Asset Poverty and Hyperinflation: The Case of Zimbabwe

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Introduction

The purpose of this is to analyze the effect of hyperinflation on asset poverty in Zimbabwe from 1994 to 2010. Of particular interest is the change that occurred after inflation became hyper in 1999 as well as in the period following the dollarization policy of 2008[1]. As stated in the previous section, the economic wellbeing of Zimbabwean households has been declining over the past three decades. In other words, poverty has been increasing over time. In 1995, the national poverty headcount ratio was 42 percent. It increased to 63 percent in 2003 and currently stands at 72 percent. A spatial decomposition from a preliminary analysis shows that poverty is a national phenomenon as 50 percent, or more, of Zimbabwean households are poor in all provinces[2]. In this paper, a non-monetary measure of poverty is used. Poverty here, means simultaneous deprivation from private assets which facilitate economic wellbeing (wealth, henceforth). Deviating from the norm of consumption based poverty measures, this study employs a wealth based poverty measure. A wealth index – a weighted combination of household assets – is created. The 'haves and have not's' are demarcated by a wealth threshold akin to a poverty line.

Typically, inflation increases poverty as it erodes the purchasing power of money. However, the transmission method when poverty is a non-monetary concept is not obvious, making this an interesting topic. In the Zimbabwean context, hyperinflation eroded the value of money so much that individuals moved to barter trade when money ran out. Barter trade was very common in 2007 and 2008 when the local currency lost value and commodities became scarce. Assets became the mode of exchange and the inverse relationship that exists between money holdings and poverty was true for assets. However, the mass migration of skilled and unskilled labour is a confounding factor as remittances (in cash and kind) countered the effect of hyperinflation on poverty.

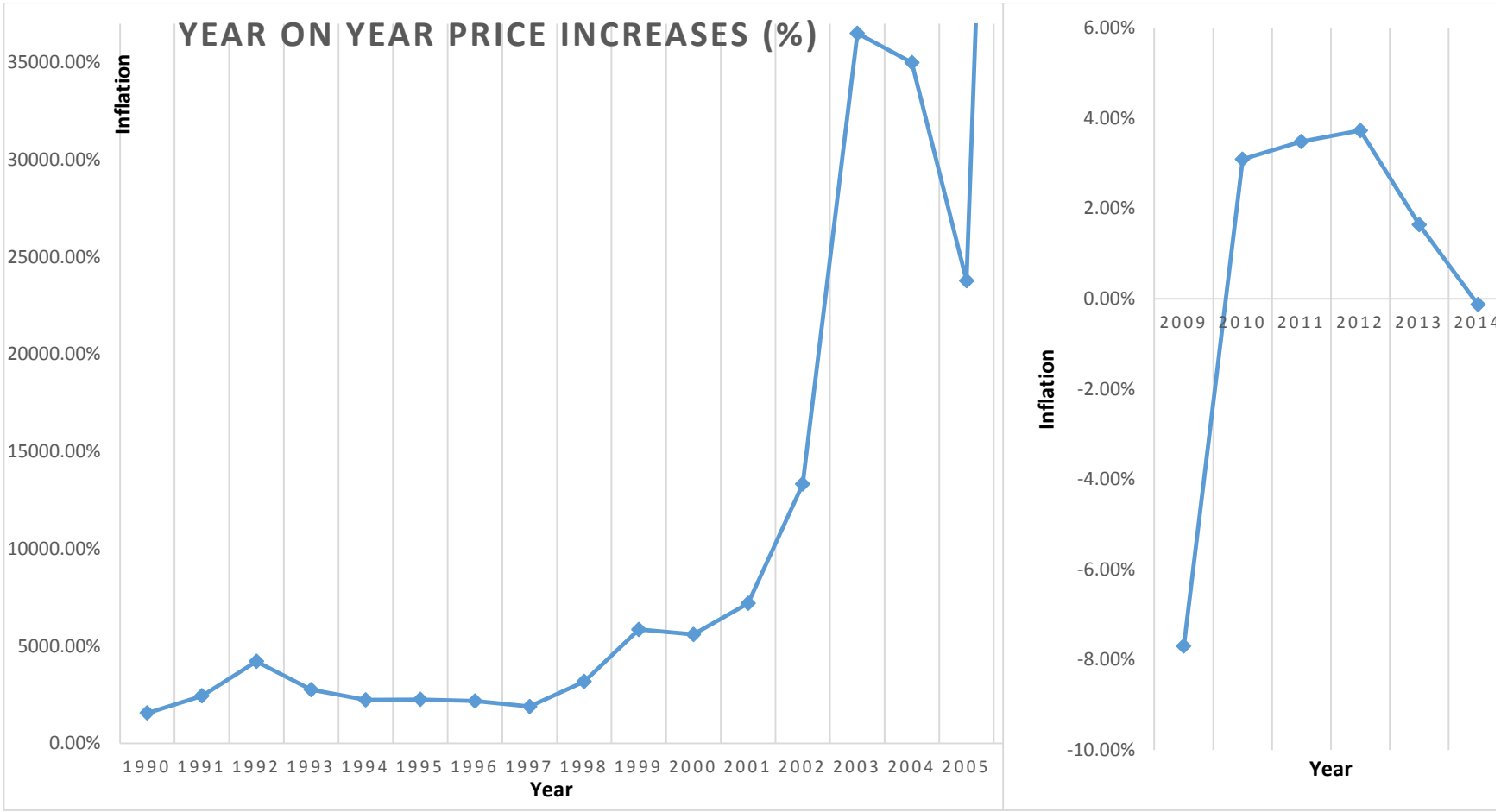
This is a significant study because there is not much academic work done using the capability approach in Zimbabwe. The dynamic work done on multidimensional poverty in Zimbabwe, thus far, is by Stoeffler, Q. (2014), who applied the OPHI methodology on data from the Income, Consumption and Expenditure Surveys (2001-2007) and the Poverty, Income, Consumption and Expenditure Surveys (2011 to 2012) which were conducted by ZIMSTAT. Stoeffler finds an increase in poverty from 2001 to 2007, where the headcount was 18 percent and 22 percent respectively. However, as the economy recovered, post the 2008 crisis, multidimensional poverty decreased to 19 percent in 2011. Larochelle et al (2014) come up with the same conclusion using polychoric principle components analysis; but they specify that the increase in poverty was concentrated in rural areas. Apart from these works, the DHS has created wealth indices for Zimbabwe from 1994 to 2011, based on Principal Components Analysis. This paper will therefore be a meaningful contribution to this literature on non-monetary poverty in Zimbabwe as it attempts to quantify the effect of hyperinflation, for the first time.

[1] See table 1 and Figure 1
[2] See table 2, in appendix.

Table 1: Zimbabwe inflation trends, 1994 to 2009

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
YOY Rate (%)	22.3	22.5	21.7	18.9	31.7	58.5	55.9	71.9	133.2	365	350	237.8	1017	6724	351410	-7.7

Figure 1: Zimbabwe inflation trends, 1990 to 2014



Source: The Reserve Bank of Zimbabwe http://www.rbz.co.zw/about/inflation.asp

Literature Review

The relationship between poverty and inflation has been established by various studies, with the majority concluding that Inflation is detrimental to economic wellbeing. From Cardoso's (1992) perspective, inflation is a tax on real wages. Using data from seven Latin American countries (Argentina, Colombia, Costa Rica, Chile, Mexico, Peru and Uruguay), the author runs a multivariate regression of real wages on the log of inflation and real GDP growth. Results show that real wages fall by 14 percent when inflation doubles and this drop in real wages translates into an increase in poverty. Cardoso (1992) cites Argentina and Brazil as examples of rising poverty due to imperfect indexation and fluctuation of wages during inflationary times. These conditions result in the erosion of income such that consumption smoothing becomes difficult.

Powers (1995) uses the American Consumption Expenditure Surveys from 1960 to 1981 and regresses the consumption based poverty rate on inflation and the unemployment rate of prime age males. Both inflation and unemployment have a significant positive effect on poverty. The author attributes the effect of inflation to the rise in uncertainty which leads to a decrease in money demand and consumption. Inflation erodes the value of permanent income and thus decreasing consumption as the discount rate applied to future income increases. Third, inflation results in capital losses such that asset values decrease and the poor can no longer hedge against inflation. Finally, Powers (1995) states that consumption poverty also rises because consumption does not decrease at the same rate as inflation.

Datt and Ravallion (1997) and Ravallion (1998) follow the same trend of analyzing the inflation-poverty link through consumption. They conclude that inflation is one of the variables that explain the negative correlation between mean rural consumption and the relative price of food. Real consumption in rural India declines when inflation is high. Ravallion (1998) shows that a 1% increase in inflation results in a 0.41% decrease in average real consumption. According to him, what has really affected the poor is the rate of inflation and not price levels because nominal wages do not adjust instantaneously as general prices rise.

Romer and Romer (1998) add to this body of literature as they regress the log of the average income of the bottom 20 percent of a large sample of countries on the log of inflation. They also regress poverty headcount rates on unemployment and inflation rates. The authors find a significant negative relationship between the average inflation rate and the income of the poor and a positive relationship with poverty. Much like Powers (1995), they find a strong positive relationship between poverty and unemployment. The combination of these results implies that income is the channel through which monetary policy can only have an impact on the long run wellbeing of the poor.

Agenor (1999) in the paper entitled, "Stabilization policies, poverty and the labour market" regresses the log of the poverty headcount rate on a myriad of macroeconomic variables across various countries. The author finds that in all cases, inflation has a significant positive effect on poverty and negative effect on income per capita. In this paper, the author finds that poverty reduces when there is an increase in the growth of output per capita, the ratios of subsidies to GDP and transfers to GDP. So, again, when inflation affects income, the poor suffer.

This notion is confirmed by Easterly and Fischer (2000) who use data from 38 countries, 19 of which are industrialized and the other half not. They regress the change in the share of the bottom quintile on the

ten year average of CPI inflation and the growth rate of real GDP per capita and find a significantly negative coefficient for inflation. In a second regression of the annual percentage change in poverty headcount rate on real GDP, per capita growth rate and inflation tax rate, the authors find that an increase of the inflation tax from zero to hyperinflation increases the poverty rate and lowers the income share of the bottom quintile by 1.7 percentage points. Third and last is the regression of the log of real minimum wage on inflation tax and real growth per capita (a proxy for labour productivity). The result is a significant negative relationship between the inflation tax and the real minimum wage.

Braumann (2004) delves deeper into the relationship between "High inflation and Real Wages" and postulates that inflation decreases real wages in two ways. First, it is through the decline of capital stock and labour productivity. Second, through a shift in relative prices against labour intense goods. According to Braumann, 'The fall in real wages during inflation can also be linked to increasing poverty in Latin America…An examination of recent data showed that the poverty maxima coincided with the inflation maxima.' Therefore, a decline in real wages due to inflation results in an increase in poverty.

To further substantiate the claim that inflation exacerbates poverty Chaudhry and Chaudhry (2008) assess the effects of inflation of food and fuel costs on poverty in Pakistan. The authors find that a 1% increase in food prices, results in a 2% increase in the poverty gap. On the other hand, a 1% increase in energy prices, results in a 0.44% increase in the poverty gap. Evidently, food prices affect the severity of poverty more than energy prices do. This is sensible because food is more of a necessity than fuel-driven assets like vehicles, stoves and refrigerators which the poor may not possess. To further prove this point, the authors determined that a 20% increase in food prices results in approximately an 8% increase in the national poverty headcount rate.

This literature clarifies the fact that poverty rises with inflation. However, there is no single sided argument. Other authors state that inflation is less a determinant of poverty than unemployment. Blank and Blinder (1985) conclude that unemployment has seven times as large an effect on poverty as inflation does. This is because a rise in national unemployment affects the disadvantaged (women, Africans) more directly as they earn less and constitute unskilled labour which is dispensable. This observation is supported by Gramlich and Lauren (1984) who show that the probability of unemployment decreases as income rises. As a result, the lower quintiles are more vulnerable to unemployment (and thus poverty). Blank and Esaki (1978) also say that inflation has an overall insignificant effect on poverty. On the contrary, a 1% increase in unemployment results in 0.26% - 0.30% decrease in the income of the bottom 40%. They find that, in the case of unemployment, the share of income lost by the bottom quintile is gained by the top quintile. Cutler and Katz (1991), like other authors above, regress poverty headcount ratios on macroeconomic indicators and they find that in periods of low unemployment, the share of income to the lowest three quintiles rises and that to the upper two quintiles declines.

Combining both views, it is safe to conclude that inflation leads to a rise in unemployment which decreases household income and thus increases poverty. In this study, income is replaced by the wealth index.

Methodology

Using the Zimbabwe Demographic and Health Surveys of 1994, 1994, 2005 and 2010 the main research hypothesis that there is no difference in asset-poverty levels in Zimbabwe over the hyperinflationary period, is tested. First, the datasets are pooled to generate an asset index, which is a measure of wealth. Second, FGT[3] poverty indices and stochastic tests of wealth dominance are computed from the aforementioned wealth index, in order to establish changes over time. The last step is a multivariate regressions of asset-poverty on inflation and other macroeconomic indicators.

Deriving the asset-poverty measure

The methodology by Sahn, D. E. and Stifel, D. C. (2000) is hereby adopted. The authors apply exploratory FA to DHS data in order to create a wealth index and make comparisons across time for 11 African countries. The FA is used instead of PCA because the former requires fewer variables in the covariance matrix, presumably, improving precision. The second advantage is that FA is designed in such a way that assets explain the variance in wealth. A known weakness of FA is the assignment of negative values to the asset weights. However, this will be rectified by the addition of a positive constant on the asset index. Using the FA on Zimbabwe's DHS datasets is a continuation of what Sahn, D. E. and Stifel, D. C. had started by analyzing the 1988 and 1994 datasets.

As aforementioned, the wealth index is a weighted combination of household assets and characteristics[4]. Equal weighting is not advisable in this case as socio-economic status varies by the type and quantity of assets in a household and access to public goods, among other factors. As a result in this paper we desist from arbitrary application of weights and instead, construct weights based on the data. We hereby use the exploratory principal factors analysis. The structural equation of the asset index is:

$$I_i = \omega_1 a_{i1} + \cdots + \omega_k a_{ik} \quad (1)$$

Here, $I_i$is the asset index for households i=1…N; the a_{ik}'s denote the i=1…K assets and ω's represent weights. For an economy like Zimbabwe which, over the past 3 decades, has succumbed to recurrent price distortions, it would not be prudent to use prices as weights. FA is the technique employed to come up with weights as well as for the construction of the asset index. Since this index mainly consists of durable assets, a slight deviation from Sahn and Stifel, is the assumption that the common factor which explains most of the variance in asset ownership is wealth (θ_i) (not welfare).

The equation to show that all assets are explained by this factor $\theta_i$is:

$$a_{ik} = \rho_k \theta_i + u_{ik} \quad (2)$$

Equation (2) implies that for each asset in the household, there exists a linear relationship with the latent variable, 'wealth' along with an unknown component, here called the uniqueness element. The relationship between the asset and wealth component is computed as a correlation coefficient. Thus, FA is about finding the unknown factors, from the pattern of correlation between the assets that are measurable. However

[3] Foster, J. E., Greer, J., & Thorbecke, E. (1984) "A class of decomposable poverty indices."
[4] See table 2

there are factors, other than wealth, that determine variation in the assets and they are all contained in the uniqueness element. The weights for equation 1, are therefore the correlation coefficients between wealth and assets, also known as factor loadings. The final step is to calculate equation (1) in order to come up with the asset indices for all the households. The assets with high factor loadings are used to come up with the regression coefficients. The following are the identification assumptions in the model:

A1 – Households are distributed iid. (3)

A2 – Error zero mean: $\mathrm{E}(u_i|\theta_i) = 0$ (4)

A3 – Constant variance of error: $V(u_i) = Diag^{Kx1}\{\sigma_1^2, \dots, \sigma_k^2\}$ (5)

The resulting asset index is used to measure poverty. Still following Sahn and Stifel, the FGT measures poverty headcount ratio is computed. The lower poverty line, which is the mark of extreme poverty, is the 20th percentile of the asset index distribution, while the 40th percentile of the distribution is the upper poverty line. These overall calculations are then decomposed by gender and location (province or sector).

The next step is to apply standard tests of wealth dominance in order to compare the wealth index distributions over time and assess the direction and magnitude of the change in poverty. In this paper, 4 distributions (1994, 1999, 2005 and 2010) of the wealth index are pooled in order to conduct the stochastic dominance tests. A constant is added to the index so that the cumulative distribution functions, $F_i(x) = D_i^S(x)$ are mapped onto the set of non-negative real numbers. Simple t statistics are employed to test whether the following hypothesis holds:

$$H_0 = D_A^S(x) - D_B^S(x) = 0 \quad (6)$$

This null hypothesis, outlined in equation (6), is the baseline in determining whether there exists a difference over time in the cumulative wealth distributions in terms of: the proportion of the population that is poor (first order dominance) and the severity of poverty, measured by the poverty gap (second order dominance). If the hypothesis does not hold true, then there is a change in wealth over time and the direction matters. Where the null hypotheses in equation 6 is rejected, yet the signs on all the t-statistics are the same, dominance of order s is declared. Here, s=1, 2, where s=1 is the test for change in the poverty rate while s=2 is the test for the change in the poverty gap. This test is repeated for the different poverty lines. This test shows the shifts in wealth, but does not explain the contributing factors, hence the need for a regression analysis.

Multivariate Regression Analysis

The methodology from Romer and Romer is adopted in order to assess the effect of hyperinflation on asset-poverty in Zimbabwean households. The authors regress the logarithm of average income of the poor on average inflation. In this paper, average income is replaced by average wealth, measured from the asset index. This is in line with Montgomery et al. (2000) who state that "A household's income summarizes its command over resources…" The implication is that a household's assets represent its income level. Following this, it is assumed that wealth and income are affected by inflation in a similar way. The main empirical model (seen in equation 7) will be a regression of asset poverty P_t on average inflation π_t, output

variability$\sigma(g)_t$, along with time and location trends. Due to the fact that remittances R_t were a unique contributor to household wealth during Zimbabwe's economic crisis, they are controlled for in the regression. Here, the poor are in the first quintile of the wealth distribution, resulting in a binary dependent where 1=poor and 0=non-poor. The regression will include provincial and sectoral dummies D_{it} to control for spatial differences and in so doing, reduce the standard errors of the coefficients on the monetary policy dummies.

$$P_t = \alpha + \beta \pi_t + \vartheta R_t + \delta \sigma(g)_t + \gamma D_{it} + e_t \quad (7)$$

Given that the dependent variable is neither continuous nor categorical, the linear probability model (logit) regression is used in the analysis. Tests for endogeneity show that all variables are exogenous, negating the need for an instrumental variables approach.

Results

Asset variables were used in the derivation of the wealth index. In table 3 below, it is evident that 2005 was the year in which asset levels were highest and then there was a decrease afterwards. The difference in asset ownership seen between 2005 and 2010 is understandable given that the climax of the economic crisis was July 2008. Most of the trade in assets in exchange for food and basic necessities happened between 2007 and 2009. Nonetheless, the quality of homes improved due to the inflow of remittances. The decrease in radio ownership specifically, is mainly due to the increased ownership of cellphones which have displaced the former. In the last column, the weights of the wealth index are reported, with the earth floor and borehole having negative values, a sign for negative correlation with wealth.

Table 4 makes is apparent that 98 percent of the bottom 40 percent of the wealth distribution, who are the poor, are located in rural Zimbabwe. This is further substantiated by Figure 2, which shows that approximately 90 percent of the cumulative wealth distribution of rural households is below the mean, while the opposite is true for urban households. An interesting phenomenon of migration, rural to urban, is seen as the number of urban dwellers in each quintile increase from 2005 onwards. Apart from the urban-rural divide, wealth is also unevenly distributed across the 10 provinces of Zimbabwe. Table 5 shows Harare as home of the majority of wealthy households, followed by Midlands, Manicalalnd and Bulawayo.

Cumulative distribution functions of wealth are compared over the years and across location in the stochastic dominance tests. The results seen in table 6, correspond well with the summary statistics discussed above. From 1994 to 1999, there was a significant increase in wealth. Then there was an insignificant decrease from 1999 to 2005, followed by a significant decline in wealth from 2005 to 2010. This is sensible in light of the sky rocketing hyperinflation between 2005 and 2008 (seen in table 5), which was stabilized by the 2009 dollarization policy. Rural households generally have less wealth than their urban counterparts.

Table 3: Summary statistics and weights for variables included in the wealth index

Household level	1994		1999		2005		2010		Pooled Data		
Variable	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Weights
ASSETS											
Radio	0.420	0.494	0.492	0.499	0.479	0.500	0.379	0.485	0.439	0.496	0.430
Television	0.137	0.343	0.207	0.406	0.302	0.459	0.362	0.481	0.270	0.444	0.676
Refrigerator	0.081	0.273	0.123	0.328	0.182	0.386	0.186	0.389	0.152	0.359	0.612
Bicycle	0.186	0.389	0.212	0.409	0.258	0.437	0.228	0.420	0.226	0.418	0.097
Motorized vehicle	0.052	0.222	0.062	0.241	0.064	0.245	0.069	0.254	0.063	0.243	0.349
DWELLING QUALITY											
Wooden Floor	0.013	0.112	0.009	0.093	0.007	0.082	0.012	0.110	0.009	0.099	0.166
Tiled Floor	0.005	0.067	0.010	0.097	0.011	0.102	0.017	0.130	0.011	0.106	0.185
Cement Floor	0.528	0.499	0.605	0.489	0.629	0.483	0.663	0.473	0.615	0.487	0.588
Earth Floor	0.439	0.496	0.338	0.473	0.333	0.471	0.295	0.456	0.342	0.475	-0.750
Carpet Floor	0.014	0.118	0.037	0.190	0.019	0.138	0.011	0.106	0.019	0.138	0.235
WATER SOURCE											
Borehole Water	0.304	0.460	0.304	0.460	0.264	0.441	0.290	0.454	0.288	0.453	-0.358

Source: Zimbabwe Demographic and Health Surveys

Table 4: Sectoral distribution by quintile

	Bottom 20%		Second 20%		Middle 20%		Fourth 20%		Top 20%	
	Proportion of households									
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
1994	99.93%	0.07%	99.00%	1.00%	97.53%	2.47%	35.29%	64.71%	6.67%	93.33%
1999	99.88%	0.12%	99.30%	0.70%	96.76%	3.24%	15.02%	84.98%	5.28%	94.72%
2005	100.00%	0.00%	99.68%	0.32%	96.27%	3.73%	27.77%	72.23%	4.55%	95.45%
2010	99.48%	0.52%	96.21%	3.79%	95.05%	4.95%	30.58%	69.42%	6.61%	93.39%

Figure 2: Cumulative Distribution Functions of wealth by location

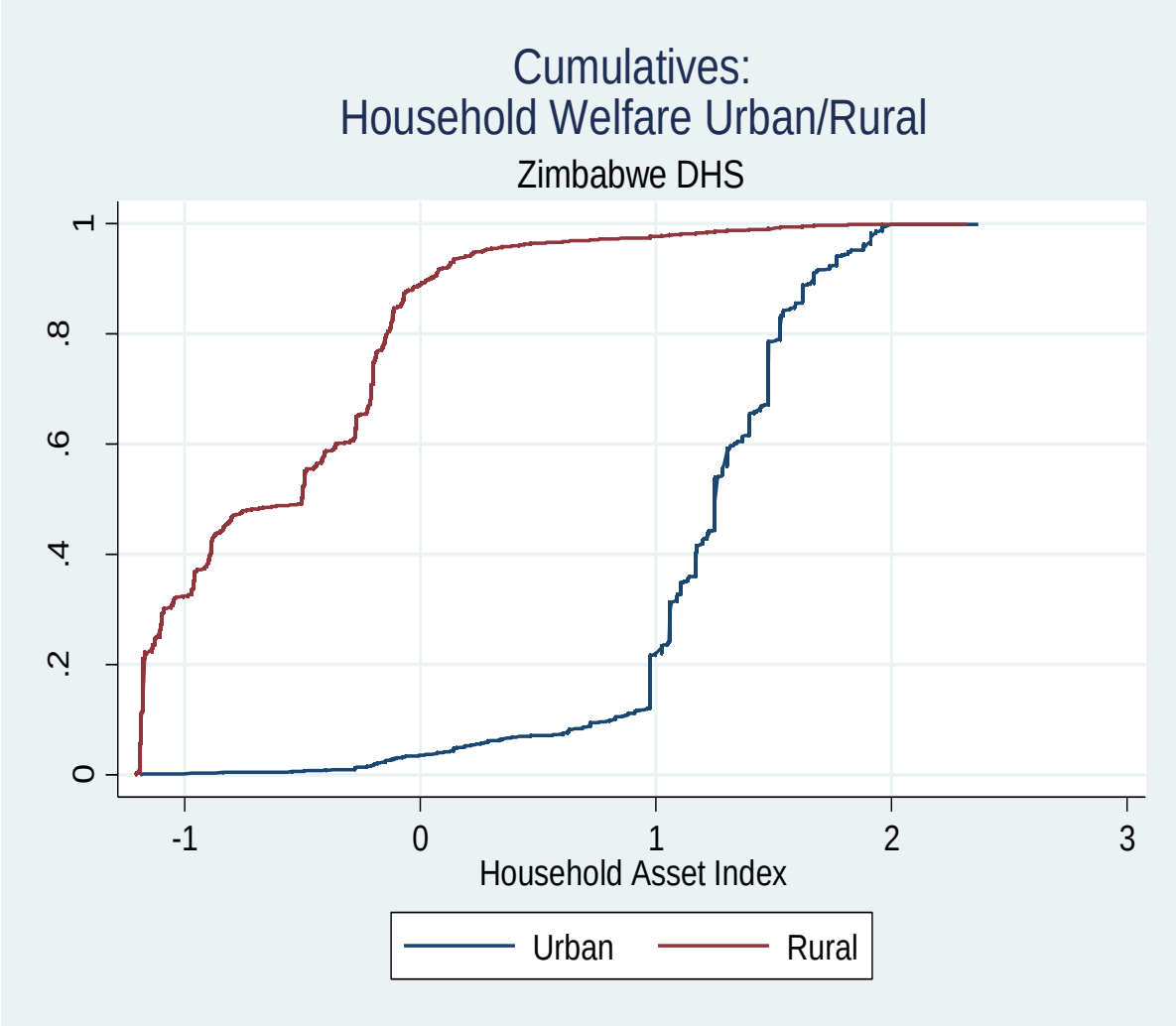


Table 5: Wealth Distribution by province, Zimbabwe

Province	Wealth Index Mean	Population share	Wealth share
Manicaland	-0.267	0.110	0.107
Mashonaland central	-0.382	0.095	0.091
Mashonaland east	-0.214	0.099	0.097
Mashonaland west	-0.181	0.098	0.096
Matabeleland north	-0.653	0.090	0.084
Matabeleland south	-0.420	0.090	0.086
Midlands	-0.172	0.109	0.107
Masvingo	-0.458	0.100	0.095
Harare-chitungwiza	1.207	0.117	0.131
Bulawayo	1.327	0.093	0.106

Table 6: Stochastic Dominance

	First Order Dominance	P-value
1994|1999	0.101	0.000
1999|2005	-0.013	0.273
2005|2010	-0.032	0.000
Urban|Rural	-0.631	0.000

In tandem with the wealth index results above, table 7 shows a decrease in the poverty headcount ratio of the bottom quintile and a subsequent increase between 2005 and 2010. Most of the variation is driven by the wealth changes in rural households.

Table 7: Decomposition of changes in poverty from 1994 to 2010

	National	**Rural**		**Urban**	
	Poverty Headcount	Population Share	Poverty Headcount	Population Share	Poverty Headcount
1994					
20th percentile	12.48%	71.40%	17.45%	28.60%	0.00%
40th percentile	28.89%	71.40%	57.79%	28.60%	2.64%
1999					
20th percentile	23.00%	69.81%	32.75%	30.19%	0.47%
40th percentile	54.91%	69.81%	71.23%	30.19%	17.16%
2005					
20th percentile	10.36%	67.09%	15.44%	32.91%	0.00%
40th percentile	40.38%	67.09%	59.95%	32.91%	0.49%
2010					
20th percentile	19.83%	65.92%	29.64%	34.08%	0.87%
40th percentile	51.21%	65.92%	70.21%	34.08%	14.47%

The results above show fluctuations in wealth and poverty in Zimbabwean households from 1994 to 2010, a period which covers the hyperinflationary period. Given these evident changes, the overall marginal effect of hyperinflation on poverty is determined in a multivariate regression. Table 8 below, shows the results of an ordinary least squares estimation as well as a logit estimation of equation 7. The LPM is the model of choice considering the binary distribution of the dependent variable. The LPM coefficient for inflation implies that a 1 percent increase increases the likelihood of becoming poor by

2.59 percent. Remittances, on the other hand, reduce the likelihood of poverty by 22 percent. These were the two main forces affecting poverty from 1999 to 2009 in Zimbabwean households.

Table 8: Logit regression results

	OLS	LPM
VARIABLES	Poor	Poor
Log(Inflation)	0.00446***	0.0259***
	(0.00122)	(0.00803)
Log(Remittances)	-0.0360***	-0.221***
	(0.00309)	(0.0199)
Log(SdGDP)	0.0473***	0.302***
	(0.00705)	(0.0463)
Rural	0.352***	3.826***
	(0.00736)	(0.150)
Provincial controls	Yes	Yes
Constant	-0.285***	-8.898***
	(0.108)	(0.912)
Observations	31,394	31,394
R-squared	0.199	0.224
Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Provincial controls included.		

Conclusion

The objective of analysing the effect of hyperinflation on poverty in Zimbabwe has been accomplished. There exists a positive statistically significant effect, with each percentage point increase in inflation translating to a two percent increase in the probability for a household to become poor. This is evident in the increase in poverty headcount ratios which occurs as hyperinflation escalated between 2005 and 2010.

When all is said and done, this paper makes three main contributions. The first step is the application of this research question on Sub-Sahara African data. Second is the use of a non-monetary poverty measure as a dependent variable in this relationship. Third and most important is the measurement of the marginal effect of hyperinflation on asset-poverty, not just an analysis of changes.

An obvious limitation of the study is the exclusion of unemployment as literature proves that it is a significant determinant of poverty. It is of particular importance in Zimbabwe's enclave economy which has 85% of its labour force participants trapped in the informal market. Consistent unemployment data was not available but further research should include this variable.

Appendix

Table 2: Poverty and Inequality in Zimbabwe, 2003.

Level	Gini Coefficient	GE(0) Theil L	GE(1) – Theil T	GE(2)	Poverty Line (US$)	Poverty Headcount Ratio	Poverty Gap
National	0.6236	0.7280	0.9320	4.8840	54.62	63.02	33.90
Rural	0.6026	0.5172	0.7209	6.5390	35.58	78.49	44.26
Urban	0.5617	0.5654	0.7311	2.6081	99.01	26.96	9.76
Male Headed	0.6289	0.7476	0.9540	5.1940	54.62	60.25	32.16
Female Headed	0.6026	0.6665	0.8471	3.4828	54.62	68.48	37.33
Provincial Decomposition							
Bulawayo	0.5434	0.5410	0.5480	2.6430	92.69	56.88	27.08
ManicalaInd	0.5534	0.5420	0.7100	3.0590	39.78	63.06	30.16
Mashonaland Central	0.5390	0.5298	0.5995	1.4887	28.46	50.44	22.74
Mashonaland East	0.5475	0.5387	0.6447	1.9972	38.91	61.01	29.32
Mashonaland West	0.5223	0.4733	0.6016	1.9115	46.18	59.46	26.31
Matebeleland North	0.6226	0.7289	1.1263	10.7546	36.18	68.84	34.40
Matebeleland South	0.5180	0.4834	0.6169	2.0995	48.61	64.45	30.25
Midlands	0.5120	0.4592	0.5045	0.9277	48.77	65.20	32.07
Masvingo	0.6212	0.7159	1.1482	21.1450	35.22	68.54	35.80
Harare	0.5770	0.5967	0.7790	2.5980	115.43	50.97	22.31

Source: Unpublished PASS data

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