DO SMALL SETTLEMENT SCHOOLS PROVIDE EDUCATION OF INFERIOR QUALITY? THE CASE OF HUNGARY[1]

Introduction

In explaining cross-national and urban-rural differences in economic growth, employment, migration levels or social inequality, many studies use the average years of school attendance or the level of schooling attained. (e.g. Ulubasoglu and Cardak 2004) But it is also commonly recognized that not only the quantity but also the quality of education plays an important role in affecting individual earnings and economic growth. (Hanushek 2004) Assuming similar levels of education, the quality of schooling thus makes a large difference. Although the effect of social background on educational performance has been well recorded since the middle of the last century (Colemann et al. 1966), and most unadjusted variation between the quality of urban and rural schools can most likely be explained by the differences in the average socio-economic status of the students, the original question still needs to be explored. First of all, it is essential to identify those factors which diminish the initial differences between the quality of rural and urban schools—besides the socio-economic variables—since these might provide indispensable clues to crafting new policies. The answer to the question of rural school performance can set the path of future development policies: whether schools are of worse quality in rural areas *per se*, or whether unadjusted differences can be modified by policies is a crucial question for policy-makers. Secondly, it is important to analyze the magnitude of these effects, including the size of the individual background variables, for similar reasons. Finally, and most importantly, it is not at all obvious that small schools provide inferior quality education. There are significant arguments for, as well as against, the existence of small community schools.

The advantages of small settlement schools are numerous: smaller class size allows for a more student focused education, since teachers can concentrate more on teaching the pupils and less

on disciplining them; small communities allow for a better parent-school relationship; the teacher is an important, highly respected member of the whole community when doing her/his job properly; smaller schools are easier to govern, arising in a smaller number of bureaucratic problems; a smaller school staff allows for more efficient peer review and greater responsibility for the children. (Barker 1986) All these factors point towards a learning environment, which allows for higher quality education.

On the other hand, small schools are more expensive; they can exploit neither economies of size – i.e. they have larger per student costs – nor economies of scope by offering an adequate diversity of courses, sporting possibilities, music or dance lessons, or differentiated language classes. (Andrews, Duncombe and Yinger 2002)

These two streams of argumentation, both pro and con, regarding the higher productivity of small settlement schools, has been present in the literature for quite some time. Some economists have pushed for the consolidation of educational systems (Papp 2002), arguing that the savings gained by the use of economies of scale could increase the overall quality of education, or suggesting that small schools are of lower quality because of other features, like managerial inefficiency (Deller and Rudnicki 1992). On the other side, some social scientists emphasize the benefits of these small schools, and reject the idea of school closings. (Barker 1986) These arguments suggest that there are advantages and disadvantages of small schools—just like Dunn has argued, "rurality and smallness have their greatest impact at the school and classroom level, but this same rurality creates problems at the school district or system level." (2001)

The present paper attempts to answer the question raised in the title: using Hungarian school continuation data, I will address the question of the quality of small settlement primary schools, whether they are better or worse than their larger urban peers. First, I will describe the policy relevance of the topic, as it is viewed in Hungary today. Note that these issues are

not country-specific: most problems and the characteristics of the system are relevant for countries in the entire Central-Eastern European region. Secondly, I will briefly describe the specificities of the Hungarian educational sector, and thirdly the data and methodology used. Next, I will present the empirical results, and finally draw conclusions from the study.

Small village school effectiveness, the Hungarian context

Due to the recent major demographic decline in Hungary,[2] the existence of small settlement primary schools has been highly questioned, bringing forth arguments both for and against the consolidation of primary education. Hermann (2005) has estimated the possible cost savings if all schools were operating on the level of economies of scale. He has shown that if all schools had at least 250 students, the overall savings would not exceed 3%, while if their size went up to 600 students, the savings would be 7% of total local government spending on primary schools.[3] He also concluded that the additional costs, connected to the diseconomies of scale by itself cannot be seen as the major reason for the efficiency-losses in the Hungarian public education sector. (85)

Another argument against the closing of primary schools is the effect of such policy on migration, due to the value people attach to the presence of schools. Imre (2004) has tested the "population preserving power" of institutions in small settlements (under 700 inhabitants) and Hermann (2002) has examined "the effect of local schools on migration in small villages," but none of them found significant results for the population as a whole. However, both studies found weak associations between the presence of schools and migration in certain groups of settlements. They both concluded that it may be the lack of proper and adequate data that provided such results, and that further analysis should be done. Thus it seems that small settlement schools in Hungary are not the major causes of national budget deficit but they are also "not highly valued" in terms of migration effects.

In addition to these factors, the decentralized school system in Hungary – in which financing is based on government-financed per-student lump-sum grants and on local subsidies – necessarily hinders small settlements since they are less able to collect additional resources to compensate for their larger per-student costs. (Lannert and Halász 2003, 50) The option of free school choice, which is also provided in Hungary, is another disadvantage for small settlements schools. Since both parents and schools are free to seek each other out, a relatively segregated schooling system is allowed to evolve, in which schools become homogeneous with respect to students' socio-economic backgrounds. The logic is simple: every child is better off when s/he is in a classroom with academically higher-performing children and schools can also deal more easily with less-troublesome/high-performing students. The resulting equilibrium is a clear systemic level segregation along student performance. Yet since students' background characteristics are well correlated with performance – argue Robertson and Symons (2003) and Kertesi and Kézdi (2005) – the resulting performance-segregation also indicates social status-based segregation. More mobile, usually higher-class families will exit small local schools, either by moving or by commuting to a larger settlement with larger schools. Given that students' socio-economic background affects student attainment to a great extent, these larger schools in cities will outperform small schools in villages. Thus small settlement schools' unadjusted quality measures will be lower than the larger ones' on two grounds: economies of size and scope (inefficient supply) and sorting (higher status students leave the school).

Unadjusted quality differences between settlement types are clearly recognized by the public. Parents will look at raw rather than adjusted school continuation data when choosing between different schools. As Kertesi and Kézdi (2005) argue, their aim is not only to choose the school which can provide the best teachers, but also to pick the school which has a similar

socio-economic composition to their own background, thereby deepening the cleavages between the schools' performance in different types of settlements.

If we measure the performance of primary schools by the percentage of their students continuing studies in academic, vocational secondary or vocational training schools, the unadjusted differences between the various settlement types are quite significant. While more than 50% of primary school students enter academic secondary schools, this ratio is only around 20% in smaller settlements. The larger a settlement is, the higher the rate of children entering academic schools, and the lower the percent of students going to vocational technical schools. (See table 1 below)

Table 1. Unadjusted continuation rates

The question therefore is whether schools in small settlements are worse according to this measure of quality because of the schools' internal unobservable features, or because of external reasons such as the socio-economic status of the parents or the possibility of school choice that allows sorting. To put it differently: can the differences in school quality between settlement types be explained by systemic features – and thus be modified by policy, - or do they remain even if most factors are controlled for?

The Hungarian system and the source of data

The Hungarian educational system is very similar to that of the post-communist countries of the region. Compulsory education – recently extended to age 18 – is divided into two main parts: primary (elementary) and secondary. Primary education typically lasts for eight years and at age 14 each student has to choose one of the three types of secondary schools. Academic and vocational secondary schools offer a secondary-school diploma (similar to the German *abitur*) for their graduates, which enables them to enter institutions of higher

education; vocational training schools provide a license for the specific occupation the student studied at the school, but s/he cannot continue her/his studies unless attending additional years at an academic or a vocational secondary school.[4] Accordingly, it can be stated that academic schools are ranked highest in society; vocational secondary schools are of lower value, since they offer less chance for college/university attendance, and very few students opt for vocational training schools, if they have other opportunities. The difference between the performances of the three secondary school types is evident from the international PISA studies as well. Students of the academic secondary schools scored higher in mathematics than any of the participating nations' average, while vocational training schools underperformed the last one. It is also shown by Varga (1995) and others that rates of returns measured by expected income of the various levels of completed education in Hungary significantly increase with each additional level.

Although the students must take the first step by applying to a secondary school, the school is also allowed to select from among the applying children. The selection thus consists of a two step procedure: first parents and students decide where they apply, then the school selects from the applicants according to their own specific criteria.

As a consequence, it seems adequate to use continuation data to measure the performance of primary schools, because the future earnings and life circumstances of people depend heavily on the length and completed level of education. Since schools select the most promising children, using the continuation data to measure quality can come close to measuring the students' future level of education and the schools' success of helping them to continue their studies in better schools. However, one must note that the selection of a secondary school measures not only individual merit or talent but also depends heavily on individual motivation. Unfortunately, at present there is no other performance measure available for 8th

graders, such as literacy or math scores. Hence I must assume that these unobserved characteristics of students' ability or motivation correlate heavily with their socio-economic background, which is controlled for.

As I have mentioned before the school system in Hungary is highly decentralized both in regulating and in financing the institutes. This fact allows for a highly differentiated quality of schooling in different settlements.

In March 2003, the Research Center of the Hungarian National Institute for Public Education carried out a research project which included a short questionnaire sent to all 9th grade students studying in academic, secondary vocational or vocational training schools. In this survey the students were asked to name the primary school where they had finished their studies. This created a possibility to trace the path of individual students. In other words, it became possible to estimate the percentage of students continuing studies in academic secondary, vocational secondary and vocational training schools from each primary school, and hence to create an output measure based on these percentages. Data on socio-economic background characteristics were also collected.

Out of the 122,262 9th grade students officially registered in secondary schools in the 2002/03 academic year, 113,649 responded to the survey, of which a little less than 100,000 responses could be considered, due to missing data in some questionnaires. The number of schools that replied to the survey was also quite large, more than 85% of all secondary level institutions replied; the response rate was 85% at the academic secondary schools, 92% at the vocational secondary schools and only 69% at the purely vocational training schools.

On the primary school level there are three potential reasons why there would be no information about a specific student: either s/he did not continue her/his studies, or was missing from the class when the questionnaire was filled out (or simply declined to respond),

or the entire secondary school failed to respond to the survey. The first two types of non-responses are unavoidable. We can assume randomized individual non-responses in class, but the lack of information about those who dropped out of the system is a greater problem. Since the number of these cases is supposedly higher in small settlements, this would lead to an overestimation of small settlement school effectiveness. I have attempted to correct the institutional and individual non-responses by generating weights for the primary schools, the types of the secondary schools where the students entered and the small regions where the secondary schools are located were used as grouping characteristics at the weight formulation. Other school level data were obtained from the official national educational statistics and population data were gained from the official annual statistics of the National Statistical Bureau. (Sources of variables are in Table 3.)

Method and variables

The outcome is a nominal three-value "continuing studies" variable. I used individual level multinomial logit regressions with standard errors clustered on institutional level to compare the percentage of students continuing studies in academic, vocational secondary and vocational training schools; vocational secondary schools being the comparison category. Hence when interpreting the results, we might consider the vocational training school as a "negative" and the academic school as a "positive" outcome, meaning that the goal of the school should be to lower the percentage of students continuing their studies in vocational training schools – as compared to vocational secondary schools providing both vocational and academic training – and increase the number of students entering academic secondary institutions. The multinomial logit regression enables us to compare these two measures of effectiveness simultaneously, on the same sample. Since most of the variables in the regression are dummies, the interpretation shouldn't pose a problem either. Clustering

standard errors on the institutional level was necessary, since school selection is not random, and thus we cannot assume independence of the students within schools.

I divided the different settlements into five distinct categories described in table 2. Since the question in focus is the effectiveness of small settlements, I have used the middle category of small settlements – large villages – as the comparison category. The division between small and large villages was necessary in order to separate out those primary schools that are "in danger" of closing. Schools in small villages with less than 150 children, i.e. less than 20 students per grade, are by definition running under the level of economies of scale, and settlements under 1500 inhabitants usually do not have adequate sources to compensate for this fact. The definition of towns here is somewhat ad-hoc[5]: they can still be considered as small settlements compared to cities (the average population of towns as administrative units is 18,779; towns under 10,000 inhabitants are in the bottom quartile with a population mean of 6917), but more than two-thirds of them have an academic secondary school, unlike the large villages (with a population mean of 3031) among which only 4% have academic school.

Table 2. Settlement categories used in the regression

Most of the variables used to analyze the differences between the types of settlements are dummy variables, except the distance from the closest academic school and the two ratios of teachers with university degrees and those with only lower levels of education. The means, standard deviations and the sources of data are presented in table 3 below. The first set of variables measures the students' socio-economic status, and is taken from the questionnaire: education of the parents, parental unemployment status variables, the gender of the student, and whether the family receives educational aid. The square root of the distance from the closest academic school is used to proxy travel costs or barriers to attend academic school. I

tried to substitute motivation by a "commuting up" dummy variable on the individual level, which shows whether the child goes to a different primary school in a larger settlement outside her/his school district. Two additional dummies controlling for different school types – whether a school is a 6 or 8 year long academic school,[6] whether it merges different age cohorts, i.e. whether it teaches different grades in the same class[7] - and the percentage of teachers with university degree and those with lower than college degree[8] are important for understanding the selectivity of the Hungarian educational system. In addition to these, I have included a set of dummy variables to adjust for missing individual and institutional non-responses (not listed in Table 4 in the appendix).

Table 3. Means, standard deviations and sources of variables

Empirical results[9]

Individual level variables

Basic specification

The difference between the small and the large village schools even before controlling for socio-economic status of the students are minor, and significant only at the 5% level. Town schools do not differ significantly from those in large villages when vocational training school continuation is concerned; i.e. there are no major differences between schools in smaller settlements – small and large villages and towns - in negative performance. The initial unadjusted differences between larger settlement types are vast both on the negative and on the positive effectiveness side. Children in cities have a 16% while in the capital a 29% higher chance to go to academic schools and similarly, a 13% and a 23% lower chance of entering vocational training schools, respectively, compared to 8th graders in large villages.

Impact of socio-economic status

A notorious fact from the PISA 2000 study (OECD 2001) is that among all participating nations, Hungarian children's performance correlates the most with their parents' socio-economic characteristics. (230) The Hungarian educational system is highly incapable of reducing initial differences between children of different backgrounds. The magnitude of the individual level factors seems to support this conclusion. In the analysis, the comparison category consisted of parents with secondary level education, each having a secondary school diploma from either a secondary vocational or an academic school. A university diploma of either the mother or the father increases the chances of the children to enter an academic school by more than 20%, separately. The same effect of a college degree is around 10-15%, while a lower than primary school educational level of the parents decreases the chances of the children by 12-13%. Similarly, if either the mother or the father was unemployed the year before the survey, the probability of choosing vocational training schools increases by 5%; in addition, if the family is entitled to educational aid – meaning that they are a low-income family – the vocational training school choice is 11% more probable.

Controlling for socio-economic status, the small and large village differences fully disappear, while the cleavage between large villages as opposed to the cities and the capital diminishes to 6% and 8% in positive, and to 3% and 8% in negative performance terms.

Distance

The distance from the nearest academic school – the distance between settlements – can be considered as a constraint: children must travel at least this much if they want to attend an academic school. If there is an academic school present in a settlement, the student has a choice of staying at home, or entering a secondary school that has a dormitory in a different location, while students in small settlements usually do not have this option. This is clearly an

exogenous constraint when we study the continuation of students. Although the marginal effect or the odds ratio of the square root of distance is less interpretable than the actual, linear distance, the square root is used since the effect of distance is more likely decreasing in size; once the child has left home, the additional kilometers traveled matter less.

The effect of distance is not only significant, but it fully eliminates the differences across settlement types. After adjusting for socio-economic background and distance, almost all of the differences between settlement types vanish, thus villages are undoubtedly not of worse quality as measured either by the negative or the positive quality measure. (Figure 1 and 2) However, I must note that it does not mean that village schools are just as good as the others, but that they are just as bad in compensating for disadvantages.

Two additional peculiarities or exceptions can be observed in the 3rd regression below. The first is that primary schools in the capital have kept their advantage in negative, while they have lost it in positive terms: after adjusting for socio-economic characteristics and distance, students in smaller settlements will be just as likely to go to academic secondary schools as students in the capital. (Figure 1) On the other hand, students in Budapest are still more likely to opt for secondary vocational schools than for vocational training schools. This remaining advantage in negative performance could be due to immeasurable features of the capital, such as the presence of many universities urging students to obtain a secondary school diploma, or the relative oversupply of jobs requiring not only vocational, but also more general training.

The other surprising result is that the adjusted positive performance of town schools still remains highly significant, and becomes higher than that of the larger cities or the capital. Among several hypotheses I have tried to address, many have failed to explain this difference. Due to free school choice those children who can afford commuting, or whose cost of commuting is lower than the additional gains s/he expects to make from attending school in a larger settlement, will be more likely to choose a different primary school outside the school

district. These students are likely to be more strongly motivated than the average. The first hypothesis explaining the outstanding performance of town schools was that more motivated students in small or large villages could potentially raise the effectiveness of town schools, if many of these children chose these, instead of staying in their own primary schools. I have tried to proxy the effect by creating the "commuting up" variable, yet it did not affect the performance of the town schools. (Equation 4) The proxy nevertheless worked, since it showed a significant effect both in the negative and in the positive effectiveness measures. Those children, who choose to go to a primary school in a larger settlement, are 4% more likely to enter academic secondary institutions than the others, while these same commuting students would be 2% more likely to opt for vocational training schools. This seemingly controversial impact of the variable can be explained by the differences in settlement types. In small villages, where there is no primary school, or where the primary school lasts only for four years, children must attend a larger school; these children are more likely to attend vocational training schools later. On the other hand, those children who opt for a larger settlement school not due to some constraint, but rather for motivational reasons, are to be expected to enter academic schools.

The second possible way of explaining the outstanding performance of town schools is based on the constraints apparent in towns. In most towns there is an academic school present, thus children will most likely stay in these after finishing primary school, hence the towns – having otherwise similar socio-economic and school level characteristics – appear to be more efficient than large village institutions. Nevertheless, the supply of vocational schools is much more constrained in towns than in cities or in Budapest. Children with a special occupation in mind have fewer chances to enter the appropriate specific vocational school in their town, and thus will more likely opt for the present academic school. (Equation 5) However appealing this argumentation is, the inclusion of the two dummies – no academic school present in

towns, and more than two types of the four possible vocational schools is present – did not decrease the differences in the performance between cities and towns with an academic school. The included variables, on the other hand, showed the hypothesized effect: the absence of an academic school in towns lowers the chances of choosing an academic instead of a vocational secondary school by 7%. The presence of more than two available vocational tracks deletes almost 3% from the likelihood of opting for academic schools, although the influence is not very strong and significant only on the 5% level.

I could not test the third possible reason for the unresolved performance difference of town schools due to its highly theoretical character. The schools and the towns themselves are small enough to incorporate the advantages of smallness without the problems of economies of size and with the benefit of having an academic secondary school nearby; i.e. small towns incorporate the advantages of villages and cities without their drawbacks.[10] Needless to say, even if this assumption is correct, the question of the quality of the academic schools in towns still needs to be researched: whether they provide the same rates of return, or same literacy and math skills as schools in larger settlements.

Figure 1 and Figure 2

In short, it seems that individual social status and choice constraints fully account for the differences between the urban and rural settlements. Interestingly though, it is well known that schools in larger settlements are better equipped, employ more qualified teachers, and use other techniques – like the 6 or 8 year long academic tracks – to select children at an early stage. This means that small settlement schools can most probably make use of their smallness, since even before controlling for school level characteristics they can provide the

same quality education. In the following, I will test the effects of these average school differences, since most policy conclusions can only be drawn on the school level.

Impact of school level variables

The variables tested above are assumed to be exogenous—neither the socio-economic status nor the distance traveled should matter when a child applies to a secondary school. Although the reality sometimes contradicts this assumption, theoretically we should control for the students' background characteristics when measuring the performance of schools.

The Hungarian educational system, just as many decentralized, free-school-choice systems, is highly segregating. Parents usually do not look at the adjusted effectiveness of the schools, how well it teaches its students, but rather at the socio-economic composition of the peers, or the unadjusted performance measured by university or college acceptance ratios. On the other hand, schools will do everything to attract the best students, since they allow them to attract the best teachers, more money – for example through parental donations – and less work. In the following I will try to test four variables with the potential of being interconnected with the error term, or may proxy features that result from the dependent variable.

Early selection and merged classes

If a secondary school is a 6 or 8 year long one, the students will probably stay in the same school for the additional four years after 8th grade. Merged classes are only necessary in those schools where the number of students or the lack of money does not allow for separate classes for the different age cohorts. Controlling for these should result in more accurate measures of performance, since they basically lie outside the decisions of the recent school leadership or the staff. Nevertheless, they still can be considered somewhat problematic in the equation; the percentage of 6 and 8 year long schools is higher in larger settlements, while the merged classes are more typical of small schools. After the transition, in the middle of the 1990's,

most “elite” secondary schools started to run either a 6 or an 8 year long track, with a quasi-explicit incentive for skimming off the most talented students at a younger age. Although the possibility of founding such new programs was abolished in 1998, running programs were preserved; and the system had already been made segregated by then. Needless to say, if we control for these, we will implicitly assume that each settlement has the same ratio of “elite” schools (the merged class being on the opposite end). Equation 6 shows how the different settlement effects have changed. The differences between large villages versus cities and the capital have grown, so that the probability for a student in a small settlement to enter academic secondary school is now greater than that of a larger city student. This means that by controlling for the effect of early selection of students into academic tracks, small settlement schools outperform larger ones. That is, “normal,” 8 year long primary schools, without merged classes, perform better in smaller settlements, in positive performance terms.

Highly qualified teachers

The effect of highly educated teachers is also controversial. It is possible that the ratio of teachers with a university degree just as its opposite, the ratio of teachers with a lower than college degree, is endogenous in the estimation. Highly educated teachers tend to be occupied in cities mainly due not to financial reasons – the salary of civil servants is legally regulated – but because of better living conditions and more importantly, because of less problematic students. Nonetheless, controlling for this ratio is essential for policy reasons. It can proxy three interconnected features of the educational system: first, that highly educated teachers teach better, second, the sorting between schools, and finally that economies of size might be present (large schools can pay more for teachers due to the per-student lump-sum grant financing). All of the above can be modified by policy; one can improve teacher education, change the selection mechanisms in the system, or allocate more resources for teachers’

salaries. Because of this ambiguous character of the variable, the size of its effect cannot truly be judged, but it is highly significant in both positive and negative performance terms and the changes it induces in the coefficient of the settlement effect of the capital is also important: it lowers the predicted ratio of students entering academic schools in Budapest.

The significance of these two school-level variables can lead to two conclusions. The first is that 6 or 8 year long academic schools, or schools with more qualified teachers, are better; since adjusting for the qualified teachers decreased school performance, one could assume, the more qualified teachers apparent, the higher the quality of education is. However a second conclusion can also be drawn. It is possible that these variables proxy a selection among schools according to unobserved characteristics of the students; if quality teachers like to teach more motivated, or higher ability children, the measure of teacher quality can proxy the effect of these on the output.

The increasing differences in settlement effects can be similarly understood. If we assume equally qualified teachers and compare only 8 year long primary schools without merged classes, small settlement institutions perform better. This can indicate two things: small settlement schools are better, or there is a selection according to unobserved characteristics. Small schools might be better due to smallness of the school or of the settlement itself, according to reasons listed in the introduction. However, if we assume that this observed difference is due to selection, we might suppose that average 8 year long primary schools in the capital are more likely to be adversely selected: those who had the chance already entered the 6 or 8 year long secondary schools, and qualified teachers will also more probably opt to teach there; thus the apparent difference in performance between the small settlements and the capital show this adverse-selection effect.

Although most studies suggest that selection is apparent in a decentralized system of free choice (Epple and Romano 2000), one cannot settle the issue using this cross-sectional data. In order to decide which of these effects is better captured by the school variables, longitudinal data should be used. However troubling the inadequacy of data to continue research is, the initial question has clearly been answered: small settlement schools are not of inferior quality.

Conclusion

The aim of this study was to analyze the performance of small settlement schools. In general, I can conclude that small settlement schools do not provide education of inferior quality, yet the major gaps in unadjusted performances still call for major changes. The possibility of free school choice and the decentralized structure of the Hungarian education produce a highly segregated school system along socio-economic lines, and even if it seems tempting to conclude that small schools, or small settlements are no worse than their larger city peers after adjusting for socio-economic status and exogenous constraints, we cannot lulled into complacency. We can only assert that small settlement schools are just as bad as the larger ones in compensating for initial social inequalities, although at least they do not increase the differences inherent in society. Additional attention and structural changes are called for in order to decrease these existing cleavages. Nevertheless proponents of primary school consolidation should not argue with quality differences.

Surprisingly, towns with academic schools can assist their students better in entering academic schools, maybe by utilizing smallness and low constraints. Smallness most likely has its purported advantages, since small settlement schools can provide the same educational quality, even if we do not control for school-level features. It is also evident that the availability of school choice options, measured by the distance from the nearest academic school, increases the performance of schools. Policies that decrease the cost of choosing

schools outside of one's settlement – for instance by providing bussing, or better dormitory systems – could increase the percentage of children attending academic schools.

Finally, it is suggested either that larger, 6 or 8 year long academic schools with more qualified teachers perform better, an advantage that is counterbalanced by the smallness of the small settlements, or more probably that the school level features proxy unobserved selection among schools, and larger settlements benefit more from this process than smaller ones.

References

Andrews M., W. Duncombe and J. Yinger (2002) Revisiting economies of size in American education: are we any closer to a consensus? *Economics of Education Review* 21. 245-262

Barker B. O. (1986) The Advantages of Small Schools. *ERIC Digests.* February

Coleman J. S., E. Campbell, A. Mood, E. Weinfeld, D. Hobson, R. York and J. McPartland. (1966) *Equality of Educational Opportunity* (Washington, DC, US GPO).

Deller S. C. and E. Rudnicki (1992) Managerial efficiency in local government: Implications on jurisdictional consolidation. *Public Choice* 74. 221-231.

Dunn R. J. (2001) The Rural Education Dichotomy: Disadvantaged Systems and School Strengths, North Central Regional Educational Laboratory: Educational Policy, http://www.ncrel.org/policy/pubs/html/dichot.htm accessed at 06.08.2005

Epple D. and R. Romano (2000) Neighborhood Schools, Choice, and the Distribution of Educational benefits, *NBER Working Paper Series 7850.* August

Hanushek E. A. (2004) Some Simple Analytics of School Quality, *NBER Working Paper 10229,* http://www.nber.org/papers/w10229 accessed at 01.28.2004

Hermann Z. (2002) A helyi iskola működésének hatása a migrációra a kistelepüléseken [The Effect of Local Schools on Migration in Small Villages], *Discussion Papers*. *Hungarian Academy of Sciences*, MT-DP. 2002/12

Hermann Z. (2005) Falusi kisiskolák és a méretgazdaságossággal összefüggő hatékonyságveszteségek [Small village-schools and efficiency loss due to diseconomies of scale] In Hermann Z. (ed.) *Hatékonysági problémák a közoktatásban* [*Efficiency problems in the public education*] Budapest: National Institute for Public Education, 73-87.

Imre A. (2004) A kistelepülési iskolák szerepe a települések népességmegtartó erejében [The function of small settlement schools in preserving the population of settlements] *Műhelytanulmányok 5*. Budapest: National Institute for Public Education

Kertesi G. and G. Kézdi (2005) Általános iskolai szegregáció I–II. [Primary School Segregation] *Közgazdasági Szemle,* April. 317-355. and May. 472-479.

OECD Programme for International Student Assessment (2001) Knowledge and Skills for Life, First Results from PISA 2000, OECD

Lannert J. and Halász, G. (eds.) (2004) *Education in Hungary,* Budapest: National Institute for Public Education

Papp A. 2002. Local or regional, Cost-benefit analysis of a hypothetical new structure in public primary education in Hungary, *Acta Oeconomica*, 52 (2), 237-253.

Robertson D. and J. Symons (2003) Self-Selection in the State School System *Education Economics,* Vol. 11, No. 3, 259-272

Ulubasoglu M. A. and B. A. Cardak (2004) International Comparisons of Rural-Urban Educational Attainment: Data and Determinants, SSRN electronic paper collection, December. http://ssrn.com/abstract=649883 accessed at 06.16.2005

Varga J. (1995) Az oktatás megtérülési rátái Magyarországon [Educational rates of return in Hungary] *Közgazdasági Szemle* June. 583-605

Appendix

Table 1. Unadjusted continuation rates

	Type of settlement				
Type of school	Small Village	Large Village	Town	City	Capital
Voc. Tech.	36,09%	33,37%	26,61%	20,62%	11,02%
Voc. Sec.	44,10%	44,18%	38,74%	40,75%	38,63%
Academic	19,81%	22,46%	34,64%	38,63%	50,35%

Table 2. Settlement categories used in the regression

	Administrative unit	Population	School size
Small village	Village	Under 1500 (and)	Under 150
Large village	Village	Over 1500 (or)	Over 150
Town	Town	Under 10000	-
City	Town, County town	Over 10000	-
Capital	Capital	-	-

Table 3. **Means, standard deviations and sources of variables**

	National mean	Capital	City	Town	Large Village	Small Village	Source of data
Primary, father	0,09	0,04	0,07	0,10	0,13	0,14	1
	(0,28)	(0,20)	(0,25)	(0,31)	(0,34)	(0,35)	
Vocational training, father	0,36	0,17	0,32	0,42	0,46	0,49	1
	(0,48)	(0,38)	(0,47)	(0,49)	(0,50)	(0,50)	
Academic or Vocational Secondary, father	0,32	0,34	0,34	0,32	0,28	0,26	1
	(0,46)	(0,47)	(0,47)	(0,46)	(0,45)	(0,44)	
College, father	0,09	0,15	0,12	0,06	0,05	0,03	1
	(0,29)	(0,36)	(0,32)	(0,24)	(0,21)	(0,17)	
University, father	0,09	0,23	0,10	0,04	0,02	0,01	1
	(0,28)	(0,42)	(0,30)	(0,19)	(0,15)	(0,11)	
Primary, mother	0,15	0,06	0,11	0,20	0,23	0,25	1
	(0,36)	(0,24)	(0,32)	(0,40)	(0,42)	(0,43)	
Vocational training, mother	0,21	0,10	0,20	0,24	0,28	0,31	1
	(0,41)	(0,30)	(0,40)	(0,43)	(0,45)	(0,46)	
Academic or Vocational Secondary, mother	0,39	0,40	0,41	0,39	0,35	0,33	1
	(0,49)	(0,49)	(0,49)	(0,49)	(0,48)	(0,47)	
College, mother	0,15	0,22	0,18	0,12	0,09	0,07	1
	(0,36)	(0,42)	(0,38)	(0,32)	(0,29)	(0,25)	
University, mother	0,07	0,18	0,07	0,03	0,02	0,01	1
	(0,25)	(0,38)	(0,26)	(0,17)	(0,13)	(0,09)	
Unemployed, father	0,13	0,07	0,11	0,16	0,18	0,19	1
	(0,34)	(0,25)	(0,31)	(0,37)	(0,38)	(0,40)	
Unemployed, mother	0,18	0,10	0,15	0,22	0,24	0,26	1
	(0,39)	(0,30)	(0,36)	(0,42)	(0,43)	(0,44)	
Educational aid	0,26	0,20	0,22	0,30	0,33	0,35	1
	(0,44)	(0,40)	(0,42)	(0,46)	(0,47)	(0,48)	
Female	0,50	0,49	0,50	0,50	0,50	0,48	1
	(0,50)	(0,50)	(0,50)	(0,50)	(0,50)	(0,50)	
Commuting up	0,11	0,10	0,13	0,13	0,09	0,13	1
	(0,32)	(0,30)	(0,34)	(0,34)	(0,28)	(0,33)	
Merged class	0,19	0,02	0,08	0,56	0,34	0,18	2
	(0,39)	(0,13)	(0,28)	(0,50)	(0,47)	(0,38)	
6 or 8 year long academic secondary	0,09	0,20	0,12	0,08	0,01	0,00	2
	(0,29)	(0,40)	(0,33)	(0,27)	(0,08)	(0,00)	
Ratio of teachers with university degree	0,14	0,30	0,16	0,09	0,06	0,04	2
	(0,22)	(0,31)	(0,23)	(0,16)	(0,07)	(0,06)	
Ratio of teachers with lower than college degree	0,26	0,20	0,24	0,29	0,30	0,28	2
	(0,19)	(0,19)	(0,18)	(0,18)	(0,19)	(0,21)	
More than 2 types of vocational training available in the settlement	0,55	0,85	0,88	0,27	0,04	0,01	2
	(0,50)	(0,35)	(0,32)	(0,44)	(0,20)	(0,11)	

No academic school present in the settlement	0,35 (0,48)	0,00 (0,00)	0,01 (0,12)	0,34 (0,47)	0,96 (0,19)	1,00 (0,06)	2
Distance from nearest academic school	4,64 (7,26)	0,00 (0,00)	0,19 (1,06)	5,17 (8,09)	12,45 (6,26)	14,51 (6,57)	3
Village	0,05 (0,22)	-	-	-	-		3
Small Settlement	0,28 (0,45)	-	-	-	-		3
Town	0,08 (0,27)	-	-	-	-		3
City	0,45 (0,50)	-	-	-	-		3
Capital	0,14 (0,35)	-	-	-	-		3

Notes: Individual level means shown with standard deviation in parentheses below. Source codes: 1 - National Institute for Public Education, Survey; 2 - Annual Statistics of the Ministry of Education; 3 - Central Statistical Bureau

Table 4. Multinomial logit regressions

Academic

	Odds ratios						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Small village	0.884**	0.983	1.025	1.015	1.012	1.018	1.050
	(0.049)	(0.058)	(0.061)	(0.060)	(0.060)	(0.060)	(0.063)
Town	1.749***	1.640***	1.277***	1.262***	1.565***	1.229***	1.237***
	(0.116)	(0.111)	(0.091)	(0.089)	(0.195)	(0.085)	(0.084)
City	1.875***	1.311***	0.889	0.874*	1.095	0.835**	0.794***
	(0.080)	(0.054)	(0.070)	(0.068)	(0.118)	(0.059)	(0.056)
Capital	2.649***	1.333***	0.902	0.894	1.105	0.826**	0.652***
	(0.194)	(0.081)	(0.082)	(0.081)	(0.131)	(0.066)	(0.051)
Primary, father		0.562***	0.565***	0.565***	0.563***	0.576***	0.587***
		(0.026)	(0.026)	(0.026)	(0.026)	(0.027)	(0.028)
Voc. Technical, father		0.639***	0.641***	0.640***	0.640***	0.652***	0.658***
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
College, father		1.593***	1.590***	1.591***	1.595***	1.545***	1.533***
		(0.047)	(0.047)	(0.047)	(0.047)	(0.047)	(0.047)
University, father		2.686***	2.678***	2.684***	2.678***	2.386***	2.273***
		(0.105)	(0.105)	(0.105)	(0.104)	(0.091)	(0.086)
Primary, mother		0.569***	0.572***	0.572***	0.571***	0.582***	0.588***
		(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Voc. Technical, mother		0.550***	0.551***	0.551***	0.551***	0.556***	0.562***
		(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)
College, mother		2.022***	2.024***	2.025***	2.024***	1.945***	1.920***
		(0.049)	(0.049)	(0.049)	(0.049)	(0.049)	(0.048)
University, mother		3.168***	3.166***	3.165***	3.170***	2.782***	2.633***
		(0.135)	(0.135)	(0.135)	(0.135)	(0.119)	(0.112)
Unemployed, father		0.924***	0.926**	0.926**	0.924**	0.939**	0.944*
		(0.028)	(0.028)	(0.028)	(0.028)	(0.029)	(0.030)
Unemployed, mother		0.965	0.967	0.963	0.964	0.963	0.969
		(0.025)	(0.025)	(0.025)	(0.025)	(0.026)	(0.026)
Educational aid		0.778***	0.779***	0.778***	0.778***	0.785***	0.786***
		(0.021)	(0.021)	(0.020)	(0.020)	(0.021)	(0.021)
Female		2.170***	2.174***	2.173***	2.175***	2.193***	2.203***
		(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Square root of distance			0.887***	0.886***	0.910***	0.934***	0.935***
			(0.017)	(0.017)	(0.026)	(0.017)	(0.017)
Merged class						0.980	1.037
						(0.046)	(0.048)

6/8 year long academic school						9.024***	2.566***
						(1.072)	(0.350)
Ratio of teach. with university deg.							10.917***
							(1.983)
Ratio of teach. with no college deg.							0.805***
							(0.068)
No academic school, towns (interaction)					0.699**		
					(0.105)		
More than 2 types of voc. school					0.859**		
					(0.058)		
Commuting up				1.307***			
				(0.051)			
Observations	98385	98385	98385	98385	98385	98385	98385

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Coefficients for controlling missing dummy variables not shown

Vocational Technical

Odds Ratios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Small village	1.103*	1.036	1.032	1.026	1.028	1.071	1.076
	(0.057)	(0.050)	(0.050)	(0.050)	(0.050)	(0.053)	(0.053)
Town	0.922	0.934	0.971	0.962	1.053	0.919	0.931
	(0.048)	(0.049)	(0.053)	(0.052)	(0.100)	(0.051)	(0.053)
City	0.665***	0.888***	0.947	0.934	1.021	0.980	0.996
	(0.022)	(0.027)	(0.054)	(0.053)	(0.075)	(0.057)	(0.060)
Capital	0.372***	0.583***	0.622***	0.619***	0.671***	0.646***	0.665***
	(0.021)	(0.031)	(0.045)	(0.045)	(0.057)	(0.048)	(0.052)
Primary, father		2.098***	2.096***	2.095***	2.094***	2.083***	2.060***
		(0.073)	(0.073)	(0.073)	(0.073)	(0.073)	(0.072)
Voc. Technical, father		1.251***	1.250***	1.249***	1.249***	1.245***	1.242***
		(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
College, father		0.706***	0.707***	0.707***	0.707***	0.706***	0.707***
		(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
University, father		0.630***	0.630***	0.632***	0.630***	0.627***	0.632***

		(0.052)	(0.052)	(0.053)	(0.052)	(0.052)	(0.052)
Primary, mother		2.748***	2.745***	2.744***	2.743***	2.721***	2.695***
		(0.080)	(0.080)	(0.080)	(0.080)	(0.079)	(0.078)
Voc. Technical, mother		1.751***	1.751***	1.751***	1.750***	1.749***	1.744***
		(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.041)
College, mother		0.668***	0.668***	0.668***	0.668***	0.668***	0.669***
		(0.029)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
University, mother		0.648***	0.648***	0.647***	0.648***	0.647***	0.650***
		(0.061)	(0.061)	(0.061)	(0.061)	(0.060)	(0.061)
Unemployed, father		1.357***	1.356***	1.356***	1.356***	1.355***	1.354***
		(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)
Unemployed, mother		1.388***	1.387***	1.384***	1.386***	1.383***	1.379***
		(0.032)	(0.032)	(0.031)	(0.031)	(0.032)	(0.031)
Educational aid		1.828***	1.828***	1.828***	1.827***	1.819***	1.816***
		(0.041)	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
Female		0.571***	0.571***	0.570***	0.571***	0.571***	0.571***
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Square root of distance			1.019	1.018	1.028	1.013	1.015
			(0.014)	(0.014)	(0.019)	(0.015)	(0.015)
Merged class						1.238***	1.192***
						(0.046)	(0.043)
6/8 year long academic school						0.711***	0.801
						(0.083)	(0.119)
Ratio of teach. with university deg.							0.814
							(0.167)
Ratio of teach. with no college deg.							1.895***
							(0.153)
No academic school, towns (interaction)					0.876		
					(0.100)		
More than 2 types of voc. school					0.945		
					(0.047)		
Commuting up				1.251***			
				(0.041)			
Observations	98385	98385	98385	98385	98385	98385	98385

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%
Coefficients for controlling missing dummy variables not shown

Table 5. **Marginal changes in predicted probabilities**

Equation	1		2		3		4		5		6		7	
	Voc. training	Acad-emic	Voc. training	Acad-emic	Voc. training	Acad-emic	Voc. training	Acad-emic	Voc. training	Acad-emic	Voc. training	Acad-emic	Voc. training	Acad-emic
Small village	0,032	-0,027	0,006	-0,005	0,004	0,003	0,003	0,002	0,004	0,001	0,009	0,000	0,009	0,006
Town	-0,065	0,118	-0,035	0,108	-0,016	0,050	-0,017	0,048	-0,016	0,090	-0,021	0,045	-0,020	0,045
City	-0,131	0,163	-0,030	0,060	-0,003	-0,019	-0,004	-0,021	-0,001	0,017	0,005	-0,032	0,009	-0,040
Capital	-0,232	0,288	-0,078	0,082	-0,058	-0,001	-0,058	-0,003	-0,057	0,037	-0,049	-0,019	-0,040	-0,058
Primary, father			0,171	-0,123	0,170	-0,121	0,169	-0,120	0,170	-0,122	0,163	-0,118	0,161	-0,113
Voc. Technical, father			0,057	-0,084	0,057	-0,082	0,056	-0,082	0,057	-0,083	0,054	-0,080	0,053	-0,077
College, father			-0,066	0,115	-0,066	0,114	-0,065	0,113	-0,066	0,115	-0,062	0,107	-0,062	0,104
University, father			-0,100	0,247	-0,099	0,245	-0,098	0,245	-0,100	0,246	-0,091	0,216	-0,089	0,202
Primary, mother			0,234	-0,134	0,234	-0,132	0,232	-0,131	0,234	-0,134	0,225	-0,130	0,224	-0,126
Voc. Technical, mother			0,131	-0,117	0,131	-0,116	0,130	-0,115	0,131	-0,117	0,126	-0,115	0,126	-0,111
College, mother			-0,082	0,174	-0,082	0,174	-0,081	0,173	-0,082	0,174	-0,077	0,164	-0,077	0,159
University, mother			-0,105	0,287	-0,105	0,286	-0,103	0,285	-0,105	0,287	-0,095	0,254	-0,093	0,238
Unemployed, father			0,055	-0,030	0,055	-0,029	0,054	-0,029	0,055	-0,030	0,052	-0,026	0,052	-0,025
Unemployed, mother			0,057	-0,023	0,057	-0,023	0,056	-0,023	0,057	-0,023	0,054	-0,023	0,054	-0,021
Educational aid			0,124	-0,074	0,124	-0,073	0,123	-0,072	0,124	-0,074	0,118	-0,071	0,119	-0,069
Female			-0,099	0,198	-0,099	0,198	-0,098	0,196	-0,099	0,199	-0,095	0,199	-0,096	0,199
Square root of distance (±0,5 unit change around the mean)					0,008	-0,023	0,008	-0,023	0,009	-0,019	0,005	-0,013	0,005	-0,013

Merged class											0,034	-0,014	0,026	-0,002
6/8 year long academic school											-0,135	0,513	-0,074	0,222
Ratio of teach. with university deg.(±0,5 unit change around the mean)													-0,131	0,437
Ratio of teach. with no college deg. (±0,5 unit change around the mean)													0,105	-0,068
No academic school, towns (interaction)									-0,005	-0,057				
More than 2 types of voc. school									-0,002	-0,025				
Commuting up							0,021	0,041						

Note: comparison category is large village parents with secondary school diploma, employed, no educational aid, male, not commuting, no merged class, no 6/8 year ac. school, distance and ratio of teachers are large village means.

Figure 1. Predicted percentage of students going to academic schools

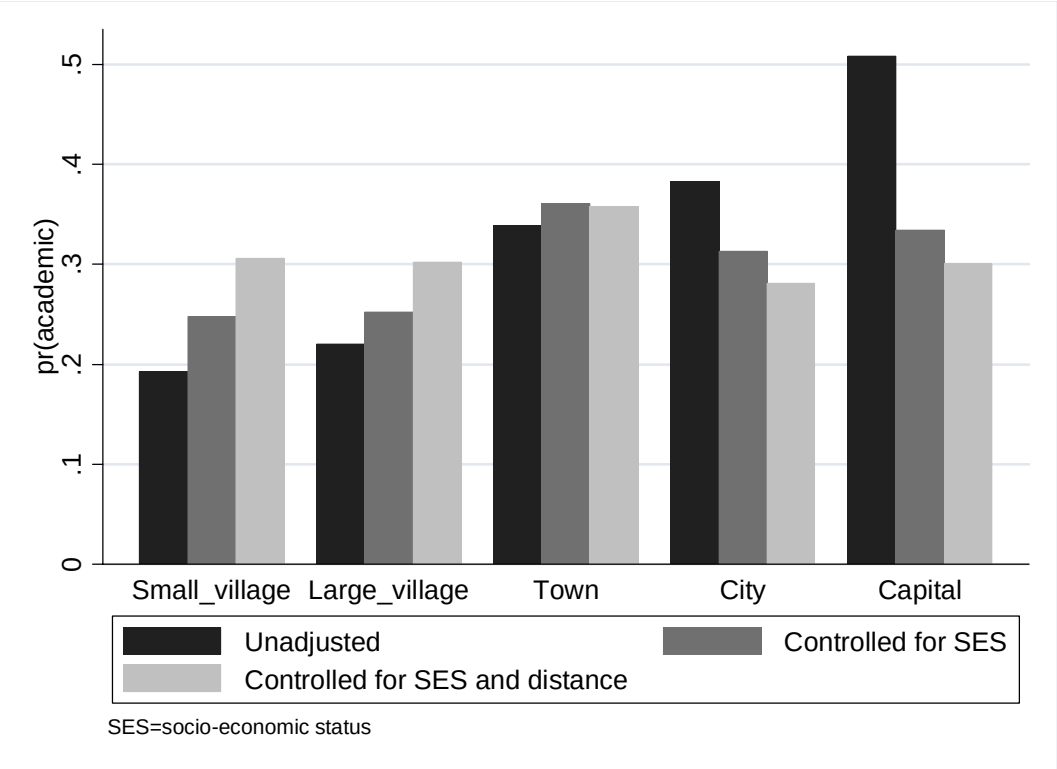
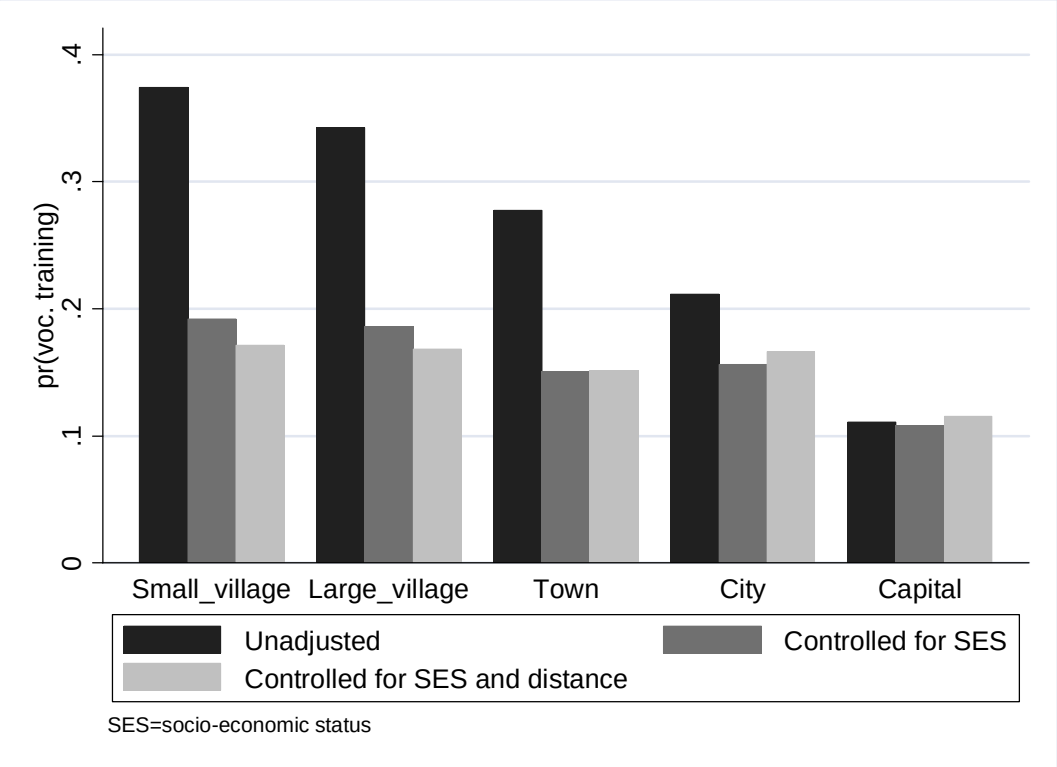


Figure 2. Predicted percentage of students going to vocational training schools



[1] This research was supported by a grant from the CERGE-EI Foundation under a program of the Global Development Network (research project "The efficiency and effectiveness of Hungarian primary school", RRC IV-07). All opinions expressed are those of the author and have not been endorsed by CERGE-EI, or the GDN.

[2] "According to long term forecasts, the number of students in public education will drop by one sixth between 2001 and 2015." (Lannert and Halász 2003, 12)

[3] Note that the economies of scale in education according to Hermann (2005) starts at about 250 students but still the costs decrease till over 1000.

[4] A detailed English description of the Hungarian education system can be found in Lannert and Halász (2003)

[5] Different specifications – namely towns defined as being under 20000 inhabitants – produced similar results.

[6] Some academic schools have the opportunity to run 6 or 8 year long programs; i.e. they recruit 6^{th} or 4^{th} grade students respectively from primary schools. These children usually stay at the same institution when they finish 8^{th} grade.

[7] The merging of classes happens only when there are not enough students to start a separate class on a grade level.

[8] Salaries of teachers are set by law throughout the country. It depends only on the level of education completed and on years of experience. The level of education of teachers proxy two different characteristics: how much schools spend on salaries and how "good" the teachers are, supposing that better educated teachers can teach more effectively.

[9] Marginal effects are listed in table 5 in the appendix.

[10] "At the school level, production function studies provide some evidence that moderately sized elementary schools (300-500 students) and high schools (600-900 students) may optimally balance economies of size with the negative effects of large schools." (Andrews, Duncombe and Yinger 2002, 246)