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Remittances and Labour Supply Revisited: New Evidence from the Macedonian Behavioural Tax and Benefit Microsimulation Model

Marjan Petreski [‡]

Abstract

The objective of the paper is to revisit the role of remittances for labour-supply responses. Previous studies documented conflicting results, while the key methodological concern – remittances' endogeneity about labour supply – has not been resolved convincingly. We construct behavioural tax and benefit microsimulation model and simulate labour-market responses of singles and couples had remittances not existed in their households. This is a novel methodological approach avoiding the usual trap of utilisation of inappropriate instruments to remittances. Our results suggest that remittances are prevalently associated with lower labour-market activity, especially for women. However, the labour-supply response is found quite feeble and only in single families. Hence, while previous findings are not entirely rebutted, they may have been overstated and are highly dependent on the construct of the receiving household.

Keywords: remittances; labour supply; simulation.

Introduction

Remittances are considered an important source of income for receiving households. They are a non-labour income which either replaces the lost labour income when a member of the household emigrates or reduces the opportunity cost of leisure of the household members left behind, or both (Justino and Shemyakina, 2012). This is the construct of the Neoclassical Model of Labour-Leisure Choice (Killingsworth, 1983). Within this theoretical foundation, remittances could also increase the reservation wage, relax credit constraints and hence result in a reduction of the labour supply by the households. On the other hand, however, remittances may increase non-borrowed liquidity and the tolerance to risk, and hence surge accumulation of capital and investment in micro-businesses (Petreski and Mojsoska-Blazevski, 2015). As a consequence, labour-market decisions of receiving households may favour an increase in labour supply and self-employment.

At the empirical front, a set of studies examine the issue of remittances and labour supply in various countries, applying various methodological constructs. The general observation is that the effect of remittances onto labour-market decisions varies and highly depends on the context in which it happens. An early widely-cited study of Funkhouser (1992), actually, documents that both hypotheses above are valid for the Nicaraguan and Salvadorian cases: namely, the study finds that remittances overall reduce labour-force participation rates, though at the same time they promote self-employment. This finding suggests that, as non-labour income, remittances work as a supplement to household income, providing space for some family members to postpone or part

[‡] Dr Marjan Petreski, Research Vice-Rector, Assoc. Professor of Economics | School of Business Economics and Management, University American College Skopje, III Makedonska Brigada, 60, 1000 Skopje, Macedonia. E-mail: marjan.petreski@uacs.edu.mk.



with their decisions for labour-market participation, while at the same time they ease credit constraints for the household members who would like to commence a business.

The negative effect of remittances on labour supply has been well established in the literature, though with partially peculiar results. Amuedo-Dorantes and Pozo (2006) find that rural women in Mexico reduce their supplied hours on the labour market when they receive remittances, while the effect for men was not established. Similar results were obtained by Acosta (2006) in El Salvador. In a slightly modified methodological framework, Hanson (2007) also finds similar results, though that the negative labour-supply response is stronger for men, himself justifying it with the self-selection of the less-able men not to emigrate. Rudi (2014) documents that the incidence of remittances reduces the probability that the recipient will register as active job seeker in the employment agency of Kosovo, while Dermendzhieva (2010), Kim (2007) and Rodriguez and Tiongson (2001) find that females, when receiving remittances, reduce their labour supply in Albania, Jamaica and the Philippines, respectively. The overall negative result of remittances' receipt on labour supply is further confirmed by Justino and Shemyakina (2012) in Tajikistan and Jadotte and Ramos (2016) in Haiti, though the effect was found stronger for men, further extending the hesitation of Hanson (2007) that self-selection might have worked in a way to contaminate the true effect, or that men reduce their labour supply more than women in anticipation of their near emigration.

Few studies find a positive effect of remittances for labour supply. Sharma and Cardenas (2018), contrary to the earlier Mexican studies, conclude that remittances work positively for labour-force participation in Mexico. Similarly, Binzel and Assaad (2011) find that women in rural Egypt responded to migration by increasing their labour supply, although this occurred by offering more working hours in unpaid and subsistence work. In the same line, the studies of Dermendzhieva (2011) for Armenia, Azerbaijan, and Georgia and Petreski and Mojsoska-Blazevski (2015) for Macedonia corroborate the reducing credit constraints hypothesis and conclude that remittances contributed to the erection of family businesses, hence supporting self-employment.

There is still a third strand of empirical evidence which does not document a statistically significant relationship between remittances and labour-market outcomes. For example, Urama et al. (2017) for Nigeria find no such relationship, despite remittances negatively affected the labour supply of the self-employed in agriculture, teenagers and the elderly. Similarly, Damon (2009) found remittances, contrary to migration status, not to have affected labour allocations in agriculture in El Salvador.

The variety of effects of remittances on labour supply identified in the literature may have been a result of the different contexts in which the relation occurred, or, more probably, because of the underlying methodologies used and their potential flaws. In general, the effect in these studies has been examined in a regression framework whereby labour-market choice is regressed on a set of individual and household characteristics, as well on an indicator of remittances. In some cases, the relationship has been scrutinised in a naïve OLS or fixed-effects framework (e.g. Kim, 2007; Justino and Shemyakina, 2012), or, at best, by applying a propensity score matching (e.g. Urama et al. 2017), which yet compares receiving and non-receiving households based on observable similarities. The key underlying problem is, however, that remittances may be endogenous to labour supply, i.e. households which have more unemployed persons (and hence their household income is low) have higher inclination to send migrant abroad to escape poverty. Unobservable characteristics – like this inclination, then motivation, ability etc. – would plague the relationship between remittances and labour supply. In other words, remittance-receiving households may be (and probably are) systematically different than non-receiving ones, especially in terms of their



earnings potential and hence their labour-outcomes structure. Several instruments have been used throughout the literature: per capita count of Western Union offices (Amuedo-Dorantes and Pozo, 2006; Dermendzieva, 2010), historical emigration rates (Hanson, 2007), the frequency with which the emigrant visits the origin country (Rudi, 2014), size of migration network (Justino and Shemyakina, 2012, in their robustness check), percentage of migrants at the neighbourhood/village level (Binzel and Assaad, 2011), village and household networks (Acosta, 2006), predicted number of migrants per household (Jadotte and Ramos, 2005) and others. However, none has been considered convincingly exogenous, being the key stumbling block in the verification of the causation between remittances and labour-market outcomes. Even in some cases (e.g. Hanson, 2007, and Justino and Shemyakina, 2012), authors themselves tried to explain the unexpected results with the work of unobservables, which is a clear case for inappropriate or insufficient consideration of the underlying endogeneity. Sharma and Cardenas (2018) propose a system-GMM method in a panel context to overcome the problem of finding a strictly exogenous instrument, by relying on past values of remittances as instruments. While such an approach may be statistically correct (and hence confirmed by the respective tests), it does not necessarily eliminate any correlation between the instrument and the outcome variable.

The present paper is the first to overcome this constraint by employing a behavioural tax and benefit microsimulation model to investigate the remittances-labour supply nexus. The microsimulation exercise is applied to Macedonian data. The model simulates households' individual disposable income had remittances not existed and provides it to conditional logit labour-supply function, whereby the labour-supply choice of the individual/couple is predicted based on the utility from marginal income and disutility from marginal work hours. Namely, the problem of remittances endogeneity to labour-supply choices is avoided by comparing receiving households with themselves (instead of with non-receiving ones) in an environment in which the labour-market behaviour of the same households is simulated had they not been recipients of remittances. Recall, the key endogeneity problem in studying the nexus between remittances and labour-market outcomes has been that receiving and non-receiving households may have different observable (e.g. income) and unobservable (e.g. motivation) characteristics correlating with emigration, which then affects the probability to receive remittances. If such unobservables are not appropriately accounted for (e.g. by employing only plausibly exogenous instrument), then the remittance recipient status' influence on the labour-market outcome may be severely plagued. Such simulation has not been done in the remittances literature, and this is the key contribution to the knowledge of the current paper.

The paper is structured as follows. Section 2 presents a brief snapshot of remittances in Macedonia. Section 3 describes the behavioural tax and benefit microsimulation model we use. Section 4 presents the results. Section 5 concludes.

The Macedonian remittances

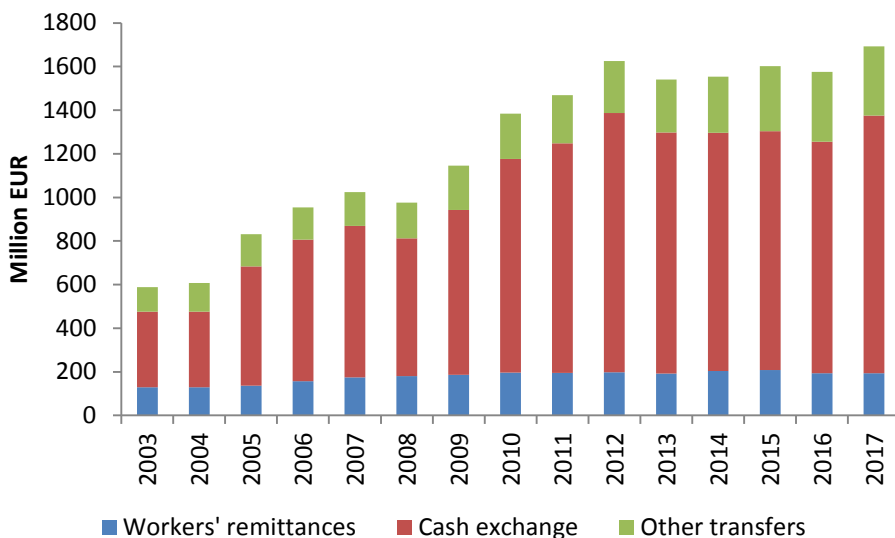
Remittances represent an important income for households in Macedonia and important source of financing the current account deficit - since 2004 they have averaged 4% of GDP, roughly the same as flows from foreign direct investment. Moreover, their upward trend has been maintained; it has been estimated that they amount to about 300 million euro (World Bank data). Petreski et al. (2017) provide forecasts based on a Delphi process and conclude that remittances will further increase, while the number of people departing annually will likely not change.

The measuring of remittances remains a challenge, though. The National bank of Macedonia (NBM) BoP data suggest that the clear distinguishing between the three key components of the



private transfers: workers' remittances, cash exchange stemming from unrecorded export, and exchange of foreign-denominated deposits remains a daunting task. According to this source, the workers' remittances amount to less than 200 million euro per year. "Along with workers' transactions via banks, using these conservative assumptions would tentatively bring the total amount of remittance flows to about 6.5 per cent of GDP, significantly higher than FDI." (IMF, 2014, p.4).

Figure 1 – Private transfers



Source: National Bank of Macedonia.

The microdata on remittances (Remittances Survey 2012) mainly coincide with the official macro data, as can be seen in Table 1. About a fifth of the households in Macedonia receive remittances (Table 2), despite the fact that a larger number (27.2%) reported an emigrant.

Table 1 – Basic facts about the remittance flows

Average amount of remittances per receiving household (euro)	Percentage of households receiving remittances (%)	Estimated amount of total remittances (mil. euro)	World Bank data on total remittances (mil. euro)
2068	20.7	230.6	293.9

Source: Remittances Survey (2012).

Remittances are well known to reduce households' poverty and social vulnerability, through predominantly financing household consumption (Figure 2). This role of remittances for poverty and inequality reduction in Macedonia has been widely documented. For instance, Petreski and Jovanovic (2016) find that remittances improve the standard of living of Macedonian households and reduce economic disparities. In particular, the study finds that remittances reduce poverty by 2-3 percentage points, being similar to the effect of the social assistance.



Table 2 – Households with absent migrant
% of remittances' receiving households

Male-headed	20.6%
Female-headed	21.2%
Total	20.7%

% of households who reported absent migrant

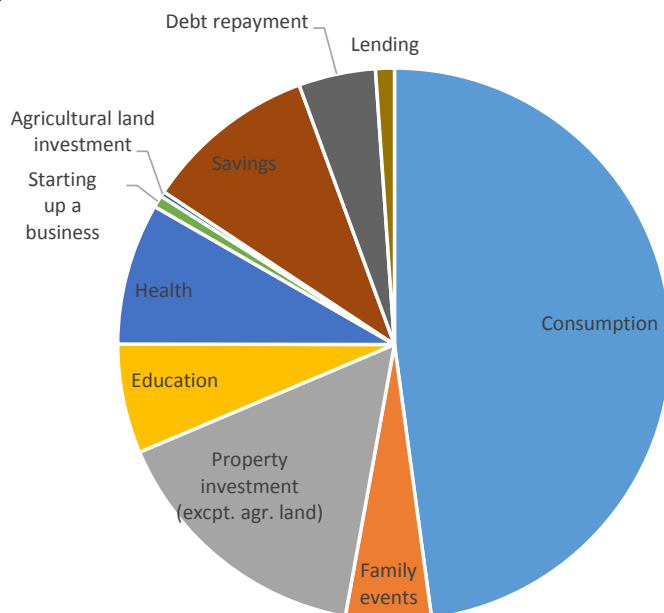
27.3%
26.9%
27.2%

% of hh with migrants not sending money

24.4%
21.4%
23.9%

Source: Remittances Survey (2012).

Figure 2 – Remittances utilization



Source: Remittances Survey (2012).

On the other hand, a negligible share of remittance receivers used the money for starting up a business. The most frequently revealed reason for this has been the small size of the received money per year, while in the rare case where large amounts were received, respondents claimed they lacked any other support for the undertaking, either because venture funding in Macedonia is not available, or because banks usually require large collaterals, while the government does not have specific forms to support erecting businesses through remittances. However, while the labour-market effects of remittances have not been studied rigorously so far, Petreski and Mojsoska-Blazevski (2015) find that youth receivers of remittances are more inclined to use the received money for starting up own business, opposing the general perception that remittances produce labour market inactivity.

Behavioural tax and benefit microsimulation model

Our methodological approach in studying the remittances-labour supply nexus combines a static tax and benefit micro-simulation model and dynamic labour supply model. In the static part, called MK-MOD, individual behaviour (labour-market activity, employment, childcare, saving,



etc.) is assumed to be exogenous to the tax-benefit system. It belongs to the family of “standard” static models where individuals/households choose to supply labour (hours of work) until the point where the “marginal disutility of work equals the marginal utility of disposable (net-of-tax) income.” (Saez, 2010, p.180). In this setting, taxes and social transfers affect labour-market behaviour by changing the relative value of work vs leisure.

The model runs the newly-collected data from the Quality of Life in Macedonia Survey 2017 and allows the simulation of any income the individual or the household receives, ranging from social financial assistance, child benefits, unemployment benefits, direct taxes, social security contributions and remittances. The advantage of the database we use (compared to existing databases from the State Statistical Office) is that it provides detailed data on all income sources, ranging from all types of market-earned income, pension, social benefits (such as the social financial assistance, child allowance, unemployment benefit, financial reimbursement for assistance and care by another persons, etc.), and the remittances the household receives from abroad. In particular, the latter is not present in the standard surveys. Based on the broad availability of incomes, we can simulate direct taxes and social security contributions. While, based on the existing rules for receiving the social-benefits, we can simulate all types of social income. Then, this allows for computation of the disposable household income, replacement rates and effective marginal tax rates. It allows the reproduction of the budget constraint for each household, i.e. the latent set of working hours and household disposable income alternatives

The structural labour supply model we use here, called MK-Labour, is a discrete choice one (van Soest, 1995), appearing in two sub-models: one estimates the preferences for singles and the other one for couples. We reproduce the model used by Mojsoska-Blazevski et al. (2015) and Petreski and Mojsoska-Blazevski (2017). The computation of the model relies on a maximum-likelihood estimation of a conditional logit function. Discrete choice models of labour supply are based on the assumption that a household can choose among a finite number of working hours, as the non-linearity of the budget constraints complicates the task when treating work hours as a continuous choice variable. Each hour corresponds to a given level of disposable income and each discrete bundle of working hours and income provides a different level of utility, the latter being also dependent on a set of household characteristics (mathematic expression of the utility function can be found in Orsini, 2006, p. 9).

For inactive and unemployed workers, the hourly wage is not observed. We first need to construct wage predictions for these categories of individuals. Hence, we rely on the predictions from Heckman’s (1979) selection model for their estimation.¹ The Heckman model is of the standard two-stage form. In the first stage, a probit model regressing the probability of employment on a set of observables (education, age, gender, number of children, marriage and receipt social benefits) is used. In the second stage, self-selection into employment is adjusted by incorporation of the transformation of the predicted individual probabilities of the first stage as an additional explanatory variable. We run a wage equation whereby the logged net hourly wage is regressed on education, age and gender, on which a cross-product of the correlation between unobserved determinants of the propensity to work and the unobserved determinants of wage, and the standard deviation of the shocks onto employment is added. The coefficient obtained on the cross-product is the inverse Mills ratio. The predictions of the latter equation are used to calculate the labour income

¹ The estimation disregards the following groups: non-employed persons under 18 and over 64 years of age, students, pensioners, persons with a disability due to inflexible labour supply; employed with zero wages as these are likely not the result of their human capital, but a specific situation in the labour market; and self-employed due to the different factors affecting their wages.



of the non-employed for the three working time alternatives and the corresponding sets of disposable income.

After we calculate the disposable income for all choices and all individuals, employed and non-employed, the next step is to apply the ML method on a conditional logit function to find out the preference parameters in the utility function.

The assumption is that each individual/partner in a couple may work 0, 20 or 40 hours, corresponding to non-participation, part-time and full-time employment², respectively, leading to three alternatives for singles and nine alternatives for a couple, and providing a triplet of disposable income and working hours of the individual/partner. The choice of the individual/partner is given by $\{h^1, h^2, \dots, h^p\}$, whereby p is the number of choices of the work hours (0, 20, 40). Individuals/partners are assumed to maximise a well-behaved utility function defined over leisure, I , and net-income, y , for time and income constraints:

$$\max U^i(I^i, y^i) \quad \text{s.t. } y^i \leq y^i(I^i, w) \quad \text{and} \quad I^i \leq T, \quad (1)$$

Where i corresponds to a given level of leisure. Hours of leisure, $I^i = T - h^i$, are given by the time endowment, T , minus the work hours h^i . Net income equals labour earnings, wh^i , plus non-labour income, N , plus pensions and social benefits, B , less income taxes and contributions, T (Keane and Moffitt, 1998). On top, we add remittances R :

$$y^i(h^i) = wh^i + N + R(wh^i, N, Z^n) + B(wh^i, N, Z^n) - T(wh^i, N, Z^n), \quad (2)$$

Where Z^n is a vector of demographic variables. Labour income, remittances and social assistance are dependent on the choice of the working hours and the respective wage rates. It is clear that labour income and social assistance depend on wages directly: wages are the labour income itself, while the eligibility and level of the social benefit is directly dependent on the earning of labour income. However, this is not the case of remittances as their receipt is not directly dependent on other income. However, earlier studies (e.g. Amuedo-Dorantes and Pozo, 2006; Hanson and Woodruff, 2003) argued that they may be endogenous to observable and unobservable household characteristics, i.e. that certain households may have higher or lower likelihood to send a migrant abroad, depending on their traits and household circumstances. For example, poorer households (labour plus non-labour income level) may be more inclined but less able to emigrate; or persons with lower education being low wage earners in the domicile country, may be more prone to emigrate, and so on.

The disposable income we use here is the one computed within the MK-MOD. We write the translog utility function as the sum of a systematic part and a random component:

$$U_{ij}(y^i, I^i) = V(y^i, I^i; Z^n, \theta) + \xi^i \quad (3)$$

² Part-time working in Macedonia is not usual: neither employees nor employers are accustomed to ask for/ offer part-time contracts. Hence, the share of those working part-time in all working individuals is only 2.9%. The median hours per week of part-timers is slightly above 20. However, we decide to work with the 0, 20 and 40 hours options.

28% of our working sample are overtime workers, half of which work 48 hours. However, we decide to simulate in our analysis only up to forty hours, because we believe this reporting of overtime work is arbitrary, i.e. respondents mostly referred to 'staying overtime' rather than to 'being paid overtime' and having that embedded into the contract.



Whereby, U_{ij} is the utility of household i making choice j ; y^i , I^i and Z^n are as before; θ is a vector of parameters to be estimated; and ξ^i is a random variable capturing the effect of unobserved variables upon the evaluation of (y^i, I^i) . For a couple, choices $j=0, \dots, J$ correspond to all combinations of the spouses' discrete working hours. In (3), we make the assumption that the utility function has a random component so as to allow for the possibility that individuals/partners may not know their utility levels perfectly, or for the fact that their optimal choice of labour supply may not correspond exactly to the discrete choice we model; it also allows for the fact that the kinks introduced by taxation may generate bunching at levels of labour supply different from those specified by the discrete model that we implement. For the purpose of identification, ξ^i is assumed to be independently and identically distributed as a Type-I extreme value random variate (i.e., the Gumble distribution) (Clevet et al. 2013).

The following estimable model is used:

$$U_{ij} = \alpha_3 + \delta_1 y_i + \delta_2 y_sq_i + \delta_3 (y * secondary)_i + \delta_4 (y * tertiary)_i + \delta_5 (y * age)_i + \delta_6 (y * age_sq)_i + \delta_7 (y * child)_i + \tau_1 h_i + \tau_2 h_sq_i + \tau_3 (h * secondary)_i + \tau_4 (h * tertiary)_i + \tau_5 (h * age)_i + \tau_6 (h * age_sq)_i + \tau_7 (h * child)_i + \tau_8 (i * h)_i + u_i \quad (4)$$

Whereby, U_{ij} is a dummy variable taking a value of 1 when the observed choice of household j equals the assigned choice, and zero otherwise; y_i stands for the disposable income of person i ; $secondary_i$ and $tertiary_i$ are dummies for the level of education (the primary education being the referent category); age_i denotes person's i age in years; age_sq_i is its square to capture wage non-linearity with age; h_i is the hours worked by person i ; $child$ is a dummy for single parent. Note that in the case of couples, y_i represents the disposable household income, $child$ will be a dummy for the joint child(ren) of the couple, while all the other terms enter the regression for the two spouses separately, as well a term for their interacted hours of work. As in Mojsoska-Blazevski et al. (2015) and Petreski and Mojsoska-Blazevski (2017), we estimate the labour supply effects by comparing the predicted probability of each choice under the condition with versus without remittances. Predicted probabilities of the scenarios without remittances are based on the optimal behaviour conditional on the budget constraints with remittances, i.e. the same estimates from the with-remittances conditional logit coefficients, and the new income, from the scenario without remittances.

Such an approach to analysing the remittances' effect on labour-market choices has not been used in the literature so far as discussed earlier. The key advantage of this approach is that it resolves, or circumvents, at best, the problem of remittances' endogeneity with respect to labour supply. The key source of endogeneity is the work of unobservable factors which simultaneously determine remittances' incidence and labour-market choices. The most prominent example is personal ability: abler individuals find it easier to emigrate and to find a job abroad (hence, to subsequently remit money to the household members left behind), as well more eager to supply their labour domestically. This source of endogeneity has been treated – in previous studies – usually by employing various instruments to remittances, most of which could be contested for their external validity, which is a standard content of referee reports. The behavioural tax and benefit microsimulation model circumvents the problem by working with the same set of households and simulating their labour-market behaviour had remittances not existed. Therefore, unobservables are allowed to work in the same manner in both the actual and simulated scenario, as the households are compared to themselves in two – actual and simulated – situations.



Another collateral advantage of such modelling of the remittances-labour supply nexus is the dichotomy between singles and couples, as well between part- and full-time employment. We have firm reasons to consider labour-supply reactions to remittances distinctively in single families than for couple families. In the context of migration, a single-family recipient may usually refer to cases where the male household head emigrated and sends money back to his wife (and children). Couple-family recipients usually signify that the remitter is another relative to the household whose remittances, *inter alia*, may be less frequent, irregular and with potentially lower amounts. In both settings, the labour responses of receivers will be likely different. Similarly, receiving of remittances may not always mean a full withdrawal from employment, especially for women, but rather switching to part-time work. All these considerations have not been at all captured in previous studies.

Results

We turn to discuss results now. We first briefly pay attention to the Heckman and utility function results of the behavioural model, and then we turn to the main results.

Heckman and utility function estimates

We first present the results of the Heckman (wage) equations. All coefficients (



Table 3) have the expected sign. Education pays off, but the effect is stronger for women. Age, on the other hand, matters for men only. The gender wage gap is 10%, suggesting that it shrank compared to previous estimates (Petreski et al. 2014), likely mainly due to the introduction of the minimum wage in 2012. Results are similarly as expected in the selection equation: higher education increases the probability of employment. Older persons do have a higher probability of employment, but up to a certain age after which this probability declines. Males have a higher probability of employment than females. The inverse Mill's ratio (λ) suggests a significant selection bias, i.e. a non-random selection into the labour force, though the coefficient is significant for males only. Unobserved factors that make employment more likely tend to be associated with lower wages for males.

Estimates of the conditional logit utility function are provided in **Table 4**: column (1) presented preferences for singles, while (2)-(4) for couples. The marginal utility for individuals increases with income and reduces with hours of work. Additional income, however, at higher age provides smaller marginal utility. Similarly, the marginal disutility with additional working hour is smaller at higher ages and for tertiary educated individuals.

In the case of couples, the utility is not correlated with household income, especially in the case of men. In the case of women, additional income brings higher marginal utility, but this is taken up by the cross-product of income and education variables since the marginal utility of income is different for females with distinct education. Both secondary and tertiary education bring about fairly higher marginal utility of the earned income than primary education. This finding may be related to the prevalent inactivity of females with primary education, who do not contribute to family income and hence have considerably different utility than higher-educated females who more frequently are in employment.



Table 3 – Heckman results

VARIABLES		ALL	FEMALES	MALES
		(1)	(2)	(3)
Outcome equation (dependent: log of wage)	Secondary education	0.139*	0.429***	0.100
		(0.082)	(0.142)	(0.094)
	Tertiary education	0.409***	0.798***	0.344***
		(0.097)	(0.194)	(0.101)
	Age	0.031***	0.009	0.005***
		(0.010)	(0.015)	(0.002)
	Age squared	-0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	
	Gender (1=male)	0.101***		
		(0.031)		
	Constant	4.005***	3.965***	4.656***
		(0.263)	(0.489)	(0.132)
Selection equation (dependent: probability of employment)	Secondary education	1.418***	1.564***	1.345***
		(0.108)	(0.170)	(0.157)
	Tertiary education	2.281***	2.473***	2.073***
		(0.124)	(0.188)	(0.176)
	Age	0.116***	0.144***	0.117***
		(0.024)	(0.033)	(0.035)
	Age squared	-0.001***	-0.002***	-0.001***
		0.000	0.000	0.000
	If the household has a child aged 3-6	-0.057	-0.288***	0.069
		(0.059)	(0.096)	(0.087)
	If the person has a partner	0.143	-0.204	0.515***
		(0.089)	(0.127)	(0.130)
	The amount of social benefits	-0.031***	-0.032***	-0.025**
	(0.007)	(0.010)	(0.011)	
	Gender (1=male)	0.768***		
		(0.065)		
	Constant	-4.203***	-4.583***	-3.576***
		(0.495)	(0.685)	(0.696)
athrho		-0.416***	0.097	-0.534***
		(0.148)	(0.322)	(0.121)
lnsigma		-0.891***	-1.057***	-0.805***
		(0.037)	(0.043)	(0.039)
Observations		1,942	986	956
Censored N		786	532	254
lambda		-0.16	0.033	-0.22
SE lambda		(0.055)	(0.11)	(0.045)
rho		-0.39	0.096	-0.49
sigma		0.41	0.35	0.45
LR test of indep. eqns. (rho = 0):		7.87	0.09	19.3
Prob > chi2:		0.005	0.76	0.000011

*Source: Author's estimations. *, ** and *** refer to statistical significance at the 10, 5 and 1% level of significance, respectively. Standard errors are robust to heteroskedasticity.*



Table 4 - Utility function

	Singles	Couples	
	(1)	Both (2)	Female (3) Male (4)
Income	0.072*** (0.027)	-0.002 (0.098)	
*Age	-0.003** (0.001)		-0.001 (0.002) 0.001 (0.002)
*Age squared	0.000** (0.000)		
*Secondary education ^(a)	-0.001 (0.007)		0.080*** (0.017) -0.004 (0.033)
*Tertiary education	-0.007 (0.008)		0.055** (0.022) -0.033 (0.035)
*Children ^(b)	0.011 (0.023)	0.001 (0.058)	
Income squared	0.000 (0.000)	0.002* (0.001)	
Hours of work	-0.814*** (0.142)		-0.457*** (0.054) -0.340*** (0.063)
*Age	0.021*** (0.007)		0.001 (0.001) 0.000 (0.001)
*Age squared	-0.000*** (0.000)		
*Secondary education ^(a)	0.051 (0.038)		0.044*** (0.015) 0.021 (0.020)
*Tertiary education	0.095** (0.044)		0.082*** (0.020) 0.072*** (0.025)
*Children ^(b)	-0.035 (0.107)		-0.019 (0.026) 0.004 (0.031)
Hours squared	0.008*** (0.001)		0.009*** (0.001) 0.008*** (0.001)
Male and female hours interaction		0.001** (0.000)	
Income*Hours of work	0.000 (0.000)		-0.002** (0.001) -0.002* (0.001)
N (c)	1,380	5,580	
Pseudo R Square	0.392	0.515	
Wald test: joint significance [Chi2 (16)]	-307.1	1404	
Prob > Chi2	0.000	0.000	

Source: Authors' calculations. Notes: (a) Primary education omitted; (b) Dummy variable for single family with child in the singles case.

On the other hand, hours worked are significant for both males and females in couples. An additional hour of work reduces utility for women more than for men, which could be explained by



the household and child-raising chores of women in patriarchal-minded society. In both cases, additional hour reduces marginal utility, but only up to a certain threshold: 25 hours for women and 21 for men. Longer work reduces marginal utility in smaller portions with the rise of education, the effect being stronger for females.

Labour supply had remittances not existed

Based on the utility function presented in **Table 4**, we calculated the labour-supply responses had remittances not existed in the households. The results for the remittance-receiving families are presented in



Table 5 and **Table 6**: the former gives the ones for singles and the latter for couples. Each table is organized so that the upper panel presents the observed labour-market choice when households dispose of the entire labour and non-labour income, while the lower panel – the simulated choice, i.e. what household would have chosen had they not received remittances.

Results for single families – singles and separated/divorced/widowed spouses – suggest that had remittances not flown into the household, individuals would have opted for increased labour-market activity. Therefore, remittances are found supportive of labour-market inactivity. Two things should be noted from the results in



Table 5. First, the finding is only significant for part-time employment, suggesting that without remittances, individuals would still not prefer full-time employment, but rather working less than 40 hours a week. However, females are an exception: when all females are observed, results suggest they do not react on remittances. On the other hand, females living in poor households react strongly: with remittances, they withdraw from full-time employment. Second, however, labour-market responses to withdrawing remittances from family's disposable income are fairly small in magnitude.

As mentioned in Section 3, this result is the most important one, as singles in remittance-receiving households may usually mean that the key spouse (usually being the male breadwinner) emigrated and remits back to his wife (and children). When men versus women receivers are observed, the significant labour-market response for the former and the insignificant one for the latter, actually corroborates the findings of Justino and Shemyakina (2012), Jadotte and Ramos (2016) and Hanson (2007), who all opted to explain the finding with the potential self-selection of abler men into emigration. We have reasonable grounds to invalidate here their observation (which, in their study, is not econometrically investigated, but rather in a qualitative fashion only), given our methodological construct which is immune to self-selection. On the contrary, however, we document an important result not usually revealed in other studies: individual women in poor households tend to decline their full-time labour supply when they receive remittances. A poor household may imply that work intensity (even before the emigrant departed) was low, or that low wages have been potentially earned given the potentially low-skill endowment. Hence, the opportunity cost of withdrawing from the labour market in these cases is low: the woman decides for labour-market non-participation once the emigrated spouse starts sending remittances which have the potential to be frequent, regular and of amounts commensurate to or even higher than the wage she had been earning before.

Overall, the results for singles document that remittances are associated with a reduction of the labour supply within the receiving households, along the lines of the first strand of literature debated in Section 1.



Table 5 - Labour supply responses for single-family receivers of remittances

	All	Males	Females	Non-poor	Poor	Poor females
Observed choice (actual disposable income)						
Non-participation	59.1%	43.2%	79.3%	12.0%	87.8%	91.7%
Part-time	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Full-time	40.9%	56.8%	20.7%	88.0%	12.2%	8.3%
Simulated choice (disposable income without remittances)						
Non-participation	55.2%**	39.7%**	75.9%	10.4%	82.4%**	87.9%**
Part-time	3.8%**	3.0%**	2.4%	4.0%**	4.1%**	1.7%
Full-time	41.1%	57.3%	21.7%	85.6%	13.4%	10.4%**

*Source: Author's calculations. ** refers to a statistical significance of the difference between the simulated and the observed choice at the 5%.*

When results for couples are considered (**Table 6**), findings alter. Couples do not react to the taking away of remittances, as almost none of the changes is statistically significant. An exception is the case of females in non-poor couples, who reduce their full-time labour supply with remittances. On the other hand, in the case of female spouse in poor households, the prevalent inactivity almost does not move. Recall, couples who receive remittances may be so doing in settings where the remitter is a further relative to the family, implying potentially less frequent and of smaller amounts remittances. This may well explain the general absence of labour-supply responses by the recipient in couples.

Table 6 - Labour supply responses for couple-family receivers of remittances

	All		Non-poor		Poor	
	Male	Female	Male	Female	Male	Female
Observed choice (actual disposable income)						
Non-participation	22.7%	64.0%	5.8%	48.1%	60.9%	100.0%
Part-time	0.0%	1.3%	0.0%	1.9%	0.0%	0.0%
Full-time	77.3%	34.7%	94.2%	50.0%	39.1%	0.0%
Simulated choice (disposable income without remittances)						
Non-participation	22.9%	63.1%	6.3%	46.9%**	60.4%	99.6%
Part-time	0.0%	1.3%	0.0%	1.9%	0.0%	0.0%
Full-time	77.1%	35.6%	93.7%	51.2%**	39.6%	0.4%

*Source: Author's calculations. ** refers to a statistical significance of the difference between the simulated and the observed choice at the 5%.*

The small reactions in the case of single families and the non-reaction in the case of couple families are highly consistent with a recent finding (Mojsoska-Blazevski et al. 2017) whereby remittances were found not to be important for the female labour-market participation in Macedonia. There could be several explanatory factors: i) families receiving remittances and being



also poor may already be recipients of various forms of social assistance; approaching the labour market may mean they could lose this right; ii) females prone to inactivity are overwhelmed with activities around the household and raising of children, hence losing remittances would not immediately mean they are willing and able to approach the labour market; iii) the stereotypes and prejudices that females are born to be housewives are still prevalent in the patriarchal-minded society; and others.

Conclusion

The objective of the paper is to shed new light on the role of remittances for labour-supply responses. The existing literature finds divergent results of how remittances potentially affect labour-supply responses of recipients. Partially, the different findings may be associated with the different contexts in which this nexus occurs, or with the different methodological approaches pursued by the existing corpus of knowledge. In particular, the issue of remittances' endogeneity with regard to labour-market choices has not been resolved convincingly, especially given the major part of the studies work with cross-section data. Variety of instruments has been used, almost all of which could be contested for their external validity.

We consider another approach by utilising behavioural tax and benefit microsimulation model, whereby labour-supply responses of households are observed and simulated for various constructs of the disposable income, and by considering the marginal utilities of the income and the working hours. The advantage of the approach is that it circumvents the problem of endogeneity by comparing the actual labour-market behaviour of households with the simulated one had remittances not existed. Hence, the assumption of identical unobservables between the two groups is satisfied by construct, given households are compared with themselves in a simulated setting. Moreover, distinct from previous studies, the model allowed for separate consideration of singles and couples, and of part- and full-time work.

The key result is that remittances reduce labour-supply only for singles, and particularly for single females living in poor households. These individuals significantly decide to decline their full-time attachment to the labour market once they start receiving remittances. However, the overall response of singles may be considered small. On the other hand, reactions of couples were found insignificant. While being aligned - to an extent - with the strand of literature documenting the negative role of remittances for the labour supply, our results still suggest that previous findings may have been overstated. Namely, remittances' role for spurring labour-market inactivity is not rebutted, but the response may be much smaller than previously thought and highly dependent on the construct of the receiving household.

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