

# Migrants' transfers and educational expenditure: empirical evidence from Albania

**Cristina Cattaneo**

Fondazione Eni Enrico Mattei (FEEM)  
and  
University of Sussex

Preliminary Draft

## Abstract

The present paper analyses the consumption behaviour of Albanian families. In particular the empirical work aims to cast some light upon the relationship between consumption in education and the volume of remittances, sent internally and from abroad by households members.

The empirical question is whether remittances positively contribute to higher consumption in education and whether these transfers represent a distinct source of welfare from other components of total household income. Moreover, the available data set allows us to distinguish between internal and international remittances and this contributes to important insights into the understanding of the reasons to remit. In fact the different motivations behind remitting may influence the expenditure pattern out of transfers. The empirical estimation accounts for the censored nature of the education consumption through using Tobit, Heckman two-step as well as semiparametric models for sample selection are applied. A final econometric aspect that deserves concern is the possible endogeneity one of the regressors. To account for this problem, instrumental variable estimation is employed.

*Keywords:* Migrant Remittances, Engel Curves, Education consumption

## **1. Introduction**

Albania, notwithstanding its effort to build the foundations for a market-based economy, which recently granted the nation macroeconomic stability, as well as the achievement of the best GDP performance in terms of rate of growth in the South Eastern Europe, remains one of the poorest countries in Europe. Per capita income is one of the lowest among the transition economies and the state of poverty is pervasive, with 25 percent of the population living in poverty (World Bank, 2003). Moreover, nearly five percent of the population lives in extreme poverty, defined as a situation where the basic food requirements are not met.

High rates of unemployment and the severe poverty experienced by the households induced strong pressure toward migration. Albanians, among other transition countries's populations, are the most inclined to leave their country. Statistics are poor, partly due to the irregular nature of much of migration, but most rough estimates of migration suggest that at least 15 percent of the population lives abroad and 40 percent of the people have some relatives settled outside the border of the country (UN, 2002).

This large migration flows grant Albania an important source of capital in terms of both internal as well as external remittances: for example worker's official transfers represent more than 15 percent of national GDP and show a stable increase over time (World Bank, 2006). Nevertheless, despite the impressive size of the remittance flows, little is known about the effective use of these transfers from Albanian families. In particular, it is still under speculation whether this money is channelled through human and physical capital investment or is spent for consumer goods. Economists are often sceptical regarding the capacity of remittances to sustain economic development and they tend to be critical upon the use of remittances for mere consumption, with no funding left for saving and investment. It should be noted, however, that remittances alone cannot provide a solution for poor economic environment: if a sound economic climate is absent, it is unlikely that remittances can be effectively used for other than consumption.

While Albania's economy is showing positive rates of growth, it still faces several critical constraints, which include among others, a poor governance across all sectors of the economy, an inefficient public sector, which obstacles improvements in the business environment and a poor public services quality. Another critical ground is represented by the schooling performance: Albania compared to most transition countries, is at the bottom in terms of educational attainment: the average school attainment is 8.5 years, which places the country far behind its neighbouring states. During the post-transition period, gross enrolment rates showed a decreasing trend: the enrolment rates in primary education declined from 103 percent to 99.6 percent, and in secondary education they dropped from 78.5 percent to 43.6 percent (World Bank, 2005).

The investigation of the link between remittances and education in Albania may provide an important insight upon the effectiveness of private transfers in stimulating a key sector, such as schooling. The ultimate objective of this study in fact, is to provide an empirical test upon the impact of remittances on education consumption at a household level. To meet this purpose, we employ an Engel curve framework, which is the most valuable way to analyse consumer behaviour. Moreover we move away from the classical theoretical framework, where different income sources are pooled together within the family. On the contrary assuming heterogeneity in interests and in bargaining powers among members within the households, we allow distinct income sources, including migrants' transfers, to exert an independent effect on education spending. This methodology allows us to assess the actual propensity to consume education goods out of internal and external remittances separately.

To our knowledge this is the first attempt which directly uses an education function to evaluate the link between remittances and schooling spending, as typically a full system of equations, which use budget shares in different items, is used. Empirical papers on education and its determinants exist, but only few investigate the potentials for remittances (Cox-Edwards and Ureta, 2003).

The remainder of the paper is organized as follows. Section II presents a brief review of the literature. Section III describes the data set used and provides a preliminary summary of the most relevant variables. Section IV outlines the methodology adopted. Section V presents the econometric results while Section VI provides summary and conclusions.

## **2. Literature Review**

The economic literature offers extensive contributions in the estimation of Engel curves. An Engel curve describes how the consumer spending behaviour varies with income levels, holding prices fixed. In particular Engel stated that food expenditure increases with income and household size, whereas food budget shares decline with increasing wealth. Moreover items can be classified according to the size of the estimated income elasticity. Many studies attempt to identify the best functional form of the Engel curves, as far as the economic theory provides little guidance for the empirical specification (Hausman *et al.*, 1995). In this regard, it has been explored the possibility to frame the Engel curves within a system of equations. A basic restriction in estimating the system as a whole, is the adding-up constraint, which is a direct consequence of the budget constraint. Other

desirable properties are the non-negativity of the component expenditure predicted by the model and the existence of an upper limit of expenditure for some components<sup>1</sup>.

Different class of models that partly or completely satisfy these criteria have been proposed: Bewley (1982) offers a good discussion on the economic properties of these alternative models. In particular the author compares the Addilog model (Bewley, 1982), which estimates the natural logarithm of the ratio of budget shares, with two linear specifications, known as the Stone's linear expenditure system (Stone, 1954) and Theil's Rotterdam Model (Theil, 1965), which utilize single item expenditures and the budget shares respectively, and finally the Working-Leser model (Working, 1943; Leser, 1963), where budget shares are linear in the logarithm of total expenditure. It should be noted that the Working-Leser specification (W-L) has been extended by Deaton and Muellbauer (1980a) to include the effect of prices within the so-called Almost Ideal Demand System (AIDS).

Finally, attempts are made to incorporate demographic effects in demand function: in fact, it has been recognized that households with different characteristics show different expenditure patterns (Deaton and Muellebauer, 1980b). A sophisticated way to account for these effects is the use of household equivalence scales, which deflate the household expenditure according to the age and composition of the family structure (Engel, 1895)<sup>2</sup>. Such an approach has been as well motivated by the need to provide welfare comparison between household with different characteristics. An alternative methodology is the Rothbarth equivalence scale (Rothbarth 1943), which arises from the idea that adult welfare is directly related to the level of consumption on adult goods.

In the empirical literature the estimation of Engel curves has been applied for a wider scope than simply quantifying total expenditure elasticities for different categories of commodities. Moreover, some authors report the interest in estimating the different marginal propensity to consume out of distinct income sources. For example Kooreman (2000) analyses the extent to which child benefits are spent for children goods, applying Dutch expenditure data. The author moves beyond the standard demand theory, which rules out the effect of the composition of income. In fact, given the fungibility of income sources, in the standard theoretical framework, different sources of income are pooled together within the households to model expenditure patterns. On the contrary, in the class of game-theoretic models of household behaviour, the composition of household income is relevant for expenditure pattern: in fact, parents may have different

---

<sup>1</sup> Theoretically plausible demand system can be derived according to two different approaches: either maximizing utility functions, that satisfy certain axioms of choice, or alternatively, imposing restrictions on arbitrary demand system.

<sup>2</sup> Cited in Deaton and Muellebauer, 1980.

preferences as well as distinct control of child benefits, and this may result in distinct marginal propensity to consume. The author finds that the effect of child benefit statistically differ from the effect of other income source, notwithstanding this conclusion does not hold for large households and for adult goods. In a similar framework, Blow et al. (2004) for UK, report opposite results, in the sense that child benefits are disproportionately allocated in adult goods such as alcohol. The validity of pooling income sources to explain consumption pattern is also assessed in Case and Deaton (1998), who explore whether pension transfers in South Africa have different effects on behaviour than other kind of income. This may occur because pension income is more stable than other income or because pension income does not accrue to people who are typically responsible for consumption decision within the household. It should be noted that the literature on household decision making developed two classes of models, the so called *unitary* versus the *collective* models, which differ in the way decisions are taken within the family. According to the former, the household can be treated as a single entity and all members are assumed to possess unique preferences. Conversely, in the latter model, interests may differ among members as well as the bargaining power. Case and Deaton find that there is not relevant distinction in spending out of pension compared to other income and they conclude that pension receivers are likely to be the main decision makers. This conclusion is corroborated by noting that in the majority of pension households, the pensioner is identified with the head or with the head's spouse. Maitra and Ray (2003) apply the same data set from South Africa, but they develop a complete system framework, to account for possible sequentiality between pension income, private transfers and other resource flows. In fact, the amount of pension transfers depend upon the magnitude of labour income, and conditional on these two sources, the household determines the resources to allocate in migration, which in turn affect the amount of remittances. Finally, the family determines the expenditure pattern. Their finding is in contrast to Case and Deaton as they report that the Rands from transfers are not spent as the Rands from non-transfers. For example remittances have a positive and significant impact on budget share of education whereas income does not influence it. Moreover, pension and migrant households show different expenditure pattern compared to households which do not receive such transfers. In Alderman (1996) domestic remittances, international remittances, pensions and other source of (transitory) income are used to analyse expenditure and savings in Pakistan. It results that pension and international remittances go entirely to savings, whereas a relevant amount of consumption comes from internal private transfers: this grants domestic remittances a flavour of permanent income. In addition this finding shows the distinct propensity to consume and save out of different income sources.

The way remittances are spent by migrant households is significantly researched and a specific interest goes to analyse the comparison between consumption behaviour of migrant and non-migrant households. For example, in Zarate-Hoyos (2004) for Mexico, the author distinguishes between current consumption, consumer goods and investment goods. A smaller proportion of spending in the various categories for migrants than for non-migrants households is documented; the author concludes that movers tend to save more than the rest of the population. Taylor and Mora (2006) for Mexico report quite dissimilar consumption patterns not only among migrants and non-migrants families, but also among households with internal and international movers. In fact, households with international migrants tend to spend relevant shares of expenditure in durable and investment goods; conversely, households with internal movers display the highest share of resources for food. Adams (2005), comparing the expenditure behaviour of migrant and non-migrant households in Guatemala, lists three main results: first, the share of income spent in food consumption, at the margin, is lower for households receiving remittances than for non-remittance-receiving families and this is true for both internal and international flows. Second, migrant families have a much higher marginal budget share allocated in housing than non-migrants and finally, the same is true for expenditure in education. In particular, disaggregating for level of education, it appears that households receiving remittances spent much more on secondary education than do non migrant families. Applying a different methodology, Cox-Edwards and Ureta (2003) document for El Salvador a positive effect of remittances on investment in human capital. The authors estimate the determinants of the hazard of dropping school and they find that remittances reduce the hazard rate. Moreover, the effect of the transfers statistically differs from the effect of other income sources. This distinct effect of remittances may depend upon the stable nature of the transfer or upon some types of conditionality made by the movers, who send remittances for the specific purpose of educating the younger family members.

Education can be interpreted according to an intertemporal arrangement between movers and the family: migrants receive education in order to move and gain urban wages; remittances consequently represent the repayment for this investment and they are used by the family members to finance subsequent education of younger siblings (see Lucas, 1997). Although the empirical literature that explicitly analyses demand functions for education is fairly vast, the paper from Cox-Edwards and Ureta is the only test upon the potential effects of migration on education. The significant impact of remittances accounted by the authors gives support to the intertemporal arrangement view.

More general analysis on the determinants of education includes, among others, Glick and Sahn (2000): the authors, applying an ordered probit model for West African countries, highlight

the importance of parental education, household income and composition in influencing the number of years of schooling of boys and girls separately. In this regard, while mother's education is significantly correlated with girls' schooling but not with boys' schooling, fathers' education influences both genders' attainments. Dostie and Jayaraman (2006) for India confirm both the relevance of parental education on the probability of children's enrolment as well as the critical effect of maternal education, though restricted to girls' enrolment decision. Moreover, they emphasize the importance of village level factors, which may encourage schooling through a simple price effect or through increasing the expected returns to schooling.

### **3. Description of the Data**

The data employed for this study are extracted from the Albanian Living Standard Measurement Survey (ALSMS) conducted between April and September 2002. The survey was undertaken by the national Institute of Statistics and the World Bank jointly and represents the first round of a five year project designed to undertake poverty assessment. The ALSMS questionnaire contains general information at household and individual level, as well as information on household expenditure on several aggregate components. Moreover data on private transfers received from abroad and from internal Albania are collected.

The number of observations for the analysis, represented by households whose heads has a working age, is 2927 notwithstanding the data set originally contained information for 3599 families. However, the exclusion of households whose head does not meet the age limits and the exclusions of units with missing observations in the relevant variables leave us with 2927 households.

Relevant to this analysis is the education variable, which represents the monthly total household payments related to pre-school and higher education. Only 62 percent of total households, however, report positive spending on this item: there is in fact a substantial censoring in the variable, which requires a specific econometric treatment. Table 1 reports the average expenditure in education for different consumption quintiles. Not surprisingly, the expenditure in education increases with wealth: in fact, at higher quintiles of consumption per capita, the spending in education rises. This last finding emphasizes the critical role of household budget constraint in explaining education demand functions. In this regard, it is often argued that consumption rather than income better proxies household life-time resources: in fact household income changes over time and the income received in a particular year may be a crude measure of the household's living standards. Therefore, in this analysis, total consumption is used in lieu of permanent income.

The consumption aggregate has been computed by the World Bank as the main welfare indicator for poverty assessment in Albania. The aggregate variable includes food consumption,

non-food expenses, utilities, education, health, and durables expenses. It should be noted that housing purchases are not included, as the definition of the expenses on this item proved quite controversial<sup>3</sup>. Moreover, for durable goods, the monetary benefit associated with the use of the goods, rather than the actual expenses for purchases are considered.

**Table 1: Education consumption according to income distribution**

Quintile of household income per capita	Mean expenditure per capita in education
1	104.8
2	128.6
3	207.9
4	267.3
5	388.5
Total	1000

The data set provide us with detailed information on the amount of transfers received in the form of goods or in-cash from family members; moreover the value of remittances sent by internal movers can be distinguished from the amount sent by international movers. Table 2 reports the incidence of households receiving remittances according to various income quintiles as well as the mean values of the transfers. The interesting feature is that the percentage of recipient families decreases at higher income quintiles, suggesting that migration in Albania is a phenomenon which mainly involves poor households. In the bottom quintile resides the greater proportion of both internal and international recipient households, which a percentage of 7.5 and 20.3 respectively. On the contrary, among the richer families, only 3.8 and 15.2 percent receives remittances<sup>4</sup>.

Second, transfers from abroad reach a much wider fraction of households than internal remittances do and this figure strengthens the statistics reporting high rates of migration to foreign countries. For example rough estimates suggest that at least 15 percent of the Albanian population lives abroad and 40 percent of the people have some relatives settled outside the border of the country (UN, 2002). In terms of size, external transfers sensibly surpasses the value of national remittances, indicating presumably a better working regime for international movers: on average, international remittances are ten times as large as internal transfers. There is not a clear link between the amount of the transfers and the welfare position of the households, though richer families seem to receive larger external transfers than poorer ones.

---

<sup>3</sup> The benefit associated with the use of a certain dwelling can be imputed from the value of the rent of the dwelling. However the absence of an actual rental market in Albania made not possible the identification of this value.

<sup>4</sup> The specific welfare characteristic of the families receiving remittances can suggest that movers remit for altruistic motives. In fact, even if migration potentially involves all households independently to the welfare position, movers remit only if the family is located in the bottom of the income distribution.



**Table 2: Households receiving transfers from abroad and from Albania**

Quintile of household income	Household receiving transfers from Albania		Households receiving transfers from abroad	
	% of households receiving transfers	Mean transfer	% of households receiving transfers	Mean Transfer
1	7.5	3997.8	20.3	24076.2
2	5.8	2020.5	20.3	28014.5
3	2.6	2555.6	18.5	27682.6
4	4.8	4296.9	19.8	46354.3
5	3.8	4009.4	15.2	42621.2
Total	4.9	3375.9	18.8	33752.1

In Table 3 average education expenditure is classified according to the households transfer regimes: families receiving no remittances, receiving transfers only from Albania, only from abroad or both. Non-recipient families consume considerably more than recipient ones in education goods, whereas among migrant families, internal transfer recipients spend much less. This first insight might suggest that both internal and international remittances are not treated as a permanent income by migrant families, and therefore the transfers received are saved rather than spent. Alternatively the result indicates that there might be a specific use attached to these transfers which does not involve education consumption. In fact migrants could have made conditions upon the type of spending: for example, for housing construction or land acquisition on behalf of migrants themselves.

**Table 3: Education consumption for different remittances recipients**

Household receiving:	Mean education expenditure
No Remittances	1055.4
Internal remittances only	691.9
External remittances only	837.7
Both types of remittances	711.4

#### 4. Methodology

The objective of this paper is to model an education function applying an Engel curve framework. In doing so, we allow distinct types of income to exert different impact on education spending: therefore, private transfers and household income enter separately the education function. Two alternative motivations are compatible with this structure: first, private transfers may embody a high variability, and therefore Albanian families may use them to increase savings rather than consumption. If this is the case, education consumption is a linear function of permanent income and transitory income separately, where the first is proxied by total consumption and the second by

private transfers<sup>5</sup>. This specification follows from utility functions that are additively separable over time and have either a quadratic or a constant-absolute risk aversion form (Paxson, 1992).

Alternatively, it may be allowed a form of heterogeneity in interests and in bargaining powers among different members within the households. This is the intuition of the so called “collective” models of household decision making, where the owner of the income may affect the pattern of consumption (Bourguignon and Chiappori, 1992; Browning *et al*, 1994). Therefore, allowing movers’ preferences to enter the aggregate household utility function, remittances can have a different allocation than other sources of income, due to the specific use attached by migrants to this form of transfers.

It follows that the Engel function for education is specified as:

$$e_i = f(C_i, NT_i, AT_i, IT_i, Z_i) \quad (1)$$

where C is total household consumption proxying for permanent household welfare, NT represents transfers from Albania, AT transfers from abroad, IT institutional transfers and Z is a vector of family and regional features. In this regard, the inclusion of demographic characteristics capture the influences of spending habits and life-cycle effects. In fact, the differences in household size, age composition, educational level and other family characteristics are likely to affect expenditure patterns (Deaton and Muellbauer, 1980b). Although the use of budget shares has been common in the empirical literature, its advantage emerges within a full system of equations. This is however out of the scope of this papers, where a single demand function is estimated. Therefore, the total household expenditure on the specific commodity is used as dependent variable<sup>6</sup>. Table A1 provides a summary statistics of the variables employed.

In modelling the determinants of education consumption, the censored nature of the dependent variable is accounted for: in fact, 38 percent of the households report zero purchases in this commodity. The application of OLS would result inappropriate. Assuming a simultaneity in the decision to consume education and in the quantity purchased, a censored Tobit model can be applied (Tobin, 1958). The limitation of this approach however, is that the impact of the covariates on the probability of consumption and on the level of consumption is constrained to have the same sign. An alternative methodology, which proves more flexible, is the two-steps Heckman procedure (Heckman, 1979), which models sequentially the selection and the level equations. Therefore, the

---

<sup>5</sup> Three types of private transfers are distinguished in this paper: transfers from family members received from Albania; transfers from family members received from abroad; transfers received from institutions, such as NGOs or churches, or other non family members.

<sup>6</sup> Among others, Kooreman (2000), Zarate-Hoyos (2004), Moffitt (1989), Case and Deaton (1998) and Hausman et al. (1995) use a similar specification.

sign effects of the covariates are not constrained to be the same. There are two concerns however, when applying such model. First of all, the estimated parameters are sensible to the identification restrictions used: the model results identified only if there are variables that influence the probability of purchasing but not the level of education consumption. The second limitation is that the Heckman standard approach relies on strong parametric assumption on the error terms: in fact, it imposes the joint normality of the error term in the level equation and in the selection equation. This technique, however, is highly sensitive to the departure from the assumed parametric distribution: if the normality assumption fails, the estimates turn inconsistent. To overcome this limitation, semi-parametric methods have been proposed: Newey (1999) suggests the combination of parametric and non-parametric functions, which are less sensitive to the violation of this assumption. In particular, a nonparametric approximation term, such as the power series, is used in place of the inverse of the Mills ratio in the second step estimation.

There are two more aspects that deserve attention: the possible endogeneity of the variable total consumption and of private transfers. In regard to total consumption, the problem can arise for two distinct motivations. First it may occur that the unobservables that influence the education expenditure can be correlated with those that affect total consumption. For example, a negative shock experienced by the household can alter both total expenditure as well as the expenditure on education. If this is the case, the orthogonality between total expenditure and education purchase would fail. Second, an equally possible case is that households systematically make errors in reporting their expenditure, inflating, for example, the consumption on health and education and under-reporting the purchases on alcohol and tobacco. This leads to a measurement error that induces a non-zero correlation between the total expenditure variable and the disturbance in the education equation. It should be noted, that the econometric implication of both features is the same, as well as the testing and solution: the paper therefore, addresses this problem employing instrumental variable techniques to correct for potential endogeneity of total consumption.

Regarding private transfers, a similar statement can be made: in fact, it can be argued that the decision to remit underlines an intertemporal arrangement between movers and the family. If remittances represent the repayment for a previous benefit received by migrants and they are used by the family to finance subsequent education of younger children (Lucas, 1997), the unobservable governing the decision to migrate and thus remit results correlated with the unobservable influencing the education consumption, inducing a problem of endogeneity similar to the one presented above. However, it is also true that the migration decision that generated the migrant remittances predates the educational expenditure decision: therefore, if we believe that the two

choices are not taken simultaneously, the assumption of exogeneity can be maintained. In fact, under this circumstance the unobservable that influences the remittance decision at time  $t-s$  should not be correlated with the unobservable governing the education consumption at time  $t$ . The endogeneity in remittances, however, can also be due to measurement error and this would require IV techniques. Despite this problem is acknowledged, the lack of appropriate instruments for remittances renders this methodology unfeasible here.

## **5. Empirical analysis**

Equation 1 is initially estimated applying a censored tobit: the maximum likelihood estimates are reported in Table 4, along with the marginal effects. The total marginal effect is composed by two elements: first it includes the effect of the independent variables on the level of education consumed, weighted by the probability of purchasing education and second it comprises the effect on the probability of a positive spending in education weighted by the expected value of education consumption. For dummy variables the marginal effect is calculated assuming an impact change of the variable from zero to one.

The covariates have the expected signs and overall exert a well defined effect on the education consumption. The positive and statistically significant effect of total consumption suggests that budget constraint plays an important role in a family's schooling decision. The number of boys and girls in the schooling age has a positive and sizeable effect on education spending. Male headed households do not show a distinct consumption pattern compared to female headed families. The education of the household head is extremely important in shaping the purchases in schooling goods and the effect is more pronounced at higher level of the head's education: this result is consistent with existing empirical findings, which highlights the critical role of parental education in children's schooling attainments (Glick and Sahn, 2000; Dostie and Jayaraman, 2006). A surprising result is the non significant effect of the transfers' coefficients: in fact, none of the transfer variables influences the education choices.

The validity of the restrictions imposed by this model is measured computing the Fin and Schmidt test: the test evaluates whether a more flexible specification, such as a separate probit and a truncated tobit, has a better fit than the censored tobit. The result of the test is reported in Table 4. The computed chi-squared with 19 degrees of freedom is 3358: the null hypothesis is clearly rejected, discarding the use of the tobit model, in favour of a more flexible specification. Therefore, the two steps Heckman procedure is employed.

**Table 4: Maximum Likelihood estimates for education consumption**

	<b>Tobit</b>	<b>Marginal Effect</b>
Household Consumption	0.052 (0.004)***	0.02
Ageup5	-325.62 (108.29)***	-149.18
Age6_18	1,058.81 (64.24)***	485.07
Age19_65	189.92 (70.90)***	87.01
Male	54.12 (236.588)	24.64
Age	398.87 (65.985)***	182.74
Age Squared	-4.511 (0.712)***	-2.07
Primary	376.191 (271.645)	174.11
Secondary	1,083.84 (307.452)***	548.9
Vocational	1,141.64 (294.120)***	572.01
University	1,793.96 (324.750)***	979.03
Central	795.34 (214.711)***	382.78
Mountain	895.692 (217.580)***	432.86
Coastal	655.198 (213.272)***	313
Urban	929.991 (149.360)***	420.69
Transfers from Albania	-0.003 (0.002)	-0.001
Transfers from abroad	-0.0002 (0.001)	-0.0001
Transfers from institutions	0.001 (0.004)	0.0003
Constant	-14,345 (1,490)***	-6572.06
Observations	2927	
Log-likelihood	-17503	
Fin and Schmidt Test	3358	

Notes: standard error in parenthesis. \* denotes significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The Fin and Schmidt test is computed as:  $LRT = -2[L_C - (L_P + L_T)] = -2(-17503 - (-14755 - 1069)) = 3358 \sim \chi^2(19)$ , where  $L_C$  is the log-likelihood for the restricted standard censored tobit,  $L_P$  is the log-likelihood of the probit model and  $L_T$  is the log-likelihood of the truncated model. It is distributed asymptotically as a  $\chi^2$  with k degrees of freedom, where k is the number of estimated coefficients in the censored tobit model. The marginal effect is computed as:

$$\frac{\partial E(Y)}{\partial X} = \Phi(z) \frac{\partial E(Y | Y > 0)}{\partial X} + E(Y | Y > 0) \frac{\partial \Phi(X)}{\partial X}, \text{ where } z = X' \beta / \sigma$$

The set of identification instruments, applied in the first step probit equation of the Heckman procedure, consists in four variables. Three of them serve as a proxy for local conditions: in fact the variables source of water, inside phone and connected to electricity and gas may capture the quality of the community environment, in terms of providing access to utility facilities. Lack of access to these services may indicate a zone of low population which implies long distance to school: this in turn increases the cost of education and lowers the chance to attend it (Edwards et al. 2003). The fourth variable, which is the squared of the family composition variable, is more *ad hoc*, but it adequately performs the identification task.

As already discussed, the assumption of the exogeneity of total household consumption may be problematic in this context. Therefore, the two-step Heckman procedure is first implemented through instrumenting the total family consumption variable. This allows us to test for the presence of an endogenous regressor. The exclusion restrictions is achieved through variables related to the dwelling conditions and durables, which capture the household permanent wealth as well as variables related to the household head's employment and education, which represent possible determinants of expenditure. Within the first group are: type of household wall, presence of a bathroom in the house, quality of water, presence of an electricity meter and availability of a computer. In the second group are dummy variables indicating whether the head worked abroad and whether she has a second occupation<sup>8</sup>. Table A3 reports the result for the structural education equation, for the linear projection of the potentially endogenous variable and for the selection equation, along with the statistics of the test on the overall significance of the instruments, Sargan test and the Wu-Hausman test<sup>9</sup>. The instruments result highly correlated with the endogenous consumption variable, as suggested by the high F statistics, and they prove to be orthogonal to the error process in the structural equation, as informed by the Sargan test: this gives support to the validity of the IV technique. Moreover, they enter with the expected signs into the consumption equation.

Using the Wu-Hausman test, finally, exogeneity of the family consumption variable is not rejected<sup>10</sup>. This indicates that although the exogeneity of total consumption is generally questionable when modelling expenditure behaviour, in this context it can be stated that Albanian families are able to protect the education expenditures from the effects of adverse shocks, which on

---

<sup>8</sup> Similar instruments are applied in Kooremn (2000); Handa (1996); Case and Deaton (1996); Maitra and Ray (2003)

<sup>9</sup> Given that the education expenditure equation uses predictions for the household total expenditure, bootstrapping is used as it guarantees better properties than the use of the conventional variance-covariance matrix.

<sup>10</sup> Although the data do not support the restrictions imposed by the Tobit model, the exogeneity of total consumption is tested within this model as well. The results are shown in Table A2: similar conclusion follows.

the contrary negatively impact on total consumption. The test may also suggest that the variable total consumption is not affected by measurement errors, although this final conclusion should be taken with caution.

The consumption equation deserves some comments. Not surprisingly, larger households tend to show greater consumption, on average and *ceteris paribus*. Male headed households consume more than female headed ones and increasing level of education of the head enhances the spending capacity of the families. An interesting feature comes from the positive and statistically significant coefficients of two of the transfer variables: although the impact is extremely modest, internal remittances and money from institutions allow a greater family spending. The effect of transfers from institutions is twice as large as the effect from internal transfers, as ten leks increase in institutional transfers induce one lek increase in total consumption, on average and *ceteris paribus*.

Given that the exogeneity of total consumption is upheld by the data, we proceed with modelling education consumption applying the standard two steps Heckman procedure. Table 5 reports the estimated parameters. The variables employed as identifying instruments perform well their task as they influence the probability of consuming education without impacting on the level function.

The striking feature in the results is the odd effect of the household size variables: in fact, while the number of young siblings and adults exert no effect on the education consumption, the number of kids below five years age has a counterintuitive impact, as they reduce the education spending. Different alternative specifications are tried but no one provide better results<sup>11</sup>. The number of young family members, on the contrary, significantly augments the probability of positive spending.

**Table 5: Two-steps Heckman procedure: education consumption**

	<b>OLS</b>	<b>Probit</b>
Household Consumption	0.053 (0.004)***	6.38e-06 (2.02e-06)***
Ageup5	-353.467 (116.919)***	0.078 (0.051)
Age6_18	142.074 (96.086)	1.897 (0.077)***
Age19_65	113.386 (81.854)	0.043 (0.033)
Male	-178.28 (262.996)	-0.002 (0.11)

<sup>11</sup> These include the use of the variable household size, the use of three variables relating to the number of males only in different age categories, the exclusion of the kid variable or alternatively of the adult variable.

Age	202.669 (79.412)**	0.112 (0.029)***
Age Squared	-1.949 (0.861)**	-0.001 (0.000)***
Primary	528.57 (302.862)*	0.226 (0.126)*
Secondary	1,051.32 (339.136)***	0.427 (0.148)***
Vocational	1,090.21 (325.611)***	0.389 (0.139)***
University	1,625.42 (355.564)***	0.714 (0.160)***
Central	851.197 (226.770)***	0.189 (0.108)*
Mountain	1,346.64 (228.774)***	-0.051 (0.115)
Coastal	690.693 (156.916)***	-0.062 (0.098)
Urban	737.599 (224.628)***	0.015 (0.107)
Transfers from Albania	-0.004 (0.002)	3.64e-07 (1.22e-06)
Transfers from abroad	0.0002 (0.001)	-7.51e-08 (2.79e-07)
Transfers from institutions	-0.001 (0.004)	0.00001 (0.00002)
Source of water	-	0.325 (0.094)***
Inside Phone	-	0.148 (0.088)*
Connected	-	0.25 (0.085)***
Age: 6-18 squared	-	-0.261 (0.018)***
Constant	-8,002.11 (1,861.378)***	-4.596 (0.648)***
Lambda	614.4621 (279.5601)**	-
Observations	2927	2927
Adjusted R2	0.18	-
Mc Fadden R2	-	0.494
Test for Validity of instruments	1.62 P-value: 0.805	216.08 P-value: 0.0000
Normality	20.45 P-value: 0.000	

Notes: standard error in parenthesis. Heckman two-step efficient estimates of the covariance matrix are applied. \* denotes significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. In the level equation, the test for the validity of the instruments is performed adding the variables source of water, inside phone, connected and squared of age6-18 to the equation and then testing their overall significance. In the probit equation, it is performed in the same manner. The test is distributed as  $\chi^2(4)$ . The normality test is distributed as a  $\chi^2(2)$ .

The coefficient of household income is positive and significant, confirming the role played by budget constraints in spending behaviour. The variable is an important determinant of the probability of consuming education, even if the magnitude of the effect is very modest: in fact, a



one lek rise in household expenditure raises educational expenditures by 0.05 of a lek, on average and *ceteris paribus*. However, given that the educational expenditures is only three percent of total family consumption, the size of the parameter seems plausible.

On the contrary, the income from remittances and institutional transfers do not exert any statistically effect on education spending. This finding has two implications: the first is that incomes from different sources are not pooled together within the household: in fact, the effect of remittances statistically differs from the effect of non-transfer income. Some family member may have distinct preferences and distinct bargaining power from other members, implying that the resource allocation is not determined by the household as a unique entity. For example, the ownership of the income may affect the pattern of its use: if the interests of the movers sending remittances and of those entitled to the institutional transfers differ from the interest of the head of the household, this distinction results in different estimated parameters.

Conversely, the hypothesis originally stated that transfer may represent a transitory component, which induces an increase in savings rather than consumption is not supported by the data. In fact, notwithstanding their modest effect, in Table A3 it has been shown how they influence total household consumption. We are therefore left with the hypothesis that the household decision behaviour may be shaped by the so called non-unitary or collective model.

The second issue is why transfers do not influence education spending. One explanation could be that expatriates have made conditions upon the type of spending out of remittances and this use does not include the education of siblings. Houses purchases or investment in land could be possible competing targets for the transfers send home by movers. This interpretation is consistent with the non-unitary models, as far as the interest of movers does not match the interests of the head of the household<sup>12</sup>. It should be noted that these variables neither impact the probability of spending in schooling items.

Another explanation for this puzzling finding can be related to the schooling situation in Albania. In fact, the country displays the lowest educational attainments compared to most transition countries and experienced, during the post-transition period, a declining trend in both primary and secondary gross enrolment rates. This may indicate low rewards for education, which

---

<sup>12</sup> Given that total transfers comprise an in kind part, and given the in kind transfers are not easily fungible and therefore cannot be employed for any purpose, in one specification the in kind and in cash components entered separately: nevertheless, this attempt did not provide a better fit. The same conclusion followed when binary variables were used, in place of the continuous variable. One attempt for example includes four mutually exclusive dummies, capturing whether the family receives internal transfers only, external only, both internal and external or no remittances.

create little incentives for investment in education, as far as alternative investments may provide higher returns.

Regarding the other covariates, the non-significant effect of the male coefficient suggests that maternal and paternal preferences for schooling do not differ: in fact female headed households do not place more attention than male ones to the education of siblings. The age coefficients confirm that life cycle profile of earnings, proxied by the age of the head, influences consumption spending and it does so in a non-linear way, as suggested by the significant effect of the squared of this variable. The schooling achievement of the head of the family is a very important determinant of the educational spending; moreover, the higher the parental attainment, the greater the expenditure in these items.

The inverse of the Mills ratio enters significantly the education equation: the selection term can proxy for the unobservables and the positive estimated coefficient suggests that the unobservable influencing the probability of consuming education is positively correlated with the unobservable affecting the quantity consumed<sup>13</sup>.

It should be noted that the two step procedure relies on the validity of the instruments, which should influence the probability equation but not the level equation. This requirement is well achieved in this context as suggested by the  $\chi^2$  tests conducted in the two equations. Moreover, the estimated parameters of the instruments in the probit are statistically significant and have the expected signs, suggesting the better community conditions increase the chance of positive spending in schooling. Given the significant effect exerted by the inverse of the Mills ratio, the application of OLS to the truncated sample would return biased estimates.

The standard Heckman procedure is based on strong distributional requirements and it is extremely sensitive to the departure from these assumptions: therefore, a normality test is computed to assess the validity of the procedure. Failure of the assumption implies inconsistent estimated parameters. An efficient score test, suggested by Chelser and Irish (1986) is computed and it strongly indicates a rejection of normality<sup>14</sup>. To overcome this problem, a two-step procedures that combines parametric and semiparametric estimation is performed: in particular, the selection term is computed as a power series approximation of the score index of the first step probit estimation<sup>15</sup>. Table 6 reports the estimated parameters. The adjusted R squared, the root mean squared error and

---

<sup>13</sup> The coefficient of the selection term is robust to the exclusion of one or more of the instruments.

<sup>14</sup> It should be acknowledge that the test suffers from poor finite sample properties, as demonstrated by Orme (1990).

<sup>15</sup> Buchinsky (1998) suggests alternative sets of power series. Among others, the power series of the inverse of the Mills ratio is considered. However, applying the approximation of the inverse of the Mills, the high-order selection terms exert an insignificant effect, probably consequently to the multicollinearity of the included terms.

the Akaike's Information Criterion (AIC) indicate that the polynomial of order two is the favourite specification.

**Table 6: Two-steps semi-parametric estimation: education consumption**

	Parametric		Semi-parametric		
Household Consumption	0.053 (0.008)***	0.053 (0.008)***	0.051 (0.008)***	0.052 (0.008)***	0.052 (0.008)***
Ageup5	-353.467 (97.569)***	-346.525 (89.382)***	-353.335 (95.122)***	-352.644 (92.159)***	-352.87 (89.833)***
Age6_18	142.074 (92.744)	133.047 (101.657)	78.451 (100.991)	87.414 (95.402)	86.949 (113.616)
Age19_65	113.386 (82.273)	115.672 (91.29)	116.062 (83.905)	116.953 (87.554)	116.096 (90.298)
Male	-178.28 (224.973)	-194.527 (203.913)	-197.96 (200.211)	-222.669 (203.112)	-219.947 (202.996)
Age	202.669 (70.397)***	192.176 (70.904)***	195.129 (70.805)***	193.642 (75.258)**	194.356 (68.177)***
Age Squared	-1.949 (0.788)**	-1.827 (0.792)**	-1.861 (0.815)**	-1.848 (0.857)**	-1.854 (0.778)**
Primary	528.57 (199.712)***	539.732 (183.725)***	510.938 (199.910)**	516 (169.488)***	519.795 (173.107)***
Secondary	1,051.32 (271.259)***	1,066.78 (255.886)***	1,005.06 (262.417)***	1,014.73 (261.286)***	1,021.53 (240.485)***
Vocational	1,090.21 (232.576)***	1,106.90 (234.927)***	1,047.97 (260.768)***	1,057.77 (227.218)***	1,060.56 (216.301)***
University	1,625.42 (349.195)***	1,672.74 (341.792)***	1,530.80 (371.103)***	1,545.70 (352.325)***	1,564.28 (312.818)***
Central	851.197 (232.483)***	860.581 (239.577)***	820.095 (236.934)***	825.074 (244.120)***	826.746 (205.731)***
Mountain	1,346.64 (305.237)***	1,351.70 (318.449)***	1,356.77 (301.572)***	1,357.24 (305.716)***	1,355.98 (291.517)***
Coastal	690.693 (160.355)***	699.756 (168.215)***	653.654 (149.198)***	659.603 (157.911)***	660.205 (137.249)***
Urban	737.599 (207.002)***	735.006 (213.593)***	728.475 (204.189)***	727.632 (219.656)***	728.98 (194.408)***
Transfers from Albania	-0.004 (0.002)	-0.004 (0.002)*	-0.004 (0.002)	-0.004 (0.002)	-0.004 (0.002)
Transfers from abroad	0.0002 (0.001)	-0.0002 (0.0004)	-0.0002 (0.0005)	-0.0002 (0.0005)	-0.0002 (0.0004)
Transfers from institutions	-0.001 (0.004)	0.001 (0.005)	-0.010 (0.006)*	-0.014 (0.009)	-0.013 (0.013)
Lambda	614.462 (297.618)**				
Z1		-211.943 (156.803)	-403.904 (191.973)**	-385.308 (187.081)**	-356.866 (233.823)
Z2			139.007 (70.538)**	91.774 (98.1)	132.312 (126.326)
Z3				12.291 (27.809)	-15.25 (87.12)
Z4					2.686 (18.792)
Constant	-8,002.11 (1,764.456)***	-7,349.05 (1,724.639)***	-7,222.65 (1,641.038)***	-7,165.04 (1,748.852)***	-7,232.76 (1,626.082)***
Observations	1801	1801	1801	1801	1801

Adj R <sup>2</sup>	0.1786	0.1804	0.1802	0.1798
RMSE	2770	2767	2768	2768
AIC*n (Akaike):	33683	33680	33681	33683
BIC (Bayesian):	-230.97	-228.5	-221.6	-214
Wald (Z=0) P-value	0.13	0.07	0.33	0.26

Notes: Bootstrap standard errors, performed on 200 replications, are reported. Column 1 reports the parametric two-step Heckman procedure. Column (3)-(6) show the semi-parametric estimation, where the selection term is approximated through power series of the standardized probit index. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. MSE is the Mean squared error of the leave-one-out prediction.

It should be noted that the estimated coefficients are not sensitive to the way the selection term is treated: in fact, comparing column (2), which applies the standard parametric techniques and column (4), where the second order selection function is used, no important differences in the parameters appear, either in terms of coefficients size, or in terms of significance. Moreover, the hypothesis of no sample selection is as well rejected in the semiparametric specification, applying a Wald test. Therefore, the previous comments apply to this last estimation.

## 6. Conclusion

We model an education function applying an Engel curve framework. The ultimate objective of this work is to study the impact of internal and international remittances on education consumption. In doing so, we test the assumptions of the so called “collective” models of household decision making, which allows a form of heterogeneity in interests and in bargaining powers among different members within the households. In fact, in our specification, incomes from different sources enter separately and are free to exert an independent effect on education consumption.

To account for the censored nature of the variable education spending, a Tobit model as well as a two step procedure are used. Within this second framework, both a parametric and a semiparametric technique are employed, to overcome potential inconsistency following the strong assumption of the standard Heckman procedure.

Some interesting results feature: first of all, the three methodology overall provide similar results, at least concerning the key variables. As expected, household wealth, proxied by total consumption, has a positive and well determined impact on education consumption, proving the critical role of family budget constraints in explaining purchasing behaviour. Moreover, a Wu-Hausman test on this variable cannot reject the hypothesis of exogeneity of household consumption, and this emerges despite the property of exogeneity is generally questionable when modelling single item demand functions. This result may indicate that Albanian families are able to smooth education expenditures from the effect of adverse shocks.

A second important result is that transfers do not influence education spending. This finding seems striking but some interpretations can be provided. One can be that expatriates have made conditions upon the use of remittances and the selected allocation does not include the education of siblings. It may be the case, for example, that the interest of movers does not match with the interest of the head of the household and this distinction emerges in the differential effect of remittances compared to total household consumption. A second explanation follows from the distinct nature of the Albanian schooling situation. The low attainment rates which characterize the education system may be indicative of low rewards for education, which create little incentives for investment in schooling: therefore, the income accruing from remittances may be channelled into more productive investments, such as land.

The previous result is consistent with the predictions of the non unitary models, as far as incomes from different sources exert distinct effects on consumption. In fact, the impact of transfers in the Engel curve statistically differs from the effect of non-transfer income.

Finally, the selection term both in the standard parametric and in the semiparametric model exerts a significant effect in the education equation. The selection can proxy for unobservable factors and their statistical effect in the level equation suggest that it exists a form of correlation between the unobservables influencing the probability of consuming education and the unobservables affecting the quantity purchased.

## References

- Adams R.H. (2005) "Remittances, Poverty and Investment in Guatemala" in Ozden C. and M. Schiff International Migration, Remittances and the Brain Drain, World Bank and Palgrave Mcmillan
- Alderman H. (1996) "Saving and Economic Shocks in rural Pakistan" Journal of Development Economics, vol. 51, pp. 343-365
- Bewley R.A. (1982) "On the Functional Form of Engel Curves: The Australian Household Expenditure Survey 1975-76" The Economic Record, vol.58, pp 82-91
- Blow L., I. Walker and Y. Zhu (2006) "Who Benefits from Chile Benefit?" The Warwick Economic Research Papers 749, Coventry
- Bourguignon F. and P. Chiappori (1992) "Collective models of household behaviour: An introduction" European Economic Review, vol.36 pp.355-364
- Browning M., F. Bourguignon, P. Chiappori and V. Lechene (1994) "Income and outcomes: A structural model of intrahousehold allocation" Journal of Political Economy, vol. 102, pp.1067-1096
- Case A. and A. Deaton (1998) "Large Cash Transfers to the Elderly in South Africa" The Economic Journal, vol. 108, pp 1330-1361
- Cox-Edwards A. and M Ureta (2003) "International Migration, Remittances and Schooling: Evidence from El Salvador" Journal of Development Economics, vol. 72(2), pp. 429-461
- Deaton A. and J. Muellbauer (1980a) "An almost Ideal Demand System" The American Economic Review, vol. 70(3), pp 312-326
- Deaton A. and J. Muellbauer (1980b) Economics and consumer behaviour, Cambridge University Press
- Dostie B. and R. Jayaraman (2006) "Determinants of School Enrolment in Indian Villages" Economic Development and Cultural Change, 54(2), pp 405-421
- Glick P. and D.E. Sahn (200) "Schooling of girls and boys in a West African country: the effects of parental education, income and household structure" Economics of Education Review, 19(1), pp 63-87
- Hausman J.A., W.K. Newey and J.L. Powell (1995) "Non Linear Errors in Variables Estimation of Some Engel Curves" Journal of Econometrics, vol. 65, pp 205-233
- Heckman J. (1979) "Sample Selection Bias as Specification Bias" Journal of the Econometric Society, vol.47(1), pp 153-161
- Kooreman P. (2000) "The Labelling Effect of a Child Benefit System" The American Economic Review, vol. 90(3), pp 571-583
- Leser C. (1963) "Forms of Engel Functions" Econometrica, vol. 31(4), pp 694-703
- Lucas R.E.B. (1997) "Internal Migration in Developing Countries" in M.R. Rosenzweig and O. Stark, Handbook of Population and Family Economics, Elsevier Science B.V.
- Maitra P. and R. Ray (2003) "The Effect of Transfers on Household Expenditure Patters and Poverty in South Africa, Journal of Development Economics, vol. 71, pp 23-49
- Moffitt R. (1989) "Estimating the Values of an In-Kind Transfer: The Case of Food Stamps" Econometrica, vol. 57(2), pp 385-409

- Newey W. K. (1999) “Two-step Series Estimation of Sample Selection Model” MIT Department of Economics Working Paper n. 99-04, Cambridge
- Paxson C.H. (1992) “Using Weather Variability to Estimate the Response of Savings to Transitory Income in Thailand” The American Economic Review, vol. 82(1), pp. 15-33
- Rothbarth E. (1943) “Note on the Method of Determining Equivalent Income for Families of Different Composition in C. Madge, War Time Pattern of Saving and Expenditure, Cambridge University Press, Cambridge
- Stone J.R.N. (1954) “Linear Expenditure Systems and Demand Analysis: an Application to the Pattern of British Demand” Economic Journal, vol. 64, pp 511-527
- Taylor J.E. and J.Mora (2006) “Does Migration Reshape Expenditures in Rural Households? Evidence from Mexico” World Bank Policy Research Paper 3842, The World Bank, Washington D.C.
- Theil H. (1965) “The Information Approach to Demand Analysis” Econometrica, vol. 33, pp. 67-87
- Tobin J. (1958) “Estimation of relationship for limited dependent variables” Econometrica, vol. 26, pp 24-36
- UN (2002) “Common Country Assessment Albania”. Prepared for the United Nation System in Albania by the Albanian Centre for Economic Research (ACER)
- Working H. (1943) “Statistical Law of Family Expenditures” Journal of the American Statistical Association, vol. 38, pp. 43-56
- World Bank (2003) “Poverty Assessment” Report N. 26213, Human Development Sector Unit. Europe and Central Asia Region. The World Bank, Washington D.C.
- World Bank (2005) “Albania Poverty and Education in Albania: Who Benefits from Public Spending?” Report N. 31983, Human Development Sector Unit. Europe and Central Asia Region. The World Bank, Washington D.C.
- World Bank (2006) *World Development Indicators 2006*, The World Bank, Washington D.C
- Zarate-Hoyos G.A. (2004) “Consumption and Remittances in Migrant Households: towards a productive use of remittances” Contemporary Economic Policy, 22(4) pp 555-565

## Appendix

**Table 4: Sample statistics**

Variable	Description	Mean	Std. Dev.
Education Consumption <sup>1</sup>	Monthly total household payments related to pre-school and higher education	1000.39	2524.73
Total Household Consumption	Monthly total expenditure of households, excluding rent consumption	36674.52	18359.22
Age: up to 5	Number of children of age up to 5	0.43	0.69
Age: 6-18	Number of children of age included between 6 and 18	1.34	1.24
Age: 19-65	Number of adults of age included between 19 and 65	2.74	1.13
Male	=1 if household head is male; 0 otherwise	0.90	0.30
Age of head	Age years of household head	46.10	10.39
Age squared	Age of head squared	2233.23	965.21
Tirana	=1 if the household resides in Tirana; 0 otherwise	0.16	0.37
Central	=1 if the household resides in the Central area; 0 otherwise	0.28	0.45
Mountain	=1 if the household resides in the Mountain area; 0 otherwise	0.29	0.45
Coastal	=1 if the household resides in the Coastal area; 0 otherwise	0.27	0.45
Primary: < 4 grades	Head's highest educational level. =1 for no education or achieved four or less primary grades; 0 otherwise	0.09	0.29
Primary: < 8 grades	=1 between five and eight primary grades; 0 otherwise	0.41	0.49
Secondary	=1 for secondary level; 0 otherwise	0.16	0.37
Vocational	=1 for vocational level; 0 otherwise	0.21	0.41
University	=1 for educational level; 0 otherwise	0.13	0.33
Urban	=1 if the family resides in an urban settlement; 0 otherwise	0.55	0.50
Transfers from Albania <sup>2</sup>	Amount of transfers, in kind or in cash, received from family members migrated in Albania	3375.88	26681.27
Transfers from abroad <sup>3</sup>	Amount of transfers, in kind or in cash, received from family members migrated abroad	33752.12	119564.00
Transfers from institution <sup>4</sup>	Amount of transfers received from institutions	593.71	12843.25

*Identification variables for probit selection equation*

Source of water	Household type of water connection. =1 if running inside dwelling; 0 otherwise	0.59	0.49
Inside Phone	=1 if household has a telephone line inside the dwelling	0.29	0.45
Connected to electricity and gas	=1 if household uses electricity and gas as source of heating; 0 otherwise	0.38	0.49
Age: 6-18 squared	Squared of variable age: 6-19	3.33	4.84

*Instruments for total household consumption*

Second occupation	=1 if household head has a second job; 0 otherwise	0.05	0.22
Foreign job	=1 if household head performed the main job outside Albania; 0 otherwise	0.02	0.13
Brick wall	=1 if the dwelling has a brick wall; 0 otherwise	0.85	0.36
Dwelling Bath	=1 if the dwelling has a separate bathroom; 0 otherwise	0.62	0.48
Quality of water	Quality of water in dwelling. =1 if water is good for drinking; =2 if it is not good for drinking but good for other uses; =3 if it is not good for any other use	1.25	0.44
Electricity meter	Type of dwelling electricity meter. =1 if dwelling has a shared electricity meter; =2 if it has its own meter; =3 if it has no meter	2.25	0.49
Computer	=1 if household owns a computer; 0 otherwise	0.03	0.16

Notes: <sup>1</sup> zero for 1126 observations. <sup>2</sup> zero for 2,784 observations. <sup>3</sup> zero for 2,376 observations. <sup>4</sup> zero for 2,892 observations



**Table A2: Instrumental variable estimation for education consumption. IVTobit**

	IVTobit	
Household Consumption	0.061	(0.013)***
Ageup5	-336.232	(110.873)***
Age6_18	1,041.02	(68.660)***
Age19_65	159.377	(84.058)*
Male	14.179	(241.47)
Age	397.597	(66.419)***
Age Squared	-4.496	(0.716)***
Primary	396.23	(272.988)
Secondary	1,049.65	(318.369)***
Vocational	1,103.39	(308.595)***
University	1,660.95	(396.850)***
Central	815.305	(217.044)***
Mountain	929.54	(222.604)***
Coastal	636.116	(216.134)***
Urban	930.584	(149.574)***
Transfers from Albania	-0.003	(0.002)
Transfers from abroad	0.0003	(0.001)
Transfers from institutions	0.0001	(0.005)
Constant	-14,465.50	(1,497.714)***
Observations	2923	
Wald test of exogeneity	0.43	P-value=0.509
F test on the relevance of instruments	35.82	P-value=0.000
Test of orthogonality	0.54	P-value: 0.80

*Notes:* standard error in parenthesis. \* denotes significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The Wald test is distributed as  $\chi^2(1)$ . The F test on the overall significance of the instruments in the first stage estimation for the endogenous variable is distributed as F(7, 2898). The test for the orthogonality is computed as a joint F-test (7, 2898) on a auxiliary Tobit regression which includes the instruments.

**Table A3: Instrumental variable estimation for education consumption. Heckman two steps with endogenous regressor**

	Structural Equation	Selection Equation	Endogenous Equation
	Education consumption	Probit	Total Household consumption
Household Consumption	0.058 (0.016)***		
Ageup5	-355.772 (95.219)***	0.100 (0.051)*	1,761.05 (705.674)**
Age6_18	146.308 (87.263)*	1.930 (0.078)***	7,065.42 (2,941.413)**
Age19_65	94.655 (107.67)	0.057 (0.032)*	3,412.76 (487.111)***
Male	-203.558 (236.468)	0.001 (0.11)	3,377.20 (1,548.738)**
Age	203.696 (68.109)***	0.114 (0.029)***	137.361 (489.249)
Age Squared	-1.962 (0.780)**	-0.001 (0.000)***	-1.175 (5.312)
Primary	552.555 (203.082)***	0.217 (0.126)*	-1,462.76 (1,816.19)
Secondary	1,051.78 (255.767)***	0.436 (0.149)***	2,086.49 (2,073.52)
Vocational	1,074.77 (242.147)***	0.411 (0.140)***	4,342.05 (1,990.684)**
University	1,559.76 (474.778)***	0.759 (0.161)***	9,710.95 (2,260.437)***
Central	859.587 (237.831)***	0.232 (0.125)*	4,042.33 (1,584.574)**
Mountain	1,357.75 (311.091)***	0.013 (0.131)	4,530.45 (1,632.588)***
Coastal	712.9 (232.624)***	0.080 (0.116)	8,413.08 (1,430.490)***
Urban	694.526 (160.419)***	-0.118 (0.098)	-5,991.01 (1,201.711)***
Transfers from Albania	-0.004 (0.003)	4.65e-07 (1.21e-06)	0.047 (0.014)***
Transfers from abroad	-0.0003 (0.0005)	-1.04e-07 (2.80e-07)	0.005 (0.003)
Transfers from institutions	-0.001 (0.005)	8.90e-06 0.00002	0.087 (0.024)***
Source of water		0.284 (0.098)***	3,178.84 (1,208.975)***
Inside Phone		0.181 (0.087)**	6,846.13 (1,080.328)***
Connected		0.251 (0.085)***	3,419.98 (1,075.173)***
Age: 6-18 squared		-0.264 (0.019)***	-1,018.60 (460.759)**
Second occupation		-0.18 (0.155)	4,426.62 (1,687.335)***
Foreign job		0.233 (0.274)	2,161.97 (2,685.73)
Brick wall		-0.012 (0.094)	2,820.94 (1,113.897)**

Dwelling Bath		0.229 (0.081)***	4,630.21 (990.803)***
Quality of water		0.025 (0.088)	4,378.18 (1,103.108)***
Electricity meter		0.089 (0.067)	2,543.40 (813.606)***
Computer		0.232 (0.200)	19,965.86 (2,527.521)***
Mills	637.558 (300.236)**		4,061.62 (3,281.67)
Constant	-8,177.62 (1,635.118)***	-4.852 (0.694)***	-13,987.67 (14,191.62)
Observations	1799	2923	1799
Sargan		2.656	P-value=0.98840
F-test on the relevance of instruments		15.54	P-value= 0.000
Wu-Hausman F test:		0.31306	P-value = 0.57588

*Notes:* standard error in parenthesis. \* denotes significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Bootstrap standard errors, performed on 200 replications, are reported in the structural equation. The Sargan statistics is distributed as  $\chi^2(10)$ . The F test on the overall significance of the instruments in the endogenous variable estimation is distributed as F(7, 1769). The Wu-Hausman test is distributed as F(1, 1778).