficient estimates are to be interpreted. Fifteen region dummies have also been included to check whether children living in certain parts of the country are advantaged or disadvantaged compared to the reference category of those residing in the Slaskie voivodship in the South of the country.¹⁰¹¹ Parent's education is represented by the highest educational level attained by the parents. By analogy with the descriptive overview in Section 4.2, we consider the education level of that parent holding the highest degree.

As mentioned above, no information on total household income has been collected in the PLFS, instead only labour income and the main source of income in the household are indicated. Since, according to the literature cited above, this latter variable as well as parents' education are strongly linked to poverty, these variables seem to be good proxies for household income. Analogous to section 2, we use a relative measure of parental labour income which indicates the ratio of total parental labour income to the mean labour income of the year considered.

¹⁰ As in Section 4.2, the voivodship dummies have been built according to the new voivodship definition introduced in 1999. Slaskie has been chosen as the reference category because the percentage of our sample living there is the largest.

¹¹ In sensitivity analyses we tried other regional differentiations, namely the nine macro regions used by the World Bank and a classification of Polish regions into groups of different regional structure according to the methodology proposed by Scarpetta and Huber (1995). Qualitatively, the results hardly vary between classifications.

For an average income, the value of this variable will be one, for parental labour income above (respectively below) average, it will be higher (respectively lower) than one. Since a rather large proportion of our sample do not report any parental labour income, we also include a dummy variable indicating this as an additional control variable. The labour income of the parents might not be the main source of income of the household. Therefore, we also include a set of dummy variables indicating where the main source of income of the household comes from (farm ownership or farm use, self-employment, pension and unemployment benefits or other non-earning sources), while income stemming from employment constitute the references category (see also Figure 10).

In order to better assess the impact of parental unemployment on the educational prospects of the children, we also include a dummy variable representing whether any one of the parents is currently unemployed. Better indicators of the family's financial background at the time when the education decision of the child has been made would probably be the incidence or duration of past unemployment spells of the parents. Unfortunately, this information has not been gathered anymore in the LFS in the years 1997 to 2000, so that we have to draw on the incidence of current unemployment. Anyway, as a rule, current and past unemployment are strongly correlated. Finally, time dummies have been included with a view to capturing the extent of educational expansion over time.

Table 2: Ordered probit estimation results. Dependent variable: Highest degree obtained.

Explanatory variables	Coefficient	Stand. dev.
Female (ref.: Male)	0.500 ***	0.040
Number of children under 15 in the household	-0.083 ***	0.023
Disabled (ref.: Not disabled)	-1.202 ***	0.108
City size (ref.: Rural area)		
<20,000 inhabitants	0.188 ***	0.058
20,000-100,000 inhabitants	0.216 ***	0.050
>100,000 inhabitants	0.310 ***	0.049
Region (ref.: Slaskie)		
Zachodniopomorskie	-0.385 ***	0.093
Pomorskie	-0.163 *	0.088
Warminsko-mazurskie	-0.187 *	0.098
Podlaskie	-0.198 *	0.114
Lubuskie	-0.326 ***	0.100
Wielkopolskie	-0.118	0.075
Kujawsko-pomorskie	-0.117	0.083
Mazowieckie	-0.127 *	0.069
Dolnoslaskie	-0.253 ***	0.079
Lodzkie	-0.258 ***	0.080
Ubelskie	-0.019	0.086
Opolskie	-0.229 **	0.108
Swietokrzyskie	0.017	0.092
Malopolskie	-0.139 *	0.079
Podkarpackie	-0.152	0.095
Highest education of parents (ref.: Primary education)		
Basic vocational education	0.270 ***	0.046
Secondary education	0.766 ***	0.049
Higher education	1.439 ***	0.084
Main source of household income (ref.: Employment)		
Farm ownership or farm use	-0.092	0.069
Self-employment	0.236 ***	0.073
Pension	-0.044	0.054
Unemployment benefits	-0.152	0.116
Parents have no labour income	0.132 *	0.065
Parents' labour income (deviation from yearly mean)	0.124 *	0.050
At least one parent unemployed	-0.180 ***	0.063
Year of observation (ref.: 1993)		
1994	0.038	0.072
1995	-0.038	0.080
1996	0.044	0.071
1997	0.205 ***	0.070
1998	0.207 ***	0.070
1999	0.196 ***	0.070
2000	0.267 ***	0.074
Threshold values: μ_1	-0.740 ***	0.010
μ_2	0.559 ***	0.096
μ_3	1.656 ***	0.098
Log likelihood		-4737.73
Pseudo R ²		0.115
Sample size		4136

Level of statistical significance of the variables: * 10 percent, ** 5 percent and *** 1 percent.

The estimation results reveal that in the transition generation, women do better than men in terms of educational attainment, other things equal. Being female is positively related to one's education level at age 21, which is true at a significance level of 1 percent. The probability of reaching a higher schooling level decreases significantly with the number of children and if the person has a disability. Education is also positively related to city size. As a matter of fact, the education level of 21 year-olds is worst in rural areas, even if other characteristics are controlled for and it is best in cities with more than 100,000 inhabitants. The pattern of relative differences according to city size remains similar to that observed on the bivariate level. Remarkable disparities exist between regions. In Figure 6, it was not easy to compare regions with each others: for instance should a region which has a higher proportion of university graduates than another but at the same time more people with a very low education level be considered as better performing or not? The estimation results provide a kind of synthetic indicator which enables us to rank the regions in terms of educational attainment. The Slaskie voivodship chosen as the reference region appears to be best-performing in terms of the educational attainment of its youth, since all other regional dummies that are significant exhibit a negative sign. However, five regions do not differ significantly from the Slaskie region (Wielkopolskie, Kujawsko-pomorskie, Lubuskie, Swietokrzyskie, Podkarpackie). The region which has the lowest educational attainment of 21 year-olds seems to be the Zachodniopomorskie voivodship, followed by the Lubuskie voivodship.

The education of the parents seems to play a more important role than their employment situation. Thus, children of parents with a higher education degree have by far the best educational prospects, while those having parents having completed at most primary education face the worst educational prospects. While the highest level of education completed by parents is significantly positively linked to the educational attainment of their offsprings, there is only a weak, though significant, negative relation to parents' current unemployment. It has to

be noted that the correlation observed on a bivariate basis between unemployment and poor educational achievement is likely to be spurious for a part and may essentially reflect the fact that parents experiencing unemployment are generally poorly educated.

Parents' labour income seems to be significantly and positively correlated with the educational achievement of the children, though the impact is limited in scope. The relationship seemed to be stronger when only bivariate correlation was considered. This means that part of this correlation actually stems from other variables, most probably from the education of the parents which strongly determines labour income, rather than from the income itself. The main source the household draws its income from does not seem to have a significant influence on children's educational prospects when other factors are controlled for, except that children of self-employed parents face significantly better educational prospects than other children. Note that contrary to the simple correlation analysis above, sons and daughters of households drawing their main income from farm ownership or farm use are not significantly affected when other factors are controlled for (in particular city size might be more determining, as well as parental education etc.), even though the effect might be indirectly captured by the variable on parents' labour income, which has lower values for agricultural households. The same is true for the offsprings of pensioner households.

The year dummies show an effect only for the later transition period from 1997 onwards. The positive signs of the years 1997 and following once again underline the pattern of educational expansion in Poland, with particular jumps in 1997 and 2000, while controlling for individual characteristics.

5 Conclusions

To sum up the results, the links between family background and children's education stated in previous studies and the correlations found in the bivariate

overview can only partly be confirmed by our multivariate analysis. Similar to the results observed in the correlation analysis, the offsprings of self-employed seem to have better, those of unemployed worse educational prospects, all else equal.

However, when controlling for personal characteristics such as sex, siblings, health status and the parents' human capital endowment, parents' labour income is only weakly related to the educational attainment of children. There may be different effects at work. First, the observed bivariate correlation between parental income and children's education may in fact be spurious and essentially the result of parents' education level, which is a strong determinant of parental labour income. This could explain that when "cleaning" the income variable from the education component, only a small effect remains for the income variable. An argument for this is that the parental education variable still has a strong and very significant effect on children's educational outcomes even though a variety of other characteristics are controlled for. Nevertheless, the question remains whether the labour income variable represents a reasonably good approximation of the household's wealth status. Also, the variable depicting the main source of household income indicates the occupational position of the parents rather than a true income effect and only imprecisely proxies the exact household income.

Moreover, children from farming families seem to be educationally disadvantaged, less for financial reasons than because of living in rural areas. The effect of city size is confirmed even in a multivariate context as well as that of the region of residence. The Southern provinces (Slaskie and adjacent voivodships) of the country remain those with the best educational prospects and Zachodniopomorskie (in the North-West) and Lubuskie (in the East) are the provinces with the worst educational prospects, but the ranking of the other regions alters somewhat if other characteristics are controlled for. The negative impact of a large number of children often stated in the literature remains

remarkably significant also in the multivariate context, as well as the better educational achievement of females compared to males.

Overall, in addition to revealing the links between children's education and their socio-economic background, these results point to the usefulness of conducting multivariate analyses instead of relying on bivariate correlations that can only tell us a part of the story.

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Figure 1: The Polish education system

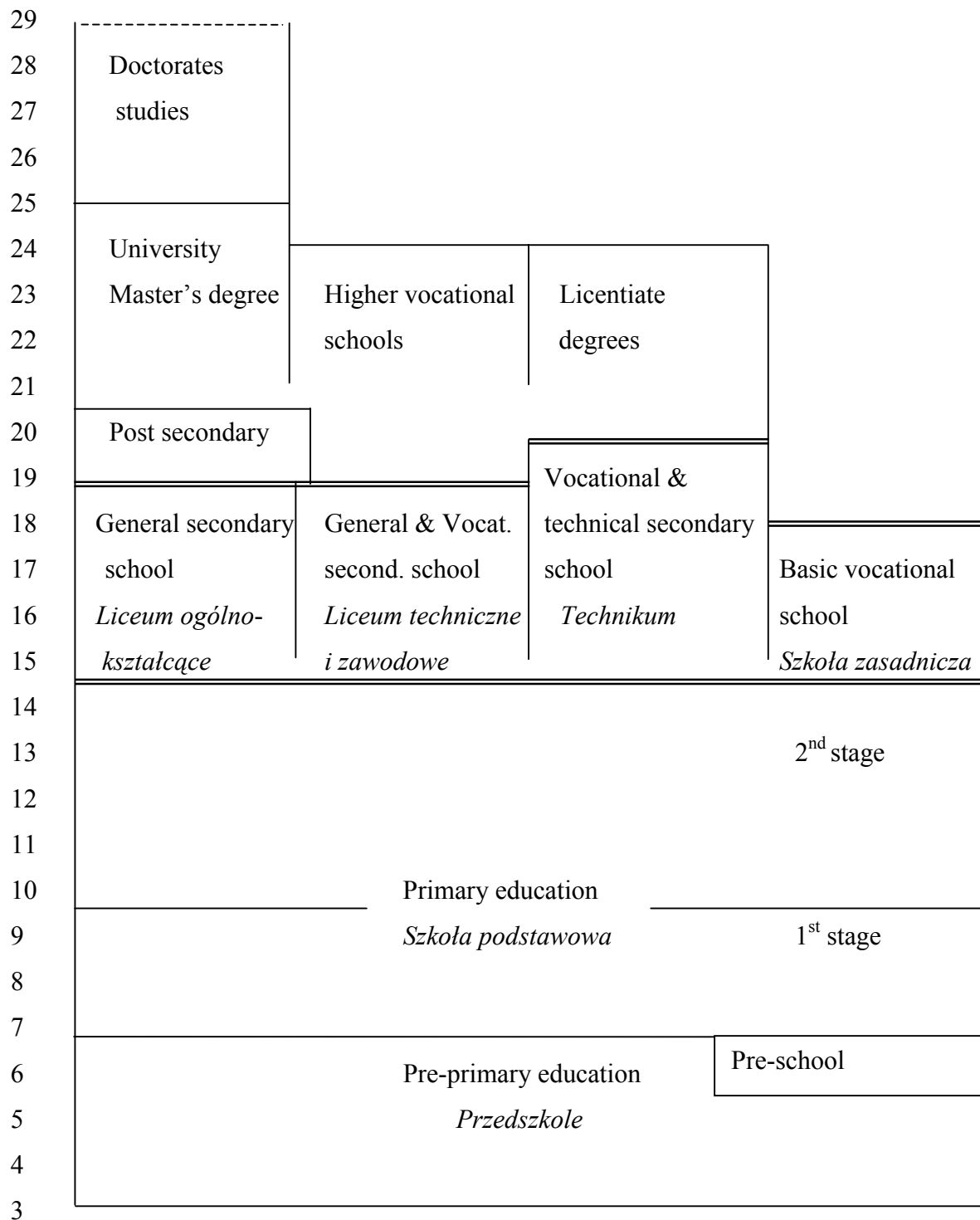


Figure 2: Enrolment rate of 15-30 year-olds over time (1992-2000)

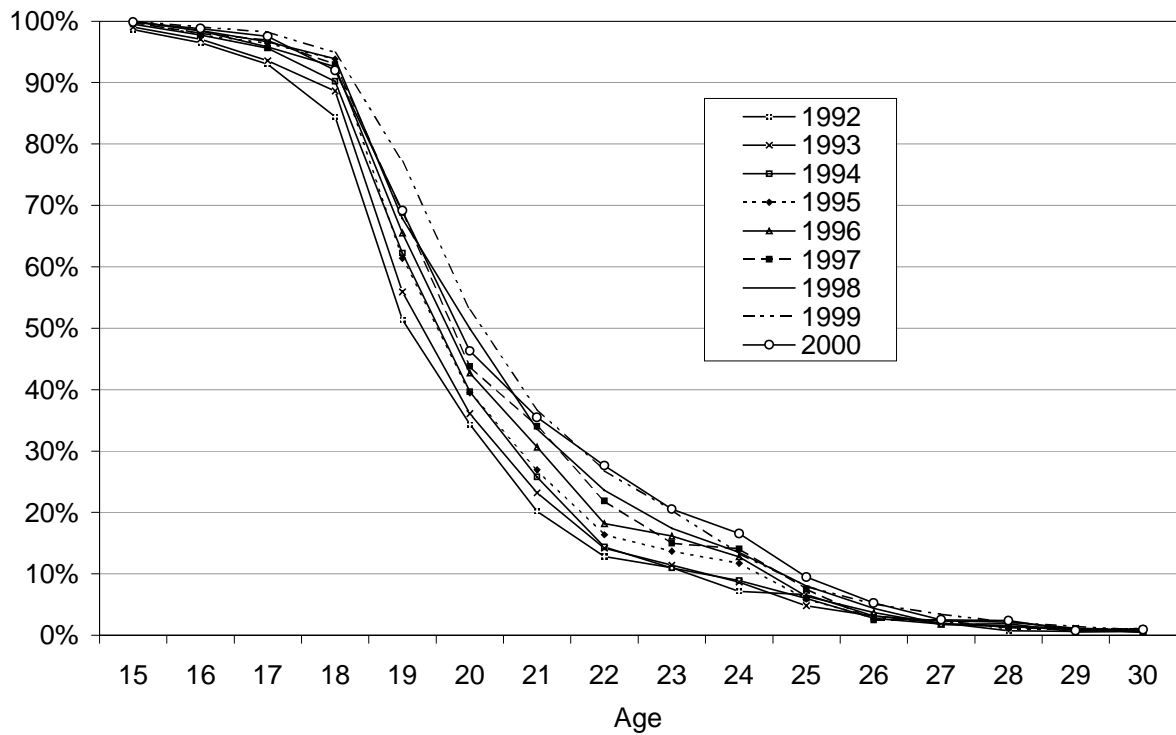


Figure 3: Highest education level of 21 year-olds over time (1993-2000)

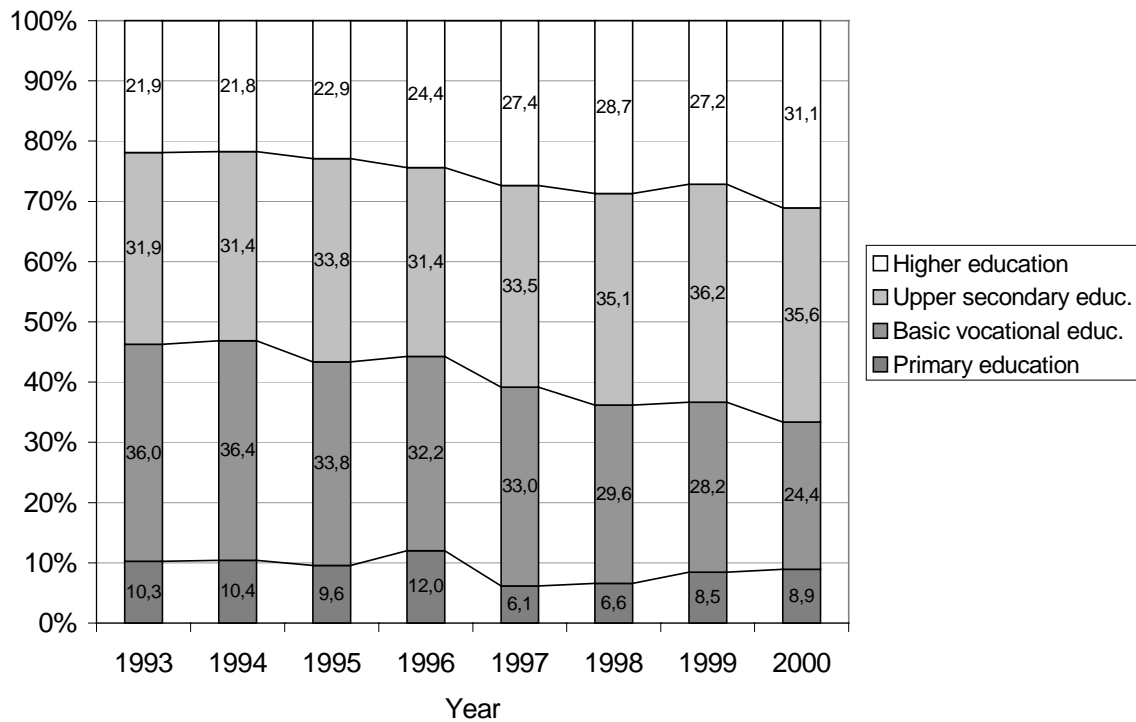


Figure 4: Highest education level of 21 year-olds by gender (1993-2000)

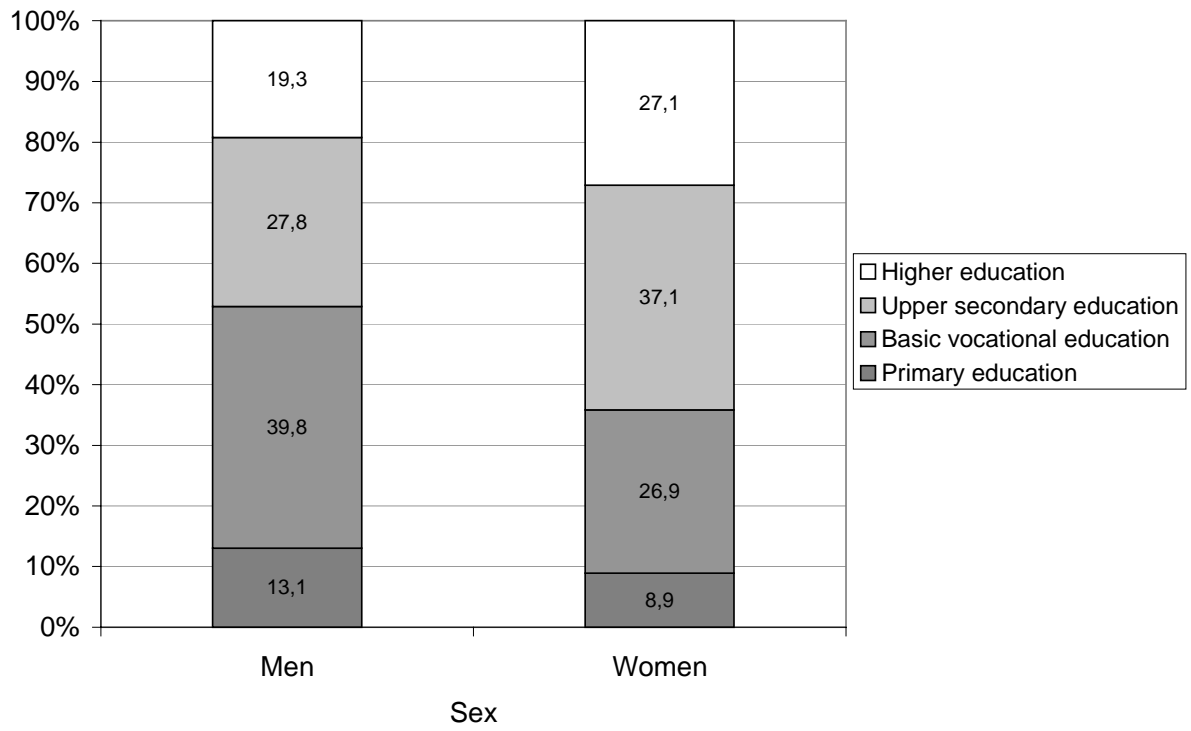
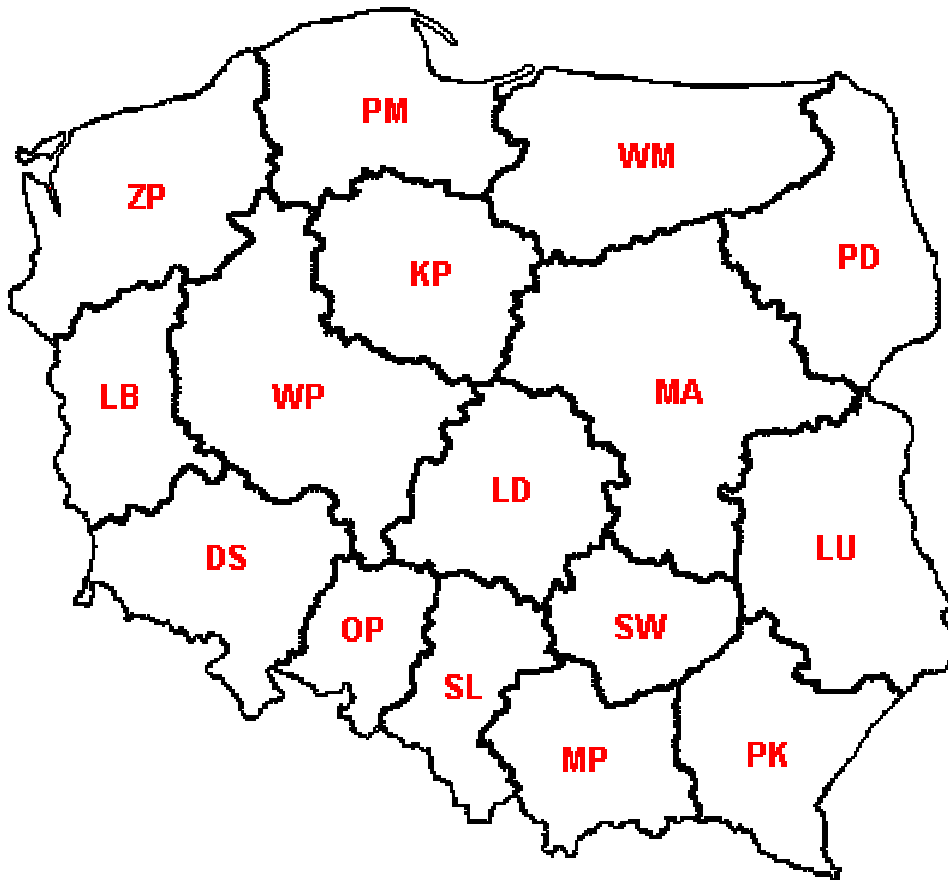


Figure 5: New voivodships of Poland



Code	Voivodship	Capital
DS	dolnoslaskie	Wroclaw
KP	kujawsko-pomorskie	Bydgoszcz & Torun
LB	lubuskie	Gorzow & Zielona Gora
LD	lodzkie	Lodz
LU	lubelskie	Lublin
MA	mazowieckie	Warszawa
MP	malopolskie	Krakow
OP	opolskie	Opole
PD	podlaskie	Bialystok
PK	podkarpackie	Rzeszow
PM	pomorskie	Gdansk
SL	slaskie	Katowice
SW	swietokrzyskie	Kielc
WM	warmińsko-mazurskie	Olsztyn
WP	wielkopolskie	Poznan
ZP	zachodniopomorskie	Szczecin

Figure 6: Highest education level of 21 year-olds by voivodship (1993-2000)

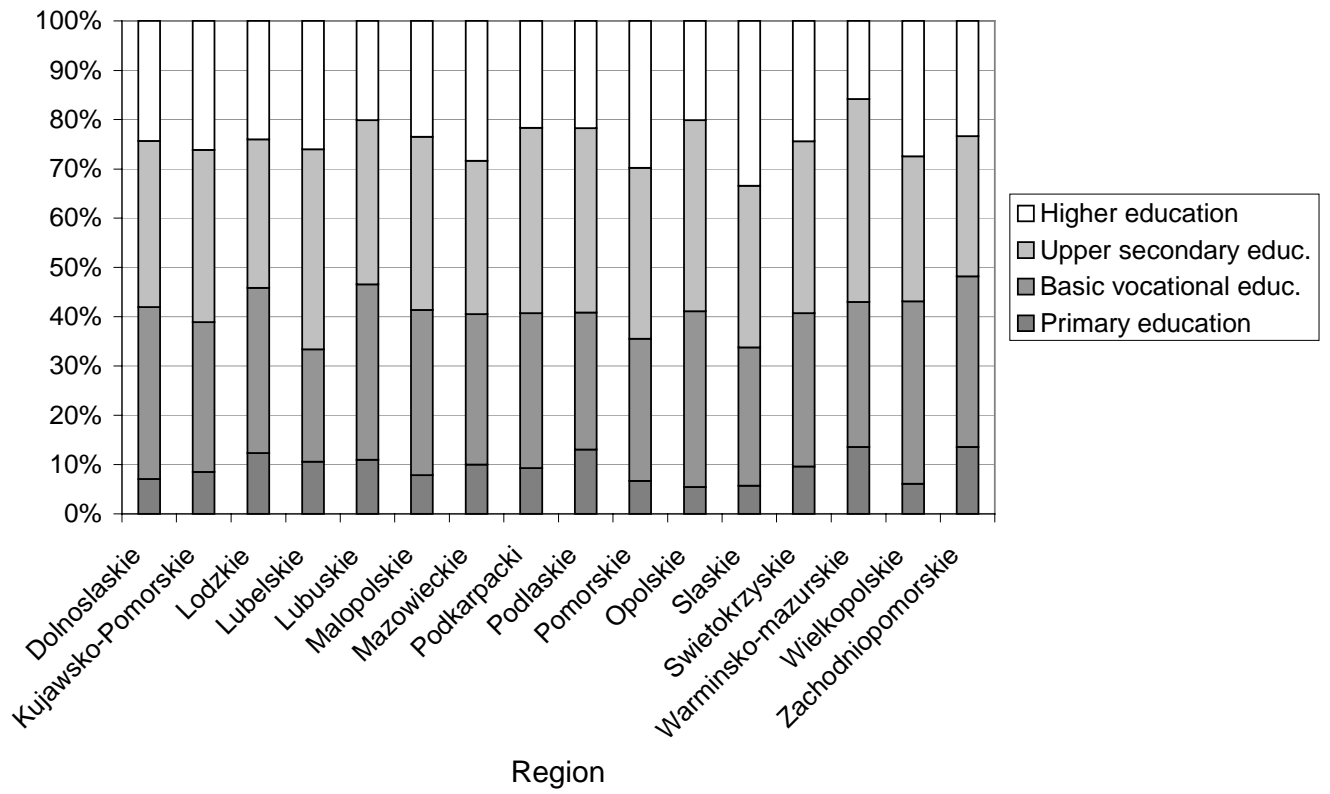


Figure 7: Highest education level of 21 year-olds by city size (1993-2000)

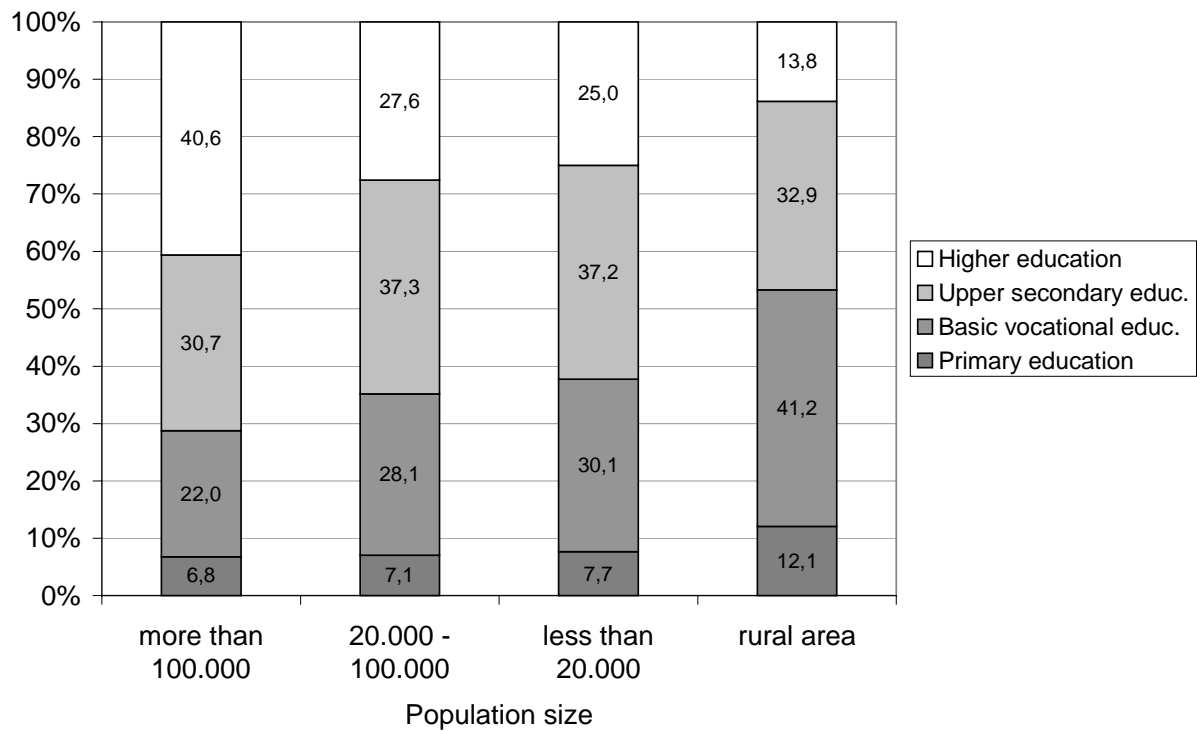


Figure 8: Highest education level of 21 year-olds by parents' education (1993-2000)

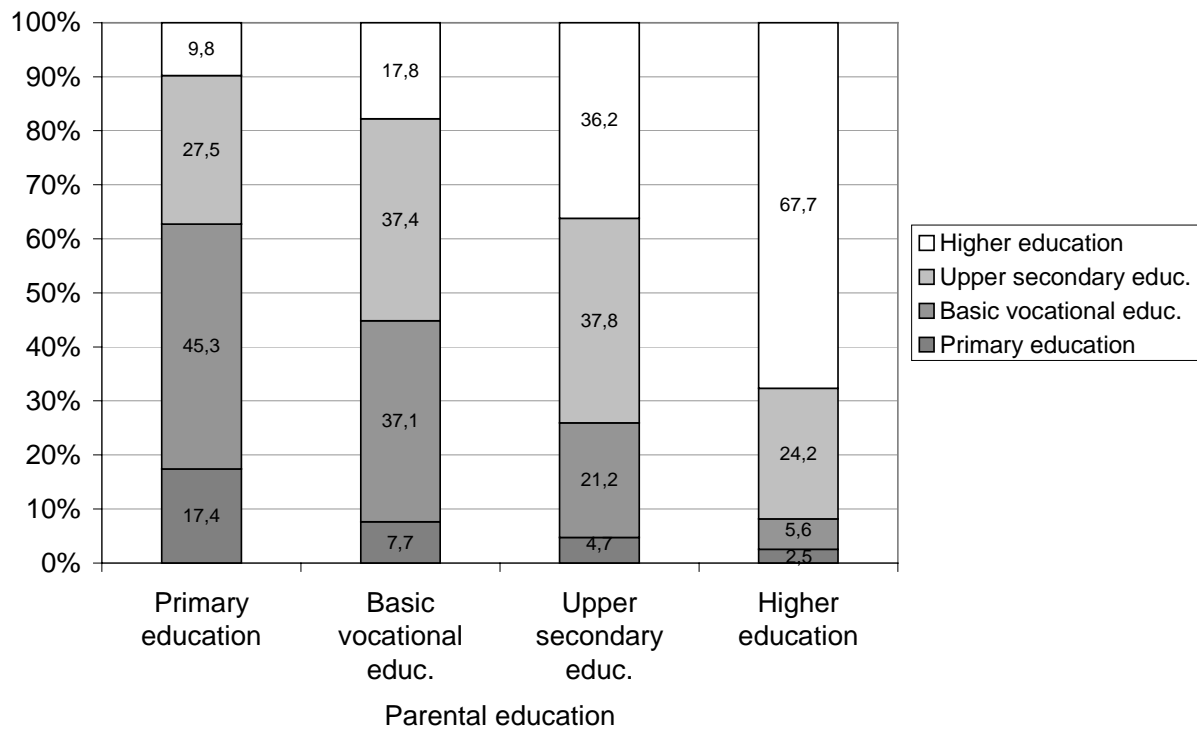


Figure 9: Highest education level of 21 year-olds by household labour income

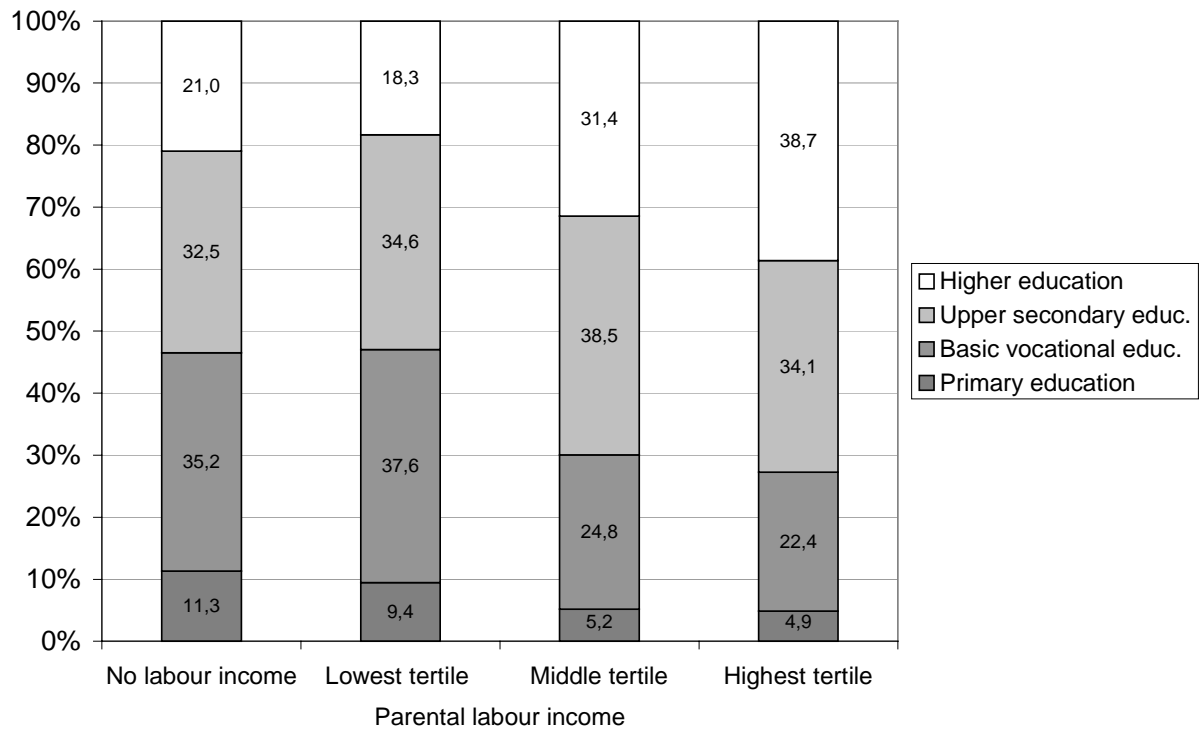


Figure 10: Highest education level of 21 year-olds by main source of household income (1993-2000)

