POVERTY IN ZAMBIA: ASSESSING THE IMPACTS OF TRADE LIBERALISATION IN THE 1990S[1]

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1. INTRODUCTION

Zambia is one of the poorest countries in sub-Saharan Africa and there is evidence that suggests that living standards worsened during part of the 1990s. There is evidence, using national poverty lines, that poverty increased between 1991 and 1996 by 20% among the those below a food-only poverty line and by 16% among those below a general poverty line (McCulloch et al, 2001). In 1996 an estimated 73% of the population lived on less than a dollar a day (World Bank 2000). Between 1996 and 1998, the last year for which comparable household survey is available, there have been reductions in poverty, although not sufficient to offset the rise between 1991 and 1996. The increase in poverty between 1991 and 1996 occurred during a period of fairly extensive economic reforms, including a stabilisation programme, reforms of agricultural marketing, privatisation, trade liberalisation and public sector reform. Given this, it is not implausible that the rise in poverty was caused by one or more of these policies, singly or in combination. Equally likely though is that not everyone will have been affected in the same way, that there will have been winners and losers from the reforms. The aim of this background paper is to investigate the impact of these reforms on household poverty dynamics focussing in particular on the reforms of the maize market and the impact of the declining international copper price. We first summarise some of the key

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features of the changes in poverty between 1991 and 1998, disaggregating the findings by geographical location and other socio-economic categories. The paper also summarise some of the essential features of the reforms in the 1990s. In the absence of panel data set for the period we construct a pseudo-panel of households, using districts and age of household head, and estimate a consumption growth model incorporating standard demographic actors and reform-related variables.

2. MEASURING POVERTY IN ZAMBIA[2]

Zambia is one of the few sub-Saharan African countries to have implemented a series of national household surveys over the 1990s. The first survey, a Social Dimensions of Adjustment (SDA) Priority survey, funded by the Norwegian government with technical assistance from the World Bank, was conducted by the Zambian Central Statistics Office between October and November 1991. This 1991 SDA is nationally representative covering all nine provinces and both urban and rural areas and contains data on household demographics, education, health, housing, economic activities, access to infrastructure and public utilities, agriculture, employment, incomes, expenditures, assets and anthropometrics. The 1991 SDA provides a useful bench-mark of living standards in Zambia, coming as it does at the beginning of the reform period. In 1993 a second SDA was conducted, similar in content and design to that of 1991, but between April and June – harvest time – rendering this second survey strictly incomparable with the 1991 survey (Republic of Zambia, 1997). In 1996 a Living Conditions Monitoring Survey (LCMS) added a section on coping strategies, migration, political participation and work by children to the SDA topics. A second LSMS was conducted in 1998. Table 1 summarises some of this information.[3]

TABLE 1: ZAMBIAN HOUSEHOLD SURVEYS IN THE 1990S

Survey	Reference Period[1]	Sample Size (households)
1991 SDA	October/November	9,886
1993 SDA	April/June	10,121
1996 LCMS	October/December	11,752
1998 LCMS	November/December	16,800

[2] This section draws heavily on McCulloch et al (2001).

[3] All the surveys used a sampling frame drawn from the 1990 Census of Population and Housing , with a three stage sample selection process of Census Supervisory Areas, Standard Enumeration Areas (stratified on the basis of housing coats in urban SEAs and agricultural activity in rural SEAs) and households. All the analysis presented from McCulloch et al (2001) uses the survey weights to corrected for both clustering and stratification.

Notes: [1] Two week recall period for food, one month recall for other expenditures. Recall periods for education expenditures vary between surveys. [2] A household is defined as a group of people sharing a dwelling, and cooking and eating together.

Because of changes to the way in which data on incomes were collected, consumption expenditure is the only available monetary indicator of living standards, although even this is subject to inconsistencies across the four surveys. The most serious seems to be the omission of consumption of own produced food in 1991, although an attempt to impute this has been conducted (see Cherel-Robson and McCulloch 2000 for details of this and other problems).

Nominal household expenditures are deflated to December 1998 *kwatcha* using the national consumer price index and normalised by the Latham (1965) equivalance scale, an age and gender specific scale with adult males aged 30-59 the reference category (shown in the Appendix). McCulloch et al (2001) provide the following estimates of real monthly per adult equivalent consumption expenditure for each year.

TABLE 2. MEAN REAL PER ADULT EQUIVALENT CONSUMPTION EXPENDITURE

	1991	1996	1998
National	43,870	34,780	46,515
	(4,985)	(2,487)	(1,941)
Urban	69,713	53,898	55,847
	(4,528)	(2,606)	(3,189)
Rural	22,311	25,218	40,885
	(950)	(1,306)	(1,221)

Notes: All expenditures are monthly and expressed in December 1998 *kwatcha*. Figures in parenthesis are standard errors.
Source: McCulloch et al, 2001, Table 2.

The results begin to suggest that the rise in aggregate poverty reported in the introduction is much more nuanced. Although mean national expenditure per equivalent adult fell by 21% between 1991 and 1996, and urban expenditures by a similar proportion, rural expenditures increased by 13%.[4] Between 1996 and 1998 rural expenditures continued to grow, resulting in 1998 expenditure levels 83% higher than in 1991.[5] Urban expenditures grew by just under 4%, with the result that by 1998 urban expenditure levels were 20% below those of 1991. The rise in rural living standards and fall in urban living standards led to a dramatic reduction in the urban-rural gap. The aggregate, national picture therefore disguises very different changes in living standards that took place within the country.

[4] The change in rural expenditures between 1991 and 1996 is not statistically significant but the larger fall in urban expenditures is statistically significant.
[5] This change was statistically significant.

In order to examine poverty changes in Zambia we use two poverty line defined by the Zambian Central Statistical Office calculated using the cost of basic needs. The cost of a food basket necessary to maintain the nutritional requirements of an average Zambian family provides a lower poverty line of K32,232.85 per adult equivalent per month in December 1998 prices. A further 30% was added to this to account for non-food basic needs giving an upper poverty line of K46,286.50 per adult equivalent per month in December 1998 prices.[6]

We show the Foster, Greer and Thorbecke class of poverty measures (Foster et al, 1984) for both poverty lines, along with their standard errors, estimated by McCulloch et al (2001) in Table 3 below. The story of differing changes in urban and rural living standards is clearly illustrated.

For the country as a whole poverty, as measured by all measures and both poverty lines, rose between 1991 and 1996 then fell between 1996 and 1998. [7] In rural areas between 1991 and 1996 there was little change in the incidence of poverty, at around 90% for the upper poverty line and 81% for the lower poverty line, but there were large falls in the other two poverty measures, the poverty gap and squared poverty gap, suggesting that although there was little change in the proportion of the rural population that were poor, the bottom tail of the rural expenditure distribution became more compressed. In contrast, urban poverty rose between 1991 and 1996, by all measures and both poverty lines, suggesting that not only were greater proportions of the urban population were poor but that the bottom tail of the urban expenditure distribution became more dispersed.

Between 1996 and 1998 rural poverty fell, for all measures and both poverty lines, to levels below those of 1991, while urban poverty rates only fell slightly to levels significantly higher than in 1991. Once again we see that the urban-rural gap narrowed over the period.

TABLE 3: POVERTY ESTIMATES IN ZAMBIA, 1991-1998

	1991	**1996**	**1998**
National			
Upper Poverty line K47,158			
Headcount (%)	69.6	80.0	76.1
	0.48	*0.37*	*0.33*
Poverty gap (%)	42.2	46.0	40.6

[6] Both of these poverty lines are significantly lower than the US$1-a-day (1985 in PPP terms) international poverty line of K140,642 which yields poverty headcounts in excess of 90%.

[7] The only exception is squared poverty gap which, using the lower food-only poverty lie, fell throughout the decade.

	0.38	*0.29*	*0.24*
Squared Poverty Gap (%)	31.0	31.2	26.1
	0.34	*0.26*	*0.20*
Lower Poverty line K32,840			
Headcount (%)	57.5	66.7	60.5
	0.51	*0.43*	*0.38*
Poverty gap (%)	32.8	33.8	28.2
	0.37	*0.29*	*0.23*
Squared Poverty Gap (%)	23.5	21.2	16.6
	0.32	*0.23*	*0.17*
Rural			
Upper Poverty line K47,158			
Headcount (%)	88.3	90.5	86.3
	0.54	*0.41*	*0.38*
Poverty gap (%)	61.8	57.4	50.4
	0.54	*0.39*	*0.32*
Squared Poverty Gap (%)	48.4	40.9	33.9
	0.55	*0.38*	*0.29*
Lower Poverty line K32,840			
Headcount (%)	81.0	81.1	73.8
	0.66	*0.54*	*0.48*
Poverty gap (%)	51.7	44.7	37.1
	0.59	*0.42*	*0.32*
Squared Poverty Gap (%)	38.9	29.2	22.6
	0.56	*0.36*	*0.26*
Urban			
Upper Poverty line K47,158			
Headcount (%)	47.2	62.1	59.3
	0.66	*0.60*	*0.54*
Poverty gap (%)	18.6	26.6	24.4
	0.34	*0.34*	*0.29*
Squared Poverty Gap (%)	10.0	14.7	13.1
	0.23	*0.25*	*0.21*
Lower Poverty line K32,840			
Headcount (%)	29.3	42.2	38.3
	0.60	*0.61*	*0.54*
Poverty gap (%)	10.1	15.2	13.4
	0.26	*0.28*	*0.24*
Squared Poverty Gap (%)	5.1	7.6	6.5
	0.17	*0.18*	*0.15*
Source: McCulloch et al (2001)			

Hence the poverty story in Zambia is rather more subtle than the simple national estimates suggest. Rural areas experienced growth over the whole period, but most strongly between 1996 and 1998 while urban areas experienced a decline between 1991 and 1996 followed by a more modest recovery in the late 1990s.

3. ECONOMIC REFORMS IN ZAMBIA IN THE 1990S[8]

Since Independence in 1964, Zambia has undergone a series of policy reforms followed by reversals. Endowed with substantial mineral deposits, a rising copper price and substantial agricultural resources, the new Republic began with liberal political and economic policies aimed at developing infrastructure and services, but within ten years had adopted a much more state-interventionist set of policies, with import substitution, price controls of all major commodities and a gradual nationalisation of manufacturing, agricultural marketing and mining. By the early 1980s, after the oil shocks of the 1970s, the collapse in copper prices, and poor economic growth, the Zambian government introduced the first structural adjustment program between 1983 and 1985, only to then abandon it in 1987 after widespread discontent. A second adjustment plan was eventually agreed with the IMF in 1989, removing all price controls on consumer goods, except temporarily for maize (the staple of most Zambian households). When prices of high grade maize meal were eventually increased, by over 100 percent the following year, riots in Lusaka and the Copperbelt led the Zambian government to request the IMF to postpone further reduction of maize meal subsidies. Its refusal led to end of international financial support to Zambia. By the end of the 1980s Zambia was suffering from declining living standards, declining social indicators, escalating inflation and economic recession.

After the elections in 1991 the government[9] began a program of major wide-ranging economic reforms in four key areas: stabilisation, agricultural maize marketing, trade and industrial policy and privatisation. Mwanawina (2003) provides a fuller account of these changes, as do Oxfam-IDS (1999), World Bank (1994, 1996), White and Edstrand (1998) and others, as well as summarised by McCulloch et al (2001). We present here McCulloch et al's (2001) summary table of the key changes in the 1990s.

TABLE 4. MAJOR POLICY REFORMS AND EXTERNAL EVENTS 1989-1998

Year	Stabilisation Policy and Key Events	Agricultural Price and Marketing Reforms	Trade Reform	Parastatal Reform and Privatisation
1989	Decontrol of all consumer prices (except maize)	Abolition of national maize marketing board		
1990	Policy Framework Paper agreed with IMF	De-monopolisation of agricultural marketing; maize meal subsidy withdrawn		

[8] This section draws freely on McCulloch et al (2001) and on Mwanawina (2003)
[9] The Movement for Multi-Party Democracy (MMD) elected in October 1991.

		leading to food riots.		
1991	IMF suspends disbursements in June – inflation soars; Election of MMD in October.		Removal of most export controls; removal of ban on maize exports	
1992	Introduction of Treasury Bill Financing; decontrol of borrowing and lending rates; introduction of "bureau de change" for exchange rate determination.	Severe drought; removal of mealie meal subsidy; removal of fertiliser subsidy	Simplification and compression of tariff rates; increase in the tariff preference for goods from COMESA	
1993	Introduction of cash budgeting	Failed attempt to reform agricultural marketing		Privatisation Act passed; Zambia Privatisation Agency formed
1994	Capital account liberalisation	Launch of the Agricultural Credit Management Programme		
1995		Privatisation of the milling industry; launch of WB agricultural sector investment programme.	Removal of 20% uplift factor applied to import values.	Dissolution of ZIMCO
1996	MMD win elections but UNIP boycott elections			Acceleration of privatisation programme
1997	Donors withdraw balance of payments support			
1998	Copper price adversely affected by East Asian crisis	Droughts in south and excessive rain in north attributed to El Niño.		Negotiations on ZCCM sale fall through.

Source: McCulloch et al (2001) Table 1.

Analysing the impacts on poverty of this far-reaching programme of reforms is a difficult task but it is possible to make some suggestions. First consider the reforms of the maize sector between 1991 and 1996. The removal of pan-territorial and pan-seasonal maize pricing and the removal of maize-meal subsidies in urban areas is likely to have benefited net maize producers those close to line of rail or road while harming those farmers in more remote areas. Similarly urban consumers are likely to have most harmed by the removal of the maize meal subsidy. The removal of the fertiliser subsidy, and subsidies on other inputs, in 1992, is most likely to have harmed larger farmers. Privatising the maize mills in 1995 led to an increase in lower-cost hammer-mills, reducing processing costs for farmers and cheaper maize for consumers. Lifting the ban on maize exports is likely to also have benefited larger producers and/or those close to roads and railways.

McCulloch et al (2001) show that although rural poverty increased very slightly between 1991 and 1996, poverty rates among medium and large-scale farmers fell slightly (perhaps the effect of higher producer prices and lower producer costs was offset by higher input prices), poverty among non-agricultural households rose by 17% and among small farmers (who may be net consumers of maize) rose by just under 2%. Urban poverty rates, as shown above, all increased between 1991 and 1996, and for all of the urban strata but the largest increases were among the low-cost housing urban strata, which may have higher budget shares of maize meal.

This reduction in the bias against agricultural production of maize continued after 1996 as the private sector emerged to replace public provision of agricultural inputs and services. Hence the rural agricultural sector experienced strong growth in the 1990s leading to a reduction in poverty for the rural sector as a whole, most significantly for large farmers, but a rise among non-agricultural households.

Urban areas though are likely to have been adversely affected by the reforms, not just in maize but of parastatals and broader trade liberalisation exposing the private sector to increased competition. Rising inflation in the early 1990s, higher consumer prices of mealie meal over the 1990s plus wide-privatisation of parastatals and the decline of the mining sector, contributed to rising urban poverty rates between 1991 and 1996. Employment levels in parastatals fell by a third between 1992 and 1996, contributing most of the decline in formal sector employment (McCulloch et al, 2001). Real average earnings of the formal sector rose between 1992 and 1995 then declined slightly in the second half of the 1990s. This aggregate trend is also the same for those employed in central government and in the private sector but those in parastatals and in local government experienced continued increases after 1995.

Hence changes in food prices as well as in employment and real wages are part of the story of poverty changes in Zambia. But so too are events outside the realm of policy makers. The severe drought of 1992 and 1998 and excess rainfall in 1998 are also likely to have negative effects impacts on poverty, either exacerbating the already negative effects of higher consumer prices or input prices or tempering the gains of those benefiting from higher producer prices and lower processing costs.

This preliminary but suggestive analysis of the impacts of reforms on poverty tie in well with the set of transmission mechanisms suggested by Winters (2002), namely prices, wages and employment, with the outcomes varying by personal characteristics such as age and gender.

4. ANALYSING THE IMPACTS OF REFORM ON POVERTY

There are a number of methods that could be pursued to try to analyse these impacts on poverty econometrically with the available household survey data. Unfortunately, unlike the cases of China and Vietnam for which panel data is available, the Zambian household surveys contain no panel element and are simply repeated independent cross-sections. [10] Hence we adopt pseudo-panel analysis as an alternative method of implementing the conceptual framework.

Households or individuals from cross-section surveys are grouped by shared characteristics – most commonly age – and cohorts are assigned average values of the variables of interest. There is obviously a trade-off between efficiency and precision. Cohorts defined on a range of shared characteristics to create a small number of very similar households within a cohort will minimise the loss of efficiency of the regression estimates resulting from grouping observations but may result in less precise estimates (see Deaton, 1985 for a discussion). Pseudo-panel analysis is most commonly applied in studies of the labour force, where age cohorts (sometimes further grouped by education, race and geographical variables) are tracked through time using repeated cross-section surveys to examine changes in real wages, employment and returns to education (see for example Schmidt, 1991, 1996, Brunello and Comi, 2000, Dickerson et al, 2001, and Pencavel, 2000)) although the method has been used to examine convergence of household incomes using a regional panel (Azzoni et al, 2002), car ownership and travel using age cohorts (Dargay, 2002).

Here we adopt a simple pragmatic approach and create a pseudo panel of households grouped by age of household head and district. More sophisticated methods of identifying like groups, such as dynamic path programming used by Jalan and Ravallion (2002) for Argentina, are the subject of future investigation. The choice of age groups is perhaps the most arbitrary but sample size constraints suggested partitioning into three categories was the most appropriate: a young category of those heads aged less than 30 years old, a middle category for those between 30 and 50, and an older category of those aged 50 plus. Zambia is divided into 9 regions and further into administrative districts: we selected district as our second shared

[10] To be more precise, there was a small panel of urban households created for the 1991 and 1993 surveys but it is not possible to link the two sets of households into the data sets.

characteristic in order to control for heterogeneity across agro-climatic zones, and further differentiate between urban and rural areas within districts. This gives us a sample size of 147 rural groups and 102 urban groups. This gives on average 40 observations per cohort, a sample size that should be adequate for the regression analysis that follows.

We first present some summary statistics on poverty and expenditure transitions over time. Table 5 shows movements in and out of poverty between each pair of years, and confirms the descriptive statistics presented earlier of persistently high poverty: around 85-90% of the pseudo-panel remained poor between years and an additional 5-10% became poor between years. Only a very small percentage (3-5%) of the pseudo-panel was able to escape poverty between any two pairs of years in the 1990s.

TABLE 5: POVERTY TRANSITIONS

	P→P	NP→P	P→NP	NP→NP
1991 to 1996	141(84)	17(10)	6(4)	4(2)
1991 to 1998	142(85)	16(10)	5(3)	5(3)
1996 to 1998	150(89)	8(5)	8(5)	2(1)

Notes: Based on the pseudo panel constructed by district and age groups (rural and urban collapsed into one observation). Poor is defined as those whose per adult equivalence expenditure is less than 47,158 kwacha. Figures in parentheses are the percentage of households in that category.

Because of the persistently high level of poverty in each year of the 1990 surveys, the poverty transition matrices conceal much movement below the poverty line. Since our regressions will examine changes in consumption per adult equivalent, rather than movements across a poverty threshold, we also present here a transition matrix constructed on quintiles. Table 6 shows movements between quintiles between 1991 and 1998. The top entry of each cell (i,j) row shows the percentage of households in quintile i in 1991 that moved to quintile j in 1998. For example 38.89% of those originally in quintile 1 moved to quintile 2 and almost 13% jumped up to quintile 5. The bottom entry of each cell (i,j) shows the proportion of those finally in column j originated in row i. For example of those who ended up in the top quintile, quintile 5, 52% were there in 1991 and almost 15% came from the bottom quintile.

TABLE 6: TRANSITION MATRIX , 1991-1998.

			1998			
1991	1	2	3	4	5	Total
1	29.63	38.89	11.11	7.41	12.96	100

		30.77	38.18	12	7.84	14.58	21.09
	2	34.62	7.69	28.85	23.08	5.77	100
		34.62	7.27	30	23.53	6.25	20.31
	3	18	24	26	28	4	100
		17.31	21.82	26	27.45	4.17	19.53
	4	9.8	21.57	17.65	29.41	21.57	100
		9.62	20	18	29.41	22.92	19.92
	5	8.16	14.29	14.29	12.24	51.02	100
		7.69	12.73	14	11.76	52.08	19.14
Total		20.31	21.48	19.53	19.92	18.75	100
		100	100	100	100	100	100

Notes: Matrix based on quintiles of per adult equivalent income in each year.

The transition matrix based on quintiles reveals much more movement than that based simply on transitions over a poverty threshold, which suggests that regression analyses based on the continuous distribution of consumption expenditures will prove more fruitful than a limited dependent variable approach.

We now discuss in greater detail the specification of the pseudo-panel consumption growth model. The dependant variable is the change in the log of median household consumption expenditure per adult equivalent (defined as above for the poverty summary). The independent variables are no longer household specific variables but averages of initial values for each cohort in the pseudo-panel. Continuous variables are collapsed into medians for each group and discrete variables collapsed into proportions of households with a given characteristic. So, for example, a continuous variable such as household size, rainfall or distance to a particular facility such as a food market are expressed as the median value for that group, taking an initial value (in log form to aid interpretation of the coefficients). Variables such as gender and employment of household head are collapsed into the proportion of households in the cohort with that characteristic, again using initial values only, following Niimi, Vasudeva-Dutta and Winters (2003).

The full list of explanatory variables is as follows:

Non-Trade related variables

Proportion of household heads that are:
- Male
- Less than primary (reference)
- Primary educated
- Secondary educated
- Tertiary educated

Median value of:
- Household size

Reform related variables

Proportion of households that grow:
- Hybrid maize
- Local maize

Median Value of
- Inverse of prop. of local maize harvest sold
- Inverse of prop. of hybrid maize harvest sold

Median Distance to (in logs)
- Food market

Land area cultivated (hectares)
Variance of long run annual rainfall (from monthly data for 36 meteorological stations from the Zambian Meteorological office)
Province controls
Central (reference)
Copperbelt
Eastern
Luapula
Lusaka
Northern
North-Western
Southern
Western
Strata controls:
Small farmers (reference)
Medium farmers
Large farmers
Non-agricultural households
Low cost housing
Medium cost housing
High cost housing
Post office
Primary school
Secondary school
Health facility
Water supply
Public transport
Proportion of household heads that work as:
Unemployed (reference)
Self-employed
Government employee
Parastatal
Private sector employee
Employer
Unpaid family worker
Other
Proportion of household heads that are employed in:
Agriculture, forestry and fisheries
Mining and quarrying
Light manufacturing
Heavy manufacturing
Electricity, gas and water
Services
Public administration
Not employed (reference)

We conduct separate regressions for urban and rural areas, dropping the maize production and land variables and farm dummies in the urban regressions. Table 7 shows the rural regression results. The first observation is that few coefficients are statistically significant, suggesting that grouping by age of household and district creates some groups that are too small to yield precise estimates. The second observation is that only one of the trade-related variable coefficients is statistically significant, marketisation of hybrid maize: cohorts who initially sold a high proportion of their hybrid maize harvest experienced higher growth of consumption expenditures. However, even though almost all of the coefficients on the trade related variables are not statistically significant most have the expected sign but: cohorts with greater proportions of workers employed by parastatals, in the private sector and as employers suffered lower growth of median consumption expenditure, as did those with high proportions employed in heavy manufacturing and services. Cohorts with higher proportions of households engaged in agriculture appear to have done better than others, although the results are not statistically significant. Of the non-trade variables, higher levels of education are generally positively associated with consumption growth between 1991 and 1998. Although the lack of statistical significance of the trade-related variables is somewhat disappointing the results do suggest that some trade effects can be identified.

TABLE 7: RURAL CONSUMPTION GROWTH, 1991-1998.

Non-Trade variables		*Trade-related variables*	
Prop of hh heads that are:		Prop of hh heads that work as:	
Male	-0.987	Self-employed	0.232
Primary ed	1.938 *	Govt employee	1.733
Secondary ed	-3.113 *	Parastatal	-0.645
Tertiary ed	3.115	Private employee	-3.274
Median value of		Employer	-25.120
Household size	-0.193	Unpaid family worker	-3.189
Land	-0.370	Other	-5.917
Rainfall	-0.013	Prop. hh heads employed in:	
Province controls		Agriculture	1.979
Copperbelt	-7.652	Mining	0.454
Eastern	-0.062	Light manu	18.259
Luapula	-0.025	Heavy manu	-0.367
Lusaka	-6.412	Electricity etc	17.061
Northern	1.786	Services	-2.697
North-Western	-2.827	Public administration	-11.179
Southern	4.826 *	Prop of hh that grow:	
Western	-0.363	Hybrid maize	0.159
Med scale farmers	-3.869	Local maize	0.777
non-ag hhs	-2.013	Hybrid maize sold	-0.542 *
Constant	2.422	Local maize sold	0.058
		Distance to	
		Food market	-0.009
		Post office	0.093
N	147	Primary school	-0.136
Adj R^2	0.27	Secondary school	-0.067
		Health facility	0.078
		Water supply	0.285
		Public transport	0.012

Notes: * indicates coefficient is statistically significant at the 5% level or better.

5. CONCLUSIONS

This paper has attempted to implement the conceptual framework of Winters (2002) using repeated cross-section data for Zambia. This case-study presents probably the toughest challenges to such an objective. Attributing poverty changes to trade liberalisation is made more difficult than usual by the range of reforms introduced during the 1990s, and the lack of panel data compounds these difficulties. Pseudo-panel data analysis has revealed that some effects of trade reform can be identified but they are not precisely estimated.

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APPENDIX

TABLE A1. ADULT EQUIVALENCE SCALE

Age (years)	Male Weight	Female Weight
0	0.33	0.33
1	0.46	0.46
2	0.54	0.54
3-4	0.62	0.62
5-6	0.74	0.70
7-9	0.84	0.72
10-11	0.88	0.78
12-13	0.96	0.84
14-15	1.06	0.86
16-17	1.14	0.86
18-29	1.04	0.80
30-59	1.00	0.82
60+	0.84	0.74

Source: Dercon, 1998.

TABLE A2: URBAN CONSUMPTION GROWTH MODEL , 1991-1998.

Prop of hh heads that are		Prop of hh heads that work as	
Male	-0.013	self-employed	-0.710
Primary educated	-0.146	government employee	-0.898
Secondary educated	0.324	Parastatal	-0.660
Tertiary educated	-1.439 *	private sector employee	-1.830
Median value of		Employer	5.519
Household size	-0.171	unpaid family worker	-3.844
Variance of long run annual rainfall	-0.179	other	-7.840
Province controls		Prop of hh heads employed in:	
Copperbelt	0.069	Agriculture	-1.707
Eastern	12.861	mining	0.625
Luapula	4.934	light manufacturing	-2.387
Lusaka (dropped)		heavy manufacturing	2.215

	Northern	-2.470	Electricity etc	-2.520	
	North-Western	14.098	Construction	32.266	
	Southern	-3.082	Services	-0.346	
	Western	0.083	Public administration	2.259	
Strata			Distance to		
Medium cost housing		0.023	food market	-0.436	
High cost housing		-0.141	post office	0.021	
Constant		2.062	primary school	-0.188	
			secondary school	0.232	*
N	102		health facility	-0.245	
Adj R^2	0.26		water supply	0.491	
			public transport	0.488	*

Note: * indicates that a coefficient is statistically significant at the 5% level or better.