The political economy of roads

An overview and analysis of existing literature

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The views expressed in this paper and all responsibility for the content of the study rests with the authors.

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Abbreviations

DFID	Department for International Development
ODI	Overseas Development Institute
RNA	Rural Net Associates
Sida	Swedish International Development Cooperation Agency
TDSI	Transport Development and Strategy Institute
TRC	Transport Research Centre
UEMOA	West African Economic and Monetary Union
UK	United Kingdom
US	United States
USAID	US Agency for International Development

1 Introduction

This paper is part of a series of Overseas Development Institute (ODI) publications that examine the political economy of basic service provision in developing countries. The programme is one element of a multiyear collaboration with the UK Department for International Development (DFID) that aims to develop effective strategies for strengthening public goods and services by ensuring they take into account political contexts and issues in their programming.

The analysis concentrates on trying to understand how a variety of governance conditions and factors affect outcomes, including aspects such as incentives, behaviour and institutional features, all of which may facilitate or impede positive results and reforms.

The work undertaken so far has focused on social services, such as health care (see Chambers, 2012; Chambers and Booth, 2012) and education (see Tavakoli et al., 2012), and a broader range of basic services, such as water and sanitation (see Harris and Wang, 2012; Kooy and Harris, 2012). It also aims to look at productive sectors, including the provision of justice, security and infrastructure, specifically electricity, and, in the case of this paper, roads.

Although the number of political economy studies on different sectors and countries is growing, these remain largely one-off or *ad hoc*. There have been few attempts to date to identify trends across multiple studies. This literature review therefore seeks to provide a more structured analysis in relation to the roads sector. It complements similar reviews already undertaken in relation to social sectors.

Taking a more systematic approach involves two levels of analysis, namely, looking at the technical characteristics of a given sector, and the political implications of these, as well as whether common governance constraints – features of the underlying political system – affect the given sector (this draws on mappings in Mcloughlin and Batley, 2012, and Wild et al., 2012).

The issues we identify often apply to roads in general, but we concentrate particularly on rural road networks, for three main reasons. First, the benefits and issues covered appear to affect these roads most starkly; second, the literature on these issues deals primarily with rural roads; and third, the literature on urban transport concentrates less on issues of road provision and much more on issues that are largely beyond the remit of this review (e.g. public transport provision, regulation of congestion, road safety issues). The analysis is thus of road provision generally, but we specify where issues are notably different for rural and urban road networks, with a main focus on the former.

The road sector is of interest because of both the significant benefits road provision is associated with and the strong potential for issues of political economy to have an impact on the form and outcomes of the sector. The benefits of road provision are both direct and indirect. Roads create connectivity, which allows for easier access to external goods and labour markets as well as greater social contact with other settlements, both of which contribute to national integration. This can have very powerful long-run implications and is accompanied by secondary effects on the provision of other basic goods and services. Rural areas generally see much stronger effects, as distances are greater and connectivity much lower than in urban areas.

The impact of political economy on the roads sector has been under-explored in the more technical literature to date, but there is good reason to believe these issues are both present and relevant. Issues of political salience or patronage may affect road construction, while community dynamics may shape local use and access to roads. Therefore, despite the qualitative differences between this sector and those for basic service delivery, we see merit in applying a similar approach and in seeking to find patterns or trends in the impact governance and political factors may have on roads.

2 Overview of the literature

While our review of the literature surrounding the political economy of roads was not exhaustive, it has been extensive and allows us to observe three major trends.

First, there has been very little analysis identifying the specific political economy aspects of this sector, or examining the impacts the broader political economy of particular countries has on it. The majority of the literature on roads either deals with technical aspects (construction methods, maintenance techniques, technological monitoring methods, etc.) or concentrates on examining the outcomes of road projects. The outcomes literature concentrates either on specific interventions and reforms, or on the broader issues of whether rural roads are 'pro-poor' and what complementary inputs could make them more so. Inferences can be made from these strands of the literature as to the presence and form of political economy aspects and constraints, but explicit analysis of them is rare.

Second, where the literature does examine political economy aspects, this consists mainly of qualitative analyses of institutions and structures specific to the roads sector. These are generally written at the national level, with some regional analyses (such as World Bank, 2010) and concentrate on reforms to the road sector in question, or on particular aid programs and interventions implemented by outside agencies. There is also a small number of studies that document the political economy aspects of public sector decision making, usually in the context of corruption, and then explore the implications of these aspects in the roads sector. In terms of quantitative analysis, there are only three notable works: one longitudinal study that demonstrates the impact of political factors (ethnic and regional power blocks) on the evolution of the Kenyan road network (Burgess et al. 2009) and two studies of specific projects in Vietnam exploring aid diversion (van de Walle and Mu, 2007; van de Walle and Cratty, 2002).

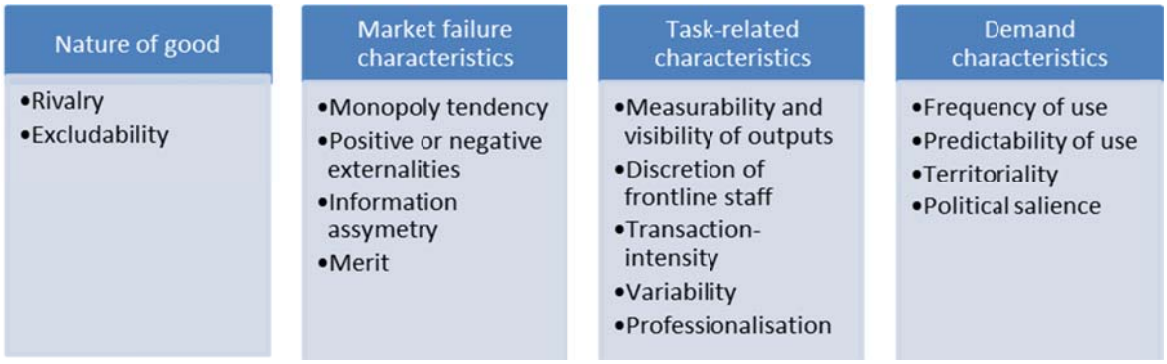
Third, the search for literature on urban road networks produced very little that addressed roads specifically. The focus here was much more on issues of public transport and road safety, with some qualitative case studies looking at successful overhauls of municipal governance, addressing road maintenance and improvement issues. The political economy issues they touch on generally matches issues raised by the rural roads literature, and so the approach we take in the following sections is simply to highlight where there is considerable urban–rural divergence.

The following sections therefore rely on a core of political economy analysis papers and then draw on the broader literature to expand on particular aspects and identify repeated themes.

3 Sector characteristics

Mcloughlin and Batley (2012) set out a mapping exercise that aims to understand why different services and sectors may face different constraints and opportunities, and have correspondingly different outcomes, within the same country and system of government. The framework breaks down services into their different aspects as goods, enabling us to understand the nature of the market for these and the potential political incentives and constraints facing the actors involved in their provision and consumption. Figure 1 illustrates the different aspects examined within their mapping.

Figure 1: Sector characteristics



Source: Mcloughlin and Batley (2012).

The framework is designed to distinguish between different tasks within the sector or service, so as to give a more complete overview of the mechanisms influencing the politics of service delivery. This is particularly important in the roads sector, where there are multiple, often fairly distinct, tasks. In this section, we begin by examining the first two columns of characteristics (nature of the good and market failure characteristics) in terms of roads in general; for the last two columns (task-related characteristics and demand characteristics) we analyse two distinct tasks: road construction and road maintenance.

It is important to emphasise that there is a wide range of other tasks and distinct markets that could be analysed, including the distinction between urban, inter-urban and rural roads sectors (both construction and maintenance), the nature of road contracting and the regulation of road usage. The decision to concentrate on construction and maintenance was motivated partly by a desire for brevity, but primarily by the existence of a clear division between these two particular tasks in the literature and an absence of extensive literature on other potential tasks.

3.1 Nature of the good

3.1.1 Rivalry

Rivalry is commonly judged by whether or not consumption of a good by one user has a negative impact on the ability of other users to utilise that good. Some goods can be classified as purely rival or purely non-rival, but roads do not fit neatly into these categories, as they are generally non-rival but under particular circumstances can become rivalrous.

For example, low levels of maintenance, poor road quality and use of heavy vehicles on inappropriate surfaces can lead to roads being eroded, and so the passage of vehicles cumulatively reduces the ability of users in the future to utilise the road. Rafiqui (2003) gives an example of this in relation to rural Laos, where roads have become rivalrous as a result of the damage inflicted by heavy vehicles from the timber industry, which have made the roads unusable for other forms of transport.

Roads may also exhibit some of the characteristics of club goods,[1] in that, at low levels of use, they are non-rival but after a particular tipping point they become congested and so rivalrous, as the presence of additional vehicles causes slower travel times and displaces other road users. The volume of traffic required to produce these effects seems to be confined to urban areas, and is often associated with poor management of traffic flows. Thus, this is not strictly a product of road characteristics alone. Abbas (2004) documents a case from Alexandria, Egypt, in which changes in road use patterns, related particularly to new commercial developments, led to peak traffic flows and heavy congestion owing to an absence of complementary flow regulation and road network reforms.

3.1.2 Excludability

Excludability is usually defined in reference to how easy it is for those who are not contributing towards the upkeep of the service to be prevented from utilising it. On a technical level, it is fairly easy to prevent people from accessing a road through the use of checkpoints and toll charges. However, implementing exclusion is not costless, and it will be a viable economic strategy for financing road construction and maintenance only if there is sufficient traffic usage and user wealth for suitable tolls to be imposed. There is also a question about the legal rights of communities with respect to road ownership and usage charging that distinguishes legitimate collection of tolls from banditry.

The literature on how excludable roads are in practice is decidedly mixed. There are no shortages of examples of checkpoints and charges, both official and unofficial, particularly from Sub-Saharan Africa. Adzibgey et al. (2007), in their examination of transport corridors in Sub-Saharan Africa, note a range of state and non-state actors that organise roadblocks and checkpoints. These frequently charge truckers and long distance drivers for road usage, with some operating as highly organised networks for distributing these rents.

Adamu et al. (2005) examine similar issues in the context of the livestock market in Nigeria, and they also emerge in surveys of road governance and travel disruption in West Africa (USAID and UEMOA, 2011). However, it is interesting to note that these studies find that uniformed state law enforcement agents (police, gendarmes and customs officials) are the main organisers of the collection of bribes and unofficial tolls, and that this occurs mainly along major trunk roads. Whether this exclusion contributes to road financing or the solving of collective action problems in this context is highly uncertain; it also cannot tell us a great deal about the viability of exclusion on rural feeder roads where traffic volumes are likely to be lower.

A report by the World Bank (2010) looking at infrastructure in Sub-Saharan Africa also casts doubt on the viability of exclusion through toll financing, even for major trunk roads. It notes that toll roads currently make up only 0.1% of the region's formal road network, and that these are found almost entirely in South Africa. Going further, it estimates that a minimum traffic volume of 15,000 vehicles a day is necessary for toll concessions to be economically viable, and that these conditions exist on less than 10% of the existing Sub-Saharan road network, with these areas concentrated in South Africa and some areas of Nigeria. These forecasts demonstrate the difficulties of viable exclusion in the roads sector, but also illustrate that there is unexploited potential for doing so, at least within South Africa and Nigeria, and that this may become more viable in the future, if and when traffic volumes increase.

Rafiqui (2003) provides a different perspective from rural Laos, where questions of economic viability combined with a lack of local legal ownership over community-constructed and maintained roads have been found to undermine the ability of communities to exclude and charge tolls to non-local users. The author also notes initiatives organised by the Swedish International Development Cooperation Agency (Sida) and others that provide models for community roads and use taxation of non-community members to provide at least partial finance for them. Exclusion may therefore be possible but requires a legal framework and an acceptance that this cannot be the main source of road financing under most circumstances.

[1] Club goods are classified as goods that are excludable but non-rivalrous, except when congestion occurs as a result of high levels of use. Examples include public parks and cinemas.

Theoretically, tolls and exclusion should be easier in urban areas, where there are greater concentrations of both wealth and people; however, our survey of the literature found little by way of specific references, with the emphasis much more on inter-city and trunk roads.

3.1.3 Summary

Roads show many of the characteristics of a public good in that they are generally non-rival and non-excludable in practice. However, it is also clear that, under certain circumstances, specifically where there are high traffic volumes, they can exhibit the characteristics of a club good, that is, they can be excludable and rivalrous when there is particularly high usage. Club good characteristics occur mainly on large trunk roads, and are theoretically present in urban areas. These characteristics would suggest that state provision of roads is necessary in areas where exclusion is not possible or is uneconomical, but that on routes with high traffic volumes there is the potential for private provision financed by toll charges.

3.2 Market failure characteristics

3.2.1 Tendency towards monopoly

Monopolies are defined as markets where there is only a single seller of a good or service, with an absence of entrants who can provide competition.

Roads have been considered a strong example of a natural monopoly since at least Walras (1875), and this assumption is implicit in much of the literature. The economic logic behind this holds in both rural and urban areas, in that road construction requires a high level of sunk costs in terms of land, materials and labour, which presents a formidable barrier to entry. In some circumstances competition may be physically impossible, in that there may not be multiple viable routes for roads to follow; this is particularly the case in mountainous or remote regions. Level of traffic flow is also likely to be a crucial determinant of whether competition is possible, as this will determine whether there is sufficient demand to make the presence of two roads economically viable. Traffic flows are generally higher along inter-urban routes and in urban areas than in rural ones (World Bank, 2010), and the geography of urban areas makes multiple routes between locations more likely.

Roads therefore have strong monopoly characteristics, particularly in rural areas and rugged terrain.

3.2.2 Positive and negative externalities

Externalities are understood as the consequences of decisions made by one person, that have an impact on another person, without them being compensated or giving compensation as a consequence. Generally, negative externalities result in a level of production that is above the socially optimal level, as the decision-making individual does not suffer the full negative consequences of their actions (e.g. air pollution resulting from industrial manufacturing). Positive externalities result in a level of production that is below the socially optimal level, as the decision-making individual cannot capture the full benefits of their choices (e.g. community immunity that results from vaccinations).

Roads are widely recognised as creating externalities, both positive and negative. The main debate surrounds their magnitude, whether they have a net positive effect and whether they are distributed equitably between different socioeconomic groups. Externalities may take economic forms, such as a decrease in price volatility and increased opportunities to take advantage of business and work opportunities outside the community; social forms, such as an increased ability to make links with people in different settlements; and governance or public service forms, such as an increased ability to access, or be accessed by, health services, schools, security forces and the justice system (see Hine and Rutter, 2000, on Sub-Saharan Africa, Rigg, 2002, on South Asia and Vietnam and Wilson, 2004, on Peru).

DFID (2004) documented in detail the effects of road rehabilitation and improvement in two *woredas*[2] in the Ethiopian state of Oromiya. They found a range of benefits and externalities resulting from these interventions, including an increased ability to travel, a widened labour market, the building of new goods markets, increases in crop prices, improved access to health facilities (particularly for maternal health) and improved access to education (particularly secondary schools).

However, they also found there was a hierarchy of beneficiaries. Rich residents benefited more than poorer ones, as they could afford more frequent access to transport and had greater surpluses to sell and invest. Similarly, men benefited more than women, as they generally controlled the surpluses and could take better advantage of travel, as they were more secure in doing so. Interestingly, however, the improved roads had a much more positive effect on female enrolment and attendance in secondary school than was the case for males. The Ethiopian case study is also instructive in terms of the potential negative externalities of roads. It found residents complained of health problems related to rising dust, that there were instances of increased soil erosion, as the roads altered the topography of the landscape, and there had been an increased risk of traffic accidents.

3.2.3 Information asymmetries

Information asymmetries arise when some stakeholders involved in a decision have access to information that other stakeholders do not. This can create an imbalance of power between stakeholders and mistrust, resulting in socially sub-optimal decisions or, in extreme circumstances, the absence of a market.

The literature suggests that asymmetrical information is common in the roads sector, although the issue is complicated by the need to distinguish between ineffective systems for monitoring of progress and the innate characteristics of the sector. Asymmetrical information seems to emanate from the difficulty of discerning the appropriateness of road designs, judging the actual quality of road construction and determining the level of maintenance being administered, without possessing both well-developed monitoring and oversight systems and the appropriate technical expertise. Thus, governments may be better informed than citizens, road agencies may be better informed than national or local governments and road contractors may be closest to complete information. This disparity in information may be particularly acute in rural and peripheral areas, where citizens may be less informed and the lack of a significant state presence and lower levels of connectivity mean oversight is increasingly difficult and expensive.

World Bank (2010) provides indirect evidence of asymmetrical information in its analysis of recent trends in road maintenance contracting in Sub-Saharan Africa. It notes that there has been a general shift away from process-based contracts and a new emphasis on performance-based contracts, with accordingly improved results in terms of road quality. This suggests that monitoring the actual actions of road contractors was difficult and expensive, resulting in asymmetrical information, and so the focus was shifted towards outcomes, which were more easily monitored and suffered less from asymmetrical information.

World Bank (2010) also provides some evidence of asymmetrical information over the appropriateness of road design. Relative to traffic flows, almost 30% of main road networks are over-engineered, potentially allowing rent seeking from higher specifications requiring greater capital budgets, and 10% are under-engineered, possibly because contractors use sub-standard materials or rush construction to pursue more profitable contracts. They also find that 15% of rural roads are under-engineered, which would fit a model where higher levels of asymmetrical information in rural areas allow greater discretion to those implementing construction. It should be noted that this may be the result simply of difficulties in predicting traffic flows, but is consistent with agents taking advantage of information asymmetries to accrue rents.

[2] District-level administrative units.

Case study evidence also points towards monitoring difficulties. Parkman (1999) notes that, in the case of privatisation of road maintenance in Ghana, there was a need for more, as well as better trained and paid, government monitors to ensure work was completed and done to an adequate standard. These issues were particularly acute at the local government level, as the decentralisation of power (including for road contracting) was not accompanied by an expansion of staffing or retraining of existing staff at these institutions.

Geilinger et al. (2010) produce evidence consistent with the narrative in World Bank (2010). In a largely technical piece, the authors outline how technological monitoring experiments in Mozambique can provide the basis for performance-based contracts as an alternative to process-based monitoring and often-superficial photography monitoring. However, they also note that it is not uncommon for roads agencies or contractors to be responsible for the construction, maintenance and monitoring of the same section of the road network, giving them privileged access to this information and the ability to act as its gatekeepers. Thus, while performance-based contracts may be a solution to information asymmetries in the roads sector, it is important that the monitoring agent is independent of the service provider.

3.2.4 Merit goods

Merit goods are defined in terms of the knowledge of the consumer. Where individuals or groups do not understand the benefits that will accrue to them from use or production of the good, it is considered a merit good. This means government intervention is usually required to ensure the good is present in quantities that are socially optimal. Examples of merit goods in other service delivery sectors include basic education and immunisation, both of which are usually implemented with elements of compulsion. The presence of considerable externalities (examined above) would suggest that roads could be considered a merit good, but much of the literature suggests that individuals are often very aware of the benefits of roads, although not necessarily in specific terms.

DFID (2004), in their examination of the benefits of rural roads improvement in Ethiopia, found that focus groups of rural people in areas that had not received improvements viewed them as a major source of socioeconomic benefits and rated them a top priority for spending in their areas. The Transport Research Centre (TRC) and Rural Net Associates (RNA) (2004) note, in the Zambian context, that there is a general association in people's minds between the creation of improved roads and the arrival of other government services, such as health care and education. Wilson (2004) examines the case of Peru and argues that rural people's demand for improved roads is very real and that it is motivated by their potential to reduce isolation, increase access to service provision and allow rural communities to integrate more completely into the life of the nation. These cases indicate that roads may therefore not be a merit good, as people are aware of the potential benefits of their creation, but seem to be unable or unwilling to provide for them without intervention.

3.2.5 Summary

Roads have many of the characteristics of a good that lead to market failure, especially in rural areas. Their tendency to be non-rival and non-excludable, combined with considerable externalities, means they are unlikely to be provided to a socially optimal level without the presence of non-toll sources of funding and returns, whether commercially provided (e.g. owners of large mines or plantations who need easy market access) or political (e.g. state construction and maintenance financed by taxation of economic activity or political returns from increases in support or the ability to more easily exercise authority).

The existence of club good characteristics in some locations and the natural monopoly characteristics of roads means private provision financed by tolls roads is plausible in inter-urban and urban areas, but evidence suggests that these opportunities are under-exploited. Information asymmetries do not seem to have collapsed the market, but do create significant potential for rent-seeking activities by governments, road authorities and contractors. Performance monitoring systems may provide a mechanism to overcome these asymmetries, but only where they are implemented in an effective and appropriate form. This is explored in greater detail in the common governance constraints section. These characteristics seem to

justify state intervention in the road system, although it is clear that this is not unproblematic, given the potential for rent seeking and that roads are not a merit good in the strictest sense, as people are largely aware of the likely benefits that will accrue from the presence of a road and greater connectivity.

3.3 Task-related characteristics

3.3.1 Visibility and measurability of outputs

Construction: Highly visible outputs that have immediate impacts on users. This is often measured in terms of kilometres of road added to the network (Burgess et al., 2009; van de Walle and Mu, 2007), although the presence or absence of a paved road in an area also provides a powerful and simple measure.

Maintenance: Generally low visibility outputs whose impacts are felt only gradually in their absence, that is, the slow deterioration of road quality with a lack of maintenance. Measurement either involves simple, but often expensive, process-based monitoring (i.e. observation of discrete acts of maintenance) or broader measures of road quality that can be more difficult to disentangle from the original quality of construction and impacts of use and environment (speed of travel, time efficiency of travel and vehicle) accessibility (see Geilinger et al., 2010; Parkman 1998, 1999; World Bank, 2010).

Examining the contrasts between road construction and maintenance highlights the extent to which different tasks in the roads sector have differing levels of visibility, which ultimately influence investment patterns and outcomes in the sector. Van de Walle and Mu (2007) examine the impact of a programme providing aid for the maintenance of rural roads in Vietnam, as part of an investigation into the fungibility of aid. In areas awarded funds for maintenance, they observed only a slight increase in maintenance and a much larger increase in the funding and scope of road expansion projects. They attribute this effect to the greater visibility of road construction over maintenance, with political incentives that affect priorities.

Similar dynamics operate in an urban context as well. Majeed and El-Kazaz (2012) note in their work on the revival of municipal infrastructure in Alexandria, Egypt, that the then-mayor used large, highly visible road expansion and bridge-building projects to generate public support for his reforms and public investment ambitions.

3.3.2 Discretion of frontline staff

Construction: Little discretion in terms of the location of the road, but varying degrees of discretion in terms of road quality and the time it takes to complete the task. Discretion is much higher in rural or remote areas where monitoring is more expensive.

Maintenance: Greater degree of discretion in rural areas as monitoring costs are higher than for construction and discretion can be exercised over both the quality of maintenance and how frequently it takes place.

Differences in the level of frontline discretion are fairly pronounced between different tasks in the roads sector, and between urban and rural areas. This can have important effects in terms of the ability of citizens to attribute successes and failures to particular policies or actors, and the potential for greater rent accumulation by frontline staff and contractors. These in turn feed into the willingness of government bodies to channel funds into the task or sector in question.

Geilinger et al. (2010), in the context of Mozambique and Ethiopia, note that monitoring the maintenance of rural roads can be expensive or tend towards being superficial, so discretion will be high, as processes cannot easily be observed. Parkman (1998, 1999), in the case of Ghana, also notes the need for improved monitoring of road maintenance contractors, both in general and specifically. Both Parkman (1999) and Rafiqui (2003) note how competition for maintenance contracts is limited by the use of fixed unit-price contracts in Ghana and Laos. This could be seen as a mechanism for restraining costs in the absence of effective monitoring that would allow for more efficient pricing by outcomes or performed labour.

However, this characteristic appears to be very dependent on local conditions. The Prime Minister's Office of Tanzania (2011) found that maintenance work was halted in some areas because local government engineers had a backlog of work and so could not be present to monitor progress – an extreme case of non-discretion. A shift towards performance-based contracts, as noted in World Bank (2010), will also tend to increase discretion for maintenance contractors in terms of actions, but should provide incentives for this discretion to be focused on how best to achieve the necessary performance standard.

3.3.3 Variability

Construction: Largely standardised but within limits set by climate and topography. May also vary according to transport types, for example use by heavy vehicles.

Maintenance: High variability across locations and, to a lesser extent, within them. This is dependent on a number of factors influencing erosion that will be unique to specific areas or regions. Many are similar to those affecting construction, but there are added issues of seasonality and extreme events that can damage roads, such as frosting, landslides, flooding, etc.

The degree of variability within tasks interacts with the level of service provider discretion to complicate the ability of citizens and commissioning agents to judge the performance of implementers. For instance, it is easier to observe a single occurrence of road construction that happens according to a fairly set formula, as opposed to a series of small maintenance interventions that may occur at a variety of points and in different forms. It is notable that there are issues of monitoring and asymmetrical information for both tasks, but that the challenge is less acute for construction.

Within the literature, we found a much stronger focus on variability of tasks within maintenance than within construction, although these are not generally compared directly. We can infer from this that maintenance is a more varied task and that the fact it is not a one-off task makes this seem plausible. Parkman (1998) goes into extensive detail on the variations that may occur in routine and non-routine maintenance tasks, particularly in climates that are more hostile and prone to natural disasters. The simple fact that maintenance occurs repeatedly and is designed to maintain a particular standard of road quality means these events will have more of an impact on the tasks required. Rafiqui (2003) mentions these issues in the context of rural Laos, noting that road operations are severely complicated by heavy rains that fall for almost six months of the year. The extent of damage to roads from accompanying floods and landslides is often unpredictable, and contractors are less eager to bid for maintenance contracts as their returns are far less certain where fixed unit-price contracts are in place. Similarly, World Bank (2010) notes the importance of fundamental topographic and climatic influences on road construction and maintenance, with wet and mountainous regions generally having a lower-quality road network.

3.3.4 Professionalisation

Construction: Varied but generally high owing to complexities of planning and building for improved or good quality roads. Mabenga (2002), Rafiqui (2003) and the Transport Development and Strategy Institute (TDSI) (2003) note examples of community-built roads in Zambia, Laos and Vietnam, respectively; however, these usually utilise a combination of local labour and professional engineers and technicians from the relevant roads agency. World Bank (2010) also notes further instances of this in Sub-Saharan Africa.

Maintenance: Varied according to the complexities of the regions in question. Basic maintenance requires little professional training, but high-quality, complex and crisis maintenance must often be done with specialised machinery and skills, and so is highly professionalised (see Parkman 1998, 1999).

The degree of professionalisation of any given sector or task is an important factor in determining whether alternative providers can emerge and the likelihood of self-provision. Road construction and maintenance both share the same essential characteristics, with a high level of professionalism required for good-quality roads and low levels of professionalism

resulting in poor or unreliable provision. Few communities are wholly without roads, but World Bank (2010) makes clear that, without considerable technical support, these are unlikely to be of high quality, durable or reliable in extreme conditions. Self-provision of roads will generally be sub-standard, and professionalisation of both tasks is the preferred norm.

3.3.5 Summary

Analysis of the task-related characteristics of the road sector provides a partial explanation for the problems we observe in the road sector and the emphasis that is placed on construction over maintenance.

The levels of discretion afforded service providers in rural areas, where monitoring is particularly costly, are factors that may explain the reluctance of governments to invest in roads in these areas, as they cannot be certain they will achieve their intended outcomes. Similarly the degree of professionalisation needed to construct and maintain good quality roads provides an additional reason why self-provision by the local populace may not be feasible, even where the problems of free-riding and externalities can be overcome. This results in the observed pattern of under-provision of good quality roads in remote and rural regions.

The reluctance to engage in maintenance as opposed to construction is also partially explained by these elements. The lower variability, higher visibility and relative lack of provider discretion in construction projects means that the government is better able to monitor and regulate these projects and to do so at a lower cost. In contrast to the need for expensive, long-term monitoring of maintenance processes, construction projects are likely to give far more certain outcomes for far less in terms of oversight costs.

3.4 Demand characteristics

3.4.1 Level of demand

Construction: Very high level of demand for road construction.

Maintenance: Low levels of revealed demand for maintenance.

Differences in demand characteristics are a major factor explaining whether or not a good will be supplied and the priority it will be given relative to other goods. This is particularly the case for public goods where coalitions of support must be built or suitable political incentives offered for supply. The lack of revealed demand for maintenance is thus likely to mean it will be much less of a priority for politicians, whereas road construction will be considered a high priority.

DFID (2004) found in Ethiopia that there was a very high level of demand among rural people for expansion of road networks in their areas. Wilson (2004) found in rural areas of Peru that there was considerable enthusiasm for road construction to connect remote villages. Mabenga (2002) noted high levels of demand for access to community-cost sharing programmes for road construction in Zambia. The literature is exceptionally one-sided in this regard, with almost no mention of demand for regular road maintenance.

3.4.2 Frequency and predictability of use

Construction / maintenance: Highly dependent on the socioeconomic status of the individual and the situation of the community. Usage will be, on average, high over short distances and for regular routes (e.g. school journeys, travelling to local markets) but low for long distances (e.g. to the nearest city). Notable differences between rural roads, which will generally have low levels of usage, and urban roads, which will be used more frequently.

The frequency and intensity of likely road usage is likely to influence the political salience of roads for the group or individual in question, as well as their demand for them. In areas where there is ready access to wheeled transport and little difference in socioeconomic access to roads, it may thus be easier to build coalitions to construct, maintain and lobby for roads; the reverse is true for areas where there are strong socioeconomic divisions.

These differences in road usage between nations and socioeconomic are explored by DFID (2004) in the context of Ethiopia, Hine and Rutter (2000) in the context of Ghana, Kenya, Malawi and Zambia and Bryceson et al. (2008) in the context of Ethiopia, Vietnam and Zambia.

3.4.3 Territoriality

Construction / maintenance: Highly territorial good with common use by residents of the area it is based in. This is most true of rural feeder roads that link into trunk roads, but under some circumstances this may be diluted if it facilitates access to major roads for other communities further into the hinterlands.

The territoriality of a good is a major issue in determining the incentives for its supply. If gains are highly territorially concentrated, this can provide incentives for politicians to provide the good, in order to secure the support of the population of the affected region, and the presence of a discreet territory may lower the cost of collective action by making it easier to both organise and apply penalties to local free riders. There are numerous examples of politicians constructing roads on the basis of these incentives, examined in greater depth in the following sections, including the targeting of roads to ethnic blocks in Kenya (Burgess et al., 2009) and personal favouritism in decisions over the siting of roads in Peru (Wilson, 2004). The literature looking at the effects of particular road projects also implicitly assumes a territorial basis for their effects (see DFID, 2004, on Ethiopia, Hine and Rutter, 2000, on Sub-Saharan Africa, Rigg, 2002, on South Asia and Vietnam and Wilson, 2004, on Peru).

3.4.4 Political salience

Construction: High degree of political salience, with politicians viewing provision as a major mechanism for rewarding supporters and creating new patron–client relations. The long-term effects of provision are also considerable, both in terms of allowing state authority to more easily reach remote areas and by giving areas with provision self-multiplying advantages in terms of economic opportunities, access to state services and political mobilisation.

Maintenance: Low degree of political salience. Visible demand seems to be low and provision is less of a priority than road construction. Lack of provision undermines usage in the long run, but effects often emerge gradually unless caused by a catastrophic event.

Differentials in political saliency can have a major impact on whether politicians are incentivised to provide a service and in what form they choose to do so. Even if demand for a good is low, it may still be provided if political actors believe they can capture gains from it in the long run. This is an issue explored by Wilson (2004) in the context of Peru, looking at both the modern era and the immediate post-Independence period. The ability of road construction to allow greater government influence in the provinces and easier mobilisation of the coercive force of the state meant that, even where roads were not demanded, or even were resisted, they were still eventually provided. In the current era, there is a clear alignment between salience emerging from this desire to expand state authority and demand from rural people for connectivity. This ensures that road construction is a highly politically salient task and that, to a large extent, maintenance loses out as a result.

Evidence on the relative political salience of these issues can be inferred from rural areas of Vietnam, as noted by van de Walle and Mu (2007). The preference for rural road construction over and above maintenance, and the willingness to transfer aid money for that purpose, indicates that local politicians view road construction as more politically salient and face political incentives that reward them for prioritising construction over maintenance. Similar effects can be observed in a variety of other places, with low investment in maintenance relative to construction noted in Nigeria (Adamu et al., 2005; Porter, 2007), Zambia (Mabenga, 2002; TRC and RNA, 2004), Laos (Rafiqui, 2003), South Africa (Woldemariam, 2011) and Ethiopia and Vietnam (Bryceson et al., 2008), as well as low-income countries as a group in Sub-Saharan Africa (World Bank 2010).

3.4.5 Summary

The high level of demand for roads, the territoriality of their benefits and the political saliency of roads as a mechanism for expanding governance all provide governments with strong incentives to provide them, either generally or as a targeted benefit to client groups. Thus despite the difficulties that can arise in terms of monitoring we can see clear incentives for provision in areas that are of political or strategic importance.

The strength of demand for construction relative to maintenance also provides a strong additional explanation for the neglect of the latter task. If there are perceived to be few political rewards for investing resources in maintenance then it will be in the interests of the government to allocate a greater share to high profile construction and rehabilitation projects in key regions, and emphasising maintenance only where consistently good quality roads are vital to their broad economic or strategic interests.

3.5 Summary

The roads sector illustrates how variations in task characteristics can have an important impact on their level of supply and the ease of creating and enforcing accountability. The split between construction and maintenance is particularly pronounced in terms of demand characteristics, monitoring incentives and front-line discretion and variability.

Together, these create powerful incentives that explain the under-provision of maintenance, given its low level of demand, an inability to easily attribute success or failure to actors and its relative lack of visibility in comparison with construction. The attributes of construction also explain why this is given priority and why it has such potential for clientelism – demand is high, construction is easy to attribute to a political actor and benefits are largely territorial, making it easy to target client groups. The potential for roads to expand government authority also makes the issue politically salient, and so leads to road expansion even in the absence of demand or clientelist gains.

The greater ease of monitoring construction and single acts of road rehabilitation may also make it more attractive as an investment for political actors, as could the potential for rent seeking from higher capital budgets and asymmetry of information over true costs and appropriate engineering standards.

These characteristics also combine with the externalities and exclusion issues mentioned in the previous section to explain the presence or absence of self-provision. Differences in usage patterns between different socioeconomic groups, combined with externalities, can undermine incentives for participation in collective action, for instance in relation to road maintenance. However, the high level of demand for road construction and territorial concentration of gains can also help resolve these issues under some circumstances. The need for professional assistance and skills for constructing and maintaining good-quality roads may also explain why community self-provision of roads is likely to be sub-optimal even where collective action issues can be overcome.

Examining sector characteristics, therefore, can highlight some particular incentive structures and their impacts on different accountability relationships. However, this gives us only a partial picture of how political and governance factors might affect roads provision. In addition, we also need to understand how underlying governance dynamics and features of the nature of the political system in a given context might shape different aspects of provision. Therefore, in the next section, we examine aspects of some of the common governance constraints that seem to affect roads provision.

4 Common governance constraints

Wild et al. (2012) present a mapping mechanism for common governance constraints that links them to symptoms and common effects they have on service delivery and performance. It aims to avoid vague definitions that undermine useful analysis and so utilises five distinct categories of governance constraints, as Table 1 shows.

Table 1: Defining governance constraints

Governance constraint	Definition
Political market imperfections	Perverse political logics often based on patronage or clientelistic relationships, contributing to short-term, populist policies and biases to visible outputs
Policy incoherence	Contradictions within policy design, structure and roles, meaning some part or the entirety of policy design is unimplementable or unimplemented
Levels of performance oversight or monitoring	Insufficient performance regulation and weak accountability (either top down or bottom up) contributing to users exiting from provision
Challenges for collective action	Weak capacity of actors to coordinate their activities and work together productively
Moral hazard	Availability of aid or other resources that insulate the state (or others) from the consequences of their actions or inaction

Source: Wild et al. (2012).

This section examines how each governance constraint manifests itself in the roads sector and uses case studies to link them to specific symptoms and common effects in the provision of construction and maintenance. Where mechanisms for solving these issues have been successfully implemented, these are also mentioned.

4.1 Political market imperfections

Political market imperfections, as defined in Wild et al. (2012), reflect the underlying nature of the relationships between politicians and citizens. Where these are based on patronage or clientelistic relations, or where ethnic politics are prevalent, they can provide political incentives for the development of road networks, but also lead these developments to be socially sub-optimal. This occurs in four main ways. Road construction and improvements may be targeted at particular groups to secure their support; resources may be diverted for patronage or personal gain; there may be a distinct bias towards highly visible outputs that citizens can attribute easily to the political actor in question (i.e. construction and road rehabilitation over routine maintenance); and, closely related to this, there be short termism in policymaking that leads to an inefficient use of resources.

Kenya provides a good example of how ethnic polarisation can lead to political market imperfections that then provide incentives for road construction targeted for patronage purposes. Burgess et al. (2009) examine this case in detail, noting that Kenya has great ethnic and regional fragmentation, with five groups comprising 70% of the population, which have a high degree of geographic concentration and social segregation. They argue that this provides the ideal conditions for ethnic favouritism and patronage politics, as resources can be targeted to politicians' ethnic power bases with considerable ease and strong identities provide a common point of political identification for poorly informed voters.

For the roads sector, this contributes to the diversion of resources (chiefly paved road construction projects) towards areas that have provided support for ruling parties and politicians. Burgess et al. (2009) demonstrate this by analysing a comprehensive dataset of post-Independence era information on road construction patterns in Kenya, the (relatively unchanged) geographic distribution of ethnic groupings and the identities and home regions of central government ministers. They find strong evidence that road expansion in any given year is closely related to the home regions of the prime minister and the minister of public works, and to ethnic groups represented in the Cabinet, with the second largest group receiving a particular boost. This suggests that politicians have used road construction as a mechanism for

distributing patronage, either to secure their own power bases, or to ensure political stability (ibid.). This may contribute to under-provision of roads in some areas and a deterioration of the road network in areas that lack a high-ranking minister or political connections.

Uganda provides another example of this. Booth and Golooba-Mutebi (2009) document the pervasiveness of political patronage throughout the Ugandan political system and the high levels of corruption that accompany it, motivated by both personal gain and a need to channel resources down to political clients or up to senior officials and party leaders. In contrast with the Kenyan case, they do not find any evidence of targeting of road construction projects to particular ethnic groups, but instead note a widespread use of jobs and promotions in various ministries and agencies as a source of political patronage. This worked alongside the generation of rents from the roads sector through kickbacks on contracts and the skimming of project funds. It resulted in a duel loss of efficiency in the sector, as costs were inflated by rents and officials were appointed for patronage purposes but lacked the competence and ability to carry out work effectively. These effects were reportedly large enough to cause the Ugandan finance ministry to become increasingly reluctant to provide funds, given the wastage that would occur. The roads sector thus lost a substantial element of its funding to rent seeking, and what remained was used inefficiently, as projects were selected for their potential to provide short-term rents rather than long-run returns.

Patronage politics may also create incentives for politicians to favour highly visible projects whose positive effects are easily claimed by individual politicians or parties. This is seen in a clear preference for large, one-off road construction and rehabilitation projects, rather than tasks of regular maintenance. As noted in earlier sections, the phenomenon of under-investment and de-prioritising of maintenance, as compared with construction, has been noted in Sub-Saharan Africa as a whole (World, Bank 2010), Nigeria (Adamu et al., 2005; Porter, 2007), Zambia (Mabenga, 2002; TRC and RNA, 2004), Laos (Rafiqui, 2003), South Africa (Woldemariam, 2011), Ethiopia and Vietnam (Bryceson et al., 2008) and Kenya, Tanzania and Uganda (Leyland, 2002). Van de Walle and Mu (2007)'s analysis of the preferences of local governments in Vietnam also provides evidence on this at the local level.

The logic of patronage politics can also create incentives for an emphasis on short-term gains that will create and sustain political support. In the roads sector, this tendency interacts with the preference for highly visible projects. Governments may promise people a road as a form of patronage, with its construction producing short-term gains for the community and political support, but may lack the funds, or the incentives, to maintain it. This allows them to promise and then conduct a large-scale rehabilitation programme on that road at the next point in time when they require the support of their client. Clients enjoy brief periods of good transport links followed by increasingly poor service, while resources can be wasted through unnecessarily large-scale operations that could be avoided were regular maintenance undertaken. These large, occasional projects can also facilitate rent seeking and corrupt activities, as seen in cycles of expansion and retrenchment in road networks noted particularly in Vietnam (TDSI, 2003; van de Walle, 2002) and Laos (Rafiqui, 2003).

World Bank (2010) notes that a series of reforms to the road sector in Sub-Saharan Africa have had positive effects in terms of limiting the more negative consequences of political market imperfections through the creation of autonomous road agencies and of dedicated road funds supported by levies on fuel. They observe that countries that have adopted these reforms show a substantially higher quality of main road networks, and a less pronounced improvement in rural areas. This appears to be consistent with the idea that political incentives lead to an alignment towards construction over maintenance, and so greater autonomy for road agencies leads to an improved emphasis on maintenance. However, the report also highlights the limitations of these reforms – there is still low priority given to rural road networks, and road funds and agencies often do not follow what are considered to be best practices. This suggests they may not be wholly insulated from outside political pressures, as illustrated in the Ugandan case too (Booth and Golooba-Mutebi, 2009).

Interestingly, reforms based on decentralisation do not seem to have had a particularly significant effect in terms of altering incentives, with much of the literature noting that these

activities seem to reproduce the same incentives on a local level (see Shrestha, 2007, on Nepal and van de Walle and Mu, 2002, on Vietnam) or created difficulties with the level of capacity and the willingness of contractors to take up small, local contractors. These issues are explored by World Bank (2010) in the context of Sub-Saharan Africa, as well as Parkman (1999) in the context of Ghana.

Forms of political market imperfections can also facilitate or encourage forms of policy incoherence, in terms of contradictions in the policy framework, where roles and responsibilities are fragmented or policies are implementable. In the roads sector, there are examples of networks of informal, non-institutionalised power within the bureaucracy and a lack of civil service capacity at various levels working to undermine formal policies. Booth and Golooba-Mutebi (2009) note how patronage networks in the roads sector in Uganda can create divided loyalties for officials between following official policy and pursuing programmes that may advantage their patrons. Rafiqui (2003) notes an analogous case in Laos, where there has been considerable ideological resistance to reforms from the hierarchy of the Communist Party within the road bureaucracy. The symptoms of these issues are chiefly inefficient working practices, resource wastage and diversion of resources for patronage or other corrupt purposes.

The creation of autonomous road agencies, as explored in World Bank (2010) and Bennett (2010), in the South African context, may provide a mechanism to reduce policy incoherence and improve capacity through training and careful selection of staff to eliminate patronage appointments. However, as noted in the previous section, the extent to which this will improve outcomes is heavily dependent on whether it is plausible to insulate these agencies from outside pressures.

4.2 Levels of performance oversight or monitoring

Low levels of performance oversight and monitoring, resulting from political motivations not to monitor and the asymmetrical information issues noted in previous sections, manifest themselves in the roads sector primarily in poor network coverage and inefficient use of resources. These will be particularly pronounced in rural and remote regions where monitoring becomes more expensive to implement.

The Ugandan case, discussed above, provides a good example of how widespread political patronage within a system, and the status of the road system as a cash cow for rents, means there is little incentive for effective vertical monitoring of the sector. Booth and Golooba-Mutebi (2009) argue that, particularly in the pre-reform era, there was a systematic insulation of the Ugandan Ministry of Works from hostile inquiries, and that this enabled both the extraction of rents and a permissive culture that was detrimental to the effectiveness of the ministry. This contributed to expensive and poor-quality roads.

Nepal provides an interesting example of inefficiencies resulting from the opaque nature of contract tendering. Although the shift to using private contractors was intended to limit corruption, create incentives for monitoring and improve the performance of road networks, this does not seem to have functioned effectively in the Nepalese case. Shrestha (2007) notes that there is a general lack of public knowledge regarding the obligations and duties of civil servants and that, in the case of the municipal roads sector, this translates into opaque tendering processes for contracting. As a result, bribes are frequently paid to secure contracts, costs are inflated and it is relatively common for officials to charge commission to the contractor. This can undermine incentives for officials to hold contractors accountable for the quality of their work, leads to inefficient use of public money and resource diversion, with knock-on effects on the quality of the road network.

It should be noted, however, that contracting-out has proven an effective solution to these issues in areas where incentives are in place that foster transparency and support greater competition. Parkman (1999) presents evidence that increased sub-contracting has improved efficiency in Ghana, and both Rafiqui (2003), in the context of Laos, and Bennett (2011), in the context of South Africa, note the benefits of having competitive firms, for instance for price

competition. However, they caution that, without attempts to foster small contractors, this will be limited, and in the case of large projects and maintenance contracts there is far less competition and a risk of a few firms dominating.

World Bank (2010) also notes that the creation of specialist management agencies and the adoption of performance-based contracts for maintenance in some Sub-Saharan African countries have had a very positive impact on road quality. Under these contracts, private contractors are required to maintain a set of public roads so they meet a set of quality conditions over a three- to ten-year period, in return for a steady stream of revenue. Estimates show that adoption of this method can reduce maintenance costs for paved roads by 10-20%.

However, these contracts are often significantly more expensive (as the contractor bears a greater share of risk) and require retraining of the bureaucracy to effectively manage them, and, so far, their implementation has been patchy, in part because of the time taken for systems to fully embed. There are also limitations as to the extent to which the contracting market is truly competitive in many developing countries, with a relative small number of bidders and wide price ranges across them, leading to a lack of viable sanctions, which allows projects to overrun significantly, and a tendency for the price of road construction and maintenance to be inflated relative to regions that have fostered more competitive markets.

4.3 Challenges for collective action

Issues of collective action manifest themselves in the roads sector mainly through a lack of good-quality roads in rural areas, especially as there has been a shift in many places towards communities having a much more formal responsibility for the construction and maintenance of feeder roads.

As noted in the discussion of sector characteristics, roads are particularly vulnerable to collective actions problems. They have significant sunk costs, in terms of either time and energy spent on political lobbying (particularly if relevant authorities are remote or unknown) or time, labour and resources in the case of physical construction and maintenance (particularly for high-quality roads). Significant externalities mean it is difficult to capture all the gains, and it may be also difficult in many cases to exclude non-contributing local or non-local users, thus lowering the incentives for provision and for participating in collective action. Thus, without state intervention or other providers, rural roads in particular can tend to be community built and of poor quality, with development and maintenance occurring only when absolutely necessitated by local conditions or crises (rainy seasons, floods, landslides, etc.).

Kooy and Harris (2012) note the problems of collective action that occur at the village level in Vietnam regarding water and sanitation, as actors cannot coordinate behaviours that will lead to a critical mass for either basic hygiene or payments necessary for the installation of elements necessary for clean water. TDSI (2003) finds that these issues also manifest themselves in the rural roads sector in Vietnam, where there is an increasingly strong emphasis on community responsibility for the construction and maintenance of roads. They note that the system in place relies on a combination of locally raised funds, central government support (often in kind) and voluntary and compulsorily raised labour. These elements are presumably in place to lower the costs of collective action to individuals in the community and to compel free riders to contribute in order to overcome these collective action issues. Despite the presence of these incentives, the authors find there is still a lack of comprehensive and high-quality road coverage in some rural areas.

Similar constraints, but with an alternative set of solutions, are presented in the Laos context by Rafiqui (2003). She notes that the low level of wages paid for community road maintenance is a major deterrent and that people are often reluctant to engage in maintenance for roads that are used and damaged extensively by large, external logging firms when they cannot exact some form of charge on them. Several programmes have been put in place that allow communities formal ownership over the roads, and so a legal right to tax non-residents (i.e. charge them tolls), measures that seem to have had some success in improving participation.

Zambia provides an alternative example of collective action issues that relate to difficulties in coordinating political action. Mabenga (2002) examines a successful community cost-sharing programme in Zambia that he notes was very popular among rural people and produced a high level of demand. However, most of the case studies examined appear to have been initiated by local elected officials, rather than communities themselves, suggesting that collective action issues are such that it requires political entrepreneurs to mobilise the necessary support. These findings are supported by TRC and RNA (2004), which find that, despite documenting considerable social and economic benefits from the provision and improvement of rural roads, there is little community involvement in road planning for their area.

World Bank (2010) notes in the Sub-Saharan African context that collective action problems, as judged by the quality and quantity of community-built roads that have not received state assistance, are a particular problem. They often rely on in-kind contributions that may be inefficient, and access to capital, as noted in the other cases, is not straightforward. An absence of technical knowledge and experience in organisational management is also a considerable barrier to community ownership and management of roads, as well as the initial construction. The World Bank argues that there is a need for cost sharing between communities and either local government or external agencies for rural road construction, possibly through the creation of specific rural infrastructure funds that could release resources and improve efficiency to generate much better results in the long run. In the language of collective action problems, this would both reduce the cost of participation and allow the provision of selective benefits to those who have contributed in the form of wage or service payments from the rural road funds.

4.4 Moral hazard

Moral hazard is generally understood as occurring when actors are insulated from the consequences of their actions by the presence of another actor who will provide largely costless compensation to them. This leads the insulated actor to pursue risky strategies or those that have short-term payoffs, as they are confident of being insulated against the long-term costs of their actions.

In the roads sector in many developing countries, this is commonly associated with flows of aid money. This can allow political actors to pursue projects with short-term political benefits over more efficient long-term investments, and to avoid enacting necessary reforms to the roads sector that would be unpopular in the short term. This works to accentuate the rapid, unsustainable expansion of road networks, increase the tendency to focus on rehabilitation over regular maintenance (as the latter is harder to finance from traditional aid) and allow the costs of road expansion and maintenance to rise without provoking attempts at reform or cost cutting.

Rafiqui (2003) argues that, in the case of Laos, the level and form of international support for rural roads programmes have created precisely this form of perverse incentives. Given the presence of large donors, operating on an annual disbursement cycle, Rafiqui argues that it is highly rational for the government of Laos to take advantage of these funds to construct roads and then go back to the same source for one-off rehabilitations in later years, rather than disbursing their own scarce finances on maintenance commitments. Thus, although this actually consumes more resources and produces a worse effect in terms of road quality, it is cheaper and more politically efficient for the Laos government to operate in this manner.

World Bank (2010) also provides an example of how donor-induced moral hazard operates in Sub-Saharan Africa. It notes that, in low-income countries (both fragile and non-fragile), donors finance about half of all road sector expenditure, creating less of an incentive for road reforms and allowing a considerable bias towards construction projects. Cost overruns on multilateral agency projects rose from 30% of total costs in 2005 to over 60% in 2007, a fact the World Bank attributes partially to rising inflation during that period, but also to a lack of incentives to keep costs under control.

World Bank (2010) also highlights that aid has partly fuelled the capital bias in priorities that has resulted in high spending on construction and rehabilitation of roads, as opposed to maintenance. Aid financing covers over half of the road investment that occurs in Senegal and almost 90% of road investment in Rwanda. Simultaneously, half of the countries sampled were not dedicating adequate resources to maintaining their main road network and a quarter were not spending sufficient amounts to cover routine maintenance. However, despite these negative implications, the report also notes that highly effective road agency reforms have also been implemented, largely as a result of donor pressures.

4.5 Summary

This overview demonstrates how interaction between common governance constraints and the attributes of the roads sector produces political incentives to expand the road network, but also creates incentives and opportunities for a range of activities that are detrimental to the road network. These include rent seeking, poor monitoring and resource diversion that leads to under-provision of roads in rural areas, inflation of road project costs and a bias towards construction at the expense of regular maintenance.

Political market imperfections encourage road network expansion to sustain and expand patron–client relationships, but also lead to socially sub-optimal outcomes, as road siting is selected for political convenience rather than to maximise economic or social benefits. Similarly, they lead to highly visible construction and rehabilitation projects being favoured over regular maintenance that would be more efficient but is less politically rewarding. The potential for roads to act as a source of patronage in terms of rents and employment can lead to selection of projects based on maximising these returns as opposed to the social good, as well as undermining incentives for road monitoring and creating policy incoherence – all of which feeds into inflation of project costs and inefficient use of resources. This then limits the expansion and quality of the road network. Moral hazard caused by the presence and form of significant aid flows for road infrastructure also dampens the incentives for reforming the sector and accentuates the potential for patronage and rent-seeking opportunities.

Reforms to the sector have shown some promise, particularly the creation of autonomous road agencies and the adoption of performance-based contracts for maintenance, but the persistence of underlying political incentives has meant that, in some places, their implementation is incomplete; in others, they have not proven wholly effective.

Collective action issues are also a major barrier to community provision and maintenance of roads in rural areas, although there are some examples of successful initiatives that have overcome them.

5 Conclusion

This literature review has served to highlight several important aspects of the political economy of the roads sector and the way it operates given the political incentives in many developing countries.

In terms of sector characteristics, we have established that roads have a tendency towards market failure. The sunk costs involved in road construction are considerable and the externalities created mean there is considerable potential for free riding that leads to non-provision or a socially sub-optimal level of provision. The imposition of tolls provides a possible solution, but these are uneconomical in areas with low volumes of traffic and often under-utilised in practice, and the natural monopoly characteristics of roads may make them socially inefficient without proper regulation. Overall, this makes a strong case for roads as a sector that requires state intervention. However, the literature also establishes that road construction, at least, is not a merit good *per se*, as people are very conscious of the potential benefits of roads and greater connectivity. These issues are also much more detrimental in rural areas than for urban and inter-urban road networks.

There is also a clear division in characteristics between the two tasks examined here. Road maintenance could almost be considered a merit good, given that it is highly neglected in terms of demand but has considerable potential to improve efficiency in the roads sector. Similarly, it has much greater potential for market failure, as it shares with construction the issues of externalities but combines this with a greater task variation, provider discretion and monitoring issues that undermine the ability of contracting agents to attribute success and judge provider effort.

The literature also illuminates the manner in which these characteristics interact with common governance constraints in many countries – often leading to under-provision of roads in rural areas, inflation of road project costs and a bias towards construction at the expense of regular maintenance.

Political market imperfections can mean political leaders exploit the status of roads as a highly visible and demanded good in order to use them as a tool for patronage, facilitated by high levels of asymmetrical information. This may have both positive and negative effects on road provision. The desire to secure new clients, reward existing ones and generate rents can create an incentive for politicians to expand the road network into new areas. However, these same incentives can lead to inflated project costs that limit network expansion, a distribution of road funds to areas that are politically important at the expense of others and inefficient prioritisation of highly visible and politically rewarding construction and rehabilitation projects when regular maintenance would produce better road quality for far less expenditure.

The various reforms that have been pursued have also had mixed effects. The creation of new independent road agencies has helped improve the efficiency of the sector to some extent by limiting rent-seeking activities occurring within ministries of works. However, these gains are highly dependent on the extent to which these agencies can be isolated from external pressures, and do not seem to have altered the fundamental bias against maintenance work.

The contracting-out of road construction to private firms has improved efficiency and reduced political rents in some circumstances, but has not removed the issue of collusive cost increases, nor solved asymmetrical information and monitoring issues that can lead to poor or inappropriate provision. The lack of competition between contractors, particularly surrounding maintenance, has also been noted and leads to inefficiency in provision. Decentralisation has had a positive impact in some areas by making public officials more responsive to local demand, but the bias towards construction over maintenance has been repeated at local levels, as have the incentives for rent seeking, and there are instances of inefficiency resulting from a lack of local government capacity to monitor contractors effectively.

Collective action problems regarding road provision seem to be particularly prevalent in rural areas, given the high levels of sunk costs involved in road construction and political lobbying, the presence of considerable externalities and difficulties with conducting viable exclusion in areas where traffic volumes are low. These effects exacerbate political market imperfections (as isolated rural people cannot properly hold officials to account) and the bias towards construction and rehabilitation over maintenance, as it is often easier to organise collective action around one-off crisis events rather than regular maintenance. This does not mean no roads are present in rural areas, but rather that roads will be of low quality, leading to slow or restricted transport and meaning in some periods they will be unusable owing to adverse weather conditions or seasonal fluctuations.

Decentralisation, where it has allowed cost-sharing schemes and the creation of legal toll systems, has provided mechanisms to overcome these issues by lowering the perceived level of sunk costs and raising revenues from those who contribute. However, the low levels of funding available for cost sharing and of viable tolls in many rural areas mean there are still considerable challenges and a bias towards construction, even in many areas that have implemented these schemes.

The availability of considerable capital for the roads sector from donor agencies has also created a degree of moral hazard in some countries, as it allows road networks to be expanded and rehabilitated even with the excessive costs associated with rent seeking. Similarly, the tendency for grants to be short term or lump sum creates an incentive for governments to pursue politically lucrative road expansion and rehabilitation using this money, rather than maintaining the existing road network.

Some of the literature (see Rafiqui, 2003; World Bank, 2010) suggests the use of multiyear grants could be conducive to creating a longer-term perspective that favours maintenance. They also point to the need to direct funds directly to community road construction to avoid issues of leakage through corruption. However, political market imperfections, even at a local level, could mean that these forms of targeted aid will simply result in maintenance funds being disbursed into construction projects (see van de Walle and Mu, 2007).

Overall, the roads sector presents a clear case of an important public good that requires state intervention, but which has characteristics that interact with political incentives to create sub-optimal results. A range of reforms has been pursued, with varying degrees of success, but significant problems still persist.

Bringing together both sector characteristics and underlying governance dynamics in this way helps illustrate the very different characteristics and political incentives that surround the two major tasks of the road sector – construction and maintenance – and can explain why we see such different priorities and effects in each aspect.

In terms of further research, there remains a need for more in-depth political economy research into the operation of the roads sector and its overall dynamics across different countries. This is particularly the case for the urban roads sector, for which we were able to find very little literature in terms of provision, which is surprising, given the World Bank (2010) underlines low road density and maintenance problems in urban areas of Africa. This is an area ODI plans to continue to work on.

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