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Can Parental Migration Reduce Petty Corruption in Education?

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Can Parental Migration Reduce Petty Corruption in Education?

Abstract

Educational outcomes of children are highly dependent on household and schoollevel inputs. In poor countries, remittances from migrants can provide additional funds for the education of the left behind. At the same time the absence of migrant parents can affect families' time allocation towards education. Previous work on education inputs often implicitly assumed that preferences for different kinds of education inputs remain unchanged when household members migrate. Using survey data from Moldova, one of the countries with the highest emigration rates in the world, and an instrumental variable approach we find that the strongest migration-related response in private education expenditure are substantially lower informal payments to public school teachers. This fact is at odds with a positive income effect due to migration. We argue that our results are likely to be driven by changing preferences towards educational inputs induced by migration.

JEL Classification: F22, I22, D13, H52

Keywords: Migration; emigration; education spending; social remittances; corruption; children left behind

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1 Lisa Sofie Höckel, RWI; Manuel Santos Silva, Georg-August University Göttingen; Tobias Stöhr, Kiel Institute for the World Economy (IfW) and IZA. *– We would like to thank Toman Barsbai, Julia Bredtmann, Artjoms Ivlevs, Stephan Klasen, Miquel Pellicer, Rainer Thiele as well as participants at seminars at the University of Göttingen, the 2016 PEGNet conference and the IOS Regensburg for valuable comments. The usual disclaimer applies.* *– All correspondence to: Tobias Stöhr, Kiel Institute for the World Economy, Kiellinie 66, 24105 Kiel, Germany, e-mail: tobias.stoehr@ifw-kiel.de*

1 Introduction

Emigration has long been thought to be detrimental to origin countries' human capital due to the loss of skilled workers. Its consequences for education can however go far beyond this first order effect. For example, the high returns to skilled migration can raise expected returns to human capital and thereby increase demand for education enough to overcompensate the departure of skilled workers as the brain gain mechanism lays out (Mountford 1997). A recent and growing micro-level literature has put emphasis not only on such demand effects but also on the household level production side of education by analyzing how the migration of family members affects the educational attainment of children left behind.[1] These papers are typically concerned with two counteracting effects. On the one hand, the absence of adult family members may harm children's education. On the other hand, migrants can ease their families' budget and credit constraints by sending remittances. These can, for example, help pay tuition fees and may allow children to postpone joining the labor force (see e.g., Yang 2008).

While the effect of migration on households' education expenditure for private schooling or extra classes has been analyzed in a few studies, this paper focuses on the weak institutional setting in which many of the children of migrants are educated and which is still missing from the education-emigration-literature. Specifically, we focus on informal payments to teachers. Such payments are common in many developing countries and have also become widespread in transition countries after the collapse of the USSR, as the real wage for teachers and schooling officials declined abruptly. Informal payments are problematic for two main reasons: first, at the household level, they impose a "tax" on education that may reduce the incentives to human capital accumulation; second, at a more aggregate level, they create distortions on performance incentives for teachers, parents, and students. Thus, informal payments are expected to contribute to a less functional and less egalitarian public education system (e.g., Heyneman, Anderson, and Nuraliyeva 2008; Lepisto and Kazimzade 2008; Osipian 2009).

Often one of two forms of such corruption exists. If payments are raised on a per capita basis, migrants with higher available income will be expected to pay similar sums as non-migrants and it would be unlikely to find any effect of migration due to changing income. If, however, payments are part of a competition for higher grades or better treatment of students, migrants could be expected to spend more money per child as they grow richer. If only the income effect mattered bribes would then increase due to migration.

We study the effect of migration on private educational expenditure and control for self-selection into migration by employing an instrumental variable approach. Our instrument is a network-based pull-effect at the local level, which is constructed using past migrant shares and destination-specific economic growth over time. The identify-

[1] E.g., Antman (2011, 2012), Bansak and Chezum (2009), Calero, Bedi, and Sparrow (2009), Cortes (2015), McKenzie and Rapoport (2010), and Yang (2008).

ing assumption is that this network-growth interaction provides exogenous variation in the *ex-ante* costs and returns to migration, but does not otherwise affect the household's educational investment decision.

Our paper is, to our knowledge, the first to document a negative causal effect of parental migration on such informal payments to teachers. Contrary to what could be expected from the positive income effect of migration, we find that migration of a household member substantially *decreases* its likelihood of paying informal fees to schoolteachers. We show that the reduction in petty corruption occurs even though migrant households are, on average, wealthier than their non-migrant counterparts. The money saved on bribes does not translate into higher spending on out-of-school tutoring. Rather, main caregivers allocate weakly more time to educational and school-related activities in migrant households. We argue that this pattern could be explained by changing preferences: migrant households seem to be less willing to use illicit means and rather invest caregivers' time in their children's education. Since the underlying preferences are unobserved, we support our hypothesis by ruling out alternative explanations: we show that income-effects, non-parental caregivers, and supply side factors are not the main transmission channels for the reduction in bribes.

Migration of a family member neither increases nor decreases the average grade of school-age children. Thus, the reduction in bribes is not systematically linked to significantly worse grades for students of migrant households. However, at the macro-level, values and preferences transferred by migrants (usually referred to as "social remittances" (Levitt 2001)) may contribute to less overall corruption in the public education system and thus result in positive long run effects.

Our results add to the growing evidence of value change due to migration – a literature which finds that the migration experience can alter migrants' and their left behind families' political values, social norms, and behavior in general.[2]

The remainder of the paper proceeds as follows. In section 2, we review the relevant literature and theoretical background; section 3 describes the data used; section 4 presents our empirical strategy; section 5 contains the results; section 6 provides robustness checks; and section 7 concludes.

2 Background

Especially in developing countries, individual migration can be beneficial for children's education by raising and diversifying overall household income and alleviating credit constraints (Adams and Page 2005; Calero, Bedi, and Sparrow 2009). However, if the migrant is one of the child's parents, migration could prove detrimental to the child's ed-

[2]E.g., Batista and Vicente (2011), Beine, Docquier, and Schiff (2013), Bertoli and Marchetta (2015), Cameron et al. (2015), Chauvet and Mercier (2014), Ivlevs and King (2014), Omar Mahmoud et al. (2013), and Spilimbergo (2009).

ucational achievement. First, parental absence can cause emotional distress and thereby influence school outcomes of children, especially if mothers or both parents are absent (e.g., Cortes 2015; Zhang et al. 2014). Second, children's time could be reallocated towards substituting the absent migrant in household chores or even paid work (Antman 2011; McKenzie and Rapoport 2010), which is particularly plausible in the (short-run) period between a migrant's departure and the establishment of a steady flux of remittances.[3] Third, parental migration may reduce drastically the child's educational inputs in terms of parental time (e.g., supervision in educational activities). Another theoretical link is proposed in the "brain gain" literature, which argues that parental investment of those with migration aspirations for their children will increase whenever they face a positive return gap to education between their country of origin and prospective destination countries (McKenzie and Rapoport 2010). In summary, there is no clear prediction on the *net* effect of a household's migration status on the educational attainment of children. Moreover, the migration-effect is presumably heterogeneous with respect to the child's gender, age, and her household's wealth (e.g., Antman 2012; McKenzie and Rapoport 2010).

Furthermore, education attainment and, in particular, private educational spending respond to public funding. Das et al. (2013), for example, show that anticipated public spending on books and writing materials partially crowds out private inputs whereas unanticipated public funds do not.[4] Migration of an adult member is thus likely to affect the family level provision of educational inputs and, thus, partially determine the child's cognitive achievement. Input changes will be mediated by public education spending when parents are responsive to it.

When analyzing the effects of migration, one has to account for households self-selection into migration because the ensuing bias may vary by reason for migration. The most common way to address this issue are instrumental variable strategies which typically exploit exogenous aggregate factors at the origin or destination level.[5] The results are mixed. Some studies find a net negative impact of migration on school enrollment and years of schooling (McKenzie and Rapoport 2010) as well as child educational time use and the probability of staying in school (Antman 2011); while others find net positive impacts of migration on the school enrollment and years of education of girls (Antman 2012; Calero, Bedi, and Sparrow 2009).[6] Overall, there is not much evidence on the mech-

[3]Even such short-lived periods of emotional turmoil may result in detrimental long run effects for children given that education is a cumulative process in which some events (e.g., repeating a grade) may have permanent effects and others may prove irreversible (e.g., dropping out of school at an early age) (Antman 2011).

[4]Houtenville and Conway (2008), Shi (2012), and Yuan and Zhang (2012) document similar partial crowding out patterns.

[5]For example, past migration rates (Antman 2011; McKenzie and Rapoport 2010; Zhang et al. 2014), financial infrastructure (Calero, Bedi, and Sparrow 2009), and political unrest (Bansak and Chezum 2009) at the origin-level; employment conditions (Antman 2011; Cortes 2015) and exchange rate crises (Yang 2008) at the destination-level.

[6]Antman (2012) uses the age-differences across siblings at the time of parental migration while con-

anisms underlying these reduced-form estimates. Notable exceptions are Yang (2008), who isolates the effect of received remittances from Filipino migrants, and Bansak and Chezum (2009), who distinguish between remittances and parental absence effects for Nepal. As predicted, both studies find that remittances have positive effects on the quantity of schooling.[7]

In addition to changing the inputs that are available for investment into education, migration can affect households more fundamentally. The preferences and views of immigrants are known to change through acculturization (Berry 1997). For example, when living in Western societies, the values of immigrants are found to converge to Western ones over time. Such changed values can have a lasting effect when migrants return to their country of origin or through value transmission to countries of origin if migrants do not return. Spilimbergo (2009) finds that, since the 1950s, emigrants who have been educated in democratic countries have supported democratization in their countries of origin. Similarly, Batista and Vicente (2011) show that the demand for political accountability increases in localities that have more migrants. Furthermore, participation rates and electoral competitiveness can increase due to migration. These effects are not exclusive of return migration. Indeed, as migrants retain contact with people at their origin, they can also transmit these values by communicating with family or friends. Such transfers of values are called social remittances (Levitt 2001). Chauvet and Mercier (2014) find spillover effects from the migrant to the non-migrant population in terms of participation and electoral competitiveness. Omar Mahmoud et al. (2013) provide compelling evidence that emigration from Moldova, the country studied in this paper, changed political attitudes and may have tipped the elected Communist government to lose the 2009 elections. In particular, potential voters from communities with high migration towards the West, i.e., mostly today's European Union, are found to have lower life satisfaction, lower trust in government and the local media, and more skepticism regarding state intervention. As the authors discuss, Moldova had very little exposure to the outside world before migration took off. In settings where information is scarce, diffusion processes are likely to be influential.

Migration may thus affect the information available to households, their preferences, and their behavior. In the following section, we discuss the predictions that can be derived from studying the literature.

trolling for family-fixed effects as identification strategy. Specifically, she assumes that children older than 20 at the time of parental migration had already completed their formal education. Therefore, the effects should only exist for younger siblings.

[7] Yang (2008) furthermore shows that the increase in enrollment rates can be partially explained by an increase in household educational expenditures.

Summary of Hypotheses

We expect families to allocate two sets of household-level inputs, education-related expenditures and education-related time allocation, to affect their children's educational success, which will be measured here by students' grades.[8] Education-related expenditures can take two forms: either investments in a child's cognitive achievement or trying to boost grades by other means such as informal payments to teachers. The effect of migration on the child's grades through the provision of these household inputs can be more easily conceptualized in a simple education production function framework. Loosely based on Todd and Wolpin (2003) we define an education production function:

$$P_{iha} = F_a[H_{ih}(a), S_{ih}(a), \mu_{ih}] \tag{1}$$

where P_{iha} is child's i performance in household h at age a, $H_{ih}(a)$ and $S_{ih}(a)$ are vectors of cumulative household and school inputs up to age a, respectively, and μ_{ih} is the child's innate ability. We assume that the level of household inputs, which can be productive investment as well as bribes to teachers, for a child of age a can be expressed as:

$$H_{iha} = \Phi[X_{iha}, S_{iha}, \eta_h] \tag{2}$$

where X_{iha} are a household's observable socio-economic characteristics and η_h are its unobservables (e.g., preferences, information, genetic traits).

The migration status of the household (Mig_h) affects the socio-economic background of X_{iha} such as available income, but can also affect preferences η_h. Using this very simple setup we see that the total expected effect of migration on household's education inputs and accordingly grades is composed of a change in the observable socio-economic background as well as a change in unobservables. The total expected effect of migration on grades then depends on 1) the effect of household inputs on grades and 2) how these inputs change due to migration.

$$\frac{\partial P_{iha}}{\partial Mig_h} = \frac{\partial P_{iha}}{\partial H_{iha}} \cdot \left(\frac{\partial H_{iha}}{\partial X_{iha}} \cdot \frac{\partial X_{iha}}{\partial Mig_h} + \frac{\partial H_{iha}}{\partial \eta_h} \cdot \frac{\partial \eta_h}{\partial Mig_h} \right) \tag{3}$$

We estimate $\partial H_{iha}/\partial Mig_h$ for two important kinds of household inputs: educational expenditures in different categories – such as informal payments to teachers, or supplementary tutoring – and time allocated to educational activities by the main caregiver. Given that the inputs are worthwhile uses of time and income, they should have non-negative effects on grades (i.e., $\partial P_{iha}/\partial H_{iha} \geq 0$). We expect that school-level inputs

[8] Moldova has compulsory schooling until the age of 15. The absence of tuition fees in the country means that there is a low fixed cost of schooling. Education spending and overcoming credit constraints will thus only have a small effect on attendance in primary and lower secondary schools. This is in notable contrast to papers such as Yang (2008) who links most of the migration effect to the relaxation of credit constraints.

(S_{iha}) play a mediating role by affecting the input decision of the household as well as the effectiveness of household inputs on outcomes.

Based on the context, we can make some predictions regarding the effects of migration on the provision of household inputs. Grades and other measures of achievement can be affected by optional expenditure for supplementary tutoring or directly bribing teachers. With stable preferences and if such expenditures are normal goods they can be expected to increase as migration boosts household income. In addition, we expect caregivers to adjust their time allocation due to migration of a family member. Migration drives a wedge between the opportunity cost of migrating family members and staying family members. Due to physical absence, the household member (typically parent) who migrates cannot allocate time to the education of the child.[9] Returning home to allocate educational time to a child has an extremely high opportunity cost for the migrant because it means foregoing the chance to earn a higher income abroad. Once migrants raise the living standard or welfare of remaining adult household members, the income effect of remittances will cause an increase in the reservation wages of the left behind. Hence, the remaining parent may reduce work as has been documented in several countries (e.g., by Funkhouser (1992) for Nicaragua and Acosta (2006) for El Salvador). Potentially, the income effect could decrease time allocated to children by remaining adults as well. However, parents often cite improving the lives of their children as the most important motive for migration. Therefore, we expect them to perceive time spent with their child for educational activities as a normal or even a luxury good. Thus, they would invest more time if remittances allow them to work less. Hence, instead of consuming more leisure we thus expect the remaining caregiver to increase education inputs.

These income effects would be likely to exist even if preferences remained unaffected by migration. If households adjusted their valuation of education or of specific inputs due to the experiences they make abroad, we would expect to see a “preference effect". It is very difficult to identify the source of any such effect unless it occurs in very specific input categories only. Any brief summary of the possible marginal effects of migration is thus necessarily incomplete and which of them are the most pressing concerns will partly depend on the studied context. We will therefore seek to rule out alternative explanations for our proposed mechanism in the empirical part of the paper instead of discussing all possibilities in detail in advance.

The Moldovan Case

In this paper we analyze Moldova, which is the poorest country in Europe. In 2013, it had an estimated GDP per capita at purchasing power parity of $4,521 (World Bank 2014).[10]

[9] We abstract from the possibility of parents helping their children with school using long distance communication such as the phone.

[10] In 2013, countries with a comparable per capita GDP (in 2011 $-PPP) were, for example Pakistan ($4,454), Nicaragua ($4,493) and Lao ($4,667).

Over the past one hundred years Moldova belonged to the Russian Empire, Romania, the USSR, and only became an independent country at the end of the Cold War. Among the country's 3.6 million inhabitants there are large minorities such as Ukrainians (8.4% of the population), Russians (6%), and Gagauz (4.4%) (IMF 2015; NBoS 2015; World Bank 2014). In addition many Moldovans self-report their ethnicity as Russian when asked.

Moldova is particularly suited for studies of the effect of emigration because it is the country with the third highest remittance to GDP ratio (24.9%), only surpassed by the Kyrgyz Republic and Nepal (World Bank 2014). In comparison, other commonly studied economies like Mexico (remittances to GDP ratio of 2%) or the Philippines (9.8%) are considerably less dependent on remittances. The potential effects of migration are therefore particularly visible in a country like Moldova. Another advantage is that migration has been a relatively recent phenomenon. After the dissolution of the Soviet Union in 1991, a wave of Moldavian emigration took of towards Ukraine and Russia but mass migration only started when the Russian financial crisis of 1998 hit and increased unemployment and poverty considerably. Today, Moldova is one of the countries with the highest emigration rates. In 2011, emigrants comprised 17% of the total Moldovan population (MPC 2013), which means that 30-40% of children, depending on the sample, are affected by emigration of at least one parent. The most common emigration destination for circular migrants is Russia, where the majority work in employment in the construction sector. While migration to Russia is usually characterized by short-term stays, emigration to the West and thus mostly the European Union is more permanent (often including regular visits in Moldova). Especially Italy and Romania, due to the linguistic proximity, as well as Poland are main destination countries. The majority of migrants to Western countries (60%) are female. Female migrants are often employed in family services such as providing care to elderly people and low-skilled jobs. Although it is more costly and difficult to enter the EU labor market, the long-term remuneration is on average higher than for migration to Russia (MPC 2013; World Bank 2014). Böhme (2015) provides evidence that in Moldova migration is associated with higher educational aspirations at the bottom end of the educational distribution and does not affect educational aspirations negatively for any other part of the distribution.

As a former member of the Soviet Union, the public educational system in Moldova is relatively well-developed in terms of coverage. Public schools are widely available even in rural areas and attendance is free of charge from first grade up to high school completion. The language of instruction in school is either Romanian or Russian, depending on the population covered. Enrollment rates in public schools are nearly 100% for primary and lower secondary schooling[11], and 87% for upper secondary schooling, as shown in Table A1.[12] Below tertiary education, there are virtually no private schools.

[11] In Moldova, school enrollment is compulsory until the end of lower secondary schooling (roughly age 15).

[12] As a contrasting example, in the same year (2010), Mexico's secondary enrollment rate was 67.3%,

However, despite its nearly universal coverage, the *quality* of public education is low on average. In 2009, Moldova was one of the 74 countries that participated in the Program for International Student Assessment (PISA).[13] The PISA is an OECD study that standardizes and compares the cognitive achievement of 15 year old students on reading, mathematics and science. The results show that only 43% of Moldovan students have a reading achievement "that is at or above the baseline needed to participate effectively and productively in life" (Walker 2011, p. xvi); only 39% have "the kind of skills that enable them to use mathematics in ways that are considered fundamental for their future development" (ibid., p. xvi); and only 53% have "the science competencies that will enable them to participate actively in life situations related to science and technology" (ibid., p. xvi). The respective figures for OECD countries are, on average, 81% in reading, 75% in mathematics, and 82% in science. Even though PISA performance is roughly what is typical for countries with Moldova's income level, Moldova's education system does not do particularly well at overcoming socio-economic background of students (ibid.). The education system thus functions very well in terms of coverage and enrollment rates (i.e., quantity metrics) but delivers poor results in terms of actual learning outcomes (i.e., quality metrics).[14] The strong dependence of educational achievements on socio-economic background means that Moldova is an interesting country to study in order to better understand how migration affects education inputs and its outcomes.

Another decisive feature of the Moldovan education system is the widespread payment of informal (and often illegal) fees to schoolteachers and other officials. These payments are monetary transfers or in-kind "gifts". Such bribes are known to be a severe problem in education systems in many developing and emerging countries and throughout Eastern and South Eastern Europe. Heyneman, Anderson, and Nuraliyeva (2008), for example, discuss survey data which indicate that about 80% of university students in Moldova, Bulgaria and Serbia were aware of illegal bribe paying in university admission. According to the 2013 Global Corruption Barometer, 37% of households in Moldova that came into contact with education authorities paid bribes in the 12 months before the survey and 58% of respondents perceive the education system to be corrupt or highly corrupt (Transparency International 2013). Similar evidence is provided by the 2011 Citizen Report Card study, a representative Moldovan survey that asked citizens how often they had to pay bribes when dealing with different public institutions. Public education was considered the fifth most corrupted public institution (out of 30) (Institute for Public Policy

even though its per capita income was more than three times higher than that of Moldova.

[13] To be perfectly accurate, Moldova was part of a group of 10 countries that were additionally included and only completed the PISA study in 2010. This extension is known as the PISA 2009+ project (Walker 2011).

[14] At the same time Moldovan students are hardly ever retained. In our nationally representative sample (described in section 3), only 0.2% of school-age children did ever repeat a grade. This means that in spite of their deficits, students are often flowing through the system without learning elementary skills. Enrollment is thus not a very meaningful outcome variable in the Moldovan context.

2011, p. 42).[15] Corruption was cited to be the most common difficulty when requiring services from public educational institutions and paying bribes was the second most common way of solving problems after insistence, joint with using personal contacts. Thus, there are many ways around paying bribes. They may however require considerable time and effort. In an older study for Transparency International, Carasciuc (2001) discusses a survey which showed that parents frequently make payments to teachers to ensure better grades regardless of the child's knowledge and also seek to establish good relations with the teachers. She furthermore mentions that another form of corruption is buying unnecessary supplementary tutoring from a child's teacher. This means that supplementary tutoring is often in a gray area between a productive investment in students' cognitive achievement and paying teachers informally.

3 Data and Descriptives

Data

We use data from a nationally representative household survey conducted in Moldova in 2011-12 that was collected by a team that included one of the authors (henceforth abbreviated CELB 2012). This unique survey was specifically designed to investigate the effects of migration on children and elderly left behind. In addition to detailed socioeconomic characteristics of household members, detailed information on the private inputs into children's education was collected by identifying and interviewing each child's main caregiver.[16] The private education inputs can be divided into financial and non-financial ones. Financial expenditures include payments and other "gifts" to schoolteachers, out-of-school tutoring expenditures, and transportation expenditures that we will use as different dependent variables in the analysis.[17] Non-financial inputs include the main caregiver's time spent helping the child in educational activities. In practice, the survey covers how often the caregiver helps the child with homework and other school activities, in the month prior to the survey interview: the values range from 1 to 6 and correspond, in ascending order, to "Never", "Less often", "At least once a month", "At least once a week", "More than 3 times a week" and "Everyday". In the survey the respondents were furthermore asked to identify the school in which the child was enrolled and its distance (in minutes) to the household's home. Respondents were assured that the survey was a scientific endeavor by an independent research organization and that any responses would be shared with authorities only in aggregate form to achieve truthful reporting.

[15] The most corrupt institutions were reported to be the standardization and metrology office, the transportation registration, the drivers qualification department, and preventative medical centers.

[16] The main caregiver is the person responsible for nutrition, health, and schooling of a child at the time of the survey.

[17] In addition, there is a residual category of "other expenditure" for which we find statistically insignificant effects.

Descriptive Statistics

In Table 1 we summarize characteristics of school-age children between migrant and non-migrant households to provide a first insight into the differences between the two groups. A migrant household is defined by the existence of at least one adult who, in the 12 months prior to the survey, has spent a minimum of three months living abroad.

[Table 1 about here.]

Approximately 29% of the children in our sample live in a migrant household. The average child in both migrant and non-migrant households is about 12 years old and lives approximately 20 minutes away from her school. The average student from migrant households is 5 months older than her non-migrant peer. Before accounting for selection into migration, the average grade (GPA) is 0.06 points higher for children in migrant households. Migrant families are slightly larger on average and more likely to come from rural areas. Despite coming from potentially poorer parts of the country, their average total income and average per capita income are significantly higher than those of non-migrants. In reality, the difference could be even wider, since we have strong reasons to believe that migrant households systematically under-report their received remittances and other sources of income, further increasing the wedge (Akee and Kapur 2012). The strong impact of migration on income and living standards is also reflected by Figure 1, which shows no difference in assets in 1999 but significantly higher assets for migrant families in 2011.[18] Without controlling for covariates, caregivers from migrant households spend a little less time with children than their non-migrant counterparts.

[Figures 1, 2 and 3 about here.]

Informal payments to teachers are a far more common education related expense than supplementary tutoring as Figure 2 shows. Households in our sample report positive payments to teachers for about 32% of all school-age children.[19] Payments to teachers typically vary from 5 to 40 USD per child per year, which is substantial given that public expenditure (cf. section A.1) for teaching materials per pupil is about 30 USD per year and wage bills per pupil are about 300 USD per year. In contrast, households only report supplementary tutoring expenses for approximately 10% of children. Both informal payments to teachers and supplementary tutoring expenses per child are significantly lower in

[18]The asset indexes were constructed by a weighted-sum of the following items: number of cars, motorcycles, bicycles, washing machines, refrigerators, radios, TVs, computers, and cell phones; existence of working phone landline and Internet access; and number of rooms in the house. For 1999, the last three items were excluded due to a large number of missing values. The weights for the index were obtained from a principal component analysis of the asset list. Dividing the divisible assets by the squared root of household size as an equivalent scaling rule does not change Figure 1 in any qualitative way.

[19]This figure is remarkably similar to the one reported in the 2013 Global Corruption Barometer: 37% of households in Moldova that came into contact with education authorities paid bribes in the 12 months before the survey (Transparency International 2013). Note that we added 1 LCU to each private expenditure to ensure that the log exists.

migrant households than in non-migrant ones. For transportation expenditure there is no such difference. The differences for bribes and supplementary tutoring are mostly driven by lower likelihoods of reporting positive expenses in the respective category rather than by lower expenses conditional on reporting any. Figure 3 shows that this is not only evident at the individual level, but also results in a strong negative correlation between the village-level share of migrant household children and their caregivers' likelihood of paying off teachers in our household survey. The regression behind Figure 3 is reported in Table 2, column 1. The slope of the regression line is approximately -0.4, a very high value that is not only economically but also statistically significant. Note that our data are not designed to be representative at the village level. Columns 2-5 of Table 2 document that the negative correlation also holds at the individual level, especially for older students for whom we suspect grades and thus bribes to matter more. In fact, before the age of 10 grades count very little and hardly ever lead to repetition. In the next section we will document that the strong correlation is not only a descriptive fact at the individual level but also robust to rigorously controlling for self-selection into migration in a causal estimation framework.

[Table 2 about here.]

4 Empirical Strategy

To analyze whether the strong negative correlation between migration and bribes at the village-level as well as the individual level is indeed closely tied to migration, we estimate the stylized model

$$y_{ihcs} = \alpha + \delta \text{Mig}_{ihc} + X'_{ihcs}\beta + \epsilon_{ihcs} \tag{4}$$

where y_{ihcs} are private inputs to the education of child i in household h from community c and school s. We consider three financial inputs (informal payments to teachers, supplementary tutoring, and transport expenditures) and one non-financial input, the frequency with which the caregiver spends time supporting the child in educational activities. The main explanatory variable of interest, Mig_{ihc} is a dummy variable taking value one if the child lives in a migrant household and zero otherwise; X_{ihcs} is a vector of child- and household-level control variables, which will later also include school-level controls; and ϵ_{ihcs} is the error term.

Clearly, migrants are not a random population group but rather self-select into migration. Thus, it can be expected that they systematically exhibit distinct unobservable characteristics relative to non-migrants. If those unobservables correlate with the provision of education inputs to their children (i.e., $E[\text{Mig}_{ihc} \cdot \epsilon_{ihcs}] \neq 0$), the OLS estimator for equation (4) will be biased and inconsistent.

To overcome this problem, we estimate an instrumental variable approach by two-

stage least squares (2SLS). Our instrument for migration status[20] is the interaction between preexisting migration networks at the local-level and destination-specific economic conditions. Formally, we use the growth rate of per capita GDP for each destination country between 2004-2010 and weight it with the share of migrants that, by 2004, had migrated from the community to that destination.[21] The data for the migrant-destination share at the community level are derived from the 2004 Moldovan Census.[22] The variable has already been employed as an instrument for migration in other studies of the Moldovan context (Böhme, Persian, and Stöhr 2015; Lücke, Omar Mahmoud, and Peuker 2012). The rationale behind the use of *Network-Growth* is twofold. First, migrant networks are known to be very important in facilitating *current* migration. The network can provide *ex ante* information and assistance and *ex post* support for the migrant upon arrival (e.g., short-term accommodation, job-searching expertise, paperwork, etc). Thus, pre-existent migrant networks effectively reduce the costs of migration (e.g., McKenzie and Rapoport 2010). Secondly, the growth of GDP per capita at the destination is a proxy for the country's economic performance and, more importantly, employment conditions that are exogenous to potential migrants in Moldova. An expanding job market is highly attractive for potential migrants and hence a pull factor to this destination (e.g., Antman 2011). As a whole, our instrument captures the exogenous variation of migrant networks at the community level – which lowers migration costs – and economic conditions at the destination country – which increase the expected returns of migration. Exploiting variation at the community level, our instrument does not allow exogenizing household level choices regarding migration such as the identity of the migrant or the duration of the stay abroad. We can only successfully predict the probability of at least one household member becoming a migrant, which is why we use the household's migration status as the main variable of interest in our analysis. Therefore, our results should be interpreted as the average effects across all migrants and migratory spells.

The validity of this instrument depends on the exclusion restriction. In our case, *Network-Growth* must not have any influence on the provision of private educational inputs other than that resulting from migration status. This seems self-evident for the growth of GDP per capita at the destination. It is hard to conceive of a different relationship (i.e., other than migration) through which the changes in per capita growth rates in a set of for-

[20] Recall that we define migration status at the household level as the existence of *at least* one adult household member who is a migrant.

[21] Analytically:

$$\text{Network-Growth}_c = \sum_{j=1}^{J} \frac{\text{migrants}_{c,j,2004}}{\text{population}_{c,2004}} \sum_{t=1}^{T} \left(\frac{\text{GDP}_{j,t+1} - \text{GDP}_{j,t}}{\text{GDP}_{j,t}}\right)$$

where c is the Moldovan community; $j = 1, 2, 3, ..., J$ is the migration destination countries and $t = 2004, 2005, ..., 2010$ the year.

[22] As a robustness check, we exclude for the analysis the migrant households which already had a migrant in 2004 or before, as they might be included in the Census migration rates. The main results do not change qualitatively (available upon request).

eign countries would affect the education investment decisions of a Moldovan household differentially.[23] For the migration network, we assume that past migration rates are predictors of current migration rates only via network effects and, otherwise, have no influence on the household's education spending. Accordingly, we include the 2004 share of the population who is a migrant to Italy, Romania, Russia and Ukraine as additional controls in the 2SLS setup to account for proximity to the border and any systematic differences in development that may have arisen because of migration to any of these important destinations between the take-off of migration, in 1999, and 2004, as in Böhme, Persian, and Stöhr (2015)[24]. Moreover, later in the paper we will match administrative data on public school expenditures to underscore the robustness of our identification strategy and to look for mediating factors in the private allocation of inputs. Since these budgets reflect the local public education expenditures and public good provision quite accurately, their inclusion ensures that the instrument is not picking up community level variation in the supply of public education.[25] Figure 4 plots the location of the 129 sampled communities and the distribution of above and below median values of the IV. Low and high values of the IV are distributed across the country. The IV is not systematically correlated with local economic conditions and the availability of public goods as proxied by night lights (Henderson, Storeygard, and Weil 2012) or local infrastructure as reported in the community questionnaire.

[Figure 4 about here.]

5 Results

The first-stage IV estimates are reported in column 1 of Table 3. As expected, the *Network-Growth* IV is a positive and highly significant predictor of the household's migration status.[26] The instrument's estimated coefficient implies that a one standard deviation increase in *Network-Growth* increases the likelihood of (at least one) household adult member migrating by approximately 14 percentage points. The Kleibergen-Paap rank test rejects underidentification at least at the 5% significance level in all the 2SLS regressions.

[Tables 3 and 4 about here.]

Table 4 reports the second stage results for the three categories of private education spending – payments to teachers, supplementary tutoring expenses, transportation ex-

[23] Both migrants and non-migrant families have high aspirations for their children as for example Böhme (2015) shows. If anything, this effect works against the mechanism we document in this paper.

[24] Alternatively using only one control for all migrant shares does not yield different results but we prefer keeping to the more conservative ability to control also for different border effects as in that earlier paper.

[25] As shown in the next section, we find no systematic relationship between school budgets and migration rates which is very reassuring.

[26] This also holds after controlling for the school budget variables (see column 2 and Appendix for more details).

penses – and the time spent by the caregiver.[27] The results indicate a strong reduction in the likelihood to pay teachers conditional on individual characteristics that is even more pronounced than the negative correlation in Figure 3. For supplementary tutoring we see a similar negative effect whereas transport expenditure remains unchanged. Column 7 furthermore shows that there is some evidence of caregivers more frequently spending time on the education of their children. In order to account for potentially inflated point estimates due to weak IVs, we also provide the conditional likelihood ratio (CLR) confidence region and test statistic for the respective migration effect at the bottom of the table (Mikusheva and Poi 2006; Moreira 2003, 2009). They show that the effect of migration on informal payments is bounded away from zero even when accounting for weak IVs. In addition, alternative estimates obtained from an IV probit estimation can be found in Table A2 for comparison. All of these results point are consistent in pointing to a statistically as well as economically significant negative effect of migration on informal payments.

The very strong negative correlation, which holds both at the village-level and, after rigorous selection correction, at the individual level is in stark contrast to what could be expected from a mere income effect under stable preferences. Namely, as migration loosens the budget constraint of parents, an increase in bribe paying could be expected. However, as shown in column 2 children's or parents' socio-economic characteristics do not explain bribing behavior at the extensive margin very well. While there is more reporting of bribes for older students, girls, and by more educated parents – one of the core predictors of income – the other controls are statistically insignificant. As the results for transportation expenditure and caregiver time show, this is not because the included covariates do not explain parental expenditure. For example, children attending more distant schools benefit from significantly higher private expenditure on transportation.

As an *ad hoc* assessment of the mechanism, log remittances received by the household can be used in place of the migration dummy as the endogenous variable (results available on request). In this case, no more significant correlation between the endogenous variable and informal payment is found in the second stage, which may be taken as tentative evidence that variation from the instrument does not affect bribe paying through the remittance channel. Even though one has to be careful interpreting such evidence because it is no longer a valid IV approach due to the omission of other channels by which migration affects the outcome variable, this may be interpreted as suggesting that instead of remittances other aspects of migration are likely to be the source of the bribe reducing effect. In line with other research we hypothesize that the negative coefficient of migration is explained by a lower willingness to bribe officials in the education system. This can be due to former migrants' own likelihood of bribing teachers or through

[27]Table A3 presents OLS estimates for the same set of covariates. Due to the inclusion of a selection correction covariates such as household size that are predictive of migration but not of informal payments pick up the correlation between migration and informal payments to teachers. The lack of a selection correction also results in statistically significant positive effects on transport expenditure, which are explained by higher available income as additional results show (available upon request).

social remittances, i.e., migrants affecting the opinions of those left behind over time (cf. evidence for Balkan countries by Ivlevs and King 2014). Omar Mahmoud et al. (2013) show that such social remittances are very influential in Moldova, even changing voting patterns in elections. Irrespectively of whether it is the migrants themselves or their families who decrease bribe paying, our finding is promising from a normative point of view. From an economic standpoint, the money not given to teachers as informal "service fees" or "presents", i.e., for rent-seeking, could be used more productively on other household expenses.

Interestingly, the determinants of supplementary tutoring are similar to those of paying bribes, supporting the view that supplementary tutoring offers a cleaner way of making informal payments to teachers. Expenses on supplementary tutoring are higher for girls, older children and children in urban areas. Furthermore, the education level of parents correlates significantly with supplementary tutoring. This suggests that both bribing teachers directly and supplementary tutoring are perceived as useful ways of spending money on the education of especially older, urban and female students (urban students and girls do far better in school in Moldova).

With respect to child and household characteristics, there are a few noteworthy differences between the determinants of households' expenditures and caregivers' time allocation to children's education. Whereas financial inputs are increasing in the child's age, the allocated amount of caregivers' time is decreasing strongly as children grow older. This could reflect that caregivers are better able to help their children in lower grades and increasingly invest money as curricula become more difficult and exams have higher stakes.

The emerging picture is thus a reduction in bribes and a simultaneous increase in the frequency of parental involvement in children's education due to migration.

The role of public funding of schools

As previously mentioned, public school quality in Moldova is lacking by richer countries' standards. According to the community leaders we interviewed this is not due to a lack of teachers. Rather, the most widely perceived problem is a scarcity of other inputs such as teaching materials or utilities as Table A4 illustrates. Private education inputs, however, could be affected by the public funding situation of local schools. Lack of information on public funding could cause omitted variable bias and make the study miss policy relevant implications of migration. Thus, we match our household data with administrative school-level expenditure data that are accessible through an open budget initiative of the World Bank. As the later availability of these data was not anticipated at the time of the household survey, matching both datasets is only possible for a subset of children (see Appendix A.1 for a detailed description of data and matching). Technically, we add the available school-level executed budget in several expenditure categories as additional

exogenous variables.[28] The results are reported in Table 5

The signs and significance levels vary across the different categories. First, wages, which closely correspond to the number of schoolteachers per pupil (cf. Figure A1), teaching material and schools' maintenance funds are not significantly correlated with the types of private expenditures reported in columns 1-6. By contrast, school's expenditures on utilities and transports, the areas where community leaders most report lacking public funds, exhibit signs of substitutability of private and public expenditure. These are the categories where a substitutive relationship is most expected: if a school, for example, pays for a free school bus parents can spend less on transport to school. Column 7 furthermore provides some tentative evidence of substitution between the parental investment of time and the time teachers could allocate to individual children.[29] We furthermore test whether the effect of migration differs between the better or worse funded half of schools and do not find robust differences. Most crucially, the strong negative effect on bribes remains, although slightly reduced in magnitude, even after adding the additional controls, which also approximately halves the sample size.

[Table 5 about here.]

We do not find evidence that spending less on education is due to parents perceiving it as less valuable due to the option of migration. On the contrary, a full 96% of caregivers replied that education was important to be successful abroad. Also, we do not observe any significant reduction in enrollment due to migration as Table A6 shows. Thus, parents seem to deliberately decide not to advance their children's educational progress by informally paying teachers. Moreover, even though migration relaxes the budget constraint, they use less rather than more supplementary tutoring. This may be because they do not expect it to be effective or because, as Carasciuc (2001) argues, supplementary tutoring from a student's teacher is sometimes just a less visible way of paying bribes – of course not ruling out that children actually learn something during these extra lessons.

The role of the income channel

In Table 6, we show that our main results hold if we control for household wealth, as proxied by a household asset index. In columns 1 and 3 we add contemporaneous assets to our usual 2SLS regression. Of course, these contemporaneous assets are endogenous to migration and in fact constitute one of the main expected transmission channels of migration on education inputs. Pre-migration differences in wealth across households, which are added in columns 2 and 4, should not and do not have any impact on the second

[28] We do not find evidence that they are systematically correlated with migration.

[29] Table A5 provides OLS results when the sample is split by migration status. The negative coefficient on the teacher-pupil ratio (proxied by wages per pupil) is similar for both migrant and non-migrant households, although statistically insignificant for the former.

stage migration coefficient. In line with expectations our instrument becomes weaker as shown by the smaller Kleibergen-Paap statistics in columns 1 and 3. Nevertheless, the result in column 2 shows that the large negative effect on bribes (Table 5, column 2) is robust to including pre-migration assets. To sum up, our finding on bribes can neither be explained by wealth differences across migrant and non-migrant households nor by the income effect of remittances.

[Table 6 about here.]

Regardless of not explaining the effect on bribes, the income effect of migration matters by improving families' ability to keep children in school as Table 7 underlines. In the household survey the main caregiver was asked if there were any barriers preventing the child from achieving the caregiver's desired level of education. In case of an affirmative answer, the main caregiver was asked to specify the main barrier. As Panel A of Table 7 shows, migrant households were disproportionately less likely to report the existence of barriers to the education of their children – the typical barrier being financial. Other reasons such as children's ability or the unavailability of secondary schools make up less than 20% of reported (main) constraints. Panel B shows that the likelihood of reporting barriers also decreases according to our 2SLS regression (see also Böhme 2015). Controlling for all the usual variables, we find that migration significantly *decreases* the likelihood of the main caregiver reporting barriers to the child's education by about 62 percentage points (average partial effect after an IV probit, see column 4). All of this supports our overall interpretation that the shifts in education expenditure are driven by households' deliberate choices – and *not* by circumstances–, and that the reduction in bribe paying is in stark contrast to the income effect of migration.

[Table 7 about here.]

6 Robustness

We have documented two main causal effects of migration on the provision of educational inputs at the household level: 1) a substantial decrease in the likelihood of paying informal fees to teachers, and 2) unchanged or weakly increasing frequency with which the caregiver spends time with the child on school-related activities. These two results could be explained in several ways, although they are inconsistent with a classic income effect. Given that in particular the finding on informal payments of teachers may be rather surprising we draw on another, less detailed dataset to show that a similar negative correlation of migration and bribe paying exists also in data independent of ours.

First, we analyzed the *Barometer of Public Opinion* of Moldova's Institute for Public Policy. This is a well-regarded biannual survey which collects individuals' opinion on a

wide range of topics regarding politics, values, and related issues in Moldova. The micro data are publicly available. Many questions feature only once or infrequently in the survey to ensure a broad coverage of different topics and relatively few individual characteristics are included. In the April 2013 survey[30] informal payments to authorities, as well as questions about the migration destination of individuals, were covered. In particular those individuals with migration experience to the West were more than twice as likely to belong to a more affluent stratum of society. Regarding corruption experience respondents were first asked whether they had interacted with the justice system over the past 12 months and, directly thereafter, *"For the solution of the problem, did you pay informal fees?"* Individuals with migration experience to the West were about twice as likely to have had interactions with justice bodies, which, in a logit model controlling for age categories, three different education levels, migration experience and socio-economic status, is explained by the latter (estimates available upon request). More affluent individuals were thus more likely to have had contact with the authorities. Moreover, these more affluent respondents and those with migration experience were more likely to have been asked for bribes, probably because they were known to be richer. Conditional on reporting *not* paying a bribe, people with any experience of migrating to the West, i.e. those known to often be more affluent, are 3.6 times more likely to have been asked to pay informal fees than those without migration experience. Still, the likelihood of paying informal fees (conditional on contact with authorities) does not differ significantly between the two groups. Individuals with migration experience thus seem to be less likely to pay bribes under a given level of pressure to do so. Ivlevs and King (2014) show similar findings for former Yugoslavian countries. While these results concern bribes payed to justice officials, they are in line with our findings for bribing schoolteachers. Hence, in Moldova, families with migration experience are less likely to make such payments even though they have more income (and may thus also be under more pressure to pay, which is any experience many migrant families in Moldova make).[31]

Finally, our results could be driven by the change in the identity of the child's caregiver due to migration if those new caregivers were less likely to report paying bribes. Relative to non-migrant households, in migrant households the main caregiver is more likely to be someone else than the biological parents. Thus, our results could simply reflect the fact that non-parental caregivers (e.g., grandparents, siblings, aunts or uncles) have less involvement in (or knowledge of) the education system and are, therefore, less likely to bribe teachers. They may also have lower opportunity costs of time and may

[30]The sample contains 1100 individuals from 76 communities and is nationally representative of the adult population.

[31]As previously mentioned, our instrumental variable strategy does not allows us to identify destination specific effects. Therefore, our results are the average migration effect across all destinations, not just Western countries. If the effect is was entirely driven by migration to the West, where corruption is far less common than in Moldova, then our 2SLS estimates would be a lower bound for the true Western migration effect.

therefore spend more time on the child's education. To rule out this mechanism, we run the usual 2SLS regression on the probability of paying bribes, supplementary tutoring, and transport expenditures, as well as the caregiver time allocation excluding from the sample all the children whose caregiver is *not* one of the biological parents. As shown in Table A7, on the bribe payment regression, the migration coefficient is negative and statistically significant (at the 5% level) and a little but not statistically larger in absolute value compared to the regression that includes all caregivers (c.f. Table 4). The coefficient for caregivers' time allocation also increases slightly when non-parental caregivers are excluded. Thus, we find strong evidence that our results are not driven by children in migrant households more often having caregivers who are not one of their biological parents. Also, our results are robust to alternative but similar definitions of the migration dummy (e.g., who migrates or how long migration spells have to be) and extend to caregiving activities which are not strictly educational but are indicative of a more nurturing family environment such as time allocated to playing, discussing news and events, and doing special activities outside the home with the child (e.g., going to the cinema, or the zoo), as shown in Table A8.

Despite facing lower financial barriers to education of their children, migrants are thus less likely to pay bribes also in different, unrelated datasets. Our main results furthermore do not depend on circumstances such as the funding, availability of teachers or subjective school quality (results available on request), nor on intra household reallocation of caregiving responsibility.

If not paying bribes had dire consequences for the children's future, lower informal payments to teachers might not be in the best interest of children. In this case there would be economic incentives against reducing bribes. In Table 8 we therefore provide some evidence in this regard by estimating effects for students' grade point average (GPA). Furthermore, grades are highly dependent on past investment into education.[32] Contrary to many other forms of investment, we suspect that the effect of bribes would matter in the short term, making the exercise informative nonetheless. We use the grade point average (GPA), which ranges from 0 to 10 in Moldova. Column 4 presents what can be thought of as a clean IV setup as in earlier tables. In column 5 the endogenous education expenditure categories and caregiver time are added. Note that a fully reliable analysis of this specification would require instrumenting migration and lower payments to teachers separately because causal effects from both would otherwise be jointly picked up by the migration dummy. In column 6 we replace pre-migration assets with current assets in an *ad hoc* way of separating the income effect from other migration effects which are, on average, negative determinants of GPA scores, such as parental absence.

The IV estimates in column 4 suggest a negative, albeit statistically insignificant, ef-

[32] Any regression that fails to account for past inputs and relies only on contemporaneous inputs will potentially suffer omitted variable bias and can thus only provide suggestive evidence (Todd and Wolpin 2003, 2007).

fect of migration on students' grades in schools for which we were able to match expenditure data. This negative effect is in line with the results from the literature that document a negative effect of parental migration on children's education performance.[33] The results in column 6 suggests that, in the absence of its positive income effect, migration would very likely have a significant negative effect on children's grades. Throughout the different specifications payments to teachers remain insignificant, though. This can have a number reasons, for example, as some suggest bribing of teachers for grades is not effective because students study less hard if they expect to receive good grades anyway. It could also indicate that bribes are not directly meant to improve grades but rather help with other aspects of education such as paperwork. Another possibility is that deviating from the the common situation of paying bribes has no adverse effects, especially as standardized tests are used more and more in the most important exams. The absence of a negative effect also suggests that the reduction in payments to teachers does not have a significant effect on grades. By contrast, positive and significant coefficients on supplementary tutoring show that private investment can help improve grades.

[Table 8 about here.]

7 Conclusion

In this paper we analyze the effect of emigration on the provision of private education inputs for children left behind. We use individual-level data from a large household survey that was specifically designed to estimate effects of migration on children left behind. We use the interaction between migrant networks and economic growth at the destination as an instrumental variable for the household's migration status in order to control for selection into migration. Using this IV approach, we document a reduction in informal payments to teachers. Studies of the impact of migration on education outcomes usually interpret the reduced-form coefficient as the net effect of two opposing forces: i) an income effect due to remittances and ii) a negative effect from parental absence. Neither effect can convincingly justify our results. In line with an emergent literature we therefore argue that value change may be the explanation. A change in preferences could explain why migration significantly decreases households' bribes to teachers even though working abroad relaxes the budget constraint and should therefore have non-negative demand effects on all normal goods. Not observing a reduction in caregivers' frequency of time spent helping the child with education and additional evidence on parents' self-reported importance of education show that there is no decrease in the valuation of education.

In order to assess the consequences of the documented decrease in spending for children's education we analyze the effect on students' grade point average. This yields an

[33] See, e.g., Zhang et al. (2014), and Meyerhoefer and Chen (2011).

overall negative, but statistically insignificant, effect of migration on children's grades. This effect is an aggregate of all causal channels affecting education: remittances, parental absence, changing financial and time inputs, etc. Further investigation suggests that the increase in caregivers' time invested into children's education cannot compensate the negative effect of migration on the average grade of student that arises through other channels such as parental absence. Using school budget data furthermore shows that, while funding schools sufficiently is helpful in its own right, it does not induce migrant households to increase their financial investment in primary and secondary education in the present case. Over time, falling corruption may however change the education systems in migrants' countries of origin for the better, thus benefiting both migrant and non-migrant families.

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Figures and Tables

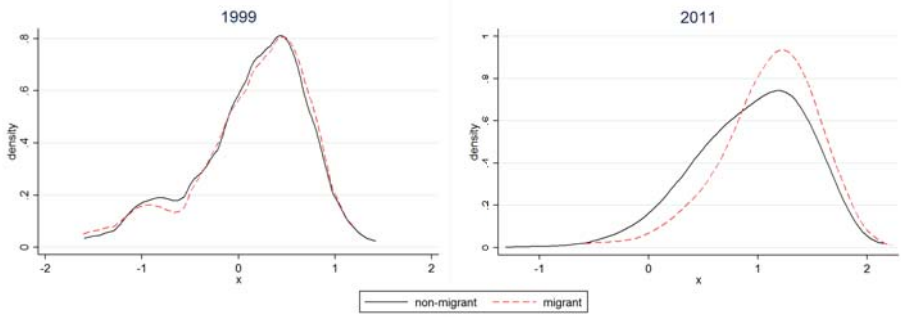

Figure 1: Kernel density plots of the household asset index in 1999 and 2011

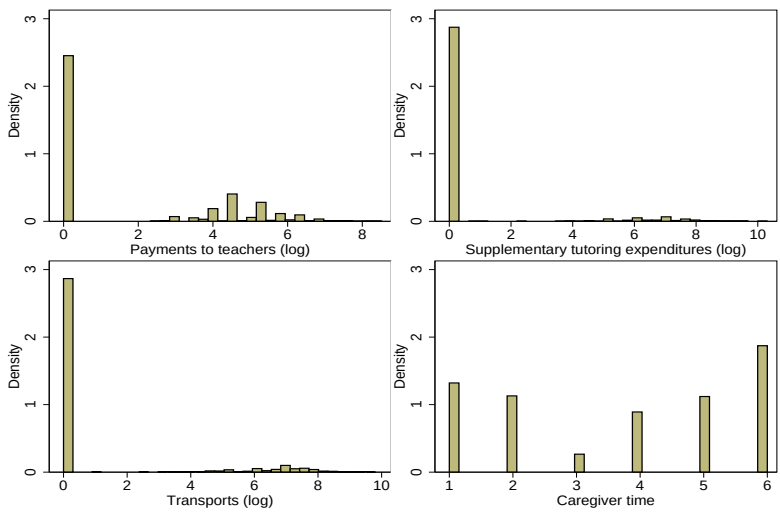

Figure 2: Histogram of private education inputs

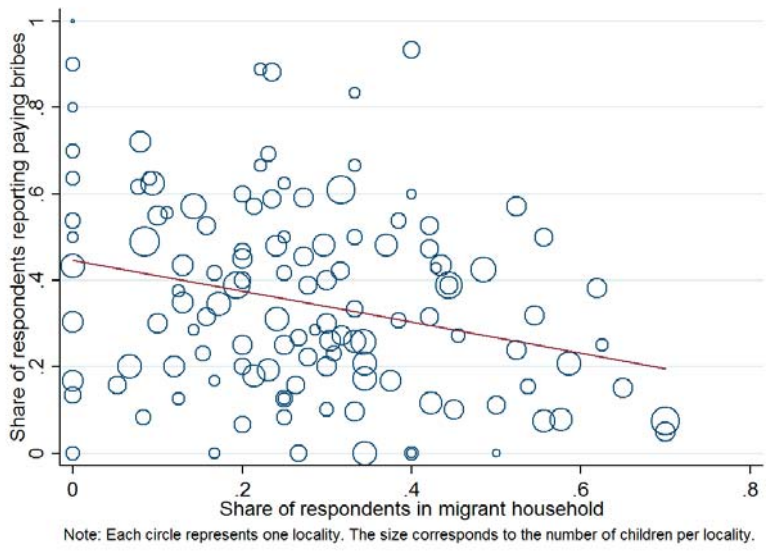

Figure 3: Correlation of bribe payings to teachers and migration rate

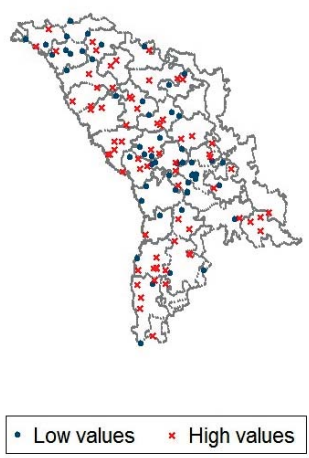

Figure 4: Map of localities with above and below median values of the network-growth instrumental variable

Table 1: Selected summary statistics

	Non-migrant Households			Migrant Households			Mean equality
	N	Mean	(SD)	*N*	Mean	(SD)	(t-test)
Child characteristics							
Age	1783	12.28	(3.73)	718	12.68	(3.79)	**
Male	1783	0.51		718	0.51		
Grade Point Average (GPA) (0-10)	1355	8.04	(1.07)	555	8.10	(0.93)	*
Serious illness (past year)	1783	0.29		718	0.26		
Distance to school (min)	1659	20.76	(18.39)	668	19.92	(17.53)	
Household characteristics							
Total income	1783	33819.11	(36592.44)	718	48901.40	(49005.71)	***
Household size	1783	4.70	(1.39)	718	5.13	(1.75)	***
Mean years education	1782	10.74	(2.40)	718	10.68	(1.93)	
Urban	1783	0.24		718	0.15		***
Older siblings	1783	0.59		718	0.58		
Parents divorced	1783	0.12		718	0.10		
Private inputs to child's education							
Caregiver time	1565	3.78	(1.94)	640	3.62	(1.97)	*
Payments to teachers	1659	83.35	(267.41)	668	62.38	(160.38)	**
Supplementary tutoring expenditures	1783	169.90	(1109.59)	718	77.41	(357.06)	***
Transportation expenditures	1659	191.36	(754.76)	668	201.77	(886.67)	

Notes: Authors' calculations based on CELB 2012. All monetary values are expressed in Moldovan Lei. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Table 2: Basic OLS estimates of the correlation between migration and informal payments to teachers

	(1)	(2)	(3)	(4)	(5)
	village level	individual level			
Age group	all	all	10+	15+	18+
Migration	-0.396***	-0.042	-0.055*	-0.068*	-0.126**
	(0.113)	(0.027)	(0.030)	(0.039)	(0.057)
Constant	0.466***	0.369***	0.394***	0.403***	0.393***
	(0.040)	(0.020)	(0.022)	(0.025)	(0.035)
Observations	129	2,367	1,790	913	340

Notes: Authors' calculations based on CELB 2012. Standard errors in parentheses. Heteroskedasticity-robust standard errors used throughout. In columns 2-5 standard errors are clustered at the village level. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. In the village-level regression in column 1, migration indicates the share of children with migrant parents. In the individual-level regressions in columns 2-5 migration is defined as migration of at least one adult at the household level. Interpreting column 1, please note that the survey was not designed to be representative at the village level.

Table 3: The effect of migration on private education inputs: first stage IV regression

	Migration	
	(1)	(2)
Instrument		
Network-Growth	0.001***	0.001***
	(0.000)	(0.000)
School budgets (per student)		
Wages (log)		0.005
		(0.072)
Teaching materials (log)		0.017
		(0.036)
Utilities (log)		-0.006
		(0.024)
Transports (log)		-0.014
		(0.011)
Maintenance (log)		-0.009
		(0.011)
Child characteristics		
Age	0.006*	0.004
	(0.003)	(0.005)
Male	-0.001	0.034
	(0.018)	(0.026)
Serious illness	-0.010	0.001
	(0.022)	(0.030)
Distance to school (log)	-0.017	-0.008
	(0.017)	(0.024)
Household characteristics		
Mean years education	0.013**	0.014*
	(0.006)	(0.008)
Older siblings	0.016	0.015
	(0.017)	(0.023)
Household size	0.040***	0.045***
	(0.011)	(0.015)
Parents divorced	-0.023	-0.056
	(0.043)	(0.049)
Urban	-0.126***	-0.118**
	(0.032)	(0.056)
Main migration destinations		
Migrant share Italy	-0.001	-0.002
	(0.001)	(0.001)
Migrant share Ukraine	0.001	-0.012*
	(0.003)	(0.007)
Migrant share Romania	-0.004	-0.004
	(0.005)	(0.005)
Migrant share Russia	-0.004**	-0.004**
	(0.002)	(0.002)
Constant	-0.157	-0.202
	(0.122)	(0.572)
N	2224	1177

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Table 4: The effect of migration on private education inputs

Second stage IV regressions	Payments to teachers		Supplementary tutoring		Transportation expenditure		Caregiver time
	(1) log	(2) $D(Y>0)$	(3) log	(4) $D(Y>0)$	(5) log	(6) $D(Y>0)$	(7)
Migration	-3.941**	-0.731**	-1.855**	-0.254**	0.351	0.105	2.667*
	(1.618)	(0.315)	(0.836)	(0.121)	(1.820)	(0.291)	(1.449)
Child characteristics							
Age	0.086***	0.015***	0.043***	0.006***	0.177***	0.025***	-0.294***
	(0.022)	(0.004)	(0.015)	(0.002)	(0.022)	(0.003)	(0.019)
Male	-0.368***	-0.073***	-0.211**	-0.032**	-0.042	-0.008	0.039
	(0.129)	(0.026)	(0.085)	(0.012)	(0.088)	(0.013)	(0.096)
Serious illness	0.224	0.017	0.221**	0.027*	0.192	0.027	0.014
	(0.169)	(0.032)	(0.107)	(0.015)	(0.143)	(0.022)	(0.131)
Distance to school (log)	-0.054	-0.016	-0.025	-0.003	0.598***	0.084***	0.021
	(0.111)	(0.021)	(0.058)	(0.009)	(0.109)	(0.016)	(0.087)
Household characteristics							
Household size	0.128	0.023	0.085	0.012	0.001	-0.002	-0.136*
	(0.087)	(0.017)	(0.053)	(0.008)	(0.088)	(0.014)	(0.079)
Mean years education	0.126***	0.021**	0.121***	0.016***	0.123***	0.016**	0.042
	(0.043)	(0.008)	(0.030)	(0.004)	(0.041)	(0.006)	(0.029)
Older siblings	-0.161	-0.020	-0.149*	-0.020	-0.162*	-0.026*	-0.264***
	(0.121)	(0.022)	(0.084)	(0.012)	(0.094)	(0.014)	(0.091)
Parents divorced	0.332	0.068	-0.020	-0.001	0.095	0.017	-0.177
	(0.258)	(0.051)	(0.167)	(0.024)	(0.176)	(0.028)	(0.168)
Urban	0.357	0.020	0.840***	0.119***	0.847***	0.142***	0.409*
	(0.335)	(0.062)	(0.224)	(0.032)	(0.296)	(0.047)	(0.224)
Main migration destinations							
Migrant share Italy	0.004	0.001	-0.005*	-0.001*	-0.000	-0.000	0.004
	(0.004)	(0.001)	(0.003)	(0.000)	(0.004)	(0.001)	(0.003)
Migrant share Ukraine	0.013	0.004	-0.003	-0.001	-0.026**	-0.004*	-0.033*
	(0.021)	(0.004)	(0.012)	(0.002)	(0.013)	(0.002)	(0.019)
Migrant share Romania	-0.013	-0.002	-0.011	-0.001	-0.004	0.000	0.025
	(0.035)	(0.008)	(0.012)	(0.002)	(0.025)	(0.004)	(0.022)
Migrant share Russia	0.007*	0.001*	0.002	0.000*	-0.003	-0.000	-0.004
	(0.004)	(0.001)	(0.002)	(0.000)	(0.003)	(0.000)	(0.003)
Constant	-0.251	0.053	-0.988**	-0.128*	-4.230***	-0.585***	6.981***
	(0.679)	(0.134)	(0.494)	(0.071)	(0.588)	(0.088)	(0.528)
N	2224	2224	2224	2224	2224	2224	2162
R^2	-0.430	-0.389	-0.079	-0.071	0.168	0.158	-0.123
F-stat	5.629	4.710	3.636	3.675	13.110	13.408	28.725
K-P underid	4.922	4.922	4.922	4.922	4.922	4.922	4.753
Underid (pval)	0.027	0.027	0.027	0.027	0.027	0.027	0.029
K-P weakid	10.644	10.644	10.644	10.644	10.644	10.644	10.609
95% CLR confidence set	[-8.28, -1.51]	[-1.57, -0.25]	[-4.74, 0.09]	[-0.07, 0.04]	[-2.11, 2.85]	[-0.25, 0.49]	[0.99, 5.57]
CLR test p-value	0.00	0.00	0.06	0.09	0.76	0.53	0.00

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. For first stage, please refer to Table 3. The CLR test refers to confidence region and the test statistic using the "condivreg" package by (Mikusheva and Poi 2006).

Table 5: The effect of migration on private education inputs: controlling for public school expenditures

Second stage IV regressions	Payments to teachers		Supplementary tutoring		Transportation expenditure		Caregiver time
	(1) log	(2) $D(Y>0)$	(3) log	(4) $D(Y>0)$	(5) log	(6) $D(Y>0)$	(7)
Migration	-2.543*	-0.460*	-0.914	-0.121	0.895	0.168	1.189
	(1.460)	(0.279)	(0.817)	(0.117)	(1.875)	(0.293)	(1.263)
School budgets (per student)							
Wages (log)	0.047	-0.006	-0.315	-0.044	0.515	0.064	-0.553*
	(0.444)	(0.087)	(0.380)	(0.055)	(0.446)	(0.068)	(0.291)
Teaching materials (log)	-0.125	-0.024	-0.032	-0.009	-0.239	-0.027	-0.043
	(0.244)	(0.044)	(0.188)	(0.026)	(0.209)	(0.030)	(0.117)
Utilities (log)	-0.209	-0.043	-0.162	-0.020	-0.296**	-0.046**	0.099
	(0.173)	(0.032)	(0.108)	(0.016)	(0.135)	(0.020)	(0.084)
Transports (log)	0.057	0.016	-0.038	-0.004	-0.198**	-0.027**	0.075
	(0.080)	(0.015)	(0.052)	(0.008)	(0.089)	(0.013)	(0.048)
Maintenance (log)	-0.042	-0.000	-0.025	-0.005	0.064	0.007	0.070
	(0.077)	(0.014)	(0.072)	(0.011)	(0.067)	(0.011)	(0.052)
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Main migration destinations	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1177	1177	1177	1177	1177	1177	1177
R^2	-0.079	-0.082	0.086	0.077	0.182	0.167	0.170
F-stat	5.742	5.162	5.211	5.138	4.068	3.597	20.837
K-P underid	3.559	3.559	3.559	3.559	3.559	3.559	3.559
Underid (pval)	0.059	0.059	0.059	0.059	0.059	0.059	0.059
K-P weakid	8.889	8.889	8.889	8.889	8.889	8.889	8.889

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 4.

Table 6: The effect of migration on private education inputs: controlling for household assets

Second stage IV regressions	D(Payments to teachers) > 0		Caregiver time	
	(1)	(2)	(3)	(4)
Migration	-0.534	-0.419**	0.986	1.271
	(0.334)	(0.213)	(1.274)	(1.116)
Asset index (log)	0.090		0.290	
	(0.073)		(0.209)	
Asset index 1999 (log)		0.017		0.149
		(0.043)		(0.130)
School budgets	Yes	Yes	Yes	Yes
Child characteristics	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
Main migration destinations	Yes	Yes	Yes	Yes
N	1176	905	1176	905
R^2	-0.132	-0.046	0.196	0.156
F-stat	4.546	4.571	23.007	19.164
K-P underid	2.937	4.025	2.937	4.025
Underid (pval)	0.087	0.045	0.087	0.045
K-P weakid	6.072	12.336	6.072	12.336

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5.

Table 7: Does migration predict perceived barriers to education?

Panel A: Perceived barriers to child's education (%)

D.048: Is there anything standing in child's way of achieving your desired level of education?	Non-migrant	Migrant	Total
Yes	51.7	34.6	46.8
No	45.8	63.3	50.8
Does not apply	1.3	0.7	1.1
Does not know	1.1	1.5	1.2
Total	100	100	100
N	1521	610	2131
D.049: If yes, what?			
Financial reasons	87.6	81.5	86.3
Child's ability	7.3	6.8	7.2
Other reasons	2.6	5.0	3.1
No access to required level due to distance	0.5	2.7	1.0
Does not know	2.0	4.1	2.4
Total	100	100	100
N	808	222	1030

Panel B: Second-stage IV regressions - LPM and IV Probit

	D(Barrier to child's education)			
	(1) LPM	(2) LPM	(3) Probit^a	(4) Probit^a
Migration	-1.930***	-1.924***	-0.612***	-0.618***
	(0.471)	(0.567)	(0.010)	(0.016)
School budgets	No	Yes	No	Yes
Child characteristics	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes
Main migration destinations	Yes	Yes	Yes	Yes
N	2008	1057	2008	1057
F-stat	3.556	2.322	–	–
K-P underid	20.458	15.362	–	–
Underid (pval)	0.000	0.000	–	–
K-P weakid	22.369	17.150	–	–

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5. ^{a} average partial effect (APE) reported for IV probit.

Table 8: Determinants of grade point average (GPA)

	GPA (0-10)					
	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Migration	0.041	0.040	0.002	-0.828	-0.835	-1.499**
	(0.077)	(0.077)	(0.069)	(0.533)	(0.519)	(0.593)
Log of Household Asset Index in 1999	-0.037	-0.070		-0.075	-0.108	
	(0.070)	(0.071)		(0.073)	(0.073)	
Endogenous outcomes						
Log of Household Asset Index in 2011			0.304***			0.531***
			(0.078)			(0.140)
Payments to teachers (log)		0.007	0.012		-0.002	0.001
		(0.014)	(0.014)		(0.017)	(0.020)
Supplementary tutoring expenditures (log)		0.037**	0.019		0.046**	0.031*
		(0.016)	(0.014)		(0.018)	(0.018)
Transportation expenditures (log)		0.041**	0.028*		0.037**	0.022
		(0.016)	(0.016)		(0.017)	(0.021)
Caregiver time		0.033	0.031		0.035	0.026
		(0.022)	(0.020)		(0.025)	(0.025)
School budgets	Yes	Yes	Yes	Yes	Yes	Yes
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Main migration destinations	Yes	Yes	Yes	Yes	Yes	Yes
N	804	804	1,028	804	804	1,028
$Adj.R^2$	0.220	0.239	0.248	0.094	0.111	-0.121
F-stat (GPA regression)	16.30	14.4	17.80	13.92	11.82	12.72
K-P underid	–	–	–	4.54	4.54	3.71
Underid (pval)	–	–	–	0.033	0.033	0.054
K-P weakid	–	–	–	12.77	12.51	7.26

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5. Please interpret columns 2, 3, 5, and 6 with caution since they include endogenous covariates for illustrative purposes.

Appendix

Can parental migration reduce petty corruption in education?

A.1 Detailed description of school-level data

The data on school-level public expenditures are derived from the World Bank's Open Budget Initiative (or BOOST).[34] The Moldovan Ministry of Finance provides all budgets of public organisms at a very disaggregated level and on a yearly basis going back to 2005. Each item is classified according to source, function and expenditure type. In Moldova, the financing of public schools is highly decentralized. Typically, the amount and allocation of funds are determined at the municipality (or *rayon*) level by a General Education Division (Sandu 2011). We collect all the school-level budgets which were executed during the year 2010 and aggregate expenditures in five categories: 1) staff wages, 2) teaching materials (also includes food and office supplies), 3) utilities, 4) transportation, and 5) maintenance (includes small-scale purchases and repairs of physical capital). We drop all those schools which do not have positive executed expenditures on categories 1), 2) and 3), since they are likely to suffer from severe missing data problems. However, we allow for zero executed totals on categories 4) and 5), since these are arguably not always necessary for the core activities of schools.

Finally, we obtain the total number of students for each school from administrative data of the Moldovan Ministry of Education. In summary, we have complete survey data for a total of 2092 school-age children (6-18 years old) from 1424 households. School names from the survey and the official records were first matched automatically. In a second step, we matched strings by hand, thus correcting minor errors such as typos. Wherever we could certainly establish a link, we then manually entered the school code for the respective child. In many cases the string variable covering the school name did not point to a particular school with certainty. Whenever we were less than 100% sure about the correctness of a match we did not match the respective child's record. After matching the survey data with the school-level budgets and number of students, we have complete data for a sample of 1121 children from 829 households. Most of the losses in sample size resulted from not reporting or misreporting the school name in the household survey and missing executed budget data at the school-level. To a smaller extent, we could not unambiguously match some school names as reported in the household survey with their counterparts in the BOOST dataset, for example if parents gave the school name as "liceu <municipality>" but there were several schools of the respective school type in that municipality.

Table A9 presents summary statistics of the child-observations successfully matched across all data sources and of those for which the matching failed. Failure to match is to some extent random but tends to happen more often in urban areas, where, for example, a particular part of town has more than one school of a specific kind. As a consequence, 16-18 years old children who attend upper secondary schooling are also disproportionately missing from the matched sample. The reason is that, at higher education levels, teenagers tend to move away from smaller communities to attend school in more populous towns, where the chances of ambiguous matches across data sources are higher.[35] This pattern also explains why the average distance to school and transportation expenditures are significantly higher for the unmatched sample. A more substantial form of selection into the matched sample occurred because of the characteristics of respondents. Parents

[34] The data are freely available at `http://wbi.worldbank.org/boost/country/moldova`.
[35] Recall that enrollment in upper secondary schooling is no longer compulsory in Moldova.

who spend more time with their children and who spend more money on educational expenditures (other than transportation) are more likely to have provided information that allowed a successful match. They may also be more likely to send their children to schools that do not provide incomplete budget records, which might be an indicator of (administrative) school quality.

For a clearer interpretation of the regression results, Figure A1 depicts that the school-level variation on budgets for staff wages is almost completely explained by variation in the number of teachers employed. The graph plots the values of school expenditures on wages against the predicted values of a regression of wage spending on the number of teachers. The red dashed line is the identity line (i.e., $y = x$). The regression's R^2 is approximately 98%. Therefore, school budgets for staff wages can be thought of as a representation of the quantity of schoolteachers.

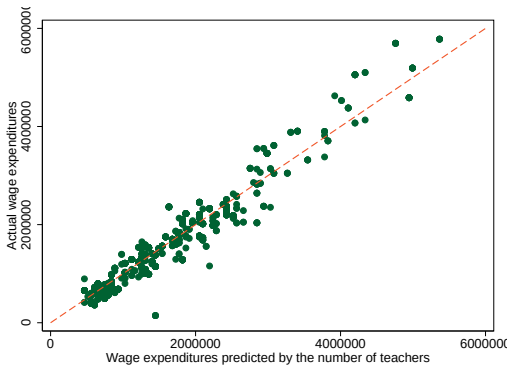

Figure A1: School-level wage expenditure in BOOST is explained by number of teachers

Table A1: School enrollment rates in Moldova (2010)

Age	N	Mean[a] (%)	(Std Error)[b]
7-10	696	99	(0.006)
11-15	973	99	(0.004)
16-18	666	87	(0.018)
All	2335	96	(0.006)

Source: Authors' calculations based on CELB 2012. [a] Nationally representative weighted mean. [b] Standards errors clustered at the village level.

Table A2: The effect of migration on education expenditures: average marginal effects after IV Probit

	Payments to teachers		Supplementary tutoring		Transportation expenditure	
	(1) $D(Y>0)$	(2) $D(Y>0)$	(3) $D(Y>0)$	(4) $D(Y>0)$	(5) $D(Y>0)$	(6) $D(Y>0)$
Migration	-0.516***	-0.428***	-0.347*	-0.274	0.141	0.239
	(0.088)	(0.160)	(0.183)	(0.180)	(0.290)	(0.282)
School budgets	No	Yes	No	Yes	No	Yes
Child characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Main migration destinations	Yes	Yes	Yes	Yes	Yes	Yes
N	2224	1177	2224	1177	2224	1177

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5.

Table A3: The effect of migration on private education inputs: OLS regressions

	Payments to teachers		Supplementary tutoring		Transportation expenditure		Caregiver time
	(1) log	(2) $D(Y>0)$	(3) log	(4) $D(Y>0)$	(5) log	(6) $D(Y>0)$	(7)
Migration	-0.137	-0.025	0.021	0.007	0.281**	0.044**	-0.053
	(0.135)	(0.027)	(0.096)	(0.015)	(0.131)	(0.020)	(0.098)
Child characteristics							
Age	0.064***	0.011***	0.032**	0.004**	0.177***	0.026***	-0.276***
	(0.017)	(0.003)	(0.013)	(0.002)	(0.019)	(0.003)	(0.013)
Male	-0.369***	-0.074***	-0.212***	-0.032***	-0.042	-0.008	0.031
	(0.103)	(0.021)	(0.080)	(0.012)	(0.088)	(0.013)	(0.076)
Serious illness	0.282*	0.028	0.249**	0.031**	0.191	0.026	-0.032
	(0.164)	(0.031)	(0.104)	(0.015)	(0.144)	(0.022)	(0.108)
Distance to school (log)	0.013	-0.003	0.008	0.002	0.596***	0.083***	-0.024
	(0.081)	(0.016)	(0.051)	(0.008)	(0.099)	(0.014)	(0.061)
Household characteristics							
Household size	-0.030	-0.007	0.007	0.001	0.004	0.001	-0.022
	(0.043)	(0.009)	(0.028)	(0.004)	(0.035)	(0.005)	(0.036)
Mean years education	0.084**	0.013**	0.100***	0.014***	0.124***	0.017***	0.070***
	(0.033)	(0.006)	(0.028)	(0.004)	(0.030)	(0.004)	(0.023)
Older siblings	-0.226**	-0.032*	-0.181**	-0.025**	-0.161*	-0.025*	-0.220***
	(0.100)	(0.018)	(0.076)	(0.011)	(0.092)	(0.014)	(0.062)
Parents divorced	0.425**	0.085**	0.026	0.005	0.093	0.016	-0.246*
	(0.196)	(0.040)	(0.135)	(0.020)	(0.166)	(0.025)	(0.138)
Urban	0.801***	0.102**	1.060***	0.149***	0.839***	0.135***	0.081
	(0.272)	(0.048)	(0.217)	(0.031)	(0.239)	(0.041)	(0.152)
Main migration destinations							
Migrant share Italy	0.004	0.001	-0.005*	-0.001*	-0.000	-0.000	0.003
	(0.004)	(0.001)	(0.003)	(0.000)	(0.004)	(0.001)	(0.003)
Migrant share Ukraine	-0.009	-0.000	-0.014	-0.002*	-0.025***	-0.003**	-0.018
	(0.012)	(0.003)	(0.009)	(0.001)	(0.009)	(0.001)	(0.015)
Migrant share Romania	-0.008	-0.001	-0.009	-0.001	-0.004	0.000	0.024
	(0.045)	(0.009)	(0.015)	(0.002)	(0.024)	(0.004)	(0.019)
Migrant share Russia	0.002	0.000	0.000	0.000	-0.003	-0.000	-0.001
	(0.003)	(0.001)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)
Constant	0.148	0.127	-0.791*	-0.100	-4.237***	-0.592***	6.709***
	(0.570)	(0.113)	(0.461)	(0.067)	(0.534)	(0.077)	(0.401)
N	2224	2224	2224	2224	2224	2224	2162
R^2	0.060	0.036	0.090	0.079	0.168	0.164	0.261
F-stat	7.717	5.494	4.058	4.312	13.143	13.715	39.759

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV.

Table A4: Main problems with local public schools: community leaders' perceptions

	Main problem for this/these school(s)	
	Frequency	Share (in %)
Primary schools		
Lack of teaching materials (books, etc)	373	41.49
Lack of health and hygiene facilities	173	19.24
Other (specify)	172	19.13
Lack of water	123	13.68
Lack of teachers	58	6.45
Total	899	100
Secondary schools		
Lack of teaching materials (books, etc)	372	41.01
Other (specify)	200	22.05
Lack of health and hygiene facilities	129	14.22
Lack of water	128	14.11
Lack of teachers	78	8.60
Total	907	100

Source: Community questionnaires of CELB 2012 that asked community leaders about schools in the community in general. The difference in number of observations between here and the sample used in Table 5 is due to some communities not having a school or the community leader not providing an answer to the question.

Table A5: Determinants of caregiver time: OLS results when splitting sample by migration status

	Caregiver time			
	(1)	(2)	(3)	(4)
Migrants	no	yes	no	yes
Estimator	OLS	OLS	OLS	OLS
School budgets (per student)				
Wages (log)	-0.633**	-0.693		
	(0.270)	(0.438)		
D(School wage bills per student above median)			-0.314*	-0.171
			(0.163)	(0.233)
Teaching materials (log)	-0.127	0.218	-0.244	0.182
	(0.157)	(0.199)	(0.148)	(0.194)
Utilities (log)	0.0858	0.0960	0.105	0.0706
	(0.105)	(0.147)	(0.111)	(0.148)
Transports (log)	0.0685	0.0320	0.0761*	0.0192
	(0.0451)	(0.0763)	(0.0446)	(0.0737)
Maintenance (log)	0.0696	0.139**	0.0856	0.146**
	(0.0536)	(0.0672)	(0.0541)	(0.0697)
Child characteristics				
Age	-0.269***	-0.269***	-0.272***	-0.268***
	(0.0177)	(0.0309)	(0.0179)	(0.0310)
Male	0.128	0.407*	0.127	0.429*
	(0.106)	(0.220)	(0.107)	(0.224)
Serious illness	-0.0358	-0.300	-0.0369	-0.306
	(0.155)	(0.214)	(0.152)	(0.211)
Distance to school (log)	-0.0880	0.00838	-0.0946	0.00763
	(0.0975)	(0.143)	(0.0970)	(0.146)
Household characteristics				
Household size	0.0266	-0.00339	0.0247	0.00357
	(0.0574)	(0.0862)	(0.0570)	(0.0882)
Mean years education	0.0430	0.124**	0.0436	0.126**
	(0.0342)	(0.0566)	(0.0338)	(0.0556)
Older siblings	-0.219**	-0.457**	-0.228**	-0.470**
	(0.103)	(0.186)	(0.102)	(0.190)
Parents divorced	-0.470**	-0.340	-0.435**	-0.335
	(0.202)	(0.374)	(0.205)	(0.376)
Urban	0.538**	0.579	0.560**	0.560
	(0.261)	(0.413)	(0.264)	(0.394)
Constant	11.81***	9.052**	7.256***	3.687**
	(1.911)	(3.596)	(1.265)	(1.760)
N	862	315	862	315
R^2	0.227	0.285	0.226	0.282

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Table A6: Migration and school enrollment

	D(Child is enrolled in school) = 1	
	(1) OLS	(2) IV
Migration	0.024***	-0.129
	(0.008)	(0.097)
Child characteristics		
Age	-0.008***	-0.007***
	(0.001)	(0.002)
Male	-0.019***	-0.019***
	(0.007)	(0.007)
Serious illness	-0.004	-0.006
	(0.008)	(0.009)
Distance to school (log)	-0.003	-0.006
	(0.006)	(0.008)
Household characteristics		
Mean years education	0.006***	0.008***
	(0.002)	(0.002)
Older siblings	0.044***	0.047***
	(0.007)	(0.008)
Household size	-0.006**	0.000
	(0.002)	(0.005)
Parents divorced	-0.011	-0.014
	(0.014)	(0.014)
Urban	0.006	-0.012
	(0.008)	(0.013)
Main migration destinations		
Migrant share Italy	-0.000	-0.000
	(0.000)	(0.000)
Migrant share Ukraine	0.000	0.001*
	(0.001)	(0.001)
Migrant share Romania	0.003***	0.003**
	(0.001)	(0.001)
Migrant share Russia	-0.000	0.000
	(0.000)	(0.000)
Constant	1.012***	0.996***
	(0.032)	(0.038)
N	2223	2223
R^2	0.068	-0.069
F-stat	4.431	4.665
K-P underid	–	4.663
Underid (pval)	–	0.031
K-P weakid	–	9.632

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV.

Table A7: The effect of migration on private education inputs: when the caregiver is a biological parent

Second stage IV regressions	Payments to teachers		Supplementary tutoring		Transportation expenditure		Caregiver time
	(1) log	(2) $D(Y>0)$	(3) log	(4) $D(Y>0)$	(5) log	(6) $D(Y>0)$	(7)
Migration	-4.223***	-0.776***	-1.982**	-0.255**	-0.077	0.026	2.160*
	(1.254)	(0.240)	(0.912)	(0.128)	(1.441)	(0.215)	(1.154)
Child characteristics							
Age	0.087***	0.015***	0.041**	0.005**	0.187***	0.027***	-0.294***
	(0.023)	(0.004)	(0.017)	(0.002)	(0.021)	(0.003)	(0.018)
Male	-0.372***	-0.077***	-0.188**	-0.030**	-0.027	-0.003	0.067
	(0.137)	(0.027)	(0.090)	(0.013)	(0.099)	(0.014)	(0.099)
Serious illness	0.310	0.034	0.213*	0.026	0.239	0.032	-0.091
	(0.191)	(0.035)	(0.118)	(0.017)	(0.160)	(0.025)	(0.120)
Distance to school (log)	-0.069	-0.018	-0.008	-0.000	0.550***	0.077***	0.033
	(0.114)	(0.022)	(0.063)	(0.009)	(0.107)	(0.015)	(0.084)
Household characteristics							
Household size	0.053	0.008	0.051	0.006	0.020	0.002	-0.081
	(0.064)	(0.012)	(0.046)	(0.006)	(0.052)	(0.008)	(0.069)
Mean years education	0.114***	0.017**	0.132***	0.018***	0.115***	0.015***	0.032
	(0.043)	(0.008)	(0.032)	(0.004)	(0.037)	(0.005)	(0.028)
Older siblings	-0.251*	-0.038	-0.218**	-0.030**	-0.167	-0.027*	-0.185**
	(0.133)	(0.024)	(0.087)	(0.013)	(0.103)	(0.016)	(0.086)
Parents divorced	0.017	0.010	-0.177	-0.022	-0.095	-0.008	0.054
	(0.319)	(0.062)	(0.223)	(0.031)	(0.215)	(0.032)	(0.207)
Urban	0.382	0.025	0.799***	0.114***	0.862***	0.143***	0.377*
	(0.325)	(0.059)	(0.246)	(0.034)	(0.281)	(0.043)	(0.210)
Main migration destinations							
Migrant share Italy	0.003	0.001	-0.006**	-0.001**	-0.001	-0.000	0.004
	(0.004)	(0.001)	(0.003)	(0.000)	(0.004)	(0.001)	(0.003)
Migrant share Ukraine	0.010	0.003	-0.004	-0.001	-0.026**	-0.004**	-0.032*
	(0.025)	(0.005)	(0.014)	(0.002)	(0.011)	(0.002)	(0.019)
Migrant share Romania	-0.015	-0.003	-0.012	-0.001	-0.011	-0.001	0.025
	(0.033)	(0.008)	(0.011)	(0.002)	(0.022)	(0.004)	(0.020)
Migrant share Russia	0.008**	0.002**	0.003*	0.000*	-0.003	-0.000	-0.002
	(0.004)	(0.001)	(0.002)	(0.000)	(0.003)	(0.000)	(0.002)
Constant	0.276	0.163	-0.926*	-0.113	-4.095***	-0.573***	6.882***
	(0.684)	(0.132)	(0.505)	(0.072)	(0.585)	(0.084)	(0.561)
N	1910	1910	1910	1910	1910	1910	1860
R^2	-0.467	-0.414	-0.093	-0.063	0.164	0.164	0.014
F-stat	5.964	5.223	4.294	4.708	12.852	13.638	27.420
K-P underid	5.727	5.727	5.727	5.727	5.727	5.727	5.345
Underid (pval)	0.017	0.017	0.017	0.017	0.017	0.017	0.021
K-P weakid	13.563	13.563	13.563	13.563	13.563	13.563	12.736

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5.

Table A8: Determinants of caregiver time: non-educational activities

Second stage IV regressions	Caregiver time spent with child in:		
	(1) Playing	(2) Discussing news	(3) Special activity
Migration	2.224	1.011	2.764*
	(1.778)	(1.323)	(1.481)
School budgets (per student)			
Wages (log)	-0.245	0.425	0.033
	(0.406)	(0.320)	(0.305)
Teaching materials (log)	0.051	-0.116	0.127
	(0.146)	(0.154)	(0.113)
Utilities (log)	0.227	-0.004	-0.008
	(0.144)	(0.120)	(0.101)
Transports (log)	0.122**	0.093	0.006
	(0.057)	(0.057)	(0.044)
Maintenance (log)	0.065	0.031	0.045
	(0.062)	(0.050)	(0.051)
Child characteristics			
Age	-0.278***	0.047***	-0.039**
	(0.022)	(0.016)	(0.017)
Male	-0.248*	-0.138	-0.175**
	(0.145)	(0.113)	(0.087)
Serious illness	-0.267*	-0.295**	-0.272***
	(0.159)	(0.140)	(0.105)
Distance to school (log)	-0.056	-0.092	-0.102
	(0.109)	(0.093)	(0.086)
Household characteristics			
Mean years education	-0.035	0.062**	0.032
	(0.039)	(0.031)	(0.036)
Older siblings	-0.305***	0.017	-0.048
	(0.096)	(0.092)	(0.094)
Household size	-0.128	-0.051	-0.087
	(0.093)	(0.087)	(0.083)
Parents divorced	0.009	-0.188	-0.024
	(0.232)	(0.231)	(0.169)
Urban	0.914***	0.624**	0.785***
	(0.323)	(0.297)	(0.238)
Main migration destinations			
Migrant share Italy	0.006	0.004	0.010***
	(0.005)	(0.004)	(0.003)
Migrant share Ukraine	0.037	0.009	0.009
	(0.042)	(0.029)	(0.026)
Migrant share Romania	0.037*	-0.007	0.003
	(0.022)	(0.017)	(0.017)
Migrant share Russia	-0.011***	-0.005	-0.008***
	(0.004)	(0.003)	(0.003)
Constant	7.300**	-0.146	0.765
	(3.028)	(2.568)	(2.355)
N	1140	1170	1174
R^2	0.019	0.014	-0.954
F-stat	15.237	1.988	4.618
K-P underid	3.673	3.569	3.526
Underid (pval)	0.055	0.059	0.060
K-P weakid	8.423	8.950	8.739

Notes: Authors' calculations based on CELB 2012. Heteroskedasticity robust standard errors that cluster at the locality level in parentheses. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. K-P underid and weakid refer to, respectively, the Kleibergen-Paap underidentification and weak identification statistics. Migration is instrumented using a network-growth interaction IV. Migration is instrumented using a network-growth interaction IV. For a list of the abbreviated controls, please refer to Table 5.

Table A9: Summary statistics: sample selection from matching

	Matched		Matching failed			Mean equality
	Mean	(SD)	N	Mean	(SD)	(t-test)
Child characteristics						
Age	12.16	(3.08)	1380	12.58	(4.21)	***
Male	0.50		1380	0.52		
Serious illness (past year)	0.26		1380	0.30		**
Distance to school (min)	19.33	(12.84)	1206	21.63		***
Household characteristics						
Migration	0.27		1380	0.30		*
Household size	4.79	(1.57)	1380	4.84	(1.48)	
Mean years education	10.80	(2.26)	1379	10.66	(2.28)	
Urban	0.18		1380	0.24		***
Older siblings	0.60		1380	0.58		
Parents divorced	0.11		1380	0.11		
Private inputs to child's education						
Caregiver time	3.94	(1.89)	1084	3.52	(1.98)	***
Payments to teachers	82.24	(239.09)	1206	72.77	(244.19)	
Supplementary tutoring expenditures	205.65	(1261.62)	1380	92.73	(601.65)	***
Transportation expenditures	149.19	(611.73)	1206	236.32	(931.43)	***
Number of observations	1121		–			

Notes: Authors' calculations based on CELB 2012. All monetary values are expressed in Moldovan Lei. *, **, and *** indicate $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.