

Transalpine freight traffic's impact on people's quality of life

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Abstract

Within an overland transport agreement between Switzerland and the European Union, Switzerland has accepted the gradual increase in HGV axle weight limits from 28 to 40 tons. Thus, people's quality of life is influenced in the affected regions, as they are very much exposed to the pollution with noise and harmful substances. Hence, it is assumed that people move to less affected areas and accept longer journeys to their workplaces; on the other hand, the transalpine freight traffic might create new jobs in the affected municipalities. Thus, research on the transalpine freight traffic's impact on people and environment is carried out at the Swiss Federal Institute for Forest, Snow and Landscape Research. The objective is to verify the previously formulated hypotheses. However, the analysis of demographic data showed for one municipality that people moved away from there because of lack of building land and because of the municipality's location in a narrow shadowy valley. These persons accepted longer journeys to their workplaces, profiting from an improved supply of public transportation and increased mobility. Nonetheless, although the transalpine freight traffic created workplaces for this municipality, it can only partially explain why people commuted there. For another municipality, in spite of transalpine freight traffic increase, people moved there as they profited from the good attainability of larger cities, low taxes, the availability of building land and because the transalpine freight traffic's noise was responsible for lower land prices. Analyses of socioeconomic data for further municipalities will be necessary and quantitative interviews will complete and thus confirm or modify the present results. The interviews shall be repeated regularly in order to evaluate the changes in quality of life in the affected municipalities.

Keywords: transalpine freight traffic, land prices, demographic data, economic data, mortgage interest rates, expert interviews.



1 Introduction

The transalpine freight traffic, crossing the Swiss, Austrian and French Alps, increases unrelentingly. It has increased by the factor twelve since 1970 (Jeannerat [1]). Within an overland transport agreement between Switzerland and the European Union, Switzerland has accepted the gradual increase in HGV axle weight limits from 28 to 40 tones. Thus, people’s quality of life is influenced in the affected regions, as they are very much exposed to the pollution with noise and harmful substances. Because of this exposition, it is expected that people move to less affected areas and accept longer journeys to their workplaces; on the other hand, the transalpine freight traffic might also create new jobs in the affected municipalities.

Nevertheless, there is a lack of studies on people’s acceptance concerning transalpine freight traffic and the effect on the well-being, as similar studies have concentrated only on general traffic impacts. The section “landscape and society” at the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) has made an assessment of the transalpine freight traffic’s impacts on people’s quality of life.

The objective of this study is to examine if the hypotheses, formulated above, can be verified.

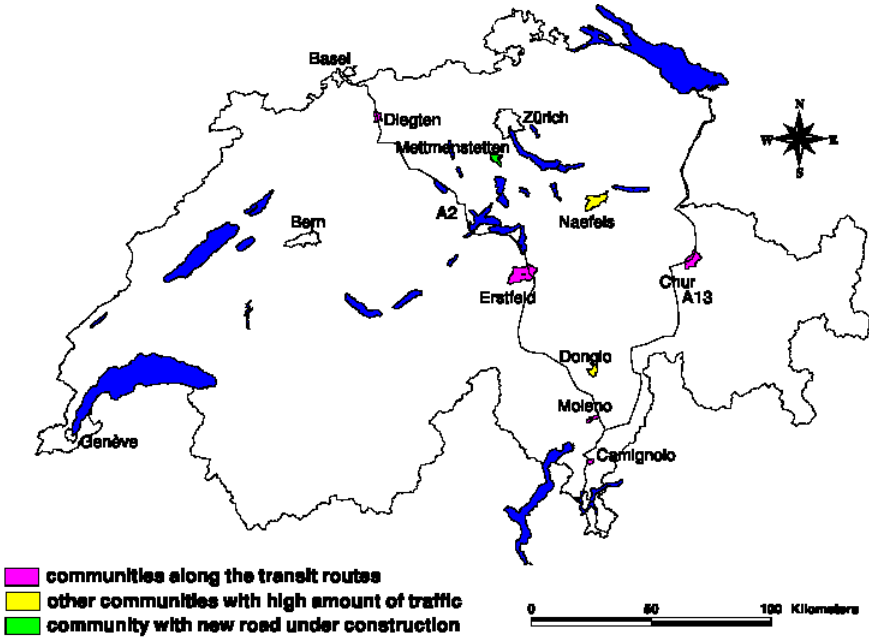


Figure 1: Swiss municipalities analysed within the research project (Swiss Federal Statistical Office and Federal Office of Topography [2, 3]).

2 Study area

The analyses, described in this paper, were conducted in eight municipalities within Switzerland. In order to study the impacts of the transalpine freight traffic, a distinction was made between five municipalities situated at the transit traffic routes A2 and A13 and thus directly affected by the transalpine freight traffic, one municipality, where a new route is under construction and where a high amount of traffic is expected in the near future and two municipalities which are not situated at transit traffic routes, but are also affected by a high amount of traffic (fig. 1). The latter municipalities were chosen, in order to compare the impacts of transalpine freight traffic with those of other traffic.

3 Methods

In order to achieve the objective formulated above, qualitative interviews, quantitative interviews and behaviour setting analyses are carried out. In addition to that, socioeconomic data are analysed.

The qualitative interviews have already been analysed. Concerning this kind of interviews, the questions where previously defined, however, possible answer categories were not provided, since it was the aim to get a wide bandwidth of different perceptions on transalpine freight traffic.

This paper focuses on the analysis of socioeconomic data that includes the analysis of demographic and economic data but also the analysis of mortgage interest rates and land prices. Socioeconomic data are of interest, as they are possibly suitable indicators to show people's commitment to their surrounding area and thus to indicate changing quality of life. The analyses of socioeconomic data have already been completed for two municipalities at the transit route A2 that is for Erstfeld and Diegten, fig 1. These results will be discussed and presented in chapter 4.

The Swiss Federal Statistical Office provides most of the data needed for the socioeconomic investigation of the selected municipalities as well as demographic and operational data in a finer resolution than on the municipality level. The latter data can be analysed by Geographical Information Systems to find out which and how many business branches lie closer to the transit routes and thus might profit from the transalpine freight traffic. The analysis can also show whether in bigger municipalities there is a difference in the development of the total population in the areas closer to the transit traffic routes compared with the rest of the municipality. Land price statistics for the municipalities, however, can only be obtained from the land registries and the statistical offices of the cantons of Switzerland.

In order to demonstrate the possible dependency of the development of the demographic and economic factors as well as of the land prices from the transalpine freight traffic, regression models shall be applied. However, the main problem with the provided data lies in the fact that most of them show too short time series for a good residual analysis, which means that it is impossible to establish useful regression models. Further, there are only a few cantons that



provide land price statistics for their municipalities. For our studies, the statistics for Diegten, Mettmensstetten, Dongio, Camignolo and Moleno (fig. 1) are available for the municipality as a whole only. Within these municipalities, no land prices are known but which would be essential, as land prices for sites close to the transit traffic routes might be lower than for those, lying further away from transit routes. In addition to that, years with less than three sales are not provided for data security reasons. As a result, time series of land price data often show either missing values or are too short and thus, it is likewise impossible to establish useful regression models.

Mortgage interest rates finally are published by banks but are not available for municipalities and are independent from a municipality's location and thus from transalpine freight traffic's impact. As telephonic questionings of different bank economists confirmed, mortgage interest rates rather depend on the building land's location in an industrial or a residential area. Building land to be used as residential area is cheaper, as it is easier to sell it than land to be used as industrial area. Hence, analysis of mortgage interest rates will not be carried out in this project.

A further problem with the operational data, provided with a finer resolution than on municipality level, lies in the fact that the class sizes, used for the number of workplaces, were chosen too big, so that it is possible to study the effects of the transalpine freight traffic on the development of workplaces only on municipality level.

Because of the statistical problems with the existing data, expert interviews with the chief secretaries of the administration of the investigated municipalities but also with the director of a service station, situated at the transit route A2 (fig. 1) were carried out thus profiting of the chief secretaries' broad knowledge of their municipalities. Based on a descriptive analysis of the provided data, hypotheses on the possible dependency of the development of the demographic and economic factors as well as of the land prices from the transalpine freight traffic were formulated. The questionnaires for the telephone interviews with the chief secretaries of the administration were based on these hypotheses. Wherever possible, the provided data were then used to back up the statements of the chief secretaries of the administration of these municipalities.

4 First results

Regarding noise and perceived quality of live, it became evident from the qualitative interviews that transalpine freight traffic has unfavourable effects on people's quality of life. The interviews made in Erstfeld for example, demonstrated that people, living near the transit traffic routes there, very often avoid staying outdoors or even sleeping with open windows (Rothenfluh and Saladin [4]). There was an increase in the number of heavy goods vehicles between 1994 and 2003, especially on the A2 route, but also on the A13 route (fig 2. and 3).

4.1 Analysis of demographic data

Demographic data are analysed to see if people move to less affected areas and accept longer journeys to their workplaces. In a first step, the development of the total population is analysed.

In Erstfeld, the total population decreased between 1991 and 2003, caused first and foremost by migration, as the balance of migration was -572 persons between 1991 and 2003 compared to a surplus of births of 58 persons (Swiss Federal Statistical Office [5], fig. 4). Although the total population decreased in Erstfeld during the nineties, this cannot be ascribed to the influence of the transalpine freight traffic. The interviews with the chief secretary of the administration of Erstfeld showed that people moved away from Erstfeld because of lack of building land and because of the municipality's location in a narrow shadowy valley but not because of the impact of the transalpine freight traffic. Nonetheless, the hypothesis that these people kept their places of work in Erstfeld and thus accepted longer journeys to their workplaces by profiting from an improved supply of public transportation and increased mobility, was confirmed by the chief secretary of the administration of Erstfeld. This statement is backed up by the figures on the commuters, provided by the Swiss Federal Statistical Office. These figures show, that the percentage of working people in Erstfeld living in another municipality than Erstfeld increased from 31% to 43.8% between 1990 and 2000 (Swiss Federal Statistical Office [6]).

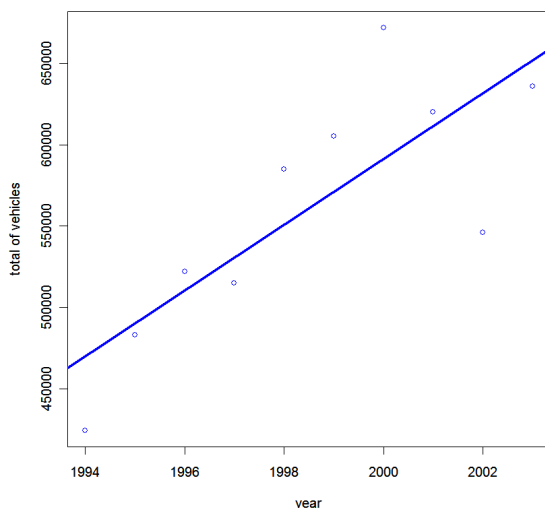


Figure 2: Number of heavy goods vehicles at the A2 (Federal Office for Spatial Development [7]).

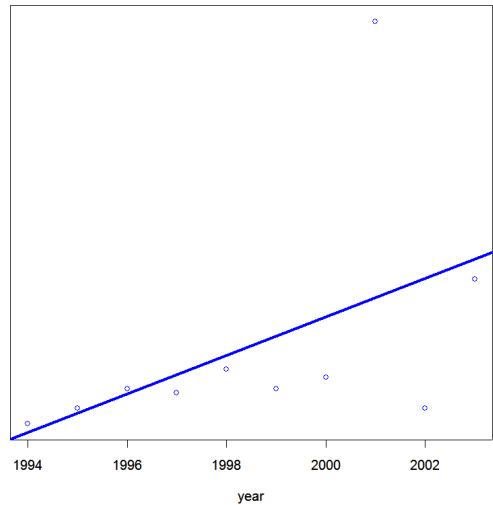


Figure 3: Number of heavy goods vehicles at the A13 (Federal Office for Spatial Development [7]).

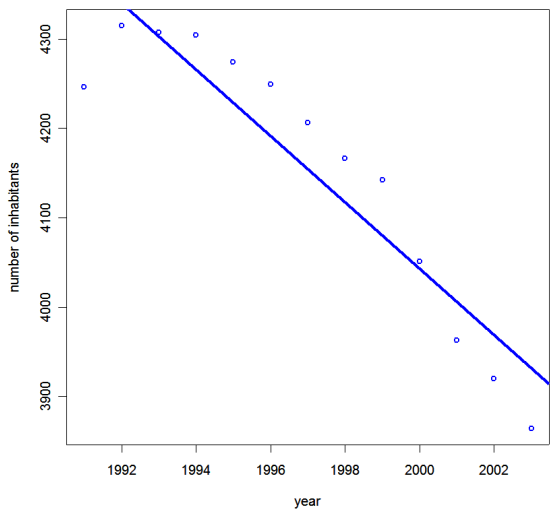


Figure 4: development in Erstfeld between 1991 and 2003 (Swiss Federal Statistical Office [5]).

Total population's In contrast to Erstfeld, in spite of the transalpine freight traffic's increase, there was an increase in the total population in Diegten between 1991 and 2003 (fig. 5). This increase resulted from immigration, as the balance of migration was 238 persons between 1991 and 2003, compared to a surplus of births of only 128 persons (Swiss Federal Statistical Office [5]). The good accessibility of cities like Basel by the A2 route is one of the reasons for the increase in the total population in Diegten. This municipality is near larger



cities of Switzerland like Basel and thanks to the transit traffic route, these cities are within easy reach. Basel is the largest city in the immediate vicinity and besides Geneva and Zurich one of the economic centers in Switzerland (Wachter [8]). As a consequence, the vast majority, that is nearly 72% of the working people living in Diegten, did not have their working place there but in the larger cities close to this municipality in 2000. More than every fifth of them (22%) worked in Basel in 2000. Compared with all the surrounding municipalities of Diegten, this city was the most frequented destination by the commuters of Diegten (Swiss Federal Statistical Office [6]). In the interview, the chief secretary of the administration of Diegten confirmed that the good location was one of the reasons for the increase of the total population in Diegten.

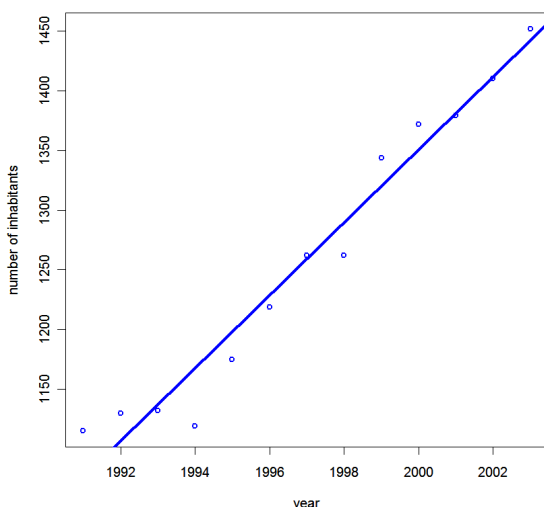


Figure 5: Total population's development in Diegten between 1991 and 2003 (Swiss Federal Statistical Office [5]).

Low land prices, low taxes and the fact that there is still enough building land available, were further reasons for the increase of the total population in the nineties, as it was stressed by chief secretary of the administration of Diegten. As it is shown in table 1, the latter factors lay below the cantonal average in 2003 and fig. 6 shows that the land prices always lay below the cantonal averages between 1995 and 2003. It was further confirmed in the interview with the chief secretary of the administration of Diegten that the slight rise in the land prices was caused by the increase of the total population in Diegten, but he also pointed out that the municipality's close location to the A2 route and thus the effects of the noise, also caused by the transalpine freight traffic, resulted in the comparatively low land prices. However, a regression model showed that different taxes, different population densities and different public transportation facilities had a significant influence on the land prices as well (table 1). The model was based on land price data, taxes, population densities from all municipalities of the canton Baselland, for which land price data were known in

2003, as well as on approximate average travelling times from these municipalities to Basel. It showed that the longer the travelling times to Basel, the lower the taxes and the lower the population densities, the lower the land prices were. As already mentioned, Diegten is characterized by comparatively low taxes, low population density but also by comparatively long travelling times by public transportation to Basel (table 1). An R-square of 73% shows that the model fits well the data, and the requirements, set at the residuals (normal distribution, constant variance, zero mean) are fulfilled. Besides that, the results, generated by this model, were confirmed in the interview with the chief secretary of the administration of Diegten.

Table 1: Regression analysis with the land prices as dependent variable and taxes, population densities and travelling times as independent variables from the municipalities of the canton Baselland, R2: 73% (Statistical Office of the canton Baselland [9]).

Variables	Coefficients	Std. Error	P-value	Average in the canton Baselland 2003	Diegten 2003
Taxes	-14.469	3.737	0.000298	59%	56%
Population density	15.834	3.555	0	6 persons per hectare	2 persons per hectare
Travelling time	-5.354	1.977	0.009085	37 minutes	32 minutes

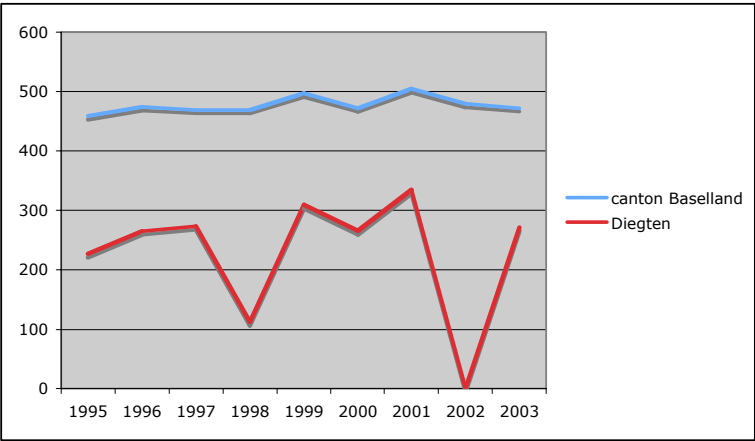


Figure 6: Land prices in Diegten compared with the average land prices in the canton Baselland (Statistical Office of the canton Baselland [9]).



4.2 Analysis of economic data

In order to address the thesis that the transalpine freight traffic might create new jobs in the affected municipalities, economic data were analysed as well.

From the figures provided by Swiss Federal Statistical Office one might draw the conclusion that the transalpine freight traffic does not create new jobs and income, as according to these figures, no new workplaces were created within business branches such as restaurants, garages and petrol stations in the assessed municipalities (table 2). This statement is confirmed by the chief secretary of the administration of Diegten. According to him, restaurants in Diegten are visited by holidaymakers and it is very rare that they are visited by lorry drivers. The chief secretary of the administration of Erstfeld however stresses that a service station at the border of Erstfeld with its neighbouring municipality would be an important employer for Erstfeld by providing more than 100 workplaces. The director of this service station confirms that of the vehicles, visiting this service station, a quarter are heavy goods vehicles from abroad, since fuel is cheaper in Switzerland than in the surrounding countries. As this service station benefited very much from the traffic, this service station had to expand during the last years. Nevertheless, the chief secretary of the administration of Erstfeld stressed in the interview that this service station can be made only partially responsible for people commuting to Erstfeld, as it is the only employer profiting from the transalpine freight traffic at Erstfeld.

Table 2: Number of workplaces in garages, petrol stations and restaurants in Erstfeld and Diegten (Swiss Federal Statistical Office [10]).

	1995	1998	2001
Erstfeld	Garages, petrol stations: 18 workplaces Restaurants: 31 workplaces	Garages, petrol stations: 16 workplaces Restaurants: 32 workplaces	Garages, petrol stations: 15 workplaces Restaurants: 31 workplaces
Diegten	Garages, petrol stations: 6 workplaces Restaurants: 23 workplaces	Garages, petrol stations: 5 workplaces Restaurants: 18 workplaces	Garages, petrol stations: 5 workplaces Restaurants: 23 workplaces

The main problem with the operational data, provided by the Swiss Federal Statistical Office lies in the fact that they are only available for the years 1995, 1998 and 2001 and that they can only be used on the municipality level (cf. chapter 3), so that it is impossible to evaluate by these data if any business branches along the transit routes might profit from the transalpine freight traffic. Hence, it is difficult to draw conclusions on the basis of these data and to use them as an indicator to illustrate the economic effects of the transalpine freight traffic. Turnovers of the analysed business branches would be an important

indicator to illustrate the economic effects of the transalpine freight traffic, but they are not published because of data security reasons.

5 Conclusions

The expert interviews showed for at least two municipalities that their population development was independent from the transalpine freight traffic and thus, the hypothesis that people move to less affected areas could not be verified for these municipalities. In the case of Erstfeld, it was proved that people who moved away from there, accepted longer journeys to their workplaces, profiting from an improved supply of public transportation and increased mobility. The hypothesis that the transalpine freight traffic does create additional workplaces in the affected municipalities, could be partially verified in the case of Erstfeld. However, it will be necessary to analyse the data for the remaining municipalities. The quantitative interviews which are going on now, will provide further information on the transalpine freight traffic's impact, as they will complete and thus confirm or modify the present results. The interviews shall be repeated regularly in order to evaluate the changes in quality of life in the affected municipalities. However, as the transalpine freight traffic increases not only in Switzerland but also in Austria and France, studies on people's well-being and acceptance concerning transalpine freight traffic need to be carried out there as well.

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