The basic service quality level of transport infrastructure in peripheral areas

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Abstract

The provision of transport infrastructure outside the most populated regions in Finland has been under budgetary pressure for more than decade. Many of these less populated areas suffer a decline of the population, which adds to the stress on these regional economies. The prolonged reduction in maintenance starts to show on the local roads and secondary railroad connections, which in turn may necessitate the reduction of speeds or axle load limits.

Last year the Ministry of Transport and Communication commissioned a study on the issue in which the various constituent elements for specifying an infrastructure (minimum) service level were discussed. In addition the study indicated the problems and trade-offs of bringing these elements together in a compound evaluation of a (minimum) service level. The constituent elements are very diverse, comprising technical and regulatory aspects of road and rail transport, social aspects such as entitled and aspired range of action, and economic aspects such accessibility of product and labour markets.

The article summarises the discussion on these elements. In addition it illustrates to what extent compensatory effects have occurred as regards housing and transport when comparing households in the countryside with urban households. There are cost differences which are in accordance with the theory, but the income gap seems to be decisive. The illustration is based on micro-data from the years 1985-1998.

1. Introduction

The provision of transport infrastructure outside the most populated regions in Finland has been under budgetary pressure for more than decade. Many of these less populated areas suffer a decline of the population, which adds to the stress on the regional economies of these areas. The prolonged reduction in infrastructure maintenance starts to show on the local roads and secondary railroad connections, which in turn may necessitate the reduction of maximum speeds or axle load limits. In this case maintenance is understood in a rather broad sense encompassing all investments except new road building and very extensive capacity changes in existing network links.

In 2002 the Ministry of Transport and Communication commissioned a study (LVM, 2002a) on the issue in which the various constituent elements for specifying an infrastructure (minimum) service level were discussed as preparatory work for a working group (LVM, 2003a). In addition the study indicated the problems and trade-offs of bringing these elements together in a compound evaluation of a (minimum) service level. The constituent elements are very diverse, comprising technical and regulatory aspects of road and rail transport, social aspects such as entitled and aspired range of action, and economic aspects such accessibility of product and labour markets.

The article summarises the discussion on these elements. In addition it illustrates to what extent compensatory effects have occurred as regards housing and transport when comparing households in the countryside with urban households. The illustration is based on micro-data from the years 1985-1998. The article concludes with pointing at the character of decision making, and the desirable integration of regional public investment portfolios from various policy areas.

2. A brief overview of recent developments in Finnish infrastructure

Road infrastructure in Finland is made up of 78.000 km public inter-communal roads (including those in built-up areas), 24.000 km public communal roads (streets) and 350.000 km private roads, often in forests, agricultural land, and to link remote (summer)houses to the public system (LVM, 2002a). About 250.000 km of the private roads are built and maintained by private funding (the owners) only. The remainder receives support from the central government and/or the municipality. Partly this is done by outsourcing the maintenance to the municipality. However municipalities, notably in sparsely in sparsely populated areas, are under budgetary stress. Yet, at the same time the emptying of the countryside implies also a drain on the locally available capacity to maintain a road[i]. The result is a deteriorating state of public and private roads in many remote areas and partly also in more central areas (Hämäläinen, 2002).

The amounts of infrastructure per capita in Finland are high compared to other EU members states, in particular in the case of rail (5800 km network for 5.2 mln. inhabitants). On the other hand stock indicators per km^2 land arearate lower than average in the EU, whereas in terms of net length per unit of GDP a similar – but not identical - picture emerges as for per capita indicators.

Table 1. *Selected indexes for infrastructure endowment compared to EU average (=100)*

Item	**rail/capita**	**rail/km²**	**rail/GDP**	**road/capita ***	**road/km² ***	**Road/GDP ***
Finland	273	36	243	215	28	191
Spain	53	36	103	102	70	200
Sweden	315	53	256	290	49	236
Ireland	122	57	101	112	51	92
Greece	88	59	128	115	77	168
Portugal	68	63	133	188	176	369
Denmark	93	99	63	57	61	39
Italy	69	114	77	76	124	85
France	130	122	126	172	162	167
Netherlands	43	140	38	110	360	98
UK	69	146	60	73	153	63
Austria	187	155	167	113	94	101
Germany	108	213	99	45	88	41
Luxembourg	151	220	73	173	249	82
Belgium	82	236	76	40	115	37

Source: Eurostat/DG TREN, 2002; rail: year 2000; road year 1999;

*) local road networks have been excluded

Road infrastructure expenditures by the central government decreased from a top of 1,1 billion Euro in 1992 to about 700 million Euro in 2000 (in constant year 2000 price levels). Between 2000 and 2002 the budget increased up to 840 million Euro and seems to stabilise around that level. To some extent, notably in the late nineties, the infrastructure budgets of the municipal authorities showed some degree of compensatory movement, amounting to an increase of about 70 million Euro per year between 1998 and 2000. In addition municipalities have spent more on public transport support in the late nineties than before, but recently various cities had to reduce these budgets as they came under a quite heavy budget squeeze in 2003.

As regards rail infrastructure there have been significant investments with respect to high speed line developments and capacity increase on some main lines, whereas on the other hand various rail sections on secondary lines are under temporary speed limits due to delayed maintenance.

All in all the picture is that in and between the most important population and economic centres[ii] there is still significant extension and upgrading of the infrastructure, whereas in many other regions the challenge is to maintain the available infrastructure whereas the population and the economy are in stagnation or decreasing. Formulated otherwise, with an – at best – modestly growing budget for investment and maintenance, there is an (almost) zero sum game at the investment allocation side. However, due to the demographic and spatial-economic changes there is still a need for extension and upgrading of infrastructure, despite a very low overall population growth (~0,25%/year). Unfortunately, a decrease in population usually does not lead to a proportional decrease in infrastructure financing needs, and consequently a political dilemma emerges. Accepting the growth in a limited number of areas, it means that the facilitation of that growth by means of infrastructure will have to go at the expense of less populated areas, though new financing and realisation concepts may provide some relieve. New financing and realisation concepts such as public-private participation (PPP), e.g. organised as BOOT[iii], have been occasionally applied in Finland (motorway Helsinki – Lahti) and a reconsideration of the organisation of infrastructure financing is in progress (LVM, 2002b). The report also mentions the recent developments in technologies for instantaneous charging of infrastructure use in combination with the application of marginal social-cost pricing (i.e. inclusion of external effects). Such systems are helpful in furthering the reallocation of investment budgets.

One may wonder to what extent the facilitation of main growth areas is speeding up the downturn in other areas, thereby aggravating the problem, possibly to an extent where the gains from agglomeration in growth centres are offset by the extra cost of *both* new infrastructure *and* keeping up a certain service level in the rest of the country. In other words the issue of determining a basic service level for transport infrastructure is by no means a pure infrastructure issue, but connects to the understanding of how infrastructure may facilitate economic and social development and how infrastructure functions in inter-regional dynamics. In the next chapter we will discuss both issues in relation to the elements of the definition the basic service level of infrastructure. In addition to this economic efficiency argument there is the concern for equity, partly also in the sense that quickly deteriorating equity may backfire into the economic efficiency sooner or later.

Subsequently the paper will scan empirical signals that either support or reject the efficiency and equity concerns about the development and state of the infrastructure in Finland.

3. Elements of the basic service level of infrastructure

In the study the following constituent elements of the service level of infrastructure were identified:

- *transport-technical* (e.g. allowable and actually attainable speed; ease of entry and exit; pre-qualifications, safety, environment);
- *economic* (e.g. cost levels – related to distance, speed, technical minimum requirements, quality limitations affecting location choice)
- *social* (e.g. accessibility of services expressed in travel time or distance; equity impacts related to mobility cost; equity regarding access to labour markets and social participation)

A ***basic*** service level, in that case, would mean the quality level one wishes *at least* to attain for any part of the infrastructure network. Since local circumstances vary and considering that an infrastructure network is hierarchical, the basic service level should be understood in the sense of enabling mobility and goods transport against reasonable cost (money and time). Obviously to ensure this enabling function rather different shapes and volumes of infrastructure are needed in different environments (geographically different and/or social-economically different).

In contrast to the basic service level also a 'minimum-service level' and a 'best service-level' were identified. The minimum level refers to those qualities that are really essential in order to regard an infrastructure segment still as functional. For example, key public services, such as for emergency, health as well as a minimum reliability and safety level (e.g. in winter conditions) should be maintained in order to prevent isolation and marginalisation. A 'best' service level would represent a volume and quality of infrastructure in a region that would facilitate the mobility needs excellently without incurring excessive cost for the region. Apparently, even though in qualitative terms the differences between the service levels can be explained, it is not easy to come up with guidelines that allow for systematic and tractable assessment and comparison. For a minimum level this is still doable, since this level refers mostly to physical characteristics and does not suffer so much from influence factors that are mutually conflicting.

For the basic service level and a fortiori the best service level the possible conflicts between constituent elements get more important. In a working group advice (LVM, 2003a) a scheme of largely qualitative guidelines was proposed. It is an interesting first step but would need further operationalisation and devlopment into a coherent and tractable decision tool involving both MCA and modern cost-benefit techniques[iv]. Eventually the decision what to include in the set of criteria for assessing the basic

service level is a political decision. This is however problematic from a research point of view in as far as infrastructure policy in a regional context is regarded as a particular way to achieve policy objectives. The contents of the evaluation system and also the role of various stakeholders can change depending on whether it is seen as a social-economic optimisation challenge, a way to promote spatial equity or rather a matter of transport-technical system management.

Another problem with the basic service concept is the management of its evolution over time, not only at the strategic planning level but also at the pragmatic level in a region. In theory everybody will agree that below certain population and economic volumes a earlier defined basic service level becomes untenable. However, as closure of peripheral railway lines throughout Europe has taught us, any kind of act which implies – explicitly or implicitly – a demotion for an area faces resistance and may indeed precipitate further decline due to its symbolic impact.

In the case of Finland the discussion about regional policy models has been focussing on the question to what extent the economic and population growth should (be allowed to) concentrate on a limited number of city regions (see also endnote ii). The actual growth was concentrated in the areas as listed (though slows down since recently), but the official regional policy has identified a larger list of regional development centres spread out over the country. A new trend is that a growing number of smaller sub-centres is considering to merge in more populous municipalities, while agreeing on a concentration of developments in the merged area[v]. The consequence is that due to regional policy objectives regional equity is clearly a motive in infrastructure policy. On the other hand the growth in the larger centres necessitates investments in those areas, thereby reducing the actual possibilities to invest rather abundantly outside these centres or corridors almost down to rhetoric.

From a socio-economic point of view the growth contributing capacities of transport infrastructure in less favoured regions in an otherwise well developed country has been regarded with caution for considerable time (Biehl, 1986; Forslund and Johansson, 1995; Rietveld and Bruinsma, 1998; Sturm, 1998; SACTRA, 1999)[vi]. In economically expanding regions infrastructure can indeed become a bottleneck for maximum attainable growth, but in stagnating regions transport infrastructure – generally speaking – is not particularly significant for returning growth or stopping decline. In specific cases new business developments may require new infrastructure also in stagnating non-central regions. All in all the message from these findings is that one needs to be careful with the operational definition of a basic service level for transport infrastructure. Well intended equity motives for aspiring fairly high basic service levels may eventually lead to crowding out of (public) investments for purposes that may produce higher socio-economic returns.

The notion of possible counter-effectiveness of policies intending to augment regional equity has received more attention since the emergence of spatial GEM (Fujita, Krugman and Venables, 1999). Up to now applications have been scarce in Finland, apart from Törniö (1998), now also in VATT steps towards a spatial GEM are made. This year a few Finnish applications have been published, one on the impact of the enlargement of a stainless steel mill in Northern Finland (Honkatukia and Vaittinen, 2003) and one regional policy effects in Central Finland (Honkatukia, Kangasharju and Vaittinen, 2003).

The rest of the paper will focus on the issue of welfare differences between countryside and (larger) cities and notably whether transport cost are systematically higher for households in the countryside as compared to similar households in (larger) cities.

4. Centre-periphery differences in housing and transportation cost in Finland

4.1 The spatial demographic context

In relation to the basic service level study some background investigations were carried out with the aim to obtain as good as possible a picture of possible welfare effects for household due to possible differences in accessibility between countryside locations and those living in larger urban areas. The findings in the report (LVM 2002a) were rather inconclusive, among others due to lack of time and data. The exercise has been repeated recently, as now more data were available for analysis thanks to the AESOPUS project (e.g. Sullström and Perrels, 2003).

For the analysis five household expenditure micro-data sets were available, being that of 1985, 1990, 1995, 1998 and 2001. The 1995 data have been left out due to extraordinary effects of the economic crisis in the early nineties. The data sets contain 4300 (1998) to 8200 (1990) respondents (households), about 170 background variables and expenditures for about 900 expenditure groups and sub-groups. The background variables not only clarify family type and income, but also ownership of cars and domestic durables, type and size of the house, as well as location.

The spatial-demographic changes in Finland have been quite profound since 1950. Figure 1 shows the changes in the shares of the population by age-category by kind of residential setting for selected years in the period 1985-2001. Even in this shorter period the changes of the population_by_age shares are obviously remarkable . The graph shows the development for the Greater Helsinki area (Helsinki, Vantaa, Espoo, Kauniainen), Other larger cities (Tampere, Turku, Oulu, Lahti) and the countryside. For

the countryside one can observe in figure 1 a substantial ageing of the population between 1985 and 2001. The shares up to 35-49 are diminishing, the group 35-49 is stable and above that age the share is increasing in the countryside. This is mainly the result of selective outward migration. Greater Helsinki, which attracted a disproportional large share of the younger adult population prior to 1985, seems – on balance – to win mostly among the 40+ working population. Other large cities have a similar but less pronounced development. The region which – on balance - attracts younger adults is the group not shown here (a mix of commuter towns, smaller mill towns and some secondary regional centres).

The total number of households increased from 2,05 million in 1985 to 2,38 million in 2001 (+16%). The share of the Greater Helsinki area in the total household population increased from 21% to 22,5%. Other large cities saw their share increase from 36,5% to 41,8%, while the countryside experienced a loss, going from 31,3% to 20%.

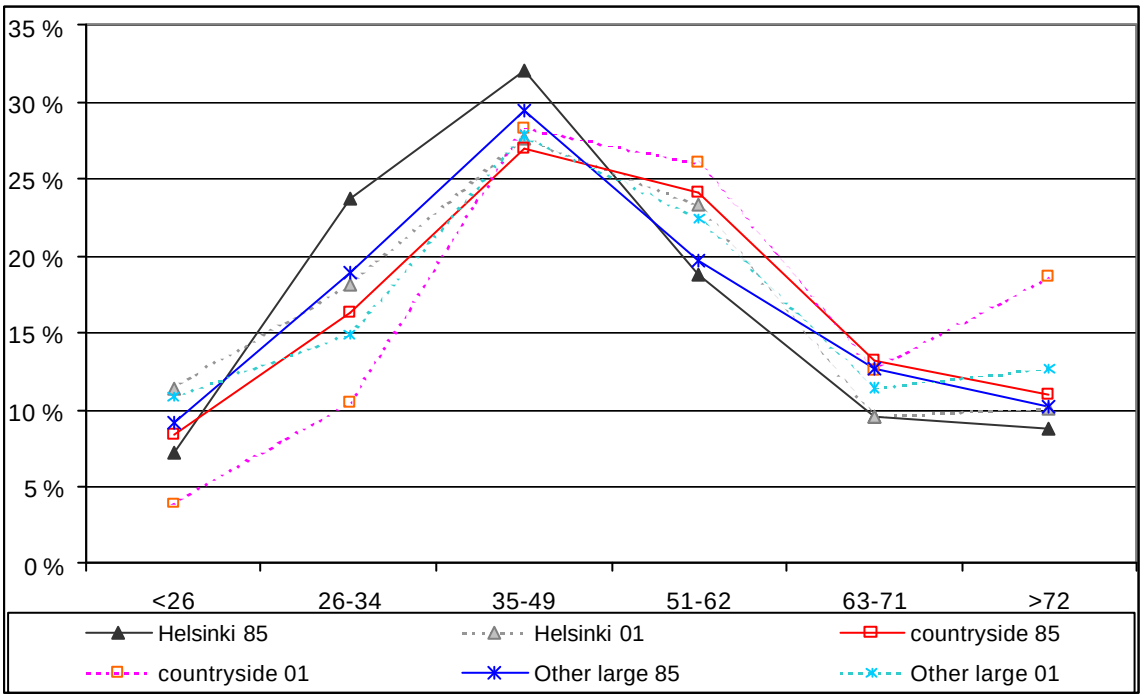

Fig 1. *Demographic spatial changes between 1985 and 2001 - population shares by age category* (source: Statistics Finland/VATT)

4.2 Statistical survey of welfare discrepancies

The demographic changes as summarised above are straining the transport infrastructure development as has been explained in earlier sections. Thanks to the availability of micro-data on household consumption it is possible to check more closely whether households in the countryside are in a disadvantageous position with respect to mobility

and accessibility. Under ideal circumstances spatial interaction of housing and labour markets would function efficiently enough to take care of equalisation of net benefits for those staying and those moving.

More specifically the following questions are put forward:

a. Do similar families spend a higher fraction of their income on transport when living in the countryside, as compared to those living in a city?
b. Do families in the countryside have a higher car ownership than comparable households in cities?
c. Are the use cost of own vehicles higher in the countryside for families that own cars, as compared to similar families in cities?
d. To what extent higher transportation cost are offset by lower housing cost ?
e. What is the development over time (1985-2001) of the issues raised in the previous questions ?
f. Would households in the countryside experience a significant reduction in purchasing power disadvantage compared to city households, if accessibility would be improved ?

As regards questions **a and e** the answer can be mostly affirmative. 4-person households in the countryside have been spending one to three percent-point more than households in larger cities (Helsinki included) in the years studied (see figure 2). The same conclusion applies for 3-person families. For singles however the picture is a bit different. The budget fraction for transportation of singles living in cities has been fairly stable (more so in Greater Helsinki, a bit less so in other cities). In contrast in the countryside the budget fraction of transport for singles fell from 1985 to 1998, and thereby reaching the same level as in other areas. In 2001 an upswing in expenditures related to the own vehicle occurs in all household types and areas, but in Greater Helsinki this happens to be significantly stronger than in the other areas. Interesting enough the same upswing, though less dramatic, occurs also for other household types in Greater Helsinki and the countryside, but barely in other cities. Figure 2 also shows that in contrast to transportation the budget share for housing has been mostly smaller for families, but for singles this situation only occurred recently. Before 2001 the situation was reverse for singles. So, indeed smaller housing cost have often a compensatory effect on the cost of living compared to the transport cost. Later on this subject will be discussed in connection to differences in disposable income.

In absolute terms (figure 3) the differences look a bit different than in figure 2. Three-person households (often young households) in the countryside tend to spend more money compared to the same households in cities, though differentials vary substantially often in relation to apparent waves in car purchases. These waves are even

stronger for four-person households though not in the same years. Just before the crisis of the early nineties Finland had a bubble-economy with rapidly growing low-cost consumer credits.

The question regarding extra use cost of own vehicles (question **c and e**) can be answered by and large affirmatively on the basis of figure 3. In comparison with the Greater Helsinki area use cost are almost 500 Euro higher for three- and four-person families in recent years. In comparison to other cities the differences are smaller and more varying over time in case of four person-households. One-person households show understandably smaller differentials, due to the household-scale effect. Furthermore, differentials for the two comparisons are more similar than for the other household types.

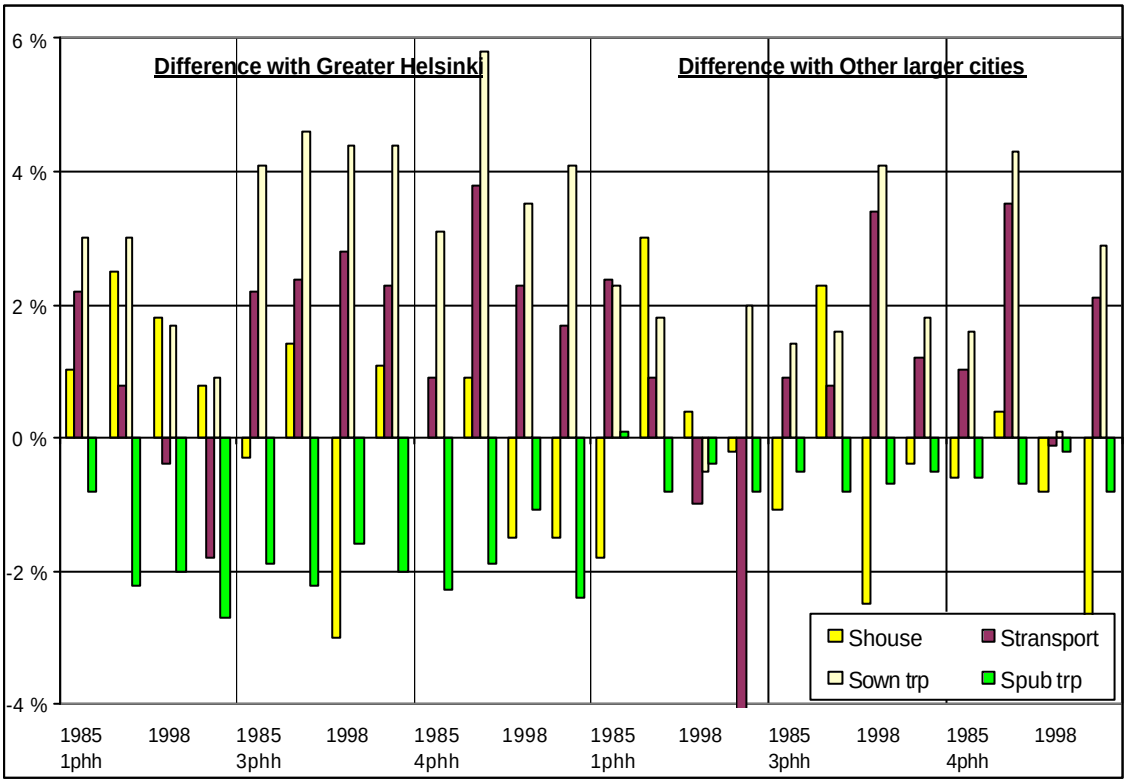

Figure 2. *Expenditure fraction differentials in percent-points by household type, countryside compared to cities 1985-2001*; source: Statistics Finland/VATT

Legend: 1pshh = 1-person household; 3pshh = 3-person household, etc. Shouse = budget fraction for housing, Stransport = budget fraction for transportation; Sown_trp = budget fraction for purchase and use of own vehicles, Spub_trp = budget fraction for use of public transport services

In figure 4 is visible how the availability of public transport affects the distribution between expenditures on public transport and on own transport (esp. private car). From the figures 2, 4 and 5 can also be derived that the diseconomies of scale of car ownership for single person households are getting less decisive the more affluent these

households get. This leads us to the second question of car ownership differences (question **b and e**). In other words are households forced to have a car whatsoever ?

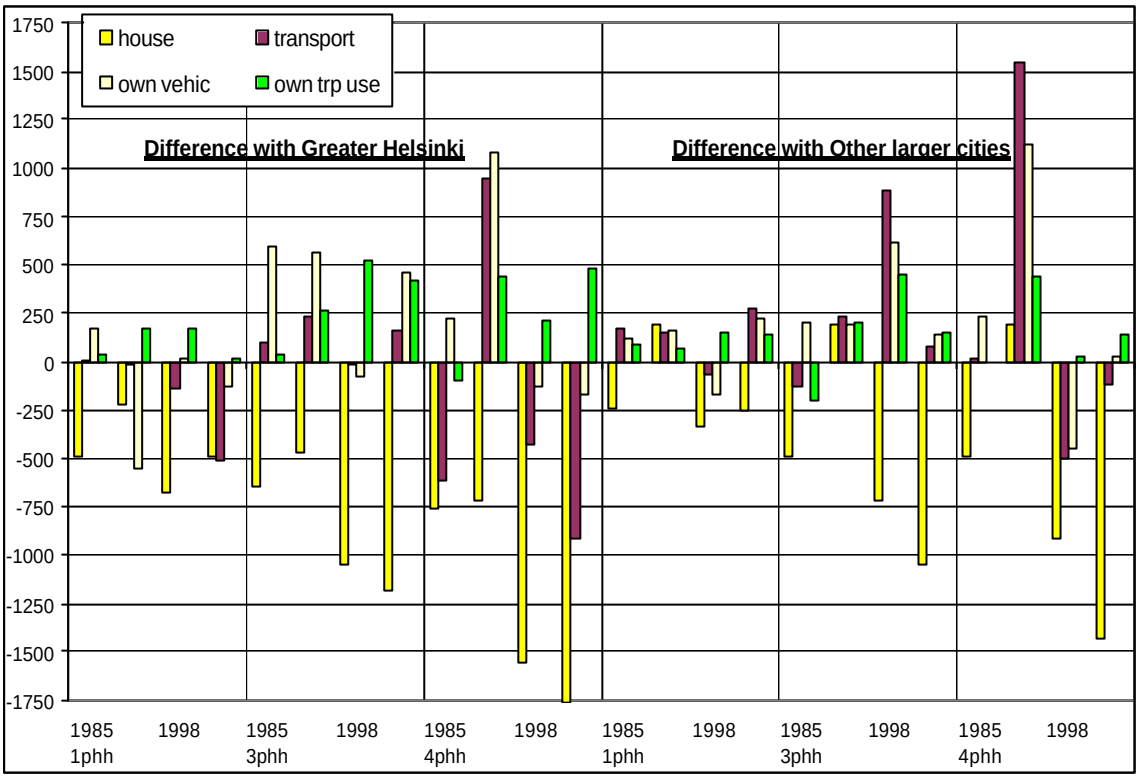

Figure 3. *Absolute differences in expenditures of countryside households compared to city dwellers 1985*-2001 source: Statistics Finland/VATT

In figure 5 can be seen that for similar household types the ownership rates (left hand scale) are significantly higher in the countryside, especially in comparison with the Greater Helsinki area. Figures above 100% indicate multiple car ownership in part of the households. Disposable income, which is shown as a line in the same figure (right hand scale), is practically always higher in other areas than the countryside (except for 4-person households in 2001, which is similar to the level in 'Other large cities'). So, similar households in the countryside appear to own much more often cars even though their disposable income level is lower than comparable households in cities. Additionally from figure 6 can be inferred that despite lower incomes countryside households tend to spend on average more on *new* cars than city households, notably in the case of three-person households. For *used* cars the picture is more mixed, especially in recent years when apparently four person households in cities start to spend remarkably more money (resulting from boosts in disposable income). As ownership rates in cities do not show similar boosts, it seems to be a matter of more expensive cars rather than more (second) cars.

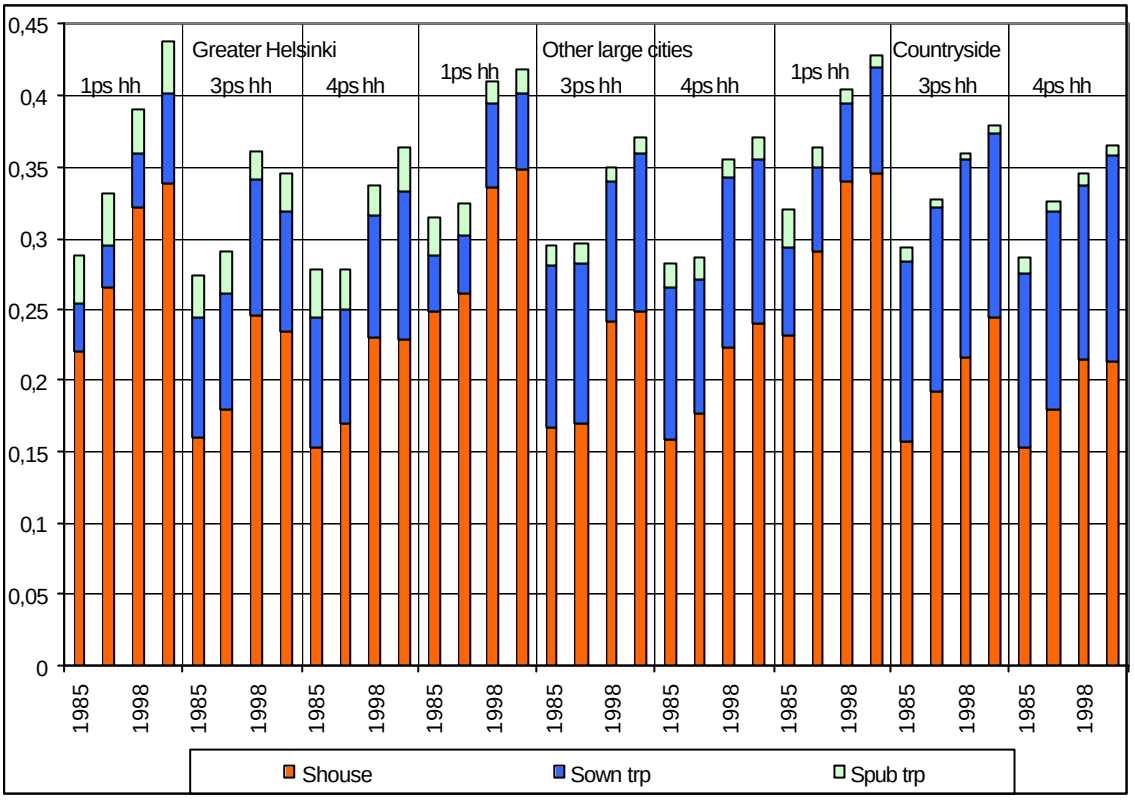

Figure 4. *Budget shares for housing and transportation by household type from 1985 to 2001; 1pshh = one-person households; 3pshh = three-person households, etc*

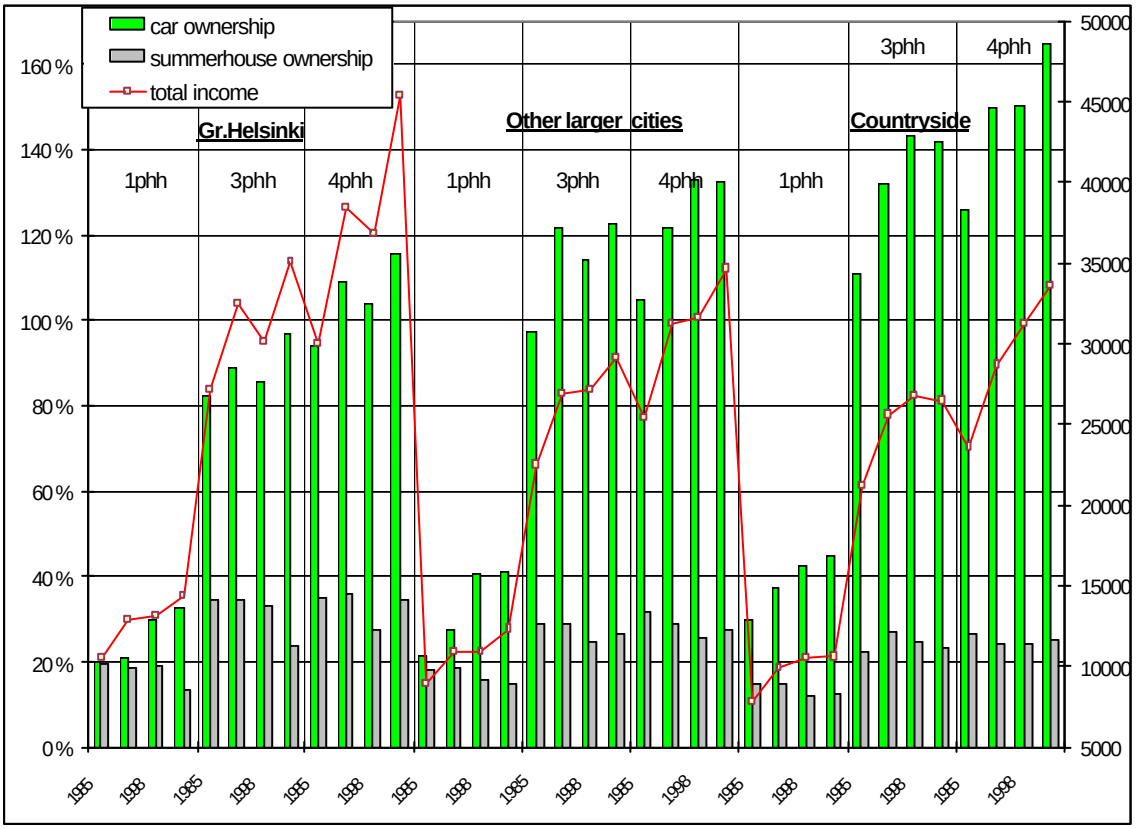

Figure 5. *Changes in influence factors (income, car ownership, summerhouses) 1985 – 2001; Ownership figures (bars) refer to left hand scale, income (line) to right hand scale*. source: Statistics Finland/VATT

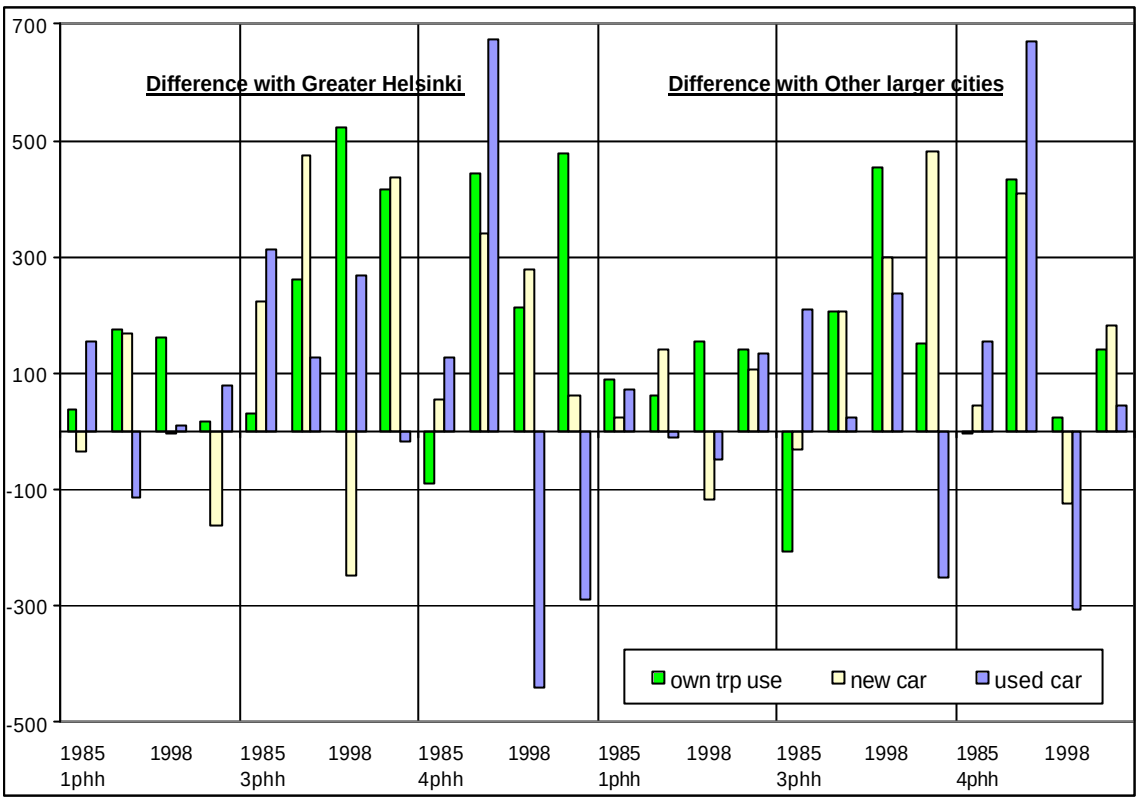

Figure 6. *Expenditure differentials (in €; 1990 prices) between countryside and cities 1985-2001* source: Statistics Finland/VATT

Eventually from an equity point of view the issue is whether regional differences in infrastructure quality exacerbate socio-economic differences for households. As has been shown earlier in terms of budget fractions countryside households have higher shares despite their lower incomes. The gap is diminishing recently, but that seems to be attributable to an upgrading trend of the car fleet of city dwellers. In absolute terms the picture has been more mixed, whereas the recent trend is that city dwellers now spend even more on transport, although this may well be caused quality improvements, enabled by quickly improving incomes, rather than by necessitated higher expenditures. Housing on the other hand has been mostly cheaper in the countryside. It can be added that the average floor area available per household type is higher in the countryside. So, this seems to be really a matter of more dwelling for less money. Furthermore, the two items are compensatory. The advantages from lower housing cost are usually higher than the extra transport cost. This impact gets more important the larger (or the more mature) the family gets So, from a (short sighted) cost-saving point of view moving from the countryside to the city does not seem very attractive. The answer lies entirely at the income opportunity side. The systematic and growing differences between income levels (four person households in other larger cities in 2001 excepted) is evidently the main source of attraction of city residency. Compared to the income differentials the cost effects and other obstructions caused by lower service levels of infrastructure are of secondary importance, although their may be specific situations where deficiencies in

the transportation system do count more. Table 2 shows the impacts on the various items and also shows in the bottom line what is left after expenditures on transport and housing (net purchasing power differential). It should be noted that even though not analysed in depth in this paper daily shopping goods are usually somewhat more expensive in the countryside, but that cost effect is smaller (and with opposite sign) than that of housing. With recourse to Fujita et al (1999, especially ch. 5 & 7) the results of table 2 suggest a situation of sustained or even strengthening core-periphery structure.

Table 2. *Differentials between similar households in the countryside and cities for income, housing and transport cost, and net effect for the remaining budget (in €)*

	Countryside -/- Greater Helsinki								
	1phh			**3phh**			**4phh**		
	1985	**1990**	**2001**	**1985**	**1990**	**2001**	**1985**	**1990**	**2001**
income	-2741	-2990	-3767	-5954	-6957	-8618	-6406	-9674	-11808
housing	-484	-218	-491	-647	-474	-1186	-760	-714	-1768
transport	2	-12	-516	101	236	158	-613	946	-907
net purchasing power diff.	-2259	-2760	-2760	-5408	-6719	-7590	-5033	-9906	-9134
	Countryside -/- Other larger cities								
	1phh			**3phh**			**4phh**		
	1985	**1990**	**2001**	**1985**	**1990**	**2001**	**1985**	**1990**	**2001**
Income	-1121	-1020	-1706	-1319	-1283	-2659	-1839	-2466	-1016
Housing	-243	187	-254	-493	192	-1044	-484	186	-1430
Transport	174	151	272	-127	232	78	19	1543	-112
net purchasing power diff.	-1053	-1358	-1724	-699	-1707	-1692	-1373	-4196	525

In addition to statistical argumentation discussed above the LVM report on the basic service level of infrastructure (LVM, 2002a) contains some material based on interviews held in the area of North-Karelia (the extensive municipal areas of Ilomantsi and Rääkkylä). From these interviews emerges a picture which confirms in a situational manner the extra costs or efforts that countryside households can be confronted with respect to transport. Temporarily bad conditions due to delayed winter damage repairs on delayed winter conditioning may oblige people to make diversions which require extra time and fuel or postpone certain trips for hours or days.

4.3 Expenditure functions for housing and transport

Based on the same statistical material also a regression analysis was made in order to estimate expenditure functions for transport and housing cost using the cross-section data of 1990, 1998 and 2001. Price information has not been used. For transportation no significant systematic price differential is assumed between different types of areas. Furthermore households probably buy parts of these services outside their own area. Longitudinal analysis based on pooled cross-section data was outside the scope of this

study. The estimations should be primarily regarded as a kind of overview indicators of influence factors, which at best give an impression of the order of magnitude of the impact of various variables. For example, in the case of transport expenditure modelling a separate treatment of vehicle purchase and variable cost would be recommendable.

The general specification form of the function was (like 'AIDS without prices'):

$$S_n = C + \sum_k (\beta_k \,.\, \log B_k) \,,$$

where S_n denotes the fraction of the household budget spent on category n (transport, housing, etc.), C is the intercept, B_k the k^{th} explanatory variable and β_k the estimated parameter value for B_k.

Table 3. *Estimation results for transportation and housing budget shares*

Budget share of transport	**1990**	**1998**	**2001**
R^2	0,12	0,14	0,13
N	8200	4340	5460
Intercept	0,1148	-0,0003	0,0963
Income	0,0181	0,0244	0,0161
No. of household members	-	-0,0090	-0,0084
Age of main respondent	-0,0655	-0,0535	-0,0473
Education level	0,0017	0,0022	-
Occupation *	0,0103	0,0193	0,0391
Urbanisation	0,0131	0,0043	0,0067
Number of cars	0,0548	0,0873	0,0743
Summerhouse *	0,0141	0,0159	0,0069
Budget share of housing	**1990**	**1998**	**2001**
R^2	0,38	0,32	0,32
N	8200	4340	5460
Intercept	0,0889	0,4483	0,2021
Income	-0,0348	-0,0466	-0,0319
No. of household members	-0,0684	-0,0486	-0,0553
Age of main respondent	0,0519	0,0578	0,0711
Education level	-0,0178	-0,0196	-
Occupation *	-0,0352	-0,0449	-0,0613
Urbanisation	0,0114	-0,0033	-0,0056
Number of cars	-	-	-
Dwelling size	0,1066	0,0642	0,0589

*) Dummy variables (0;1); insignificant variables have cells with a '-' sign. For dat character of variables see endnote [vii]

The multiple correlation coefficient of the estimated functions for transport is not very high. The large sample sizes have a significant influence keeping multiple correlation coefficients. The parameters have the right signs and the parameter values of most variables are reasonably stable. It should be realised that 1998 bears still some signs of the crisis of the early nineties. In other words in terms of generic economic situation 1990 and 2001 are more similar. However in other respects, e.g. emergence of mobile communication, spatial demographic developments, structure of the labour market, etc, there are considerable differences between 1990 and 2001.

The parameter values of Age of Respondent, (degree of) Urbanisation, and Occupation seem to change systematically (unidirectionally). Possibly this relates background trends. For Age the reason could be that new and upcoming vintages of middle-aged and elderly people are more active in a spatial-temporal sense and just as mobile as others (rising car ownership and driving license holding). As regards Urbanisation it seems to refer to the fact that gradually availability of public infrastructure does not withhold people anymore from nevertheless buying a car. The steadily rising parameter values of Occupation suggest that employment assumes gradually a more influential position in the impact portfolio. This is probably related to the increase of commuting distance and the increase of commuting by car in recent years. Remarkably the ownership of a summerhouse (which causes a considerable amount of long distance car trips) seems to matter less over time. Overall ownership rates have been going down, though this trend could reverse.

5. Conclusions

The idea to come up with a definition or rather a definitional framework for appraisal of the service level of a transport infrastructure system or segments thereof is laudable, since it would enable to create a comprehensive and tractable decision making framework which can be used on a recurrent basis in subsequent policy cycles. It would preferably take the form of a Cost-Benefit Analysis (CBA) system embedded in a Multi-Criteria Analysis (MCA) decision support tool.

Notwithstanding the economic and social science underpinning of such a decision support framework the chosen service levels for ‘minimum level’, ‘basic level’, etc. are to be understood as political decisions.

Investments in transport infrastructure will continue to have a role to play in regional development policy, also in non-central (peripheral) regions of Finland. The timing, the sequencing in relation to other regional investments, the sectoral focusing and the regional distribution of investments requires however careful and well founded

consideration, since the simple default assumption that more or better infrastructure will always be beneficial to the host region can be deceptive. Apart from the extreme cases where infrastructure investment has even a reducing effect on the regional product, it is by no means rare if (a part of) the infrastructure investments yield a much lower return than other public investments or policy incited private investments would yield.

As regards the equity effect of poor endowment of infrastructure in non-core regions both the statistical analysis and the interview based information indicate beyond doubt that households living in the countryside have a disadvantage with respect to fulfilling their mobility needs. They spend on average a higher share of their income for mobility than comparable households in cities, even though countryside households have lower incomes. In terms of absolute amounts of money spent the picture is more mixed, primarily due to the larger amounts of money a part of the city dweller can spend.

The longer distances and the lower service level of public transport apparently necessitate households in the countryside to uphold a higher level of car ownership than comparable households in cities do. Even though more recently the wealth increase in cities seems to contribute to close the gap in car ownership differentials between city and countryside.

The lower housing costs for countryside households usually more than compensate for the extra transport cost, even when taking into account that dwelling space per person per type of household in the countryside is higher than in cities. Consequently, from a pure cost minimisation point of view moving from the countryside to the city does not seem to be a beneficial option. *The reason why moving is nonetheless an attractive option lies in the sustained, and in some respects even growing, income disparity between cities and the countryside.*

The reason for these income disparities relates to the differences in economic structure and concentration of growth sectors in a limited number urban areas. Positive location factors for these growth sectors are concentrations of well educated workforce and good national and international connections (both physical and virtual). Generally speaking it will be difficult and costly to obtain competitive levels for these factors in other areas. Consequently, *in general terms* investing in infrastructure peripheral regions may be expected to have mediocre results on the augmentation regional welfare. However, on the basis of ***eclectic policies*** it is possible to boost the competitiveness of various peripheral or non-core areas. As a consequence this may sooner or later necessitate (extra) investments in transport infrastructure in non-core regions. Probably the needed infrastructure will be of a particular nature and may be spatially rather focused.

The results of the regression analysis hint at some structural changes in the order of significance of influence factors of mobility in Finland, such as employment and

commuting, an ageing population where upcoming cohorts are very much used to car mobility (and cars), and a reduction of the car ownership prevention effect of good public transport.

Endnotes

[i] . The greater part of these private roads has no asphalt pavement, but gravel or grit

[ii] . Roughly: the corridors Greater Helsinki – Hämeenlinnä - Tampere and Greater Helsinki – Lahti – Kouvola, the areas around Oulu and Turku, and to a lesser extent Jyväskylä and Kuopio.

[iii] . BOOT – Build Own Operate Transfer (to public body after forecast pay-back period).

[iv] . In an evaluation of the ministerial policy of the public transport system the international evaluation group strongly recommended development of *comprehensive* CBA tools (LVM 2003b).

[v] . Even though economies of scale can be achieved thanks to the larger population, the problem of large surface areas remains. Merged municipalities may cover 1500 to 2000 km^2 or even more.

[vi] . The notion of a stagnant non-central region in a well developed country is important. Countries that only recently started to approach EU or OECD average income levels and consequently had less time to build up infrastructure are expected to benefit more from extending their transport infrastructure also outside core-regions (see e.g. Venables and Gasiorek, 1996).

[vi] . Coding of variables in the regression analysis:

Income –	as observed, in Euro (2001) and markka (1998, 1990)
No. of household members –	as reported (1,…,12)
Age of main respondent –	in years
Education level –	coding from basic schooling (low) to university (high)
Occupation –	0: no employment; 1: (self)employed
Urbanisation –	1: Greater Helsinki; 2: other larger cities; 3: commuter and (small) mill towns; 4: countryside
No. of cars –	as reported (1,…,5)
Summerhouse –	0: no summerhouse owned; 1: own summerhouse
Dwelling size –	as reported, in m^2

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