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Public Expenditure and Poverty Alleviation in the South African Labour Market

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Abstract

The paper utilises a class of poverty measures to determine the potential cost to the fiscus, in 1995 Rands, of alleviating poverty in South Africa. The simulations are undertaken for both households and individuals in the society, by the different covariates of poverty.

The study finds that the commitment required from the state to reduce poverty, is fairly modest, albeit within the realm of very strict assumptions. In addition, the paper illustrates that individual and household level data imparts differential poverty information, which is important for policy prescriptions.

Finally, it is evident that for state targeting purposes, the nature of household poverty is fairly easily reduced to a small sub-group of labour market defined household types.

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1. Introduction

Perhaps one of the more under-developed areas of poverty and labour market research in South Africa is that of understanding the parameters of the state's required poverty expenditure and in turn, linking this commitment to their potential poverty effects. It is not clear what poverty or social welfare impacts at the individual and household level will result from specific and quantifiable public expenditure outlays, or indeed what value of fiscal expenditure is required to minimise poverty in the society. It would be crucial to determine the possible poverty impact of, for example, a wage subsidy on farm workers, and also what value of wage subsidy would generate zero poverty amongst the recipients of the subsidy. This paper will empirically assess the public expenditure commitment necessary to generate zero poverty in the society – with consideration given to the different household and individual categories in the economy. In addition, an attempt will be made to provide some sensitivity analysis, where intermediate expenditure outlays are correlated with reduced (but non-zero) poverty levels. This analysis will in turn provide a comparison and assessment of two alternative types of income grant schemes.

2. The Theoretical Approach

The most useful measure for simulating the effects on poverty of various policy interventions is the poverty gap measure. The poverty gap measure is derived from the general class of poverty measures developed by Foster, Greer and Thorbecke (1984). The FGT index of poverty measures, can be represented in general form as:

$$P_a = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^a \qquad (1)$$

where n is the total sample size, z is the chosen poverty line, q is the number of poor agents and y_i is the standard of living indicator of agent i. The parameter α measures how sensitive the index is to transfers between the poor units. The poverty gap measure (PG) is generated when α=1, and therefore for a given poverty line z[1] is presented as:

$$P_1 = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right) \qquad (2)$$

As is clear, the PG represents a direct measure of agents' incomes relative to the poverty line. It is a money metric of poverty in the group under scrutiny. A first advantage of the FGT index, is its additive decomposability, which allows for sub-group poverty measures to be summed to form a society-wide measure without any loss of generality. More importantly here, the PG measure, in being linked to money values, can be utilised to run simulations on the poverty impacts of income transfers to the poor for any given reference group in the society. Remembering that P_1 is a measure not simply of how many

[1] If we assume an infinite number of poverty lines, we can then trace what is known as the Poverty Deficit Curve, which is represented as $P_1 = \int_0^z \left(\frac{z-y}{z}\right)^a f(y)dy$. This is the area under the Poverty Incidence Curve, which is associated with the headcount index.

poor agents there are, but also of how poor the poor are, we do arrive at a fairly nuanced analysis of the welfare outcomes of poverty alleviation strategies.

Utilising the poverty gap measure then, it is possible to calculate the minimum financial cost of poverty alleviation. This is done by assuming that the poverty outcome in each sub-group is for P_1 to be zero. Put differently, it means that the income to each agent in the sub-group or society (y_i), would at least be equal to the value of the poverty line (z). This value can be determined from the equation (2) by calculating $\sum_{i=1}^{q}(z-y_i)$. A reformulation of this, and one that is easier for calculation purposes, is nzP_1. Using the latter as a basis, we can therefore present the minimum financial cost of alleviating poverty as measured by P_1, to the sub-group or society by the value associated with nzP_1 (Kanbur,1987:71). This figure represents the minimum commitment required of the state in that it assumes perfect targeting, with zero administrative and other costs generally associated with welfare transfer schemes. It is also assumed that the scheme would elicit no behavioural responses from any potential recipients. These responses are particularly important when individuals' returns to labour supply fall within the range of the transfer value. While these assumptions are of course extreme, the value of nzP_1 does provide a very useful first step in trying to gauge the importance and magnitude of the problem facing the society or the public sector.

The value of nzP_1 can be extended to include sub-divisions of the total sample. Hence, what can be determined is a matrix of the minimum financial commitment required to eradicate poverty amongst different groups at the household and individual level in the society. It is also useful to determine the poverty impact when committing to expenditure less than the value of nzP_1. In this way, we engage in sensitivity analysis that provide results which correlate intermediate expenditure changes to intermediate alterations in the poverty gap. It has to be remembered that these results would also not explicitly take account of the administrative and other set-up costs associated with an income grant programme. Following from Kanbur (1987), it is possible to deal with this sensitivity analysis through a methodology that allocates specific income grants to agents. There are two alternative ways of operationalising such a fiscal intervention. One would be an additive income grant and the other a multiplicative grant. An additive income transfer would be an absolute transfer independent of the income earned by the recipient. For example, one could think of a R50 increase to old age pensioners or single unemployed mothers, as an additive income transfer with imperfect targeting. A multiplicative transfer would be set as a fraction or percentage of the recipients given income, and hence the absolute amount received would differ across agents. An example here would be to lower average tax rates on all individuals earning in a certain income range. Simulation of each of these two types of transfers – additive or multiplicative – will impart relevant information concerning the effect on poverty in the society or sub-group.

Examining the additive case first, and assuming that we account for the entire income distribution, an increase in everybody's income in the society of an absolute amount, Δ_i, will mean that equation (1) takes the form:

$$P_a = \int_0^{z-\Delta} \left(\frac{z-y-\Delta}{z} \right)^a f(y)d(y) \qquad (3)$$

Hence each agent gets a transfer in each scheme of Δ_i while the total cost of the scheme would be Δ. The marginal impact on poverty, as measured by P_1, would be calculated as (Kanbur,1984:73):

$$\frac{dP_a}{d\Delta} = -\frac{a}{z} P_{a-1} \qquad (4)$$

Equation (4) presents the unit change in poverty as measured by P_a, given a unit change in the transfer value, Δ_i to each agent in the society. Hence, an increase of Δ_i to each agent in the society or sub-group would cause poverty to fall by a specified and calculable value. It is possible to see that the amount by which poverty will decline, is proportional to P_{a-1}. Using P_1 as a guideline, an increase of Δ_i would cause a parallel downward shift in the poverty deficit curve associated with the measure P_1 in equation (3) above. In other words, the change in poverty can be measured here in relation to the poverty line, z, and the headcount index P_0 (or more generally P_{a-1}). The headcount index is therefore an important indicator of the impact of public spending on poverty, despite not serving as the direct measure of poverty in the methodology.

The second simulation case is to assume that the expenditure is multiplicative in nature. Following from the above the corresponding equations that present the distribution function associated with the multiplicative expenditure, Δ, and its impact on measured poverty respectively are:

$$P_a = \int_0^{z/(1+\Delta)} \left[\frac{z - y(1+\Delta)}{z} \right]^a f(y) d(y) \qquad (5)$$

$$\frac{dP_a}{d\Delta} = -\frac{a}{1+\Delta} \left[P_{a-1} - P_a \right] < 0 \qquad (6)$$

Note that the value of the transfer is expressed as a share of the income of each agent. Again, the headcount index is a relevant variable in understanding how measured poverty is affected by budgetary allocations. Here, it is the weighted difference between P_a and P_{a-1} that calculates the degree to which poverty falls after an expenditure that is multiplicative in nature.

3. Simulations for South Africa

Utilising the above methodology, it is possible to estimate the once-off costs of eradicating poverty amongst different groups in the society. An important conceptual issue is to deal adequately with the unit of analysis in the different simulations. This relates to the problem of individuals and households in poverty analysis. In the language of the labour market individuals earn or receive income, but from a strict poverty perspective it is households that should be examined when trying to understand income in relation to poverty. The analysis here will be diligent in trying to ensure that both individual and household level impacts of poverty-alleviating expenditure are adequately dealt with. This is particularly important, as each approach offers separate conceptual advantages.

3.1. Expenditure for Zero Poverty

It was noted that the minimum expenditure required to yield zero poverty in the society is represented by nzP_1. The tables below provides these estimates for different sub-groups in the society. A few things need to be noted about the tables. Firstly, the analysis is based on the October Household Survey of 1995 (OHS95), which sampled about 30 000 households, drawn from 10 selected households in each of 3 000 clusters. For the household-specific data, the accompanying Income and Expenditure Survey (IES) was also utilised. The IES undertook to survey a sub-sample of those households in the OHS95. Secondly, for

all the calculations that follow, the household poverty line chosen was R903 per month, a scale based on May (1995). The resultant individual poverty line drawn directly from this measure was R293 per month[2]. Finally, given the date of the survey, the money values presented are in 1995 prices.

Table 1 below provides baseline estimates of the minimum financial commitment required to eradicate poverty at the household level. The different sub-groups of households, are those characterised by the race of the household head and the location of the household. The total number of dwellings in the society is about 9.5 million, of which about 3 million are poor households. The national poverty gap measure for this group is about 0.13. As a consequence, the minimum financial commitment necessary to eradicate poverty at the household level in the economy using the 1995 data, is approximately R12.9 billion per annum. This is equivalent to spending R4 276 per year per poor household. The state's total expenditure in 1995, at current prices was about R154,9 billion, and thus the cost of eradicating household poverty in the society constitutes 8.31% of this expenditure.

Table 1: Minimum Poverty Alleviation Expenditure for Households[3]

Sub-Group	n	q	P_1	Exp.(nzP_1), p.a.	Unit Expenditure	% of Total Expenditure
Total	*9 475 165*	*3 010 855*	0.1254	12,874,672,944	4276.09	8.31
African	6 625 570	2 749 295	0.1188	12,198,138,822	4051.39	7.87
Coloured	783 595	187 707	0.0078	797,780,073	264.97	0.52
Asian	249 906	11 356	0.0003	28,304,986	9.40	0.02
White	1 816 094	62 497	0.0023	239,334,822	79.49	0.15
Urban	5 122 047	831 863	0.0370	3,802,212,727	1262.83	2.45
Semi-urban	177 302	52 081	0.0024	249,167,387	82.76	0.16
Rural	4 175 816	2 126 911	0.0876	8,993,747,101	2987.11	5.81

In terms of the race-household distribution of public expenditure, a disproportionate share is allocated to African households. While African households form about 70% of the total household population, they constitute 95% of poor homes in the society. As a result R12.2 billion of the total expenditure will be allocated to households where the head is African. Coloured households, are marginally under-represented amongst poor households relative to their share in the total household population. Coloured dwellings thus form 8.3% of the population, and 6.2% of the poverty eradication expenditure. The commitment from government for these households is less that 1% of total expenditure outlays. No significant financial commitment is required from the fiscus to eradicate poverty amongst Asian and White households. For White households despite the fact that they form close to 20% of all homes in the society, the commitment from the state constitutes under 2% of the poverty eradication expenditure. The location results reveal the importance of rural household poverty in South Africa. To eradicate poverty amongst rural households, the state would need to commit to at least R8.9 billion per

[2] Given that the expenditure figures below will be presented as annual commitments, the equivalent household poverty line is R10 836 and the individual annual poverty line, R3 516.

[3] The decomposability properties of the FGT measure is particularly useful here, and the P_1 measures are calculated according to the formula, $P = \frac{\sum_{j=1}^{m} P_j n_j}{n}$ where the j individuals are summed by the m sub-groups in the sample and then weighted by the total sample, n, to derive the composite P_1 value. It should be noted that using this formula, the value for the minimum financial commitment by m sub-groups will be equal to $nz\sum_{j=1}^{m} \frac{n_j P_j}{n}$. In this table and all that follow, the variable q refers to the number of those in poverty, while P_1 represents weighted shares of total poverty.

annum, constituting 5.8% of the state's total expenditure in 1995. Notwithstanding the expected predominance of rural household poverty, 31% of fiscal expenditure on poverty alleviation would still need to be allocated to urban households.

The household poverty alleviation figures may be complemented by a description of the magnitude of commitment required from the state, by the different labour market cohorts in the society. In a more general vein, this is an analysis of poverty and public expenditure at the individual rather than the household level. Table 2 below attempts to achieve this division of individual poverty alleviation expenditure, by calculating the value of nzP_1 for individuals identified by their labour market status, where z is now R293 per month, and the unemployed are of course zero earners.

Table 2: Minimum Poverty Alleviation Expenditure for Labour Market Individuals

Sub-Group	n	q	P_1	Exp. (nzP_1), p.a.	Unit Expenditure	% of Total Exp.
Labour Force						
Total	*13 817 522*	4,499,617	*0.3100*	*15,060,546,279*	*3,347.07*	9.72
African	9 550 773	3,971,141	0.2700	13,117,249,985	2,915.19	8.47
Coloured	1 509 564	379,631	0.0300	1,457,472,221	323.91	0.94
Asian	414 511	49,675	0.0000	0	0.00	0.00
White	2 342 674	99,170	0.0100	485,824,074	107.97	0.31
Urban	8 528 908	2,100,535	0.1600	7,773,185,176	562.56	5.02
Semi-Urban	263 791	81,463	0.0200	971,648,147	70.32	0.63
Rural	5 004 374	2,301,880	0.1300	6,315,712,956	457.08	4.08
Employed						
Total	*9 947 208*	721,625	0.03	1,049,231,500	233.18	0.68
African	6 146 540	622,992	0.03	1,049,231,500	233.18	0.68
Coloured	1 191 020	84,206	0.00	0	0.00	0.00
Asian	364 780	1,932	0.00	0	0.00	0.00
White	2 244 868	12,495	0.00	0	0.00	0.00
Male	6 127 107	269,078	0.01	349,743,833	77.73	0.23
Female	3 820 101	452,547	0.02	699,487,667	155.45	0.45
Urban[4]	6 546 947	182,856	0.01	349,743,833	77.73	0.23
Semi-urban	189 015	10,036	0.00	0	0.00	0.00
Rural	3 207 066	528,733	0.02	699,487,667	155.45	0.45
Agriculture	1 266 183	288,918	0.01	349,743,833	77.73	0.23
Mining	463 743	2,085	0.00	0	0.00	0.00
Manufacturing	1 497 292	21,833	0.00	0	0.00	0.00
Construction	92 470	10,386	0.00	0	0.00	0.00
Utilities	472 457	370	0.00	0	0.00	0.00
Wholesale	1 730 487	68,001	0.00	0	0.00	0.00
Transport	510 099	4,081	0.00	0	0.00	0.00
Finance	643 354	2,526	0.00	0	0.00	0.00
Community	3 271 123	323,425	0.02	575,063,423	127.80	0.37
Armed Forces	19 949	0	0.000	0	0.00	0.00
Manager	570 923	7,201	0.001	34,974,383	7.77	0.02
Professional	351 518	347	0.000	0	0.00	0.00
Technicians	1 137 083	3,698	0.000	0	0.00	0.00
Clerks	1 205 348	10,194	0.001	34,974,383	7.77	0.02

[4] The full sample of employed individuals is not included here as 0.04% of the survey are coded as missing in terms of their reported location.

Service	1 124 283	30,872	0.001	34,974,383	7.77	0.02
Skilled Agric.	129 267	9,143	0.000	0	0.00	0.00
Craft	1 211 344	25,556	0.002	69,948,767	15.55	0.05
Machine Operators	1 152 070	26,551	0.002	69,948,767	15.55	0.05
Domestic Helpers	379 684	22,973	0.001	34,974,383	7.77	0.02
Agric. Lab.	944 531	250,972	0.008	279,795,067	62.18	0.18
Mining Lab.	256 891	8,925	0.001	34,974,383	7.77	0.02
Manuf. Lab.	352 742	12,770	0.000	0	0.00	0.00
Transport Lab.	38 307	934	0.000	0	0.00	0.00
Domestic Workers	713 035	267,439	0.013	454,666,983	101.05	0.29

The data illustrates for example, that the state would need to spend approximately R15 billion per annum to keep all individuals in the labour force out of poverty. This static figure amounts to R3 347 per poor person per annum, which constitutes 9.7% of total government spending in 1995. Note that the individual expenditure value is greater than the household figure above, indicating that the cost to keeping a household out of poverty involves economies of scale not realised when dissecting the sample by individuals only. The racial division for the labour force, again shows the dominance of African individuals. While the state would need to spend about R108.00 per year per poor White worker in order to keep them out of poverty, the corresponding figure for Africans is exactly 27 times greater. The racial disparities are also evident in that Africans form 69% of the labour force but 88% of all poor individuals in the labour force, while the corresponding figures for Whites is 17% and 2.2%.

The second set of figures for the labour market concentrate on employed individuals, by race, gender, location, sector and occupation. It is immediately apparent that the required resources from the fiscus declines sharply when only employed individuals are included. The expenditure required falls by over R14 billion, suggesting that the large numbers of unemployed would capture a substantial portion (93%) of the state's poverty eradication expenditure. Hence, a labour market focused poverty eradication programme would be overwhelmingly targeted at the unemployed. It is tempting then to describe the fault line of poverty in the labour market, as between the employed and the unemployed. However, as the discussion below will illuminate, pockets of poverty do exist amongst specific categories of the employed as well – that may require modification of this strict division.

Expenditure on the employed by race, once again yields over-expenditure on Africans, relative to their share in the population. The financial resources required for the employed according to gender, shows greater spending is required for women than men. Despite the fact that women form only 38% of the workforce, the state needs to spend twice as much on poor employed females compared to males in order to end poverty in this cohort. Female expenditure constituted 0.45% of total government expenditure in 1995.

It is the sector and occupation cohorts though that provide for an interesting analysis of labour market poverty. At the sectoral level, the two poorest sets of individuals are those in Agriculture and Community & Social Services. These two sectors account for 85% of all the poverty amongst employed individuals in the labour market. Community & Social Services has marginally more poor individuals than Agriculture. These two sectors account for close to 90% of all the required expenditure on the employed poor. More specifically, the state would need to spend R78.00 per poor individual in Agriculture and R128.00 in Community & Social Services every year to eradicate poverty in these sectors. This sectoral picture of poverty is mirrored in the poverty results by occupation. The two poorest occupations are Domestic Services and Agricultural Labourers. These two occupations account for 72% of all the employed poor in the labour market. Note that there are more poor individuals that are domestic workers than farm labourers. As a result, the state would need to spend R101.05 per annum

per domestic worker versus R62.18 per farm worker, to eliminate poverty amongst these individuals. These two occupations would have accounted for 0.47% of the government's total expenditure in 1995.

From the above table then, it can be argued that the majority of public expenditure would be committed to the unemployed. A strict separation in poverty terms between the employed and the unemployed does not, however, exist. This is particularly true in the case of farm workers and domestic workers who represent the core of the working poor in the labour market. These two groups of workers would require a substantial public expenditure commitment aimed at poverty reduction. This suggests that should public expenditure take the form of a labour market intervention, due consideration should be given to the fact that poverty exists not only amongst the unemployed, but also amongst sections of the employed. There would remain though, the real danger of disincentive effects on the labour supply decision of these two cohorts of workers, from this type of government support.

Perhaps a stronger mechanism for displaying this shared poverty amongst the unemployed and a segment of the employed is found in Table 3 below. The table presents household level data, but these are households categorised according to their labour market status. Hence each labour force individual - in this case domestic workers, farm workers and the unemployed, is linked back to their respective households. The sub-groups therefore, are of households characterised by a labour market status variable. The sample in each category is mutually exclusive. Hence, the households that domestic workers are found in, refers specifically to those dwellings where domestic workers, *and no unemployed individuals or farm workers,* reside. This is to avoid double-counting in our poverty measures, which would bias our poverty gap estimates. In addition, the households wherein combinations of these three labour force types are found, is included under the sub-group termed 'Combined'. Note that this category represents a minor share of these selected indigent household types. The data illustrates that while these four household types account for 54% of the total population, they represent 73% of all poor homes in the society. In terms of trying to gain a labour market view of household poverty then, it is evident that these four sub-groups of households are a fairly strong representation of how labour market earnings generate the observed household poverty levels in the society.

Table 3: Minimum Poverty Alleviation Expenditure for Selected Households

Sub-Group	n	q	P_1	Exp.(nzP1), p.a.	Exp. per Agent	% of Total Exp.
Total	9 475 165	3 010 855	0.1254	12,874,672,944	4276.09	8.31
Domestics	407 247	185 841	0.008	807,045,012	268.05	0.52
AgricW	662 888	424 002	0.018	1,803,417,208	598.97	1.16
Unemployed	3 386 180	1 371 302	0.058	5,917,762,505	1965.48	3.82
'Combined'	698 632	230 745	0.014	1,430,818,542	475.22	0.92

In terms of public expenditure, the state would need to spend about 77% of its total poverty eradication budget on these households. Hence, well over two-thirds of fiscal support for the poor would need to be targeted at only four types of dwellings in the society, accounting for 6.4% of the government's total expenditure. The largest share of the annual expenditure would accrue to households with unemployed individuals (R5.9 billion), followed by farm worker (R1.8 billion), combined worker households (R1.4 billion) and then domestic worker dwellings (R807 million). Ultimately, if one were to use a general targeting rule of capturing the most disadvantaged labour market participants, together with ensuring that their households were the recipients of public support, this sub-group meets the requirement in a powerfully optimal manner. Clearly, public support that takes cognisance of both the individual and household dimensions of poverty, can ensure that the effectiveness of the expenditure is

maximised.

With regard to farm workers and domestic workers, an interesting switch occurs when moving from the individual level data to household data. In the previous table domestic workers were poorer than farm workers, and hence required greater expenditure than the latter to place them out of poverty. However in Table 3 above, it is evident that farm workers come from poorer households than domestic workers. Not only is the number of farm worker homes in poverty larger than those of domestic workers, but the intra-group poverty measure, not shown here, is also higher for farm workers[5]. A possible reason for this outcome is that farm worker households are by their very nature found in rural or semi-urban areas. This location effect is a strong predictor for greater household poverty, given the nature of rural labour markets and the returns provided to labour in these areas. Hence, the data shows that close to 92% of all farm worker homes are in rural areas, while the corresponding figure for domestic workers is 49%. A second reason for this outcome was tested; namely that the probability of multiple earners is greater in domestic worker homes, so increasing the total household income earned. The data illustrates however, that this is an unlikely source of the poverty differential, as the number of earners per household type is fairly equal. Hence farm worker households have on average 1.8 earners while domestic worker homes have about 2 earners each.

Another interesting facet of the individual and household differences can be highlighted when comparing the unemployed as individuals to the households they live in. As individuals the unemployed, by definition, earn no income and are therefore the poorest in the labour force. However, at the household level, this dynamic changes. While this sample of dwellings clearly outnumber those of any other poor sub-group, the poverty measures tell a slightly different story. The poverty gap measure for households with the unemployed is lower than that of domestics and farm workers. The household P_1 measure amongst the unemployed households is 0.16, while the headcount index is 40.50, compared to 0.18 and 45.63 amongst domestics and 0.25 and 63.96 amongst farm workers. Put differently, while there are more unemployed households living in poverty, the extent of poverty within this sample is lower than amongst domestic or farm worker dwellings. It would appear then that farm workers come from the poorest homes in the society, while the unemployed in fact live in homes that are generally better off than the other two categories.

There are a few lessons in the above empirical experiments for policy prescriptions. Firstly, the data suggests that despite the very strict assumptions of zero running and fixed costs in the income transfer, the value of the financial commitment asked of the state for both individuals and households is fairly modest. This is supported by comparisons with the relatively large expenditure outlays on other functions of government. Secondly, the markers of household and individual poverty, such as race, location and occupation, are important determinants of this expenditure. An extension here is that labour market poverty should not simply be expressed as a distinction between the employed and the unemployed, given that pockets of deep poverty do prevail amongst the employed. Thirdly, the choice of generic sub-groups in the form of individuals or households significantly alters the description of poverty, and therefore the magnitude of expenditure allocations. Finally it is evident that should the state opt to target those households with domestic workers, farm workers or the unemployed residing in them, a large proportion of poverty in the society will be captured. As such, a targeting of expenditure in this way involves a creative and effective manner in which to give credence to both the individual and household dimensions of poverty.

3.2. Additive and Multiplicative Income Grants

[5] The household Headcount measure for domestics is 45.63, while for farm workers it is 63.96. The respective P_1 measures are 0.18 for domestics and 0.25 for farm workers.

While the above provides the minimum financial commitment necessary to yield zero poverty in the society, it may be informative to examine the possibility of non-zero poverty outcomes from public intervention. Hence, a hypothetical public transfer programme set at an intermediate absolute value per individual or household, independent of their income or as a share of their income, can be generated with the sample. In so doing the sensitivity analysis will yield results that measure the responsiveness of the poverty gap measure to the stipulated state support. As with the above section, there is no account of all the added costs associated with such a welfare transfer scheme.

The table below presents the first case of an additive transfer to households. It is assumed here that each poor household in the society is allocated a lump-sum transfer from the state, valued at R2400 per annum, or R200 per month per household. As with Table 1, the household categories are by race and location. The total figures indicate that an annual subsidy of R2 400 to each poor home would cost the state about R7.2 billion. Expenditure of this value would in turn cause the poverty gap to fall from 0.125 to 0.063, a 49.5% decline in society-wide poverty. The value for H/z as explained above, reflects the marginal decline in poverty associated with a marginal increase in the value of the subsidy, Δ. Hence, the results show that a R1.00 increase in the subsidy to each agent will cause P_1 to fall by 0.000022 units. An approximate halving of national household poverty requires the state to commit 4.66% of its total annual expenditure.

Table 4: Poverty Impact on Households of Additive Transfer of R2400 p.a.

Sub-Group	Q	qD	Old P_1	New P_1	% Change	H/z	% of Tot. Exp.
Total	3 010 855	7,226,052,000	0.125	0.063	-49.50	-0.00002182	4.66
African	2 749 295	6,598,308,000	0.119	0.061	-48.82	-0.00001926	4.26
Coloured	187 707	450,496,800	0.008	0.004	-53.91	-0.00000213	0.29
Asian	11 356	27,254,400	0.000	0.000	-58.01	-0.00000007	0.02
White	62 497	149,992,800	0.002	0.001	-57.90	-0.00000036	0.10
Urban	831 863	1,996,471,200	0.037	0.018	-50.83	-0.00000654	1.29
Semi-urban	52 081	124,994,400	0.002	0.001	-47.96	-0.00000041	0.08
Rural	2 126 911	5,104,586,400	0.088	0.045	-48.94	-0.00001487	3.30

The racial dimensions of household poverty re-appear very strongly here, as do the location effects. Note that given the fact that Asian and White households are likely to be less poor than Coloured and African dwellings, the reduction in the poverty gap is larger for the former groups. Hence a transfer to all the poor will have the greatest impact on those closest to the designated poverty line. The stronger impact for urban, as opposed to rural households reflect the same trend, although the effect is smaller than for the race-based data.

The above simulation was also carried out on individuals using a subsidy value of R50.00 per month, or R600 per annum. The table is provided in the Appendix below. The results show that poverty amongst the labour force falls by 19%, while for the employed it declines by 41%. The large difference here is due to the zero earners picked up in the labour force. The cost to the fiscus of reducing poverty to this new level for the labour force would be approximately R2.7 billion, while for the employed the figure would be R433 million. Once again for the employed, the largest expenditure would be for domestic workers and farm workers. The biggest decline in poverty by occupation is for professionals and managers. This indicates that these two occupations are the best off amongst the poor in the labour market. The sectoral data reveals that individuals in Manufacturing and Mining live closest to the poverty line, as a R50 monthly transfer would cause the poverty gap here to fall by over 90%. Clearly then, even though a lump-sum transfer means the same cash-in-hand for all the poor, it is those who are relatively less poor - or closer to the poverty line - who will benefit the most from the expenditure.

Table 5 below presents the results of the R2400 per annum transfer to the households with domestics, farm workers and the unemployed in them. Once again, it is evident that a large share of the total poverty expenditure would be captured by this sub-set of households. In addition, the value of the transfer would appear to have the greatest poverty impact for the combined worker homes, as their poverty gap measure would fall by over half. The corresponding figure for the other categories is only marginally lower though.

Table 5: Poverty Impact on Selected Very Poor Households of Additive Transfer of R2400 p.a.

Sub-Group	q	qD	Old P_1	New P_1	% Change	H/z	% of Tot. Exp.
Total	3 010 855	7,226,052,000	0.125	0.063	-49.50	0.00002182	4.66
Domestics	185 841	446,018,400	0.008	0.004	-49.92	0.00000095	0.29
AgricW	424 002	1,017,604,800	0.018	0.009	-50.69	0.00000231	0.66
Unemployed	1 371 302	3,291,124,800	0.058	0.030	-48.33	0.00000679	2.12
'Combined'	230 745	553,788,000	0.014	0.007	-52.46	0.0000016	0.36

Given the uneven distribution of earnings within each of these household categories, the poverty impacts of the transfer do not accord entirely with the initial poverty gap measures. It still remains true though that equal transfers to households that differ in poverty status will have a differential outcome on each agent, depending on their position in the overall earnings distribution. It is interesting to note that to decrease poverty amongst domestic worker households by half, the state would need to spend a mere R446 million per annum – amounting to 0.29% of its total annual expenditure in 1995. The commitment for unemployed dwellings is greater given their sheer weight of numbers thus accounting for 45% of all poverty eradication expenditure. From the above table, it is possible to conclude that in committing R2400 per annum to the most destitute households in the society, the state would be able to go a significant way toward eradicating household and individual level poverty.

The case of a multiplicative income grant programme presents with the same set of assumptions about perfect targeting and zero running and other costs. However, the very nature of the programme means that its poverty outcomes will be different to that of an additive income grant. Only two tables will be presented here, and both consider the sample of the three household types that capture most of the deep poverty in the society[6]. Table 6 presents a multiplicative intervention that offers each poor household 68% of its current income. The figure was chosen as it represented the share of income required to place the median household in the total sample out of poverty. It is immediately evident, in comparison with Table 5 above, that such a transfer has a more powerful impact on overall poverty in the society. Hence, while total poverty declined by 50% in the additive case, here it falls by about 65%.

Table 6: Poverty Impact on Select Poor Households with Multiplicative Transfer of 0.68

Sub-Group	Old P_1	New P_1	% Change P_1	(1/1+0.68)* [H – P_1]	% of Total Exp.
Total	0.125	0.044	-64.87	-0.069	5.65
Domestics	0.008	0.003	-63.59	-0.003	0.35
AgricW	0.018	0.006	-67.82	-0.010	0.79
Unemployed	0.058	0.021	-62.79	-0.033	2.60
'Combined'	0.014	0.004	-69.26	-0.004	0.63

Likewise, the impact on each of the household types is over 60%. As with the additive case, the largest impact is for combined worker homes, followed by farm workers. While the multiplicative programme offers different cash transfers, in value terms, to each recipient it is still true that the position of each agent in the income distribution will affect the degree to which the transfer affects their poverty status. The public expenditure commitment shows that if the state spent 4.37% of its total expenditure in 1995 on these three household types, it would reduce their poverty levels by over 60%.

It is important though to weigh the relative effectiveness of the additive versus multiplicative transfer scheme. This can be done by assuming a multiplicative case that in total would cost the same as the additive programme. Based on the data, and using the full sample of households, it was found that an income transfer of 35.7% of each agent's income was equivalent to the total cost of the additive grant programme. Hence the table below provides the results from such a simulation. When compared with the previous table, it is evident that the poverty outcomes are more modest, with the P_1 measure dropping by about 40% across all categories.

[6] The Appendix provides estimates of the multiplicative programme for households by race and location, for both income grant simulations.

Table 7: Poverty Impact on Select Poor Households with Multiplicative Transfer of 0.357

Sub-Group	Old P_1	New P_1	% Change in P_1	(1/1+0.357)* [H-P_1]	% of Tot. Exp.
Total	0.125	0.073	-41.75	-0.104	4.66
Domestics	0.008	0.005	-42.21	-0.006	0.29
AgricW	0.018	0.010	-44.01	-0.018	0.66
Unemployed	0.058	0.035	-39.95	-0.047	2.12
'Combined'	0.014	0.008	-46.09	-0.006	0.36

However, what the table does suggest is that a multiplicative programme will have a smaller impact on poverty, when compared with its additive equivalent. Across all the household types, the change in the value of the poverty gap was smaller in comparison with the results of Table 5. For example, while an additive transfer to unemployed households caused poverty to fall by 48%, in the equivalent multiplicative case, it fell by only 40%. The reason is obvious: poorer agents are disadvantaged by a multiplicative system as it offers them less cash in hand than those who are higher up in the income distribution. The lesson for policy makers then is that in order the maximise the impact on poverty alleviation, additive grant schemes are a better option than the multiplicative programme, which disadvantages those at the lower end of the income profile.

4. Conclusion

This paper offers a number of important lessons about poverty and public policy in addition to some notable pointers for future research. Hence, as a first approximation the study has yielded detailed baseline estimates of what, free of all additional costs, is required of the state to reduce poverty in the society. In addition, the results show that a creative combination of individual and household level data can be very informative as to the formulation of appropriate policy interventions. Relatedly, the centrality of the labour market and individual earnings in understanding poverty is displayed. In combining these two units of analysis, we see that poverty in South Africa is readily condensed into three, labour market defined, household types. The additive and multiplicative grant programmes show firstly that a low financial commitment does go a significant way toward reducing poverty. Secondly though, the comparison of the two programmes offers the prescription that the additive scheme is friendlier to those who are relatively worse off amongst the poor.

In terms of extending this work further, it is evident that estimates would need to account for the additional costs associated with the schemes. Secondly, it may be useful to derive a matrix of the required financial commitment from the state, over a short-run period of say five years. This would present a more realistic picture of expenditure by the state. Finally, the analysis would be greatly enhanced by applying this methodology to already existing welfare interventions in the country, such as for example, the old age pensions scheme.

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Appendix

Table A: Poverty Impact on Individuals of Additive Transfer of R600 p.a.

Sub-Group	q	qD	Old P1	New P1	%change	H/z	% of tot. exp.
Total	4,499,617	2,699,770,200	0.301	0.244	-19.03	-0.001113	1.74
African	3,971,141	2,382,684,600	0.268	0.217	-18.95	-0.000940	1.54
Coloured	379,631	227,778,600	0.025	0.020	-20.02	-0.000135	0.15
Asian	49,675	29,805,000	0.003	0.003	-17.50	-0.000016	0.02
White	99,170	59,502,000	0.007	0.006	-17.64	-0.000022	0.04
Employed							
Total	721,625	432,975,000	0.034	0.020	-40.74	-0.000234	0.28
African	622,992	373,795,200	0.029	0.028	-4.48	-0.000191	0.24
Coloured	84,206	50,523,600	0.004	0.003	-9.49	-0.000038	0.03
Asian	1,932	1,159,200	0.000	0.000	20.72	-0.000001	0.00
White	12,495	7,497,000	0.001	0.001	26.73	-0.000004	0.00
Male	269,078	161,446,800	0.010	0.009	-16.00	-0.000075	0.10
Female	452,547	271,528,200	0.023	0.023	0.81	-0.000159	0.18
Urban	182,856	109,713,600	0.010	0.010	-2.46	-0.000063	0.07
Semi-urban	10,036	6,021,600	0.000	0.000	-4.58	-0.000003	0.00
Rural	528,733	317,239,800	0.021	0.020	-4.71	-0.000168	0.20
Agriculture	288,918	173,350,800	0.009	0.008	-13.79	-0.000085	0.11
Mining	2,085	1,251,000	0.001	0.000	-92.18	0.000000	0.00
Manufacturing	21,833	13,099,800	0.011	0.001	-90.60	-0.000007	0.01
Construction	10,386	6,231,600	0.000	0.000	-9.32	0.000000	0.00
Utilities	370	222,000	0.000	0.000	-49.01	-0.000004	0.00
Wholesale	68,001	40,800,600	0.003	0.003	-0.06	-0.000019	0.03
Transport	4,081	2,448,600	0.000	0.000	-16.75	-0.000001	0.00
Finance	2,526	1,515,600	0.000	0.000	-23.17	-0.000001	0.00
Community	323,425	194,055,000	0.017	0.018	1.85	-0.000118	0.13
Armed Forces	0	0	0.000	0.000	0.00	0.000000	0.00
Manager	7,201	4,320,600	0.001	0.001	21.14	-0.000002	0.00
Professional	347	208,200	0.000	0.000	34.22	0.000000	0.00
Technicians	3,698	2,218,800	0.000	0.000	15.54	-0.000001	0.00
Clerks	10,194	6,116,400	0.001	0.001	11.06	-0.000003	0.00
Service	30,872	18,523,200	0.001	0.001	-1.34	-0.000009	0.01
Skilled Agric.	9,143	5,485,800	0.000	0.000	1.15	-0.000003	0.00
Craft	25,556	15,333,600	0.001	0.001	-8.01	-0.000008	0.01
Machine Operators	26,551	15,930,600	0.001	0.001	-21.99	-0.000006	0.01
Domestic Helpers	22,973	13,783,800	0.001	0.001	-8.29	-0.000007	0.01
Agric. Labourers	250,972	150,583,200	0.008	0.007	-14.86	-0.000074	0.10
Mining/Constr. Labourers	8,925	5,355,000	0.000	0.000	-18.34	-0.000003	0.00
Manuf. Labourers	12,770	7,662,000	0.000	0.000	-15.22	-0.000003	0.00
Transport Labourers	934	560,400	0.000	0.000	-16.17	0.000000	0.00
Domes Workers	267,439	160,463,400	0.013	0.013	2.34	-0.000100	0.10

Multiplicative Example 1 : Transfer of 0.68

Table B: Poverty Impact on Households with Multiplicative Transfer of 0.68

Households	n	p1w,old	p1,new,w	%change in P1	(1/1+0.68)*[h-p1]
Total	9475165	0.12539506	0.044057	-64.87	-0.06878
African	6625570	0.11880584	0.042830	-63.95	-0.06332
Coloured	783595	0.00777011	0.002231	-71.29	-0.00337
Asian	249906	0.00027568	0.000063	-77.23	-0.00014
White	1816094	0.00233104	0.000611	-73.78	-0.00095
Urban	5122047	0.03703230	0.012676	-65.77	-0.01555
Semi-urban	177302	0.00242681	0.000892	-63.25	-0.00114
Rural	4175816	0.08759612	0.031092	-64.51	-0.05173

Multiplicative Example 2 : Transfer of 0.357

Table C: Poverty Impact on Households with Multiplicative Transfer of 0.357

Households	n	p1w,old	p1,new,w	%change in P1	(1/1+0.357)*[h-p1]
Total	9475165	0.12539506	0.07304035	-41.75	-0.1038
African	6625570	0.11880584	0.070283501	-40.84	-0.09479
Coloured	783595	0.00777011	0.004051972	-47.85	-0.00539
Asian	249906	0.00027568	0.000129577	-53.00	-0.00027
White	1816094	0.00233104	0.001111781	-52.31	-0.00147
Urban	5122047	0.03703230	0.020982464	-43.34	-0.02323
Semi-urban	177302	0.00242681	0.001459095	-39.88	-0.00187
Rural	4175816	0.08759612	0.051599155	-41.09	-0.07797