

**Sharing the Cake: A Review of Provincial Equitable Share
Formula in South Africa[©]**

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1. Introduction

The method of determining intergovernmental transfers is a critical component of a multilevel fiscal system. Theoretical literature on fiscal federalism as well as contemporary experiences of various multilevel governments show that it is important to have formula based rather than discretion based transfer system. Furthermore, the formula should be designed to be equitable and without disincentives for tax effort and expenditure economy. Equity is interpreted to mean provision of adequate resources to enable the subnational governments to carry out their functions satisfactorily or meet their expenditure needs so long as they exploit their taxable capacity to the stipulated extent. This would enable the subnational governments to provide normative standards of public services at stipulated tax-prices. Thus in a scientifically designed transfer system, it is important to estimate the capacity to raise revenues (revenue capacity) and expenditure needs.

The design and implementation of provincial equitable share (PES) formula used for allocating revenues to the provinces is of critical importance for the delivery of social services in the Republic of South Africa. The Constitution assigns the responsibility of providing basic social services (education and health) and administering social security grants and welfare schemes to the provinces. The expenditure implemented by provinces constitutes about 44 per cent of total government expenditure incurred at all levels although they raise only about 1.3 per cent of revenues. Thus, over 97 per cent of the provincial expenditure is financed from the transfers from the national government and almost 90 per cent of this is received by way of PES.

There are a number of reasons for undertaking the review of the PES formula at the present juncture. First, by the end of the 2004-05 fiscal year, the prevailing formula would have been fully phased in. Second, a new medium term cycle will start from 2004-05 and it would be opportune to fit in any changes in the formula to coincide with the new cycle. Finally, the new census data have become available in 2003 requires an assessment of the appropriateness of the current weights assigned to the different components, since the formula is heavily driven by demographic patterns.

This paper reviews the provincial equitable share formula from its inception to the current period, (i.e. 1999/00 to 2003/04.) The paper evaluates the performance of the formula with respect to the stated policy objectives of the government, taking into account the provisions of Section 214 (2) a-j, and other relevant sections of the Constitution.

II. Rationale for Equalising Transfers

The rationale for unconditional transfers is grounded on the horizontal equity principle. Taking the comprehensive concept of income to include current consumption, net accumulation to wealth and current benefits from government services, it can be shown that, even when fiscal systems of the

center and individual provinces treat equals on an equal footing, nation-wide horizontal equity may be violated (Boadway and Flatters, 1982). This happens because the fiscal activities of subnational governments cause differential net fiscal benefits (expenditure minus taxes or NFB) to individuals with equal incomes.

Differences in NFBs arise mainly because of regional differences in taxable capacity or unit cost of providing public services. This can also occur if the provinces have powers to levy origin based taxes. In such cases, to ensure horizontal equity unconditional transfers may be given to equalize net fiscal benefits across states. Such transfers discourage fiscally induced migration, reduce barriers to factor mobility and thereby, enhance economic efficiency. Thus, equalizing transfers are argued to be one of the rare instances in economics where efficiency and equity considerations are in harmony (Boadway and Shah, 1994).

In a fiscal system where provinces do not have significant tax powers, the objective of the transfer system can not be to offset the fiscal disabilities of the provinces. In such a system, the design of the unconditional transfers is fairly straightforward. Unconditional transfers to subnational governments without significant tax powers are essentially to employ the subnational governments as spending agencies. In such a system, ensuring horizontal equity requires that each of the provinces should receive the transfer equivalent to enable it to provide identical real value of public services. In such cases, variation in the unit cost of public services is the only source of inequity. Thus, the transfer system should be designed to take into account all cost differences beyond the control of provinces. However, in a system with little tax powers to provinces, the ability of the provinces to vary the standards of public services or their composition in accordance with the preferences of residents would be limited and thus, the system does ignore a major advantage of fiscal decentralization.

III. The Transfer System in South Africa: A Retrospective View.

III.1 FFC Recommendations 1996

The formula that is currently in use is based on the recommendations of the FFC that were submitted in 1997. In making its recommendations on the structure of the formula for the equitable division of national revenue, the FFC proposed that:

- (a) the division of nationally raised revenue between the national and provincial spheres of governments be based on a constitutional allocation of functions, whereby the delivery of the major basic services to the public, such as education and health care, are the responsibility of provincial governments and
- (b) the total provincial allocation (G) be divided among the provinces by means of a formula comprising three major elements:
 - (i) a basic grant (B) to enable provinces for the provision of public services in the fulfilment of their constitutional obligations according to their own priorities.

- (ii) a national standards grant (S) to enable the provinces specifically to provide primary and secondary education and primary health-care to their residents; and
- (iii) a tax capacity equalisation grant (T) to encourage provinces to take responsibility for raising their own revenue. This component of the formula is an essential element in developing provincial accountability for expenditures.

In addition, recognising the national role of the academic hospitals, the FFC recommended separate conditional grants (m) to those provinces having such institutions. Thus the total transfers to be received by the provinces were expressed as:

$$G = B + S + T + m$$

The FFC recommended that the formula be phased in over a period of five years, to give the provinces that would get lower shares in their budgetary allocations than previously sufficient time to make the necessary adjustments.

Both in respect of education and health grants, the FFC proposed that there should be demographic, policy and cost components in the formula. In the case of education the three components respectively identified as, children in the age group 5-17; (ii) teacher - pupil ratio of 1:38 (derived from an average of 1:40 for primary schools and 1:35 for secondary schools) and normatively determined salary and non-salary outlay (required number of teachers multiplied by the average salary and non-salary costs). The amount accruing to a particular province is determined by multiplying the average grant per pupil by the number of children the 5-17 cohort in that province. Similarly in the case of health, the demographic component defines the "qualifying population"; the policy component is the projected target of visits to public clinics; and the cost component is derived from a National Health Insurance (NHI) model designed by the national health department.

In its submission for 1998/99 the FFC proposed that the total provincial allocation formula should be extended to incorporate an institutional grant (I) such that the formula becomes:

$$P = S + m + T + I + B$$

The FFC also recommended that provinces be allowed to exercise their constitutional powers to raise their own revenues by imposing, among other taxes, surcharges on personal income tax. In order to make "room" for such surcharges, the FFC proposed that the national government reduce its individual income tax rates by 7 percentage points. The creation of tax room would be phased-in over five years¹.

III.2 Government's responses to the recommendations of the FFC.

The final allocations in the Division of Revenue Bill incorporated the recommendations of the FFC in two ways:

¹ The FFC has maintained this position in subsequent submissions, emphasising the fact that in order to avoid a situation where provinces merely become an administrative arm of national government. In particular, the FFC emphasised in its Submission on The Provincial Tax Regulation Process Bill, (2001) to Parliament that there is a need for provinces to utilise more broad based taxes as opposed to the current user charges.

- (i) There was a broad adherence to the principles recommended by the FFC's submission. The FFC has consistently advocated an objective formula based on demographic data as the proper method for calculating each province's equitable share. The final provincial equitable allocations are derived from a formula similar in design to that proposed by the FFC.
- (ii) the final allocations reflected specific proposals made by the FFC. The FFC was consulted before the revised allocations were submitted to Cabinet and several specific changes to the formula suggested by the FFC were incorporated. In particular, the FFC provided extensive assistance in revising the health and welfare components of the equitable share formula. The FFC recommendation on adjusting the formula to take into account expenditure outcomes in earlier years, was adopted for purposes of the final allocations.

The recommendation on the imposition of a surcharge on personal income tax, which in fact had been proposed by the FFC in its submission in 1996, was not implemented. Instead the cautious approach advocated by the 7th Report of the Katz Commission was accepted in consideration of administrative capacity and economic effects associated with the surcharge on income tax.²

The final allocations in the Division of Revenue Bill reflected the following differences from the FFC approach:

- (i) Although there was some similarity in the components of the formula, the method for calculating the provincial shares was different. The FFC's approach involved estimating the costs of achieving certain minimum standards implicit in Government policies.
- (ii) The final allocations also incorporated the introduction of certain new conditional grants mainly to deal with spillovers. Government stated its belief that the introduction of conditional grants represented a new and innovative step in the intergovernmental financial system.

III.3 Recommendations for the 2001/04 MTEF Cycle

The FFC, in its submission in 2000, proposed that the provincial equitable share allocations formula should be based on the "costed – norms" approach. The recommendation emphasised the point that the equitable share formula should incorporate the need for financing constitutionally mandated basic services (CMBS). Briefly, the final recommendations of the FFC were as follows³:

- (i) The CMBS levels in education, healthcare, and social security should be provided for and where possible, the costed norms

² See Katz Commission 1997, "Seventh Interim Report, "A Synthesis of Policy Recommendations with Regard to Provincial Taxation".

³ For detailed recommendations and the different proposed formulae, See FFC Submission for 2001-04 MTEF Cycle, (May, 2000)

approach should be used to ensure adequate provision of CMBS. The FFC used the costed norms approach to determine formulae for CMBS in health, education and welfare.

- (ii) Each province should be allocated a Basic element (B) to include services not defined as CMBS and any other functions negotiated by the three spheres of government. The B element should be determined in a manner that is consistent with the principle that both the vertical and horizontal division should be based on clear and transparent norms where such norms exist.
- (iii) Each province should be allocated an institutional element set equal to the cost of operating government institutions.
- (iv) The T element should be set at zero (since provinces had no significant tax powers at the time).
- (v) The conditional grants from the national government's equitable share should be used to eliminate backlogs.

For “operational reasons, the Government did not accept these recommendations. However, it acknowledged the importance of the costed norms approach as an analytical tool that could be used to assess performance relating to the provision of basic services in future when the conceptual and data issues required to operationalise the approach have been resolved⁴.

Thus, the Government decided to continue with the formula. However, it also indicated the need for further investigation and consultation to determine whether more recent or appropriate data could be sourced for updating the social sector and backlog components of the formula. Government also indicated the need for further investigations and consultations with regard to the economic activity component, and the possible use of a constant until more appropriate data are available. The Stats SA was informed of the data needs of the PES formula to enable it to take steps to ensure these are made available in good time. The approach to calculating the weights for the social sector components should be reviewed with the intention of moving to a policy based approach. Finally, the current budget process should be continued in regard to the vertical division of revenue

The main concern of the government with respect to the FFC's recommendations seems to revolve around the use of a cost-based approach with respect to determining allocations to provinces. This concern has been mainly on the grounds that the cost-based approach might impose perverse incentives by encouraging cost raising behaviour on the part of the provinces. There is also a perception that such an approach limits the flexibility of provinces in determining their budgets and also could be interpreted as prescribing to provinces on how to spend. However, the FFC has consistently emphasised that correct application of the costed norms approach could ensure that provinces receive the sufficient resources required to deliver on nationally determined standards. What is required to operationalise the

⁴ For a detailed discussion on the Government's response to the costed norms approach, see Budget Review (2001), Annexure E, National Treasury.

approach is the generation of adequate and more accurate data. There is also a need for government to specify the relevant norms and standards that are sensitive to the resource constraints of the country and take into account the notion of progressive realisation as provided for in the Bill of Rights.

Another area of differences has been around the value of expanding provincial own revenue sources by implementing the provisions of Section 228 of the Constitution, although there has been some convergence in this respect with the enactment of the enabling legislation in the form of the Provincial Tax Regulation Process Act (2000). The Act shifts the onus of identifying new provincial taxes to the individual provinces.

In spite of the above technical differences with respect to the formula, the Government has generally agreed with the FFC on the need to prioritise the provision of constitutionally mandated basic services, while at the same time not neglecting the other functions assigned to provinces.

IV. The System

This section describes the system of intergovernmental finance in the Republic of South Africa. The objective of this review is to provide a background to the analysis of the PES formula and to understand the role of provinces in the provision of public services and the method of financing them including the transfer system and to place the inter-governmental transfers in this context.

In terms of providing the CMBS, the role of provinces is critical. The provision of social services such as school education, primary and secondary healthcare, social security and welfare are mainly in the domain of the provinces. Almost 44 per cent of total public expenditures is implemented at the provincial level the national government retains just about 39 per cent of the revenues collected by it and 57 per cent is transferred to the provinces (Table 1).

Spheres of Government	Revenue Allocation (Bn. Rd)	Per cent of Total
National	108.983	38.93
Provincial	158.995	56.79
Of which, Equitable Share	142.386	50.86
Conditional grants	16.609	5.93
Local	12.001	4.29
Of which: Equitable Share	6.343	2.27
Conditional grants	5.658	2.02
Total	279.979	100.00

Source: Intergovernmental Fiscal Review 2003, National Treasury.

An important feature of the fiscal system in South Africa is the overwhelming dependence of the provinces on National revenues to meet their expenditure requirements. The contribution of own revenues to provincial expenditure is minor – just about 3.9 per cent. Over 96 per cent of provincial expenditure is financed from transfers. An overwhelming proportion of the transfers (86.6) is received by way of the PES. Thus, the PES formula design is extremely important in determining efficiency and equity in the provision of public services in South Africa.

	Amount (Bn. Rands)	Per cent of Total
Own Revenues	5.624	3.9
Transfers from National Government	136.936	96.1
Of which: Equitable Share	123.457	86.6
Conditional Grants	13.479	9.5
Total	142.56	100.0

Source: Intergovernmental Fiscal Review 2003, National Treasury.

The design of the PES formula is summarised in Table 3. The formula takes into account seven functions of the provinces. Weights are assigned to the functions broadly based on the aggregate expenditure incurred and are revised periodically to take into account the changes in priorities of the provinces taken in aggregate. The structure of the formula has remained primarily the same since it was introduced in 1997/98, but the weights have been marginally adjusted, mainly in 2002/03. Although the entitlements of provinces are determined for the seven components, individual provinces have the discretion to spend according to their own priorities and the allocation is unconditional and thus, fully fungible.

The PES formulae for individual components are simple and take into account broad indicators of need in respect of each category. However, shortcomings have been pointed out both in terms of the choice of variables and the weights assigned to them by the FFC in its past submissions.⁵ Besides, the formula does not include cost disability factors.

In addition to the PES, the provinces get conditional (specific purpose) transfers. About 10 per cent of provincial expenditure is financed through conditional transfers. These were introduced in 1998 to ensure minimum expenditure levels in all provinces in respect of specified services with significant inter-provincial spill-overs. There are twenty two conditional transfers for a variety of programmes. In the health sector alone, there are eight programmes receiving conditional support. In social development, there are four and in education there are three conditional grant programmes. The most important conditional grant programmes are for national tertiary health services, housing subsidy, strengthening treasury infrastructure in provinces, health professions training and development.

⁵ See Financial and Fiscal Commission Submission for the 2001-04 MTEF Cycle, May 2000

Table 3: The Design of the Provincial Equitable Share formula in South Africa

Equitable share component	Weight	Data used	Formula	Source	Year of data
Education	41	Total enrolment numbers (A_i)	$A_i + 2 [(P_{i6-16})] / \sum_i A_i + \sum_i 2 [(P_{i6-16})]$	National Department of Education: Enrolment figures	Average of last three years enrolment
		School-age cohort (6-17 years) (P_{i6-16})		Stats SA: Census	1996 Census
Health	19	Population with and without medical aid support	$(Ph_i + 4 Pw_i) / \sum_i (Ph_i + 4 Pw_i)$	Stats SA: October Household Census Stats SA: Census	1995 OHS 1996 Census
Social development	18	Target population of each grant type	Sum of grants (weighted 75) and prov population in lowest 2 income quintiles (weighted 25). Grant values are sum of population eligible for old age grant (65), childcare grant (10) and population distribution as proxy for disability grantees (25).	Stats SA: Census	1996 Census
		Ruralness		Stats SA: Income and expenditure survey	1995 IES

Equitable share component	Weight	Data used	Formula	Source	Year of data
Economic activity	7	Gross geographic product (replaced by Remuneration Data in 2000)	Not applicable anymore	Stats SA: GGP	1994 GGP
		Remuneration Data	Provincial share of remuneration	Stats SA: Remuneration data	1999 remuneration data
Backlog	3	Schools Survey of Needs 1998 1998 Health Sectoral Report	Sum of health backlog (18 share), education (40 share) rural weighting (42 share)	National Department of Education: SSN National Treasury: coordination of health sector report	1999 SSN 1998 Health Sectoral Report
Basic	7	Census	Provincial share of population	Stats SA: Census	1996 Census
Institutional	5	Independent of data	Equal proportions		

Source: National Treasury: IGFR

IV. Augmenting Own Revenues of Provinces:

IV.1. Implementing Revenue Powers

In all decentralised fiscal systems, while expenditure decentralisation is found to be desirable, economic efficiency considerations warrant the assignment of only the relatively immobile tax bases to subnational governments. (Musgrave, 1983) Nevertheless, to enable the provinces to match public service provision with the preferences in different provinces, it is important to assign tax powers to them. Linking revenue and expenditure decisions at the margin is necessary also to ensure fiscal accountability. Therefore, in assigning revenue raising powers to provinces, the efficiency loss must be weighed against the gains due to better fiscal management that would result from linking expenditure decisions with those of raising revenues.

The revenue powers exercised by provinces in South Africa are, by all accounts very little. This is true not only in relation to the expenditure responsibility assigned to them, but also in comparison with the revenues raised by regional governments in other countries. In South Africa, the primary revenue sources are assigned to the national government. Thus, while the expenditure assignment in South Africa is highly decentralised to subnational governments, revenue assignment is highly centralised, i.e. national government controls the revenue sources with broad bases while provinces only have access to narrow based taxes and a few user fees.

The Provincial Tax Regulation Process Act (2001) empowers the provinces to raise revenues by levying surcharges on personal income tax and fuel taxes as well, but provinces are yet to make proposals to levy the surcharge under this legislation for approval by the national government. Currently, the provinces in South Africa collect revenue mainly from gambling taxes, motor vehicle licence fees and user fees on hospital services. On average, the provinces in 2001/02 raised 4.2 per cent of total revenues or about 0.6 per cent of GDP (Table 4). The motor vehicle licence fees and other fees connected with the road traffic ordinance formed almost 40 per cent of total revenue. Next in importance is taxes on gambling (10.8 per cent) consisting of casino and horse racing. Hospital fees constituted about 9.2 per cent. Besides, the provinces also received revenue from interest.

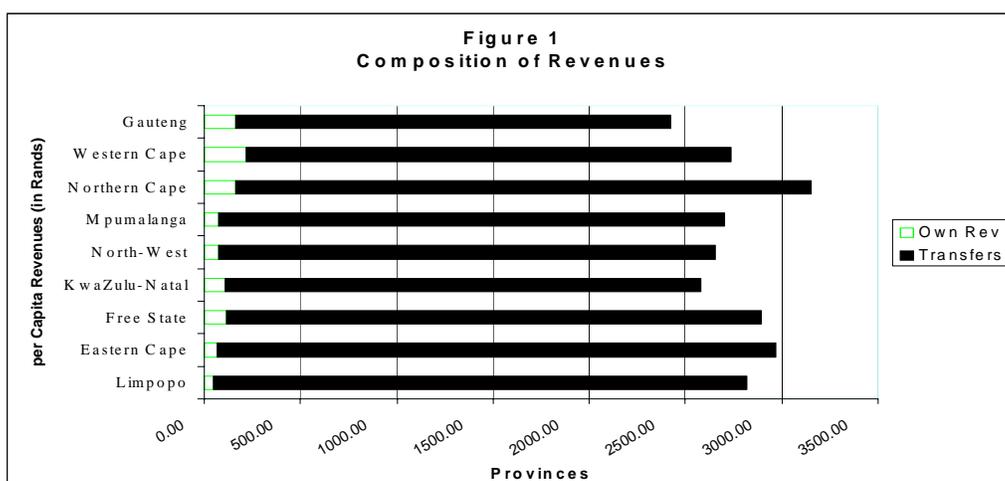


Table 4
Composition of Own Revenues of Provinces

	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
1. Per cent of GDP at market prices						
Road traffic act	0.27	0.22	0.22	0.24	0.25	0.25
Patient fees	0.11	0.07	0.06	0.05	0.05	0.06
Gambling	0.08	0.07	0.07	0.07	0.09	0.07
Horse racing	0.05	0.05	0.04	0.03	0.02	0.02
Casino	0.03	0.01	0.02	0.04	0.07	0.05

Interest	0.16	0.07	0.05	0.06	0.08	0.14
Other	0.23	0.21	0.19	0.22	0.17	0.12
Total	0.85	0.64	0.59	0.64	0.65	0.64
Per cent of Own Revenue						
Road traffic act	32.1	34.6	36.6	37.5	38.5	39.6
Patient fees	12.5	11.1	10.1	8	7.9	9.2
Gambling, of which:	9.9	10.6	11.7	10.9	13.8	10.8
Horse racing	6.2	8.4	7.6	4.2	3.7	3.1
Casino	3.7	2.2	4.1	6.6	10.1	7.7
Interest	18.4	11.3	8.6	9	12.8	21.9
Other	27.1	32.4	33	34.7	26.9	18.6
Total	100	100	100	100	100	100

Source: *Intergovernmental Fiscal Review Statistics*

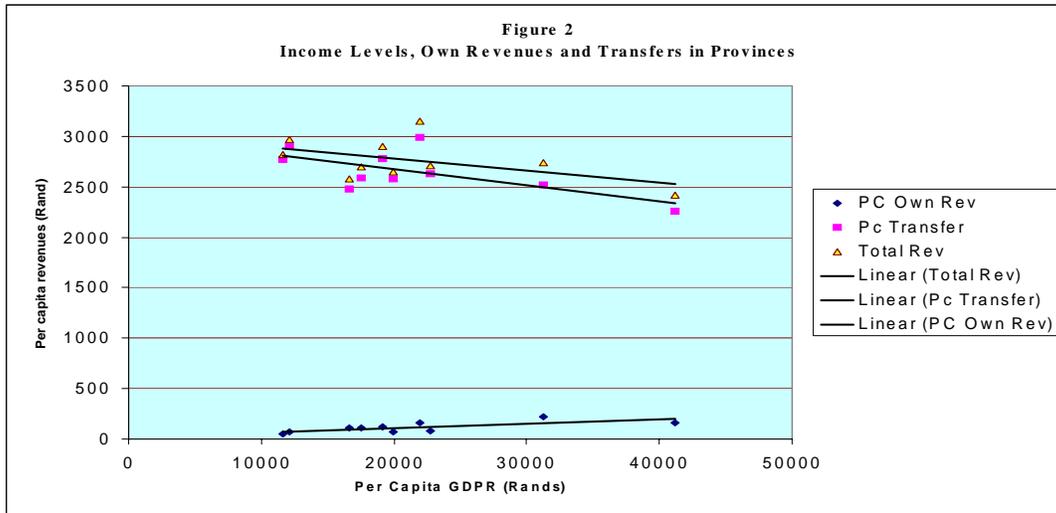
Provinces	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
1. Per Cent of Total Revenue						
Eastern Cape	1.37	1.43	2.58	2.19	2.09	2.40
Free State	4.67	4.24	3.66	3.72	3.94	4.10
Gauteng	7.23	5.92	5.74	6.01	6.21	6.67
KwaZulu-Natal	4.88	3.42	2.24	3.03	3.92	4.16
Mpumalanga	4.13	4.69	3.22	5.42	2.08	2.83
Northern Cape	4.36	4.59	3.47	3.14	3.45	5.21
Limpopo	4.43	1.80	2.45	1.92	2.19	1.71
North-West	5.79	4.03	3.80	3.79	4.58	2.75
Western Cape	5.38	5.55	4.92	6.50	6.42	8.02
Average	4.60	3.75	3.51	3.90	3.96	4.16
2. Per Cent of RGDP – Own Rev						
Eastern Cape	0.43	0.39	0.70	0.58	0.54	0.58
Free State	0.78	0.67	0.63	0.58	0.62	0.62
Gauteng	0.47	0.39	0.37	0.38	0.39	0.39
KwaZulu-Natal	0.83	0.59	0.37	0.49	0.66	0.64
Mpumalanga	0.48	0.52	0.36	0.63	0.25	0.34
Northern Cape	0.74	0.72	0.54	0.47	0.51	0.75
Limpopo	1.50	0.52	0.67	0.51	0.59	0.42
North-West	0.89	0.61	0.57	0.57	0.66	0.37
Western Cape	0.64	0.58	0.51	0.64	0.61	0.70
Average	0.85	0.64	0.59	0.64	0.65	0.64

Ibid

The analysis of own revenues since 1996/97 shows that even the low level of provincial revenues declined from 0.85 percent of GDP in 1996-97 to 0.64 percent in 1997/98 and remained at that level thereafter. As a ratio of total revenues, the share of provincial revenues declined from 4.6 percent in 1996/97 to 3.7 percent in 1997/98 and increased slowly thereafter to 4.1 percent in 2001/02 (Table 4 and 5). The trend is similar in the case of individual provinces. It is also seen that the contribution of individual sources has been stable during the period. Analysis also shows that the contribution of own revenues has been insignificant in each of the individual provinces' GDP. The maximum contribution in terms of contribution to GDP was the

highest in the Northern Cape though in terms of the contribution to total revenues it was the highest in the Western Cape (Table 5).

The overwhelming dependence of the provinces on transfers impacts on the expenditures in two important ways. First, it imposes a constraint on provinces' ability to change their expenditure patterns. Thus, the volume of expenditure incurred by each province depends virtually on the transfers. This also implies the second feature, namely that national government has virtual control over equity in spending through the current structure of the PES formula. Thus, it can be seen that the variation between the provinces in per capita revenues accruing to them is negligible as is shown in Figure 1. In



2001/02, it varied from R. 2420 in Gauteng to 2970 in Eastern Cape with a Coefficient of Variation of 0.08, which has steadily declined from 0.14 in 1996/97 to 0.08 in 2001/02. The above analysis shows the negligible role of own revenues in the finances of the provinces in South Africa. As a consequence, the provinces are unable to significantly augment or alter the allocation to various expenditure items. Figure 2 brings out the negligible role played by the provinces in influencing expenditures. It shows that the province's own revenue is positively correlated with per capita GDP whereas per capita transfers from national have a significant negative correlation (as indicated by the negative slope in Figure 2). The net impact on expenditures however, is per capita expenditures that are negatively related to per capita GDP. The log linear regression estimates show that the effect of own revenue on total revenues is positive and significant, with a buoyancy coefficient of 0.65. However, per capita transfers in provinces are negatively related per capita GDP. Given the negligible role of own revenues and overwhelming weight of transfers in provincial expenditure, the aggregate per capita revenues are also negatively related to per capita GDP with a correlation coefficient of -0.5 .

IV.2. Determinants of Revenues

Although the contribution of own revenue in provincial expenditures is not important, an attempt has been made to explain the differences in per capita revenue collections among provinces. In the statistical analysis, variations in per capita revenues collected in different provinces over the period 1997-98

are regressed on different causal factors such as per capita GDP, poverty ratio and proportion of urban population. The details of the model used for estimating these factors are given in the Appendix.

The important findings of the econometric analysis may be summarised as follows:

- (i) Per capita GDP is not a significant determinant of provincial revenues. This shows that the provinces do not seem to put any systematic effort into raising revenues.
- (ii) Revenue raised by provinces is significantly related to urbanisation and the poverty ratio.
- (iii) Gambling taxes and taxes related to motor vehicles – the two current major tax sources with the provinces are positively related to the degree of urbanisation and inversely to the poverty ratio.

IV.3. Augmenting Own Revenues of Provinces: Policy Issues

The analysis brings out some important features about the raising of own revenue by provinces in South Africa. First, the contribution of own revenues to financing expenditures in the provinces is negligible. This is mainly because the sources of revenue assigned to them are narrow-based. Second, the provinces do not seem to be making concerted efforts to raise revenues even from the sources assigned to them. The lack of relationship between per capita revenues of provinces and their per capita GDP shows that the provincial revenue is largely a random phenomenon. In other words, the provinces do not seem to put in effort to raise revenues and therefore, the revenue raised has no significant relationship with the important taxable capacity factor namely, per capita GDP. Further evidence to this is provided by the fact that even after the enactment of the enabling legislation, namely the Provincial Tax Regulation Process Act of 2001, none of the provinces currently imposes the surcharge on income tax, which the Constitution assigns to them.

Augmenting own revenues of provinces is an important reform issue. This is necessary to provide greater fiscal autonomy to the provinces in terms of their ability to change the level and composition of spending on public services. Besides, as the provinces play a predominant role in public service provision, there has to be a stronger “Wicksellian link”⁶ – the link between revenue and expenditure decisions. Requiring the provinces to make a contribution from their own sources of revenue may be considered as a method of encouraging the provinces to raise revenue from the sources assigned to them under Section 228 of the Constitution. This recommendation is in conformity with the FFC’s past recommendations. Furthermore, the decision to empower the provinces to levy surcharges on individual income tax and fuel tax by enacting the Provincial Tax Regulation Process Act is an attempt to endow the provinces with greater fiscal autonomy.

⁶ The importance of the link has been emphasised in the competitive federalism literature. See, Breton (1995).

In most multilevel systems, revenue assignment to subnational levels has an efficiency cost. The subnational governments do not have a comparative advantage in raising revenues from broad based taxes. The exception to this is the property tax, which is assigned to municipalities. However, in many decentralised fiscal systems, the levies such as land taxes, motor vehicles taxes and stamp duties are also assigned to regional governments. In some countries, regional governments can levy a profession tax as well. Other sources that may be assigned are a surcharge on personal income tax and regional value added tax piggybacking on the national tax.

By itself, assignment of tax powers to provinces would not induce them to raise larger revenue. As already mentioned, even though the provinces have the powers to levy a surcharge on the personal income tax, none of them currently impose the surcharge. It is therefore, important to build in an incentive in the design of the transfer system itself. In particular, the efficient design of conditional transfers involves a matching contribution by the provinces. This would enable provinces to augment these meritorious services with efficiency and their contributing of resources from their own revenues would also give a sense of ownership to the provinces.

V. The PES Formula: Design Issues

V.1 Normative issues of design

As mentioned earlier, there are seven components in the PES formula as shown in Table 3. The funds for the seven components are allocated according to the weights assigned and distributed among the provinces according to the relevant formula for each component. The formula includes a 'need' indicator – a demographic variable representing the beneficiary population group. The share of each province is estimated for each of the seven components separately and then aggregated. The province is free to alter the allocations to different functions according to its own priorities. Over the years, the allocation to social security has increased at the cost of the share of the education and health sectors⁷.

Conceptually, if equalisation is done on the revenue side, there is no need for expenditure equalisation, though cost disabilities may be considered, to enable equalisation in the service standards. However, in a situation where the provinces do not have significant revenue sources, equalising revenues is not a meaningful objective and the transfer system should be designed to provide normatively determined standards of public services. This implies that the cost of providing a given standard of public services in respect of individual functions should be estimated and aggregated to determine the entitlement of each province.

Does the existing PES formula achieve the objective of equity? To enable every province to provide a given level of public service, it is necessary to estimate the admissible cost of providing the given standard of services. Admissible costs include all those costs over which provinces do not have control (Rao and Agarwal, 1994). Expenditure variations among provinces

⁷ See FFC Submission for the Division of Revenue 2004/05, May 2003

can be due to differences in the quantity and quality of public services provided and the unit cost of providing them. Therefore, ideally, the PES formula should estimate the effect of various quantity and cost factors for the seven components. Expenditure “need” can then be estimated by multiplying the given (normative) quantity of the service to be provided with the admissible unit cost of providing the service.

In actual practice, very few transfer systems consider expenditure needs. One important exception to this is the Australian system in which both revenue and cost disabilities are measured by the Commonwealth Grants Commission to estimate the relativities of the States, which is the basis of the distribution of unconditional grants. This is not the case with the PES formula in South Africa, as will be seen below.

The weights for the seven components in the PES formula are determined historically. Although initially this might have depended on the composition of expenditures when it was initially introduced, the weights are not sensitive to the changing composition of expenditures. Secondly, the formula that is currently used to determine the equitable share of the provinces takes into account only one or two variables that broadly represent the quantity factor (need) in the case of the seven components. This however, provides only a partial measure of expenditure need. Thirdly, the measure ignores the impact of cost variations among provinces on expenditures. Input cost variations, including scale economies, are important and these are ignored in the formulae. The shortcomings of the existing PES formulae become clearer when the formulae with respect to individual components are examined.

IV.2 Evaluation of the formula

a. Education:

The determination of the education component of the PES formula is extremely important as it has the highest weighting⁸. The weight assigned to this component is 41 per cent. The design of the education component has an important bearing on the overall distribution of unconditional transfers in South Africa.

The formula for distributing the education component takes into account the primary and secondary school enrolment (S_i) and the population in the age group, 6-17 (P_i) with twice the weight assigned to the latter. Thus, the total funds for educational component (A_{ed}) is distributed among the provinces according to:

$$E_i = [(S_i + 2 P_i) / \sum_i (S_i + 2 P_i)] A_{ed}$$

The enrolment ratio represents actual beneficiaries and the population in the age group is supposed to represent the potential beneficiary group. The

⁸ For a comprehensive discussion of PES formula for education see, FFC (2003), Chapter 2, Part B, pp. 70-81.

enrolment variable is important because the actual cost of providing the service depends on this variable. The reasoning for taking the population variable into account seems to be that irrespective of whether or not all the children attend the school, it is the responsibility of the State to provide this basic service and hence, the provision should be made.

When basic and secondary education is restricted to the specific age group, the children in the relevant age group represent the need variable. Taking the school-age children variable enables the provinces to provide education for all the eligible children. However, when there are repetitions, and even persons from the age beyond 17 years accessing secondary education, the demographic variable ceases to represent potential need. Similarly actual enrolment is a variable representing the actual population group accessing the service. From this point of view, actual enrolment rather than the population in the age group seems to have greater relevance for determining the entitlements of the Provinces.

The appropriateness of enrolment rather than population in the age group is seen from the viewpoint of ensuring the right incentive structure in the transfer design. When actual enrolment is used for distribution, provinces have the incentive to increase the school enrolment in order to gain a larger share of funds. Use of relevant age group population in the formula does not create the incentive to provide better educational access to the population.

Another notable feature of using the school-age-group population for distribution of funds for education is the inequity implicit in it. Giving twice the weight to the population variable, in fact, discriminates against the provinces where the out-of-age children (children below the age of six or above the age of 17), access the education relatively more. The provinces with a greater concentration of poverty are the ones in which more children tend to repeat grades and therefore, the school enrolment would have higher a proportion of children above 17 years. Use of the age-group population does not take the cost of educating these children into account and is therefore, biased against the disadvantaged provinces.

Thus, there is no case for including the demographic variable in the PES formula, much less giving twice the weight to this factor. This, besides giving the wrong incentive structure, is clearly inequitable and needs to be corrected.

In addition, the formula does not take into account the various cost factors impacting on the public service provision. The higher cost of educational attainment of children in provinces with a larger concentration of the poor has already been pointed out. This is because, educational attainment is a function of, *inter alia*, a number of factors such as parental education, health status and nutritional intake of the children. Besides, the formula does not consider factors such as sparsity of population, salary and other input cost differences across provinces.

Before concluding the discussion on education, it is important to refer to the inclusion of early childhood development (ECD) funding in the PES formula for education. The prevailing conditional grant funding for ECD will cease by the end of 2003-04, and the time is opportune to incorporate this in the equitable share formula. As was recommended by the FFC in its submission

(2002/03), this would require that the amount available under the equitable share for education should be augmented at least by the amount incurred under the current conditional grant.

Thus, the education component of the PES would comprise early childhood, primary and secondary education components. The ideal way to determine the shares is to estimate the cost of providing an average standard in respect of each of the three components and to aggregate them to determine the total education requirements for each province. This will be in the spirit of the costed-norms approach recommended by the FFC. However, until such time as a proper costed-norms approach is evolved, the prevailing formula should at least be modified by dropping the population age group 6-16 variable altogether. This would imply that the formula would have only the enrolment variable in each of the three components and weights should be assigned to the three components according to the proportion of average expenditures incurred under the three categories in the provinces taken together.

b. Health:

The PES formula for the health sector empowers the provinces to provide primary and secondary healthcare services. The formula has two components: (i) population covered by the medical aid support (Phi) and (ii) population without the medical aid support (Pwi) The volume of transfers for health is determined on the basis of the two variables with the former variable weighted four times the latter. Thus, the PES formula for health is:

$$(Ph_i + 4 Pw_i) / \sum_i (Ph_i + 4 Pw_i)$$

The data on population with and without medical aid support is taken from 1995 household survey and applied to the census population estimates.

In the formula, population is the only factor used for allocating resources under the PES formula for healthcare expenditures, with the population without medical aid being weighted four times. The reasoning behind this is that the population without medical aid is likely to use the public health facilities provided by the provinces four times as much as those with medical aid support. This is based more on judgement than on any current survey. Besides, the formula does not capture the differences in the use of public health facilities due to differences in the proportion of aged, children below five years and women in reproductive age group. Perhaps, a survey to quantify the intensity of use of public health facilities should be undertaken to design the variable and weighting system. The formula also does not consider the possibility of economies of scale or input cost differences among the provinces.

Primary and secondary health care, like in the case of basic education, is a critical social infrastructure with a high degree of externality. In fact, the

productivity of tertiary healthcare expenditures depends on the health infrastructure. At the same time, it is not the population with or without medical aid facilities that seems relevant for determining the equitable share of provinces. Although the population in general is the beneficiary of healthcare, the requirement of healthcare facilities is greater for certain categories of population. Healthcare requirement is particularly important for small children (less than 5 years), elderly (more than 65 years) and women in the reproductive age group. It may be useful to redesign the formula by including these factors.

c. Social Development:

Social development is the third important component of PES formula, with an 18 percent weight attached to it. It is different from the education and health components in three important respects. First, most components are transfer items rather than provision of services as such. Second, the transfers are means tested and the role of the provinces is to administer them. The proximity to the population and their administrative capacity to implement the programmes are the reasons for assigning the role to provinces. Finally, the actual benefits to the recipients vary depending on a variety of factors including information available to the potential beneficiaries.

The welfare component has two elements. The first provides transfer payments to identified groups, namely, the elderly, disabled and children. The weights for the target population groups were determined according to the historical distribution of expenditure on different grants. The second element is the population in the lowest two quintiles of income distribution determined on the basis of the 1995 Income and Expenditure Survey. The introduction of a child support grant in 2001 has changed the shares significantly. The results of the 2000 survey should now be available and it is desirable to use this information.

It would seem appropriate to make the social security element a conditional grant rather than keep it in the PES formula.⁹

d. Economic Activity:

The economic activity component carries a weight of 7 per cent and is distributed among the provinces on the basis of share of remuneration of employees. The grant is a proxy for the provincial tax revenue, representing the return of a proportion of the revenue raised to the province. In principle, it was supposed to be a temporary component to be replaced when the enabling legislation for provincial taxation took effect. It is also given to meet the costs associated with economic activities such as maintenance of provincial roads. Creation and maintenance of infrastructure depends on the economic activities and the grant is supposed to meet this requirement. However, since 1999, this component of grant has been distributed according to the remuneration of employees in the provinces. There is no clear rationale for using remuneration data as a basis for making the allocations. With the

⁹ For a more detailed discussion on the social development component, see FFC Submission Document, May 2003

new estimates of Gross Geographic Product (GGP) available, the replacement of remuneration with GGP should be considered for the future.

The problem with this component is that if considered in isolation in its current form, it is bound to be regressive. High income provinces have greater economic activity and naturally qualify to get larger funds under this. Infrastructure maintenance expenditure requirements on the other hand, depend on the volume and type of infrastructure, its vintage and such other factors rather than on the remuneration of employees or the GGP. Thus, a more appropriate way to design this component is to estimate the maintenance requirements of roads, buildings and other infrastructure works that the government is required to provide, and allocate accordingly.

e. Basic Component;

The basic component has two elements. The basic share is given according to population. Each province receives funds for this component according to its population share.

The *Backlog* component includes capital (backlogs) needs in education, health and a ruralness factor. The information for the education backlog is drawn from the Schools Survey of Needs and for the health sector, the 1998 MTEF Report on hospital recapitalisation. The information used for determining the shares is not up to date.

In the case of infrastructure augmentation, it is necessary to make a detailed assessment of the capital expenditure requirements taking into account the functions of the provinces. A detailed assessment of infrastructure backlogs based on a scientific assessment of the requirements of different provinces should be the starting point for determining the backlogs and phasing-in its financing over a period of time. Again, it would be necessary to work out a conditional grant programme for this, to ensure that the funds allocated are actually spent in augmenting the infrastructure facilities¹⁰.

f. Institutional Component:

The Institutional Component of PES formula constitutes 5 percent of the total PES transfer and is given in equal amounts to each of the provinces. The underlying logic is that there are fixed costs associated with establishing the institutions for provincial governance and delivery of public service and therefore, these amounts should be provided. There is also an underlying assumption that these institutions are in the nature of public goods and the cost of establishing them remains the same irrespective of area or population. There are however, very few services of pure public good nature provided by provincial governments and most of the services provided are quasi-public goods. Thus, in respect of most of the public goods provided by provincial governments, the total cost of providing the service is a positive function of the population though in many cases, the per capita costs may decline with the volume of output for some range. It may therefore be desirable to have the institutional component determined as a fixed proportion of all other components.

¹⁰ See FFC Capex Model 2003

An important outcome of the component approach in the design of the transfer system is the possibility of offsetting impacts among different components in the way the formulae are designed. Education and health components have some relationship with the need although the design has a lot of room for improvement. In contrast, the Economic Activity component has a regressive impact, as the richer provinces tend to gain more from this component. The disbursement of equal amounts under the “I” component on the other hand, tends to benefit the smaller provinces, which in the context of South Africa are also relatively the poorer ones. The problem with this way of disbursing the funds is that it is difficult to control the ultimate distributional outcomes due to the opposing influences in the different components of the formula. Clarity of objectives needs to be reflected in the design of the transfer system.

VI. Equity and Efficiency Aspects of the PES Formula.

It is important to note that the use of resources allocated to the provinces according to the PES formula is unconditional. In other words, the weights assigned to different components of the PES formula and the design of the various components need not impact on the actual spending. However, since provinces do not raise significant own revenues, they are unable to significantly influence expenditure levels or patterns. It is therefore, not very surprising to see a stability in the composition of expenditures since 1999-2000.

Per cent of Total	1999/2000	2000/01	2001/02	2002/03
Social Services of which	83.2	82.0	82.0	81.2
Education	39.8	39.1	38.3	36.7
Health	24.1	23.9	24.3	22.9
Welfare	19.4	18.9	19.4	21.6
Others	16.8	18.0	18.0	18.8
Total Expenditures	100.0	100.0	100.0	100.0
Per Cent of GDPR				
Social Services of which	13.23	12.98	12.97	
Education	6.32	6.20	6.05	
Health	3.83	3.79	3.84	
Social Development	3.08	3.00	3.08	
Others	2.66	2.85	2.85	
Total Expenditures	15.89	15.84	15.82	

Source: *FFC Annual Submission, 2003*

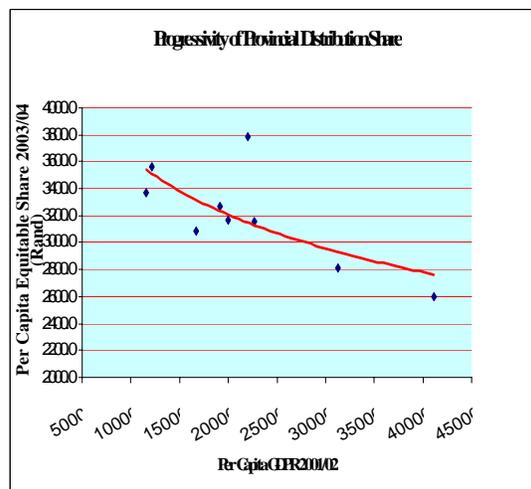
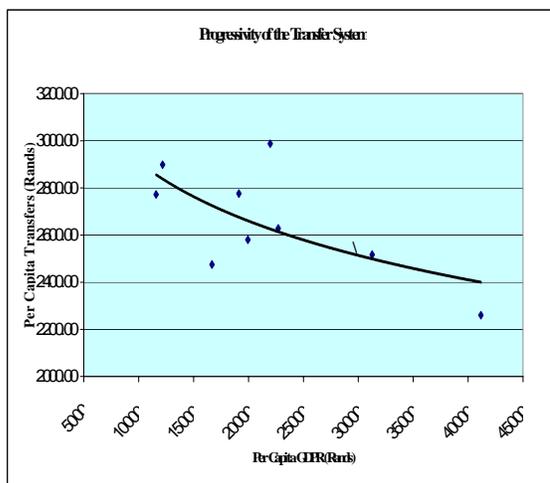
At the same time, the data presented in Table 6 show changing priorities at the provincial level. Although spending on social services constitutes over 80 per cent of provincial expenditures, there has been change in the priority within the social sector. While the share of education and health sectors in total expenditures together declined by 4.2 percentage points from 63.9 per cent in 1999-2000 to 59.7 per cent in 2002-03, the share of expenditures on

welfare payments increased from 19.4 per cent to 21.6 per cent during the period. In other words, increased take-up rates on the various social security grants and therefore increased payments seem to have constrained the ability of the provinces to make larger allocation to spending on education and health sectors.

What has been the overall impact of the transfer system in South Africa in terms of the equity objective? Considering that provinces do not have worthwhile tax powers, the objective of the transfer system is (i) determining the equitable shares for provinces, which in effect implies equal per capita or per beneficiary expenditures and (ii) ensuring minimum standards of certain services through conditional transfers. The equitable share component attempts to enable all provinces to provide a given normatively determined standards of public services taking into account their relative expenditure needs and unit cost variations in providing public services. The PES formula is designed to fulfill this objective. The specific purpose transfers in the context of South Africa are relatively minor. The most important among them are the healthcare grants. In total specific purpose or conditional transfers, constitute around 10 per cent of total transfers to provinces in South Africa. Thus there is very little difference between the distribution of equitable share transfers and total transfers and as the contribution of own revenues from provinces is negligible, there is not much difference between transfers and expenditures of the provinces either.

Table 7 below presents the transfers received by different provinces over the period from 1997/98 to 2001/02 in both per capita terms and as a proportion of GDP. When only plotted against per capita GDP, the analysis shows that by and large, the richer provinces received relatively lower transfers though in statistical terms this was not significant (Figure 3). This is true of PES as well. In that sense, it may be easy to conclude that in broad terms the objective of equity is served.

Per Capita Transfers and Per Capita GDP – 2001/02.



The econometric analysis of revenues and expenditures presented in the Appendix confirms this finding. The expenditure of provinces is negatively related to per capita GDP. However, it shows a positive relationship with urbanisation and is inversely related to the density of population. In other words, the provinces had to provide for these cost disabilities which were not taken into account in the formula. The expenditure of provinces, however, was not significantly related to poverty ratio. Considering the fact that the unit cost of providing public services such as education and health to the poor is higher, not taking this into account is a major weakness of the formula. The econometric analysis also brings out that inequities are created in not taking account of major cost disabilities arising from urbanisation and sparsity of the population, particularly in the case of education and health care services.

A notable feature of the distribution of intergovernmental transfers and their impact on the distribution of expenditures among provinces in South Africa is its remarkable stability (Table 7). The shares of different provinces have changed very little during the last six years. Even where there are marginal changes, it is not possible to discern a pattern in them. Thus, while the share of Gauteng, one of the richer provinces increased from 16.1 per cent in 1997-98 to 16.5 per cent in 2002-03, the share of Western Cape, another relatively rich province declined from 11 per cent to 10.2 per cent during the period. Similarly, pattern is seen in the case of the two lowest income provinces. While expenditure share of Limpopo province in total provincial expenditures increased from 11.9 per cent in 1997-98 to 12.8 per cent in 2002-03, the share of Eastern Cape, another poorest province declined from 16.8 per cent to 16 per cent during the period.

Provinces	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Transfers – Per Capita at Current prices (Rand)						
Eastern Cape	2505.29	2399.44	2462.50	2565.78	2801.54	2898.41

Free State	2179.71	2219.16	2445.46	2466.90	2672.96	2775.84
Gauteng	1688.05	1909.00	1994.78	2095.42	2219.09	2259.80
KwaZulu-Natal	1918.52	2113.11	2165.19	2220.53	2462.45	2474.74
Mpumalanga	1788.23	1828.71	1996.62	2123.53	2401.99	2627.88
Northern Cape	2515.05	2500.75	2547.32	2789.00	2829.79	2987.17
Limpopo	2194.79	2196.54	2282.46	2398.94	2649.03	2772.02
North-West	2040.86	2124.30	2229.44	2326.65	2489.11	2579.47
Western Cape	2484.71	2382.24	2482.78	2519.04	2611.87	2516.70
Average	2087.10	2153.26	2245.73	2332.57	2528.37	2589.17
Per Cent of GDPR						
Eastern Cape	30.91	27.05	26.54	25.95	25.46	23.81
Free State	15.95	15.18	16.63	15.02	15.12	14.52
Gauteng	6.04	6.20	6.04	6.01	5.82	5.49
KwaZulu-Natal	16.26	16.59	15.92	15.59	16.10	14.84
Mpumalanga	11.11	10.51	10.93	11.02	11.63	11.57
Northern Cape	16.26	14.98	14.90	14.62	14.20	13.59
Limpopo	32.42	28.41	26.88	26.02	26.34	23.94
North-West	14.42	14.48	14.40	14.44	13.65	12.93
Western Cape	11.27	9.87	9.91	9.22	8.85	8.05
Average	17.53	16.51	16.18	15.81	15.74	14.77
Per Cent of Total Expenditure						
Eastern Cape		16.8	16.1	16.3	16.5	16.0
Free State		7.1	7.3	6.7	6.7	6.7
Gauteng		16.1	16.7	16.8	16.4	16.5
KwaZulu-Natal		20.4	19.7	19.4	19.7	20.4
Mpumalanga		6.2	6.3	6.5	6.4	6.9
Northern Cape		2.4	2.5	2.5	2.4	2.4
Limpopo		11.9	12.5	12.8	13.1	12.8
North-West		8.0	8.1	8.2	8.3	8.1
Western Cape		11.0	10.9	10.7	10.4	10.2

VII. Concluding Remarks.

The foregoing analysis brings out the important shortcomings of the provincial fiscal transfer system, particularly the PES formula. The major conclusions of the paper are summarised in the following.

1. Given the intention behind their establishment, absence of worthwhile revenue raising power for the provinces is a major shortcoming in the fiscal system in South Africa. Since the provinces get virtually all revenues from the national government by way of the PES (a significant percentage of which is already committed for social services) and conditional transfers, they have very little leeway in determining the level of expenditures. Furthermore, since the PES formula is determined separately for each of the seven components, provinces can change the priorities only to a limited extent.
2. Augmenting the revenue powers of the provinces is essential for a number of reasons. Strengthening the linkage between revenue and expenditure

decisions is necessary for fiscal autonomy, efficiency and accountability. Furthermore, the designing of the conditional transfers in an incentive compatible manner, particularly requiring the provinces to make matching contributions, is possible only when the revenue raising powers of the provinces is augmented significantly. It is therefore, necessary and important to identify some potential sources of revenue for assignment to the provinces.

3. The detailed examination of the PES formula shows that there is still room for improvement in its design. Generally, the formula considers only some beneficiary groups of population in respect of the individual components for allocation to the provinces. There are a number of other “need” factors, such as scale economies affecting the cost disabilities of provinces, which are clearly beyond the control of provinces. These factors would need to be addressed in order to enable every province to provide a given normative bundle of public services. A comprehensive treatment of cost disabilities is possible only through a ‘costed-norms” approach. Therefore it is important to keep that as the medium to long term goal and build the conceptual database and information systems required to achieve the goal.
4. In addition to the general shortcomings of the PES formula, the choice of variables used in the formula for the individual components is not entirely appropriate in some cases. In the case of education, the use of the age group population in the formula imparts inequity to the transfer scheme and creates perverse incentives. The distortion is further accentuated as the variable is given twice the weight assigned to the enrolment variable. There may be no case for including the age group variable and much less for assigning it twice the weight. It is also necessary to incorporate early childhood education in the unconditional transfers by proportionately augmenting the overall volume of allocations.
5. In the case of health care services, the formula only takes into account the population groups with and without medical aid. There is a need to consider the population groups with greater medical need such as children below the age of 5, elders above 65 and women in the reproductive age group.
6. The paper addresses areas of improvement for the PES formula in respect of the other components as well. There is a case for taking out the social development component (social security grants) from the PES formula and converting it to a conditional grant while the processes around the establishment of the social security agency are finalised. The paper also argues that the economic activity component in its current form is inequitable. It is necessary to estimate the infrastructure maintenance requirements of the provinces since the transfer is given for this purpose. With respect to the backlogs component, it is necessary to make a detailed estimate of various infrastructure requirements of provinces, the prevailing levels and the shortfall and to provide them with capital grants in a phased manner to equalise infrastructure levels in provinces¹¹.

¹¹ See FFC Capex model for infrastructure backlogs 2004

7. The regression equations estimated to assess the effect of the prevailing transfer allocation scheme, broadly support the shortcomings pointed out above. The equations for aggregate revenues and expenditures highlight the fact that these are not related to the cost disability factors employed. The equations on education clearly show that the expenditures on education are inversely related to the enrolment ratio. This explains the inequity and the perverse incentives in the PES formula. Similarly, health expenditures incurred by provinces have no relationship with the cost disability factors.

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Appendix

Determinants of Provincial Revenues and Expenditures in South Africa

This appendix undertakes an econometric analysis of determinants of revenues and expenditures in the Republic of South Africa. With respect to provincial revenues, the objective is to find out whether the per capita revenue in provinces is related to any of the identifiable factors representing taxable capacity. In the case of expenditures, the analysis attempts to examine whether the provincial expenditure is related to various identifiable variables that represent cost disabilities.

One of the major problems in undertaking econometric analysis of revenues and expenditures is that in any cross-section frame, there are only nine observations relating to the nine provinces in the country. One way to deal with this problem of limited degrees of freedom is to combine cross-section observations over a given time period in the econometric analysis. In this exercise, the cross-section observations over the period, 1997/98 to 2001/02 have been combined. In order to separate time-specific and province-specific effects, a “fixed-effects” model has been employed for estimation. In the “fixed effects” model, it is assumed that the province-specific effects remain ‘fixed’ or constant and do not vary in combination with other variables. Such ‘fixed-effects’ models, however, allow for differences in the intercept among different provinces. In other words, this model assumes that the effect (slope) of different economic variables on per capita revenues is identical across different provinces, but the level of relationship of different provinces with per capita revenues (intercept) could vary.

Thus, in the analysis of revenue, the following equation was estimated:

$$R_{ij} = f(A_{ij}, T_i, P_j)$$

Where, R_{ij} represents the per capita revenue of province j in time period i , A_{ij} represents the vector of economic variables representing revenue capacity of the province j in time period i , T_i are the dummy variables for the time period, taking value of 1 for the year and 0 otherwise and P_j denotes the dummy variables taking values of 1 and 0 for various provinces. The estimated equation is linear.

Similarly, to analyse the expenditures, the following equations were estimated:

$$E_{ij} = f(A_{ij}, T_i, P_j)$$

Where, E_{ij} represents the per capita expenditure of province j in time period i , A_{ij} represents the vector of economic variables representing expenditure need variables of province j in time period i , T_i are the dummy variables for the time

period, taking the value one for the year and zero otherwise and P_j denotes the dummy variables taking values of 1 and zero for various provinces. As in the case of revenues, linear equations are estimated for expenditures.

Analysis of per capita revenues:

As mentioned above, the “fixed effects” model employed to estimate the effects of various explanatory variables on per capita revenues combines the cross section observations of provinces over 5 years from 1997/98 to 2001/02. Two alternative linear models are used for estimation, one with only province-specific effects, and another with both province-specific and time-specific effects estimated. The explanatory variables included in the revenue regressions are per capita GDP, extrapolated estimates of poverty ratio and proportion of urban population.

Table A1: Determinants of Own Revenues of provinces

Independent variables	Equation 1	Equation 2
Constant	77.7031 (3.369)	
Per capita GDP	-7.09E-05 (0.9407)	0.0044 (1.0295)
Poverty ratio	-1.053410 -(2.7525)*	-(0.2046) -(0.3950)
Per Cent Urban Population	0.8489 (3.5757)*	
Time Dummy 1998/99	-5.1810 -(0.5077)	-8.8933 -(0.0857)
Time Dummy 1999/2000	24.8344 (1.9915)***	2.1157 (0.1225)
Time Dummy 2000/01	29.909 (2.2750)**	0.5734 (0.0025)
Time dummy 2001/02	42.5991 (3.0275)*	4.6123 (0.1557)
Provincial Effect- Eastern Cape		24.0256 (0.4693)
Free State		39.3036 (0.5376)
Gauteng		-16.6374 -(0.1118)
KwaZulu-Natal		24.4455 (0.3888)
Mpumalanga		1.0806 (0.0130)
Northern Cape		36.8724 (0.4596)
Limpopo		19.6395 (0.4207)
North-West		26.5608 (0.3582)
Western Cape		49.2910 (0.4437)
\bar{R}^2	0.7236	0.7645
F – Statistic	17.4576*	11.2040

Both the equations have high explanatory powers. In the case of the equation separating both time and province specific effects, none of the explanatory variables is significant. On the other hand, the equation with time effects shows that while the poverty ratio and urbanisation variables are significant explanatory variables, per capita GDP is not. Given that much of the own revenue is raised from motor vehicle licenses and gambling fees, it is not surprising that urbanisation is a significant determinant. Since, by and large, relatively urban provinces also have higher per capita GDP, the latter variable is not significant. Similarly, the negative relationship between per capita revenue collections and poverty ratio is easily explained by the fact that the density of vehicle population and gambling activity are lower in provinces with higher concentration of the poor.

Analysis of expenditures:

When per capita revenues (including transfers) accruing to provinces and their per capita expenditures are regressed on per capita GDP along with other “need” variables and cost disability factors such as density of population and poverty ratio, the above inference no longer holds. To examine the relationship of per capita expenditures – both aggregate and on education and health sectors (separately) with various need and cost variables, linear regressions are estimated by pooling five cross sectional observations from 1997-98 to 2001/02. This has been done to ensure adequate degrees of freedom. The pooled regressions are estimated in the “fixed effects” model with two alternative specifications. The first one specifies the economic variables along with time dummies, and the second has both time and province specific dummies, as in the case of own revenue equations discussed earlier.

Table A2 presents the results of equations on per capita revenue accruals in provinces and per capita aggregate expenditures. Interestingly, in terms of statistical properties, in the equations without provincial dummies, the economic variables are significant. When provincial dummies are included, the economic variables become insignificant and all provincial dummies are significant. In the case of urbanisation, the data are available for only one year and the same has been repeated in other years. This would be equivalent to province specific effects and therefore, when the province specific dummies are introduced, the urbanisation variable is not included.

The results show that revenue and expenditure allocation, *ceteris paribus*, has a negative relationship with per capita GDP. This indicates that the transfer system as a whole has an equalising impact. It is also seen that per capita expenditures are higher in provinces with greater urbanisation. The significant negative relationship with density of population implies that sparsely populated provinces have had to incur higher per capita expenditures and this has happened despite the fact that this cost disability has not been included in the design of the PES formula. However, as the PES formula does not directly take into account the incidence of poverty in different provinces (except the social development component and to an extent the backlogs component), the variable is not significant which implies

the expenditure distribution among provinces does not take into account the problem of poverty.

The inferences drawn above are based upon the equations without province specific dummies. When the intercept dummies are introduced to separate province specific effects, none of the economic variables is significant. In other words, if province specific effects are taken into account, the transfer system does not impact on equalisation of the expenditures.

Table A3 presents regression results of education and health sectors. In the case of education expenditures, in addition to the two equations estimated in the 'fixed effects' model pooling the observations for five years, two more equations have been estimated pooling three years beginning 1999/2000. That is because learner –teacher ratio data are available for only these three years.

Table A2: Regression Results

Independent Variables	Total Revenue		Total Expenditure	
	Equation 1	Equation 2	Equation 1	Equation 2
Constant	2464.453 (16.4321)*		2262.067 (12.6081)	
Per capita GDPR	-0.0417 -(6.7720)*	-0.0213 -(1.5123)	-0.0196 -(2.1541)**	-0.0245 -(1.2273)
Density			-1.2034 -(3.6698)*	4.6140 (0.9821)
Poverty ratio	-2.1751 -(0.8740)	2.6437 (1.5785)	2.6071 (0.9188)	2.9932 (1.8441)
Per Cent Urban Population	10.3619 (6.7114)*		9.1043 (5.6379)*	
Time Dummy 1998/99	132.5004 (1.9966)**	115.8246 (3.5677)*	-31.4291 -(0.4806)	-35.2383 -(1.1240)
Time Dummy 1999/2000	332.4697 (4.0998)*	214.6895 (3.8431)*	-16.7093 -(0.1913)	-28.3087 -(0.4891)
Time Dummy 2000/01	584.1639 (6.8330)*	434.3424 (5.9142)*	209.238 (2.1865)**	197.2524 (2.4554)**
Time dummy 2001/02	755.1109 (8.2525)*	568.7460 (5.9383)*	483.5706 (4.5309)*	472.6306 (4.3346)*
Provincial Effect- Eastern Cape		2483.198 (15.0022)*		2425.048 (15.0907)*
Free State		2576.084 (10.8974)*		2689.647 (10.2580)*
Gauteng		2652.64 (5.5133)*		1192.538 (0.9087)
KwaZulu-Natal		2297.63 (11.3015)*		2035.739 (6.4284)*
Mpumalanga		2330.46 (8.6898)*		2373.602 (8.6807)*
Northern Cape		2880.296 (11.1046)*		3177.894 (8.9281)*
Limpopo		2301.642 (15.2506)*		2272.586 (13.8445)*
North-West		2411.702 (10.0601)*		2466.879 (9.9014)*

Western Cape		2944.92 (8.1987)*		3030.426 (7.3137)*
$\bar{R}^2 =$	0.7413	0.9455	0.7628	0.9533
F – Statistic	19.0082*	55.5295*	18.69*	60.9975*

N= 45. * significant at one per cent level. ** significant at five per cent level. *** significant at ten per cent level.

Table A3: Regression Results: Education and Health Sectors

Independent Variables	Education				Health	
	Model 1	Model 2	Model 1 N= 27	Model 2 N=27	Equation 1	Equation 2
Constant	819.8341 (12.436)		602.1633 (4.4879)		302.7905 (8.9358)*	
Per capita GDP	-0.0063 (-4.797)	0.0035 (-0.652)	-0.0031 (-1.3395)	-0.0109 (-1.4529)	-0.0052 (-1.4825)	-0.0049 (-0.6300)
Enrolment ratio	-467.732 (-7.411)	-342.525 (4.2734)*	- 399.6861 (-3.4861)	- 197.3498 (-1.5109)		
Learner – Teacher ratio			0.6391 (0.3012)	2.3760 (1.0196)		
Density	-0.0345 (-0.556)	1.1012 0.848	-0.0919 (-1.0545)	2.8438 (1.3487)	0.1859 (1.1995)	1.6373 (0.8236)
Children<5 and Elders>65					0.0057 (3.7658)*	0.0005 (0.6545)
Poverty ratio	0.995 (1.782)		2.3352 (2.236)**			
Per Cent Urban Population	0.2981 (0.023)				5.2639 (6.7326)*	
Time Dummy 1998/99	0.298 (0.023)	-3.732 (-0.428)			8.3324 (0.2660)	5.4446 (0.4322)
Time Dummy 1999/2000	-13.729 (-0.811)	-5.759 (-0.492)			-58.6762 (-1.4319)	17.0087 (0.7341)
Time Dummy 2000/01	-6.846 (-0.367)	-0.409 (-0.024)	4.6479 (0.3552)	20.8789 (1.939)@	-16.1657 (-0.3653)	62.1032 (1.953)@
Time dummy 2001/02	8.426 (0.409)	11.064 0.457	15.5074 (0.9660)	45.6474 (2.250)**	110.0772 (2.8243)*	131.9186 (3.4312)*
Provincial Effect- Eastern Cape		717.825 (8.416)*		484.0736 (3.0201)*		468.1636 (3.4313)*
Free State		666.721 (5.590)*		524.6377 (2.6683)*		632.4951 (7.3873)*
Gauteng		210.0458 (0.563)		- 388.4601 (-0.6607)		267.7446 (0.4822)
KwaZulu-Natal		563.201 (4.614)*		257.8857 (1.3023)		482.4679 (3.7926)*
Mpumalanga		661.549 (5.417)*		517.6255 (2.6040)*		383.4614 (4.1041)*
Northern Cape		682.199 (4.927)*		591.4149 (2.5982)*		546.8438 (4.2308)*
Limpopo		685.404 (8.042)*		465.0820 (2.9598)*		358.5806 (6.4385)*
North-West		527.914 (5.689)*		491.0334 (2.7233)*		407.8170 (5.0693)*
Western Cape		602.358 (4.005)*		539.2159 (2.338)**		810.2642 (5.2029)*

\bar{R}^2	0.873	0.949	0.8698	0.8438	0.7859	0.9698
F – Statistic	38.685	56.035	25.8183*	21.0642*	21.189*	95.1729*

In the case of education, expenditure per school going child is taken as the dependent variable. Expenditure per child is negatively related to per capita GDP as in the case of aggregate per capita expenditures. However, it has no relationship with density of population or urbanisation. In general it is also not related to the poverty ratio though in the pooled regressions for three years it is significant. Interestingly, expenditure per school going child is negatively related to enrolment ratio. This is not surprising as the children in the age group 6-17 get twice the weight of enrolment in the PES formula. As the former variable is in the denominator of the enrolment ratio, the variable is negative and significant. This result essentially underlines the inherent inequity in the PES formula for education. Interestingly for the three years for which learner-educator ratio data are available, the variable is not significant. The non-significance of this variable, as the density and urbanisation variables indicates that education expenditure has no relationship with cost disabilities. This again highlights the shortcoming of the PES formula.

In the case of health sector expenditures per capita GDP is not significant, which implies that progressive distribution seen in the case of education expenditure is not seen in health expenditures. Interestingly, per capita expenditure on health is significantly related to the medically vulnerable population (children below 5 years and elders above 65 years). However, health expenditure in provinces has no relationship with any of the cost disability factors included in the regressions, namely, density of population and urbanisation.