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The Matching Approach on Expenditure Patterns of Migrant Households: Evidence from Moldova

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Abstract

This paper examines the effect of temporary and permanent migration on household expenditures and on asset/durables ownership. Using household survey data from Moldova, this paper relies on the matching approach for identification. It is shown that temporary migrant households have additional expenditures for food compared to non-migrant households. Further, non-migrant and temporary migrant households have higher expenditures for the repayment of loans than permanent migrant households. Concerning the ownership of goods or assets in 2006 compared to the regional crisis in 1998, temporary migrant households are more likely to own more assets or goods than non-migrant households. Overall, the findings indicate that temporary migration has a stronger effect on household expenditures than permanent migration.

Keywords: Expenditures, Remittances, Migration, Matching

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1 Introduction

Today workers' remittances are recognized as an important and stable source of development finance (Ratha, 2003). In many developing countries, remittance inflows are larger than inflows of development aid or foreign direct investment. Remittances offset some of the output losses from emigration of skilled workers; even more in the case of unskilled workers who escape unemployment. On the household level, beside augmenting the recipient households' incomes, remittance income may have a different marginal impact on household expenditures than income from other sources, e.g. households may have a higher propensity to spend remittance income on education.

How remittances are spent has received considerable attention in the literature on remittances. Most studies conclude that remittances are consumed instead of invested, but some studies find the opposite.[1] Two recent papers (Adams, 2005; Taylor and Mora, 2006) address the failure of remittance-use studies to capture indirect effects of remittances via their contribution to household budgets. Both papers use a regression-based approach which consists of entering household characteristics and a variable indicating the migration status or the receipt of remittances along with interaction terms in a linear model to explain household expenditure shares for different categories of goods. In addition, Taylor and Mora (2006) account for the endogeneity of migration by using the predicted probability of migration obtained from a probit model instead of a simple variable indicating the migration status of the household. Using data from Guatemala, Adams (2005) finds that, at the margin, households receiving remittances spent less on consumption than do households without remittances and more on education than household which do not receive remittances. Using data from Mexico, Taylor and Mora (2006) find that households with international migrants have larger marginal budget shares for investment than non-migrant households.

In this paper, the empirical analysis is based on the matching approach. There are two related advantages of this identification strategy compared to regression-based approaches (Black and Smith, 2004; Ichino, Mealli, and Nannicini, 2007). Matching requires that there is sufficient overlap in the

[1] For a review of remittance-use studies see Taylor et al. (1996).

distributions of the covariates when comparing migrant with non-migrant households. In principle, one would like to compare households that have the same values of all covariates, while differing with respect to migration status. The regression-based approach can hide the failure of the *common support* condition. If, for example, only members of households living in rural areas migrate and only members of households living in urban areas do not migrate, then the counterfactual outcome—what is the household expenditure pattern of rural households that have no migration experience—is not non-parametrically identified. However, the linear functional form assumption still provides identification of the counterfactual outcome (Black and Smith, 2004). Even if the common support condition is unproblematic, the linear functional form assumption may not be justified. Matching does not need the linear functional form assumption for identification, allowing for non-linearities in covariates on household expenditures.

The present paper does not only compare expenditure patterns of non-migrant and migrant households, but also distinguishes between temporary migrant and permanent migrant households. The remittance behavior of temporary and permanent migrants is expected to be different. Permanent migrants are expected to remit less as community and family ties become weaker, their remittance behavior being dominated by altruistic motives. Merkle and Zimmermann (1992) find a significantly negative relationship between the amount of remittances and the planned future duration of residence of migrants in Germany. Using data on Moldova, Pinger (2007) finds that remittances from permanent migrants are less likely to occur than from temporary migrants. Stark and Galor (1990) argue that migrants that have a positive return probability save more and transfer some of their savings as remittances to household members who stay behind in the source country. They may expect a future income lower than their current income and save more to smooth their consumption path over the life-cycle.[2] Glytsos (1997) argues that temporary migrants set a target of savings that they want to accumulate and consume as little as possible while abroad, effectively postponing consumption to a later time at home.

In the Republic of Moldova, labor migration and workers' remittances

[2]Lucas and Stark (1985) and Rapoport and Docquier (2005) provide an overview of motives to remit.

started off in the wake of the 1998 regional crisis. More than 80% of migrants departed for the first time since then (Cuc, Lundbäck, and Ruggiero, 2005). As of mid-2006, approximately one quarter of the economically active population was employed abroad (Lücke, Omar Mahmoud, and Pinger, 2007). According to the Labour Force Survey, the number of migrants grew from less than 100,000 in 1999 to more than 400,000 at the end of 2005, compared to an active population of 1,474,000 people in 2003. The Department of Migration estimated the number of migrants at around 600,000 as of August 2004 (Ruggiero, 2005). Total remittances reported in the balance of payments increased from around US$ 100 million annually in the late 1990s to just under US$ 1 billion in 2005 which is equivalent to about one third of GDP (Lücke et al., 2007).

There are two broad regions that are chosen by Moldovan labor migrants as destinations: the Commonwealth of Independent States (CIS), such as Russia and Ukraine, and Western Europe. According to the 2006 CBS-AXA survey, most migrants were occupied in Russia (around 60%), followed by Italy (17%). Other important destinations include Ukraine, Portugal, France, Spain and Turkey.

Different destinations are chosen by male and female migrants depending on the job characteristics. Destinations preferred by male migrants are CIS member countries (notably Russia and Ukraine) reflecting demand for labor in the construction sector. Destinations with migrant jobs predominately in the service sector, such as household help (notably Italy and Turkey), are preferred by female migrants (Ruggiero, 2005).

Job characteristics and travel costs also have an impact on the seasonality of migration. Travel costs to Western Europe are considerable, amounting to US$ 3,600 one way in 2006 (Lücke et al., 2007). Crossing borders illegally makes traveling to Western Europe so costly. Thus, migration to Western Europe tends to be on a permanent basis. In contrast, the average cost of travel to CIS member countries was around US$ 100. Furthermore, there is not much construction in the winter due to the climate. Thus, Russia and Ukraine attract mostly seasonal migrants.

2 Data

2.1 Data and Sample Description

The empirical analysis of this paper is based on a cross-sectional household survey that has been conducted by CBS-AXA in July and August 2006. The total number of households interviewed was close to 4,000. The survey was designed to be representative of Moldovan households at the national level (excluding Transnistria), since one goal of the CBS-AXA survey is to compare households with migrants to those without (Lücke et al., 2007). The dataset does not only contain information on current household members but also on permanent migrants that are no longer considered household members by the interviewed household.

The present paper groups households into three categories:

(a) Non-migrant households (NONM)

(b) Temporary migrant households (TEMP)

(c) Permanent migrant households (PERM)

The sample used for the empirical analysis contains information on all characteristics (see Table 1) of households that have either a permanent migrant (PERM), a temporary migrant (TEMP) or no migrant at all (NONM). Those households that have both a permanent and a temporary migrant were excluded. The category migrant households (MIGR) was constructed by aggregating permanent (PERM) and temporary migrant households (TEMP).

Contrary to other studies, temporary and permanent migrants are not distinguished by length of stay abroad (see also Pinger, 2007). Instead, a household is considered a permanent migrant household if the interviewee indicated that the migrant has the intention to settle abroad.[3]

2.2 Descriptive Statistics

Panel (a) of Table 1 shows the means of all variables that were included in the estimation of the propensity score. As explained in Section 3, all

[3]Conversely, a household is considered a temporary migrant household if the interviewee selected one of the two other alternatives, namely that the migrant intends to accumulate more money abroad and then return to Moldova for good or that she intends to stay in Moldova and not to go abroad again.

Table 1: Number of observations and characteristics of different groups

	NONM	TEMP	PERM	MIGR
Number of observations	956	553	234	787
Panel (a)				
Sex of household head (male=1)	0.71	0.83	0.70	0.79
Household size (permanent migrants excluded)	2.8	3.8	2.4	3.4
Number of children	0.40	0.72	0.37	0.62
Number of adults in university attending age (18–25)	0.37	0.69	0.40	0.60
Adults with higher education	1.1	1.7	1.9	1.8
Age of household head	54.8	46.6	54.6	49.0
Residence area (urban=1)	0.43	0.32	0.58	0.40
Living standard directly after the crisis in 1998 (good=1)	0.17	0.20	0.20	0.20
Living standard directly after the crisis in 1998 (bad=1)	0.37	0.37	0.41	0.38
Expenditure sum per adult equivalent[a] (leu)[b] excluding permanent migrants	856	1312	1263	1297
Panel (b)				
Expenditure sum per adult equivalent[a] (leu)	856	1312	1134	1259
Household expenditure sum	1384	2458	1867	2283

[a] The sum of household expenditures is divided by the equalized number of people in the household using an OECD equivalence scale in which the first household member over 14 equals 1, all others over 14 equal 0.5, and all under 15 equal 0.3. To account for economies of scales in household consumption the denominator is raised to the power of 0.8.

[b] From July to August 2006, the (official) average exchange rate of the Moldovan leu (MDL) was 13.31 MDL/USD as published by the central bank of Moldova.

variables that influence the household's migration status and the outcome need to be included.

The variable *household size* contains the number of household members that are still considered members of the household excluding all permanent migrants.[4] Permanent migrants were excluded because, effectively, they may no longer be counted as household members. For the same reason, they were excluded from the calculation of the *expenditure sum per adult equivalent*. The variable *adults with higher education* contains the number of adults with tertiary education (college or university). The variable *living standard directly after the crisis in 1998* contains the perceived living standard of

[4]In the sample used for the empirical analysis, out of the 234 permanent migrant households 174 households have a permanent migrant that is no longer considered a member of the household.

the household. The living standard is perceived to be bad if the household indicated that there was just enough for the bare necessities or that there was not enough for the bare necessities.

Table 1 shows that temporary migrant households (TEMP) differ substantially from non-migrant (NONM) and permanent migrant households (PERM) in most of the variables. Among temporary migrant households, the percentage of the household head being male, the household size, the number of children, the number of adults in university attending age, the expenditure sum per adult equivalent, and the sum of household expenditures are higher and the age of the household head is lower compared to non-migrant and permanent migrant households. Permanent migrant households are very similar to non-migrant households except for the number of adults with higher education, the percentage living in urban areas, the expenditure sum per adult equivalent, and the sum of household expenditures.

3 The Evaluation Framework

To evaluate the effect of migration on the household expenditure pattern, one would ideally compare the observed outcome of households participating in migration with the outcome that would have resulted had the household not migrated. However, the counterfactual outcome cannot be observed. To identify the effect of migration, the counterfactual outcome must be estimated.

The mean outcome of non-participants is not a suitable substitute for the counterfactual outcome due to selection bias. Usually, the outcomes of participants and non-participants would differ even in the absence of treatment. Using the mean outcome of non-participants as an estimate for the counterfactual outcome would be a valid approach were those participating in migration a random sample of all those households that may participate. However, this is unlikely to be the case. Selection bias will typically result when some of the determinants of participation also influence the outcome (Bryson, Dorsett, and Purdon, 2002).

The general idea of matching is to estimate the counterfactual outcome by constructing an artificial control group. The units in the control group are selected among the group of non-participants such that they are similar

to the participants in all relevant pre-treatment characteristics.

The standard model of only two treatments, i.e. participation versus non-participation, is extended by Imbens (1999) and Lechner (2001) to the case of multiple treatments.[5] In the case of migration, multiple treatments become relevant if one wants to distinguish between temporary migrant households and permanent migrant households, as done in this paper, the other category being households that do not participate in migration.

With $(M+1)$ mutually exclusive treatments, the potential outcomes can be denoted by $\{Y(0), Y(1), \ldots, Y(M)\}$. For each household, only one element of $\{Y(0), Y(1), \ldots, Y(M)\}$ is observable.[6] The remaining M outcomes are counterfactuals. The average treatment effect on the treated, i.e. the average treatment effect for participants in treatments m and l on the participants in treatment m, can be expressed as follows:

$$\begin{aligned} \tau_{m,l} &= E[Y(m) - Y(l)|S = m] \\ &= E[Y(m)|S = m] - E[Y(l)|S = m], \end{aligned} \tag{1}$$

where participation is indicated by the variable $S \in \{0, 1, \ldots, M\}$. It is important to note that the average treatment effects on the treated will not be symmetric ($\tau_{m,l} \neq \tau_{l,m}$) if the effects of participants in treatments m and l differ for the two subpopulations participating in m and l, respectively.

Since the average causal effect is generally not identified, this lack of identification must be overcome by means of some plausible assumption. Identification can be obtained by the conditional independence assumption (CIA) which states that given a set of observable covariates X all potential treatment outcomes are independent of treatment assignment:

$$\{Y(0), Y(1), \ldots, Y(M)\} \perp S|X, \tag{2}$$

Under the CIA, participation in migration, whether temporary or permanent, is random conditional on all relevant pre-treatment household characteristics X, thereby removing any selection bias. The CIA requires that all variables that influence treatment assignment and potential outcomes are simultaneously observed. It should be noted that the CIA is an untestable

[5] Non-participation can also be regarded as treatment.

[6] The notation is based on Lechner (2002).

assumption. Its plausibility has to be justified by the data at hand and relies on the possibility to match treated and untreated units on the basis of a large and informative set of pre-treatment variables.

McKenzie, Gibson, and Stillman (2006) estimate the gains from migration using data from a natural experiment in which migrant applicants to New Zealand from Tonga are selected by a lottery. They compare this estimate with estimates from non-experimental methods to examine how successful several non-experimental methods are. All non-experimental methods, including propensity score matching described below, were overstating the gains from migration.[7] With means of propensity score matching, the authors were unable to remove the selection bias on the basis of the observed covariates that they used, suggesting that the conditional independence assumption was not satisfied.

In practice, it can be difficult to condition on all relevant pre-treatment variables in case of a high dimensional vector X. To deal with this dimensionality problem, Rosenbaum and Rubin (1983) proposed an alternative based on the propensity score defined as $P(X) = \text{prob}(S = m|X)$, i.e. the probability of participation in treatment m given a set of observed covariates X. The CIA based on the propensity score can be written as:

$$\{Y(0), Y(1), \ldots, Y(M)\} \perp S|P(X). \tag{3}$$

However, no procedure for adjusting for pre-treatment differences is likely to work well if there is insufficient overlap in the distribution of pre-treatment variables by treatment status (Imbens, 1999). The common support requirement ensures that for households with the same X values there is a positive probability of every treatment to occur:

$$0 < \text{prob}(S = m|X) < 1, \tag{4}$$

which is also referred to as the overlap condition.

Given that the CIA and the overlap condition hold, the ATT can be

[7] McKenzie et al. (2006) conclude that among the non-experimental methods the instrumental variable approach performed best but only with a good instrument.

identified as:

$$\tau_{m,l} = E\{E[Y(m)|S = m, P(X)] - E[Y(l)|S = l, P(X)]\}. \quad (5)$$

The important result is that—under the CIA and the overlap condition—the observed outcome of the control units can be used to estimate the counterfactual outcome of the treated units.

The propensity scores can be obtained by using a series of binary choice models, estimating propensity scores pairwise, i.e. the probability of being in a given state is estimated for those units that are in either of the states. The alternative is a multinomial logit or probit model which has the disadvantage that the common support condition is more restrictive because only those units that have a positive probability to participate in all treatments may be considered as potential candidates for the control group. In comparison, the pairwise estimation of the propensity score leads generally to a smaller proportion of cases dropped because units only need to have a positive probability to participate in either treatments (Bryson et al., 2002).

When estimating the probability of treatment, i.e. either temporary or permanent migration, all covariates that influence both participation in the treatment and the outcome, i.e. expenditures for a certain category of goods or asset ownership, need to be included in the estimation equation. If a variable influences only participation, there is no need to control for differences between the treatment and the comparison group because the outcome is unaffected (Bryson et al., 2002). For example, networks may play a role in shaping the decision to migrate (Görlich and Trebesch, 2006). However, such a variable is not included in the estimation of the propensity score since it is unlikely that it affects the outcome variable.

Based on the propensity score or, alternatively, directly on covariates,[8] matching is performed via a matching algorithm that needs to be chosen. Lechner (2002) proposes nearest neighbor matching with replacement, where an untreated unit may be used for more than one match.[9] Matching with replacement is necessary if the number of participants in treatment m is different from the number of participants in treatment l. Since the role of m and l can be reversed, this procedure avoids the problem that there are

[8] Zhao (2004) compares covariate matching with propensity score matching.

[9] Caliendo and Kopeinig (2005) provide an overview of different matching algorithms.

not enough participants in one treatment to be matched with participants in the other treatment. The disadvantage of matching with replacement is the potential problem that a few observations may be heavily used although other similar observations are available. Although this increases the average quality of matching, the number of distinct control units is reduced, which increases the variance.

Propensity score matching can be combined with covariate matching (see, for example, Rosenbaum and Rubin, 1985). Covariate matching is based on a distance metric standardizing the covariates in some way. The most common distance metric is the Mahalanobis metric which is defined as:[10]

$$d(X_i, X_j) = (X_i - X_j)^T Cov^{-1}(X_i - X_j), \tag{6}$$

where Cov_j^{-1} is the inverse of the covariance matrix of the covariates and X_i and X_j are the vectors of covariates of units i and j, respectively. In the case of nearest neighbor matching units i and j are matched with the smallest Mahalanobis distance. Including the propensity score in the X_i and X_j along with some variables that are already included in the estimation of the propensity score amounts to increasing the weight of these variables, giving particularly good matches with respect to these variables (Lechner, 2002).

4 Empirical Analysis

In the present paper, propensity score matching is combined with covariate matching.[11] When comparing expenditures by household migration status, it is important to achieve particularly good matches with respect to the expenditure sum per adult equivalent. Therefore, beside the propensity score in which the expenditure sum per adult equivalent is included,[12] this variable

[10] See, for example, Cochran and Rubin (1973).

[11] The analysis was conducted with Stata using the programme *psmatch2* provided by Leuven and Sianesi (2003). Caliendo and Kopeinig (2005) provide an overview of several programmes that can be used for matching in Stata.

[12] For the estimation of the propensity score, all variables in Panel (a) of Table 1 were included.

is also included in the Mahalanobis metric:

$$d(X_i, X_j) = \left(\begin{bmatrix} \widetilde{p}_i \\ x_i \end{bmatrix} - \begin{bmatrix} \widetilde{p}_j \\ x_j \end{bmatrix} \right)^T Cov^{-1} \left(\begin{bmatrix} \widetilde{p}_i \\ x_i \end{bmatrix} - \begin{bmatrix} \widetilde{p}_j \\ x_j \end{bmatrix} \right), \quad (7)$$

where $\widetilde{p}_i$ and $\widetilde{p}_j$ are the estimated propensity scores for units i and j, respectively, and x_i and x_j are the expenditure sum per adult equivalent for units i and j, respectively. For the estimation of the propensity score, binary probit models were used.

Being influenced by the treatment, the control variable *expenditure sum per adult equivalent* exhibits a potential endogeneity problem. The question arises what happens if some of the covariates are influenced by the treatment. As long as the CIA is satisfied, the endogeneity problem does not matter at all (Lechner, 2005). However, endogeneity of the control variables makes the CIA unlikely to hold. Lechner (2005) proposes an alternative formulation of the conditional independence assumption together with explicit exogeneity conditions to solve the endogeneity problem.

Table 2 shows average treatment effects on the respective households. The entries on the main diagonal display (unadjusted) average expenditures for different expenditure items, e.g. the average household expenditure for food is 616.2 lei, 924.1 lei, and 892.2 lei for households participating in non-migration, temporary migration, and permanent migration, respectively. The treatment effects are off the main diagonals (non-migration is also called a treatment). For households participating in the treatment given in the row, the average treatment effect is displayed compared to participating in treatments given in the respective columns. For example, the average effect of TEMP compared to NONM is 140.1 lei of additional expenditure.

Apart from food expenditures of households participating in temporary migration compared to non-migration, other significant average treatment effects are expenditures for the repayment of loans of households participating in non-migration and temporary migration, respectively, compared to households participating in permanent migration.

A higher expenditure for food of temporary migrant households is consistent with the notion that remittances by temporary migrants are used to meet current consumption needs (Glytsos, 1997). In contrast, permanent migration is less likely to be motivated by this type of expenditure. Both

Table 2: Average effects for participants measured as the difference in expenditure (Moldovan leu)[a]

	NONM	TEMP	PERM
Food			
NONM	616.2	–59.6 (64.3)	76.7 (82.9)
TEMP	140.1 (49.2)**	924.1	31.4 (164.0)
PERM	82.3 (85.0)	108.5 (95.2)	892.2
Health			
NONM	147.7	2.4 (31.3)	–0.5 (25.4)
TEMP	–0.1 (21.6)	175.4	–17.8 (37.0)
PERM	6.2 (31.0)	–3.8 (39.9)	184.0
Education			
NONM	72.4	3.7 (45.1)	27.8 (20.8)
TEMP	–24.6 (25.7)	141.4	67.5 (46.5)
PERM	–21.8 (37.9)	–11.4 (68.8)	68.2
Savings			
NONM	36.8	3.6 (17.6)	6.9 (28.8)
TEMP	13.5 (18.1)	141.4	70.2 (81.3)
PERM	–20.2 (26.6)	–20.8 (55.1)	49.9
Repayment of loans			
NONM	70.5	36.2 (82.6)	60.1 (23.7)**
TEMP	–125.5 (57.7)	271.2	254.1 (119.9)**
PERM	–87.3 (114.4)	–126.9 (130.5)	14.5
Dwelling			
NONM	103.1	31.0 (27.9)	27.8 (43.4)
TEMP	–16.8 (30.1)	142.5	–12.7 (84.9)
PERM	–35.9 (60.0)	53.3 (33.2)	154.1
Clothes/shoes and entertainment			
NONM	204.7	–5.6 (60.8)	33.2 (85.6)
TEMP	43.0 (39.6)	429.9	34.5 (152.1)
PERM	14.8 (77.0)	101.4 (87.1)	290.6

[a] Standard errors are given in parentheses; ***(**, *) indicates significance at the 1% (5%, 10%) level (two-sided test).

non-migrant households and temporary migrant households spend more on the repayment of loans compared to permanent migrant households. As households start to repay debts soon after migration, debt repayment becomes marginal over time (see Ruggiero, 2005). Thus, non-migrant and temporary migrant households have additional expenditures for the repayment of debts compared to permanent migrant households. Contrary to Adams (2005) and Taylor and Mora (2006), both temporary and permanent migrants do not spend more on education than non-migrant households.

Table 3: Matching diagnostics

	NONM	TEMP	PERM
Number of observations on support[a]			
NONM		933 (23)	955 (1)
TEMP	543 (10)		543 (10)
PERM	233 (1)	225 (9)	
Matching performance with respect to the expenditure sum per adult equivalent[b]			
NONM		0.99 (0.12)	1.00 (0.10)
TEMP	0.99 (0.08)		0.94 (0.21)
PERM	0.99 (0.12)	1.00 (0.19)	
Share of the 10% most frequent used matching units in total matching (%)[c]			
NONM		45 (11.6)	33 (17.7)
TEMP	33 (3.8)		46 (19.4)
PERM	46 (3.6)	46 (5.4)	

[a] Observations lost due to the common support requirement are given in parentheses.
[b] Ratio of mean expenditure sum per adult equivalent of matched untreated households to mean expenditure sum per adult equivalent of treated households. Standard errors are given in parentheses.
[c] The average frequency of matching of the 10% most frequent used matching units is given in parentheses.

Table 3 gives several indicators regarding the performance of matching conducted for the estimation of average effects in Tables 2 and 4. The number of observations lost due to the common support requirement is very low. Common support is imposed by dropping treatment observations whose propensity score is higher than the maximum or less than the minimum propensity score of the (untreated) control units.

On average, the expenditure sum per adult equivalent of treated households compared to non-treated households is nearly equal. Thus, the quality of matching with respect to this variable is very high.

When nearest neighbor matching is applied with replacement, it is possible that an untreated observation is matched many times. Table 3 displays the share of the weights of the 10% most frequent used observations. This concentration ratio must be at least 10% which corresponds to the case when every untreated observation is used only once. Following Lechner (2002), we conclude that the respective shares are in the usual range. The average fre-

quency of matching of the 10% most frequent used observations is high if the treated group is large relative to the untreated group, as is the case when matching temporary and permanent migrant households with non-migrant households, respectively. Then, observations are used more frequently.

Table 4 displays average effects measured as the difference in the share of households that indicated to own more of an asset or good compared to directly after the crisis in 1998. Significant parameters are found for households participating in temporary migration only. Compared to non-migration households, temporary migrant households own more often more houses/apartments, land, cars, washing machines, and phones. This is consistent with the notion that, beside food items, remittances from temporary migrants are spent on durables. Compared to permanent migrant households, (weak) significant parameters are also found with respect to phones and TV sets.

Average effects displayed in Tables 5 and 6 are estimated on the basis of participation versus non-participation in migration. Migrant households which include households with either temporary or permanent migrants are classified according to the share of remittances in total household expenditures. Migrant households whose share of remittances in total household expenditures is in the first quantile, i.e. their shares belong to the 33.3% lowest shares, are classified as *low*. Those migrant households whose share is in the third quantile, i.e. their shares belong to the 33.3% largest shares are classified as *high*. Migrant households classified as *medium* have a share of remittances in total household expenditures that is in the second quantile, i.e. their shares are between the 33.3% lowest and the 33.3% largest shares.

Food expenditures are higher for migrant households with a high share of remittances compared to non-migrant households (see Table 5). These households have also the lowest mean household expenditures per adult equivalent for all items compared to migrant households in the other two quantiles (not displayed). Thus, this result is consistent with the notion of poorer migrant households having additional food expenditures (Rempel and Lobdell, 1978). Education expenditures for migrant households with a high share of remittances are lower compared to non-migration households. This result is unexpected because one would rather expect that these households have additional expenditures for education. However, educa-

Table 4: Average effects for participants measured as the difference in the share of households that have more of an asset/good compared to 1998 (percentage points)[a]

	NONM	TEMP	PERM
House/apartment			
NONM	8.97	–2.35 (5.48)	0 (3.76)
TEMP	10.70 (3.29)**	19.64	0.91 (7.49)
PERM	–4.17 (6.25)	2.86 (5.81)	9.46
Land			
NONM	10.65	–0.59 (5.62)	1.87 (3.44)
TEMP	7.65 (3.51)**	19.05	7.62 (6.50)
PERM	–7.64 (5.78)	1.43 (5.25)	6.08
Car			
NONM	6.54	–1.37 (4.96)	–0.56 (3.13)
TEMP	9.79 (3.18)**	17.56	5.48 (7.17)
PERM	0.69 (5.30)	–2.14 (6.26)	9.46
Tractor			
NONM	2.99	0.00 (3.24)	–3.93 (2.80)
TEMP	2.75 (1.98)	6.25	–7.01 (5.87)
PERM	3.47 (3.43)	1.43 (3.86)	5.41
Washing machine			
NONM	11.78	–7.83 (6.42)	–2.43 (4.53)
TEMP	9.48 (4.19)**	29.17	11.89 (8.99)
PERM	0.00 (7.26)	8.57 (7.41)	18.92
Computer			
NONM	5.98	–2.15 (4.71)	–2.43 (3.33)
TEMP	2.44 (2.93)	12.5	4.27 (6.76)
PERM	–5.56 (5.43)	0.71 (5.96)	7.43
Phone			
NONM	4.67	–3.52 (4.77)	–3.75 (3.08)
TEMP	11.93 (2.59)***	16.37	9.45 (5.65)*
PERM	–1.39 (5.04)	1.43 (4.81)	7.43
TV			
NONM	12.71	–8.41 (6.40)	–1.48 (3.13)
TEMP	4.89 (4.21)	28.27	14.33 (8.11)*
PERM	–0.69 (6.45)	5.0 (6.48)	14.19

[a] Standard errors are given in parentheses; ***(**, *) indicates significance at the 1% (5%, 10%) level (two-sided test).

tion expenditures may decrease if the migrant who used to be educated is working abroad instead. Expenditures for dwelling (rent, maintenance) are lower compared to non-migration households. As shown in Table 6, high

Table 5: Average effects for participants measured as the difference in expenditure (Moldovan leu)[a]

	Classification of migrant households with respect to remittances			
	all	low	medium	high
Food				
ATT	152.2	164.0	20.2	165.7
	(36.4)***	(100.4)	(80.1)	(70.7)**
Health				
ATT	1.7	72.4	2.4	–26.7
	(16.9)	(43.3)*	(52.3)	(18.7)
Education				
ATT	–25.5	18.4	–6.1	–91.2
	(20.2)	(53.2)	(36.8)	(37.4)**
Savings				
ATT	–3.1	50.3	18.7	2.5
	(16.5)	(42.1)	(23.6)	(29.9)
Repayment of loans				
ATT	–164.4	–490	105.9	–101.1
	(44.7)***	(124.6)***	(109.0)	(71.3)
Dwelling				
ATT	–3.1	83.6	–35.5	–52.4
	(21.0)	(69.3)	(29.9)	(22.8)**
Shoes/clothes and entertainment				
ATT	–37.7	62.7	46.5	37.0
	(34.0)	(92.9)	(60.2)	(61.5)

[a] Standard errors are given in parentheses; ***(**, *) indicates significance at the 1% (5%, 10%) level (two-sided test).

remittances migrant households own more often more houses/apartments than non-migrant households. Thus, dwelling expenditures may be smaller because migrant households save dwelling expenditures by moving in their own house/apartment instead of renting.

Expenditures for the repayment of loans are smaller for low remittances migrant households. As already mentioned, debt repayment appears to be important initially, but becomes marginal over time as debts are settled. The share of remittances in total household expenditure is expected to decrease over time as migrants stay longer abroad, which is affirmed by the disproportionally high share of permanent migrant households among the

Table 6: Average effects for participants measured as the difference in the share of households that have more of an asset/good compared to 1998 (percentage points)[a]

	Classification of migrant households with respect to remittances			
	all	low	medium	high
House/apartment				
ATT	2.51	–3.23	12.35	15.15
	(2.86)	(5.99)	(5.91)**	(6.18)**
Land				
ATT	0.21	0	3.70	10.01
	(2.98)	(6.06)	(5.67)	(6.20)
Car				
ATT	3.98	-4.30	11.11	16.16
	(2.62)	(5.41)	(5.56)**	(5.13)**
Tractor				
ATT	0.62	–4.30	2.47	6.06
	(1.82)	(4.01)	(3.31)	(2.87)**
Washing machine				
ATT	6.08	3.23	11.11	24.24
	(3.37)*	(7.25)	(7.15)	(6.5)***
Computer				
ATT	–1.04	–7.53	4.93	9.09
	(2.51)	(5.39)	(4.31)	(4.19)**
Phone				
ATT	6.08	2.15	7.41	21.21
	(2.31)**	(4.67)	(5.06)	(4.82)***
TV				
ATT	5.45	–9.68	4.93	12.12
	(3.34)	(0.67)	(7.69)	(6.92)*

[a] Standard errors are given in parentheses; ***(**, *) indicates significance at the 1% (5%, 10%) level (two-sided test).

low remittance migrant households (not displayed). Thus, low remittances migrant households have lower debt repayment expenditures because they are more likely to have migrants who have been abroad for a longer time and, therefore, debts are more likely to have been already settled.

As displayed in Table 6, it is above all the high remittances migrant households that own more of an asset or good in 2006 compared to directly

after the crisis in 1998. Their high share of remittances in total household expenditures appears to enable them to buy goods that they would not have been able to afford had one or several household members not migrated. Land is not owned more more often by any type of migrant households classified according to the share of remittances in total household expenditures.

5 Conclusion

Employing the matching approach, this paper examined the effect of temporary and permanent migration on household expenditures and on asset/durables ownership. This paper employs a different approach than the regression-based approach that has been used in the literature (see Adams, 2005; Taylor and Mora, 2006).

Concerning differences in expenditures for different items, this paper finds that temporary migrant households have additional expenditures for food compared to non-migrant households which is consistent with the notion that remittances by temporary migrants are used to meet current consumption needs. Further, non-migrant and temporary migrant households have higher expenditures for the repayment of loans than permanent migrant households.

Concerning differences in the ownership of goods or assets in 2006 compared to directly after the regional crisis in 1998, temporary migrant households are more likely to own more goods or assets than non-migrant households. For permanent migrant households no increased ownership of any of the goods or assets compared to non-migrant households was found.

In a different specification, migrant households were not differentiated by temporariness of migration but by the share of remittances in total household expenditures received. Food expenditures are higher for high remittances receiving households compared to non-migrant households. Further, low remittances receiving households have lower expenditures for the repayment of loans than non-migrant households.

Overall, the findings indicate that temporary migration has a stronger effect on household expenditures than permanent migration.

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