



Supply and pricing strategies of informal rural transport providers



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ABSTRACT

Informal paratransit operators using a range of vehicle types (including pickup trucks, small buses, and motorcycles) are a major provider of mobility in rural areas of the developing world. The paper describes a mixed method approach used to examine such operators' decisions about vehicle deployment, route frequency, network organisation, and pricing in three rural districts in South Africa. New evidence is presented showing that the condition of rural roads (both paved and unpaved) affects the quantity and quality of public transport services provided, as well as the fares charged to passengers. This strengthens the case for judicious infrastructure investment as a way of improving rural access and livelihoods, and suggests how this might happen by way of leveraging better private sector responses. We also describe the emergence of a differentiated service hierarchy involving a variety of vehicle types suited to different operating conditions, and based on intentional coordination among operators of minibus and pickup truck ('bakkie') services. We argue that governments should promote such coordination and innovation in rural transport markets.

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1. Introduction: rural roads, transport services, and welfare

There is strong international interest in the links between poverty and rural transport. In industrialised countries, the question has often been framed in terms of social exclusion, with a growing literature seeking to understand the causes of rural inaccessibility and its effects on the welfare of rural people (e.g., Gray et al., 2006; Smith et al., 2012). Since rural mobility is strongly mediated by access to private transport, there has been a specific focus on potentially non-car owning populations, including the elderly and low-income people and those with disabilities (Kamruzzaman and Hine, 2011; Shergold and Parkhurst, 2012). Potential responses include improved access to public and community transport, reducing car dependence in road design, and greater use of information and communication technologies to enhance connectivity (Gray et al., 2001; Velaga et al., 2012; Parkhurst et al., 2014).

In developing countries, the problems of rural isolation are compounded by two main factors: road infrastructure tends to be significantly less developed, and the incidence of rural poverty is much higher than in industrialised societies. Consequently, the majority of research on rural transport in developing countries

has focused on the relationship between rural roads and economic development (Gannon and Liu, 1997; Van de Walle, 2002). The traditional focus of such studies has been on demonstrating and quantifying the effects of rural road investment on production and consumption, either by reducing travel costs or by increasing prices of agricultural produce (e.g., Hettige, 2006; Khandker et al., 2009; Adewunmi and Francis, 2013). A few studies have gone further to examine the impacts of road investment on market structure and institutions (Mu and Van de Walle, 2011).

It is also widely accepted that rural road investments include significant social benefits, a large part of which cannot be measured in monetary terms. Such benefits include the welfare effects of improved school attendance and access to health care, as well as the risk insurance benefit of improved connectivity to national transport networks (Van de Walle, 2002). Our understanding of these benefits is based, in part, on a rich, largely qualitative literature around the links between rural mobility and livelihoods in developing countries (e.g., Howe, 1981; Barwell, 1996; Porter et al., 2013). This literature has produced an understanding, for instance, of the household and personal costs of excessive walking and portage (in terms of reduced labour productivity and health), and of the gender dimensions of travel constraints and costs (Porter, 2011; Porter et al., 2012).

Yet while it is generally accepted that investment in rural roads can lead to demonstrable benefits in terms of both conventional monetary indicators and (far less tractable) social indicators, this

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is not guaranteed. Howe (1981) observed that large investments in road building do not always result in the expected increases in road traffic and economic activity. Hettige (2006) came to a similar conclusion based on case studies of rural road projects in Asia, noting that the traditional assumption that road investment will lead spontaneously to more, better, and cheaper transport services does not always apply. “Rural roads are not enough,” state Lebo and Schelling (2001), for the same reason. All of these authors argued for a better understanding of the links between infrastructure provision and transport services to allow planners and project implementers to leverage real livelihood benefits more effectively.

This research takes the view that the relationship between infrastructure and services, especially those provided by private sector transport operators, is key to the improvement of rural mobility. A review of the literature shows, however, that motorised rural transport services have received much less research attention than have rural roads. One reason for this is that transport services in much of the developing world have moved from being a public undertaking to being in the private sector domain, where they tend to be largely ignored by transport planners, governments, and donor agencies (Ellis and Hine, 1998). The demise of big public intercity bus operators in Africa, Latin America, and Asia in the last few decades has left a void that has been filled by informal or para-transit operators, typically using smaller buses, pickup trucks, and motorcycles (Barwell, 1996; Gwilliam, 2008). Recent studies show that informal services are now major mobility providers in much of Africa (for instance Uganda’s *boda-boda* and Tanzania’s motorcycle taxis (Howe, 2003; Porter et al., 2013)), and Asia (e.g., Cambodia’s modified pickups (Ericson, 2011)).

The above studies are part of a growing literature examining the informal public transport sector in developing countries (e.g., Boudreaux, 2006; Gilbert, 2008; Schalekamp and Behrens, 2010; Venter, 2013). Informal operators tend to have several characteristics in common (Gwilliam, 2008), including:

- Adoption of an informal business model operating largely outside of the ambit of government regulation and control. Unprofessional management practices and poor access to credit tend to lead to the use of old and unreliable vehicles and poor maintenance practices.
- Self-regulation often evolves as a way of allocating economic rights among competing operators. Providers tend to organise into informal associations or unions, which exercise *de facto* control over fares, route allocation, and the quantity of service.
- This often leads to uncompetitive practices and pricing at higher than competitive market levels (Ellis and Hine, 1998; Hettige, 2006), as well as a user experience that is often one of low service quality, erratic availability, high prices, and poor road safety.
- Vehicle sizes are typically smaller than big buses, due to affordability constraints and sometimes the constraints imposed by adverse operating conditions (e.g., poor roads).

What this handful of studies further highlights is the shortage of knowledge that exists in academic and government circles about exactly how these informal services operate: how decisions are made, for instance, about which routes to operate; what drives the entry decision for individual operators; what kind of vehicle to use; and at what level to set fares. Furthermore, most studies have focused on urban conditions. This knowledge gap often is reflected in the public transport plans prepared by consultants for rural areas, which tend to be based on urban practices, but ignore rural realities such as the wider range of vehicle types in use, the considerable impact of bad road conditions on transport operating costs, and taxi associations’ practice of using old vehicles

retired from urban areas for rural services. Clearly, obtaining a deeper understanding of rural transport services in general requires a specific focus on the conditions and constraints of informal operators.

So what is known about the drivers of quality and quantity in rural public transport services? First, there is evidence of a direct link between poor road conditions and high vehicle operating costs. This tends to reduce the profitability of passenger services, sometimes to the point where no service can profitably be provided given local affordability limits (Raballand et al., 2011). The low ability of users to pay is a second constraining factor (Ellis and Hine, 1998). Third, road conditions may limit the types and sizes of vehicles used, such as the case with *boda-boda* motorcycle taxis in Uganda, where more conventional services are uneconomical or physically impossible (Howe, 2003).

A fourth factor constraining the availability and affordability of rural transport services is low-demand densities (Ellis and Hine, 1998). Starkey et al. (2002:19) blame insufficient services on “the absence of a critical mass of users and operators.” Fifth, information asymmetry between users and operators creates conditions where operators fail to operate effectively, leading to a mismatch between demand and supply. Sixth, low supply coupled with aggressive self-regulatory practices constrains competition: Hettige (2006:12) finds that “competition is clearly the critical precondition for the development of better transport services.” In this regard, Hettige (2006) sees the lack of diversity in vehicle types and sizes as a problem, arguing that a diversity of vehicle types is important to keep transport costs to a minimum and ensure that all transport needs are met.

Overall, then, while the potential for rural road investment under the right conditions to enhance economic and household welfare is not contested, there is as yet a weak understanding of *how* this actually happens. It is especially the role of rural public transport operators as intermediaries in the rural mobility chain that needs study. How do operators respond to improved infrastructure (if at all), and do these responses translate into improved accessibility for users? Is there empirical evidence to indicate the scale of the supply elasticity to road investment? In this paper we seek to understand operators’ business practices and decisions around supply, vehicle deployment, network organisation, and pricing. Accordingly, the objectives of this work are:

- To examine the extent and characteristics of public transport supply in selected rural areas of South Africa.
- To identify the factors determining the service patterns (including routes served, frequencies, fares charged, and vehicle sizes to be used) of informal rural public transport operators, and to quantify the strengths of these relationships.
- To develop evidence-based recommendations on how rural mobility may be strengthened, with specific reference to informal modes.

We take a case study approach, focusing on three typical rural districts within South Africa. While the focus is primarily on motorised (thus longer-distance) passenger transport, linkages to Intermediate Modes of Transport (IMT) and freight movement are identified. We do not examine the demand for rural transport or any particular mode in detail, focusing instead on supply and supply–demand interactions. The paper first provides a brief description of the study methodology and data collection. We then discuss findings, including qualitative analyses and statistical modelling of supply and pricing patterns. Lastly, we identify measures that could increase supply, affordability, and use of motorised transport services in rural Africa.

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