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Paper ID: 03172 **Changing rural–urban accessibility linkages: long distance mobility behavior over two decades in the Philippines**

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Abstract The spatial interaction of rural and urban areas is strengthening in developing countries. This development put pressure on urban transport systems and on road capacity along urban-rural corridors. However, our understanding of rural people's long-distance travel behaviour and changes throughout time and space are rudimentary. The paper's aim is to investigate how individuals and households rural-urban long-term travel behavior is influenced by improved road accessibility and concentration of opportunities to cities and urban areas. Based on a longitudinal household survey from 1990 to 2008, this is investigated in a Philippine rural area, previously characterized by poor road accessibility. *Preliminary findings show that* over time more people are travelling to long-distance destinations, more people are travelling more often, and more people are travelling more often in privately owned vehicles. Among the individuals, around one fourth, still wants to increase their travel frequency. While the ability to return home earlier has improved due to improved road accessibility, this does not compensate for the increase in additional travellers and travel frequency. Finally, it is possible that the changing mobility behaviour would have taken place despite the improvements in physical accessibility because of the development in the concentration of opportunities to major cities.

Keywords: rural-urban linkages; accessibility; mobility behaviour; long-distance; long-term

1. Background situation and problem

A problem in the management of urban transport systems concerns how well improved rural-urban accessibility and mobility linkages can be managed; that is, the composition of short-term commuting and long-term migration performed for all purposes. This is more evident in developing countries, where urbanization take place at an unprecedented pace and car ownership levels and motorization in general are rising rapidly (Williamson, 1988; Kitamura & Mohammad, 2009). Following on from these developments, more people travel over longer distances in everyday life. Despite this, our knowledge of rural-urban mobility behavior in general and changes over time in developing countries is rudimentary (Deshingkar & Anderson, 2004; Srinivasan & Rogers, 2005; Bradbury, 2006; Johnston, 2007).

As more people live in cities and urban areas and rural-urban commuting and migration increase enormously, particularly in East and Southeast Asia, the transport systems are put under pressure; especially as this urbanization and intra-city transport are largely unplanned

(Tacoli, 1998; Chow, 2002; WBCSD, 2004; IOM, 2005; UN, 2007). So far, various measures have had little impact. For example, the provision of higher mobility through additional road capacity has led to even higher car traffic and congestion (Stradling & Anable, 2008).

While the rooted demand for increased mobility is primarily related to highly car mobile societies, similar patterns are repeated in the developing countries (Nijkamp & Blaas, 1994; Metz, 2002; Olvera et al., 2003; Lee, 2006a). A substantial growth in road infrastructure over the last 40–50 years in these countries (Johnston, 2007) has influenced this development. The improved transport conditions expand the hinterland from where commuters and migrants are drawn. Further, as opportunities are increasingly concentrated to major cities and urban areas, so is the spatial interaction between rural and urban areas. *"There are few people in the region* [Southeast Asia] *today who are isolated from the market…".* (Rigg, 2001: 57). Likewise, Jones (1997) stresses that truly isolated villages are things of the past for the greater part of Southeast Asia. Olsson (2006) has reported on similar patterns from rural Philippines. More recently Rigg and Wittayapak (2009) developed this discussion in regard to the Greater Mekong Subregion, which has become a region, increasingly, on the move, both including daily mobility and longer-term and longer-distance migration. However, in many countries the rural population will outnumber the urban for many decades.

While the literature covering job migration is extensive, rural people visit cities for other reasons as well (Deshingkar & Anderson, 2004; Bradbury, 2006). *"Aside from travelling to find work, rural people are now increasingly mobile for a variety of other reasons".* (Deshingkar & Anderson, 2004:3). According to Bradbury (2006), the literature disregards the means by which people physically access social capital by maintaining rural-urban linkages with extended family members. Access to social capital networks requires mobility, and transport is one agency by which social networks are supported.

To add up, as the supply of transport infrastructure grows and opportunities are concentrated to major cities/urban areas, more people desire and need to travel. Previous latent demand can be 'released' when transport costs decrease and services improve. Thus it is crucial for rural dwellers to have access to transport resources (national and provincial roads in particular) that connects rural areas. The provision of public transportation is given less priority while the private vehicle fleet is expanding, it is also important to be able to master the transport resources. So while the rural world in developing countries is still predominantly a 'local and walking one', characterized by short-distance daily mobility, motorized mobility for all purposes to major cities and urban areas, often located at a far distance (measured in time and/or km), is becoming increasingly important for rural people.

Aim and structure

In order to understand the conditions for improved urban transport systems and inter-regional road corridors, there is a need to study rural-urban linkages and spatial interaction. These linkages and interactions should be understood as relational processes which connect society, economy and the environment that sustain them. Accordingly, the paper's aim is to investigate how individuals and households rural-urban long-term travel behavior is influenced by improved road accessibility and concentration of opportunities to cities and urban areas. Empirically this is investigated through survey data spanning from 1990 to 2009 in a rural Philippine area, previously characterized by poor road accessibility, namely the

municipalities of Infanta and General Nakar (Map 2). The empirical questions addressed are: *i)* How do changes in accessibility influence actual and latent demand for long-distance mobility? *ii)* What characterizes the mobility in terms of trip purpose, modal choice, activity space, travel budgets (time and monetary), mobility restrictions and satisfaction etc? *iii)* Do rural peoples´ travelling put additional pressure on urban transport systems and roads along inter-regional corridors?

The Famy–Infanta national road project, which reduced travel times to cities at a far distance (above 60 km/one way, and at least 1½ hour travel time/one way), is in focus. In particular Metro Manila and Lucena City, the national and provincial capital, respectively, Map 2. The road is a link in the arterial road network, and as it connects urban areas it has interregional traffic movements. A main objective of the project was to enhance the accessibility of rural people to markets and social services and facilities (ADB/DPWH 1998). However, access to services was only mentioned briefly but, both before or after the implementation (DPWH 1989; ADB/DPWH 1998). Generated passenger traffic was assumed to last five year after project implementation (DPWH, 1989). The zone of influence was almost solely dealt with in relation to Metro Manila. Accessibility is defined as; *the ease with which individuals can reach major cities and urban areas, measured in terms of time, seasonality and transport service quality (frequency, safety, comfort).* Although migration involves a large spectrum of movement, from daily commuting to permanent relocation, the paper excludes the latter. Mobility here involves all trips for all purposes, with a time-span from one to eight days.

2. Philippine population, vehicle fleet, road network, and socioeconomic concentration

The population, vehicle fleet, access to public passenger transport services and the road network have increased considerable in the Philippines during the last 50 years. While the population increased two times from 1960 to 2007, the public road network length quadrupled from 1960 to 2006 (NSCB ?, DPWH, various years). National roads almost doubled, provincial roads increased by 43%, city roads more than doubled, while village roads almost eleven-folded from 1970 to 2006. During the same period the vehicle fleet outperformed the population and the road length; total vehicles increased by 31 times (vehicles per 1000 inhabitants almost ten-folded) (LTO, various years): cars by twelve times, utility vehicles (passenger jeepneys, pick-ups, vans) by 69 times, buses 1.5 times if measured from 1970, while motor-/tricycles increased by 13 times from 1980 to 2007. While, for example, Indonesia has witnessed a large increase in public passenger buses (Johnston, 2007), the increase in utility vehicles, especially passenger jeepneys used for intra-/inter-provincial and –regional passenger trips, was most notable in the Philippines.

As to geographical distribution; in 2007 Metro Manila's almost 12 million inhabitants made up only 13% of the total population, but its contribution to the GDP stood at 33% (NSCB 2009). Together with Region III and IV-A (located approximately within a 150 km radius from Manila) (Map 3), this area made up 37% of the population and 56% of the vehicle fleet (NSO, 2007; LTO, 2008). Manila alone stood for 28% of the vehicle fleet. Following the concentration of vehicles, traffic in these regions and their cities has the highest traffic rates.

Transport regulations influence on rural dwellers mobility

Historically, officially regulated public passenger transportation fares have not been applied in practice (Roschlau 1985, Cabanilla 1991). Instead, the transport sector has developed its own pricing mechanism, where fares are adjusted to passengers' ability to pay, the level of competition on routes, and underlying operational costs. Lower rates are also a way to fill vehicles in order to make trips worthwhile, especially on long routes. Rates are lower far away from urban centres as a large share of the rural people could not afford public transport at prescribed rates. In 1992, a regulatory framework for transport services and enhancing private sector operations appeared (NEDA 2001). The government would guarantee operator free and unrestricted access to markets (Manila was excluded due to saturation). A minimum of two franchise holders on any route would ensure competition. Market forces with very little government subsidies or rate fixing would set tariffs and fares, the exception being remote rural areas with weak markets. Consequently, services are competitive, resulting in lower rates than the official and a higher mobility than expected for the rural people.

In short; vehicle ownership is rising but is still very low, especially cars; the population is increasingly mobile (additional vehicles, improved infrastructure, and low public passenger rates), and; with a continued increase in vehicles and the number of people traveling, the pressure on urban transport systems and inter-regional road corridors will be reinforced, if no additional road capacity and/or efforts to promote public transportation is introduced.

3. Driving forces behind rural-urban spatial interaction and earlier empirical research

Increased rural–urban spatial interactions are due to many reasons; from increased concentration of socio-economic activities to major cities to the lack of access to basic facilities and livelihoods in rural areas via the inability of governments to fund rural and agricultural reforms and regional transport infrastructure investments, enabling more efficient transports to cities and enhanced flow of people (Ellis, 2000; ADB, 2005; Rigg, 2006; Tacoli, 2006; Hew, 2007; Jones & Corbridge, 2009). The interactions play a decisive role in people's livelihoods diversification and strategies, often including some form of mobility. Hence geographical space should not be viewed as a bounded set of fixed locations, but as a set of interconnected relationships (McGee, 1987).

Rigg (2006), and others (e.g., Ellis, 2005) outline five first level propelling forces that, for a very long time, have affected the rural transformation in developing countries, namely: the erosion of profitability of small-holder farming; the emergence of new, non-farm opportunities (e.g., improving access and heightened levels of mobility associated with infrastructure improvements); environmental degradation; increasing land shortages, and; social and cultural changes (e.g., mobility and education). So while livelihoods are diversifying in the countryside lives are becoming more mobile and livelihoods correspondingly delocalized. This occupational diversification is closely linked with the increase of spatial mobility and migration, and the changing nature of employment has increasingly important consequences for transport (McQuaid, 2003). The shift from an agricultural economy to one increasingly dependent on the industry and service sectors, have been accompanied by a concentration of economic activity and demand, together with changing travel-to-work and hence travel demands and patterns. However, rural-urban

interactions are also related to other activities (social, educational, medical, administrative, religious, pleasure, shopping) (Deshingkar & Anderson, 2004; Bradbury, 2006).

Mobility needs and accessibility opportunities
In today's contemporary societies, the availability of fast and cheap transport resources and the ability to choose from activities within a huge geographical area, together with residential and work place adjustments to a car-based society, has led to that the demand for high mobility has been built into the societal fabric (Frändberg et al., 2005; Vilhelmson, 2007, Kitamura & Mohamad, 2009). This development has, partly, de-coupled access from geographical proximity. Instead *time-budgets*, and access to cars are stronger constraints to participation in activities. Spatial mobility is the result of a complex interplay of *human needs* (wishes, values), *individual resources/constraints* (age, gender, income, car access etc.), *social context, activity characteristics, land use,* and the *potential* for interaction, accessibility (Frändberg *et al*., 2005; Straatemeier, 2008). Thus accessibility and mobility is inter-linked and must be addressed simultaneously. Accessibility in itself is influenced by the qualities of the transport system (reflecting the travel time or the costs of reaching a destination, and service frequency), and the qualities of the land-use system and its spatial distribution (reflecting qualities of potential destinations and activities able to reach).

Access to transport resources and differences in spatial mobility in developing countries
The relationship between transport infrastructure and mobility has traditionally, but also at present, been viewed from the supply side. Kitamura and Mohamad writes that *"New transport infrastructure generates new demand for travel, new roads generate faster and longer trips, more trips by car and higher car ownerships…"* (Kitamura & Mohamad, 2009:269). Others (Lowe & Moryadas, 1975) stress that people living closer to roads travel more often than do they living further away, and groups with better access to transport have greater mobility within rural areas in developing countries. However, Ahmed (1997) studying rural transport needs among the poor in Bangladesh, found that proximity to improved infrastructure failed to generate any increased use of conventional motorized transport, either for males or females. In a discussion concerning the relationship between spatial integration and mobility in developing countries, Rigg and Wittayapak (2009) hypothesize that when levels of spatial integration are low, migration will be restricted to a small number of the non-poor in rural areas, mainly young(er) men, who move primarily for economic reasons. As spatial integration proceeds, the incidence of migration increases and spreads to other classes (e.g., the poor) and to women, although it will remain a young(er) person's prerogative. With high levels of spatial integration, the opportunity will arise for a partial re-localization of life (rather than livelihoods), as daily mobility replaces longer-term migration. This phase may also see the permanent dislocation of some people from their natal villages.

As accessibility constitute one base for mobility, access to and supply and distribution of transport resources influences disparities in actual and latent demand for mobility. Hägerstrand (1987), point out how technological improvements have created differences in spatial mobility. For example, people living close to a railway station can embark on the train more easily. But, once all passengers have embarked they arrive at the final destination at the same time. In this sense, public transportation has an equalizing effect that is contrasted by the high entrance and user costs associated with the car. As the public market is undermined, the differences in spatial mobility increase. Reduction of network length or

service levels and fare increase may follow, reducing the market further. Negative feedback effects reinforce this process. The attempts made to meet mobility needs are merely seen as a 'welfare service', resulting in lack of funds for new projects and finance for maintaining old vehicles, so that services cannot keep pace with growth in demand.

While the provision of and proximity to transport resources does not necessarily generate a demand for mobility, the reverse does not hold; the absence of adequate transport resources does not necessarily represent low demand, demand may still be present but suppressed (Preston and Rajé, 2007). Low mobility may indicate difficulties related to other aspects that, either by themselves or in conjunction with poor transport opportunities, influences mobility. Instead, the understanding of different patterns of mobility lies in the realization of its place in the fabric of social and economic life (Fox, 1995; Banister, 2005; Frändberg et al., 2005). Transport is both about technical systems and people that make decisions, with various changing motivations and conditions. Conceived of this way, it is possible to analyze interdependencies between needs and desires, transport resources and accessibility; how it affects mobility and in the prolongation urban transport systems.

*Earlier empirical research**.***
Literature on rural daily local mobility behavior and job migration is extensive (see Leinbach, 1981; Lucas, 1997; Dennis, 1998; Rigg, 2001; 2007; 2009; Howe, 2001; Fernando & Porter, 2002; Hugo, 2003; Lall *et al*., 2006; Hettige, 2006; Johnston, 2007). In sharp contrast, literature on rural-urban and long-distance mobility behavior to cities and urban areas for any purpose is rudimentary and generally lacking, despite a general claim that today's cities and major urban areas are swamped by rural (and peri-urban) commuters and migrants (Phetsiriseng, 2001; Lee, 2006a; Hew, 2007; Rigg, 2009:90). Further, longitudinal studies including the same households and/or individuals are very rare (studies on longitudinal internal and international labour migration, analyzing its causes, scope, migrant characteristics, outcomes for the migrants and those left behind etc., are common, see Afsar, 2003; Rigg, 1998; 2006)).

In an early study of how rural road rehabilitation projects had influenced the mobility behaviour among households in Indonesia, Leinbach (1981) report on trip distances from 60 to almost 100 km (these trips made up a very small minority) to visit relatives 5 to 8 times/year in two villages (it was unclear if these data were for the household or for individuals). There was not data on visit related trips prior to the road project. Surveying early empirical studies on rural household travel behavior in Africa and Asia during the 1970s and 1980s, Howe (2001) mentions external and off-farm trips, but focus was on all short trips made for local purposes). Howe criticized case studies performed in Africa, Asia, and Oceania; especially its categorization of travel as on-farm or off-farm, neither taking into consideration that land-holdings were often scattered, that some households were not engaged in farming and differences between individual household members. In a study covering nine locations (297 households) in Gazaland district, Zimbabwe, Wanmali (1991) analyzed how access to road transport facilities and to various modes of transport impacted on demand for consumption and production of goods and services. On average, communal farming households had to travel about 24 km (one way) to use services, whereas commercial faming households, located in two different areas, had to travel 63 and 75 km, respectively. For commercial households, distances measured up to 175 km for health and 160 km for agro machinery. For commercial

households, the three services located furthest away made up 12.4 and 20.6%, respectively. Commercial farmers mainly used mechanized transport, 66 and 87% used cars, respectively.

In a synthesis paper on rural transport and accessibility, Dennis (1998) report that demand for transport outside the internal increase, although its extent in number, distance or purpose was not dealt with. In a case-study analysis of how six rural road projects impact on poverty reduction among very poor, poor and better-off households (ADB, 2002). Two of these roads were serving as bypasses for major traffic on the road network, and all roads had a mix of motorized and nonmotorized traffic. The study found that most 'appear' to restrict their travel to the village area and occasionally travel outside the village, with little use of medium- or long-distance transportation links. But, the report goes on to say that better roads offer an expanded scope of opportunity outside the village, especially among better-off households. 63% of household members (over 15 years old) had worked away outside the project site; 14.5% in the capitol city, 4.5% in the capital city of the province or city in another district, and 7.5% in a city in another province. Unfortunately, the report only mentioned the distance from one project site to a major city (Bacolod City, the Philippines), 80 km away. Hine & Rutter (2000), report on long-distance trips, reaching 40 km/one way at its maximum to visit friends and relatives. An average of more than 20 such trips were carried out per household and year for 'non-motorized households', trips carried out by rural households in Ghana and Malawi without defining long-distance.

In studying the mobility and accessibility needs of the poor and the non-poor, Bryceson *et al*. (2003) compared household travel behavior across an urban–to–rural spectrum in Zimbabwe and Uganda. The location located furthest away from the capitol city was 80 km, but the villagers travel behavior to respective country's capitol city was not dealt with. Instead the study concentrated on 'previous day's short-distance trips', not exceeding 13 km, excluding long-distance trips. A recent World Bank evaluation report's (2007) cover pictures showed traffic congestion and non-motorized transport. The report added little to our understanding of how rural dwellers effect urban traffic congestion or how, why and how often they travel to cities. Likewise, there was no discussion on how the two contexts are spatially interlinked (rural and urban transport were treated in separate sections), despite a recognition by the Bank that an improved transport situation enables essential trips to service centres, health and educational facilities and markets and that such improvements unlocks employment.

More recently, some notable exceptions exist. A study of two villages in a sub-district in Central Thailand reveals the way in which transport infrastructure (roads) has become so well developed that it has permitted a re-localization of lives, if not of livelihoods. In these two villages, 55 % of the 744 household members had traveled outside their village during the day prior to the interview. Over two-thirds of these trips were for work or business. Factories in this formerly rural area pick up workers from 100 km from the factory site, on a daily basis (Rigg & Wittayapak, 2009). Johnston (2007), researching the usage of public passenger transport service on local level in rural Indonesia, did not include long-distance mobility from rural to urban areas. For all trip purposes, bus trips averaged 19.9 km. Mean travel distances were more variable, ranging from 8.9 km for 'marketing produce' in local markets to 56.9 km for 'business' trips. Bradbury (2006), in reviewing the relationship between transport mobility and access to social capital networks and its relevance for rural development in Kenya, reported several trips (although they made up a clear minority, and

changes over time was not reported) above 100 km made for social activities and even more long-distance trips made for income earning and subsistence activities. Finally, without reporting on actual frequencies in an Indian context, Deshingkar and Anderson (2004) stress that rural people are now increasingly mobile for other reasons except for livelihood purposes; spanning from health and education to administrative via social.

4. Methods and data

The study area

The study area, made up of seven villages within Infanta and General Nakar municipalities, is located in northeast Quezon province, Luzon Island (Map 1–2). This area has a long history of being peripheral due to poor transport conditions (Map 3). It is only accessible by land via one road and is located far from major markets. Several physical barriers have contributed to the area's peripheral nature and the particular characteristics of its production system. It is located behind the Sierra Madre mountain ridge to the west, an unbridged river divides Infanta from General Nakar in the north, and the eastern and southern parts border the Pacific Ocean. As a result the area's accessibility was very poor before the implementation of the Famy–Infanta road project in 1995. Manila (major market) and Lucena City (provincial capitol) are located 155 and 140 km respectively from Dinahican (Map 3).

Villages

There are around 42.000 *barangays* (hereafter villages) in the Philippines. A village is the smallest political unit into which cities and municipalities are divided. It is the basic unit of the political system and is administered by elected officials, headed by a village captain (NSCB, 2001). A village consists of *sitios* (neighbourhoods), clusters of households that form the basic building blocks of society above the family unit. Some basic social and economic facilities are usually found in the largest sitio.

In 2003, a new urban definition was approved (NSCB, 2004). A village is considered urban if: i) it has a population size of 5,000 or more, ii) it has at least one establishment with a minimum of 100 employees, or iii) it has five or more establishments with a minimum of ten employees, and five or more facilities within the two kilometers radius from the village hall. Rural areas are all *poblaciones* or central districts and *barrios* that do not meet the requirements for urban classification. Following this definition, of the seven villages included in this study, *Infanta town* and *Dinahican* in Infanta and *Poblacion* in Nakar are urban. *Banugao* and *Lual* in Infanta, and *Catablingan* and *Pesa* in Nakar are rural. Village selection also followed other criteria:

- *Major income source(s):* As the study area is predominantly agricultural, the selection of villages represented the agriculture sector's diversity. The two urban centres in each municipality were chosen due to their diversified economic structure, together with their status as administrative and nodal centres (Table 1).

Table 1: Study villages, municipality belonging and major income sources.

Village	Municipality	Major income sources
Infanta town	Infanta	Diversified
Dinahican	Infanta	Fishing
Banugao	Infanta	Rice, wood-craft/furniture
Lual	Infanta	Rice
Poblacion	General Nakar	Diversified, rice
Catabliingan	General Nakar	Rice, fishing, copra
Pesa	General Nakar	Forestry, rice, copra

- *Accessibility and distance to urban centre:* Since all villages in Infanta are accessible by land, road condition, capacity, and distance to Infanta town were prioritised. In Nakar, network connectivity was important. Accessibility to Nakar is restricted and the intramunicipal road network is underdeveloped. One village with and one without a road link to Poblacion were chosen.
- *Average village income:* Income is mainly related to resource endowments. Through local government data, villages with average household incomes above, below, or average with the municipality average were chosen.

Sampling units and household characteristics

The survey individuals and households included in this paper are drawn from a longitudinal data base, containing travel behaviour and basic background variables from the same individuals collected through a first round in 1999, followed up by questionnaires again in 2001, 2008, and 2009. Longitudinal data for 263 households and approximately 500 individuals, adult mothers/wives and fathers/husbands, were used for the analysis. Women made up a slight majority (see table 2). A large majority of the survey households are income poor. In 1999, 63 % and 60 % of the survey households had lower yearly incomes than rural Philippines and rural Region IV respectively, the region wherein the study area is located.

Table 2: Households and respondents included in the study.

	1990	1994	1999	2008
Total households / respondents	263 / 509	263 / 509	263 / 505	263 / 474
Mean / median ages	37,4 / 36	41,4 / 40	46,4 / 45	54,6 / 54
Minimum / maximum ages	16 / 71	20 / 75	25 / 80	34 / 85
Females (%)	51,5	51,5	51,3	52,0

Note: The major reason why the number of individuals are lower in 2008 is due to deceases.

The road project and the consequential changes in road accessibility

The 63 km Famy–Infanta underwent considerable improvements between 1993 and 1995, (Map 3) (ADB/DPWH, 1998). A major constraint along the road before 1995 was the Sierra Madre mountain section, especially the narrow road width around curves, the low bridge capacities in terms of the maximum vehicle weight, and poor alignment; some streams along the route even had to be crossed by fords. As a result, travel speed was low. As well, heavy rains, causing mudslides and poor surface conditions, could make the road dangerous and impassable, sometimes for weeks. When the project was completed, the road was paved with asphalt and its condition improved from bad/very bad to good (NEDA, 1982a, 1982b; DPWH, 1989; ADB/DPWH, 1998). Alignment was improved, while the road right-of-way was widened and the road foundation was strengthened. This, together with improved drainage, slope protection, and curve straightening improved the transport conditions.

Direct effects related to the road project
In line with the general understanding of investments in underdeveloped road networks, both vehicle operating costs and travel time decreased considerably after the project. Fuel consumption declined, on average, by 35%, while maintenance costs and travel time declined by 44% and 40% on average, respectively. Average travel time back and forth to Manila decreased from 12–16 hours to 7–10 hours. Delays almost disappeared and the road became passable to all vehicle types throughout the year. On average, almost half of all deliveries were delayed before 1995, especially in the rainy season, resulting in much lower selling prices (up to 50% lower), extra labour costs, and difficulties planning. For example, transport problems meant that previously fish had to be sold at the local market at a lower price instead of being shipped to the distant and more lucrative market of Manila. Finally, the road's low carrying capacity before the project resulted in low vehicle load capacities; after the project, the vehicles could be loaded to the legal maximum capacity. Following from these direct effects, Dinahican's road accessibility improved substantially.

Other infrastructure related factors influencing accessibility and mobility in the study area
While it is not generally concluded in what ways land-line telephones, mobile phones, computers influence mobility, it has the potential to do so. Public calling centres and land-line telephones were available in Infanta town in 1994 and 1996, respectively, while neither was available in the other two villages. A public calling centre was available in Poblacion, Nakar, from 1999 until 2001 when it burned down. In 2002 a mobile phone network was available in Infanta town and internet connection became available. Further, the 12 km long national road from Infanta town to the Pacific coast (see map 2), has undergone continuous concrete paving last 14 years. In 2009, approximately 90% was completed. Also the 5–6 km long provincial road section, connecting Poblacion (Nakar) to the Famy–Infanta national road, was widened and asphalted from 2002 and 2003. In line with this project the bridge across Agos river connected the two municipalities in 2002. Following the completion of the bridge, a passenger service started to operate between Poblacion and Infanta town. Economically the Asian economic crisis had little impact on the study area, while the global recession starting in 2007 and, not the least, the severe flash flood that hit the area with full blast in 2004, killing more than 1,000, making many more homeless and devastated economic resources.

5. Preliminary findings

Latent and suppressed mobility demand – future expectations
It is advisable to try to outline people's opinions about their present trip frequency satisfaction. Is it that people just suddenly starts to travel less or more often? No, a decision is preceded by some change in the individuals/households situation or by a contextual change in ones surrounding. From table 3 it can be argued that a latent mobility demand was present both in 1999 and 2008. The actual increases in mobility also indicate that quite a large majority of the households had, amongst others, the monetary means to perform such trips. Having said that, does it mean that the households (and individuals) needs and desires for spatial mobility have reached their optimal levels?

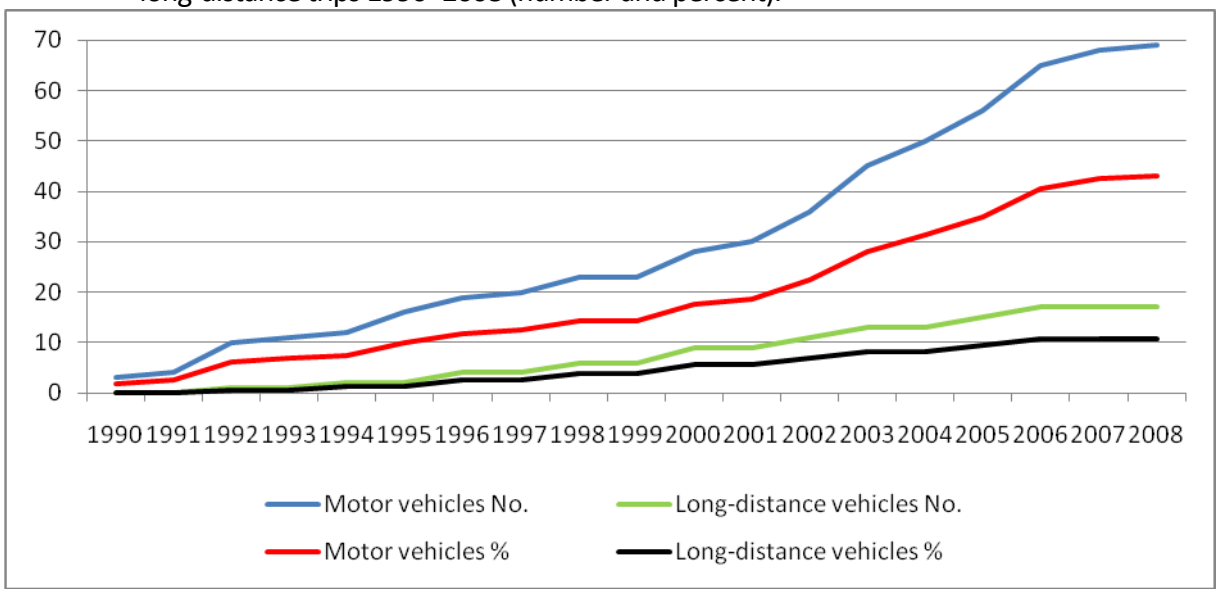
Table 3: Respondents satisfaction with present trip frequency considering long-distance trips 1999 and 2008 (percent).

	1999	2008
Satisfied with present frequency	57,3	51,6
Want to increase frequency	37,5	37,2
Want to decrease frequency	5,2	11,2
Want to increase frequency, net	32,3	26

Table 3 shows that many would like to travel more often, both in 1999 and in 2008, while a smaller share would like to travel less often. This indicate two things; i) improved road accessibility does not generate optimal individual mobility levels and, ii) an increasing number of people would like to increase their long-distance mobility, indicating the increasing need (and desire) to visit cities and major urban areas.

Motor vehicle ownership and the reasons why households purchase private vehicles

Diagram 1: Number of and share of households owning a motor vehicle and motor vehicles used for long-distance trips 1990–2008 (number and percent).



Note: Motor vehicles include tricycle, mc, vespa/scooter, car, owner type jeep, jeepney, van, light truck. Motor vehicles used for long-distance trips exclude tricycle, mc, and vespa/scooter. In 2008, the most common motor vehicle was tricycles (41), followed by motorcycles (33), and minivans (12).

Table 4 shows that the number of motor vehicles increased in number steadily from 1990 until 1999, and thereafter even more so. The increase in motor vehicles used for long-distance trips was also much sharper after 1999, proceeding a period with a very low increase. An overwhelming share of the motor vehicles used for long-distance trips are vans, twelve out of 24 vehicles in 2008 were vans, followed by four cars and owner type jeeps respectively, three jeepneys, and one light truck. The major advantages with vans are their higher load capacity, speed compared to all vehicles except for cars, and the opportunity to use the vehicle as an income generator by accepting passengers and bringing back goods. Table 5 shows the main reasons why the households purchased vehicles.

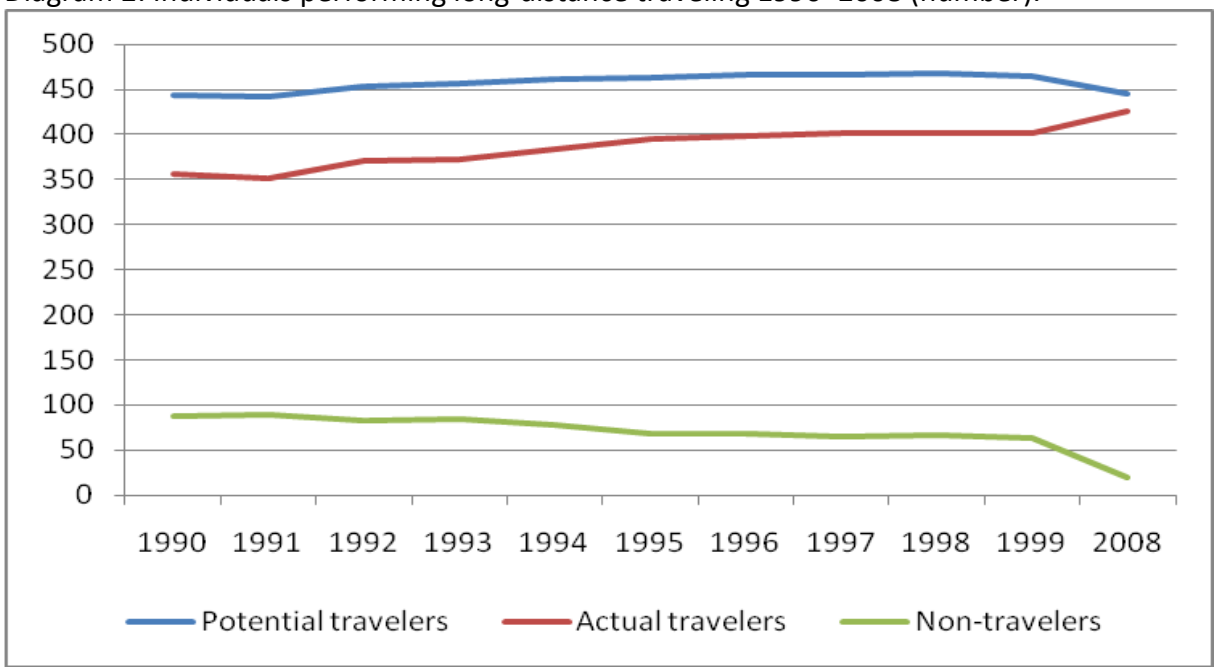
Table 4: Reasons why households purchased motor vehicles (percent).

	1st choice
Cost savings	46,2
Time savings	31,8
Flexibility	12,4
Load capacity	4,5
Punctuality	1,9
Security	0,6
Comfort	0,0
Total	100

Cost savings stand out as the major reason why households purchase motor vehicles. Neither is it surprising that cost savings are followed by time savings and load capacity. However, it may be somehow remarkable that cost savings did not generate a higher percentage share, just 44% reported cost savings to be the first choice. A second issue that is slightly remarkable is, given that a large share of the households are income poor and engaged in agricultural activities, that only one out ten households responded that load capacity was the major reason for purchasing a private vehicle.

People performing long-distance trips

Diagram 2: Individuals performing long-distance traveling 1990–2008 (number).



Total trips and trip frequency

Diagram 3: Total number of yearly long-distance trips performed 1990-2008, distributed by low, high, and average scenarios.

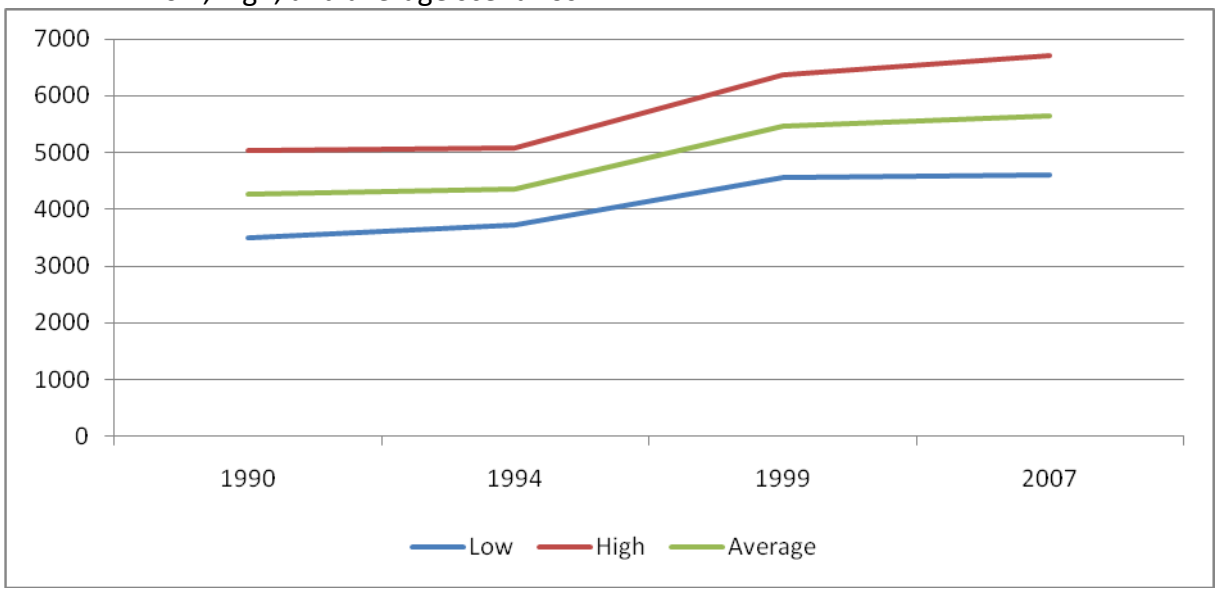
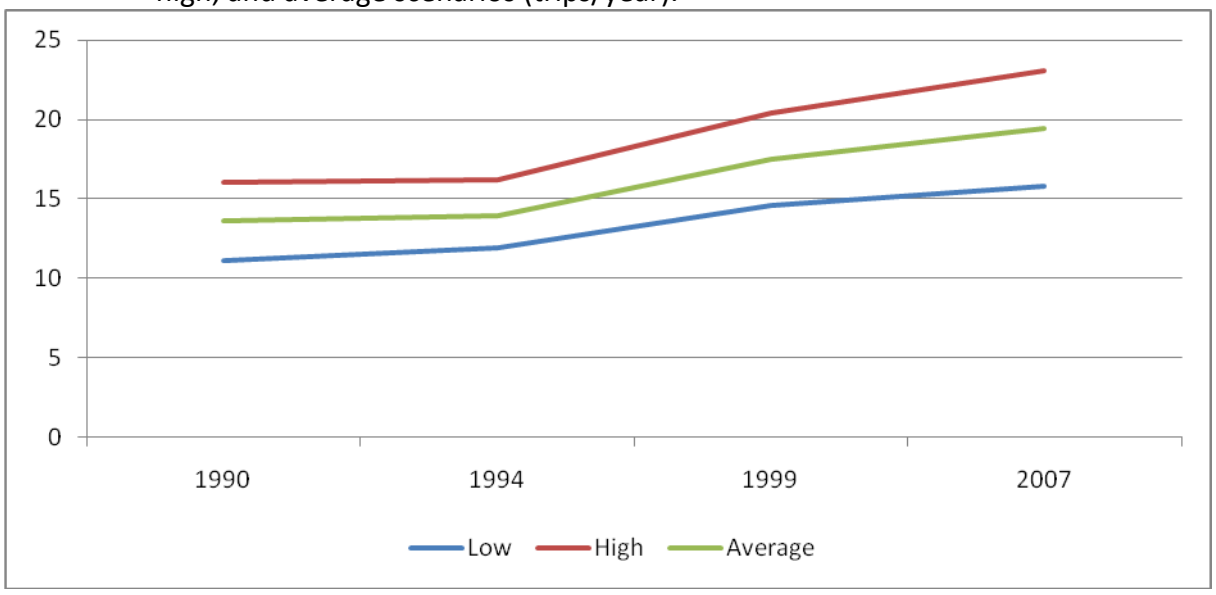


Diagram 4: Travel frequencies to long-distance destinations 1990-2008, distributed by low, high, and average scenarios (trips/year).



Trip destinations

Diagram 5: Total number of long-distance destinations visited 1990–2008.

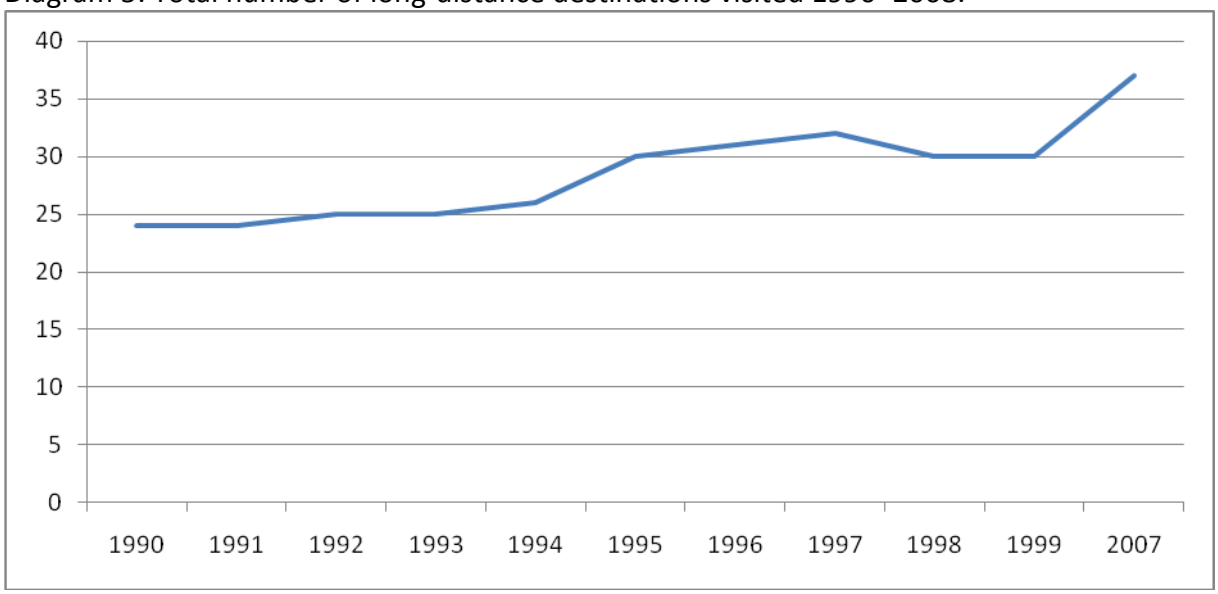


Diagram 6: Total number of long-distance destinations visited, distributed by destination 1990–2008.

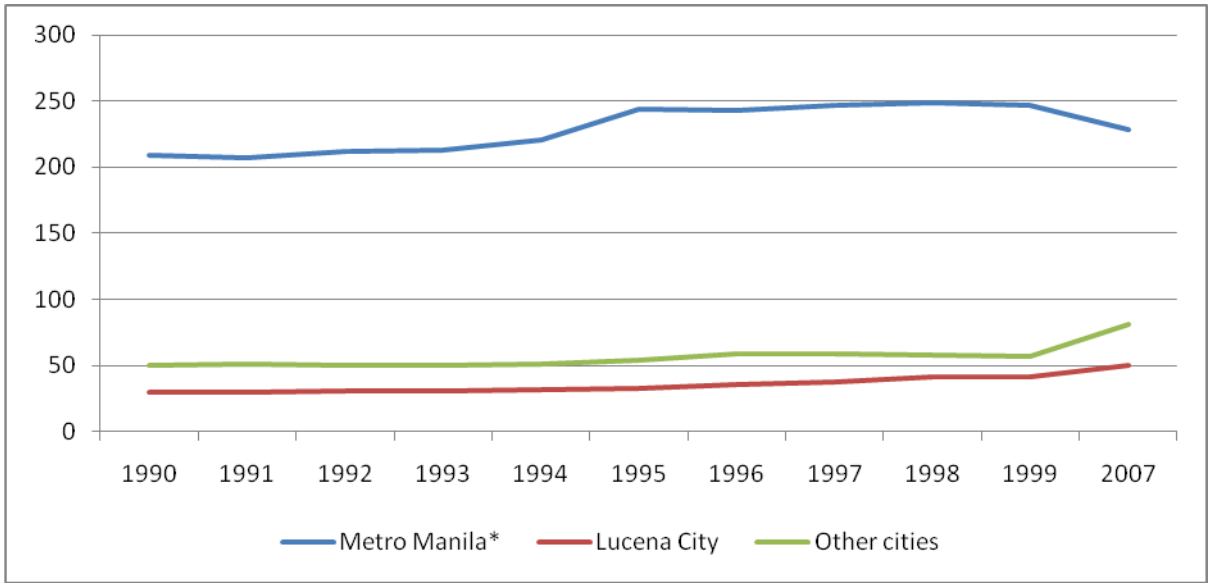
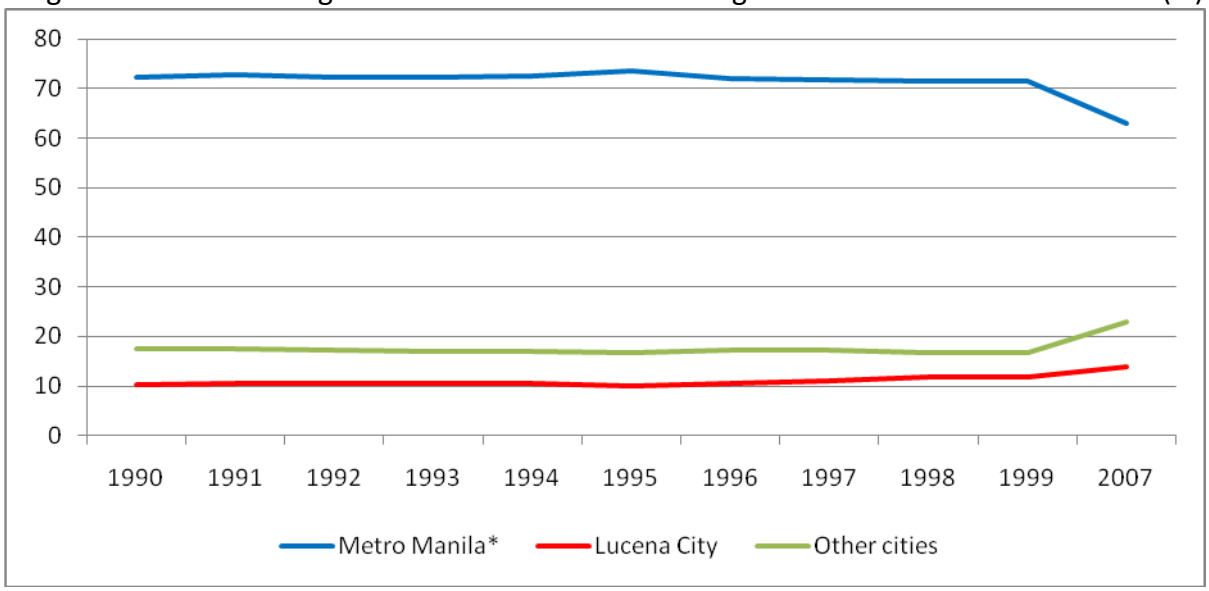


Diagram 7: Different long-destinations share of total long-destinations visited 1990–2008(%).



Major mobility restrictions

Table 5: Major mobility restriction restricting long-distance trips 2001 and 2008 (percent).

	2001	2008
• Lack of money	54,9	76,0
• Lack of time, take care of:	17,1	9,0
Household chores	0,4	1,1
Children/elders	6,1	0,6
Busy working	10,6	7,3
• No access to vehicle	5,7	0,4
• Sickness/physically disabled	7,3	4,4
• Physical access./facility too far away to walk	1,6	0,0
• Women not expected to move around alone	0	0,2
• Not acceptable to make a career for women	0	0,0
• Disadvantage compared to men*	0	0,0
• Feel insecure on my own**	1,2	0,2
• None	11,8	9,3

*Lower education level, lower salary, and fewer work opportunities.

** Sexual harassment, afraid of getting robbed, cannot find way around at final destination.

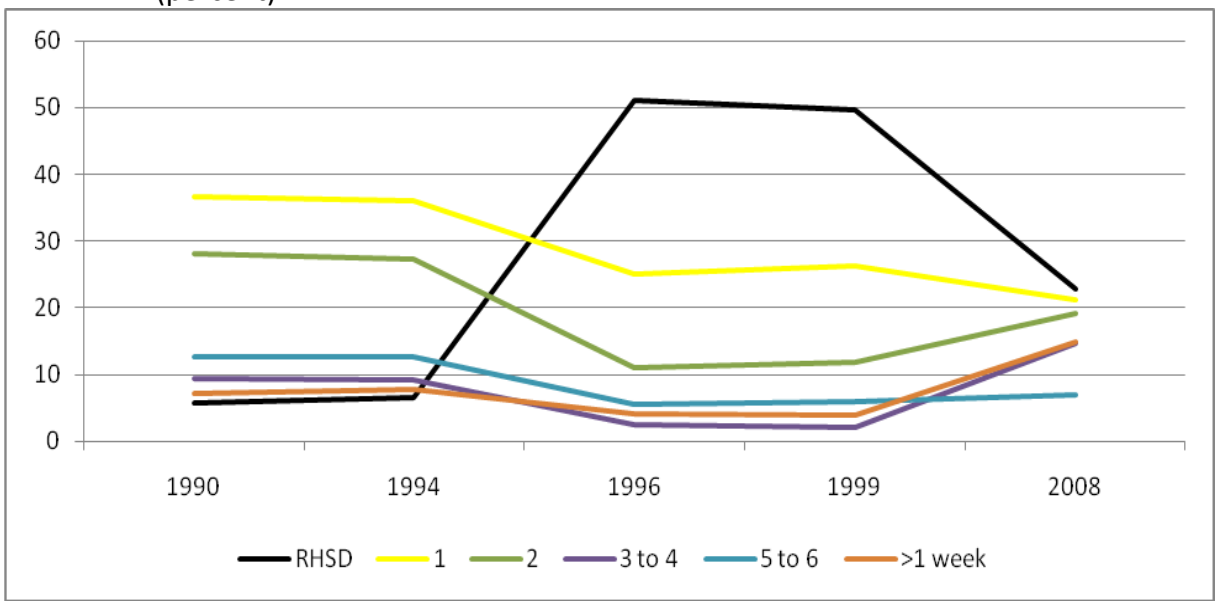
Table 6: Total travel expenses effect on the household economy 1999 and 2008 (percent)*

	1999	2008
• Very small effect	42,4	0,3
• Small effect	32,0	26,4
• Big effect	25,6	62,6
• Very big effect	0,0	10,5

*Including local and short-distance traveling.

Time spent away at long-distance destinations

Diagram 8: For how long do you stay away at destination before returning home 1990–2007 (percent).



Note: RHSD: Return home same day. 1: 1 night. 2: 2 night. 3 to 4 nights. 5 to 6 nights.

Diagram 9: For how long do you stay away at destination before returning home 1990–2007 (percent).

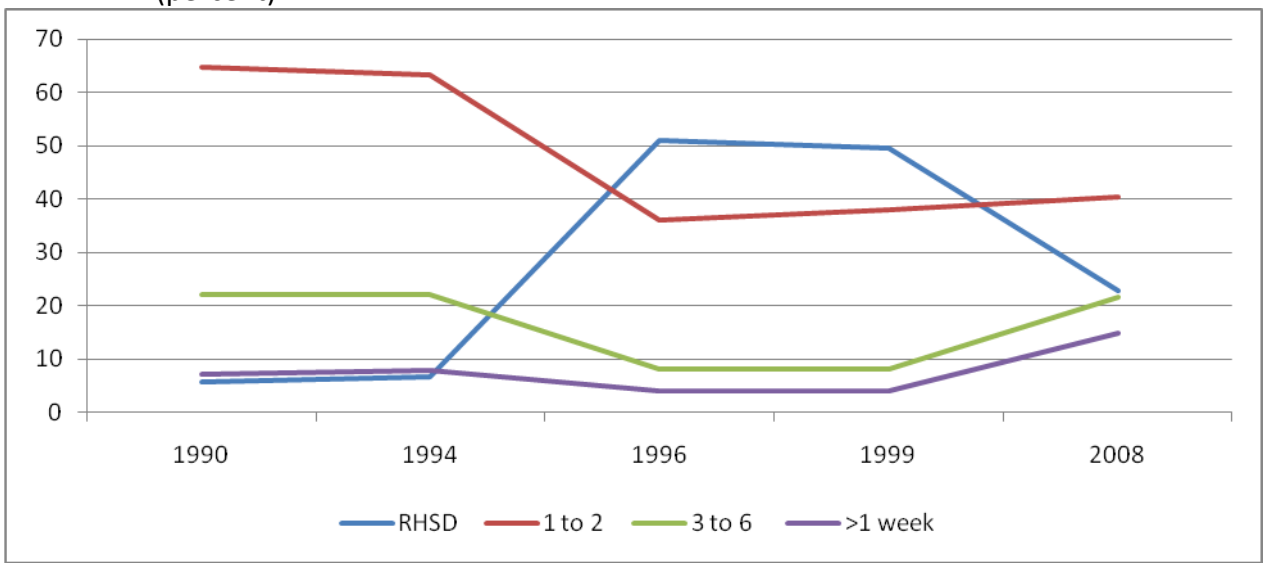
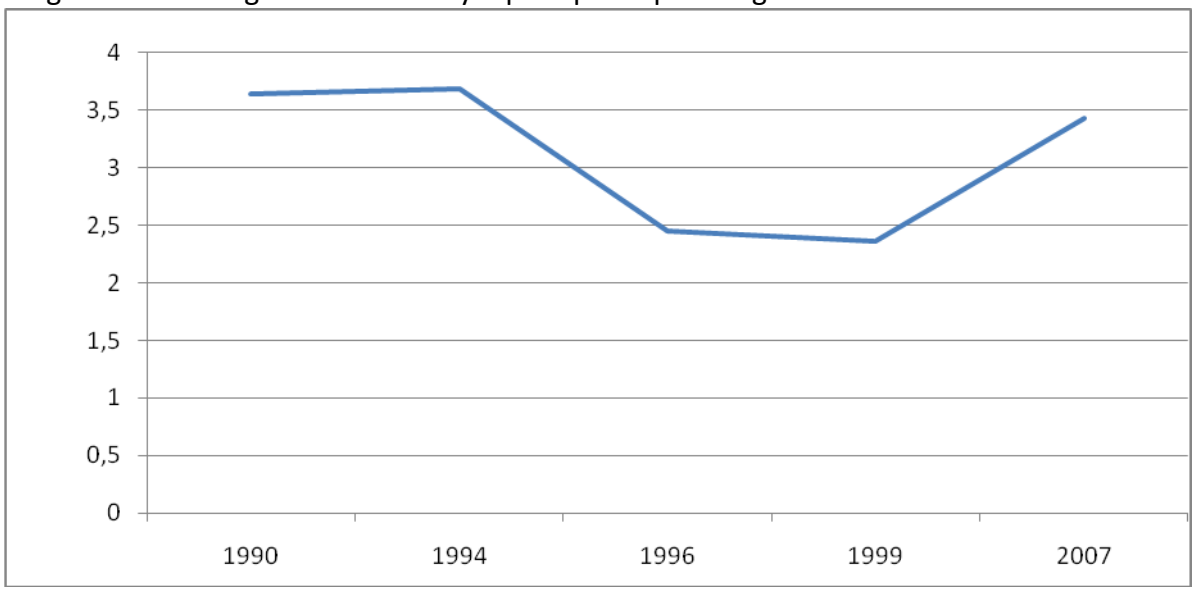


Diagram 10: Average number of days spent per trip at long-distance destination 1990–2008.



Transport mode

Trip purpose

Discussion

In the Philippines, regulations and operator behaviour have resulted in a higher mobility than expected at a relatively low cost for the rural people. This has been reinforced by a high increase in population, road supply and private vehicle ownership. But also because opportunities are increasingly located in major cities, Metro Manila in particular. As for the study area investigated in this paper, over time more people are travelling, more people are travelling more often, more people are travelling more often more frequently to long-distance destinations. Finally, an increasing number of people do so in privately owned vehicles. However, the latter development is a very slow one. This development can be expected to continue, because a large share, around one fourth, of all individuals are not satisfied with their travel frequency, but want to increase it. It seems safe to argue that the rural people's mobility behaviour put pressure on urban transport systems, increasingly so. Due to the above mentioned developments, the ability to return home earlier, that's also what people do in general, does not compensate for the increase in additional travellers and an increase in travel frequency. It is also possible that this development in mobility behaviour would have taken place despite the improvements in physical accessibility because of the development in the concentration of opportunities to major cities.

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