Remittances and subjective well-being: A static and dynamic panel approach to single-item and multi-item measures of happiness

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Abstract

Using all five waves of the National Income Dynamics Study (NIDS) panel dataset, we examine the effect of domestic remittances on the static and dynamic subjective well-being (SWB) of recipient households in South Africa, by using a random effects ordered probit model that accounts for individual heterogeneity. Moreover, we check the robustness of our static model results in two different ways. First, we develop a unique SWB index for South Africa using 10 emotional health questions derived from the NIDS adult questionnaire. In doing so, we attempt to adjust the well-known 12-item General Health Questionnaire (GHQ) to suit the South African framework. Second, we use an instrumental variable for migrants' remittances. Two major empirical findings emerge from this paper: firstly, domestic remittances are consistently found to have a positive and statistically significant impact on both the single-item and multi-item measures of happiness. Moreover, this finding persists in both the static and dynamic models. Second, and in line with Roth (2013), autoregressive SWB functions are regarded as more favourable in comparison to static ones, because omitting the lagged variable of SWB could result in potential biases.

1. Introduction

In many developing countries like South Africa, domestic remittances are a major source of income for poor households and therefore represent an important component of the economy (Posel & Casale, 2006). A number of studies have shown that these remittances not only increase the disposable income and consumption levels of recipient households, but also help reduce poverty, increase long-run economic development and improve overall standards of living by enabling these poor households to invest in better quality healthcare and education (Nicoli, Kachingwe & Kaput, 2018; Biyase, 2012; Rapoport & Docquier, 2006). According to a 2016 report on remittances in South Africa, the total volume of domestic remittances is equivalent to 4 percent of GDP and is estimated to be valued between $11 billion and $13 billion (TechnoServe, 2016). Despite the importance of domestic remittances in South Africa, very few studies have examined their impact on the subjective wellbeing[1] (SWB) of recipient households (see one study by Kruger, 2017).

The main objective of this paper is to examine the effect of domestic remittances on the static and dynamic SWB of recipient households in South Africa using all five waves of the National Income Dynamics Study (NIDS) panel dataset. Currently, there exists a vast amount of international literature exploring the effect of remittances on the SWB of recipient households (see for example Joarder, Harris & Dockery, 2017; Borraz, Pozo & Rossi, 2010; Semyonov & Gorodzeisky, 2008). However, these studies have limitations. First, they simply explore the relationship between total remittances and a static component of SWB. Second, studies examining this relationship within a panel setting are limited. Therefore, the contribution of this paper is threefold. First, we incorporate the dynamic nature of SWB into the empirical analysis to account for the complexities of human behaviour. In doing so, we observe how the SWB of recipient households may influence itself or, put differently, how SWB today might be influenced by SWB in the past. Second, we attempt to address some of the deficiencies associated with cross-sectional data by employing the nationally representative household panel dataset NIDS. Third, we develop a multi-dimensional SWB index

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[1] Consistent with other studies, we use the words 'subjective well-being', 'life satisfaction' and 'happiness' interchangeably.

for South Africa using the well-known 12-item General Health Questionnaire (GHQ)[2] to check the robustness of our results.

The rest of this paper is structured as follows: Section 2 offers a comprehensive review of the literature on the topic. Section 3 presents the methodology. Section 4 describes the dataset and presents descriptive statistics. Section 5 provides the empirical results, and, lastly, Section 6 concludes.

2. Literature Review

The literature on SWB and remittances will be discussed first and thereafter literature on dynamic SWB. Studies on the relationship between SWB and remittances are mainly divided into the analysis of the SWB of migrants themselves (see for example Akay, Guilietti, Robalion & Zimmerman, 2014) or the households that are left behind (see for example Borraz et al., 2010, and Semyonov & Gorodzeisky, 2008). Only one study includes both migrants and their households, when investigating SWB and remittances (Joarder et al., 2017).

Akay et al. (2014) investigated the influence of remittances on the SWB of migrants in China. Data were obtained from the Migrant Household Survey (MHS) component of the Rural to Urban Migration in China (RUMiC) survey. SWB was measured by compiling an index from "12 standard questions of the General Health Questionnaire (GHQ) on mental health" (Akay et al., 2014:521). The descriptive statistics of the analysis showed that there were no significant differences in the average level of SWB between remitters and non-remitters. In this study, the preferred model for the empirical analysis was a linear regression model due to the simplicity of interpreting and comparing results and the similarity of results to ordered probit models. The results from the empirical model show that there is a significant positive relationship between SWB and remittances. According to Akay et al. (2014), this result implies that the value of sending money home is greater than the deficiency in the implied loss of income. Furthermore, the study distinguished between the SWB of migrants with varying levels of family responsibilities. A

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[2] Unfortunately, not all the 12-items used in the standard GHQ were available in the NIDS questionnaire. Therefore, we develop a unique South African SWB index using the available 10-items from NIDS.

stronger relationship was established among migrants with fewer family responsibilities, possibly because these migrants have a choice to remit or not.

Borraz et al. (2010) investigated the SWB of family members of migrants who get left behind in their home city, Cuenca, Ecuador. Data for this research was taken from the Discrimination and Economic Outcomes Survey, which was conducted in Ecuador in 2006 (Borraz et al., 2010:8). The SWB of family members was measured by their responses to one question from the survey regarding their current wellbeing. A propensity score matching technique was incorporated into the study in order to overcome any possible endogeneity flaws. Their research shows that households of migrants exhibit the same levels of happiness as households independent of migration. Borraz et al. (2010) ascribe this trend to the remittances received by family members at home, which neutralises the effect of the migration.

Andersson (2014) examined the effect of remittances on household welfare in Ethiopia. The data for this study were collected from a migration-specific survey administered by the Maastricht Graduate School of Governance (Andersson, 2014). Two measures for household welfare were incorporated: SWB of households and an asset index strategy. The SWB measures were derived from two questions from the survey instrument. The first question was related to the subjective assessment of the household's economic standard of living and the second was a comparison of the household's economic conditions with that of other households in the community (Andersson, 2014). The study incorporated a matching approach (propensity score matching) in order to overcome the weakness of self-selection in the sample data. By making use of this approach, it is possible to compare households that receive remittances with comparable households that do not receive remittances. According to Andersson (2014), the probit models which control for individual and household characteristics show a significant positive effect of remittances on the SWB of households.

Semyonov and Gorodzeisky (2008) examined the relationship between remittances and the economic wellbeing of households in the Philippines. The Population Institute of the University of the Philippines Diliman surveyed households and children of overseas workers during 1999 to 2000 (Semyonov & Gorodzeisky, 2008). The sample was divided into households with and

households without overseas workers, in order to compare the contributions of remittances to the standard of living of households of the two groups. The standard of living was represented by one objective and one subjective indicator. The objective indicator was denoted by an index of the number of household goods that the household owns whereas the subjective indicator was symbolised by the subjective valuation of the household's position in terms of "standard of living and capability to meet daily needs" (Semyonov & Gorodzeisky, 2008:623). Regression analysis was used to determine the outcome of remittances of the two indicators of standard of living. The results show that variances in the standard of living between households with and without overseas workers are accredited to remittances (Semyonov & Gorodzeisky, 2008).

In a recent article by Ivlevs, Nikolova and Graham (2019), a global outlook is given for the relationship between SWB of the family that stays behind and remittances. Ivlevs et al. (2019) made use of the Gallup World Poll data for 114 countries from 2009 to 2011. Four measures of SWB were utilised in the study: one cognitive (evaluative) measure (best possible life) and three hedonic (affective) measures (positive affect, stress and depression). OLS estimations were conducted for the four SWB measures, controlling for standard individual and household properties. The results show that receiving remittances is associated with an increase in evaluative SWB (Ivlevs et al., 2019). It is noteworthy that the study also found that having family members in a foreign country is accompanied by greater stress and depression, which are not counterbalanced by remittances.

In a study of the influence of rural-urban migration on the SWB in South Africa, Mulcahy and Kollamparambil (2016) used instrumental variables and propensity score matching to show that migration harms SWB. The researchers ascribe the negative relationship to "false expectations and changing relative groups used to peg aspirations, as well as the emotional cost of being away from family and a home environment" (Mulcahy & Kollamparambil, 2016:1357). Data were sourced from the Wave 1 and 3 datasets of the National Income Dynamics Survey (NIDS), which was conducted by the South African Labour and Development Research Unit (SALDRU) at the University of Cape Town. The NIDS questionnaire includes a global life satisfaction question, which was used as the dependent variable in this study. Remittances were not included explicitly in the empirical analyses of the study.

Joarder et al. (2017) considered the effect of remittances on the SWB of both the receiving household and the migrant by making use of a matched sample obtained from two survey instruments, the UK/Malaysia Migrant Household Questionnaire and the Households of Origin Questionnaire. The survey was completed by migrants (living in the UK or Malaysia) and their households of origin (Bangladesh). The SWB variable in the ordered probit models was represented by a single-item self-assessed life satisfaction question from the surveys (Joarder et al., 2017). The findings were that remittances by migrants play a substantial positive role in the SWB of both the migrant and the origin household. The next section will discuss the limited literature on dynamic SWB.

The dynamic effect of SWB has mainly been tested on several life-events, such as unemployment, marriage, divorce and having a child. Studies that include the dynamic effect of SWB in standard happiness equations are somewhat scarce in comparison to work done on the determinants of SWB.

Bottan and Truglia (2011) were the first researchers to anticipate that happiness might be autoregressive for individual-level data. They named this channel, where happiness today depends on the level of happiness in the past, the "general habituation" channel. The theory was tested by making use of dynamic and static specifications of happiness regressions, tested on various panel-data sets (German Socio-Economic Panel Study, Japanese Panel Survey of Consumers, British Household Panel Survey and the Swiss Household Panel; Bottan & Truglia, 2011). The results from the models show that the estimates in the dynamic models are not significantly different from the static models (Bottan & Truglia, 2011). Furthermore, the lagged happiness variable in the dynamic specification is statistically significant and positive (Bottan & Truglia, 2011). According to Bottan and Truglia (2011:232), the significance indicates "that happiness is inertial: i.e., ceteris paribus, having greater feelings of happiness in the past directly increases the probability of feeling happy in the present."

According to Roth (2013), models that do not consider the dynamic nature of SWB might result in biased results. The study made use of panel data from waves 8 to 18 of the British Household

Panel Survey for the dynamic panel specification of SWB (Roth, 2013). Two measures were utilised to represent SWB in the study: a single-item scale (a self-assessed life satisfaction question) and a multi-item scale (12-question General Health Questionnaire). The results showed that SWB is autoregressive and persistent for both measures of SWB (Roth, 2013). According to Roth (2013:11), "There is an unspecific persistence effect that makes people with currently high SWB likely to exhibit high SWB tomorrow".

3. Methodology

The random effects ordered probit model was used in this study. The ordered probit model takes the ordinal nature of the SWB variable into account and the random effects account for an additional normally distributed cross-section error term. The model was be specified as follows (adapted from Long & Freese, 2006 and Ferrer-i-Carbonell & Frijters, 2004):

$$y_{it}^* = x_{it}\beta + \varepsilon_{it} \tag{1}$$

y_{it}^* is the unobserved 10-point latent variable that signifies the ordinal SWB of household i at year t and x_{it} is a vector of the determinants of SWB (as identified by other studies on the subject, including remittances). β is a vector of unknown parameters. The error term ε_{it} has the following combined nature (Ferrer-i-Carbonell & Frijters, 2004):

$$\varepsilon_{it} = v_i + \eta_{it} \tag{2}$$

v_i represents unobserved, time-invariant individual-specific heterogeneity and η_{it} is the white-noise error term. According to Ferrer-i-Carbonell and Frijters (2004:649), v_i and η_{it} are "both normally distributed, orthogonal to each other and both orthogonal to observed characteristics x_{it}."

The unobserved latent variable y_{it}^* is related to the observed variable y_{it} as follows (Long & Freese, 2006):

$$y_{it} = \begin{cases} 1 \ if \ y_{it}^* < \tau_1 \\ 2 \ if \ \tau_1 \leq y_{it}^* < \tau_2 \\ 3 \ if \ \tau_2 \leq y_{it}^* < \tau_3 \\ 4 \ if \ \tau_3 \leq y_{it}^* < \tau_4 \\ 5 \ if \ \tau_4 \leq y_{it}^* < \tau_5 \\ 6 \ if \ \tau_5 \leq y_{it}^* < \tau_6 \\ 7 \ if \ \tau_6 \leq y_{it}^* < \tau_7 \\ 8 \ if \ \tau_7 \leq y_{it}^* < \tau_8 \\ 9 \ if \ \tau_8 \leq y_{it}^* < \tau_9 \\ 10 \ if \ y_{it}^* \geq \tau_9 \end{cases} \tag{3}$$

Where the τ's represents cut points.

The random effects ordered probit model was used for the single-item measure of SWB in a static as well as dynamic panel model setting. Other models that served as robustness checks in the paper included a least squares dummy variable (LSDV) model for the multi-item index of SWB and a fixed-effects instrumental variable (IV) model for the single-item measure of SWB.

## 4. Data and Summary Statistics

As noted in the introduction, this paper uses data from the 2008 through to the 2017 NIDS waves to investigate the effect of remittances on static and dynamic SWB. The NIDS is a nationally representative panel study conducted by SALDRU biennially since 2008. The NIDS survey gathers useful information regarding individuals and households, such as employment, household size, remittances, income, gender, age and other related socio-economic and demographic information. The NIDS was particularly valuable for our paper as it monitors and tracks changes in subjective wellbeing, health and other related aspects of an individual's wellbeing over time. Two measures were used to represent SWB in the study. The first was a single-item, self-assessed life satisfaction question (similar to the one used in the study by Joarder et al., 2017). The second measure (which was used as a robustness check) was similar to the index used by Akay et al. (2014) and Roth (2013) where standard general health questions were combined to form a multi-item SWB index. The first SWB measure is based on the following question, which was posed to NIDS survey respondents (NIDS, 2008): "Using a scale of 1 to 20 where 1 means "very dissatisfied" and 10 means "very satisfied", how do you feel about your life as a whole right now?"

In addition to the dependent variables – multi-item index of SWB and single-item measure of SWB – we used several control variables (see Table 1) in our econometric analysis. We use as independent variables several factors identified in the literature as important determinants: socio-economic variables (including, respondents' health status, years of education, marital status, race dummies, province dummies, employment status, household size, religious affiliation, and province dummies). Figure 1 displays the responses to this question among the remittance-recipient households and non-receiving household's samples. A quick glance at the two distributions does not reveal any discernible differences in the average level of wellbeing between the two groups; the modal level of reported satisfaction is 5. The similarities in the distribution across the remittance-receiving and non-receiving households remain, even when comparing the satisfaction level to ten years ago (as can be seen in Figure 1A in the Appendix). Unsurprisingly, Figure 2, a scatterplot of the relationship between SWB and remittances, suggests a positive relationship between these variables.

**TABLE 1: Description of dependent and independent variables**

Variables	Type	Description
Dependent variable		
Life Satisfaction (LS)	Continuous	LS is rated on a scale of 1-10, where 1 is very dissatisfied and 10 is very satisfied
Multi-item SWB index	Continuous	Includes scores of the 10 emotional health questions in the NIDS adult questionnaire
Explanatory variables		
Marital status	Dummy	1 = if married/living with partner, 0 = Otherwise
Age	Continuous	Age in years
Age-SQ	Continuous	Age squared
Remittances	Continuous	Amount of remittances received
HH-size	Continuous	Number of members in household
Education	Continuous	Education in years
Africans	Dummy	1 = Africans, 0 = Otherwise
Coloured	Dummy	1 = Coloured, 0 = Otherwise
Indian	Dummy	1 = Indian, 0 = Otherwise
White	Dummy	1 = White, 0 = Otherwise
Rel-affiliation	Discrete	Whether the individual is affiliated to any religion: 1 if affiliated, 0 = Otherwise
Health status	Discrete	1=if excellent or very good, 0 = Otherwise
Gender	Dummy	1 = Female, 0 = Otherwise
Employment status	Dummy	1= Employed, 0 = Otherwise
Traditional areas	Dummy	Household in traditional areas
Urban	Dummy	Household in urban areas
Farm	Dummy	Household in farm areas
Eastern Cape	Dummy	Household in Eastern Cape
Northern Cape	Dummy	Household in Northern Cape
Free State	Dummy	Household in Free State
KwaZulu-Natal	Dummy	Household in KwaZulu-Natal
North West	Dummy	Household in North West
Gauteng	Dummy	Household in Gauteng
Mpumalanga	Dummy	Household in Mpumalanga
Limpopo	Dummy	Household in Limpopo

Source: NIDS data
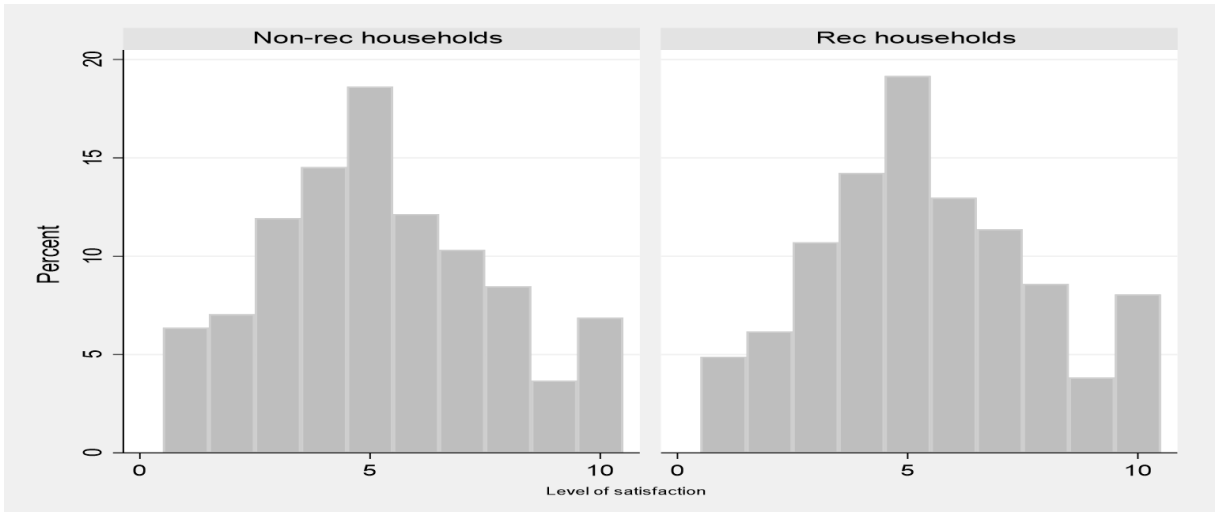
Source: Authors estimations based on NIDS data (Wave 1, 2, 3, 4, 5)

Figure 1: Satisfaction level among receiving and non-receiving households, 2008-2017
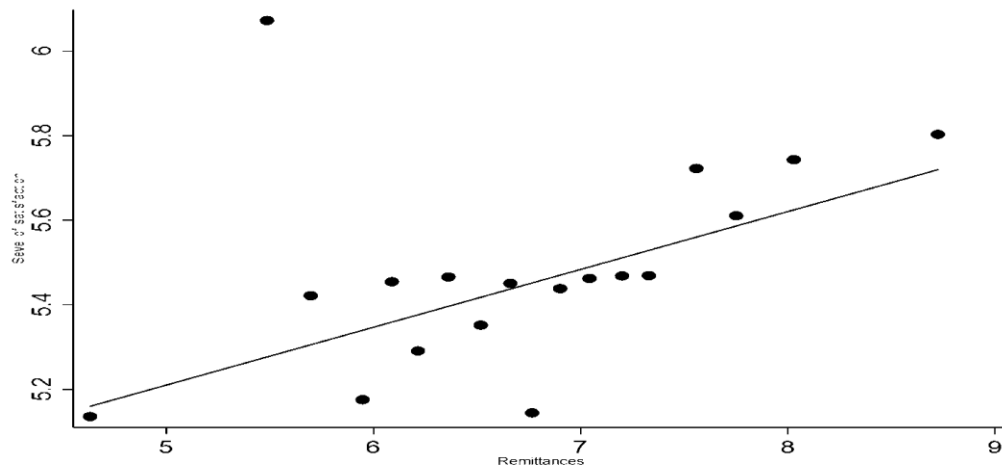
Source: Authors estimations based on NIDS data (Wave 1, 2, 3, 4, 5)

Figure 2: Satisfaction level and remittances for receiving households, 2008-2017

Table 2 presents the summary statistics of the key variables used in the empirical analysis for the entire sample. The mean age of respondents surveyed in NIDS is 24 years and the average years of schooling is 12. Moreover, the average household consists of six members and the mean remittance is seven. In line with the findings from Figure 1, the mean life satisfaction score is 5.

This is consistent with other South African studies on SWB (Blaauw & Pretorius, 2013; Ebrahim, Botha & Snowball, 2013).

Table 2: Summary statistics of analysis variables

Variable	Mean	Std. Dev.	Min	Max
Level of satisfaction	5.438813	2.384456	1	10
Remittances	6.67283	1.041755	0	11.8
Education years	11.96687	8.064058	0	32
HH-size	6.349578	3.757422	1	30
Age	23.73908	19.63018	0	108
Christian	0.8104506	0.391956	0	1
Jewish	0.0024548	0.049487	0	1
Muslim	0.00339	0.058127	0	1
Hindu	0.0039745	0.06292	0	1
African spir. beliefs	0.0932258	0.290757	0	1
Living with partner	0.0452446	0.207846	0	1
Widow/Widower	0.0885602	0.284116	0	1
Divorced	0.02233	0.147759	0	1
Never married	0.6481557	0.47756	0	1
Very good health	0.2911333	0.454298	0	1
Good health	0.2668186	0.44231	0	1
Fair health	0.0934011	0.291002	0	1
Poor health	0.0383424	0.192027	0	1
Employed	0.2871125	0.452428	0	1
Female	0.5817794	0.493275	0	1
Coloured	0.0941819	0.292087	0	1
Asian/Indian	0.0060176	0.077341	0	1
White	0.0116153	0.107148	0	1
Urban	0.4258475	0.49448	0	1
Farm	0.042088	0.200793	0	1

Source: Authors' estimation based on NIDS data (Wave 1, 2, 3, 4, 5)

5. Empirical Results

Table 3 presents the results of the random effects ordered probit model for the effect of remittances on the single-item measure of SWB and is divided into two columns. The first column presents the results for the static model, while the second column for the dynamic model. The dynamic model differs from the static model in that, in addition to the usual explanatory variables, we included the lag of the dependent variable (*LS_1*) as an additional independent variable in the

empirical analysis. The results from the static model are in line with our expectations and consistent with existing South African literature; most coefficients are statistically significant and hold their anticipated signs. For example, the relationship between age and SWB is U-shaped. This is a well-known finding in the literature (Blanchflower & Oswald, 2008, 2004; Clark & Oswald, 2006; Winkelmann & Winkelmann, 1998). Moreover, a number of additional demographic and socio-economic variables appear to be significant predictors of SWB (such as the respondent's household size, religious affiliation, marital status, perceived health status, employment, race, geo-type and provincial location). Unsurprisingly, the effect of domestic remittances is positive and statistically significant at a 1 percent level of significance, implying that remittances significantly improve the SWB of recipient households. This corresponds to the finding of Akay et al. (2014) and suggests that the drawbacks of not having these migrant workers at home are outweighed by the remittances that the migrants pay to whoever gets left behind. A surprising finding is that of the gender coefficient, which appears to be positive though statistically insignificant in the static model, but significant in the dynamic model. Contrary to domestic studies by Blaauw and Pretorius (2013) and Posel and Casale (2015), this suggests that, once the panel and dynamic nature of SWB are accounted for, females report higher levels of SWB as compared to their male counterparts. However, it is true in most instances that male migrants leave their households to work elsewhere and hence our sample is somewhat biased because it contains a larger representation of females. However, such a finding is relatively common in international studies on gender and happiness (Senik, 2016; Graham & Chattopadhyay, 2013; Blanchflower & Oswald, 2004).

The results from the dynamic model show that the explanatory variable capturing the dynamic nature of SWB is positive and significant at a 1 percent level of confidence, confirming the fact that SWB today is significantly influenced by SWB in the past. This finding is in line with Roth (2013), who argued that human decisions are driven by factors including SWB, and which themselves influence one's SWB. Hence, an autoregressive SWB function is "more evolutionarily efficient than a static one" which is likely to result in omitted-variable bias (Roth, 2013:10). Consistent with the static model results, the coefficient of remittances is positive and significant, illustrating its robust positive influence on the SWB of recipient households.

Moreover, most covariates in the dynamic model hold the same sign as in the static model, except for one location dummy which turned positive and remained insignificant (North West). Notably, several explanatory variables became insignificant (such as marital status, Eastern Cape and Limpopo) or less significant in the dynamic model (such as household size, religious affiliation, households residing in farm areas, and households located in KwaZulu-Natal). This suggests that by disregarding the dynamic nature of SWB, the static model may be overcompensating (at least to some extent) by placing a larger weight or significance on additional explanatory variables that are considered insignificant in a dynamic panel setting. In summary, this means that the dynamic panel model is more accurate in its ability to capture the complete picture regarding the happiness of recipient households.

Table 3: Random effects ordered probit estimates of the effect of remittances on SWB (SWB level)

Variables	STATIC MODEL			DYNAMIC MODEL		
	Coef.	Std. Err.	T-stat	Coef.	Std. Err.	T-stat
Remittances	0.0825205	0.009884	***	0.0451634	0.011917	***
Education	0.0026013	0.002045		0.0024064	0.002208	
HH-size	0.0142899	0.003131	***	0.0093378	0.003435	**
Age	-0.0375013	0.00344	***	-0.0230655	0.004051	***
Age-SQ	0.0003989	0.000038	***	0.0002547	4.38E-05	***
Rel-affiliation	0.1433989	0.037037	***	0.1088488	0.044464	**
Married	0.1016976	0.031166	***	0.0384888	0.033355	
Very good health	0.1050005	0.022949	***	0.1295964	0.027463	***
Employed	0.1726377	0.024645	***	0.1683354	0.028006	***
Female	0.0365759	0.02441		0.0560217	0.027107	**
Coloured	0.5625845	0.051867	***	0.2712617	0.059057	***
Asian/Indian	0.8309136	0.144569	***	0.4658964	0.157151	***
White	0.833427	0.103667	***	0.3716021	0.123633	***
Urban	0.1167266	0.030503	***	0.1240396	0.034136	***
Farm	0.1644368	0.057073	**	0.1271432	0.064854	*
Eastern Cape	-0.2901737	0.060669	***	-0.0933213	0.069463	
Northern Cape	-0.2679262	0.059958	***	-0.2319116	0.066092	***
Free State	0.0424062	0.065722		0.0483878	0.072284	
KwaZulu-Natal	-0.2678134	0.058036	***	-0.1491915	0.0659	**
North West	-0.0253113	0.070098		0.0719476	0.077817	
Gauteng	-0.3321193	0.060434	***	-0.2735086	0.067536	***
Mpumalanga	-0.3972217	0.066075	***	-0.3883696	0.074123	***
Limpopo	-0.1682829	0.064238	***	-0.0074084	0.072219	
LS-1				0.2197715	0.005445	***
/cut1	-2.100002	0.11526		-0.9534863	0.1397	
/cut2	-1.542164	0.113608		-0.3619509	0.137281	
/cut3	-0.9635064	0.112638		0.2010516	0.136215	
/cut4	-0.4071786	0.112177		0.7464131	0.13594	
/cut5	0.2387057	0.112064		1.3812	0.136314	
/cut6	0.6940727	0.112237		1.834744	0.137006	
/cut7	1.167048	0.112643		2.322185	0.138161	
/cut8	1.642646	0.113354		2.80738	0.139795	
/cut9	1.934586	0.114		3.104611	0.141065	
Log likelihood	-33111			-19413		
Observation	15,418			9,432		

Source: Authors' estimation based on NIDS data

Notes: Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

In order to check the reliability of our random effects ordered probit model results, we conducted robustness checks. First, we used a different measure of SWB to see whether the two static models are consistent. In particular, we then used a multi-item index of SWB as our dependent variable. Second, we used an instrumental variable for the migrant's remittances. Table 4 presents the

robustness results for the effect of remittances on the SWB of recipient households. Column 2 contains the LSDV model estimates using the multi-item index[3] of SWB and column 3 contains the fixed effects IV model estimates using the single-item measure of SWB (ie, SWB level). The LSDV method is advantageous as it allows us to retain the effect of time-invariant variables (such as gender and race) within a panel setting.

Surprisingly, only a handful of explanatory variables shared the same sign and level of significance in both the fixed effects IV and LSDV models (including remittances, age, age squared, employed, Coloured and Gauteng). This finding highlights the importance of conducting such robustness checks in happiness research and also reveals the difficulties that are associated with trying to estimate or model subjective wellbeing (which is highly subjective from one person to another). Nevertheless, the results are meaningful and find a consistently positive and significant impact of remittances on both the single-item and multi-item measure of happiness. This confirms and accentuates the importance of domestic remittances in South Africa, as they are consistently found to be a key predictor in the happiness of recipient households, irrespective of the econometric model used.

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3 The SWB index was calculated using the principle component method.

Table 4: Robustness results of the effect of remittances on SWB

Variables	LSDV ESTIMATES (SWB-INDEX)			FIXED EFFECTS- IV ESTIMATES (SWB LEVEL)		
	Coef.	Std. Err.	T-stat	Coef.	Std. Err.	T-stat
Remittances	0.031431	0.0073774	***	0.882085	0.2616949	***
Education	0.000983	0.0014037		-0.00585	0.0086037	
HH-size	0.002401	0.0021245		-0.00884	0.0152107	
Age	-0.01458	0.0023371	***	-0.08277	0.0155039	***
Age-SQ	0.00013	0.0000259	***	0.000918	0.0001722	***
Rel-affiliation	0.16446	0.0276289	***	0.418631	0.172201	**
Married	0.040967	0.0215691		0.110477	0.1376918	
Very good health	0.136456	0.0170859	***	0.179433	0.1060671	
Employed	0.079632	0.0180669	***	0.534256	0.1217896	***
Female	0.01821	0.016285		0.12006	0.1095098	
Coloured	0.323729	0.0347906	***	1.154903	0.2593654	***
Asian/Indian	0.47202	0.0897318	***	1.228626	0.6885396	
White	0.337469	0.0631275	***	1.169333	0.7354647	
Urban	0.025174	0.0208389		0.530516	0.1343069	***
Farm	0.060497	0.0402247		0.874202	0.2975728	***
Eastern Cape	-0.03843	0.0416215		-0.27144	0.3062898	
Northern Cape	0.22946	0.0401224	***	-0.90623	0.318971	***
Free State	0.331141	0.0443201	***	0.001643	0.3241132	
KwaZulu-Natal	-0.030122	0.0392655		-0.58483	0.295926	*
North West	-0.274463	0.047075	***	0.23479	0.3397369	
Gauteng	-0.152917	0.040999	***	-1.10037	0.3146987	***
Mpumalanga	-0.26431	0.0449315	***	-0.64959	0.316119	*
Limpopo	-0.419613	0.0435449	***	-0.1295	0.3173329	
Cragg-Donald Wald F statistic				106.03		
Chi-sq(1) Pval=				0.0000		
Number of observations				15,783		

Source: Authors' estimation based on NIDS data

Notes: Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Conclusion

This paper aimed to contribute to a growing body of knowledge investigating the relationship between remittance/migration and SWB in South Africa. Existing studies appear to have leaned heavily on static analysis, overlooking the conceivable dynamic effect of SWB (autoregressive nature of the SWB). Given this gap, our paper attempted to establish whether the estimated coefficients are sensitive to model specification (ie, using a dynamic model alters the estimates). To the best of our knowledge, this is the first paper to investigate this relationship in South Africa. The random effects ordered probit model was used for the single-item measure of SWB in a static

as well as a dynamic panel model setting. To assess the robustness of our findings we employed a LSDV model for the multi-item index of SWB, as well as a fixed effects IV model for the single-item measure of SWB.

Perhaps, reassuringly the results from the static model are in line with our expectations and consistent with existing South African literature; most coefficients are statistically significant and hold their anticipated signs. Our variable of interest (domestic remittances) is positive and statistically significant at a 1 percent level of significance, suggesting that remittances significantly improve the SWB of recipient households. The coefficient on lagged SWB (derived from the dynamic model) is found to be positive and statistically significant, confirming that SWB today is significantly influenced by SWB in the past. This finding is in line with Roth (2013), who argued that human decisions are determined by factors including SWB, and which themselves influence one's SWB. Hence, an autoregressive SWB function is "more evolutionarily efficient than a static one" which is likely to result in omitted variable bias (Roth, 2013:10). Our results are also robust to various model specifications: we found a strongly positive relationship between remittances and SWB, which holds even after controlling for all the covariates. The policy implication that seems to emerge from this analysis is that SWB should be treated as an important indicator of living conditions of those left behind (see Wunder et al., 2013).

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Appendix A

Figure 1A: Satisfaction level compared to 10 years ago: receiving and non-receiving households, 2008-2017