

The time pattern of remittances and the decay hypothesis: Evidence from migrants in South Africa

DANIEL MAKINA*
ANDRIES MASENGE[^]

Abstract

Using a dataset of migrants who migrated to South Africa over the period 1979-2007, we investigate the time pattern of remittances and the determinants of remittances. We find that the level of remittances first increases with the time spent in the host country and later on declines after an estimated 8 years of migration experience and thus exhibiting an inverted-U pattern over time. This finding lends support to the remittance decay hypothesis. We also find the level of remittances to be significantly positively related to the number of dependents in the home country, legal status, access to banking, income and savings levels, and negatively related to the education level, return intentions, frequency of home visits and economic and political reasons for migrating. Furthermore, the level of remittances is observed to exhibit an inverted U-profile with the age of the migrant, that is, it first rises in early age and falls in old age. The remittance decay phenomenon is seen to stem from a mixture of the theories of altruism and the informal loan repayment alluded to in the literature.

Keywords: migration hump; migrant remittances; remittance decay; South Africa; Zimbabwe.

Introduction

Historically, migration patterns have been observed to change over time in response to globalization and economic development. For instance, in the aftermath of the 19th century industrial revolution in Europe, there was significant European migration to America. The migration flows eventually subsided as incomes rose in Europe as per prediction of the migration hump theory postulated by Martin (1993) and Martin and Taylor (1996). The migration hump theory predicts that an increase in wealth would initially raise emigration levels as travel becomes more affordable. Then over time as the labour factor price in the home and destination countries converge as a consequence of economic growth in the home country, emigration follows a downward trend creating a hump-shaped or an inverted “U” pattern. A hump occurs at some critical level of income during later stages of development, after which emigration countries tend to transform from being net labour exporters to net

* Daniel Makina is Professor in Finance at University of South Africa, South Africa. E-mail: makind@unisa.ac.za.

[^] Andries Masenge is Senior Research Data Analyst at University of South Africa, South Africa. E-mail: masena@unisa.ac.za.



labour importers. In recent decades de Haas (2008, p. 16) reports that this has happened with countries as diverse as Spain, Italy, Greece, Ireland, Malaysia, Taiwan and South Korea, which used to be located on global “labour frontiers”.

A corollary of the migrant hump theory is the remittance decay hypothesis which suggests that the length of stay by the migrant outside the home country can influence remittance behaviour. The remittance decay hypothesis first argued by Stark (1978) and theoretically refined by others (e.g. Poirine, 1997, 2006; Brown and Poirine, 2005) stipulates that the level of remittances sent by migrants will decline over time as migrants’ commitment and attachment to their relatives and home country weakens. Two theories of remittances, namely, altruism and loan repayment theories, give us some insights into the rationale of the remittance decay hypothesis (Poirine, 1997, 2006). According to altruism theory, remittance decay over time at the micro level could a consequence of weakening altruism and/ or reunification of dependents with parents in the host country. On the other hand, at macro level an inverted U-pattern for aggregate remittances over time could occur as a result of the diaspora growing to outnumber the home country recipients without any weakening of altruism. As Poirine (2006) observes, in a growing diaspora each remittance sender has fewer and fewer needy recipients to assist at home while each recipient receives more and more but up to a point after which less and less remittances are sent to the home family.

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However, if the theory of remittances is premised on the repayment of the informal educational loan to parents as postulated by Poirine (1997) and Brown and Poirine (2005), remittance decay could occur as a result of the full repayment of the loan after a number of years and/ or family reunification in the host country. In this scenario we would expect the more educated to be remitting more, *ceteris paribus*, as they would have received a large amount of the educational loan.

Despite the rationale of the remittance decay hypothesis, the contemporary view is that remittances are a stable source of development finance for developing countries less volatile than other international capital flows (Ratha, 2005). However, it has been observed that while remittances might vary slightly from year to year, they dry up after a long period. As in the case of the migration hump evidence, Echazarra (2011) cites the case of Spain which lived off remittances from emigrants living in Latin America for 50 years (from 1880 to 1930) after which migration flows slowed significantly and remittances plummeted as a consequence.

Early research on remittance decay rejects the hypothesis that remittances decline over time (see Brown, 1997, 1998; Loomis, 1990; Stanwix and Connell, 1995; Vete, 1995). Brown (1997) actually found evidence supporting the opposite conclusion that remittances tended to increase the longer the mi-

grant stays in the host country. The rejection of the decay hypothesis has, in some instances, been attributed to migrant population favouring temporary or “circular” migration whereby one or a few family members move for short periods back and forth as observed among Mexicans in the United States. For instance, Grieco (2004) observes that for some households, the ultimate goal may not be permanent settlement but circular migration which preference would probably lead to the stability and continuity of remittances over time. Furthermore, migrants intending to return to the home country are likely to exhibit different remittance behaviour from those that do not wish to return. For example, intuition would indicate that the level of remittances would remain high for migrants intending to return home.

Researchers who utilized income as a determinant of the remittance decay hypothesis, found a positive relationship between migrant worker income and remittances (Massey and Basem, 1992 in Mexico; Banerjee, 1982 in India; Hoddinott, 1994 in Kenya; and Lucas and Stark, 1985 in Botswana). Further studies by Roberts and Morris (2004, p. 16) observed that “as income increased beyond a certain point remittances stayed constant in Kenya and actually declined in India.” Following a similar approach using a microeconomic model, Hunte (2004) found support for the remittance-decay hypothesis whereby over time remittances decline when household income increases.

Recent empirical evidence has found evidence in support of the remittance decay hypothesis and the existence of an inverted-U time pattern of remittances (Briere et al., 2002; Amuedo-Dorantes and Pozo, 2006; and Echazarra, 2011). The level of remittances is observed to increase with the migrant length of stay in the host country reaching its maximum level after 5 to 10 years of migration experience after which it starts to decline. Specifically, Briere et al. (2002) observe the level of remittances starting to decay after 10 years; Amuedo-Dorantes and Pozo (2006) observe a decline after 5.5 years; and Echazarra (2011) observe a decline after 6 years.

This paper lends further support to this strand of research by reporting an inverted-U pattern of remittances in the context of migrants living in a developing middle-income country, South Africa. Preliminary work using a non-rigorous, non-parametric approach on the same dataset by Makina (2012a) had observed remittance behaviour to be independent of the migrant length of stay. The rest of the paper is structured as follows. Section 2 describes the research methodology. Section 3 presents data analysis and findings. Section 4 concludes.

Data and methodology

We use data from a cross-sectional survey of Zimbabwean migrants living in South Africa conducted in 2007 and reported in Makina (2007; 2010; 2012a; 2012b; 2012c). The survey captured migrant arrivals in South Africa from 1979 to 2007 as well as the socioeconomic (including remittance levels)

and demographic characteristics of the migrants. Assuming the remittance decay hypothesis holds, we would expect early migrants to remit none or lower levels of remittances than later migrants as they lose ties with the country of origin. We investigate this by examining how the rand amount remitted home by migrants varies on account of time spent living in South Africa. The data utilized comprise 11.3% non-remitters and 88.7% remitters as reported in Makina (2012a) which is thus a mixture of discrete and continuous distributions. This censored nature of the distribution of remittances renders the utilization of OLS inappropriate. We therefore utilize the Tobit model that is capable of modelling the likelihood of remitting and the actual remitted amounts as function of the same covariates. A similar approach has been employed by researchers who have studied the same phenomenon (Briere et al., 2002; Brown and Poirine; Amuedo-Dorantes and Pozo, 2006; Echazarra, 2011).

The Tobit Model for examining remitting behaviour over time is given by the following equation:

$$R_i = \alpha t_i + \beta t_i^2 + X_i \varphi + \varepsilon_i, \text{ with } R_i = \max (0, R_i) \quad [1]$$

Where:

R_i is a vector of the rand amount remitted (recognising that some migrants do not remit at all and others remit rand amounts, thus giving a combination of discrete and continuous distributions);

t_i is the time spent living in South Africa;

t_i^2 is a squared term of time spent living in South Africa which captures a non-linear pattern in remittance sending patterns;

X_i is vector of remitters' characteristics;

α , β and φ are coefficients; and

ε_i is the error term.

If the pattern of remittances over time follows an inverted "U" shape (i.e. hump-shaped) as hypothesized in the literature, the coefficient of t would be positive and that of t^2 would be negative. The vector of remitters' characteristics comprises fourteen explanatory variables, viz. gender, age, age squared, marital status, dependents supported in the home country, dependents supported in the host country, education level, access to banking, income level, legal status, return migration intention, frequency of home visits, reasons for migrating and the savings level. Many of these variables have been observed to influence remittance behaviour in the literature.

Gender: Assigning binary 0= female and 1= male, the Tobit coefficient is positive if males are remitting more than females. If negative, females will be remitting more than males. In a related study on characteristics of remittance

senders of the same dataset of Zimbabwean migrants using non-parametric tests, Makina (2012a) reported that in numerical terms more male migrants remit more than female migrants.

Age: A positive coefficient indicates that the older the migrant the more the level of remittances while a negative coefficient would mean that the younger migrant is remitting relatively more. The expectation is to observe younger migrants remitting higher rand amounts home as predicted by the altruistic motive to support relatives left behind. It is plausible to expect the older migrants to have integrated in the host country and hence remitting less or none at all.

Age squared: A negative coefficient coupled with a positive coefficient of age not squared would be indicative of an inverted U-pattern behaviour in relationship with the level of remittances. Poirine (2005, p. 421) postulates that the relationship between the migrant's age and the incidence of remittances should follow an inverted-U profile, but the level of the remittances should not depend on age. However, he furthermore postulates that if altruism is strong then the incidence and the level of remittances would either be unrelated to age, or should decrease with age as altruistic sentiments weaken over time.

Marital Status: The variable is included to determine whether marital status influences remittance behaviour. Binary 0 is assigned to married migrants and 1 to single migrants. A positive coefficient would be indicative of married migrants remitting more than single migrants. In a related study of the same data set, Makina (2012a) observed that married remitters constituted the largest proportion, possibly because their spouses lived in the home country. However, the study did not investigate the variation in the levels of remittances.

Dependents supported in the home country: According to the altruism theory, a positive coefficient indicates that if a migrant has more dependents to support in the home country the higher the level of remittances. For the same data set it has been observed that the proportion of remitters increases with increasing numbers of dependents supported (Makina, 2012a). A Tobit estimation by Echazarra (2011) also found a positive relationship between the level of remittances and dependents supported in the country of origin.

Dependents supported in the host country: The expectation is that if a migrant has more dependents in the host country, the level of remittances to the home country will tend to decline over time as host country attachment increases. The coefficient of this variable is expected to be negative as observed by Echazarra (2011).

Education: The idea is investigate whether education level influences the level of remittances. The theory underlying remittances would determine how the level of education influences remittances. If the theory of altruism under-

lies remittances then the level of education has no effect on the level of remittances (Brown and Poirine, 2005). On the other hand, if the loan repayment theory underlies remittances, then the opposite is true; the higher the level of education, the more the informal loans from parents and the more the repayment to the parents (Poirine, 1997).

Access to banking services: This is expected to be positively related to the level of remittances. The reason is that a migrant would find it safer to send a larger amount of remittances through formal channels rather than through risky informal channels.

Income level: The expectation under the altruism theory is that a migrant with a higher income level will remit more than one with a low income level. Hence, the expected sign of the coefficient of this variable is positive. However, the loan repayment theory and controlling for education, income should not be significant (Brown and Poirine, 2005).

Legal Status: Assigning binary 1 = undocumented migrants and 0 = documented migrants, the Tobit coefficient is negative when documented migrants remit more than undocumented migrants. On the corollary, if the coefficient is positive it would mean undocumented migrants remit more than documented migrants. A priori expectation is that due to constant fear of deportation, undocumented are likely to remit more than documented migrants. By virtue of their illegal status the host country, undocumented migrants may not have access to financial services and hence may remit more home as some remittances would constitute savings.

Return Migration: Assigning binary 0 = intending to return and 1 = intending to stay in the host country, if the Tobit coefficient is negative it means that if a migrant intends to stay in the host country, he/she will remit less compared to those who intend to return. This is a priori expectation. This was indeed observed by Merkle and Zimmerman (1992).

Frequency of home visits: If the coefficient is negative it is indicative of frequent home visits for which we would expect a migrant to post a low level of remittances compared to a migrant who does not go home often. The reason could simply be that the migrant who visits home frequently carries remittances with him/her rather than sending them.

Reason for migrating: Assigning binary 0 = economic and political reasons and 1 = other reasons like family reunification and further studies, a negative Tobit coefficient means that migrants who migrated for economic or political reasons remit more than those that migrated for other reasons. It is logical that migrants who migrate in order to reunite with their families are bound to remit less.

Savings level in the host country: A positive significant coefficient would indicate that migrants with higher savings levels remit more under the loan re-

payment theory of remittances as such coefficient would be indicative of the loan repayment period being over (Brown and Poirine, 2005). On the other hand, a negative coefficient would indicate that migrants with low savings levels remit more. There could also be no a priori expectation as the savings coefficient can have either sign as remittances and savings are substitutable.

Data analysis and findings

Descriptive statistics of the variables are computed and presented below.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Level of remittances (annual)	3407.44	2040.17	0	6300
Length of stay	2.95	3.64	0	28
Legal status	0.57	0.50	0	1
Age	31.67	7.97	15	65
Access to banking services	0.41	0.49	0	1
Level of income (annual)	29336.99	24596.46	3000	132006
No. of dependents in the host country	1.69	0.72	1	4
No. of dependents in the home country	2.96	0.88	1	4
Frequency of home visits	4.22	0.69	1	5
Level of savings in the host country (annual)	1660.06	2901.79	0	16200
Return migration decision	0.06	0.23	0	1
Reason for migrating	0.02	0.15	0	1
Gender	0.41	0.49	0	1

Five variables are dummies and hence have minimum values of 0 and maximum values of one. Among the ordinal variables, the levels of remittances, income and savings exhibit high volatility. The results of the Tobit model estimation are shown in Table 2.

Accepted significance is at levels of 1% and 5%. At these levels, it is observed that the level of remittances has a significantly positive relationship to the length of stay while the square of the length of stay has a significantly negative coefficient. This is an indication that remittances first goes up and then

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Table 2: Tobit Model: Dependent Variable is the Annual Amount of Rands sent by Migrant

Explanatory variable	Tobit Results	Marginal Effects at Observed Censoring Rate		
	Coeff. (t-statistic)	Unconditional Expected Value	Conditional On being Uncensored	Probability Uncensored
Length of stay	87.70*** (4.65)	79.70	63.73	0.008
Length of stay squared	-5.61*** (-5.41)	-5.09	-4.07	-0.001
Legal status(0=Documented, 1=Undocumented)	429.53*** (7.21)	390.32	312.12	0.040
Reason for migrating ((0=Economical & Political, 1=Other)	-668.29*** (-3.19)	-607.27	-485.61	-0.062
Gender (0= Male, 1 = Female)	10.92 (0.19)	9.93	7.94	0.001
Age	128.23*** (4.92)	116.52	93.18	0.012
Age_Squared	-1.81*** (4.82)	-1.65	-1.32	-0.000
Marital status (0= Married and other, 1 = Single)	124.92* (1.84)	113.51	90.77	0.012
Education level (0 = Other, 1 = Primary)	-482.82*** (-3.14)	-438.74	-350.84	-0.045
Access to banking services (0 =No,1=Yes)	548.64*** (8.38)	498.55	398.67	0.051
Level of income	0.018*** (12.76)	0.017	0.013	1.70e-06
Number of dependents supported in host country	-12.99 (-0.31)	-11.81	-9.44	-0.001
Number of dependents supported in home country	705.04*** (20.37)	640.67	512.32	0.065
Frequency of home visits	-472.80*** (-10.76)	-429.64	-343.56	-0.044
Return migration decision (0 = Intending to return, 1 = Settling in host country)	-1081.06*** (-8.20)	-982.36	-785.55	-0.100
Level of savings	0.16*** (13.34)	0.143	0.114	0.000
Constant		-143.10 (-0.28)		
N		4206		
Left Censored Observations		384		
Uncensored Observations		3822		
LR Chi2 (16)		1645.96		
Log Likelihood		-34433.70		

*, ** and *** significant at 10%, 5% and 1% level respectively

falls in a hump-shaped fashion. An inverted U-pattern is thus observed from the Tobit regression.

Fitting the data to the estimated equation [1]: $R_i = \alpha t_i + \beta t_i^2 + X_i \varphi + \varepsilon_i$, with $R_i = \max(0, R_i)$,

the number of years at which remittances reach the maximum point after which they start to decline are derived by setting the first order derivative of $f(x) = 0$ i.e. $\frac{df(x)}{dt} = 0$ where $f(x) = R$ and solve for t .

$$\begin{aligned} \frac{df(x)}{dt} &= \alpha t + \beta t^2 + X \varphi + \varepsilon & [2] \\ &= \alpha + 2t \end{aligned}$$

Thus the maximum point is given by solving the equation:

$$\alpha + 2t = 0. \quad [3]$$

Substituting values for α and t from the Tobit estimation we obtain:

$87.70 + (-2 \times 5.61)t = 0$ for which t is solved to be about 8 years, being the number of years at which remittances reach a maximum point. Thus remittances rise to a maximum after 8 years of migration experience and start to decline thereafter.

The legal status has a coefficient which is significantly positive meaning that undocumented migrants remit more than documented migrants. It could be argued that the fear of deportation forces undocumented migrants to remit most of their savings home. On the other hand, the coefficient for reason for migrating is significantly negative meaning that migrants who migrated for economic or political reasons remit more to support families left in the home country.

The coefficient of age is significantly positive while the coefficient of squared age is significantly negative. Thus an inverted U-pattern is observed meaning the level of remittances goes up in early age up to point and then declines in old age. This is consistent with the altruism theory as observed Poirine (2006).

The education level is seen to influence remittance behaviour but negatively. The coefficient is significantly negative which means migrants with higher education remit more than those with lower level of education. This finding is consistent with the loan repayment prediction (Poirine, 1997).

As expected under the altruism theory, it is observed that remittance behaviour has a significant positive relationship with income level, access to banking services and number of dependents supported in the home country

(Brown and Poirine, 2005). However, the significant positive relationship with the savings level in the host country is consistent with the loan repayment theory of remittances.

The intention to return to the home country has a significant influence on remittance behaviour. The coefficient for the return migration intention is significantly negative showing that over time migrants who intend to settle in the host country remit less than those who intend to return to the home country. The frequency of home visits also influences remittance behaviour. The coefficient is significantly negative meaning migrants who make home visits frequently remit less than those who do not visit home often. This is possibly explained by the opportunity to personally carry remittances presented by the opportunity to make frequent home visits.

Conclusion

The findings of this paper provide further evidence in support of the remittance decay hypothesis and the inverted-U time pattern of remittances. Lending further support to a few other empirical studies, we find that the level of remittances first increases with the time spent in the host country and later declines after a certain period of migration experience leading to an inverted-U time pattern of remittances over time. This finding also lends support to the remittance decay hypothesis. Furthermore, we find the level of remittances to be positively related to age, the number of dependents in the home country, legal status, access to banking, income and savings levels, and negatively related to the squared age of the migrant, education level, return intentions, frequency of home visits and economic and political reasons for migrating. It is observed that the remittance decay phenomenon stems from a mixture of the theories of altruism and the informal loan repayment alluded to in the literature.

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