

Decentralisation and Government Provision of Public Goods:
The Public Health Sector in Uganda*

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Abstract

While many developing countries have devolved health care responsibilities to local governments in recent years, no study has examined whether decentralisation actually leads to greater health sector allocative efficiency. This paper approaches this question by modeling local government budgeting decisions under decentralisation. The model leads to conclusions not all favourable to decentralisation and produces several testable hypotheses concerning local government spending choices. For a brief empirical test of the model we look at data from Uganda. The data are of a type seldom available to researchers – actual local government budgets for the health sector in a developing country. The health budgets are disaggregated into specific types of activities based on a subjective characterization of each activity's 'publicness'. The empirical results provide preliminary evidence that local government health planners are allocating declining proportions of their budgets to public goods activities.

I. INTRODUCTION

Movements towards decentralised public sector health systems in developing countries over the past several decades have been spurred by numerous rationales. In both Africa and Latin America, these rationales have often focused on larger initiatives aimed at increasing democratic participation in governance in response to previous autocratic governing regimes or histories of civil conflict. Decentralisation has been used as a mechanism to disperse power, to ensure political stability, to bring representative governance closer to citizens, and to improve the accountability and responsiveness of local leaders [*World Bank 2000, Dillinger 1999a, Silverman 1992*].

Decentralisation has also been undertaken because of dissatisfaction with the efficiency of centralised provision of public services. Often inefficiencies have been tied to the difficulties of coordinating large sets of activities in disparate locations from a centralised point. Greater autonomy in decision-making by local officials or local placement of agents of the central government has removed layers of bureaucracy, decreased decision-making times, and reduced information costs associated with diseconomies of scale [*Dillinger 1999a, Shah 1998, Silverman 1990*].

It has also been argued, as in the fiscal federalism literature, that decentralisation can improve allocative efficiency by bringing greater diversity into the supply of public services, providing a greater scope for meeting heterogeneous preferences for public goods. When preferences for public goods and services differ across localities, decentralisation can represent a Pareto improvement in welfare for the country's citizens by allowing a mix of services that is better able to meet these diverse preferences. Heterogeneous preferences may be more likely to be revealed, as well as addressed, by officials that are closer and more accountable to constituents than remotely located officials [*Oates, 1972, Musgrave 1983*]. Further, by allowing for different mixes of public services across jurisdictions, decentralisation can achieve an efficient allocation of resources either by forcing local governments to compete for constituents, who will choose their preferred mix of public services by 'voting with their feet' and moving to jurisdictions offering services more in line with their preferences or by allowing constituents to vote out of office

politicians whose policies are not in accord with their preferences for public services [Tiebout 1956; Stigler, 1957; Oates 1972; Musgrave 1983].

The encouragement by international donors for public provision of primary health care has provided further impetus to the push for decentralised health sectors. Policy documents such as the 1978 World Health Organization/UNICEF *Primary Health Care Declaration of Alma Ata* and the 1981 *Health for All by the Year 2000* stressed the importance of primary health care and the role of community participation in planning and providing health services [World Health Organization 1978, 1981]. As noted by several authors, promotion of primary health care was seen as incompatible with centralised systems of health care [Collins and Green 1994], though concerns about equity and sustainability, rather than efficiency, generally spurred these efforts. Other donors [World Bank, 1987] have cited the efficiency gains from decentralisation among a set of health sector reforms, including expansion of risk coverage, charging of user fees for private health services among those able to afford them, and better use of private and nongovernment resources.

Such arguments might explain the large number of countries that have in recent years devolved fiscal and administrative responsibilities to local governments. A survey of developing and transitional nations indicates that out of the 75 such economies with populations greater than five million, all but 12 claim to have embarked on some type of transfer of power to local governments [Dillinger, 1994]. Decentralisation in China, India and much of Latin America, for example, has helped to reduce bureaucratic burdens at the center, to allow for greater community involvement, and to improve local service delivery [Griffin 1999, World Bank 1997, Alvarez 1990]. In Africa, decentralisation has permitted greater community participation in health sector planning and management [Blas and Limbambala 2001, World Bank 1997, Maganu 1990, Ndiaye 1990].

In spite of the wide coverage of decentralisation programs and extensive theoretical support, decentralisation does not automatically ensure welfare improvements and may have impacts worse than centralised health systems. Because it often reduces the redistributive powers of central governments and

therefore the overall level of transfers from richer to poorer jurisdictions, decentralisation may in fact worsen vertical equity [*World Bank 2000, Dillinger 1999b*]. Several authors have argued that decentralised systems, particularly those without well-functioning democratic systems or mechanisms for community representation, could decrease welfare if they are associated with a higher degree of corruption or 'leakage' of resources than centralised systems. Decentralisation may therefore be associated with an increasing susceptibility for 'local capture' of decision-making processes by local elites, whose decisions may reflect the preferences of their own sub-group rather than those of the members of the locality as a whole [*Prud'homme, 1995; Collins and Green, 1994; Bardhan and Mookherjee 1998 and 2000, World Bank 1997*]. Similarly, some authors [*Tanzi 1996; Dillinger 1999a*] have noted that even when local decision-makers are well-meaning, they may lack the technical competency to make appropriate decisions, thereby reducing the supply and effectiveness of government health services.

Finally, decentralisation may decrease social welfare if supply decisions for public goods are devolved to levels below which the public goods' benefits extend or for which there are substantial benefits across jurisdictions. In health, such national or regional public goods commonly include standards and regulations, health education and communication, disease surveillance, and environmental health [*Griffin 1999*]. The argument for this decrease in allocative efficiency is that decentralisation to lower and lower levels increases the potential for revealed preference problems associated with public goods. In essence, small governments may behave too much like individuals, with residents not revealing their preferences for public goods but in fact for private goods (acute and chronic care) provided publicly. The implication of this argument is that if supply decisions regarding the provision of national or regional public goods are devolved to lower-level jurisdictions, i.e. if the benefits and costs are not completely internalized within a jurisdiction, then these positive benefits are unlikely to be realised. Local jurisdictions may be unwilling or unable to coordinate with other jurisdictions to ensure an efficient level of public goods provision, choosing instead to allocate resources to private goods type activities for which constituents more likely to reveal their preferences.

The evaluation of decentralisation in developing countries has rarely been empirically tested. Few studies have examined the effects of decentralisation on government provision of public goods relative to private health services. West and Wong [1995] consider the role of decentralisation and local provision of education and health services in China. However, they consider only aggregate provision and not the mix of private versus public goods that we consider here. Further, they do not formally consider the relationship between provision levels and the extent of decentralisation or trends in provision levels.

A study in Bolivia [Faguet 2001] found that decentralisation was associated with greater attention to indicators of social need in the education, agriculture, urban development, water management and water and sanitation sectors but to a lesser extent in the health, transportation, communication and other sectors. Again no distinction was made between public and private goods provision in health. Whilst in the Philippines, decentralisation was associated with an increase in local health expenditures and in the share of resources allocated to health but a decrease in the share of public goods types of health care services overall [Schwartz, Guilkey and Racelis 2002]. In contrast, a recent analysis of the effects of decentralisation in Zambia found evidence of an increased tendency to allocate resources to primary care (though not necessarily public goods). These results, however, were not based on a testable behavioral model. Further, the degree of fiscal autonomy by local governments was limited by strict guidelines and reporting procedures [Bossert et al 2003].

Our work complements the previous literature on decentralisation by suggesting a channel through which decentralisation may affect allocative efficiency, namely by reducing government provision of public goods. This result flows from the nature of decentralisation itself, which seeks to sub-divide jurisdictions into smaller and smaller units. In the extreme, these lower level jurisdictions may rationally behave in ways approximating the behaviors of individuals, to the detriment of overall social welfare. In order to empirically test some of the hypotheses of the model, we have assembled one of the first data-sets which enables local fiscal behavior in a developing country to be analyzed. We collected three years of district-level health budget data following the recent decentralisation in Uganda, a sub-Saharan African

country of just more than 20 million people. These budget data provide extensive detail on the allocative decisions made by local government officials and the types of health activities – payment of salary bonuses, purchases of drugs and supplies, and provision of health education, community outreaches, and preventive and curative care – undertaken each fiscal year.

This paper is part of an on-going study of the decentralisation process in Uganda. A previous analysis [*Hutchinson 1999*] reviewed the Ugandan experience, examining the key institutional changes in the health sector as a result of decentralisation, which began in Uganda in 1986, and providing some preliminary assessments of decentralisation's impacts. This earlier analysis examined the decentralisation process in the context of overall reform of the public sector, finding several positive effects of decentralisation, while also noting that decentralisation in many instances had recreated at the local level the inefficiencies of the centralised system. A survey of District Medical Officers, the senior health officials at the local government (district) level, highlighted the increased flexibility in planning and greater availability of financial resources, but also noted the lack of accountability in appointment processes and inadequacies of local capacity [*Hutchinson 1999*].

Other studies in Uganda have examined the problems that have been associated with the decentralisation process in the health sector, including the difficulties of fulfilling national priorities in the context of decreased Ministry of Health influence over local governments, of unclear lines of communication between the center and the periphery, and of rigidities and resistance in the central Ministry of Health in moving from a directing to an advising role (*Jeppsson, Ostergren and Hagstrom 2003, Jeppson and Okuonzi 2000*).

The outline of the remainder of the paper is as follows. Section II presents the theoretical model. Section III discusses the data, while Section IV outlines the empirical framework. Section V contains the empirical results. Section VI has a brief conclusion.

II. THEORETICAL FRAMEWORK

It is important to develop a theoretical model in order to establish the important factors and behaviors at play in determining levels of health services provided and to aid in interpretation of the empirical results. In particular we are interested in determining whether decentralisation of responsibilities to local governments necessarily implies higher or lower relative levels of public goods provision. One objective in specifying the model is to specify how the demands of the local population affect the decisions of local and central governments so that the relative impact of individual demands in centralised and decentralised systems can be compared. To investigate the process we develop a stylised model of government. We compare outcomes when either a single policy-maker makes decisions for the whole country ('centralisation') or different policy-makers make separate decisions for each local district ('decentralisation'). In each case, policy-makers have a fixed amount of money which they must allocate between private goods which benefit particular individuals (such as curative health care) and public goods which benefit many individuals (such as sanitation, mosquito control, and safe water). For realism we will presume the public good level can vary across local districts and that it chiefly benefits local residents, although there is some spillover benefit to non-residents. For example, mosquito control will be most effective at reducing malaria incidence in the area where it is provided but it will also reduce cases elsewhere.

Each policy-maker is concerned about the well being of some group of citizens. Under decentralisation, each district policy-maker tries to maximize the welfare of all or some subset of residents. For example, a district policy-maker might care about an influential group of elites or alternatively if elected by majority rule might care equally about all residents. Under centralisation, the national policy-maker maximizes the welfare of all or some subset of all residents in the country. As is standard in the literature, we assume that under decentralisation local policy-makers control all local resources and can determine their allocation; similarly, under centralisation the national policy-maker controls all resources and can determine

their allocation. This assumption simplifies the analysis (because it means citizens make no decisions) but is not essential for any of the results below.

We suppose each individual i who lives in district l cares about his personal consumption of a single composite private good, X_{il} , as well as the level of the public good available. An individual benefits from the public good where he or she resides, G_l , and to a lesser degree from the public good in the other districts, $\beta \sum_{k \neq l} G_k$, where β is some number between 0 and 1 which measures the extent which public goods spillover to non-residents. Assuming for simplicity that each individual has separable preferences over the private and public good, then the individual's utility function may be written as,

$$(1) \quad U_{il} = U_1(X_{il}) + U_2(G_l + \beta \sum_{k \neq l} G_k)$$

where $U_1(\cdot)$ and $U_2(\cdot)$ are concave increasing functions.

We first consider the case where both the district and national policy-makers care equally about all of their residents (the 'egalitarian assumption'). Then the objective function for the decentralised policy-maker in district l is,

$$(2) \quad W_l = \sum_{i \in l} U_{il}$$

while the objective function of the centralised policy-maker is,

$$(3) \quad W = \sum_l \sum_{i \in l} U_{il}$$

Each policy-maker seeks to maximise his or her objective function subject to the resource constraint.

Under decentralisation, the resource constraint in district l is,

$$(4) \quad \sum_{i \in l} X_{il} + p_G G_l = I_l$$

where p_G is the price of the public good in terms of the private good and I_l is the level of resources in district l .

Under centralisation, the resource constraint is,

$$(5) \quad \sum_l \sum_{i \in l} X_{il} + p_G \sum_l G_l = \sum_l I_l$$

In addition each local policy-maker assumes the level of public good provisions in the other districts is constant (the 'Nash assumption'). Under these assumptions, the following result holds:

Proposition 1: *Under egalitarian objective functions, decentralisation unambiguously lowers the level of public good provision and individual welfare.¹*

This result follows because the local district policy-makers do not take into account the benefit their public good provides to non-residents while the centralised policy-maker explicitly considers such spillovers. The under-provision of public goods under decentralisation has been hinted at in the early literature [Williams, 1966] and has been cited as a folk-result more recently [Gordon, 1983] though there does not appear to be a formal proof in the literature.

The result extends to three settings which are quite important in the context of developing countries.² First, suppose that the central policy-maker (but not the local policy-maker) also cares about the preferences of external donor organizations such as the World Bank or the World Health Organization. Because such groups tend to prefer that their funds be used for providing public goods, the central policy-maker will have a bias towards providing public goods, possibly even at levels above the socially optimal level.

Corollary 1: *If the central policy-maker is influenced by external donors who prefer spending on public goods, then decentralisation unambiguously involves a lower level of public good provision.*

It is reasonable to assume that central policy-makers are likely to come in direct contact with donors and so are more likely to be influenced by their suggestions than are local leaders who do not often leave their home districts. Second, individuals typically are relatively more informed about their own benefit from health-oriented private goods than from health-oriented public goods. While a visit to the doctor has a tangible valuation, understanding the benefit of spraying with insecticides to reduce malaria transmitting vectors requires a more sophisticated understanding of disease transmission. These examples suggest that individuals may undervalue even their own benefit of health-oriented public goods. Decentralisation will amplify this potential individual-level under-valuation of public goods because local governments are assumed to be more

responsive to the preferences of individuals than is the central government. It is in this case that having a system that responds more closely to the demands of the people actually leads to a loss of welfare. If, as often seems to be the case, the local residents want the government to pay for private goods for them, rather than the more socially valuable public goods, it is the private goods that will tend to emerge from the representative government process.

Corollary 2: *If individuals undervalue the public good and if local governments are more responsive to individual preferences than is the central government, then decentralisation unambiguously involves a lower level of public good provision.*

Finally, the under-provision of public goods under decentralisation extends to the more realistic case where the policy-makers care more about certain residents. In particular suppose that the objective function the decentralised policy-maker in district l is,

$$(6) \quad W_l = \sum_{i \in l} \alpha_i U_i$$

and the objective function of the centralised policy-maker is,

$$(7) \quad W = \sum_l \sum_{i \in l} \alpha_i U_i$$

The term α_i is the weight given to individual i in district l : higher values of α_i indicate that the policy-makers care more about this individual. Notice that the centralised and decentralised policy-makers use the same weights.

Corollary 3: *If the policy-makers have non-egalitarian objective functions, then decentralisation unambiguously involves a lower level of public good provision.*

Interestingly, movements away from egalitarianism have an ambiguous effect on the difference in public goods provision under centralisation and decentralisation. The effect of such shifts on the decentralised outcome is determined by the functional form of $U_i(X_i)$ while there is typically no effect on the centralised outcome.

III. DATA

The data for this analysis principally come from district annual health workplans compiled by decentralised districts in fiscal years 1995/96, 1996/97 and 1997/98. The process of fiscal decentralisation began in Uganda in 1993/94, when the central government devolved many functions and responsibilities, including the provision of basic health services and control over medical personnel, from the central Ministry of Health to the district level. At the time of the analysis, the country was divided into 45 districts, each containing approximately 200,000 to 500,000 people.³ The districts generally have at least one public sector hospital, supported by 10 to 15 health centers and 20 to 30 dispensaries. Responsibility for hospitals, however, was not devolved to the district level (Ministry of Health 1997a).

Institutional Background: Districts receive funds for all health and non-health activities from three sources: local revenue, central government transfers and donors. Overall, central government transfers constitute the largest proportion, 81.3 per cent, of district revenue. These are divided into an unconditional (block) grant (18.7 per cent) and a series of 17 conditional grants (62.6 per cent). The latter are delegated for salaries of public sector workers, hospitals, road construction, and other central government priorities and cannot be reallocated by district planners. Throughout the decentralisation process, both decentralised and non-decentralised districts have received conditional grants. Donors constitute an additional 12 per cent of district revenue, although this proportion is considerably higher in the health sector. Local revenue makes up only 6.5 per cent of district revenue [*Ministry of Local Government 1999*].

The unconditional block grants are allocated to decentralised districts based on a formula that includes district population, geographical size, infant mortality rate, and school age population. Presumably these characteristics are exogenous to the district decision-maker. The conditional block grants are targeted to particular spending categories such as health and education. In 1997/98, a conditional grant for primary health care was also established. Within the class of primary health care

goods and services, local decision-makers have leeway in whether they want to spend on public goods or other non-public goods.

Fiscal decentralisation occurred in a phased manner, with some districts being decentralised before others. For our purposes, we define the initiation of decentralisation with a district's receipt of the unconditional block grant. Beginning in 1993/94, 13 districts received budgetary allocations directly through the Parliamentary Vote system. Each year after that, fiscal responsibilities were devolved to an additional 13 districts until all districts were encompassed in the decentralisation program [*Local Government Finance Commission 1997*]. We have little reason to believe that the sample of districts that were decentralised first differs in meaningful ways from the sample of districts that were subsequently decentralised. This is because the order of decentralisation was unlikely to hinge on relative preferences for public versus private goods. Appendix Table 3.1 presents means and standard deviations of district characteristics by the year in which districts were decentralised.

District Annual Health Workplans: We have collected fiscal data from a sample of decentralised districts in Uganda. These data represent a substantial effort in data collection and provide a rare opportunity to examine the behavioral decisions of local government health officials in a developing country. The data have been made available to the authors through the Project Coordination Office of the District Health Services Pilot and Demonstration Project financed by the International Bank for Reconstruction and Development (The World Bank).

Health workplan data are currently available for fiscal years 1995/96 through 1997/98 [*Ministry of Health, 1996, 1997b, 1998*]. The annual health workplans list all health activities which public sector health officials plan to undertake in a fiscal year. Examples include renovations or construction of health facilities, payment of supplementary salaries to district health workers, meetings with local officials, drug procurement and distribution, immunization activities, family planning, treatment of common illnesses, training, support supervision, etc. The workplans include line items for each activity, a time line for its undertaking, monitorable outcome indicators, sources of funding, and amount of funding.

In order to analyze the budget patterns of local government health officials, it was necessary to develop a methodology for categorizing the items included in the workplans. Numerous categorisations were examined. The chosen methodology grouped activities into 13 categories: primary health care; information, education and communication activities; drugs; civil works; equipment; vehicles; monitoring and evaluation; operations and maintenance; salaries; support supervision; supplies; training; and other. These categorisations were developed based on normative concerns within the District Health Services Project and the Ministry of Health that districts were disproportionately allocating resources to activities that improved the welfare of health workers or local politicians but had only minimal or very indirect impacts on the quality and availability of health services and the health of the population. Explicit descriptions of the components of each category are in Appendix 1.

A second categorisation system aggregated specific types of activities by degree of 'publicness' and contains implicit subjective judgments. Four categories were used: (1) public goods activities; (2) private or non-public goods; (3) support activities; and (4) other activities. The items contained in the 'public' category included allocations for information, education and communication (IEC) activities; primary health care; and drugs. Among the IEC activities are radio messages, community events, newspaper advertisements or signboards, all of which are generally both non-excludable and non-rival in consumption. A high proportion of the expenditure for drugs was for communicable diseases, such as basic childhood illnesses, sexually transmitted diseases or tuberculosis treatment. Provision of these drugs has important spillover benefits to non-recipients of the drugs. Many of the primary health care components - family planning, construction of pit latrines or bore-holes, distribution of insecticide impregnated materials - also have important public goods characteristics.

The second category - 'non-public' - includes allocations to civil works, vehicles and equipment. While it was clearly recognized that all of the 13 types of interventions are necessary components of any health system, for many of these activities the benefits accrue (indirectly) not just to consumers but often (directly) more realistically to the health workers themselves. Supplemental salaries have obvious benefits

for health workers. Training, as well, often involves payment of per diems for health workers, a valuable salary supplement particularly if government transfers are irregular. Vehicles are often used for personal transportation as well as official health business. Civil works – the construction of new clinics and occasionally new offices for senior district health management – are also necessary for public goods types of services, but most often are mainly used for providing curative care, the main benefits of which are to the direct recipients. New clinics are very visible demonstrations of political commitment to health but may be less effective than other uses of money, particularly given low levels of utilization at existing facilities [*Hutchinson 1999*].

Other components are less easily categorised using this ‘publicness’ criteria and are placed in two additional categories: support activities and other. Many activities of the District Health Team, such as supervision of health units and health workers, training of health workers, studies, payment of salaries, and maintenance of health equipment are necessary for the proper functioning of the health sector but are not directly categorised as either public or private. ‘Other’ is simply a catchall category for activities that did not fit in any of the 13 subcategories.

It is important to note that budgetary allocations for hospitals have been omitted from the analysis. This was because, while some district workplans included budget information for the hospitals, many districts did not, even though hospitals were present in the districts. This was a particular problem with respect to nongovernmental hospitals.⁴ It was decided that using the sample of districts for which hospital data were available would have reduced the sample size to an unusable level, as well as creating serious problems of sample selection.

Other Data Sources: Data on sources of revenue are extracted from reports from 1994-95 through 1998-99 by the Decentralisation Secretariat of the Ministry of Local Government. Data on district per capita incomes are derived from national household surveys conducted in 1994, 1995 and 1997 by the Statistics Department of the Ministry of Planning and Economic Development. Per capita income is computed as total household

income divided by the number of members of the household. Averages for this per capita income variable are computed for each district for each year [*Ministry of Local Government 1996, 1997 and 1999*].

IV. EMPIRICAL FRAMEWORK

In the empirical model, we use as our dependent variables the budget shares for the categories outlined above. We prefer the use of budget shares, as opposed to per capita figures, because budget shares have the advantage of indicating the importance of one category of good relative to other categories of goods. Estimations examining per capita spending on different types of goods might find positive trends in all types of spending but say little about spending on one category relative to another over time.

All dependent variables used in this analysis are continuous outcomes, and therefore we use Ordinary Least Squares estimation methods to estimate our models. The explanatory variables are intended to control for district preferences and needs, budgeting flexibility, costs of activities, and extent of decentralisation.

The chosen set of explanatory variables includes two measures of decentralisation: years since receipt of the unconditional grant, i.e. since the beginning of fiscal decentralisation, and proportion of the local government budget financed by local sources. The proportion of expenditure from subnational levels has been used elsewhere to indicate the level of decentralisation [*Fisman and Gatti 2000*]. The years since decentralisation variable is intended to reflect the hypothesis that districts take time to reallocate resources to suit their local needs and preferences. In order to allow for more flexible (non-linear) relationship between our outcomes and the years since a district has been decentralised, dummy variables were created for different ranges of years: 0-1 years since decentralised, 2 years since decentralised, and 3-4 years since decentralised. Our maintained presumption in this paper is that there are frictions in the policy-setting process so that spending is not instantly changed to reflect environmental changes. This means that in the first year a district is added to the decentralisation program its spending may actually be closely related to how it would behave under centralisation. As more time elapses, it will gradually adjust

its spending towards the new optimum given a decentralised state. The years since decentralisation variable is distinguished from time trends by having separate dummy variables for each fiscal year (1995/96, 1996/97, 1997/98). District per capita incomes were included to control for the overall level of resources in a district and for factors such as human capital and education that could affect how district planners chose to allocate resources.

The allocation of resources to specific components of the local government budget is therefore given by:

$$\text{Alloc}_{it} = f(\text{years decentralised, fiscal year, district per capita income, proportion of the budget from local sources})$$

All estimations are undertaken in Stata version 8.0.

V. RESULTS

In this section, we use the empirical data from the district health budgets, combined with secondary data sources, to examine the following:

1. Whether decentralised districts exhibit preferences towards provision of public goods relative to other types of activities.
2. Whether districts will attempt to “free ride” on the public goods provided by their neighbors. Districts with neighbors that expend large amounts on public goods may attempt to reduce their own public goods production accordingly.

District allocations to public and private goods over time: Our data support the hypothesis that districts alter the budget shares of public goods and other types of health activities during the decentralisation process. Table 1 shows the budget shares for different types of workplan activities categorised by their degree of publicness. Between 1995/96 and 1997/98, the overall budget share allocated to our public goods category of health activities decreased from nearly 50 per cent of the total budget to around 30 per cent of the total budget. The largest decrease was for primary health care activities such as provision of family planning materials, malaria control or maternal and child health, all activities with high degrees of

publicness. This category decreased from nearly one-third of the budget to only 15.6 per cent of the budget. The budget share for drugs also decreased slightly, from 13.4 per cent to 8.0 per cent. Interestingly, the share of spending on the highly public category of Information, Education and Communication activities doubled from 3.1 per cent to 6.5 per cent.

On the other hand, the proportion of the budget allocated to non-public goods activities – civil works, equipment and vehicles – increased from 16.4 per cent to 27.3 per cent of the budget. The largest increase was for civil works activities – construction of new offices and clinics – which increased from 8.7 per cent to 16.0 per cent. Other categories with significant benefits to health workers showed changes. Salary bonuses increased from 8.8 per cent of the budget to 11.7 per cent. Training, which often includes payment of per diem bonuses, remained relatively unchanged. Even given the problems of categorisation inherent in the data, these patterns so strongly indicate a movement of resources out of highly public activities into brick, mortar and staff amenities that the conclusion is obvious. Resources seem to be flowing away from societal benefit goods toward the kinds of expenditure that benefits health sector managers and employees.

A few positive results were also noted. The share of the budget allocated to monitoring and evaluation of activities increased from less than 1 per cent to 3 per cent. Support supervision activities also increased slightly from 2.9 per cent to 4.5 per cent.

[TABLE 1.]

Ordinary least squares estimations of the effects of important covariates were undertaken on eight budget share dependent variables: three public goods activities (primary health care, drugs, and IEC) and the public goods aggregate (public); two types of private goods (civil works and vehicles) and the private goods aggregate; and allocations to salary bonuses.⁵

These estimations support the hypothesis that districts allocate fewer resources to public goods type activities – including primary health care and supplementary drugs – as they progress further into the

decentralisation process (Table 2). Looking specifically at the results for the 'years since decentralised' variables, the coefficients are negative for all of the public goods estimations except IEC, even controlling for secular time trends as represented by the fiscal year dummy variables 'year =1996' and 'year=1997.' For the 'all public goods' category, being in the third full year of decentralisation (years decentralised = '2 years') relative to having been decentralised for '0-1 years' is associated with a 20.1 percentage point reduction in the share of the budget to public goods, while having been decentralised for '3-4 years' is associated with a 16.1 percentage point reduction in the share. Similarly, being further into the decentralisation process – either '2 years' or '3-4 years' decentralised – is associated with an 11-12percentage point decrease in the budget share for primary health care, though these results are only marginally significant. The results for supplemental drugs are similar; additional years of decentralisation beyond '0-1 years' are associated with a 7-10 percentage point decrease in the drugs budget share. In contrast, the results for the 'years since decentralised' variables for the private goods activities indicate that progression in the decentralisation process is associated with an increase in budget shares to private goods activities, although these results are only marginally significant for the 'private goods' and 'salary' categories.

The time trend variables - the fiscal year dummy variables 'year =1996' and 'year=1997 – are almost never statistically significant, with the exception of IEC, indicating that allocation behaviors are determined by the decentralisation process itself rather than secular trends across time for all local governments.

In general, there do not seem to be significant effects of other variables in the model on district allocation behaviors. Neither district per capita income nor the percentage of total district revenue from local services is statistically associated with allocation behaviors. The only exceptions are for the share for IEC activities, for which a ten per cent increase in the local revenue share is associated with a five percentage point increase in IEC activity shares, and for supplemental drugs, for which a US\$ 10,000

increase in per capita income (approximately US\$10) is associated with a 3.3 percentage point increase in the supplemental drugs share.

The result on information, education and communication is intriguing since, as noted above, it is opposite in sign to the prediction, though at low levels of statistical significance. This result may be related to the nature of many health education activities in Uganda. Much health education is very localized, targeted ‘community sensitization’ of community and religious leaders regarding specific health issues, as opposed to radio, newspaper or other media messages, which are more common at the national level. This form of health education, while perhaps more appropriate for districts, may be easily targeted to favored groups or regions, and may in practice often be more akin to a private than a public good activity.

TABLE 2.

Spillovers: This section examines the possibility that districts might reduce their public goods provision due to a spillover from neighboring districts’ provision of public goods. Such spillovers could help explain some of the negative relationships between decentralisation and public goods provision found in the last section. These spillovers were also posited in the theoretical model.

We examine several independent variables intended to measure the extent of spillover effects from neighboring districts onto a planner’s district:

1. Average public goods budget shares of neighboring districts
2. Average per capita public goods expenditure of neighboring districts
3. An instrumental variable for average public goods budget share in neighboring districts
4. Average private goods budget share of neighboring districts
5. Average per capita private goods expenditure in neighboring districts

We again use Ordinary Least Squares with robust standard errors to estimate our model.⁶ One complication is that neighbor spending may be endogenous as a result of being determined along with that of the district in question as part of an overall Nash equilibrium. To account for this, we consider a two-

step estimator in which we first consider the effect of neighboring district's characteristics on own spending. These parameters are used to form an index, which can be used to measure the spillover effect.

Estimations are only for fiscal years 1996/97 and 1997/98. In 1995/96, too few districts had contiguous neighbors for whom we had available workplans and the resultant public goods expenditure data. Because they do not cover the full analysis period, the spillover estimations shown here have been separated from the earlier estimations.

The results support the hypothesis that spillovers affect neighboring district spending decisions, although the absolute magnitudes of the effects are small (Table 3). In all of the models, the coefficients on neighbors' public goods expenditures are negative and statistically significant, including the model with the instrumental variable for neighbors' public goods budget share.⁷ The results indicate that districts with neighbors who spend a high amount on public goods reduce their own public goods expenditure accordingly. Districts seem to act as free riders to a degree, and spend less on their own public goods when neighbors provide public goods from which they can benefit.

Similarly, there is evidence of switching between public and private goods based on the behavior of neighboring districts. In model (5), the statistically significant results indicate that districts spend more on private goods if their neighbors spend a higher proportion of their budgets on public goods. That the results show no evidence that districts spend more on private goods if their neighbors spend more on private goods, suggests that the results are in fact a result of the free riding on public goods phenomenon that we hypothesize (Model 6). This is obviously in accord with the theoretical model, which contains no mechanism through which private goods spending in a district will lead to decreases in private goods spending for neighboring districts.

TABLE 3.

VII. CONCLUSION

The assumption that decentralisation of government decision-making to the lowest level practicable is in the best interest of the people is widespread in the development literature. Decentralisation is so well accepted that most of the literature on decentralisation is focused on how to carry it out rather than on whether it actually increases social welfare. We have discussed and formalized a conceptual model that leads to questioning of the widely held assumption that decentralisation necessarily increases social welfare. We suggest that, for reasons including inter-district spillover benefits of public goods and that central governments tend to be more likely to listen to non-biased expert advice favoring the provision of public goods, decentralisation may in fact lead to a substitution of publicly financed private goods for public goods.

The empirical results paper are supportive of this hypothesis that there is a negative impact of decentralisation on public goods provision. They indicate that in Uganda during the late 1990s local governments and health planners were allocating a declining share of government health budgets to public goods activities relative to private goods. This impact seems to have grown as districts have been decentralised longer, perhaps indicating the growing effects of greater autonomy in decision-making. We also find evidence of a specific mechanism affecting district allocation patterns; districts alter their public goods budget mixes based on the public goods activities of neighboring districts. Spillover effects do seem to lead to free riding by districts on the health budgets of their neighbors.

The importance of this work should be noted. The trend toward greater democratization in many regions of the world has meant the increasing devolution of responsibilities for decision-making about the allocation of health resources to lower levels of government, whose motivations and capacity may differ considerably from those of central governments. This work points to a need for greater monitoring of expenditures and budgets at sub-national levels of government, linked with measures of regional epidemiological profiles and costs of service delivery, in order to

ascertain how decentralisation impacts upon the health of populations. The rapid expansion of systems of National Health Accounts in developing countries has gone a long way to improve the documentation of resource flows at the aggregate national level. More effort is needed, however, to document the sources and uses of health resources at sub-national levels, where increasingly resource allocation decisions are being made, perhaps to the detriment of hard-earned gains in health status. Future research should examine the role of changing allocative decision-making on health outcomes under decentralised health systems.

NOTES:

1. The proof of this proposition is straightforward and is available from the authors upon request.
2. The proofs of these results are generalizations of the first proof and are also available from the authors.
3. The number of districts has been increasing over time as many districts have been sub-divided. In 1991, there were 33 districts. In 1995-96, there were 39 and by 1997-98 there were 45.
4. Initial regression models sought to incorporate information on hospitals and indicators of NGO involvement in districts. These models included variables on presence of any public or NGO hospital in the district, number of public and NGO hospitals in the district and spending on public or NGO hospitals in the district. In none of these estimations were the hospital and NGO variables statistically significant. As these models were associated with substantially reduced sample size and testing these hypotheses seemed to take the paper in a slightly different direction (with the end results being somewhat disappointing), these results were not presented.
5. OLS estimations were also undertaken including both fixed and random effects and are available from the authors. These results mirror those presented above. Hausman tests indicated the appropriateness of the fixed effects estimators over the random effects estimators in the majority of cases. The estimations presented here are simple Ordinary Least Squares estimations with robust standard errors controlling for heteroskedasticity. Estimations were also undertaken with per capita budgeted expenditures for each of the dependent variables. These too did not differ greatly in the signs and levels of significance for the key explanatory variables.
6. The same justification is used for these estimations. Hausman tests justified random effects estimations but tests of random effects showed that these were not statistically different from zero. Results for the random effects estimations are available from the authors.
7. In this model, a Hausman-Wu test for the endogeneity of neighbors' public goods expenditure fails to accept the hypothesis that unobservable factors affect both own public goods expenditures and neighboring districts' public goods expenditures. The Hausman-Wu test involves including both the actual value of neighbors' public goods budget share and the predicted residuals from the first stage equation in the equation for own district public goods allocations. Significance for the predicted residuals in the second stage supports the hypothesis that unobserved factors affect both own public goods budget shares and neighboring districts' public goods budget shares.

REFERENCES

- Alvarez, R., 1990, 'Implementing Decentralization of Health Services: A Case Study from Mexico', In A. Mills, J.P. Vaughan, D.L. Smith and I. Tabibzadeh, eds., *Health System Decentralization: Concepts, Issues and Country Experiences*. World Health Organization, Geneva.
- Bardhan, P. and D. Mookherjee, 1998, 'Expenditure Decentralization and the Delivery of Public Services in Developing Countries', University of California, Berkeley and Boston University.
- , 2000, 'Corruption and Decentralization of Infrastructure in Developing Countries', University of California, Berkeley and Boston University.
- Blas, E. and M. Limbambala, 2001. 'User-payment, decentralization and health service utilization in Zambia', *Health Policy and Planning*, Vol.16, Suppl.2, pp.19-28.
- Bossert, T., M.B. Chitah, and D. Bowser, 2003, 'Decentralization in Zambia: Resource Allocation and District Performance', *Health Policy and Planning*, 18(4): 357-369.
- Collins, C., and A. Green, 1994, 'Decentralization and Primary Health Care: Some Negative Implications in Developing Countries', *International Journal of Health Services* Vol.24, No.3, pp.459-75.
- Dillinger, W., 1994, 'Decentralization and Its Implications for Urban Service Delivery', Washington D.C.: Urban Management and Municipal Finance Discussion Paper No. 16, The World Bank.
- , 1999a, 'Decentralization: Politics in Command', Chapter 1 in *Beyond the Center: Decentralizing the State*, S.J. Burki, G.E. Perry and W.R. Dillinger (eds.), World Bank Latin American and Caribbean Studies, Washington, D.C.
- , 1999b, 'Getting the Rules Right: A Framework for Subnational Government', Chapter 2 in *Beyond the Center: Decentralizing the State*, S.J. Burki, G.E. Perry and W.R. Dillinger (eds.), World Bank Latin American and Caribbean Studies, Washington, D.C.
- Faguet, J., 2001, 'Does Decentralization Increase Responsiveness to Local Needs? Evidence from Bolivia', Policy Research Working Paper No. 2516, The World Bank, Development Research Group, Public Economics, Washington, D.C.
- Fisman, R. and R. Gatti, 2000, 'Decentralization and Corruption: Evidence Across Countries', World Bank, Washington, D.C.
- Gordon, R. 1983. 'An Optimal Approach to Fiscal Federalism', *Quarterly Journal of Economics*, Vol.98, pp.567-586.
- Griffin, C. 1999 'Empowering Mayors, Hospital Directors, or Patients? The Decentralization of Health Care', Chapter 5 in *Beyond the Center: Decentralizing the State*, S.J. Burki, G.E. Perry and W.R. Dillinger (eds.), World Bank Latin American and Caribbean Studies, Washington, D.C.
- Hutchinson, P.L., 1999, 'Decentralization of Health Services in Uganda: Moving Toward Improved Delivery of Services', In *Health Care in Uganda: Selected Issues*, by Paul Hutchinson in collaboration with Demissie Habte and Mary Mulusa, World Bank Discussion Paper No. 404, Washington, D.C.

- Jeppson, A. and S. Okuonzi, 2000, 'Vertical or holistic decentralization of the health sector? Experiences from Zambia and Uganda', *International Journal of Health Planning and Management*, Vol.15,No.4, pp.273-289.
- Jeppson, A. P. Östergren, and Bo. Hagström, 2003, 'Restructuring a Ministry of Health – An Issue of Structure and Process: A Case Study from Uganda', *Health Policy and Planning*, Vol.18,No.1, pp.68-73.
- Local Government Finance Commission, 1997, 'Financial Decentralization in Uganda: Commission Report No. 1', Makerere University Printery, Kampala.
- Maganu, E.T., 1990, 'Decentralization of Health Services in Botswana', In A. Mills, J.P. Vaughan, D.L. Smith and I. Tabibzadeh (eds.), *Health System Decentralization: Concepts, Issues and Country Experiences*, World Health Organization, Geneva.
- Ministry of Health, 1996, '1995/96 District Annual Health Workplans', Entebbe.
- , 1997a, '1996/97 District Annual Health Workplans', Entebbe.
- , 1997b, 'Health Sector Inventory for the Year 1996', Entebbe.
- , 1998, '1997/98 District Annual Health Workplans', Entebbe.
- Ministry of Local Government, 1996, 'Analysis of 1995-96 Budgets for Districts on Block Grants System', Decentralization Secretariat, Kampala, Uganda.
- , 1997, 'Analysis of 1996-97 Budgets for Districts on Block Grants System', Decentralization Secretariat, Kampala, Uganda.
- , 1999, 'Analysis of District and Urban Councils Budgets for 1998/9 Financial Year', Kampala, Uganda.
- Musgrave, R.A., 1983, 'Who Should Tax, Where, and What?' In Charles McClure (ed.), *Tax Assignment in Federal Countries*, Canberra: Centre for Research on Federal Financial Relations, Australian National University.
- Ndiaye, J. ,1990, 'Decentralization of Health Services in Senegal', In A. Mills, J.P. Vaughan, D.L. Smith and I. Tabibzadeh (eds.), *Health System Decentralization: Concepts, Issues and Country Experiences*. World Health Organization, Geneva.
- Oates, W., 1972, *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- , 1999, 'An Essay on Fiscal Federalism', *Journal of Economic Literature*, Vol.37, pp. 1120-1149.
- Prud'homme, R., 1995, 'The Dangers of Decentralization', *The World Bank Research Observer* , Vol.10,No.2,pp.201-20.
- Schwartz, J., D. Guilkey, and R. Racelis, 2002, 'Decentralization, Allocative Efficiency and Health Services Outcomes in the Philippines', MEASURE *Evaluation* Working Paper WP-02-44, University of North Carolina at Chapel Hill.
- Shah, A., 1998, 'Balance , accountability, and responsiveness: lessons about decentralization', Policy Research Working Paper WPS 2021, World Bank, Washington, D.C.
- Silverman, J., 1990, 'Public Sector Decentralization: Economic Policy Reform and Sector Investment Programs', Africa Technical Department Division Study Paper No. 1, World Bank.

- Stigler, G., 1957, 'Tenable Range of Functions of Local Government', in *Federal Expenditure Policy for Economic Growth and Stability*, Washington, DC.: Joint Economic Committee, Subcommittee on Fiscal Policy, pp. 213-19.
- Tanzi, V., 1996, 'Fiscal Federalism and Efficiency: A Review of Some Efficiency and Macroeconomic Aspects', M. Bruno and B. Pleskovic (eds.), *Annual World Bank Conference on Development Economics 1995*. World Bank, Washington, D.C.
- Tiebout, C., 1956, 'A Pure Theory of Local Expenditures', *Journal of Political Economy*, Vol.64, No.5,pp.416-24.
- West, L. and C. Wong, 1995, 'Fiscal Decentralization and Growing Regional Disparities in Rural China: Some Evidence in the Provision of Social Services', *Oxford Review of Economic Policy*, Vol. 11, No.4, pp.70-84.
- Williams, A., 1966, 'The Optimal Provision of Public Goods in a System of Local Government', *Journal of Political Economy*, Vol.74,pp.18-33.
- World Bank, 1987, 'Financing Health Services in Developing Countries: An Agenda for Reform', A World Bank Policy Study, Washington, DC.
- , 1997, *World Development Report 1997: The State in a Changing World*, Washington, DC.
- , 2000, *World Development Report 1999/2000: Entering the 21st Century*, Washington, DC.
- World Health Organization, 1978, *Report of the International Conference on Primary Health Care, Alma Ata*, Geneva.
- , 1981, *Health for All by the Year 2000*, Geneva.

TABLE 1. AVERAGE DISTRICT SPENDING BY CATEGORY, 1995/96 - 1997/98
(SAMPLE: DECENTRALISED DISTRICTS WITH AVAILABLE WORKPLANS)

Type of Activity	1995-96	1996-97	1997-98
Primary Health Care	32.9%	21.5%	15.6%
Information, Education & Communication	3.1%	7.9%	6.5%
Drugs	13.4%	9.9%	8.0%
Total Public	49.3%	39.3%	30.1%
Civil Works	8.7%	13.2%	16.0%
Equipment	5.1%	7.2%	9.0%
Vehicles	2.5%	3.1%	2.3%
Total Private	16.4%	23.5%	27.3%
Monitoring & Evaluation	0.9%	2.5%	3.0%
Operations & Maintenance	2.8%	2.6%	3.5%
Salary	8.8%	6.8%	11.7%
Support Sup.	2.9%	3.7%	4.5%
Supplies	4.2%	3.5%	4.2%
Training	13.5%	16.6%	13.9%
Total Support	33.0%	35.7%	40.8%
Other	1.3%	1.6%	1.8%
Total	100.0%	100.0%	100.0%
No. of Districts	13	19	29

TABLE 2. ORDINARY LEAST SQUARES ESTIMATIONS – SHARES OF BUDGETED EXPENDITURES ON SPECIFIC CATEGORIES OF PUBLIC AND PRIVATE GOODS

Independent Variables	All Public Goods		Primary Health Care		Drugs		IEC	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Years since decentralised								
= 2 years	-0.201	-2.70	-0.118	-1.74	-0.101	-2.34	0.018	1.05
= 3-4 years	-0.161	-1.97	-0.114	-1.56	-0.068	-1.56	0.020	1.04
Fiscal Year (Base ='1995/96')								
FY= 1996/97	-0.022	-0.32	-0.058	-0.97	-0.004	-0.11	0.040	2.44
FY= 1997/98	-0.088	-1.22	-0.081	-1.41	-0.033	-0.76	0.026	1.52
Pct. Local Revenue	0.031	0.20	0.060	0.44	-0.081	-0.73	0.052	2.45
Per Capita Income	-0.004	-0.15	0.021	0.85	-0.033	-2.25	0.008	1.06
Intercept	0.559	8.47	0.302	4.29	0.257	4.07	0.000	0.03
Obs.	60		60		60		60	
F(4,45)	4.62		1.68		2.35		6.16	
R-Squared	0.420		0.294		0.248		0.354	
Root MSE	0.1225		0.1175		0.0875		0.0287	

Independent Variables	Private		Civil Works		Salary		Vehicle	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Years since decentralised								
= 2 years	0.129	1.57	0.031	0.81	0.047	1.28	0.002	0.16
= 3-4 years	0.094	1.15	0.033	0.76	0.066	1.77	0.003	0.22
Fiscal Year (Base ='1995/96')								
FY= 1996/97	0.088	0.89	0.042	0.99	-0.057	-1.32	0.016	1.16
FY= 1997/98	0.081	0.70	0.057	1.04	-0.021	-0.41	0.007	0.51
Pct. Local Revenue	0.078	0.71	0.004	0.04	-0.034	-0.78	0.035	1.63
Per Capita Income	0.008	0.20	-0.030	-1.71	0.014	1.05	-0.008	-1.15
Intercept	0.214	2.72	0.123	3.77	0.052	1.84	0.027	1.85
Obs.	60		60		60		60	
F(4,45)	1.86		1.74		3.54		0.76	
R-Squared	0.141		0.116		0.186		0.077	
Root MSE	0.1699		0.0869		0.0688		0.0255	

TABLE 3. FIXED EFFECTS ORDINARY LEAST SQUARES ESTIMATIONS OF PUBLIC GOODS SPILLOVERS

Independent Variables	Budget Share Public Goods								Budget Share Private Goods			
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Neighbor's Budget												
Public goods budget share	-0.010	-5.060							0.003	1.490		
Public exp. Per capita			-0.009	-3.260								
Private goods budget share					-0.010	-4.730						
I.V. Public Goods Budget Share							-0.011	-3.570				
Private Exp. Per Capita											-0.014	-0.300
Years since decentralised	-0.013	-0.520	-0.016	-0.600	-0.013	-0.490	-0.014	-0.520	-0.020	-0.790	-0.018	-0.810
Pct. Local Revenue	0.233	1.090	0.232	1.120	0.231	1.090	0.223	1.060	-0.248	-2.830	-0.280	-2.350
Per Capita Income	-0.010	-0.530	-0.014	-0.720	-0.010	-0.520	-0.008	-0.410	-0.031	-1.380	-0.033	-1.640
Intercept	0.394	4.730	0.419	5.090	0.391	4.640	0.405	4.850	0.392	3.970	0.414	4.280
Observations	37		37		37		37		37		37	
Clusters	19		19		19		19		19		19	
R-Squared	0.141		0.131		0.140		0.147		0.148		0.149	
F(4,18)	25.48		4.94		25.09		6.99		4.13		3.64	

APPENDIX 1. TYPES OF DISTRICT ANNUAL WORK PLAN INTERVENTIONS

<i>Type</i>	<i>Description</i>
Civil works	New construction of physical structures, Rehabilitation, Renovation
Drugs	Purchases of supplemental Vaccines and other drugs
Equipment	Purchase/"procurement" of durable goods (refrigerators)
Information, education, and communication	Home-visiting for education and awareness-raising, community sensitization and mobilizations, drama groups, radio and newspaper messages
Monitoring and evaluation	Routine monitoring of health situations (outcomes), communities; scientific studies; Health Management Information System
Maintenance	Operations and maintenance, utilities' expenses, day-to-day running of District Medical Officers' offices
Other	Meetings at district or community level, library, management, study tours, travel, transport, District Medical Officer office work
Primary health care	Delivery of preventive and basic curative services to secondary level or below, end products (Vitamin A, constructing wells, pit latrines, distribution of family planning supplies, procurement of Insecticide Impregnated Materials, growth monitoring, outreach to AIDS patients, Maternal and Child Health)
Salary	District Medical Officer's office salaries and allowances, other health staff salaries, incentives and allowances (excludes salaries and allowances for hospital staff since health unit staff are excluded)
Support supervision	Support supervision of District Medical Officer's office to district health workers or of central Ministry of Health personnel to District Medical Officer's office; monitoring and evaluation of health workers and process indicators (audits, performance reviews)
Supplies	Semidurable goods (uniforms, chemicals, office supplies)
Training	Health workers' courses and refresher courses
Vehicle	Purchase of vehicles, motorcycles

APPENDIX 3. SELECTION ISSUES

Since much of the analysis examines the effects of decentralisation on allocation of resources over time, it is legitimate to wonder whether a selection process is occurring in which districts that were decentralised earlier are different in important ways from districts that were decentralised later. We find little evidence of such differences. The primary differences appear to be related to size. Districts that were decentralised first have both larger populations and larger total areas. Table A3.1 shows the means and standard deviations of important district characteristics for districts categorised by the year in which they were decentralised.

TABLE A3.1. MEANS AND STANDARD DEVIATIONS FOR DISTRICTS BY YEAR IN WHICH THE DISTRICT WAS DECENTRALISED

Indicator	1993		1994		1995		T-statistics		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	1993 v. 1994	1993 v. 1995	1994 v. 1995
1996 Population	748,200	217,576	496,625	243,909	290,938	152,505	2.49	4.52	2.32
Annual Population Growth (pct)	2.6	0.4	3.0	2.0	1.9	1.6	-0.61	1.15	1.29
Pct. of Population under 5 years	18.7	1.2	19.3	1.7	19.1	1.4	-0.91	-0.56	0.31
Pct. of Pop. Female 15-49	44.5	2.3	45.0	3.4	43.4	1.6	-0.36	0.93	1.40
Pct. of Population in Urban Areas	8.9	3.7	5.6	3.4	3.5	2.5	2.05	3.42	1.59
Total Area (sq. km.)	6,960	4,274	5,821	3,443	3,859	2,483	0.66	1.79	1.48
Development Indicators									
Ave. Per Capita Income (Ush)	197,134	83,133	191,056	49,352	190,729	50,655	0.19	0.20	0.01
Pct. of Pop. with Latrines	67.6	23.5	69.9	23.0	63.2	13.5	-0.22	0.43	0.82
Pct. of Pop. with Safe Water	24.9	14.6	27.1	10.8	14.3	9.7	-0.38	1.84	2.77
Literacy Rate	54.2	8.5	50.5	7.4	47.7	6.2	1.05	1.83	0.90
Female Literacy Rate	43.8	13.6	40.0	10.8	37.5	7.3	0.69	1.15	0.62
Health Indicators									
Life Expectancy at Birth	47.6	3.6	48.4	3.4	47.8	3.2	-0.46	-0.11	0.36
Crude Birth Rate	51.9	2.7	52.8	3.6	51.1	2.6	-0.66	0.60	1.25
Crude Death Rate	17.8	2.2	17.3	1.8	18.2	2.2	0.57	-0.43	-0.95
Infant Mortality Rate	127.7	22.9	118.0	14.4	124.5	13.9	1.11	0.36	-1.01
Total Fertility Rate	7.1	0.5	7.4	0.6	7.2	0.7	-0.95	-0.45	0.42
Health Infrastructure									
Number of ...									
Government Hospitals	1.8	0.7	1.2	0.6	1.0	0.5	2.20	2.80	0.66
Government Health Centers	37.3	11.2	28.6	18.3	17.1	4.5	1.35	3.13	2.08
Government Hospital Staff	196.1	84.2	105.1	76.4	79.0	45.4	2.55	3.28	0.96
Gov't Health Center Staff	209.7	90.9	126.7	90.3	91.1	47.5	2.08	2.97	1.15
Field Staff	27.3	19.8	20.1	10.6	18.0	8.2	0.99	1.28	0.49
NGO Hospitals	1.3	1.3	1.0	0.7	0.4	0.7	0.68	1.96	1.85
NGO Health Centers	10.3	5.7	10.3	5.7	6.4	4.0	0.00	1.57	1.82
Population per...									
Government Hospitals	464,680	188,933	420,123	183,176	227,021	106,525	0.53	2.84	2.83
Government Health Centers	20,485	4,712	19,368	7,694	16,750	6,672	0.41	1.37	0.81
Government Hospital Staff	4,599	3,092	5,314	3,278	2,880	1,041	-0.50	1.20	2.29
Gov't Health Center Staff	3,874	961	4,709	2,408	3,377	1,346	-1.09	0.65	1.58
Field Staff	35,571	25,413	28,460	15,531	18,807	11,844	0.71	1.67	1.57
NGO Hospitals	444,721	141,216	478,350	299,244	365,125	300,202	-0.29	0.69	0.48
NGO Health Centers	82,639	26,123	79,525	76,408	58,910	41,896	0.13	1.00	0.78
N	9		12		8				