

## ***1. Equity of access to higher education in the transforming economy. Evidence from Poland***

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## **Abstract:**

This paper demonstrates how the probability of enrolment in tertiary schools evolves for different social groups in Poland over the period of educational boom and expansion of tertiary schooling institutions. It also investigates how the socio-economic status influences the choices between full-time and part-time studies (the latter being of relatively low quality), and the probability of admission to subsidized, free programs versus programs requiring tuition. Using data from the household survey for the period 1995–2008, we show that the expansion of tertiary schooling in Poland has undoubtedly improved the accessibility of universities for students with low family educational background, low income and residing in smaller towns and rural areas. However, if we look at the relative change in the odds of enrollment for different layers of the social strata, we find that the improvement refers to those with low family educational background and living in small settlements, but not to individuals suffering from the low income. Further investigation shows that the policy makers should focus not only on ensuring equal access to tertiary education for the whole social strata, but on allowing the unprivileged groups access to education of acceptable quality.

Keywords: Higher education, equity, participation rate, transformation, Poland

## **1. Introduction**

During the twentieth century, the role and accessibility of tertiary education has been evolving, as the economies and societies of developed countries have evolved. Along with the reduction of employment in agricultural and industrial sectors and the growing demand for an educated labor force, the formerly elitist universities have gradually become more open to students from less socially advantaged families. The demand for education was stimulated by technological progress, emancipation of women, reduction of discriminatory practices toward ethnic minorities (especially in the U.S), and the democratization process. Some studies emphasize the role decolonization plays in stimulating the expansion of higher education in developing countries. Secondary-education expansion and public expenditures for this also played crucial roles in widening access to universities. In effect, as noted by Schofer and Meyer (2005), while in 1900 only about 1% of the relevant age cohort was enrolled in tertiary education institutions worldwide, this indicator reached 20% by the end of the twentieth century. Currently the participation rate in leading countries exceeds 50%. As the author puts it: “a new model of society became institutionalized globally – one in which school knowledge and personnel were seen as appropriate for a wide variety of social positions, and in which many more young people were seen as appropriate candidates for higher education.” A decreasing selectivity of admissions to higher education institutions with respect to U.S. colleges was demonstrated by Hoxby (2009). In Europe, the evolution of the admissions system since World War II is summarized by Hasley (1993), who points out that the progress toward a more egalitarian access to higher education in Europe is associated with the move away from traditional admissions, controlled by university teachers, to the system in which control is more in the hands of politicians and budgetary administrators.

Despite the gradual opening of higher education to the masses, numerous analyses prove that even in the most egalitarian contemporary societies the access to tertiary education remains uneven for different social groups. OECD statistics (see Table 1) show that, in virtually all countries

that were considered, individuals with high socio-economic status are overrepresented among students enrolled in tertiary institutions. This is an important problem, since in the presence of substantial returns to higher education estimated for most economies, barriers in the access to it for socially disadvantaged individuals widen the social and economic gap between groups within societies.

The literature on the equity of access to higher education is mostly oriented toward some clearly defined social groups that were, or still are, (depending on country and social group) considered as being discriminated against. Typically, this refers to race (ethnicity), sex, religion, income, and place of residence. Naturally, the participation of these groups in tertiary education depends not only on the institutional arrangements in the tertiary schooling of particular countries, but also on the access and quality of education at the lower tiers, on the country's history, on its political system, on its economic performance, and on many other factors. Therefore, university enrollment within underprivileged social groups is a measure of equity referring to much broader phenomena, than the education system itself.

Low income is traditionally considered one of the main barriers to achieving higher education, or even enrolling in university. Intuitively, this should apply most of all to the countries in which many tertiary schools are financed through tuition fees and particularly those with underdeveloped assistance programs. Blom and Murakami (2008) demonstrate that in Latin American countries the direct costs of education (tuition fees) represent on average 35% of GDP per capita, as compared with 10% observed for the high income countries. At the same time the available student grants and loans (4% jointly) in Latin America are much lower than these available in more affluent economies (9%).

Insufficient income is still perceived as a barrier against university enrollment in the U.S. (Hill and Winston 2010; Rumberger 2010), but, as observed by Asplund et al. (2008), the liquidity constraint argument in reference to highly developed countries has recently been challenged, with some evidence suggesting that the long-term consequences of poverty in a child's formative years are far more important for subsequent higher education enrollment than is the necessity to cover a direct cost of university admission in a later period.

Mateju et al. (2007) demonstrate in turn that socio-economic status still has a significant effect on college admission expectations at the age of 15, but its magnitude is strongly diversified across OECD countries. Eastern Europe, Italy and Germany are characterized by a strong link between social status and expected educational attainment, while in the U.S., Denmark and France this effect is much weaker. The authors argue that the institutional arrangements for tertiary schooling (including funding method) are of minor importance in determining the equity of access, which is more affected by the degree of "openness" of the secondary education systems in particular countries.

Early formation of college expectations and the weaker than expected influence of direct cost on participation have important implications for the ongoing debate on effective ways of higher education funding, with many authors arguing that, with proper financial assistance to low income students, tuition based systems actually tend to be more equitable than these relying on state subsidies to public universities (Woessmann 2008).

Some less-developed countries still experience a significant gender gap (in favor of men) in access to higher education (Azam and Blom 2008). Low participation of females in tertiary education is no longer an issue in highly developed nations. In fact, in most modern educational systems the rates for women tend to be higher than for men—see Baum and Goodstein (2005) for evidence from the U.S, or Christofides et al. (2010) for Canada. It is argued, however, that the horizontal segregation (across fields of studies rather than levels) is very common despite the ongoing cultural changes (Charles and Bradley 2002). There is also evidence of discriminatory admission practices toward women, a result of their submitting more applications than men do (Baum and Goodstein 2005).

Empirical research proves, also, that even in the countries with a well-developed transport

network, such as Germany, the probability of studying at tertiary level may be significantly influenced by a student's place of residence. Spiess and Wrohlich (2010) show that – controlling for other socio-economic and regional characteristics – distance to the nearest university at the time of completing secondary school significantly affects the decision to enroll in a university. Their results further suggest that the distance effect is driven mainly by transaction costs rather than by neighborhood effects.

Although various types of social disadvantages are believed to have independent influence on higher education accessibility, they frequently overlap for particular individuals. This makes identifying causal relationships and addressing them with effective policy tools challenging. For instance, James (2001) observes that higher education participation for people in rural and isolated areas of Australia may be affected less by distance from university campuses than by socio-economic circumstances and the influences of rural social and cultural contexts. Socio-economic effects are generally more pronounced and pervasive than any effects of location identified by this study.

The U.S. literature on the equity of access to higher education is in large part devoted to racial issues. Affirmative action, while achieving some success in ensuring equal opportunities for individuals of all races, is for many reasons highly controversial and still hotly debated. During the 1990s some states, like Texas, Washington, California, and Florida, banned the direct application of racial criteria in admission process for public universities. Instead they introduced the so-called top x-percent programs, under which students graduating from high school in the top x percent of their school (or class) are guaranteed to qualify for the state university. However, as demonstrated by Long (2004) such programs are unable to replace traditional affirmative action and maintain the proportion of minority students.

The social background has impact on not only the admission process, but also on the propensity to continue studies after the initial year(s). Using French data, Jaoul-Grammare (2007) shows that, although after the first year of university education the probability of continuation depends on academic performance and area of studies, in a later period the socio-economic status plays an important role, with students with stronger family backgrounds being less likely to drop out.

## **2. Conceptual framework and data**

This paper demonstrates how the probability of enrolment in tertiary schools evolves for different social groups in Poland over the period of educational boom and expansion of tertiary schooling institutions. It also investigates how the socio-economic status influences the choices between full-time and part-time studies (the latter being of relatively low quality), and the probability of admission to subsidized, free programs versus programs requiring tuition.

While discussing equity in access to higher education, we focus on the three criteria defining the social groups that potentially have uneven odds of enrollment to tertiary school. The first criterion is the household income, the second describes the student's place of residence and the third refers to the parental education.

The rapid growth of university enrollment in Poland (a fivefold increase over two decades) was accompanied by partial privatization and marketization of the system, previously based exclusively on public schools and financed through subsidies from the central budget. We first discuss the recent developments in Poland's higher education sector, including changes in demand, supply, and public policy toward students and tertiary institutions. Then we show how the tertiary education participation rates were changing between 1994 and 2008 for various social groups. In the next stage, using a logit specification and controlling for a number of individual characteristics, we estimate the odds of enrollment ratios for different groups, separately for each year in the 1994–2008 period. Drawing on the latest available data we also discuss the socio-economic characteristics of students who end up in different types of tertiary programs (full-time versus part-time, and tuition-based versus subsidized). We then comment on the results, in the

context of existing public policy measures and demographic trend.

To calculate the participation rate and logit estimation, we use data from the national Household Budget Survey conducted by *Główny Urząd Statystyczny* (GUS), which is Poland's Central Statistical Office. We start with 1994 data, which is the oldest available, and we repeat the analysis for each year until 2008. The survey involves about 30,000 households yearly (about 100,000 individuals), but we limit attention to individuals between 19 and 26 years old, which gives 8,700 observations on average per year.

The data we use are the best available to research the impact of socio-economic status on the higher education participation in Poland. However, there are important bottlenecks resulting from the use of the household survey to observe individual behavior. First, since the survey is designed mostly to collect information on the household, and only secondarily on household members, we can only observe family characteristics for those individuals who still live with their parents in the same household. Since the information on family background is crucial for this research, we have to exclude all individuals who left their family home early. Although this implies a loss of some important information, and may induce a bias to our estimates, it has to be emphasized that a vast majority of the considered age cohort in Poland actually lives with parents. According to Eurostat, this situation applies to 81% of women and 89% of men ages 18–24. Therefore, although the omission of early home leavers will certainly have some influence on the results of estimation, we still believe that the research conclusions can be informative. We think that this research's most valuable contribution to knowledge of the determinants of higher education accessibility will result from the analysis of the time pattern of the role particular factors play, rather than from estimating the precise measures of their impact at a given moment.

In the discussion and the introductory part of the results' description, we also rely on additional data on public and private spending on higher education as well as on enrollment, and teachers and faculty profiles in tertiary schools. These were collected by the Central Statistical Office. The Ministry of Science and Higher Education was the information source on the policies and legal acts in tertiary schooling. International data, used as reference in discussion, was gathered from OECD database.

### 3. Model

We use a logit approach to determine the influence of various aspects of an individual's socio-economic status on the probability of participation in higher education. For each individual  $i$  aged between 19 and 26 the endogenous variable  $Y$  takes one of the two values that follow:

$$(1) Y_i = \begin{cases} 1 & \text{if enrolled at tertiary school} \\ 0 & \text{if not enrolled at tertiary school} \end{cases}$$

Since the logit function of the probability  $p$  is:

$$(3) \text{logit}(p) = \log\left(\frac{p}{1-p}\right)$$

the estimated equations take following forms:

$$(4) \log\frac{p(Y_i = 1)}{1 - p(Y_i = 1)} = \beta_0 + \beta_1 G_i + \beta_{2-4} S_i + \beta_{5-8} M_i + \beta_{9-13} L_i + \beta_{14} A_i + e_i$$

Where:

$G_i$  is a binary variable describing an individual's gender (0=male),  $S_i$  indicates three binary variables representing father's educational attainment, with primary level serving as a reference category,  $M_i$  reflects a quintile of household income per head, with four binary variables included in the

specification and the lowest quintile being a reference category,  $L_i$  describes an individual's place of residence, with rural areas as a reference category, and  $A_i$  represents an individual's age.

The estimation of equation 4's parameters is performed separately for each year between 1995 and 2008 in order to examine the changing role socio-economic variables play in determining the probability of enrollment in tertiary school.

## 4. Results

### 4.1. Recent developments in tertiary education in Poland

Poland is a valuable case for studying the equity of access to tertiary education. For 45 years following World War II, higher education participation has been very low, not exceeding 10% of the respective age cohort. Under communist rule, the centrally planned economy was dominated by the industrial and agricultural sectors, with limited demand for highly educated labor. Moreover, the government preferred to keep the number of the intellectuals low to depress the risk of political turbulence. However, the situation has been changing dramatically since 1989 as a result of democratization and the opening of the Polish economy to the world.

The number of tertiary students has risen from 404 thousands in the academic year 1990/1991 to 1.928 thousands in 2008/2009 – a nearly fivefold increase. Simultaneously, the number of tertiary schools has increased from 112 to 456 (Główny Urząd Statystyczny 2009).

The rapid growth of higher education enrollment would not have been possible without allowing private capital to invest in education. Until 1990 all existing higher education institutions were state owned. Since the academic year 1990/1991 and the introduction of the new Law on Higher Education (1990), private tertiary schools have been established and public schools can offer paid part-time programs. In the academic year 2008/2009, in addition to 131 operating public tertiary school, there were 325 nonpublic institutions, attended by one-third of Polish tertiary students (see Table 1). Part-time study, chosen by 46.7% of students, was much more prevalent than on average in the OECD (20.1%).

Unlike public schools, which receive substantial subsidies from the state (mainly for teaching activities) the nonpublic sector relies financially on tuition fees paid by students, constituting 83.7% of its total revenues, compared to 14.4% of public tertiary schools' revenues. Tuition fees are only required from students in nonpublic schools (regardless of the mode of studying) and from those enrolled in part-time programs in public institutions.

Since the majority of students in Poland pay tuition fees, while the remaining students' studies are fully subsidized by the public, the burden of private contributions is borne by part of the student population and not shared by all. The number of students paying tuition fees (i.e., part-time students from public TEIs and all the students from nonpublic TEIs) reached 1.1 million in the academic year 2008/2009, accounting for 58% of the total student population in Poland (Ernst&Young and Instytut Badań nad Gospodarką Rynkową 2009). The tuition fees are rather low. The average annual fee paid at ISCED 5A nonpublic institutions in academic year 2004/2005 equaled 2.710 USD (PPP) – a similar amount to the Czech Republic. According to other sources of data, yearly tuition fees in the academic year 2003/2004 ranged between PLN 1600 and 8000<sup>170</sup> across different institutions (OECD 2007).

From the equity point of view, the duality of the higher education funding system (subsidized full-time public programs versus tuition fees required in the other forms of schooling) raises serious concerns. It is believed, although little research has been done in this area, that the students from affluent families, with high educational background and residing in the large cities, are winning the competition for the subsidized seats in public schools. Therefore, the less privileged families end up paying both general taxes (through which they subsidize public schools) and the tuition fees. Moreover, it is argued that despite paying twice they receive education of lower quality as compared to their well-endowed peers, as they attend the part-time programs or are enrolled in the nonpublic schools.

170 After converting these amounts using PPP (2004), fees range between USD 850 and 4500.

At this point it must be said that the available data do not allow a fully reliable assessment of the quality of the different forms of tertiary schooling in Poland. There are no longitudinal, comprehensive studies on the labor market performance of the graduates, and neither the public statistics, nor the universities, track the careers of alumni in a way that would permit the evaluation of the contribution of the received education to the success in life. A few quantitative studies which approached this issue focused on the short-term probability of employment after graduation, but they have not controlled for the obvious endogeneity of the educational choices. The results of these evaluations are therefore strongly biased.

Some valuable observations on the quality of higher education in Poland can be made by looking at the indicators describing different resources available to the sector (see Table 2).

First, along with the increase of enrollment in higher education, the student to teacher ratio also increased dramatically. The number of full-time academic teaching positions in Polish tertiary schools amounted to 99,000<sup>171</sup> in the academic year 2008/2009, thus it grew by 60% since 1990 (Główny Urząd Statystyczny 2009; Ernst&Young and Instytut Badań nad Gospodarką Rynkową 2009). It is a moderate increase compared to a fivefold growth in enrollment during the last 20 years. As a consequence, the accessibility to teachers has significantly worsened for students. It is, however, much better for the students in the public schools (15.1), than in the private sector (37.3).

Enrolling so many students with such scarce human resources wouldn't be possible without multiple employments of staff, which severely compromises the quality of teaching, particularly in nonpublic institutions, which are often "second posts." Some 30% of Polish academic staff, and 66% of Polish professors, hold multiple teaching posts, either in other tertiary institutions or outside education systems (Ernst&Young and Instytut Badań nad Gospodarką Rynkową 2009). Multiple employment is a particular impairment at nonpublic schools – 95% of academic teachers work there on their (at the best) second post, compared to 25% in the case of public institutions (Główny Urząd Statystyczny 2009). Such academics have to share their teaching time between at least two schools, which undoubtedly lowers their ability to match students' specific needs. Moreover, such professors are unlikely to devote much time to the needs of students in nonpublic institutions, who are de facto directly paying for their courses, while nonpaying students tend to get priority attention, as they are academically stronger (passing the merit-based selection process). Therefore, the less-well-off students attending nonpublic TEIs are indirectly subsidizing the better-off students in public universities (World Bank 2004).

Another quality-related aspect of the Polish tertiary education involves the dominant position of the humanities and social sciences. Most new slots created in higher education during the 1990s and 2000s were funded directly by tuition fees, with little financial aid from the state. This resulted in a shift toward mass, inexpensive studies (see Table 2). The distribution of students by profiles reflects their willingness to acquire a tertiary school diploma at low cost, and not necessarily a concern about the demand by the labor market for various professions. The current distribution of Polish students among academic profiles skews strongly toward social sciences, business, and education.

The performance of Polish higher education institutions in the area of academic research, which is presumably correlated with the quality of teaching, is not improving along with the expansion of tertiary schooling, and the contribution of nonpublic schools to the internationally recognized literature is negligible. According to SCImago Journal & Country<sup>172</sup>, Poland's rank (by number of publications) decreased by 4 places since 1996, giving Poland 20<sup>th</sup> place in the world in 2008. If focusing on the citation indicator reflecting the quality of the contribution, Poland drops to 38<sup>th</sup> place out of 68 countries included in this query (Ernst&Young and Instytut Badań nad Gospodarką Rynkową 2009). According to the standard assessment of the academic potential

171 This value refers to number of posts, therefore an individual employed at two full-time posts simultaneously is counted twice.

172 SCImago Journal & Country Rank is a bibliometric project of four Spanish TEIs, which provides international comparisons based on number of publications and citations.

of Poland, undertaken in 2006 by State Committee for Scientific Research, 98.5% of this capability (measured by, e.g., number of publications, research grants, patents obtained, etc.) lies in the public sector, while only 1.5% result from research activities performed by nonpublic schools.

Independent of the concerns about the quality of Polish higher education in general, as well as the public-private gap, there are also many reasons to believe that part-time programs provide students with a lower quality education as compared to full-time programs. Some research shows that teaching takes place in overcrowded conditions, there is insufficient time for direct student-teacher relations, the profiles often mismatch the needs of the labor market, etc. (United Nations Development Programme 2007; Drogosz-Zabłocka and Minkiewicz 2007). The teaching time offered to students in part-time programs can even be 65% to 70% less than that of the respective full-time programs.

Summarizing the recent developments in tertiary education in Poland, the government policy in the transformation period emphasized the expansion of overall enrollment considerably more than it directly addressed equity of access. Clearly, equity itself is not among the priorities of Polish tertiary education policy – e.g., little data on student's background are collected and a relatively small share of public funds is allocated to needs-based schemes. Also, the equity of outcomes receives minimal attention – little emphasis is placed on students' progression or on assisting disadvantaged (socially or academically) students.

The state-financed program of grants for low-income students was extended to cover those enrolled in the part-time programs and in private schools only in 2004 – fourteen years after the expansion of the higher education sector has been initiated. It must be noted here that institutional (school-based) financial assistance is nonexistent in Poland, so the state aid is the only aid available. Recently (in 2008/2009) the grants were received by only 12.4% of students, and their amounts are by far insufficient to cover the substantial part of education costs.

Besides nonrepayable forms of support, students in Poland are eligible for a loan under the student loan scheme (launched 1998/1999). Up until the 2008/2009 school year, nearly 318,000 students had been granted a loan, but the popularity of this form of support has been significantly decreasing over the last ten years. According to OECD authors (OECD 2007), up until 2004/2005 only 22% of grants were taken by students from the nonpublic sector. The main reason for the low and decreasing usage of student loans was that the banks offering them imposed their own eligibility criteria based on standard risk assessment procedure, preventing less affluent students, who really needed assistance, from using them.

In many aspects the recent developments in the Polish tertiary schooling are strikingly similar to the experience of Brazil (McCowan 2007). Similarly to this country, the rapid expansion of higher education in Poland was achieved largely through increasing the share of private sector in the market and, given different funding schemes for public and private schools, in both countries this brings serious equity concerns. Although Polish enrollment increases much faster and observed inequities are by far less severe than in Brazil, some of the mechanisms described by McCowan definitely apply to Poland.

The main equity-related questions to be answered by this research are:

1. How did the rapid increase in the number of tertiary programs contribute to the improvement of the enrollment odds for the socially disadvantaged groups, given that the majority of new seats in school are offered in tuition-financed programs?
2. Do students with low socio-economic status tend to end up in presumably lower quality programs than the well-endowed programs?
3. Are students from unprivileged groups more likely to pay tuition fees?



#### **4.2 Changes in participation rates of different social groups**

Given the unusual rate of increase in the number of students and tertiary education institutions reflected in Polish statistical data, one cannot expect anything else than the strong improvement in accessibility of higher education across all social and economic groups. Indeed, the enrollment rate at the tertiary level within the 19–26-years-old age group increased from 8% in 1994 to 34.5% in 2008. The changes particularly benefitted women. In the early 1990s, participation in higher education was similar for both sexes, although earlier it had been higher for males than for females. The economic transformation and developments in the education sector have reversed this: from the mid-1990s on, young females have been more likely to study at the tertiary level than their male peers. Since then, the gap between sexes has been steadily increasing, reaching 8.7 percentage points in 2008 (30.1% for males and 38.8 for females).

The transformation generated the demand for education among young people in Poland, but the increase in participation rate within other age groups was much smaller. For instance, the portion of tertiary students among the 27–35-years-old age cohort, which was below 0.5% in 1994, reached 4% in 2003 and remains at this level. In turn, the rate for the 36–50-years-old age cohort has increased from 0% to 1.2% during 1994–2008. Therefore, the easier access to higher education has been a moderately used opportunity to catch up by those who, for some reason, did not enter the tertiary level directly after graduating from secondary school. Those members of older age cohorts who decide to study at the tertiary level do it predominantly at part-time and in nonpublic institutions.

The changes in the higher education participation rates for different social groups are shown in Figure 1. The enrollment rate has been increasing within all income quintiles (see upper-left chart in Figure 1). However, although the higher education accessibility for the less affluent groups has improved in absolute terms, the relative accessibility (compared to that experienced by affluent individuals) has been decreasing for most of the period considered. Evaluating whether the changes led to more or less equitable situations in particular years depends on the measures applied. On the one hand, the difference in participation rate between the 1<sup>st</sup> and the 5<sup>th</sup> income quintiles increased from 13.3 percentage points in 1994 to 40.5 percentage points in 2005, and then began to fall, reaching 30.5 percentage points in 2008. On the other hand, if one considers a ratio of probabilities for studying at the tertiary level for the 1<sup>st</sup> and 5<sup>th</sup> income quintiles, it decreased from 6% in 1994 to 2.5% in 2008 (through 3.7 in 2005).

After 10 years of rapid growth, the demand for higher education among the most affluent households stabilized, possibly indicating the end of adjustment caused by the economic transformation. The enrollment rates within the three highest income quintiles were increasing from the beginning of the 1990s until the mid-2000s, then began falling (see Figure 1). It seems probable that the stabilization of enrollment rates results from demand reaching its “natural level”.

The expansion of tertiary schooling in medium-sized cities undoubtedly shortened the way to higher education institutions for secondary school graduates, reducing spatial inequity in access. One important aspect of tertiary schooling development in Poland relied on the establishment of a number of tertiary institutions outside the largest metropolitan areas, in cities of regional importance or even smaller. In the context of the low mobility of Polish students and the very low capacity of student dormitories (according to the Central Statistical Office, only 6% of tertiary students live in dormitories), reducing the distance between tertiary school and households should significantly improve the accessibility of tertiary studies in the provincial areas of Poland.

Research based on the data from the web portal tracking the educational careers of students showed that the average distance between the secondary school from which an individual graduates and the tertiary school he or she chooses to attend has decreased from 79 km in 1990 to 67 km in 2008 (Herbst 2009). Also, household data (see upper-right chart in Figure 1) prove that spatial accessibility to tertiary education improved vastly in the past 13 years. For instance,

the enrollment rate for individuals living in rural areas increased from 3% in 1995 to 24% in 2008.

Participation in tertiary education improved for both those individuals with high- and with low-family educational backgrounds, but since the 1999/2000 school year the gap in enrollment rate between these two groups has begun to close. Previous studies on the equity of the Polish tertiary education system emphasized the role of parental education in determining tertiary school accessibility. Indeed, as shown in Figure 1 (lower chart), 50% of individuals with a father holding a degree entered tertiary school in 1994, as compared to only 3% of individuals whose fathers had reached only the primary level of education. During the 1990s, the difference in higher-education participation rates between families with highly and poorly educated parents was increasing, despite the fact that accessibility was generally improving across all social groups. In 1999, the enrollment rate for the individuals with a degree-holding father reached 72%, and it remained close to 70% during 1999–2008, which suggests it met a demand limit at this level.

Similarly, the enrollment rate for households with fathers having secondary education was improving until the mid-2000s and eventually stabilized around 50%. The participation rates among the least-educated families were, in turn, rising during 1994–2008 and eventually reached 30% and 17% for those with fathers holding basic vocational and primary education, respectively.

#### **4.3 Logit estimation results**

The results of logistic regressions are shown in Table 3 and in Figures 2–4. Since the table, containing the estimated odds of enrollment ratios separately for each year over 1995–2008, are quite difficult to read, the changes of the odds in time are also shown in the Figures 2–4.

Concerning the difference by sex in participation in tertiary education, the estimation confirmed that in the 1990s and early 2000s the probability of entering the tertiary school was significantly higher for females than for males. The value of odds ratio (females to males) estimated for the full sample remained close to 2.0 between 2000 and 2006, but in the most recent period (2007–2008) it began to fall, indicating a decreasing gap between the probability of studying, for males and females (see Table 3).

Father's education remains a strong determinant of tertiary education participation, but its importance decreased rapidly between 1995 and 2002. In the mid-1990s, the odds for individuals with a tertiary-education family background was more than 10 times higher than for those whose fathers received only primary education. By 2002 this ratio fell below 8 (see Figure 2), and eventually remained stable. The advantage provided by a father with secondary education, as compared to primary education, was substantially smaller, but also was more stable over time. It remained close to 4 over the whole period considered. Also the probability of participation in tertiary education for the individuals with a basic-vocational family background is significantly higher than for those with only primary background, and the relative odds of these two categories haven't changed meaningfully between 1995 and 2008. Overall, what Figure 2 shows is that the higher education system in Poland prior to the reforms was extremely elitist. The changes introduced in the early 1990s relied on closing the participation gap between students originating from highly educated families and the remaining categories, while the ratios between these remaining categories have almost not changed at all.

By the end of the 1990s, the distance to a large city (for those who decided not to move to the city) ceased to be an unbreakable barrier to accessing a tertiary education program. In the middle of the decade the residents of the metropolises faced a respective odds ratio about 4 times higher than did those living in rural areas. Recently this indicator dropped to approximately 1.5 (see Figure 3). Although some difference in accessibility of tertiary education in medium-sized towns (with a population of up to 100,000) as compared to the largest cities is observed, it is also, in this case, just a fraction of the spatial inequity existing 15 years ago, and the gap is no longer substantial.

Independently of educational background and the place of residence, the household income seems to affect the chances of entering higher education. The latest (2008) data show that, with lowest income quintile being a reference category, the relative odds for the remaining quintiles are 1.28, 1.59, 1.73, and 1.88 respectively. Thus, although the role of money in determining the probability of studying is not as important as that of family education, it is still remarkable. What is more intriguing, however, is the observed pattern of income contribution's change over time. Between the mid-1990s and 2002 the role of income in determining participation in tertiary education was increasing, despite the rapid growth of total enrollment. For instance, the odds of participation for the most affluent quintile, as compared with the poorest, reached 5.1. Eventually the impact of income has weakened, and as of 2008 the odds values for particular income quintiles are not very different from these observed in 1995 (see Figure 4). Therefore, a quick increase in the number of seats in higher education institutions proved to be insufficient to achieve the improvement in the relative accessibility of tertiary schooling for low-income groups. Instead, in the absence of adequate assistance to the underprivileged students and in the presence of high demand for education among the well-situated individuals, the relative chances of studying for the least affluent individuals have been decreasing in the first part of the considered period. A question arises as to why their odds have started to improve since 2002. Neither that year nor shortly before, did any substantial change in the rules of income-based assistance to students occur that would facilitate admission for low-income individuals. Such changes took place two years later, in 2004, when the public system of income-based grants was extended to cover students in the part-time programs and in the private schools (previously it was only available to full-time students in the public schools). But at that time the relative odds of enrollment for the highest versus lowest income quintile was already lower by 12% than in 2002. Thus the equalization process has started before the policy has changed, which does not exclude the eventual positive impact of the policy in subsequent years.

One possible explanation of the improving equity of the tertiary enrollment chances for different income quintiles refers to demographic changes and the presumed reaction of the higher education sector. The 19–26 age cohorts reached its demographic peak (in urban areas) in 2002. Since then the numbers have been falling, and they are expected to drop by approximately 50% (compared to 2002 value) by 2025 (Główny Urząd Statystyczny 2009). This means that the higher education institutions, previously provided with the constantly growing demand for their services, are now forced to compete for students, and certainly some of them will be pushed out of the market. Their incentives for students may rely on relaxing the academic requirements at the entry, which can be done by these schools that perform entry selection, or on lowering the tuition fees, which can be done by the schools and programs requiring a tuition fee. The former process is difficult to verify with the available data, but it is likely to occur and to contribute to the easier access of less endowed individuals to higher education. The latter possibility is more verifiable, but so far is not confirmed by the statistical data. For instance, the average yearly tuition fee paid by the students in the private tertiary schools in 2008/2009 was higher by 4.5% than in 2004 (in real terms), which indicates, that the "price war" hasn't taken place or at least hasn't started yet.

An important question is how belonging to disadvantaged social groups shapes the probability of enrollment to different types of tertiary schools. As argued earlier, there exists evidence indicating that the recently emerging part-time programs and private schools offer education of lower quality as compared with the traditional forms of tertiary schooling in Poland. Moreover, if disadvantaged students tend to end up more frequently in the programs requiring tuition fees, then we should consider such situation as doubly inequitable – both in terms of conditions of access, and the quality of received service.

While investigating the role of social status in determining the mode of studying we focus on the family educational background, father's occupation and the place of residence as the status indicators. The reason for not considering household income is that it is difficult to distinguish

its impact on the school and program choice from the reverse causal effects, as income is observed simultaneously with enrollment, and certain types of education programs are clearly more likely to be combined with professional work.

According to 2008 data, students with low family-educational backgrounds are much more likely to end up in part-time tertiary programs than are their peers coming from well-educated households (see Table 4). Only 20% of students with a father holding a university degree would study in a part-time program. About 60% of tertiary students with only a primary educational background and 50% of those with fathers who had obtained basic vocational education, however, would study in a part-time program.

The effect of father's occupation on student's choice of tertiary program seems much weaker than that of educational background, but students with fathers holding high-skill white-collar jobs (according to ISCO 88 categories) are less likely to study part-time than are the other groups (see Table 5).

Part-time studies are chosen (voluntarily or by necessity) by 50% of the students living in small- and medium-sized towns and villages. This is 20 percentage points more than in the case of students from large cities. Interestingly, the propensity to study part-time divides students into two groups: those who live in settlements with populations of more than, and those who live in settlements with populations of fewer than, 100,000 persons. No significant variation in the proportion of part-time students is observed within these groups, indicating that the population of 100,000 constitutes a threshold, above which it is possible to study "locally" in Poland.

When it comes to the probability of ending up in a subsidized versus a tuition-based program (the latter including all part-time programs and the full-time programs in the private schools), it seems that students with high-education family backgrounds win the competition for the available free slots. Less than 30% of students with a father with a university degree attend a program requiring a tuition fee. In turn, almost 70% of students with the poorest background (the father received only a primary education) have to pay directly for tertiary schooling. The same applies to 56% of students whose fathers hold basic vocational training (see Table 4).

Whether or not a student is obliged to pay for a tertiary program is also influenced by his or her place of residence. As much as 58% of students living in small towns, with populations below 20,000, pay tuition fees, while it is true for only 36% of large-city residents.

## 5. Conclusions

The transformation of Polish economy toward a free market system and related changes on the Polish labor market released the demand for higher education, held for decades at an artificially low level. The increase in enrollment was possible because the Polish government allowed the private sector to establish higher education institutions. The existing public schools also expanded, mostly by offering more seats in the part-time programs. The participation in higher education has increased from 10% to 40%. In absolute terms it has improved for all social groups, including these traditionally considered disadvantaged.

Most of the newly created slots in tertiary schools are offered in the tuition-based programs, as opposed to traditional, full-time studies in public schools, the costs of which are covered by subsidies from the central budget to universities. According to many experts, the "marketization" of higher education was not accompanied by the adequate development of the assistance programs that would support disadvantaged social groups in bearing the cost of schooling. Using data from the household survey for the period 1995–2008, we first demonstrated that the expansion of tertiary schooling in Poland has undoubtedly improved the accessibility of universities for students with low family educational background, low income and residing in smaller towns and rural areas.

However, if we look at the relative change in the odds of enrollment for different layers of the social strata, we find that the improvement refers to those with low family educational background and living in small settlements, but not to individuals suffering from the low income.

Despite the fivefold increase in tertiary enrollment over twenty years, today's odds ratio of participation in higher education for individuals in the top- versus bottom-income quintile is similar to that observed in the mid-1990s. Moreover, when isolated from the influence of other factors, and compared with their more affluent peers, the low income students' relative chances of studying were systematically falling during the initial period of transformation, and they have begun to rise only since 2002. It is also doubtful if the subsequent improvement is a consequence of policy changes introduced. The increasing demographic pressure imposed on tertiary schools, being now more and more forced to compete for the new students, seems to be a more probable explanation.

Further investigation shows that the policy makers should focus not only on ensuring equal access to tertiary education for the whole social strata, but on allowing the unprivileged groups access to education of acceptable quality. The analysis proves that, currently, students originating from uneducated families or living in small towns and villages are significantly more likely to study in part-time mode which, under the Polish institutional arrangements, frequently means receiving education of low quality. Low socio-economic status and living outside a large city contribute also to the increased probability of enrolling in the tuition-based program, which is in line with the common view that the well-situated students win the competition for the subsidized seats in the public schools.

## Anex

**Table 1.** Tertiary students, teachers and schools in 1990 and 2008

	1990	2008		
		Total	Public	Non-public
<b>Number of schools</b>	112	456	131	325
<b>Enrollment (thousands)</b>	404	1,928	1,268	659
<b>Enrolment ratio</b>	9.8	40.6	-	-
<b>Full-time students (% of)</b>	77.2	48.1	63.7	18.3
<b>Number of full employed teachers (thousands)</b>	61.5(?)	98.6	81.7	16.9

**Source:** Central Statistical Office

**Table 2.** Inputs and performance indicators for tertiary schooling in Poland in 1990 and 2008

	1990	2008		
		Total	Public	Non-public
<b>Student/teacher ratio</b>	6.6	18.9	15.1	37.3
<b>SCImago Country Rank</b>	16 ('96)	20	-	-
<b>Contribution to scientific potential of Poland ('06)</b>	-	100%	98.5%	1.5%
<b>Public spending per student (in PLN)</b>	-	8564	11123	3642
<b>Teachers at first post (% of)</b>	76.8* ( '93)	63.0	74.8	5.5
<b>Students benefitting from nonrepayable forms of support (% of)</b>	54.3	24.0	25.5	21.3
<b>Distribution of students by fields of study [%]:</b>				
<b>Education</b>	14.2	11.8	9.9	15.5
<b>Social science</b>	4.4	13.5	12.2	16.0
<b>Business and administration</b>	13.2	23.5	16.8	36.5
<b>Engineering</b>	17.2	6.9	10.3	0.3
<b>Health</b>	10.1	6.1	7.0	4.5
<b>Mathematics &amp; computing</b>	3.1	5.4	5.3	5.6
<b>Science</b>	no data	8.9	10.2	6.4

**Note:** \*Only public schools included; based on a survey of a representative group of academic teachers undertaken in 1993 by Wnuk-Lipińska Wnuk-Lipińska, E. (1996). *Innowacyjność a konserwatyzm: uczelnie polskie w procesie przemian społecznych*. Warszawa, Centrum Badań Polityki Naukowej i Szkolnictwa Wyższego, Uniwersytet Warszawski.; presented value is computed by excluding those interviewees who declared they are holding a post (either full-time or part-time) in another school.

**Source:** Based on Bajerski 2009; Ernst&Young and Instytut Badań nad Gospodarką Rynkową 2009; Główny Urząd Statystyczny 1991, 2000, 2009.

**Table 3.** Estimation of the logit model of participation in tertiary education

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number of siblings	0.891 *	0.908 *	1.019	1.045	1.066 *	1.054 *	1.054 *	1.016	1.015	0.988	0.939 **	0.971	1.006	0.938 **
Age	1.047 *	1.028	1.011	0.962 *	0.938 **	0.937 **	0.918 **	0.924 **	0.899 **	0.921 **	0.908 **	0.897 **	0.916 **	0.896 **
<b>Sex (male=reference category)</b>														
Female	1.415 **	1.458 **	1.600 **	1.597 **	1.679 **	2.144 **	2.052 **	1.947 **	1.959 **	2.034 **	1.939 **	2.107 **	1.831 **	1.761 **
<b>Father's education (primary =reference category)</b>														
Higher	15.474 **	12.278 **	11.324 **	11.875 **	12.049 **	10.639 **	9.474 **	7.440 **	7.674 **	7.971 **	6.165 **	6.945 **	6.395 **	7.209 **
Secondary	5.314 **	4.442 **	5.406 **	4.558 **	4.321 **	4.527 **	3.675 **	4.041 **	3.932 **	4.155 **	4.068 **	4.314 **	3.876 **	3.746 **
Basic vocational	2.052 **	1.696 **	1.865 **	2.033 **	1.940 **	2.010 **	1.714 **	1.895 **	1.789 **	1.874 **	1.718 **	1.912 **	1.731 **	1.822 **
<b>Quintile of household income per member (1<sup>st</sup> quintile = reference category)</b>														
2 <sup>nd</sup>	1.556 **	1.227	1.142	1.492 **	1.926 **	1.946 **	1.707 **	1.944 **	1.443 **	1.687 **	1.715 **	1.546 **	1.621 **	1.277 **
3 <sup>rd</sup>	1.699 **	1.309	1.634 **	1.626 **	2.039 **	2.072 **	2.087 **	2.444 **	2.118 **	2.260 **	2.245 **	1.931 **	1.793 **	1.588 **
4 <sup>th</sup>	1.530 *	1.249	1.821 **	2.205 **	2.748 **	2.934 **	2.369 **	2.810 **	2.637 **	2.816 **	2.448 **	2.340 **	1.988 **	1.733 **
5 <sup>th</sup>	1.634 **	1.418 *	1.911 **	2.060 **	2.963 **	3.497 **	3.237 **	3.555 **	2.800 **	2.795 **	2.940 **	2.942 **	2.487 **	1.883 **
<b>City population in thousands (rural = reference category)</b>														
More than 500	3.849 **	4.211 **	2.237 **	2.018 **	1.691 **	1.573 **	1.749 **	1.653 **	1.430 **	1.502 **	1.916 **	1.840 **	1.456 **	1.497 **
200-500	3.414 **	4.319 **	2.783 **	2.083 **	2.224 **	2.348 **	2.012 **	2.067 **	1.648 **	1.817 **	1.750 **	1.534 **	1.781 **	1.569 **
100-200	1.885 **	2.362 **	1.666 **	1.441 **	1.563 **	1.691 **	1.244	1.449 **	1.326 **	1.292 *	1.278 *	1.385 **	1.060	1.333 **
20-100	1.611 **	1.493 **	1.732 **	1.541 **	1.497 **	1.528 **	1.199 *	1.227 *	1.395 **	1.199 *	1.265 **	1.128	1.189 *	1.254 **
Up to 20	1.088	1.316	1.159	1.283 *	1.246 *	1.449 **	1.281 **	1.405 **	1.461 **	1.364 **	1.350 **	1.026	1.196 *	1.237 *

**Note:** Sample includes only individuals living with their parents. Values of the odds ratios (eB)

\* Denotes significance at 0.05 level. \*\* Denotes significance at 0.01 level.

**Source:** Author's calculations based on Household Budget Survey data 1995-2008.

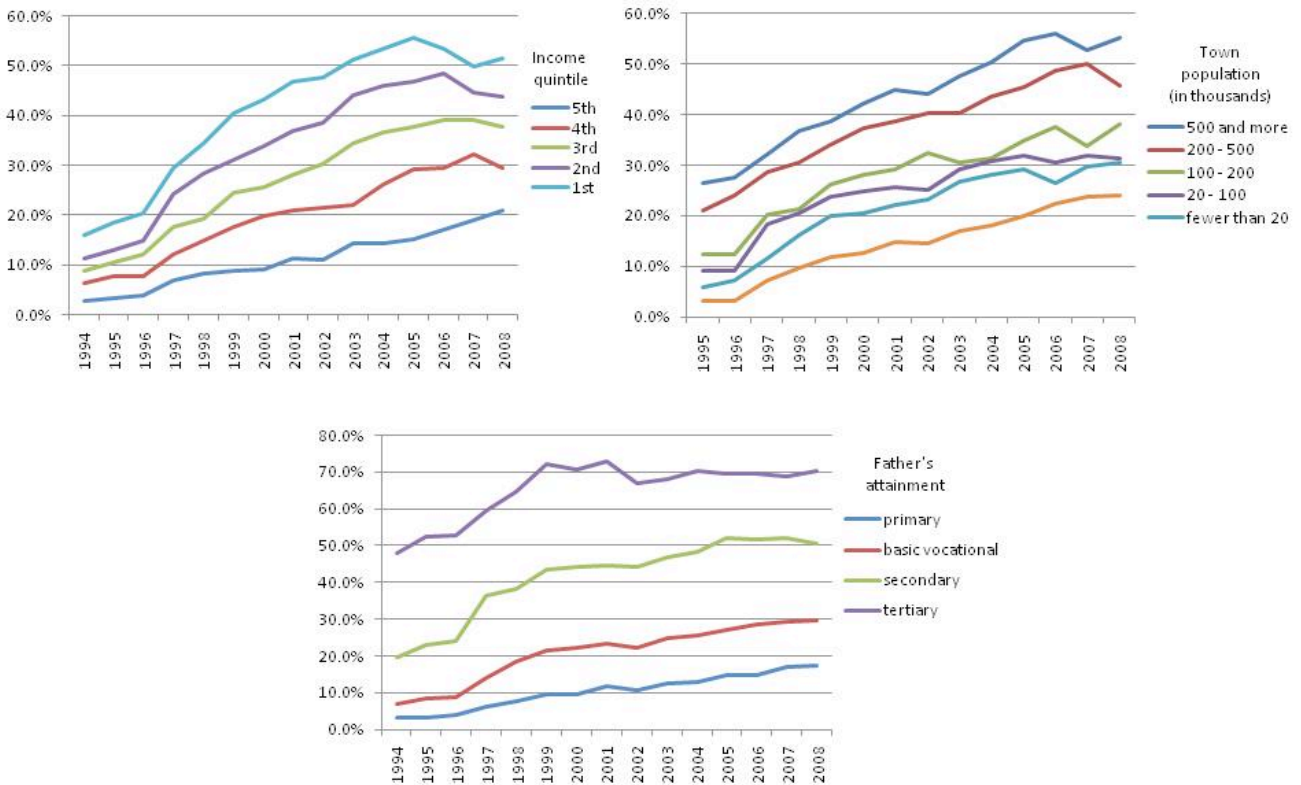
**Table 4.** Tertiary students enrolled to part-time and all tuition-based programs

	<b>Students in part-time programs (%)</b>	<b>Students in all tuition-based programs (%)</b>
<b>Father's education</b>		
Tertiary	21.2%	28.5%
Secondary	38.4%	44.2%
Basic vocational	50.9%	55.1%
Primary	61.4%	65.1%
<b>Father's occupation</b>		
high-skill white-collar	27.4%	34.5%
low-skill white-colla	40.5%	46.0%
high-skill blue-collar	49.2%	53.3%
low-skill blue-collar	47.1%	52.2%
<b>Place of residence (Population)</b>		
500,000 and more	27.6%	36.8%
200,000–500,000	27.4%	32.5%
100,000–200,000	34.5%	39.2%
20,000–100,000	51.2%	55.2%
Fewer than 20,000	53.1%	57.7%
Rural	54.8%	57.6%

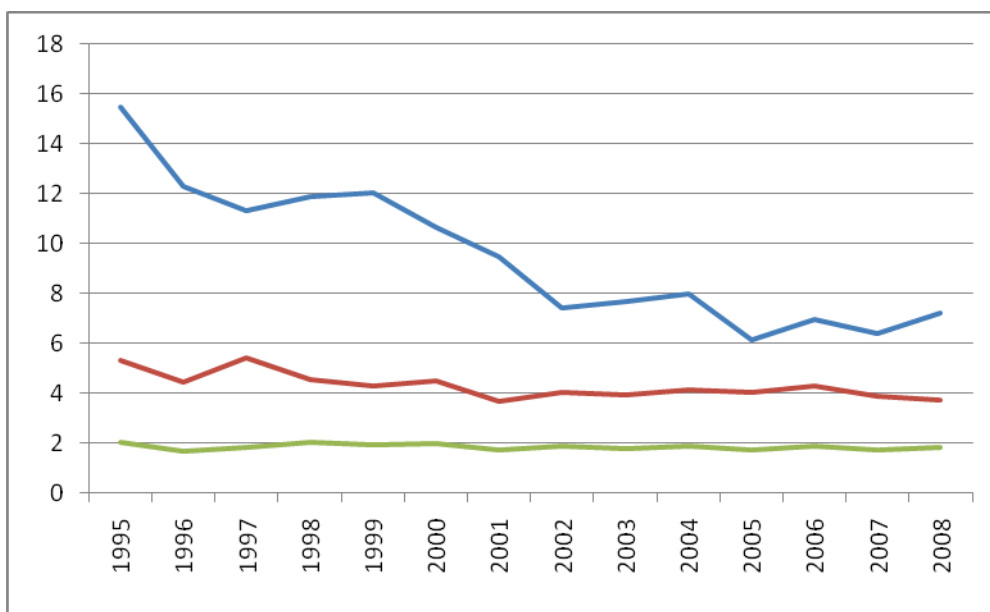
**Source:** Based on Household Survey data, 2008



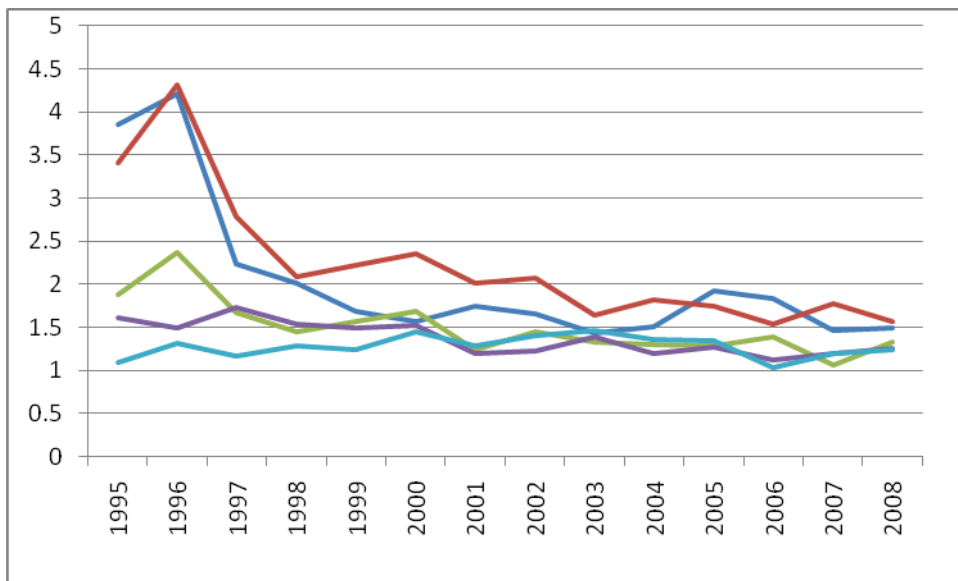
**Figure 1.** Participation in higher education: rates by household income quintiles, town population and father’s educational attainment



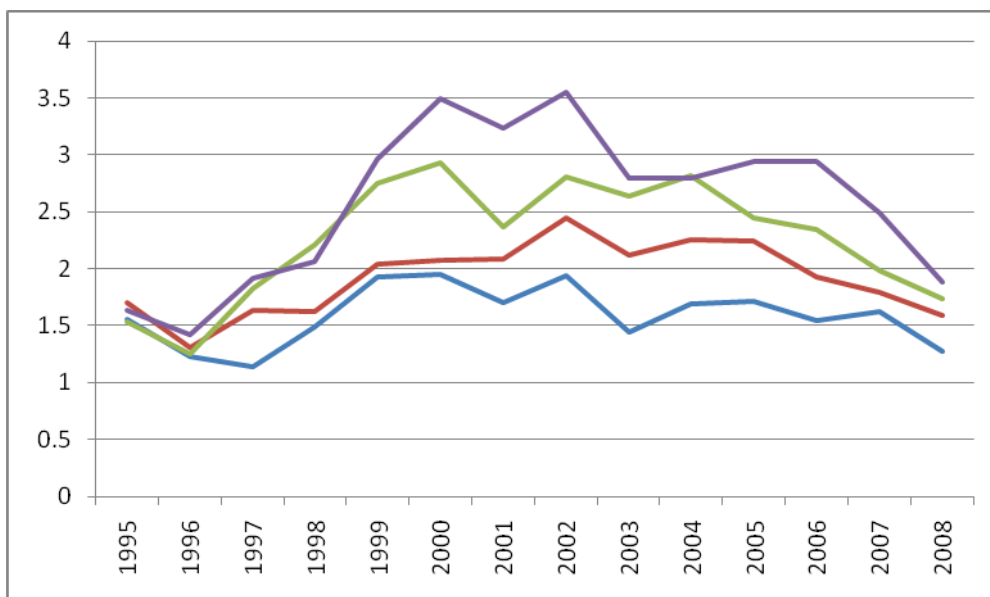
**Figure 2.** Odds of participation in higher education for differing levels of father’s education, estimated through logistic regression. Primary education is a reference category.



**Figure 3.** Odds of participation in higher education depending on the place of residence, estimated through logistic regression. Rural area is a reference category



**Figure 4.** Odds of participation in higher education for different income quintiles, estimated through logistic regression. First quintile is a reference category



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