Consumption Response to Diaspora Remittances in Zimbabwe

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Abstract

This paper explores the impact of remittances on private consumption in Zimbabwe for the period 1980 to 2007. An augmented Keynesian consumption function which incorporates income, remittances, exchange rate, taxation, inflation and an economic and political instability dummy variable is postulated for this purpose. We also postulate a remittance equation with consumption, income, financial deepening, inflation, trade openness and an economic and political instability dummy variable as explanatory variables. In order to deal with the possible existence of the endogeneity problem between consumption and remittances, a Three Stage Least Squares method is used to estimate a simultaneous equation model with endogenous variables. The results indicate that diaspora remittances play a crucial role in determining private consumption in Zimbabwe. Hence, the results confirm the notion that diaspora remittances are mainly consumed, thus improving the living standards of many Zimbabweans. The paper therefore recommends that Zimbabwe can close the consumption gap through policies that promote the inflows of remittances.

Key words: Consumption, Remittances, Endogeneity
JEL Classifications: E12; E21

Introduction

Zimbabwe's recent economic and political crisis (2000 to 2008) triggered a wave of emigration of an estimated 3-4 million people[6] (Pasura, 2008). Between 2000 and 2008 the country's macroeconomic situation was characterized by declining output, hyperinflation and rising unemployment. Zimbabwe experienced a cumulative economic decline estimated at 50.3% between 2000 and 2008 (Draft MTP, 2010). The official inflation peaked at 231 million percent in July 2008 rendering the local currency worthless. The country's formal sector employees declined from 1.1 million to 990 000 between 1993 and 2004 (UN, 2010). Zimbabwe's poverty index also declined from 0.654 in 1990 to 0.513 in 2005 (UN, 2010).

Zimbabwe's worsening economic situation resulted in increased emigration of both skilled and unskilled labour which in turn resulted in significant inflows of remittances. As suggested in migration theory this emigration was a result of many factors, the two major ones being economic and political reasons. Many Zimbabweans in the diaspora today are referred to as "economic refugees." Hence, perhaps the altruism hypothesis which argues that people migrate to increase their incomes and send cash home to their loved ones offers the best explanation for Zimbabwe's migrants. While South Africa is believed to have the majority of Zimbabwe's emigrants estimated at between 2 and 2.5 million, the UK and Botswana are believed to have attracted about 500 000 and 400 000, respectively (Bracking and Sachikonye, 2006). Other popular destinations include the USA, Canada, Australia, and New Zealand.

Research efforts in Zimbabwe have centred on verifying remittance inflows, their uses as well as analyzing the profile of beneficiaries (Maphosa, 2004; IOM, 2005; Bracking and Sachikonye, 2006; and LEDRIZ, 2009). In 1980 and 1982, remittances amounted to US$17 million and US$33 million, respectively. The figures took a downward trend from 1984 to the mid-1990s, (UNCTADstats). The International Fund for Agricultural Development (IFAD) reported that in 2006 Zimbabwe received US$361 million in remittances. The near breakdown of the Zimbabwean economy and the lack of proper travel documentation by many Zimbabwean emigrants meant that a significant flow of remittances came in through informal channels. Hence, Orozco and Lindley (2007) estimate that in 2004 US$1.3 billion were remitted to Zimbabwe through formal and informal channels. Given the economic and political crisis characterizing the Zimbabwean economy and the meaningless incomes in Zimbabwe due to hyperinflation these remittances were directed towards consumption. Thus, remittances had the potential to change the consumption patterns of many Zimbabweans.

The increasing remittances coming through informal channels forced government to devise ways of harnessing remittances even from the illegal emigrants. Hence, the Zimbabwean government sought to reap the benefits of remittances through the Reserve Bank of Zimbabwe (RBZ)'s subsidiary, the Homelink. This subsidiary was created with the purpose of mobilizing remittances from both legal and illegal emigrants. Through the Homelink, emigrants were to send remittances to the RBZ and in turn have houses built for them. Table 1 summarizes RBZ's remittances estimates during the peak of Zimbabwe's economic crisis.

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[6]   Zimbabwe's emigration population includes the irregular emigrants those who emigrated without the required documents or even using unofficial means especially to neighbouring countries. Hence, there are no official statistics on the actual Zimbabwean emigration population especially during the period of the economic crisis.

Table 1: Remittance inflows 2004-2009

Year	2004	2005	2006	2007	2008
Remittance (US$ million)	46.3	13.1	5.2	14	78.5

Source: Reserve Bank of Zimbabwe, 2009

Existing studies on remittances in Zimbabwe are mainly of a qualitative nature concentrating on the uses of remittances. These studies confirm that remittances were mainly used for consumption purposes (Maphosa, 2004; Bracking and Sachikonye, 2006; Tevera and Chikanda, 2009, and Magunha *et al*, 2009). There has been no attempt to statistically test the impact of remittances on consumption in Zimbabwe. This paper therefore seeks to establish the direct impact of remittances on consumption in Zimbabwe using the econometric approach.

This paper has five sections. Section 2 briefly reviews the literature. Section 3 presents the model. Section 4 presents and discusses the results. Finally, Section 5 concludes the paper and draws some policy recommendations.

A review of Literature

John Maynard Keynes (1936)'s absolute income hypothesis boosted interest in the empirical investigation of the consumption function. Keynes argued that consumption is mainly a positive and linear function of income. His absolute income hypothesis made the following three hypotheses on the relationship between consumption and income. Firstly, the marginal propensity to consume is between zero and one. Secondly, the average propensity to consume falls as income rises. Finally, income is argued to be the most important component affecting consumption with interest rate playing a nominal role. Thus, according to Keynes as income increases consumption also increases but less than proportionately.

Keynes' theoretical work stimulated empirical work as economists turned to the use of statistical information in studying consumer behavior. Estimations to verify Keynes postulations of the consumption function gave conflicting results. For example, Davis (1952) and Ferber (1966)'s estimated consumption results using USA data were consistent with Keynes' postulations. Kuznets' 1946 study of consumption and saving behavior conducted using USA long term data revealed different findings about consumption behavior. The average propensity to consume showed no downward trend indicating that the marginal propensity to consume equalled the average propensity to consume. Thus, these findings refuted Keynes' postulations.

From the 1950s economists' attention were focused on developing more theories of consumption. Among the various theoretical works which attracted considerable attention were those by Friedman (1957) and Ando and Modigliani (1963).[7] Friedman (1957)'s permanent income hypothesis argues that current consumption is a function of permanent income and not current income. In this theory, current income is made up of two components, permanent and transitory income. It is the changes in permanent income which changes consumers' consumption habits and not transitory changes in income. Ando and Modigliani postulated that consumption goes through a life cycle. Their life-cycle theory assumes that individuals allocate their consumption expenditure considering their spending needs and future incomes over the remainder of their lifetimes. According to this theory the young and old individuals spend a higher proportion of their income compared to the middle aged individuals.

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[7] Other famous literature include among others those by Duesenberry (1949) and Hall (1978).

Hence, there is general agreement on the fact that income is an important determinant of consumption.

Continued empirical investigations into the consumption function have so far produced no major theoretical developments. However, there been a number of modifications to the estimated consumption functions. The opening up of economies Zimbabwe included heavily impact on the consumption patterns in these economies. This therefore justifies the inclusion of variables such as remittances and exchange rate in the consumption function. On the relationship between remittances and consumption, Burney (1989) found that remittances have a positive and significant impact on consumption in the Pakistan economy. Other studies that have investigated the impact of remittances on consumption and found it to be positive include Amjad (1986) and Munir *et al* (2007). Munir *et al* in particular used an econometric approached that employed the ordinary least squares technique. Their estimated consumption function had only two independent variables income and remittances. We employ a simultaneous equation modeling technique to study the impact of remittances on consumption in Zimbabwe.

Methodology and Data Sources
We use an augmented Keynesian model to study the impact of remittances on consumption in Zimbabwe. In the model, private consumption is posited to be a function of income which we proxy by Gross National Income (GNI), remittances (REM), inflation (Infl), exchange rate (Exrate), economic and political instability (PS), and tax (Tax). As noted above, remittances in Zimbabwe came through both formal and informal channels. Remittances coming through informal channels are difficult to measure. Hence, we use remittances that came through formal channels. We define remittances as personal flows of money from migrants to their families. In this study, we utilize consumption per capita and remittances per capita. Zimbabwe's economic and political crisis during part of the study period requires that we include a dummy variable separating the period of economic and political instability (2000 to 2007) from the economically and politically stable period. The economic and political instability dummy variable (PS) takes a value of zero for the economically and politically stable period and 1 for the economically and politically unstable period that is, between 2000 and 2007.

Remittances and consumption are assumed to be endogenous due to reverse causality. As noted above, during Zimbabwe's economic and political crisis period, remittances could be viewed as compensation for reduced incomes. On the other hand, consumption in the face of reduced incomes during the economic and political crisis period likely increased remittances. Remittances were driven by reduced consumption due to the economic and political crisis that is, the level of consumption was a determinant of remittance inflows. Hence, we postulate a remittances equation with consumption (CONS), GNI, financial deepening (Findeep), inflation, trade openness (TOP), and economic and political instability (PS) as explanatory variables.

In order to account for the possible existence of the endogeneity problem the Three Stage Least Squares (3SLS) method is used to estimate a simultaneous equation model. We expect a positive bi-directional causality between consumption and remittance inflows. In the model, the control variables are GNI, inflation, exchange rate, tax, economic and political instability, trade openness and financial deepening. The exchange rate is simply defined as the price of a unit of domestic currency in terms of foreign currency. Financial deepening which we proxy by M2/GDP measures the financial sector infrastructure. Trade openness is a measure of how

well our borders are open to other economies. Hence, we measure trade openness as the sum of imports and exports. In the case of the tax variable, tax revenues are used. The estimated simultaneous equation model is specified as;

$$CONS_t = \tau_0 + \tau_1 GNI_t + \tau_2 REM_t + \tau_3 Exrate_t + \tau_4 Tax_t + \tau_5 Infl_t + \tau_6 PS_t + \varepsilon_t \qquad (1)$$

$$REM_t = \eta_0 + \eta_1 CONS_t + \eta_2 GNI_t + \eta_3 Findeep_t + \eta_4 Infl_t + \eta_5 TOP_t + \eta_6 PS_t + v_t \qquad (2)$$

where $\tau_0, \tau_1, \tau_2, \tau_3, \tau_4,$ and τ_5 are the intercept, marginal propensities to consume due to income, remittances, exchange rate, taxation and inflation, respectively, τ_6 measures the impact of political instability on consumption and ε_t is the error term which is assumed to be stationary and $IID(0, \delta_\varepsilon^2)$. We hypothesize that income, remittances and exchange rate are positively related to consumption, that is, $\tau_1 \succ 0$, $\tau_2 \succ 0$ and $\tau_3 \succ 0$. On the other hand, taxation, inflation and economic and political instability are expected to be negatively related to consumption. In equation (2), $\eta_0, \eta_1, \eta_2, \eta_3, \eta_4$ and η_5 are the intercept, marginal propensities to remit due to consumption, income, financial deepening, inflation and trade openness, respectively, η_6 measures the impact of political instability on remittance inflows and v_t is the error term which is assumed to be stationary and $IID(0, \delta_v^2)$. Consumption, financial deepening, inflation, trade openness, and economic and political instability are expected to increase remittances while GNI is expected to reduce remittances. We assume the error terms in equations (1) and (2) to be uncorrelated, that is, $Cov(\varepsilon_t, v_t) = 0$.

The study uses yearly data collected from two sources that is the RBZ and the Zimbabwe National Statistical Agency (Zimstat)[3]. Table 2 provides a summary of the descriptive statistics of all the variables. As indicated in the table, huge variations in all variables were recorded over the study period.

Table 2: Descriptive Statistics

	CONS	REM	GNI	Infl	Exrate	Findeep	Tax	TOP
Mean	693.3400	1.525676	734.2500	334.4143	10726436	53.70549	1480.000	29587.26
Median	689.2549	0.912446	740.0000	22.45000	7.665000	0.001570	1407.000	2217.371
Maximum	1072.258	4.846365	1120.000	6723.700	3.00E+08	1364.374	5175.000	169825.9
Minimum	410.2055	0.034667	350.0000	7.100000	0.630557	0.000256	193.0000	19.01852
Std. Dev.	191.8950	1.581402	207.8100	1268.713	56692311	258.0291	829.2623	45536.02
Skewness	0.210845	0.766668	-0.113538	4.810748	5.003696	4.935456	3.144427	1.601407
Kurtosis	2.084320	2.106187	2.429678	24.71137	26.03700	25.57191	15.50520	4.795482
Jarque-Bera	1.185676	3.675023	0.439636	657.9498	735.9931	708.0802	228.5847	15.72874
Probability	0.552756	0.159213	0.802665	0.000000	0.000000	0.000000	0.000000	0.000384
Sum	19413.52	42.71894	20559.00	9363.600	3.00E+08	1503.754	41440.00	828443.4
Observations	28	28	28	28	28	28	28	28

The data was subjected to econometric tests. Table 3 presents the unit root tests results. The calculated Augmented Dickey-Fuller (ADF) test statistic is greater than the ADF critical values at the 5% level for all but the tax variable. Hence, we have enough statistical evidence to conclude that the variables are non-stationary or are integrated of order one at the 5% level of significance while the tax variable is integrated of order zero in levels. Since the variables

are not integrated of the same order there is no likelihood of co-integration. We therefore apply the 3SLS estimation technique. In the model, non-stationarity is corrected by using differenced series.

Table 3(a): Augmented Dickey-Fuller test for unit root in levels

Variable	ADF statistic (with intercept)	ADF statistic (with trend and intercept)	LAGS	Conclusion
CONS	-0.922476	-2.662153	Max lags	Non-stationary
REM	-2.575976	-2.635155	Max lags	Non-stationary
GNI	0.601263	-1.275747	Max lags	Non-stationary
Infl	-0.684246	-2.994998	Max lags	Non-stationary
TOP	6.331482	6.477650	Max lags	Non-stationary
Exrate	3.573689	2.823960	Max lags	Non-stationary
Tax	-3.252828**	-3.127647	Max lags	Stationary without linear trend
Findeep	-1.004382	9.313466	Max lags	Non-stationary

* and ** means significant at the 1% and 5% level of significance, respectively

Table 3(b): Augmented Dickey-Fuller test for unit root in first differences

Variable	ADF-stat	Critical 1%	Critical 5%	Critical 10%	Integration order
DCONS	-6.661177*	-3.711457	-2.981038	-2.629906	I(1)
DREM	-7.238494*	-3.711457	-2.981038	-2.629906	I(1)
DGNI	-4.225542*	-3.752946	-2.998064	-2.638752	I(1)
DInfl	-3.007132**	-3.752946	-2.998064	-2.638752	I(1)
DTOP	-3.616115**	-4.394309	-3.612199	-3.243079	I(1)
DExrate	-3.440702**	-3.808546	-3.020686	-2.650413	I(1)
Tax	-3.290695**	-3.699871	-2.976263	-2.627420	I(0)
DFindeep	-6.545247*	-3.769597	-3.004861	-2.642242	I(1)

* and ** means significant at the 1% and 5% level of significance, respectively

Empirical Results and Discussions

Table 4 presents the results of the parsimonious model (also see the Appendix). The overall estimation of the two equations seems to be good in terms of the coefficient of determination and the Chi-squared statistics. The results indicate that about 80% of the variation in consumption is explained by the combined variations in the regressors. The Chi-squared value indicates that the slope coefficients of the consumption model are not simultaneously equal to zero at the 1% level of significance. While the regressors in the consumption function indicate a strong explanatory power, their counterparts in the remittances equation have a weak explanatory power. They explain only about 31% of the variations in remittance inflows. This however is not a serious problem since our main focus is on the consumption function. The remittances equation only serves the role of correcting the possible endogeneity problem.

Table 4: Estimated Results
Method Three Stage Least Squares
Sample (adjusted): 1980 2007
Included observations: 28

Equation 1:   Dependent Variable, DCONS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DInfl	-0.3555	0.1973	-1.80	0.072
DExrate	0.000007	0.000004	1.79	0.073
DREM	72.8447	40.8304	1.78	0.074
DGNI	0.5498	0.1495	3.68	0.000
TAX	0.0058	0.0189	0.31	0.758
PS	-72.2917	39.5827	-1.83	0.068
Intercept	242.7327	86.8445	2.80	0.005
R-squared	0.8049			
Chi-squared	182.67			
Prob (Chi-squared)	0.0000			

Equation 2:   Dependent Variable, DREM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DInfl	0.0164	0.0075	2.20	0.028
DFindeep	-0.0768	0.0353	0.030	0.030
DTOP	-0.000017	0.00002	0.411	0.411
DCONS	0.0270	0.0078	0.001	0.001
DGNI	-0.0192	0.0070	0.006	0.006
PS	1.0425	0.6317	0.099	0.099
Intercept	-4.3695	1.5140	0.004	0.004
R-squared	0.3057			
Chi-squared	33.62			
Prob (Chi-squared)	0.0000			

In equation (1), the income variable supports the Keynesian consumption hypothesis. The income variable is positive and statistically significant at the 1% level. The results show that the marginal propensity to consume due to income is 0.55. In the remittances model, increased income reduces remittance inflows. The income variable is statistically significant at the 1% level. A unit increase in income reduces remittances by 1.9%.

Our main focus is on the remittances coefficient of the consumption function. As noted in the theoretical section, remittances are positively related to consumption. However, the coefficient is only statistically significant at the 10% level. Thus, as remittances increase, consumption increases. As noted in the theoretical section our results tallies with results from other studies. The results imply that holding other factors constant, a percentage increase in remittances increases consumption expenditure by 72.8%. As noted earlier on much of the remittances especially during the economic and political crisis period came in through informal channels. Such remittances were not captured in this study. This probably explains the weak statistically significance of this variable.

There is evidence of the existence of endogeneity between consumption and remittance inflows. Although equation (1) results indicate that variations in consumption are significantly explained by remittance inflows, equation (2) results indicate that consumption is also a significant explanatory factor of remittance inflows. A percentage increase in consumption increases remittance inflows by 0.027%. This confirms the endogeneity problem we raised in the methodology section.

In the consumption model, a unit increase in inflation reduces consumption by 35.6% whereas in the remittances model it increases remittances by 1.6%. The inflation variable is statistically significant at the 10% and 5% levels in the consumption and remittances equations, respectively. Inflation erodes incomes thereby reducing consumption levels. Under such circumstances, emigrants remit in order to compensate the eroded domestic incomes, hence the positive relationship between remittances and inflation. Taxation and trade openness are statistically insignificant determinants of consumption and remittance inflows, respectively.

The economic and political instability dummy variable is negatively related to consumption and statistically significant at the 10% level. Consumption was reduced by 72.29 units during the economic and political crisis period. This can be explained in terms of the macroeconomic fundamentals like the exchange and inflation rates which were very high affecting the consumers' purchasing power.

Conclusions and Policy Recommendations

The main focus of this paper was to estimate a consumption function incorporating remittances as one of the explanatory variables. The income variable is found to be the most important determinant of consumption. Hence, the results confirm the traditional consumption behavior as postulated by Keynes. The results further indicate a positive and statistically significant coefficient for the remittances variable. Thus, as remittances increases, consumption increases. The results thus prove our hypothesis that consumption is positively affected by remittances.

The relationship between remittances and consumption implies that remittances served to fulfil the consumption needs of Zimbabweans especially during the economic and political crisis period. Hence, remittances were used to bridge the gap between incomes and consumption. The results also have implications on economic growth and poverty reduction in Zimbabwe. The influence of remittances on consumption has the effect of increasing growth in Zimbabwe as consumption creates investment demand through its multiplier effect. Increased growth has important implications on poverty reduction.

The economic and political instability dummy variable in the consumption function is negative and statistically significant. Hence, economic and political instability negatively affected private consumption expenditure in Zimbabwe. The negative relationship between consumption and the economic and political instability dummy variable implies that remittances improved the welfare of Zimbabweans during the economic and political crisis period. The policy implications are that the Government should work to attract more remittances as this improves the welfare of Zimbabweans.

Based on the above findings, we recommend that the Zimbabwean government can improve the living standards of the population through the export of labour. Exported labour will therefore remit thus affecting the consumption behavior of the Zimbabweans positively.

Government also stands to benefit especially if the remittances are remitted through formal channels. The policy implications are that Government policy aiming at attracting diaspora remittances should be encouraged. Hence, the RBZ's, the Homelink initiated the economic and political crisis period should be encouraged.

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APPENDIX: 3SLS ESTIMATION USING STATA

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      name:  <unnamed>
       log:  C:\Users\Pindiriri\Desktop\Remittences\Results stata.smcl
  log type:  smcl
 opened on:  1 May 2013, 17:19:55

. reg3 (DCONS = DINFL DExrate DREM DGNI TAX PS) (DREM = DINFL DFindeep DTOP DCONS DGNI PS)

Three-stage least-squares regression
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Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
DCONS	28	6	83.23268	0.8049	182.67	0.0000
DREM	28	6	1.293958	0.3057	33.62	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
DCONS						
DINFL	-.3555486	.1973299	-1.80	0.072	-.7423081	.0312109
DExrate	7.18e-06	4.01e-06	1.79	0.073	-6.77e-07	.000015
DREM	72.84472	40.83037	1.78	0.074	-7.181328	152.8708
DGNI	.549809	.1495168	3.68	0.000	.2567615	.8428565
TAX	.0058125	.0188853	0.31	0.758	-.0312021	.042827
PS	-72.29169	39.5827	-1.83	0.068	-149.8724	5.288979
_cons	242.7327	86.84532	2.80	0.005	72.51903	412.9464
DREM						
DINFL	.0163686	.0074561	2.20	0.028	.0017549	.0309824
DFindeep	-.0767505	.0352831	-2.18	0.030	-.1459042	-.0075969
DTOP	-.0000166	.0000202	-0.82	0.411	-.0000562	.000023
DCONS	.0269594	.0077504	3.48	0.001	.011769	.0421499
DGNI	-.0192092	.0069872	-2.75	0.006	-.0329039	-.0055146
PS	1.042498	.6317451	1.65	0.099	-.1957	2.280695
_cons	-4.369456	1.513954	-2.89	0.004	-7.336751	-1.402161

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Endogenous variables:  DCONS DREM
Exogenous variables:   DINFL DExrate DGNI TAX PS DFindeep DTOP
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