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# Simulation of a voucher policy for improving the social condition of individual remittance receivers in Macedonia

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PAGE
policy analysis on growth and employment

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## Abstract

Macedonia receives at least 4% of GDP as cash remittances per year while a third of the population faces poverty. The study has two objectives: first, to investigate if and to what extent remittances improve individual social indicators; and ii) to devise and ex-ante simulate the effects of Remittances' Voucher policy for transforming their potentially sheltering role into a formal mechanism for social protection. To that end, we rely on the DotM 2008 Remittances' Survey and a conditional mixed process estimator. We devise the Remittances' Voucher providing each remittance receiver who obtains the money through financial institution the right to a health protection equal to the average health expenditure if he/she sets 6% of the remitted money on a pension account. We find that remittances have a significant effect onto consumption and, hence, contribute to reducing poverty. This finding lends support to the claim that remittances serve an informal social protection in the country. We also find that the Remittances' Voucher policy may play a crucially positive impact on remittance receivers, as it improves poverty and the health condition, especially for females, rural dwellers and Macedonian recipients of remittances. The bold recommendation is for the government to introduce this policy into the array of social policies as means of framing remittances into more formal social protection.



**JEL:** F24, J21
**Keywords:** remittances, social protection, Remittances' Voucher policy, Macedonia


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# I. Introduction

Poor households in Macedonia, as elsewhere, face risks originating from different causes, the most prominent of which is the lack of or limited access to formal social insurance and formal credit finance. Macedonia receives about 20% of its GDP in private transfers each year, out of which it is estimated that at least half are pure cash remittances which directly contribute to the livelihoods of (poor) households of Macedonian citizens (Petreski and Jovanovic, eds., 2013). Petreski and Jovanovic (2014) find that remittances sent to Macedonia significantly reduce poverty and increase income equity, while Petreski and Mojsoska (2014) find that while they could overall deter people from investing, the opposite holds for youth in households receiving remittances. Hence, the available studies for Macedonia document large developmental potential of remittances.

No government policy exists yet for channelling this potential into productive use. The economy was still experiencing a colossal unemployment rate of 29% and a poverty rate of 27% in 2014. Only 9% of households receive formal social assistance from the government, and this reduces the incidence of poverty by only 3 percentage points (State Statistical Office, 2012). In addition, Mojsoska et al. (2013) argue that the assistance triggers inactivity and laziness. Hence, it is likely that the formal social assistance does not exert a (large) positive role in Macedonia.

However, these figures reflecting facets of economic development do not take into account the effect of remittances. Remittances are not a part of the official regular surveys and policies. They are frequently channelled through unofficial-unregistered channels (at least half of them; Petreski and Jovnanovic, 2013). Hence, the bold question emerging is the extent to which remittances serve as informal social-protection agreements in handling social risks (Dercon, 2002) and potentially prevent social unrest.

The objective of the paper is to investigate whether emigration and the money remitted as a result serve as informal social protection for household members left behind, and to devise and ex-ante simulate a policy instrument – Remittances' Voucher (RV) – for transforming it into a formal social protection. Specifically, the objective of the research is twofold: first, to investigate if and to what extent remittances determine individual social indicators; and ii) to devise and simulate the effects of a mechanism for transforming their potentially sheltering role into a formal mechanism for social protection. In particular, the study proposes a Remittances' Voucher policy to consist of health protection provided by the government for each remittance receiver who obtains the money through a bank, conditional on placing 6% of the remitted money into a pension account in the voluntary pillar of the pension system.

We found that remittances significantly contribute to reducing poverty: increasing remittances by about 2.000 denars (going from the first to the third quartile of the remittances distribution) increases consumption by 1,176 denars, and the health consumption by 370 denars, which then reduces the probability of falling into a bad health condition by sizeable 63%. As this is a rather large impact, it gives support to our claim that remittances serve as informal social protection in the country. We also found that

the Remittances' Voucher policy may play a crucially positive impact on remittance receivers. Health improved by about 0.5 percentage points due to the voucher, on top of the effect of remittances themselves. Then, while the savings component of the Remittances' Voucher produced a fairly large negative impact on income, the overall effect of the policy for the social indicators was positive. The effect has been found to be stronger for female, rural, young and Macedonian receivers. Remittances do not appear to have any significant effect on the housing condition or material deprivation.

The paper is organized as follows. Section 2 draws on the survey underlying this study and presents stylized facts about the social indicators and their interferences with remittances. Section 3 lays the theoretical background and reviews the referent literature. Section 4 presents the methodology and explains the design of the policy instrument. Section 5 presents the results and offers a discussion. Section 6 concludes.

# II. Data and stylized facts

## 2.1. Data and survey design

The research uses the 2008 DotM Remittance Survey. It is a dataset compiled on a representative sample of 1,211 households in Macedonia, covering all geographical regions and considering gender, ethnic and geographic representativeness. It is comprised of 4,173 individuals.

The survey has been conducted for examining remittances, in particular, as standard surveys such as the HBS, SILC or LFS do not contain data on remittances. The Survey includes information about the demographic and social characteristics of the household and its members (the usual information contained in Household Budget Surveys) plus information on the amount of remittances received, their spending pattern, the relationship with the household labour-market decisions, and so on. In addition, the dataset encompasses social indicators of the household and its members like: income; health status; housing and living conditions (measured by the possession of property, number of rooms, walls and floors material, access to public services, etc.); material deprivation status (measured by spending on non-basic goods like holidays, leisure items and activities, purchase on vehicles, etc.). Therefore, the dataset based on this survey will give sufficient information to achieve the objectives of the study.

In the empirical work, we exclude dependent members younger than 18 years of age and students because they do not have income, although this does not necessarily expose them to vulnerability. Once eliminated, the sample boils down to 3,089 individuals, which is the sample size we work with.

We also define the survey's structure since the failure to account for the correct survey design can lead to wrong inference. The "representative" 1,211 households have been stratified on two levels – by region and by rural/urban. On the first level of stratification, each region is included in the survey with a number of households proportional to the total number of households in that region. Then, on the second level of stratification, the number of rural and urban households from each region is proportional to the total number of rural/urban households in that region. Then, after the number of

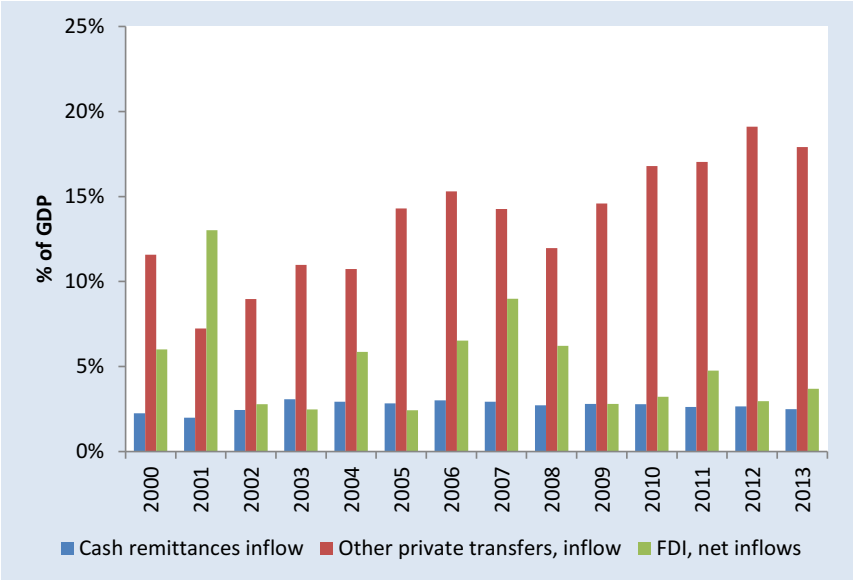
rural and urban households for each region has been determined in this way, those households are selected randomly. Then, on the grounds of this information, the probability of being selected is calculated for each household, and these probabilities are used to correct the estimates.

In addition to the survey data, we use some other sources for the regional variables. These sources include the State Statistical Office, the Ministry of Agriculture and the Ministry of Health. Variables used are further explained in Annex 1.

## 2.2. Remittances – size and utilization

It has been estimated that Macedonia receives at least USD 400 million of cash remittances per year, representing about 4% of GDP and being comparable to the FDI inflows (**Figure 1**). Some studies (e.g. Petreski and Jovanovic, eds., 2013) suggest that this figure is underestimated and the true figure reaches 10% of GDP. **Figure 1** also suggests that while FDIs registered ups and downs over the years, and the top years being driven by the privatization of large-scale public utilities, remittance flows remained stable over the years. 5.8% of the non-dependent persons in our survey were recipients in 2008, which includes individuals in about 14.8% of the households. The average remittance per receiving person was about USD 1,200 per year.

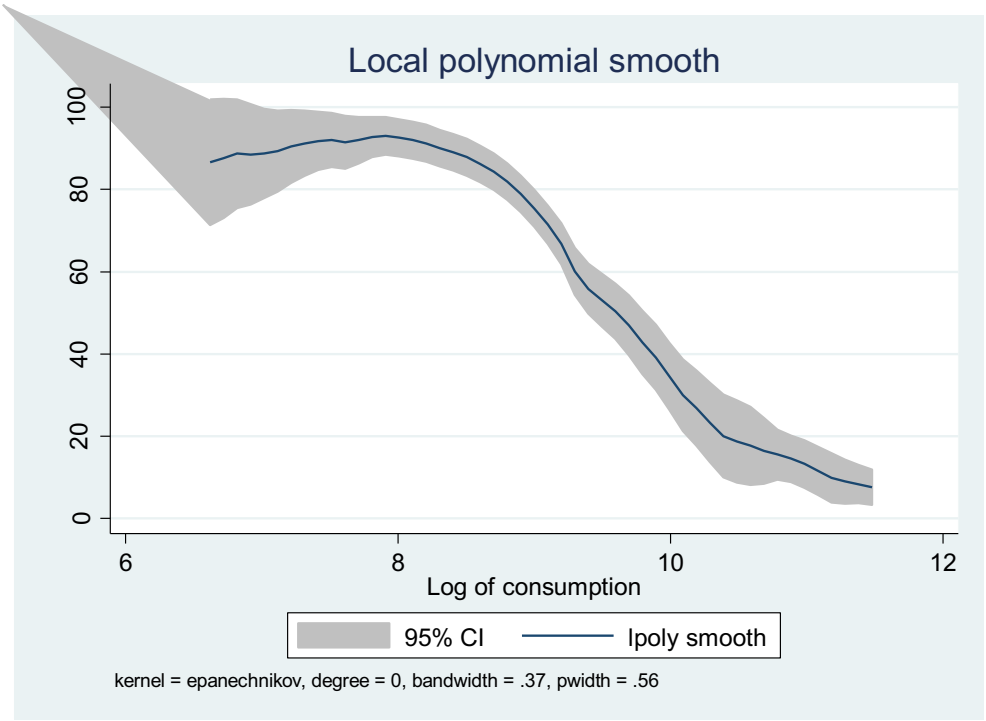
**Figure 1 – Remittances and other inflows**




*Source: National Bank of the Republic of Macedonia*

As such, remittances represent an important contributor of the living standards of poor citizens. **Figure 2** and **Table 1** reveal that for the poor households which are generally those in the first two quintiles of the income distribution, remittances accounted for about 90% of personal consumption[1].

**Figure 2 –Remittances as a share of personal consumption**




*Source: Authors' calculations*

Then, while the average remitted amount fluctuates between income classes, their participation in income declines, although remittances continue to represent important fraction of income even for the richest quintile (**Table 1**).

**Table 1. Remittances and their shares, by income groups**

| Quintiles of population | Average remittance per person per month (MKD) | Average share of remittances in personal income/consumption (%) |
|---|---|---|
| **Lowest 20%** | 2,237 | 90.9 |
| **Low-mid 20%** | 4,670 | 96.8 |
| **Mid 20%** | 4,419 | 70.2 |
| **Up-mid 20%** | 7,277 | 71.7 |
| **Upper 20%** | 4,804 | 17.5 |

*Source: Authors' calculations based on DotM Survey*

[1] Note that throughout the analysis we approximate personal income through per capita consumption, mainly because the survey reports the income in just a few intervals. Hence, the variable lacks variability and may hide information which is important for our analysis. However, consumption may be a more stable category in terms of resistance to shocks.

**Table 2** presents data on remittances, consumption and their ratio by different population groups. Males receive a slightly higher amount of remittances, but because their consumption is lower than that of females, remittances as share of consumption are lower. The difference between the amounts remitted is larger between Macedonians and Albanians.[2] Given that Albanians have more vivid diaspora and maintain closer contacts with it than Macedonians, they get larger amounts of money on average. With lower consumption, the relative importance of remittances for Albanians is twice as high. Remittances' size and importance do not differ between young and non-young persons, while size is not different for the urban-rural divide either. On the other hand, given the twice as large consumption of rural persons, the relative importance of remittances for them is significantly lower.

**Table 2. Remittances and their shares, by population groups**

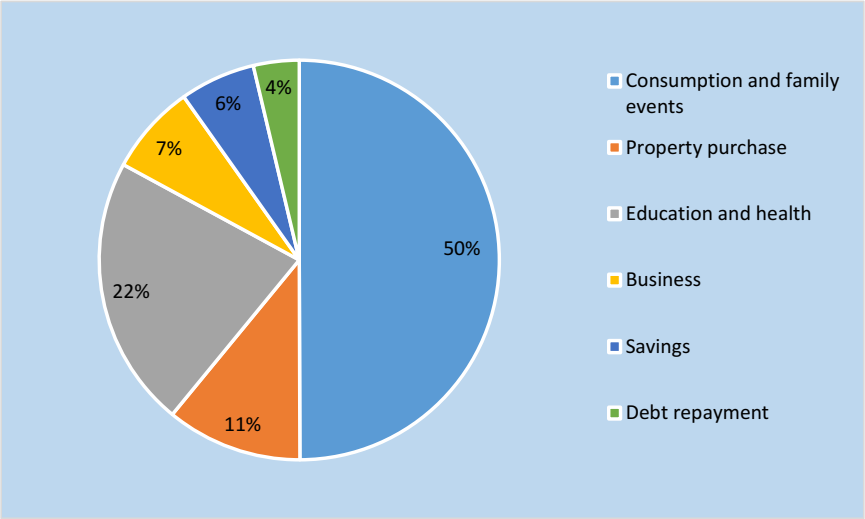
| | Remittances p/m (MKD) | Consumption p/c, p/m (MKD) | Share of remittances in personal consumption (%) |
|---|---|---|---|
| All | 4,737 | 7,278 | 65.1% |
| Males | 5,083 | 6,373 | 79.8% |
| Females | 4,452 | 8,023 | 55.5% |
| Macedonians | 4,141 | 8,281 | 50.0% |
| Albanians | 5,924 | 5,282 | 112.2% |
| Young | 5,092 | 8,100 | 62.9% |
| Non-young | 4,639 | 7,054 | 65.8% |
| Urban | 4,560 | 4,456 | 102.3% |
| Rural | 4,883 | 9,626 | 50.7% |

*Source: Authors' calculations based on DotM Survey*

Given the meagre social indicators in the country – poverty of above 30% and an unemployment rate of 27% - it is not odd that remittances are mainly used for consumption. **Figure 3** reveals that half of the respondents used remitted money for current consumption, while usage to purchase of property, or to cover education and health expenses, account for an additional third. The inclination to do business with the money is negligible, much as is the case for the propensity to use this money to add to savings.

[2] We use dichotomous division on Macedonians and Albanians, as both account for more than 90% of the population in Macedonia.

**Figure 3 – Remittances' utilization**




*Source: Authors' calculations based on DotM Survey*

## 2.3. Social indicators and remittances

The following four indicators are available from our survey: per capita income poverty, health status, housing condition and material deprivation. The first two are at the individual level[3], while the last two are at the household level. The definitions of the indicators are available in Table A.1 in Annex 1**. Table 3** gives the preliminary overview of the social indicators by different groups of the population. An income poverty rate of 31.2% is much in line with the one published by the State Statistical Office of 31.1%. Only 4.4% of the surveyed persons reported bad or very bad health. Also, the percentage of those living in bad housing conditions is fairly low, 18.9%, which is due to the fact that in the old Yugoslav times, one of government's priorities was housing for everybody. Hence, it happens that a household/person lives in poverty, but actually possesses a decent house or apartment inherited from parents and grand-parents. That poverty exists while having decent housing is a reality in Macedonia is observable through the fourth social indicator: material deprivation. More than 40% of the citizens cannot afford holidays and leisure (i.e. their spending on leisure items is below 20% of the total consumption).

[3] Note that it is more conventional for the poverty status to be calculated at the household level. However, we here refer to personal poverty simply because we take the income per capita. This means that any person who is classified as poor based on income per capita is likely to be classified as poor based on household income, although not exclusively.

**Table 3. Social indicators, by population groups**

| | Income poverty | Bad health | Bad housing conditions | Material deprivation |
|---|---|---|---|---|
| All | 30.8% | 4.4% | 18.9% | 57.2% |
| **Males** | 31.5% | 3.2% | 19.2% | 56.8% |
| **Females** | 30.3% | 5.7% | 18.7% | 57.7% |
| **Macedonians** | 32.7% | 5.7% | 16.7% | 63.2% |
| **Albanians** | 27.9% | 2.2% | 22.7% | 47.3% |
| **Young** | 28.9% | 0.2% | 22.8% | 56.1% |
| **Non-young** | 31.5% | 5.8% | 17.7% | 57.4% |
| **Urban** | 31.1% | 4.5% | 7.1% | 55.6% |
| **Rural** | 30.6% | 4.3% | 29.4% | 58.5% |

*Source: DotM Remittances Survey*

Observed by different groups, few notable differences emerge. Males are likely healthier than females. Social indicators differ between Macedonians and Albanians, the latter being less poor, healthier and less materially deprived than the former. There is no clear-cut evidence of why this may be the case, but possible explanations include the fact that Albanians are more frequently included in the informal economy, receive larger and more frequent amounts of remittances, and are known to have a have a more pro-working attitude. Younger citizens are expectedly healthier than the older ones. Social indicators do not differ by geography, except by the housing conditions, which are expectedly worse in the villages.

Overall, as income poverty and material deprivation are pronounced among the four social indicators, and as material deprivation is actually based on income (households who spend less than 20% of their expenditures on leisure items), it appears that in Macedonia, the main determinant of the personal social condition – to the extent in which it is defined here – is income and the associated employment opportunities.

A slightly different picture is obtained when social indicators are portrayed for remittance receivers versus non-receivers (**Table 4**). Overall, receivers' poverty is lower and health is better, but they have worse housing and material conditions than non-receivers. This may be due to the observed fact in Figure 3 where remittances are mainly spent for consumption, driving income poverty down and likely affecting the health condition (which is expressed as a subjective opinion). Important differences among groups may help explaining our findings in later sections. Primarily, male and female receivers are significantly different. Despite being healthier, men are significantly poorer than women receivers and live in worse housing conditions. The pronounced social vulnerability of male receivers may be associated with the fact that female receivers are usually spouses of the male migrant. This implies that the family left behind has a lower number of household members, on average. Meanwhile, in the case of male receivers, it is likely that money is sent by a person who is not a spouse (son, daughter or further

relative), hence reducing the size of remittances which males may receive (the relationship between the male receiver and the remitter may be weaker in such a case compared to when a husband sends money to his wife).

**Table 4. Social indicators of remittance receivers/non-receivers, by groups**

| | Receivers | | | | Non-receivers | | | |
|---|---|---|---|---|---|---|---|---|
| | Income poverty | Bad health | Bad housing conditions | Material deprivation | Income poverty | Bad health | Bad housing conditions | Material deprivation |
| **All** | **23.3%** | **3.1%** | **27.1%** | **61.6%** | **32.4%** | **4.4%** | **18.4%** | **51.6%** |
| **Males** | 37.6% | 1.0% | 36.5% | 56.6% | 32.9% | 3.2% | 18.3% | 51.6% |
| **Females** | 11.5% | 4.8% | 19.5% | 65.7% | 32.0% | 5.7% | 18.5% | 51.6% |
| **Macedonians** | 19.0% | 3.3% | 19.2% | 63.9% | 31.3% | 5.8% | 16.3% | 56.9% |
| **Albanians** | 31.8% | 2.7% | 42.9% | 57.0% | 34.4% | 2.2% | 21.8% | 42.9% |
| **Young** | 24.5% | 0.0% | 41.7% | 77.4% | 33.8% | 0.2% | 21.7% | 51.9% |
| **Non-young** | 23.0% | 3.9% | 23.2% | 57.3% | 32.0% | 5.8% | 17.3% | 51.5% |
| **Urban** | 31.0% | 6.8% | 9.0% | 59.5% | 29.5% | 4.2% | 7.1% | 50.0% |
| **Rural** | 16.9% | 0.0% | 42.2% | 63.4% | 35.1% | 4.6% | 28.8% | 53.1% |

*Source: DotM Remittances Survey*

Macedonian receivers are less poor than Albanian ones, and they live in better housing conditions. The difference in poverty may be associated with the fact that Macedonian receivers are scattered throughout the country, while the majority of Albanian receivers are concentrated in poor remote villages. Rural receivers are significantly less poor than the urban counterparts. They are also healthier, but live in worse housing conditions, which is a reflection of the overall picture in **Table 3**. As a consequence, these stylized facts may drive some of our later results and help in their justification.

## III. Literature review

The theory behind the role of remittances and migration as informal social protection for receivers dates back to the new economics of labour migration (Stark, 1978, 1991). This strand of theoretical underpinnings links the causes and consequences of migration explicitly, so that both positive and negative development effects are possible. In particular, this strand of literature puts the household, not the individual as the decision-making unit with regard to the migration decisions (Taylor, 1999). Hence, if the household is exposed to social risks and income shocks, it will opt for diversification of its labour resources so as to minimize these risks (Stark and Levhari, 1982). This is done by sending a migrant abroad, so that the incidence of income shocks and hence falling into poverty is minimized by diversification of income sources and remittances serve as (informal) social insurance at origin (Lucas and Stark, 1985). Therefore, this approach adds the household-level decisions to the individual-level

decisions, as the latter are mainly driven by the self-interest, i.e. the objective to maximize personal income. Although we deal with individual social indicators, the theoretical background is still applicable in our case: while the decisions to send a migrant and to subsequently share remitted money among household members may be made at the household level, social condition may still have an individual component expressed through income earned by individuals and through their health condition.

At the empirical front, the consumption and investment effects of remittances have been widely investigated. Petreski and Jovanovic (2013) make an extensive reference to this strand of the literature: some papers date back to 1987, like Lucas, while others are quite recent, e.g. Javid et al. (2012), suggesting that the topic of remittances has not lost of its appeal over the decades. However, the potential of remittances to act as informal social protection and insurance mechanisms in a broader sense has rarely been investigated. Mendola (2010) makes a pioneering attempt to investigate a related issue, i.e. how migration affected the informal social networking among remittance receivers, and finds that the latter are more likely to join groups that provide social insurance. Similarly, Gallego and Mendola (2013) find that households with more migrants are less likely to have members associated with informal risk-sharing groups, while households who receive remittances are more likely to have members joining such groups.

In a broader context, the literature acknowledged the exposure of developing-country households to high social risk (Morduch, 1995; Fafchamps, 2005) and that the poorest ones are typically least insured against shocks and a large part of income shocks directly affect their consumption (Ravallion and Jalan, 1999). The incidence of these shocks and their devastating effects for the individuals, households and the society have been important considerations for setting social safety nets or social insurance mechanisms. While some countries practice mutual assistance through groups and networks (see in Mendola, 2010), others, such as Macedonia, devised formal systems for social protection. Social financial assistance, child health care, pensions and other forms of social protection soften the incidence of poverty. The literature on the poverty effect of standard social schemes is vast: Crook (1997); Stigler (1970); Buter and Kondrtatas (1987); Murray (1984); Kenworthy (1998) and the references therein. However, the effects the of the standard social protection schemes for poverty as found in the literature remain divided.

When it comes to linking remittances with the formal social protection, literature is also scarce (Sabates-Wheeler and Waite, 2003). Essentially, the bulk of the literature addresses migration and formal social protection only from the migrants' perspective and the protection options they have in different stages of the migration process. On the other hand, as Sabates-Wheeler and Waite (2003) clearly point out (p.17), migration and hence remittances have only an informal protective role for a migrant's family at origin, if not framed by the government in a specific policy. This is also the highlight of De la Briere et al.'s (1997) models of remittances' role: "…migration may be conceptualized as an informal preventive social protection strategy used by migrant households for insurance and risk diversification" (Sabates-

Wheeler and Waite, 2003, p.19). However, to the best of our knowledge, remittances have not been framed by governments in specific formal social-protection mechanisms.

In conclusion, the literature is rich in investigating the role of formal social protection for poverty and social indicators, but the documented effects have been divided. On the other hand, little has been researched on the effects of remittances for informal social protection. To our knowledge, there has been no study investigating the extent to which migration and remittances serve as informal social protection nor any study to propose and test a formal way in which remittances may shield receivers. This is where this study will position and add to the currently sparse literature.

# IV. Methodology

## 4.1. Theoretical model - the econometric model

As the first objective of the research is to investigate if and how remittances affect individual social indicators, we deal with a latent continuous random variable, y*. However, we observe only binary outcomes, y's, which take a value of 1 or 0, according to whether or not y* crosses a threshold. These are: poverty, health, housing condition and material deprivation. The natural regression model for y* is the index function model (Cameron and Trivedi, 2005):

$$y* = x'\beta + u. \qquad (1)$$

However, this model cannot be estimated as y* is not observed. Instead, we observe:

$$y = \begin{cases} 1 \; if \; y^* > 0 \\ 0 \; if \; y^* \leq 0 \end{cases} \qquad (2)$$

Where the threshold of zero is a normalization explained as follows. Given (2):

$$\begin{aligned} \Pr[y=1 \mid x] &= \Pr[y^*>0] \\ &= \Pr[x'\beta + u > 0] \\ &= \Pr[-u<x'\beta] \\ &= F(x'\beta) \qquad (3) \end{aligned}$$

Where F is the c.d.f. of –u, which equals the c.d.f. of u in the usual case of symmetric density near zero. Given that we have four social indicators, we have the following four equations:

$$\Pr[poor_i] = F_{\varepsilon 1i}(\alpha_{10} + \sum_{j=1}^{k} \beta_{1j} Z_{ij} + \gamma_1 R_i) \qquad (4)$$

$$\Pr(health_i) = F_{\varepsilon 2i}(\alpha_{20} + \sum_{j=1}^{k} \beta_{2j} Z_{ij} + \gamma_2 poor_i) \qquad (5)$$

$$\Pr(house_i) = F_{\varepsilon 3i}(\alpha_{30} + \sum_{j=1}^{k} \beta_{3j} Z_{ij} + \gamma_3 poor_i) \qquad (6)$$

$$\Pr\left(mat_{dep_i}\right) = F_{\varepsilon 4i}(\alpha_{40} + \sum_{j=1}^{k} \beta_{4j} Z_{ij} + \gamma_4 poor_i) \qquad (7)$$

Whereby:

- $\Pr\left(poor_i\right)$ is the probability that person i is in poverty (the poverty threshold is defined as the 60$^{th}$ percentile of the median income);
- $\Pr\left(health_i\right)$ is the probability that a person is in poor health (as health condition is measured from 1 (excellent) to 5 (very poor), the poor health condition takes a value of 1 if answered as poor or very poor);
- $\Pr\left(house_i\right)$ is the probability that the house is in a bad condition (takes value of 1 if at least two of the following prevail: the person lives in rented home, the person lives in one-room home, house material other than bricks; and house has access to less than 2 of 4 public services); and
- $\Pr\left(mat\_dep_i\right)$ is the probability that the household is materially deprived (takes value of 1 if the share of the following items in total consumption is less than 20%: holidays, leisure items, leisure activities);
- $Z_i$ contains a set of explanatory variables;
- $R_i$ is the amount of remittances received by person i.
- $\varepsilon_i$ is the error term which is assumed to be well behaved.

Note that remittances directly affect only income (poverty), while income then affects health, housing and material deprivation.

## 4.2. Empirical considerations

There are a couple of empirical considerations and challenges in estimating the system of four equations from Section 4.1.

*First*, income enters the models only indirectly, through the calculation of the poverty dummy. We have two practical problems with this. First, while this approach may be more suitable to our need, it is less precise in imposing shocks onto the income or remittances. At present, increase in remittances, say, may reduce the probability of a person to fall into poverty, but may actually not change the poverty status. On the other hand, having the income itself in the calculation will reveal how much income changed due to a unitary change of remittances. Second, our survey asks only for the wage income, classified in just a few intervals which means that the actual amount is censored. In addition, no information on other income (pension, social assistance, non-wage income) is available. To overcome both problems, we rely on actual consumption. Taking the consumption for determining the poverty status has another advantage: it is less volatile, less prone to shocks and is not zero, compared to income. A non-zero consumption will also capture the effects of spouse's income onto other non-working members of the household. From that viewpoint, it should be a better approximation of one's welfare than earned income itself.

*Second*, and stemming from the first one, is that the health condition of a person may be actually related to the consumption on health and medicines, rather than to the total consumption. Since this is available in the survey, we split the total consumption between consumption on health and other consumption. In this way, we will be able to allow for remittances to affect both parts of consumption, and for both parts of consumption to affect their health condition. While this adds a sixth equation in the system, hence making estimation more cumbersome, it may be crucial for pursuing our simulation at a later stage.

*Third*, the literature includes a multitude of explanatory variables which in this paper are contained in the vector $Z_i$ (e.g. Funkhouser, 1992, Dermendzieva, 2011). We use three groups of explanatory variables: personal, household and community. Personal variables include gender, age, ethnicity, education level, marriage and labour-market status of the individual; household variables include the number of household members and the dependency ratio; while community variables, being at a regional level[4], control for the region and for the access to financial institutions as measured by the % of branches in total banking sector belonging to the region. Basic descriptions of the variables are provided in Annex 2.

*Fourth and most important*, remittances may be endogenous with respect to income/poverty. This has been extensively argued and documented in Petreski and Jovanovic (2014). If households face credit constraints, poorer households may be less able and more willing to send migrants abroad. If we do not observe all facets of household wealth and personal characteristics, there would be omitted variables correlated with both remittances (which are the 'product' of migration) and income. Hence, remittances would tend to be correlated with the unobserved determinants of income, biasing the potential OLS estimate (Hanson and Woodruff, 2003). Endogeneity stemming from both simultaneity and omitted variables (unobserved variables) is a serious methodological concern.

To overcome the problem, we rely on the instrumental variables approach (Cameron and Trivedi, 2005; Amuedo-Dorantes and Pozo, 2006; Hanson, 2003; Petreski and Jovanovic, 2014; Petreski and Mojsoska, 2014). The chosen instruments need to affect income only through remittances and not directly. To find such, we revert back to the migration literature, considering the availability of data in our case. Following Hildebrandt and McKenzie (2005), we use historic migration rates as instrument for remittances, as they are likely not to affect consumption, apart from their influence through current migration. Migration rates are defined per region. They are obtained from the regional statistics of the State Statistical Office, referring to 2007, the year preceding our survey data and the earliest year for which such statistics exists.

Following these considerations, our estimable model has the following six-stage shape:

$$\text{remit}_i = \alpha_{10} + \sum_{j=1}^{n} \beta_{1j} Z_i + + \sum_{j=1}^{n} \gamma_{1j} instrument_i + \varepsilon_{1i} \qquad (8)$$

[4] Macedonia is statistically divided in eight planning regions.

$$\text{consumption}_i = \alpha_{20} + \sum_{j=1}^{n} \beta_{2j} Z_i + \gamma_2 remit_i + \varepsilon_{2i} \quad (9)$$

$$\text{consumption\_health}_i = \alpha_{30} + \sum_{j=1}^{n} \beta_{3j} Z_i + \gamma_3 remit_i + \varepsilon_{3i} \quad (10)$$

$$\Pr\left(health_i\right) = F_{\varepsilon 4i}(\alpha_{40} + \sum_{j=1}^{k} \beta_{4j} Z_{ij} + \gamma_4 consumption\_health_i) \quad (11)$$

$$\Pr\left(house_{condition_i}\right) = F_{\varepsilon 5i}(\alpha_{50} + \sum_{j=1}^{k} \beta_{5j} Z_{ij} + \gamma_5 consumption_i) \quad (12)$$

$$\Pr\left(mat_{deprivation_i}\right) = F_{\varepsilon 6i}(\alpha_{60} + \sum_{j=1}^{k} \beta_{6j} Z_{ij} + \gamma_6 consumption_i) \quad (13)$$

Whereby: $\text{remit}_i$ stands for the amount of remittances received by individual i, being caused by the observable variables contained in the vector $Z_i$, and the instrument; $\text{consumption}_i$ stands for the total consumption (excluding health consumption) of person i, being caused by the vector $Z_i$ and remittances of the first-stage regression (8); $\text{consumption\_health}_i$ stands for the health consumption of person i, being caused by the vector $Z_i$ and remittances of the first-stage regression (8); $health_i$ is an indicator of the health status of person i being caused by the vector $Z_i$, consumption of the second-stage regression (9) and health consumption of the third-stage equation (10); $house\_condition_i$ is the $i$ and consumption of the second-stage regression (9); and $mat\_deprivationi$ is the share of consumption on leisure and leisure items in total consumption, being caused by the vector $Z_i$ and consumption of the second-stage regression (9). Variables' definitions and sources are available in Table A.1 in Annex 1.

Note that for the remittances variable we exclude the top percentile, as there were few extremely large observations, likely reflecting one-time money sent for a specific purpose (purchase of house, wedding or the like), which may significantly affect our results. Consumption variable is defined per non-dependent member (excluding children and students) and not per household member, so as to approximate the personal income.

## 4.3. Method of estimation

The system of recursive equations (8)-(13) can be best described as a Mixed Structural Equation Model as it relates continuous and categorical dependent variables. It is estimated by maximum likelihood (LIML) through the CMP package developed in Stata (Roodman, 2011). Predicted consumption, that results from equations (9) and (10) allows for the estimation of a poverty status (dummy) through a relative poverty line. Similarly, predicted health, housing and material deprivation are used to estimate the resulting social conditions.

## 4.4. Policy instrument – Remittances' Voucher (RV)

Given the ultimate aim to devise an instrument for converting remittances into a formal social protection devise, in this section we present the design of the instrument: the Remittances' Voucher (RV) policy. The voucher envisages that each individual who is unemployed (and hence has no labour income) and

who receives remittances through official channels, obtains a voucher from the government for the value of the average consumption on health and medicines, conditional on setting 6% of the remitted money into a pension savings account with the third pillar of the pension system (voluntary pension pillar). The average consumption on health in our survey is about 250 MKD, representing slightly more than 5% the average remittance. We believe that this magnitude of the voucher is reasonable given the average per capita spending on health and medicines of about 4% of the average remittance, as per the Household Budget Survey 2013. On the other hand, **Figure 3** revealed that 6% of the remitted money, on average, is saved in Macedonia, so that we decide to operate with this savings rate in the absence of other guidance. The approximated sum of the health component of the RV is assumed to be directly paid by the government on behalf of the voucher holder to the Health Insurance Fund (hence issuing to the holder the right of health protection). While, the pension savings account established by the remitted money would not be possible to be withdrawn until the holder reaches 52 years of age (which is a current condition for the contributors into the third pension pillar).

The RV policy has manifold benefits. For the remittance receivers:

- It provides formal social protection, both health and pension protection;
- It may support receivers' financial literacy, as it is conditional on obtaining the funds through and interacting with a financial institution;
- It supports the indirect inclusion of these people in society, since, as they will have health and pension insurance, they may become eligible for other public or private forms of financing;
- In the long run, it may contribute to a more productive and healthier nation and extend the life expectancy.

For the government:

- It reduces the incidence of social vulnerability and exclusion;
- It may reduce the amount spent on social assistance, given that some receivers of social assistance at the same time receive remittances;
- Despite cost having been generated, it does not require cash payments, but may reduce the pressure for social items in the budget, as it may lead to better targeting of socially vulnerable people.

For the overall economy:

- It gives a more accurate answer to the question of how much money from remittances enters the economy by minimizing the amount sent through informal channels;
- It may increase savings, as money will be transferred in an official way and may steer savings, either into the bank, or into the pension fund over the required minimum;

- It may subsequently increase investment, not only because the intake of savings has increased, but because these people have being more societally integrated, will have decided at one point to invest the accumulated money into their own business and hence secure their self-sufficiency in the medium to long run.

In what follows, we are simulating the short-run effects of such a policy instrument for the social condition of a person.

## 4.5. Simulation

As the second goal of this study is to simulate the effects of the remittances' voucher system on the individual social condition, the system of equations (8)-(13) is now suitable for that purpose. We use an ex-ante simulation method, applying hypothetical shocks. Ex-ante simulation is useful for designing new policy measures and/or assessing their potential impact, and can provide evidence about the range of the potential impact after the program's implementation. It is less expensive than ex-post simulation, and could also help in avoiding implementation of high-cost ineffective programs (Todd and Wolpin, 2010). The ex-ante simulation has been applied in the evaluation of social programs, mainly in the developed countries and not so often in the developing ones. Bolsa Escola in Brasil, Progressa in Mexico and similar cash conditional transfers are all programs evaluated with ex-ante simulation, before their actual implementation. For example, Bourguignon, Ferreira and Leite (2002) simulated the effect of Bolsa Escola and found it would be effective in reducing the number of children who did not attend school, and hence recommended its implementation.[5]

As discussed in Section 4.3, our policy instrument – the Remittances' Voucher – has two components: a voucher enabling health protection of remittance receivers and a pension savings account within the third pillar of the pension system. The simulation exercise will simulate the two effects separately and their combined impact. Before that, we briefly revert back to the literature relating to health and pension systems to poverty.

The literature investigated the impact of formal social protection (health and pension insurance) on poverty and social condition. Poor health triggers poverty. Households just above the poverty line are easily pushed into poverty for even a small amount of expenses on health services. The evidence from South Africa, Kenya and Senegal shows that health expenditures deepen poverty of the already poor from 37% to 41% in South Africa, from 25% to 27% in Kenya and from 54% to 64% in Senegal (WHO, 2006). This confirms the need for a "special" health insurance program, such as Medicaid, which provides health insurance for 54 million vulnerable Americans. Sommers and Oellerich (2013) investigated the impact of this program on poverty alleviation and found it reduces out-of-pocket

[5] On the other hand, there are programs which were evaluated ex-post. For instance, the Oportunidades in Mexico – being similar to our proposed policy in terms of outcomes – has been evaluated as positive for education and health outcomes (e.g. Gertler, 2000); while "Tres por Uno" also in Mexico – being similar to our proposed policy in terms of means – has been evaluated as negative for poverty (e.g. Aparicio and Meseguer, 2012).

medical spending from $871 to $376 per beneficiary, and decreases poverty rates by 1.0% among children, by 2.2% among disabled adults, and by 0.7% among elderly.

Pension plans play a crucial role in securing and improving the living standard of the elderly. The literature concurs that poverty among older people is generally low in countries where a generous pension system exists. In contrast, in countries where old-age pension systems are inexistent or target a low number of people, poverty rates among the elderly are higher. Barrientos (2003) confirms this in his study of the relationship between the non-contributory pensions and poverty in Brazil and South Africa. Results show that the poverty gap would be 40% larger for Brazil and 81% larger for South Africa if pension income is removed and there are no offsetting changes. The indigence gap would be almost three times larger in Brazil, and over a fifth larger in South Africa in similar circumstances. Faye (2007) investigated the role of a basic pension in poverty reduction in Sub-Saharan Africa. Results show dramatic poverty reduction among households with elderly. Namely, an introduction of a pension benefit level equal to the poverty line induces a reduction of the poverty gap and the severity of poverty indices by 39% and 49%, respectively.

Our voucher firstly provides health insurance and it is granted due to the fact that a person has received money from a migrant through a financial institution. This component of the voucher hence does not imply changes in the amount of remitted money, but is rather an assumed cost of the Health Insurance Fund. However, we assume it implies changed level of health consumption, if health consumption is thought of as welfare gained through free-of-charge primary healthcare. Alternatively, we may assume increased welfare since costs for primary healthcare with the voucher will be no longer born by the household/personal budget and hence more money will be available for consumption. Therefore, we impose a shock in the magnitude of an increase of health consumption in (10) equal to the average value of the health consumption (being about 280 MKD per person, per month). As health consumption then feeds the health equation (11) in our system of equations, it is likely that increased health consumption will reduce the probability of entering into an ill condition. Both increased (health) consumption and reduced probability of illness will then improve social conditions. Comparing social conditions in the baseline with the one obtained once the health component of the voucher has been imposed will give a quantitative estimate of the effect of the health component of the voucher.

Secondly, the voucher provides pension insurance, since it is conditioned on setting around 6% of the remitted money into a pension savings account. This component of the voucher implies that both remittances and current consumption will be reduced for that amount, in exchange for the future benefit of the saved money for retirement. Here, we will be simulating only the penalty of the foregone money for consumption now and not the gain of the pension insurance to accrue into the future. Hence, the "savings" component of the voucher has a detrimental short-run effect. With the simulation, we will be imposing a shock onto both remittances and consumption. Comparing social conditions in the baseline with the one obtained once the savings component of the voucher has been imposed will give a quantitative estimate of the effect of the savings component of the voucher.

Finally, in the simulation we combine the two effects. One needs to note that the simulation analysis assumes that the agents (receivers) will not change their behaviour once they receive and 'consume' the voucher. This is, however, a rather restrictive assumption, as the voucher holders may actually change the behaviours in different ways, e.g.: keep the transfers obtained through the bank at the minimum and continue receiving larger shares in an informal way; declaring that an unemployed person of the (broader) family is the receiver instead of the true receiver who would otherwise not qualify for the voucher; reduction of overall savings, rather than increases due to fear of possible taxations of the remittances by the government; reduce other savings by the same amount as the one put into a pension savings account; and so on. As these changing behaviours are not presently modelled/simulated, one needs to be cautious in the interpretation of the results. On the other hand, the social condition is expected to significantly improve in the long run, once benefits of the voucher accrue upon retirement, but the quantification of the long-run effect is beyond this study.

# V. Results and discussion

## 5.1. Results of the system of equations

**Table 5** presents the results of the estimated system of equations (8)-(13). At the top of the table, our main results of interest are shown: the magnitude with which remittances affect consumption and health consumption; the magnitude with which consumption and health consumption affect the health status; and the magnitude with which consumption affects house condition and material deprivation. Some of the results are significant and with plausible signs: an increase of remittances results in an increased overall consumption and health consumption, respectively. In which case, increased health consumption reduces the probability that a person reports a bad health status. Consumption is found insignificant for the housing condition and the material deprivation.

**Table 5. Baseline model**

| Variable | First-stage regression | Second-stage regression | Third-stage regression | Fourth-stage regression | Fifth-stage regression | Sixth-stage regression |
|---|---|---|---|---|---|---|
| | *Dependent: remittances* | *Dependent: consumption (w/o health consumption)* | *Dependent: health consumption* | *Dependent: bad health condition* | *Dependent: bad housing condition* | *Dependent: share of leisure consumption in total cons.* |
| **Remittances received** | | **0.589*** | **0.1851***** | | | |
| **Consumption** | | | | | **0.0001** | **0.0004** |
| **Health consumption** | | | | **-0.0017**** | | |
| | | | | | | |
| **Male** | -3.4702 | -357.568 | 13.4323 | -0.0803 | 0.084 | 0.1281 |
| **Age** | -6.2402 | -70.5187 | 1.0000 | 0.0124 | -0.0372* | -0.0155 |
| **Age squared** | 0.0669 | 0.6206 | -0.0033 | 0.0001 | 0.0003 | 0.0000 |
| **Albanian** | 91.9028 | 1,753.6969*** | 23.3877 | -0.3811 | 0.0859 | 0.9131 |
| **Secondary ed.** | -85.8381 | -6.6417 | -34.8117 | -0.4313*** | -0.5522*** | -0.1288 |
| **Tertiary ed.** | -181.2564** | 1,242.8464*** | 24.1426 | -0.4323* | -0.5497*** | 0.1107 |
| **Married** | 37.9756 | 1,364.4411*** | -1.9445 | 0.0564 | 0.1846 | 0.252 |
| **Employed** | 65.4698 | 178.4416 | -105.5628*** | -0.5255*** | 0.0379 | 0.0399 |
| **Number of members per household** | -73.3048** | -430.5879*** | -36.6856*** | 0.0031 | -0.0318 | 0.2018 |
| **Share of dependents** | 132.886 | 1,348.90 | 267.0074** | 0.0955 | -0.0758 | -1.6895** |
| **Region** | -9.4814 | 268.2759*** | 3.6746 | 0.0231 | -0.0206 | 0.1706*** |
| **Financial institutions per region** | 82.90 | 6,273.3679*** | 363.6793*** | 0.9118** | -0.7029 | 3.2876 |
| **Instruments** | | | | | | |
| ***Migration rate per region*** | 4,991.9427*** | | | | | |
| **Constant** | 399.4179 | 3,127.2085** | 179.8908* | | 0.443 | -1.8750 |
| **Observations** | 3,015 | 3,015 | 3,015 | 3,015 | 3015 | 3,015 |

*Source: Authors' estimates*

*Note: *, ** and *** denote significance at the 10, 5 and 1% level, respectively. Marginal effects reported. Estimates corrected for heteroskedasticity through the feasible GLS procedure (Wooldridge, 2013, p.287).*

The instrument is highly statistically significant and has the expected signs: the migration rate is positively affecting the amount of remittances sent, suggesting that regions which are 'more emptied' with emigration receive larger amount of remittances. In order to test the validity of the instrument in a more rigorous way, we conducted an exercise whereby we instrumented remittances with migration rate in an IV setup, whereby consumption has been the dependent variable, hence ignoring the other equations. The weak identification test produced a Cragg-Donald Wald F statistic of 32.060, while the underidentification test a Kleibergen-Paap rk LM statistic of 46.369, both being above the simple rule of thumb of 10, both suggesting that we have relevant instruments. While our estimation is not entirely comparable to that in the CMP setup, it provides some flavor related to the treatment of endogeneity of remittances.

The other coefficients in the estimated equations largely have the expected signs. Albanian citizens consume more than Macedonians. Secondary-educated individuals have better health than those with only primary schooling. Individuals with higher education consume more, are healthier and have better housing condition than those with primary education. Married persons consume more. Employed persons consume less on health (as they are already entitled to primary healthcare) and are healthier. Additional member of the household reduces consumption (overall and for health) per non-dependent member. More financial institutions per region increase consumption and health consumption.

The coefficients of interest –health consumption in the fourth-stage and remittances in the second and third-stage regressions – are significant and have the expected signs. An additional denar of remittances received increases consumption (except for health) by 0.6 denars and health consumption by 0.2 denars. These magnitudes are expected, given that about 50% of remittances (see **Figure 3**) are currently spent for consumption, reflecting the propensity of this non-earned money to be (easily) spent. Then, an additional denar of health consumption reduces the probability of falling into a bad health by 0.17%. Seemingly, these may look like small coefficients, but given the size of the increase in remittances from the first to the third quartile in their distribution – which is an approximate increase of about 2,000 denars –, then the implied increase in overall consumption is 1,176 denars, and the increase in the health consumption is 370 denars, which then reduces the probability of falling into a bad health by a sizeable 63%.

## 5.2. RV policy – results and cost

Based on the estimated coefficients in **Table 5**, we next simulate the effects of the RV policy described in Section 4. As consumption was found insignificant for the housing condition and the material deprivation, we do not pursue simulations for these social indicators. **Table 6** presents the results.

We separately present the effect of the voucher and savings, which both comprise the two components of the RV policy.

**Table 6. Social effect of the RV policy (receivers only)**

| **Poverty** | **Percentage points** |
|---|---|
| - with voucher only | (1.4) |
| - with saving only | 0.5 |
| - with voucher policy | 0.0 |
| **Bad health** | |
| - with voucher only | (0.5) |
| - with saving only | 6.7 |
| - with voucher policy | (0.2) |

*Source: Authors' calculations.*

The results are appealing: the entitlement to health protection provides remittance-receivers with better health, as the bad health share drops by 0.5 percentage points (p.p), as well better consumption, as the poverty of receivers is also reduced by 1.4 p.p. On the other hand, setting aside a share of the received money for pension insurance reduces current consumption (though not health consumption). A 6% savings was estimated to have a fairly large detrimental effect, as poverty increases by 0.5 p.p. The overall effect of the RV policy is estimated to leave poverty intact, while improving the health condition by 0.2 p.p.[6]

Nevertheless, one could argue that a health insurance equal to the average health consumption may be arbitrary. We therefore produce **Table 7** to obtain the improvement in social indicators given lower/higher values of the RV components. Results suggest that social indicators worsen if the value of the health provision is reduced to 50% of the average health consumption, resulting in decreased welfare. On the other hand, better results are obtained if the value of the voucher increases, hence increasing welfare. However, the objective of this study is not to judge the right value for the voucher, not even for the savings rate, but rather to show one way in which the RV policy may be designed, producing favourable results for the social indicators of the receivers. Arguably, the health results of the RV policy are more sensitive to changing the health provision, rather than to the savings share.

[6] The estimated cost of this design of the RV policy is presented in Annex 3.

**Table 7. Improvements in social indicators under different compositions of the Remittances' Voucher policy**

| | | | *Health insurance provision (% of average consumption for health)* | |
|---|---|---|---|---|
| | | | **50%** | **150%** |
| ***Pension savings provision*** | **4% of remittances** | Income poverty | 0.0 | (1.5) |
| | | Health condition | 0.9 | (1.3) |
| | **8% of remittances** | Income poverty | 0.4 | 0.0 |
| | | Health condition | 1.2 | (1.0) |

Source: Authors' calculations.
Note: A negative value means that the respective indicator declines, which is a positive movement, and vice versa.

## 5.3. Differential effects of RV policy

**Table 8** reports the changes (in percentage points) brought by the RV policy, by gender, age, ethnicity and geography. Results suggest that the design retains income poverty intact, but works mainly through the health component. Expectedly, remittances' effect on health differs among groups. The negative figures suggest that the RV policy would reduce the incidence of bad health by 0.1 p.p. for males, 0.8 p.p. for females and so on. Females, rural inhabitants, young persons and Macedonians would benefit more from the RV policy than their counterparts.

**Table 8. Effect of the RV policy on the social indicators of receivers, by population groups**

| | **Gender** | | **Geography** | | **Age** | | **Ethnicity** | |
|---|---|---|---|---|---|---|---|---|
| | **Males** | **Females** | **Urban** | **Rural** | **Young** | **Non-young** | **Mace-donian** | **Albanian** |
| **Poverty** | | | | | | | | |
| **RV policy effect** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Health condition** | | | | | | | | |
| **RV policy effect** | (0.1) | (0.8) | (0.4) | (0.7) | (1.7) | (0.6) | (0.7) | (0.3) |
| Observations | 62 | 91 | 104 | 49 | 25 | 132 | 115 | 38 |

*Source: Authors' calculations*
*Note: A negative value means that the respective indicator declines, which is a positive movement, and vice versa.*

# VI. Conclusions and policy recommendations

The overarching objective of this study was to convince the policymakers of the benefits of specific policy instrument to convert remittances into a formal social protection instrument in Macedonia. The study had two specific objectives: first, to investigate if and to what extent remittances reduce individual social indicators; and ii) to devise a Remittances' Voucher policy and simulate its effects on social indicators via transforming their potentially sheltering role into a formal mechanism for social protection. To that end, we relied on the DotM 2008 Remittances' Survey and two methods of estimation. First, we used the conditional mixed process estimator to estimate a system of six equations, whereby remittances were purged from their potential endogeneity with respect to income. Migration rates per region were used to instrument remittances. Then, remittances were allowed to determine consumption (its health and remaining component, separately), which in turn determined the health condition of a person. We used this system of six equations to simulate the effect of the Remittances' Voucher policy, as follows. In the second step, we devised the Remittances' Voucher policy providing each unemployed remittance receiver who obtains the money through financial institutions a right of health protection equal to the average health expenditure if he/she sets 6% of the remitted money into a pension account. To pursue a simulation we imposed shocks onto remittances and consumption, and then calculated the effects on social indicators.

We found that remittances significantly contribute to reducing poverty: increasing remittances by about 2,000 denars (going from the first to the third quartile of the remittances distribution) increases consumption by 1,176 denars, and the health consumption by 370 denars, which then reduces the probability of falling into a bad health condition by a sizeable 63%. As this is a rather large impact, it supports our claim that remittances serve as informal social protection in the country. We also found that the Remittances' Voucher policy may play a crucially positive impact on remittance receivers. Health improved by about 0.5 percentage points due to the voucher, on top of the effect of remittances themselves. Then, while the savings component of the Remittances' Voucher produced a fairly large negative impact on income, the overall effect of the policy for the social indicators was positive. The effect has been found to be stronger for female, rural, young and Macedonian receivers. Remittances do not channel into any significant effect for the housing condition and the material deprivation.

Hence, the bold recommendation out of this study is that the government should consider introduction of the Remittances' Voucher policy in the array of social policies as means of framing remittances into more formal social protection.

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# Annexes

## Annex 1. Variables' definitions and sources

**Table A. 1. Variables' definitions and sources**

| Variable | Definition | Source |
|---|---|---|
| Remittances (amount) | Remittances sent from migration in Macedonian denars, per month. Top percentile excluded since it contains only a few extreme observations. | DotM 2008 Survey |
| Consumption | Consumption per non-dependent member, to approximate personal income, in Macedonian denars, per month. Excludes health consumption, as well leisure items. | DotM 2008 Survey |
| Health consumption | Health consumption per non-dependent member, per month, in Macedonian denars. | DotM 2008 Survey |
| Bad health condition | Dummy: 1 = person reported personal health as bad or very bad; 0 = otherwise | DotM 2008 Survey |
| Bad housing condition | Dummy: 1 = if at least one of the following conditions prevails: Person lives in rented home; Person lives in home with only one room; House material other than bricks; House has access to less than 2 out of 4 listed public services; 0 = otherwise | DotM 2008 Survey |
| Material deprivation | Dummy: 1= consumption on leisure items is less or equal to 20% of the total consumption; 0 = otherwise | DotM 2008 Survey |
| Male | Dummy: 1 = male; 0 = female | DotM 2008 Survey |
| Age | Age in years | DotM 2008 Survey |
| Age squared | Age squared | Calculated |
| Albanian | Dummy: 1 = Albanian; 0 = Macedonian | DotM 2008 Survey |
| Primary ed. | Dummy: 1 = uncompleted or completed primary education; 0 = otherwise. Taken as a referent category (omitted) | DotM 2008 Survey |
| Secondary ed. | Dummy: 1 = uncompleted or completed secondary education; 0 = otherwise | DotM 2008 Survey |
| Tertiary ed. | Dummy: 1 = tertiary education or above; 0 = otherwise | DotM 2008 Survey |
| Married | Dummy: 1 = married; 0 = otherwise | DotM 2008 Survey |
| Employed | Dummy: 1 = employed (for wage or self-employed); 0 = otherwise | DotM 2008 Survey |
| Number of members per household | Total number of members of the household | DotM 2008 Survey |
| Share of dependents | Number of dependents (children younger than 18 years of age and students) / Total number of members of the household, expressed as percentage. | Calculated |

| | | |
|---|---|---|
| Region | Ordered variable controlling for each of the eight planning regions in Macedonia | DotM 2008 Survey |
| Financial institutions | Number of financial institutions (tellers) per region | State Statistical Office, Regional Statistics |
| Migration rate | Number of households with emigrated persons divided by the total number of households, per region. The rate refers to 2007. | Regional Statistics, State Statistical Office |

## Annex 2. Descriptive statistics of the variables included

**Table A. 2. All households**

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Male | 3037 | 0.493 | 0.500 | 0 | 1 |
| Age | 3015 | 43.664 | 15.287 | 19 | 93 |
| Age squared | 3015 | 2,140.194 | 1,437.948 | 361 | 8649 |
| Albanian | 3037 | 0.276 | 0.447 | 0 | 1 |
| Primary ed. | 3152 | 0.2553934 | 0.4361513 | 0 | 1 |
| Secondary ed. | 3152 | 0.481 | 0.500 | 0 | 1 |
| Tertiary ed. | 3152 | 0.264 | 0.441 | 0 | 1 |
| Married | 3152 | 0.718 | 0.450 | 0 | 1 |
| Employed | 3152 | 0.471 | 0.499 | 0 | 1 |
| Number of members per household | 3152 | 3.913 | 1.353 | 1 | 10 |
| Share of dependents | 3152 | 0.191 | 0.207 | 0 | 0.75 |
| Region | 3043 | 3.712 | 2.399 | 1 | 8 |
| Migration rate per region | 3152 | 0.050 | 0.035 | 0.024 | 0.113 |
| Remittances (amount) | 3152 | 230.163 | 1,155.735 | 0 | 12,375 |
| Consumption | 3150 | 3,970.912 | 6,796.948 | 0 | 95,778 |
| Health consumption | 3150 | 202.38 | 403.34 | 0 | 8,000 |
| Bad health condition | 3152 | 0.039 | 0.194 | 0 | 1 |
| Bad housing condition | 3152 | 0.143 | 0.350 | 0 | 1 |
| Material deprivation | 3152 | 0.501 | 0.500 | 0 | 1 |

*Source: Authors' calculations based on DotM Survey*

**Table A. 3. Remittance-receiving households**

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Male | 153 | 0.405 | 0.493 | 0 | 1 |
| Age | 151 | 47.013 | 15.463 | 19 | 83 |
| Age squared | 151 | 2,447.768 | 1,521.451 | 361 | 6889 |
| Albanian | 153 | 0.248 | 0.433 | 0 | 1 |
| Primary ed. | 157 | 0.357 | 0.481 | 0 | 1 |
| Secondary ed. | 157 | 0.452 | 0.499 | 0 | 1 |
| Tertiary ed. | 157 | 0.191 | 0.394 | 0 | 1 |
| Married | 157 | 0.739 | 0.441 | 0 | 1 |
| Employed | 157 | 0.452 | 0.499 | 0 | 1 |
| Number of members per household | 157 | 3.280 | 1.423 | 1 | 10 |
| Share of dependents | 157 | 0.203 | 0.254 | 0 | 0.75 |
| Region | 153 | 4.719 | 2.243 | 1 | 8 |
| Migration rate per region | 157 | 0.074 | 0.038 | 0.024 | 0.113 |
| Remittances (amount) | 157 | 4,620.860 | 2,561.455 | 262.5 | 12375 |
| Consumption | 157 | 5,976.679 | 10,031.870 | 0 | 95778 |
| Health consumption | 157 | 330.60 | 470.82 | 0 | 3,200 |
| Bad health condition | 157 | 0.045 | 0.207 | 0 | 1 |
| Bad housing condition | 157 | 0.178 | 0.384 | 0 | 1 |
| Material deprivation | 157 | 0.580 | 0.495 | 0 | 1 |

*Source: Authors' calculations based on DotM Survey*

## Annex 3. Estimated cost of the RV policy

Designed in the way explained in the main part of the paper, the RV policy would generate a cost for the government. Putting the remittance receivers under the health protection umbrella, the government will assume the cost associated to the primary health protection.

**Table A. 4** gives an estimated cost of the RV policy: 0.05% of GDP. The cost is comparable to that of the permanent social assistance and the conditional cash transfers, and far lower than the one associated with the social financial assistance. On top, there are notable advantages of the RV policy. First, its targeted population is more than twice as large than the one of the social assistance. Second, the social assistance is a cash cost, while the RV policy cost is an assumed cost which materializes once the holder of the right to health protection appears in front of a doctor. Third, while we have no data on hand, it is reasonable to assume that some of the remittance receivers are recipients of social assistance. Should they decide to switch to the RV policy, the government expenditure for the social financial assistance will drop. As a consequence, it seems that the effect of the RV policy is much

stronger overall. Note that these estimates assume that all unemployed remittance receivers would opt to be included in the RV policy, which may be a strong assumption.

**Table A. 4. Cost and target comparison of the RV policy versus other social policies**

| Social programs | % of GDP | Targeted persons |
|---|---|---|
| **RV policy** | 0.05% | 88,500 |
| **Social financial assistance** | 0.26% | 35,000 |
| **Permanent social assistance** | 0.07% | 5,800 |
| **Conditional cash transfers** | 0.04% | 9,000 |
| *Source: Authors' estimates (for RV policy); Ministry of Labour and Social Policy (for social assistance); World Bank (for CCT).* | | |

The 'size' of the pension insurance generated by the RV policy seems reasonable compared to what employees presently deposit in the mandatory second-pillar aspect of the pension, as judged by the average deposited monthly amount in **Table A.5:** the savings generated out of remittances are on average one-third of those deposited by employees who are currently in the second pillar. While this finding is plausible, one should further note that the second-pillar pension savings represent only one-third of the overall pension insurance of the employees, while the third-pillar pension account will be the only pension insurance of remittance receivers.

**Table A. 5. Size of the pension insurance created by the RV policy**

| | Second pillar in 2013 (mandatory membership for employed persons) | Third pillar for remittance receivers only (voluntary membership) |
|---|---|---|
| **Number of deponents** | 350,040 | 88,500 |
| **Total deposited amount (as % of GDP)** | 0.86% | 0.05% |
| **Deposited amount per deponent, annual (MKD)** | 11,684 | 2,856 |
| **Deposited amount per deponent, monthly (MKD)** | 974 | 238 |
| *Source: Authors' estimates (for the third pillar) and Agency for Supervision of Fully Funded Pension Insurance (2013)* | | |