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The effect of basic infrastructure delivery on welfare in rural and urban municipalities

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Access to a comprehensive set of basic infrastructure services is essential to attain social development goals and ensure equal opportunity for all people to participate in a country's economy. This article investigates whether the delivery of basic infrastructure has a significant positive effect on growth and development in South Africa and whether the effect is different for urban and rural municipalities. A complex picture emerges, necessitating care in making such infrastructure investment decisions.

Introduction

Numerous laws and policies aiming to improve people's quality of life and promote economic and social transformation have been introduced since 1994. Major programmes – such as the Reconstruction and Development Programme (RDP), the Growth, Employment and Redistribution (GEAR) strategy and the Accelerated and Shared Growth Initiative of South Africa (ASGISA) – have achieved mixed levels of success in that South Africans still experience high levels of poverty and live in an exceedingly unequal society.

It appears that there is broad agreement that economic growth would be the best solution to poverty and inequality. However, economic growth alone is insufficient to alleviate poverty and increase equality: legislation and policies have to be pro-poor and inclusive to achieve the desired economic and social goals. This article looks at the role of basic infrastructure services in this context.

Basic infrastructure in South Africa

The South African government, through the three tiers of government, is mandated to provide its people with basic infrastructure, education, health and security. Access to infrastructure is considered a basic human right, irrespective of where people live, their race, gender or income level. Accordingly, the three tiers of government have to plan to ensure the citizens' basic human rights and to comply with the Bill of Rights (RSA Constitution, Chapter 2, Section 27.1 (a, b, c)).

To achieve these goals, the South African government tasked the National Planning Commission (NPC) to determine a vision of what South Africa should look like by 2030 and how this vision could be achieved. In a diagnostic overview (in 2011) the NPC suggested that a development plan would have to address nine primary challenges: the poor outcomes in education, the heavy burden of disease, a divided community, uneven performance in public service, divided spatial patterns, low levels of employment, corruption, a resource-intensive economy and crumbling infrastructure. The diagnostic overview also indicated that the challenges regarding poverty and inequality were more severe in rural areas and municipalities.

The National Development Plan (NDP) of 2012 highlights differences between urban and rural areas with regard to access to basic infrastructure services, and their quality. While backlogs are a challenge to the reform of rural infrastructure, they also inhibit economic and social inclusion in rural areas (NPC 2011:44). Bogetic and Fedderke (2005) show that South African urban areas are generally well-serviced in terms of electricity; water and sanitation; information and communication (ICT); and transportation, while their rural counterparts fall significantly short in these respects.

Table 1 shows updated figures, based on the benchmark exercise conducted by Bogetic and Fedderke in 2005 and using World Development Indicators (WDI) and International Telecommunication Union (ITU) data, where available.

Table 1: Basic infrastructure access comparisons (\pm 2010-12)

Infrastructure type	Upper middle income	Sub-Saharan Africa	South Africa		
			National	Urban	Rural
Improved sanitation facilities (% of population with access)	74	31	74	84	57
Improved water source (% of population with access)	93	63	92	99	79
Access to electricity (% of population)	97	35	76	84 [†]	37 [†]
Mobile subscriptions* (per 100 people)	92	55	127	n/a	n/a
Internet access at home* (% of households)	26	6	10	n/a	n/a
Ownership of telephone (% of households)	13 [†]	4 [†]	28 [†]	43 [†]	6 [†]
Roads** (kms per 1,000 people)	9.2 [†]	3.3 [†]	6.1 [†]	n/a	n/a

WDI: Latest observations ranging from 2010 to 2012

[†] Adapted from Bogetic & Fedderke: Latest observations ranging from 1997 to 2003

* International Telecommunication Union (ITU): Latest observation 2011

** International Road Federation (IRF): Recent figures not publically available

The table shows that South Africans have less access to water and sanitation than citizens who live in countries with upper-middle-income economies. Rural areas are shown to have lower rates of access to water, sanitation and electricity than urban areas (which, in some cases, are even above the average of the upper middle-income countries).

A lack of recent data on urban and rural municipal access to information and telecommunication as well as road infrastructure has necessitated their exclusion from the analysis. Hereafter, basic infrastructure will refer to water, sanitation and electricity.

Why should urban-rural basic infrastructure inequality be targeted?

The impact of selected infrastructure services on growth and development has been well researched internationally. It shows a strong relationship between investment in infrastructure and growth, even though the nature and direction of the causal relationship is often debated.¹ The exact impact on poverty and inequality remains elusive. Nevertheless, there appears to be consensus that, under the right conditions, investment in basic infrastructure does contribute to reducing inequality and poverty (Calderón & Servén 2008:1). There are several ways, at least

¹ See De la Fuente & Estache (2004:5), Snieska & Simkunaite (2009:16); Brenneman & Kerf (2002:5&6) for a summary of relevant literature.

theoretically, in which basic infrastructure can affect growth, poverty and inequality (see Gnade 2013 for a fuller discussion).

While a positive effect of basic infrastructure on economic growth and development seems uncontroversial, the different ways in which the improvements may affect rural and urban municipalities is less certain. The effects of infrastructure investment in rural and urban municipalities are largely understudied due to the unavailability of comparative data (Bogetic & Fedderke, 2005:12; Svendsen, 2009:25). Jerome & Ariyo (2004:39) confirm that information on the effect of infrastructure reforms on poor citizens, who typically live in rural areas, is limited as a result of the lack of consistent data.

In the research for this article, anecdotal evidence in the literature on the possible differential impact of basic infrastructure on urban and rural municipalities was taken into account. The availability of a comparative municipal dataset, together with indicators on growth, poverty and inequality, suggested the empirical component of this study.

New results for the impact of basic infrastructure in South Africa

The IHS Industry and Insight *Regional Explorer* (Rex) database provides comparative data on demographic, infrastructural, economic and socio-economic matters in South African municipalities from 1996 to 2012. A balanced panel dataset was constructed, using a selection of growth, poverty and inequality indicators. The classification of municipalities into urban and rural groups was informed by the definitions of the National Department of Cooperative Governance and Traditional Affairs (COGTA).

The selected growth, poverty and inequality indicators included: the number of households, the Human Development Index (HDI), the percentage of poor people, the level of functional literacy, household disposable income, and GDP per capita.

An index of the stock of basic infrastructure (sanitation, water and electricity) was calculated for each of the 234 municipalities in South Africa.² The infrastructure variables that were used in constructing the index were: the number of households with hygienic toilets, the provision of water in households above RDP-level, and the households that had electricity.

² The Principal Component Analysis (PCA) method was used to construct the basic infrastructure index. The synthetic (PCA) index captures information on the different measures of basic infrastructure that are mutually uncorrelated, in addition to reducing the measurement error associated with taking only a single infrastructure indicator (Calderon, 2009:4; Gnade, 2013).

The COGTA classification of rural and urban municipalities was used in this analysis. Each of the 234 municipalities in South Africa was classified as being either urban or rural, based on the size of the population and the concentration of people in single or multiple cities and/or towns.³ The classification resulted in 53 urban municipalities, with the balance being classified as rural.

Various statistical techniques were used to test whether the presumed relationship between the stock of basic infrastructure and the economic growth, poverty and inequality indicators were statistically different between rural and urban municipalities – and to quantify any such effects (see Gnade 2013 for more technical detail).

While the general positive effect of basic infrastructure on income growth, poverty alleviation and development is confirmed, the results with regard to the urban-rural differentiation are quite varied. First, they suggest that an increase in basic infrastructure by 1% would likely lead to a larger increase in *per capita GDP* in rural municipalities when compared to that in urban municipalities – a 0.36% increase for rural compared to 0.33% for urban.

In contrast, as far as the likely effect of a 1% increase in basic infrastructure on household *disposable income* is concerned, rural households would benefit *less*: 0.21% in rural municipalities and 0.29% in urban municipalities. A similar differential is found with regard to poverty rates: while there is an overall decline, the poverty rate is likely to decline *less* in rural municipalities (by 0.19%) than in urban municipalities (0.25%). So, for these two indicators, household gains due to basic infrastructure investment are skewed in favour of urban municipalities.

Lastly, for the HDI, the most comprehensive development indicator used, there is no statistically significant difference between urban and rural municipalities in the benefit from an increase in basic infrastructure – for both there is an increase in the HDI of approximately 0.1%.

Conclusion

The empirical results support the broad view that basic infrastructure investment would have a positive influence on growth, poverty and inequality. For all the indicators used, a positive impact was indicated for South African municipalities.

³ Urban: metropolitan municipalities (large urban complex with population over 1 million) as well as local municipalities with either secondary cities or large towns as a core. Rural: local municipalities with only small towns with a relatively small population, in addition to rural municipalities with commercial tenure and one or two small towns at most (COGTA 2009: 16).

The second question relates to a possible difference in this regard for rural and urban municipalities. The results are mixed. Given anecdotal indications in the reviewed literature, it was expected that the impact on growth, poverty and inequality would be greater in rural than in urban municipalities. However, the analysis suggests that this is only true with regard to per capita GDP. With regard to poverty and disposable income, increases in basic infrastructure would likely bring about larger benefits in urban as opposed to rural municipalities. (For the HDI and literacy they would benefit equally.)

While the initial results are somewhat ambiguous, they do make an important point. In designing and prioritizing basic infrastructure delivery to address growth, poverty and inequality, policy-makers should consider that basic infrastructure delivery may have potentially different effects in urban areas when compared with rural municipalities. Because limited resources and funds are available, awareness of the different returns on investment in urban and rural basic infrastructure should inform decisions on how and where to invest. The results could also direct basic infrastructure delivery towards the most deprived municipalities

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