

European Sea Transport and Intermodalism – Consequences for Switzerland

Project B8 of the
National Research Programme (NRP) 41
'Transport and Environment'

Authors:
Roman Rudel, John Taylor

Address:
Roman Rudel
Istituto di Ricerche Economiche (IRE) Centrocivico
Università della Svizzera Italiana
Via Ospedale 13
CH-6900 Lugano
phone: +41 91 912 46 67, fax: +41 91 912 46 62
e-mail: roman.rudel@ire.ti-edu.ch

Publisher:
National Research Programm NRP 41:
Transport and Environment
Bern, 2000

Summary

Introduction and Goals

For many years transalpine freight traffic has been at the centre of political debate and many research projects in Switzerland, while sea transport logically remained a black spot. However, interest in container traffic across the Alps grew with the liberalisation of the European transport markets, the projects for the new transalpine railway infrastructures across the Alps and the unexpected development in the Italian ports. The present research project provided an opportunity to investigate the transalpine container market and to assess its evolution.

The research project focuses on principal goals:

- 1) to describe the present strategies of maritime operators and the evolution trend in the maritime transport as a consequence of the diffusion of the container technology
- 2) to analyse the development of the Italian ports after the port reform and to compare it with the Northern Range ports
- 3) to assess the container traffic from and to the European ports across the Alps
- 4) to determine the impact of the ongoing evolution in container sea transport on the hinterland freight traffic across the Alps and evaluate its aspects on the ecological and transportation level.

Here the transalpine freight traffic is analysed from an unusual point of view, where sea transport and the European ports are the main objectives and alpine freight traffic a pure „appendix“. The development of this market segment largely depends on the strategies and dynamics in the deep-sea transport and the performance of the various ports. Therefore the evolution of the container transport across the Alps is mainly shaped by factors external to the influence of Switzerland.

The survey follows the different elements of the transportation chain, starting with sea transport, ports and ending with hinterland transport and transalpine freight traffic. Chapter one is on the technological, organisational, institutional and economic aspects of sea transport thus provides the background of the whole project. Chapter two describes the unexpected development of four principal Italian ports, which has attracted the attention of several international terminal operators and shipping companies. Chapter three is an attempt to assess the seaborne container traffic across the Alps on the basis of different statistical sources. In the last chapter the range of future development paths of this container traffic is summarised in three scenarios. The scenarios should help to indicate the conditions, the barriers and the potential as well as possible impacts of the seaborne container traffic across the Alps.

The introduction of the container and the evolution of the maritime freight transport

The introduction of the container truly revolutionised maritime freight transport. The container fuelled the transformation process of sea transport into an industrial activity. Before the emergence of the container the loading and discharging of a cargo ship was basically a craft based on specialised knowledge. However, after the Second World War sea transport was unable to respond to the increasing trade volumes. Furthermore, the ships were blocked for up to 50% of their operation time on the berth.

The productivity of the port operations could be increased only with the introduction and standardisation of the container that allowed handling the increasing freight volume. This evolution required substantial investments in specialised port facilities and transformed the port operation essentially in a standardised mass production. This caused a thorough rationalisation in the port operations, the use of larger ships and the yielding of economies of scale. In subsequent years, sea transport costs per unit decreased. Hence, the technological and organisational evolution could be linked to a positive feedback connecting the increase of the productivity and transport capacity to decreasing transport costs. This feedback mechanism still characterises maritime freight transport.

Running larger and larger ships economically requires bundling and concentration of the principal freight flows. New organisational strategies and principles emerged, which may be compared to the hub and spoke patterns in other transportation sectors. The result was a high concentration on a few routes linking the main markets of the USA, Europe and Asia. The giant deep-sea container ships travel in a regular round-the-world service calling between 10 and 15 large container ports or hubs located nearest to the principal routes. The containers are distributed to destination by feeder-ships, barges, railways or road hauliers from these mega-terminals. This concentration of the maritime freight transport opened up new opportunities for the Mediterranean ports, of which Gioia Tauro is an example.

The rebirth of the Mediterranean ports

The successful diffusion of the container has also fundamentally changed the cargo handling operations in the port. However, traditional ports in Mediterranean missed the technological development linked to the container. Structural problems and powerful trade unions led to gradual decline of the Italian ports. At the same time the ports in the Northern Range extended their technological and competitive advantages, creating a dominant position in Europe. The Northern Range ports (such as Antwerp, Rotterdam and Bremen) were even used for the Italy's overseas transport, creating a consistent container freight flow across the Alps.

With the Italian port reform of 1994 the conditions changed dramatically. The crucial elements of the port reform are the abolition of the monopolistic control over the labour force by the former *compagnie portuali* and the possibility to licence terminals and port operations to private companies. Through these changes the Italian ports have reached the necessary conditions to operate efficiently, according to the standard of best practice. The cost of each container movement could be reduced by two thirds and is more or less the same as in the ports of Northern Europe.

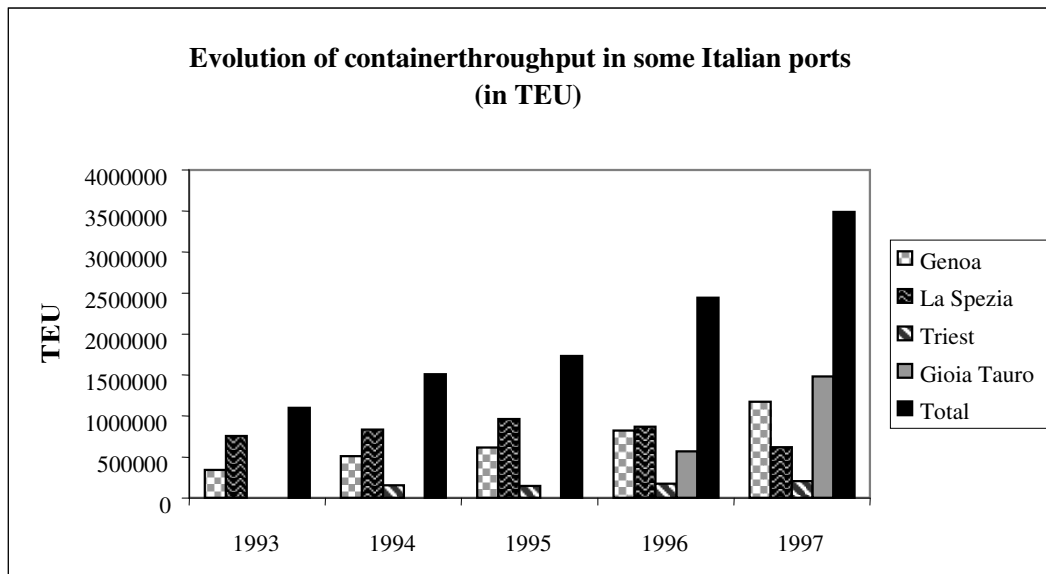


Figure 1 The evolution of the four most important ports in Italy. Gioia Tauro was opened in 1995. The figures refer to the container movements (lifts); therefore a double counting of the same container is not excluded. (Source: Local port authorities).

However, the impact of the port reform is manifold. In the context of this study three aspects are of particular interest. First, the considerable increases in the container throughput. Second, the significant interest on the part of international terminal operators and shipping companies, which is stressed by their interest in terminal operation licences in major ports as well as in substantial investments. Third the successful transformation and operation of the container Terminal of Gioia Tauro in Southern Italy by a private company.

The container hub of Gioia Tauro is located very close to the principal route for the deep-sea container vessels between the Suez Canal and Gibraltar. This geographical position is of strategic importance, in particular, in the Far East container market. It can be reached by a minimum diversion from the main route and permits a significant time saving with regard to the Northern Range ports, creating a new situation in the European container traffic (see following map).

Globale Transportrouten für den Containerverkehr und die wichtigsten Europäischen Häfen

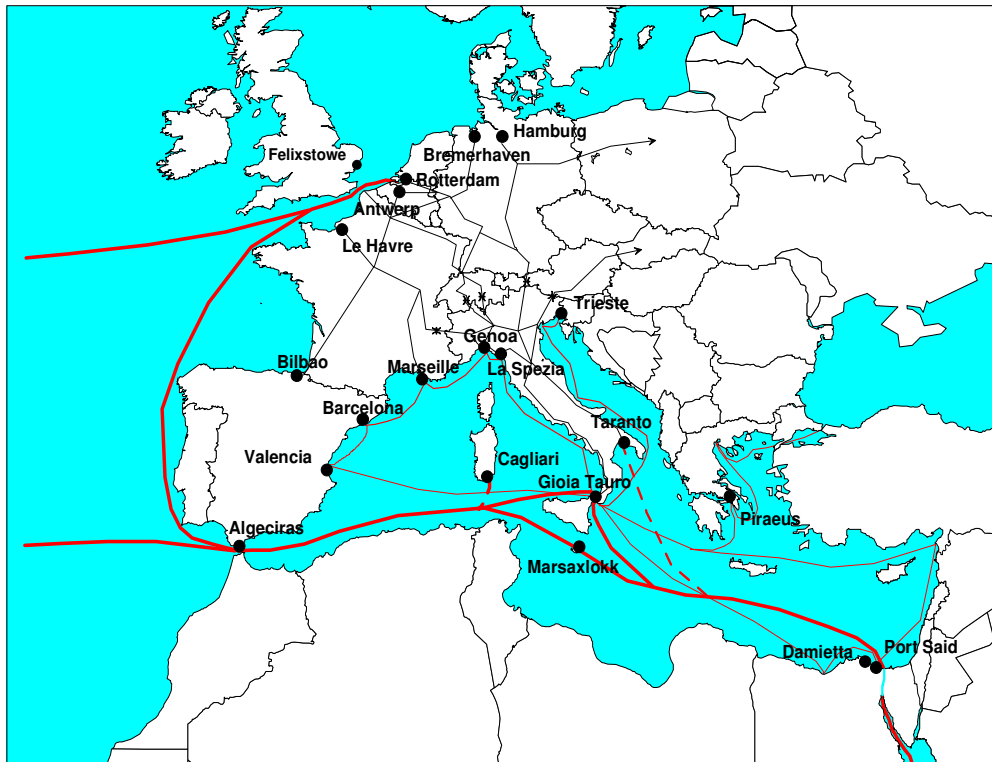


Figure 2 Map indicating global container routes (thick lines) from and to the principal ports in Europe and the hinterland connections (thin lines) for the feeder and railway transport. (Elaboration IRE/1999).

Ships from/to the Far East through the Suez Canal can be loaded or discharged 4 to 6 days later/earlier with respect to the Northern Range ports. Gioia Tauro became within two years the largest container terminal in the Mediterranean and is likely to exceed the throughput threshold of 2 Mio. TEUs in 1999. Whether the Italian ports succeeded in recapturing lost market segments at the cost of the Northern Range ports is analysed in the chapter on the hinterland transport.

Hinterland freight traffic and container flows across the Alps

Seaborne container traffic across the Alps has to be considered as hinterland traffic of different ports in the Mediterranean and the Northern Range. The volume and the direction of these freight flows are a good indicator of the accessibility and attraction of these ports. In this project it was made a first attempt to assess the volume of this market segment. Since there are no reliable statistics regarding the hinterland container traffic, a cautious assumption was made on the basis of the Güterverkehrsstatistik of the Swiss Federal Office of Transport, although it does not contain a specific category for container traffic either. The statistical zones of ports, listed in the following table, were taken into account. In this statistical database the figures for Rotterdam and Antwerp are included in the national data only. The port related traffic in the Netherlands and

Belgium are about 20% of the global freight traffic. Therefore the total port related freight traffic across the Alps is less than 7.425 Million tons.

| Direction of freight flows across the Alps (in metric tons) | North - South | South - North | Total |
|--|----------------------|----------------------|-------------------|
| Lübeck | 435,062 | 150,537 | 585,599 |
| Hambourg | 543,158 | 626,745 | 1,169,903 |
| Bremen | 341,420 | 217,533 | 558,953 |
| Bremerhaven | 73,766 | 126,699 | 200,465 |
| Savona | 157,149 | 60,732 | 217,881 |
| Genoa | 153,581 | 177,311 | 330,892 |
| La Spezia | 81,758 | 26,656 | 108,414 |
| Livorno | 207,485 | 134,906 | 342,391 |
| Ravenna | 181,123 | 295,192 | 476,315 |
| Venice | 605,542 | 491,439 | 1,096,981 |
| Trieste | 351,964 | 176,124 | 528,089 |
| Belgium | 2,850,118 | 2,140,155 | 4,990,272 |
| The Netherlands | 2,284,353 | 1,585,872 | 3,870,225 |
| Total | 8,266,479 | 6,209,901 | 14,476,380 |

Table 1 Total freight traffic across the Alps from and to the most important ports in Europe. (Source: Transalpinen Güterverkehr, GVF, 1994).

In any case, the results have to be interpreted very cautiously. The freight traffic volume from or to the European ports across the Alps accounts for about 5% of the whole freight traffic across the Alps. The share of the railway might be particular high, because of the considerable bundling effect of ports, which explains the increasing interest shown by the railway companies.

Besides the quantitative assessment of the container traffic, the development of this container segment was evaluated against the backdrop of the revival of the Italian ports. The evaluation is mainly based on the definition of the range of the tributary area, which indicates the port's accessibility. However, it has been shown that distance is not the main criteria for a port and route choice. Reliability and service quality definitely play a more important role. While the quality and the costs of the Mediterranean ports have reached the level of the Northern Range ports, shippers and forwarders perceive the ports still differently. North of the Alps the Mediterranean ports are still considered as completely unreliable and strike-prone, although there has been no strike since the introduction of the port reform. Yet, there are considerable problems and bottlenecks with regard to the railway infrastructures in the hinterland of the Italian ports. However, the same problems are likely to occur in the Northern Range, where new infrastructures – such as the Betuwe–line – are strongly contested and the dominant road freight transport is about to reach road capacity limits. If no solutions are found to these problems the high traffic forecasts for Rotterdam as well as Antwerp and the German ports might severely be hampered and a part of the traffic could be diverted on the Italian ports.

Bottlenecks in railway infrastructures and, more recently, lacking quality in railway service jeopardise considerably the opportunities for Italian port's further expansion. Since they depend strongly on railway given the modal split in the hinterland between 30% and 50%. Therefore new railway infrastructures are the backbone for further growth in Italian ports. In particular the new railway tunnel through the Apennines on the mountain side of Genoa (*Terzo valico*) is fundamental as well as the connecting line to the port of Gioia Tauro.

Available statistics show that the tremendous increase of container traffic in the Italian ports is mainly restricted to the Italian market. With some exceptions, Italian ports have not yet succeeded in translating their advantage on the seaside transport into an extension of their catchment areas north of the Alps.

Impacts on the transalpine freight traffic

The port reform in Italy has radically changed the conditions of the competition between Northern Range and Mediterranean ports on the north – south corridor across the Alps. The range of possible impacts of these new conditions on the transalpine freight traffic are illustrated by the following three scenarios:

Scenario I

The first scenario is characterised by the persistence of the dominant position of the Northern European ports. In this case the catchment area of those ports includes the Northern and central Italy, generating an increasing flow of container traffic across the Alps. However, the probability of this scenario is very small for several reasons. First, the ongoing development in the Italian ports clearly indicates that, at least, the Italian forwarders and shippers heavily refer to their homeports, which are served by every important shipping company. Therefore, the Northern Range ports lose their role as alternative ports. Second, the Northern Range ports have – considering the improvements in the Mediterranean ports – more and more difficulties to keep their competitive advantage and their dominant position. Third, even the Northern Range ports are facing increasing problems in the hinterland transport. Fourth, Northern Range ports will not be very eager to keep the transalpine container traffic from and to Italy, since it accounts only for a few percentages of the whole container throughput.

The impact of scenario I for Switzerland consists in an increase in the container traffic. This increase is likely to be absorbed by railway and mainly lead to slightly higher energy consumption and noise emissions, which in any case are relatively small, compared to the remaining freight traffic.

Scenario II

In this scenario the alpine mountain chain builds a natural divide between the catchment areas of the ports north and south of the Alps. Given the present situation and conditions in this market segment, the second scenario is the most probable. First, Northern Range ports are unlikely to dominate in the Italian hinterland traffic in the future, as the present figures in the Italian ports clearly indicate. And even the new freight freeway from Rotterdam to Italy is unlikely to invert the ongoing improvements in the Mediterranean. Second, shippers and forwarders in Northern Europe are hardly going to change their preferences and switch to the Southern ports, in spite of the potential advantages. The existing regular connections between Italian ports and Northern Europe are quantitatively almost irrelevant.

Therefore, the container flows across the Alps might decrease in coming years with some positive environmental effects. However, the ecological benefits should not be overestimated, since they derive from a reduced volume of railway traffic.

Scenario III

The third scenario includes the expansion of the catchment areas of Mediterranean ports north of the Alps due to considerable time and cost savings on the sea leg. Mediterranean ports would compete with the dominant Northern European ports for markets like Switzerland, Austria and Southern Germany. In spite of favourable economic arguments there are several reasons this scenario has little chance to succeed in the short and medium term. First, time advantages on the sea leg do not necessarily imply cost reductions. Second, the bottlenecks in the railway infrastructures in the hinterland of the Italian ports can be solved only in the long term, which may hamper the expansion of the market areas.

As matter of fact, the main consequence of this scenario might be a slightly stronger container flow across the Alps. However, it is unlikely that this comes about before the new alpine railway infrastructures are in place. Therefore also in this case the environmental impact has to be considered rather low, in particular, compared to the global transport flows across the Alps.

Conclusion

The present study shows that the transalpine container traffic flows from and to European ports account for about 5% of the whole freight traffic across the Alps. However, this traffic is mainly transported by rail and concentrated on the Gotthard and Brenner Passes. The considerable bundling of these freight flows explains the growing interest in this market segment by several railway companies. Container traffic could also considerably accelerate a generalised use of the intermodal freight transport mode.

However, a substantial quantitative change in these container flows across the Alps may not be expected in the short and medium term. On the contrary, in this period the container flows might decrease slightly, since the *diverted traffic* to the Northern Range ports to and from Italy should have dropped substantially after the port reform. However, it can not be excluded that new entrants, offering transport services in the Italian hinterland, gain considerable market shares. Only in the long term might Italian ports expand their market area north of the Alps and give new impetus to the container flow across the Alps. This demands overcoming the bottlenecks in the railway infrastructure and the operational difficulties as well as regaining the trust on the part of the shippers and forwarders north of the Alps.

