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Equity in an educational boom:

Lessons from the expansion and marketization of tertiary schooling in Poland.

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Abstract:

The transformation of Polish economy toward a free market system and related changes on the Polish labour market released the demand for higher education, held for decades at an artificially low level. The impressive increase in enrolment was possible because the Polish government allowed the private sector to establish higher education institutions. This paper demonstrates how the probability of enrolment in tertiary schools evolves for different social groups in Poland over the period of educational boom. 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. Between 1994 and 2008 Poland has undoubtedly improved the participation of students with low socio-economic status in the university education. However, if we look at the change in the ratios of enrolment probabilities 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, transformation, Poland

I. 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 labour force, the formerly elitist universities have gradually become more open to students from less socially advantaged families. 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%.

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 (OECD 2010) 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

enrolment 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%). Blom and Murakami (2008) further argue, that partial privatization in these countries led to the so-called 'double injustice', that allowed most privileged students to enrol to free public universities, and left the less privileged to pay for an education of inferior quality in private schools.

Insufficient income is still perceived as a barrier against university enrolment 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 enrolment 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 those relying on state subsidies to public universities (Woessmann 2008).

Some less-developed countries still experience a significant gender gap (in favour 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, as well as Zimmermann (2008) for Central and Eastern Europe. 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 enrol in a university. Their results further suggest that the distance effect is driven mainly by transaction costs rather than by neighbourhood effects.

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 expansion of higher education played special role in the transforming countries of the Central and Eastern Europe. For decades the share of population holding a university degree in the region was at very low level (around 10%), reflecting the profile of the economies, relying mostly on agriculture and heavy industry. The bankruptcy of communism and massive restructuring of the markets led to the immediate increase of the demand for general education in CEE countries. On one hand, education has been considered by many as an insurance policy against the rapidly peaking unemployment. On the other, early 1990s brought also substantial increase in the wage return to education in the whole region (Newell and Reilly 1999). However, although transformation in the CEE is undoubtedly accompanied by widening access to higher education (in raw numbers), some studies raise concerns on whether the new arrangements are as equitable as they look at the first glance, and to what extent a drop in average quality is a necessary price to paid for the expansion of tertiary education (Ernst &Young & Instytut Badań nad Gospodarką Rynkową 2009).

Our paper's structure is the following: In section II we discuss the recent developments in Poland's higher education sector, including changes in demand, supply, and public policy toward students and tertiary institutions. Section III is devoted to the analytical framework of the research and data issues. In section IV, using a logit specification and controlling for a number of individual characteristics, we estimate the odds and probabilities of enrolment for different groups 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. We find that our results are generally in line with the earlier (mostly

descriptive) studies. Section V provides the conclusions from the research and outlines the problems to be addressed by the policymakers.

II 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 labour. Moreover, the government preferred to keep the number of the intellectuals low to depress the risk of political turbulence.

However, the situation in Poland has been changing dramatically since 1989 as a result of democratization and the opening of the economy to the world. The number of tertiary students has risen from 404,000 in the academic year 1990/1991 to 1,928,000 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 enrolment 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. Basic comparison of Polish higher education system in 1990 and 2008 (public and non-public separately) is presented in Table I. In the academic year 2008/2009, in addition to 131 operating public tertiary school, there were 325 non-public institutions, attended by one-third of Polish tertiary students. Apart from evident quantitative growth, there was a major shift towards part-time programs. This mode of study, chosen by 51.9% 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 non-public 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 non-public 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 HEIs and all the students from non-public HEIs) surpassed 1,120,000 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 non-public institutions in academic year 2004/2005 equalled 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 1,600 and 8,000¹ 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. Some earlier research demonstrated that students with higher education background have much better access to the free-of-charge studies than their peers, whose parents have not attained higher education (Świerzbowska-Kowalik and Gulczyńska 2000).

If it is confirmed that 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, then less privileged families end up paying both general taxes (through which they subsidize public schools) and the tuition fees. In addition, 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

¹ After converting these amounts using PPP (2004), fees range between USD 850 and 4,500.

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 income based 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 loans were taken by students from the non-public 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.

There is a widespread assumption that less privileged families – even if paying twice for education – receive service of lower quality as compared to their well-endowed peers, as they attend the part-time programs or are enrolled in the non-public schools. 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 labour 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 apparent endogeneity of the educational choices. The results of these evaluations are therefore strongly biased.

Nevertheless, 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 II). We use this input analysis to gauge the “double injustice” issue.

Along with the increase of enrolment 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 99,000² 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 enrolment 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 newly established private sector (37.3).

Enrolling so many students with such scarce human resources would not be possible without multiple employments of staff, which severely compromises the quality of teaching, particularly in non-public 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). Again, multiple employment is a particular impairment at non-public 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 non-public institutions, who are de facto directly paying for their courses, while non-paying students tend to get priority attention, as they are academically stronger (passing the merit-based selection process). Therefore, the less-well-off students attending non-public HEIs 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 II for detailed image). The distribution of students

² This value refers to number of posts, therefore an individual employed at two full-time posts simultaneously is counted twice.

by profiles reflects their willingness to acquire a tertiary school diploma at low cost, and not necessarily a concern about the demand by the labour 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 non-public schools to the internationally recognized literature is negligible. According to SCImago Journal & Country,³ Poland's rank (by number of publications) decreased by 4 places since 1996, giving Poland 20th place in the world in 2008. If focusing on the citation indicator reflecting the quality of the contribution, Poland drops to 38th 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 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 non-public 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 labour 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 40% 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 enrolment considerably more than it

³ SCImago Journal & Country Rank is a bibliometric project of four Spanish HEIs, which provides international comparisons based on number of publications and citations.

directly addressed equity of access. Clearly, equity itself was not among the priorities of Polish tertiary education policy over this period. Little data on student's background were collected and a relatively small share of public funds was allocated to needs-based schemes. Also, the equity of outcomes received minimal attention – little emphasis was placed on students' progression or on assisting disadvantaged (socially or academically) students. The existing evidence and expertise suggest that, despite rapidly growing enrolment, the Polish institutional arrangements in higher education might have led to uneven conditions of access to tertiary schooling for different social groups.

III. Conceptual framework and data

Our paper attempts to address the following research questions:

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

While discussing equity in access to higher education, we focus on the three criteria defining the social groups that potentially have uneven odds of enrolment 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.

In our model 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:

$$(4) \log\frac{p(Y_i = 1)}{1 - p(Y_i = 1)} = \beta_0 + \beta_1 G_i + \beta_{2-4} S_i + \beta_{5-8} M_i + \beta_{9-13} L_i + \beta_{14} A_i + \beta_{15} N_i + e_i$$

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,

A_i represents an individual's age,

N_i represents number of siblings

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 odds of enrolment in tertiary school.

Logit estimation results, even in the form of odds ratios, are difficult to interpret. Intuitively it is the probabilities that we are interested in, not the odds of an event. Moreover, since comparison is made over the period of substantial changes in the Polish tertiary education, we face very different mean values for the variables (except the income quintiles) in different years. This may influence the results and thus lead to wrong conclusions. Difficulties in logit interpretation are more profoundly discussed by Norton, Wang et.al (Norton, Wang et al. 2004).

One way to overcome these shortcomings is to compute the estimated (conditional) probabilities for a few values of the independent variables. We do that separately for 1995 and 2008, and then for each of these years we calculate the probability ratios which reflect the relationship between the chances of participation in higher education for individuals with particular socioeconomic status (for algebraic details see Stata Library (2011)⁴).

Since we are interested not only in the probability of participation in any kind of higher education, but also in how social status determines the mode of studying and the type of the attended program, in further part of the paper the equation (4) is re-estimated using two alternative

⁴ To estimate the probabilities from the logit model coefficients one needs to use continuous variables rather than "dummies" indicating particular values, as it is in the proposed model. Therefore, the equation (4) was reestimated with the information on father's education expressed as the number of years of schooling, and the standardized value of household income per capita (instead of binary indication of the income quintile).

dependent variables. The first one describes whether a student attends a part-time program. The other one identifies all kinds of tertiary education requiring a tuition fee (as opposed to these fully covered from the taxes). For these two estimations the considered sample is narrowed to the individuals aged between 19 and 26 enrolled to any kind of tertiary school.

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 behaviour. 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 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 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 believe that the bias will not exceed the acceptable level.

It is useful to think how the exclusion of early home leavers affects the structure of the sample. Most likely it will result with underrepresentation of students grown up in the small communities, as they need to move early to the city in case they decide to enrol to the full-time program. It may also cause the underrepresentation of individuals with high educational background, as according to

some research (Murphy and Wang 1998), the children in such families tend to leave parental home earlier. The effect of income on early home leaving may in turn be twofold. On one hand, the affluent families are more able to help children in renting or buying their first apartment, which should increase the rate of home leavers in the households with high income. On the other however, the poorer families may exert more pressure on young adults to set up their own households and start their professional life early, bringing relief to parental budget. The overall effect of income on early home leaving is thus uncertain.

To check whether using household survey data has important impact on the conclusions drawn from our research, we performed a sensitivity analysis, by using different subsamples from the available dataset. We verified how the results are affected by applying the analysis only to the 19 years old individuals, as they are much more likely to still live with parents than their older colleagues. Then we restricted the sample to the individuals living in cities with population over 100,000. Finally, we included in the sample all individuals with missing information on parental education and created for them a distinct value within parental education variable.

Although the numerical results were slightly different for every variant of the sample, the general patterns and conclusions remained the same. We thus believe that data issues do not pose a threat to reliability of our results. 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 addition to the household survey data, in the discussion and the introductory part of the results' description we also rely on supplementary information on public and private spending on higher education as well as on enrolment, 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.

IV. Results

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 year to year comparisons of enrolment rates based on household survey data reveal that:

- 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).
- Between 1995 and 2008 the enrolment rate has been increasing within all income quintiles, but, particularly in the first ten years, the participation of affluent young adults has been improving at much higher rate as compared to those from poorer environment. Over the whole considered period the difference between enrolment rates of the 5th and the 1st income quintile almost tripled, reaching 30 percentage points in 2008 (the rates are 51% and 21% respectively) .
- 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. Household survey data prove that spatial accessibility to tertiary education improved vastly in the past 13 years. For instance, the enrolment rate for individuals living in small towns (below 20,000 inhabitants) increased from 6% in 1995 to 30% in 2008. Some other

research 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).

- 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 enrolment 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 (Świerzbowska-Kowalik and Gulczyńska 2000, Białocki 2003). Our findings seem to be consistent with these observations, indicating that during the 1990s the difference in higher-education participation rates between families with highly and poorly educated parents was even increasing. However, recently the participation rates for households where father attained either tertiary or secondary education has stabilized, which suggests meeting a demand limits. The enrolment rates among the least-educated families were, in turn, rising during the whole period.

The results of logistic regressions are shown in Table III⁵. 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 recently began to fall, indicating a decreasing gap between the probability of studying, for males and females (see Table III).

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, and eventually remained

⁵ Interestingly, the R^2 systematically falls between 1995 and 2008, which indicates that the explanatory power of the „objective” factors included in the specification diminishes over time.

stable. The advantage provided by a father with secondary or basic vocational education was substantially smaller (ratio of odds close to 4 and 2, respectively), but also was more stable over time. Overall, this shows that the higher education system prior to the reforms was extremely elitist, despite slogans of equal access to education widespread in communism era.

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 the respective odds about 4 times higher than did those living in rural areas. Recently this indicator dropped to approximately 1.5 (see Table III). 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.

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. It was increasing substantially between the mid-1990s and 2002, but eventually weakened, and as of 2008 the odds values for particular income quintiles are not very different from these observed in 1995. Therefore, a quick increase in the number of seats in higher education institutions seems 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 individuals⁶.

One possible explanation of the improving equity of the tertiary enrolment 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” has not taken place or at least has not started yet.

As already mentioned, odds ratios are not easy to interpret, and the chances of participation in higher education would be more intuitively understandable if expressed in terms of probabilities. Therefore, in Table IV we show the estimated probability ratios calculated for selected values of parental education variable, place of residence, and household income variables. The ratios are computed separately for 1995 and 2008, based on the coefficients of the respective logit regressions.

⁶ 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.

The strongest conclusion from the Table IV is that the role of parental education in determining the chances of enrolment in tertiary school decreased substantially over 1995-2008. In the middle 1990s the probability of studying for those with father holding a degree used to be 13 times higher than for individuals whose fathers had completed only primary school. Recently this ratio dropped to 1.35. Also the gaps between the other categories (basic vocational versus primary, secondary versus basic vocational) are now smaller than at the beginning of the transformation period.

The place of residence still have some influence on the probability of studying, although the results in Table IV confirm the earlier observation that between 1995 and 2008 universities came closer to the people in smaller cities. For instance, the probability of enrolment in tertiary school for the young adults in the city with population around 200,000 is now only by 5% higher as compared to those living in the city of 50,000 (instead of 21% difference observed fourteen years earlier). The benefits from living in metropolis of 1,000,000 inhabitants, in terms of probability of enrolment in tertiary school, has decreased by even more.

In contrast, the effect of household income on the chances of participation in higher education is stronger in 2008 than it was back in middle 1990s. This suggests that institutional arrangements accompanying the expansion of tertiary schooling in Poland made higher education relatively less accessible for the young adults from low income families (even though actual participation rates were increasing within all social groups). This situation seems to be typical for the Central European Countries. Studies from this region usually link low participation rates of poor households with ineffective system of student financial support (World Bank 2008 on Romania; Matějů, Konečný et al. 2008 for Czech Republic). Some Polish research shows that uneven access to tertiary schools education is partly determined on the earlier stages of education (Białecki 2003). Despite profound changes in secondary schooling (postponed tracking, improvement in the availability of general schools), the socio-economic status of the families is still more reflected in the college expectations of Polish 15 years old pupils than it the case in the average OECD country (Mateju, Smith et al. 2007). Nonetheless, the dichotomy in funding (subsidized and non-subsidized programs), and insufficient

direct assistance to low income students combined with the underdeveloped loans scheme undoubtedly depress the participation of the Poland's least affluent students in higher education.

An important issue is how belonging to disadvantaged social groups shapes the probability of enrolment to different types of tertiary schools. In section II of the paper we provided some indirect evidence that non-public institutions and part-time programs offer, on average, lower quality of instruction compared to full-time programs in the public schools. Moreover, the latter are subsidized by the government, while attending the former requires paying a tuition-fee. If disadvantaged students tend to end up more frequently in the tuition based programs, 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 enrolment, and certain types of education programs are clearly more likely to be combined with professional work.

According to simple frequencies computed on 2008 data, only 20% of students with a father holding a university degree would study in a part-time program. In turn it happens to about 60% of tertiary students with only a primary educational background and 50% of those with fathers who had obtained basic vocational education.

The effect of father's occupation on student's choice of tertiary program seems 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 (27%) than this with fathers holding blue collar job (49%).

Part-time studies are chosen (voluntarily or by necessity) by 50% of the students living in settlements with population below 100,000 persons, 20 percentage points more than in the case of

students from larger cities. Interestingly, the propensity to study part-time divides students into two groups: those who live in settlements with populations above, and below 100,000 persons. No significant variation in the proportion of part-time students is observed within these two 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), the frequencies suggest that parental education retains its key importance. The advantage provided by size of settlement and father’s occupation slightly diminishes, but distribution patterns remain the same as in the case of part-time studies. Apparently, well-endowed students win competition for free slots in higher education system with educational background playing the major role.

Not to rely only on basic statistics we run a logit regression on 2008 data and then we calculate the conditional probabilities of attending part-time program and tuition-based program for selected values of the independent variables, namely: father’s education and the place of residence. The results, in the form of estimated probability ratios are shown in Table V. They prove that the mode of studying, and the financial effort related to enrolment in the tertiary school are closely linked to the social status of a student. The estimated probability of a student with highest family educational background ending up in part-time program is five times smaller as compared to a student whose father obtained only primary education. The outcome is similar if we consider a tuition-based versus subsidized programs. The chances of obtaining free higher education are much lower for those with low family educational background. These results are in line with earlier studies, such as the one undertaken by Świerzbowska-Kowalik and Gulczyńska (2000), who found that students with primary education family background were over 2 times more likely to choose part-time mode of studying, than students with father holding a university degree.

Apparently there is more inequity regarding the availability of free higher education when we consider family endowment in human capital than if we look at the place of residence. Table V

suggests that in 2008 the probability of attending a subsidized program is only twice as high for the residents of a large city (with population around 1,000,000), compared to those living in small villages. There is also no substantial difference in the accessibility to such programs between the city of 50,000 and 200,000.

V. Conclusions

The transformation of Polish economy toward a free market system and related changes on the Polish labour market released the demand for higher education, held for decades at an artificially low level. The increase in enrolment 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 on the period 1995–2008, we found that the expansion of tertiary schooling in Poland has undoubtedly improved the participation in university education for students with low family educational background, low income and residing in smaller towns and rural areas. These results are contrary to the observation of growing inequalities in Polish higher education system, prevailing in the beginning of the decade (Domański 2000), but in line with more recent studies, highlighting the closing of the educational background gap (United Nations Development Programme 2007).

However, if we examine the change in the probabilities of enrolment for different layers of the social strata using a multivariable logistic model, we find that the improvement refers to those with low family educational background and living outside of large metropolises, but not to individuals suffering from the low income. This evidence provide valuable insight, since some of the recent studies suggest that Poland is one of few transition countries where efforts to achieve equitable higher education have been thriving and therefore Poland can be showcased as a success-story (Kwiek 2008).

Further discussion 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. Currently, students originating from poorly educated 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.

Summarizing, there is strong evidence that equity concerns regarding the Polish higher education are justified, even if Poland is considered very successful in expanding the tertiary schooling during transformation. The inequity which still exists has little to do with physical barriers such as distance or transport costs, but rather with the degree of institutional openness in the education system. Drawing on our results, three major problems to be solved are the following:

- The existing institutional arrangements, and particularly higher education funding mechanism, may prevent individuals with low income from participating in tertiary education.
- Considering those enrolled in higher education institutions, students with lower socio-economic status face substantially larger costs that those originating from the privileged environment.

- Students aspiring to the social advancement (and bearing larger financial burden) tend to receive education of low quality as compared to students from better endowed families.

In many aspects the recent developments in the Polish tertiary schooling are typical for the countries undergoing a transformation, particularly in the Central and Eastern Europe. But Polish experience is also strikingly similar to the case of Brazil, as described by 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 enrolment 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.

Table I. Tertiary students, teachers and schools in 1990 and 2008

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

Source: Central Statistical Office

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

	1990	2008		
		Total	Public	Non-public
Student/teacher ratio	6.6	18.9	15.1	37.3
SCImago Country Rank	16 ('96)	20	-	-
Contribution to scientific potential of Poland ('06)	-	100%	98.5%	1.5%
Public spending per student (in PLN)	-	8,564	11,123	3,642
Teachers at first post (% of)	76.8* ('93)	63.0	74.8	5.5
Students benefitting from nonrepayable forms of support (% of)	54.3	24.0	25.5	21.3
Distribution of students by fields of study [%]:				
Education	14.2	11.8	9.9	15.5
Social science	4.4	13.5	12.2	16.0
Business and administration	13.2	23.5	16.8	36.5
Engineering	17.2	6.9	10.3	0.3
Health	10.1	6.1	7.0	4.5
Mathematics & computing	3.1	5.4	5.3	5.6
Science	no data	8.9	10.2	6.4

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

Note: *Only public schools included; based on a survey of a representative group of academic teachers undertaken in 1993 by Wnuk-Lipińska (1996).; presented value is computed by excluding those interviewees who declared they are holding a post (either full-time or part-time) in another school.

Table III. Estimated odds ratios for 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 **
Sex (male=reference category)														
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 **
Father's education (primary =reference category)														
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 **
Quintile of household income per member (1st quintile = reference category)														
2 nd	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 rd	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 th	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 th	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 **
City population in thousands (rural = reference category)														
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 *
Pseudo R ²	0.21	0.21	0.18	0.16	0.17	0.18	0.16	0.15	0.14	0.15	0.14	0.14	0.11	0.11

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

Note: Sample includes only individuals living with their parents. Values of the odds ratios (e^B)

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

Table IV. Chances of participation in tertiary education in 1995 and 2008 - estimated probability ratios

1995				
Father's education	Basic vocational / basic	Secondary / basic vocational	Higher / secondary	Higher / basic
Ratio	1.88	1.84	3.86	13.4
Household income	Mean / mean-2 standard deviations	Mean / mean-1 standard deviation	Mean+1 standard deviation / mean	Mean+2 standard deviations / mean
Ratio	1.10	1.05	1.05	1.10
City population	50,000 / 1,000	200,000 / 50,000	1,000,000 / 200,000	1,000,000 / 1,000
Ratio	1.06	1.21	2.71	3.47
2008				
Father's education	Basic vocational / basic	Secondary / basic vocational	Higher / secondary	Higher / basic
Ratio	1.13	1.09	1.10	1.35
Household income	Mean / mean-2 standard deviations	Mean / mean-1 standard deviation	Mean+1 standard deviation / mean	Mean+2 standard deviations / mean
Ratio	1.30	1.14	1.14	1.27
City population	50,000 / 1,000	200,000 / 50,000	1,000,000 / 200,000	1,000,000 / 1,000
Ratio	1.02	1.05	1.29	1.38

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

Table V. Estimated probability ratios for attending a part-time program and tuition based program in 2008

Part-time programs				
Father's education	Basic vocational/ basic	Secondary/basic vocational	Higher/secondary	Higher/basic
Ratio	0.68	0.68	0.38	0.18
City population	50,000 / 1,000	200,000 / 50,000	1,000,000 / 200,000	1,000,000 / 1,000
Ratio	0.96	0.89	0.55	0.47
All tuition based programs				
Father's education	Basic vocational / basic	Secondary / basic vocational	Higher / secondary	Higher / basic
Ratio	0.71	0.71	0.42	0.21
City population	50,000 / 1,000	200,000 / 50,000	1,000,000 / 200,000	1,000,000 / 1,000
Ratio	0.97	0.92	0.63	0.57

Source: Author's calculations based on Household Budget Survey data

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