

THE ECONOMIC IMPACT OF CARRIER LIABILITY ON INTERMODAL FREIGHT TRANSPORT

Final Report

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TABLE OF CONTENTS

S	SUMMARY	1
S.1	Main Findings and Conclusions	1
S.2	Recommendations	2
1	Introduction	3
1.1	Background	3
1.2	Scope of the Report	3
2	Freight Transport Supply Chain and Carrier Liability	5
2.1	Alternative Arrangements of Moving Freight	5
2.2	Stakeholders	5
2.3	Transport Carriers and Liability Regimes	6
2.3.1	Air transport	7
2.3.2	Inland water transport	9
2.3.3	Maritime transport	10
2.3.3	Rail transport	11
2.3.5	Road transport	14
2.3.6	Forwarders and similar roles	15
2.3.7	Other Parties	17
3	Loss and Damage and Carrier Liability	18
3.1	Introduction	18
3.2	Cargo Values	18
3.3	Loss and Damage	19
3.4	Terms of Transport Services and Litigation	22
3.5	Cargo Insurance	23
4	The Elements of Friction Cost	26
4.1	Friction Cost Characteristics	26
4.2	Losses	28
4.3	Shippers	28
4.4	Forwarders	28
4.5	Carriers	29
4.6	Insurers	30
5	Friction Costs	31
5.1	Journey Costs	31
5.2	Intermodal Transport Friction Costs in the EU	33
5.3	Generalised Used of UNCTAD/ICC Model Rules	34
5.3.1	Introduction	34

5.3.2	Unimodal or intermodal - the shipper's perspective	35
5.3.3	Unimodal or intermodal – introducing a multimodal contract	36
5.3.4	Costs and benefits of adopting UNCTAD/ICC type contract	37
5.4	Harmonisation of Carrier Liability Regimes	38
5.4.1	Perceptions on weaknesses of current regimes	38
5.4.2	Potential benefits of harmonisation	39
APPENDIX		41
A.1	Nature of Surveys of Stakeholders	41
A.2	Impact of Internet and E-Commerce	42

S SUMMARY

S.1 Main Findings and Conclusions

This research study has examined the key characteristics of the economic impact of carrier liability on intermodal freight transport and the main findings and conclusions of this study can be summarised as follows:

- The transport supply chain has four principal stakeholders, viz.: shipper, freight forwarder, carrier(s), and insurer (both cargo and carrier liability insurance). Beyond these 4 are further stakeholders, including terminal operators, warehouse operators, track (ie infrastructure) providers and intermediaries in the insurance world;
- Carrier liability regimes are modal based, this is true even for network liability regimes, such as UNCTAD/ICC, which aims to facilitate intermodal transport;
- The average cargo value of intra-EU freight by mode tends to be low relative to the limitation of liability. For example, for road freight the average cargo value is about 1.6 Euro/kg whereas the CMR limitation of liability is about 11.4 Euro/kg;
- Most reporting shippers (more than 75%) indicate a rate of loss of less than 0.1% and only a small handful (less than 5%) of shippers report a loss of more than 1%. Land base carriers appear to have less favourable loss records than those of air and maritime carriers. This is most probably due to the relative level of containerisation of the different modes. Certainly analysis of loss and damage by geographic distribution indicates that USA related freight has a better record than intra-EU freight; again one can expect a higher level of containerisation related to the cross-Atlantic freight;
- The perception on rate of loss over recent years is heading in the right direction, ie slightly down!
- It appears that shippers surveyed in this research are not very knowledgeable of the many different carrier liability regimes, which could apply. This is demonstrated by the low response rate when they were asked to provide the terms of their transport contract;
- The level of disputed claims related to loss and damage is very small – more than 90% of responding shippers reported that less than 1% of claims led to litigation and carriers and forwarders concur;
- Insurance is widely available and used by both the carriers and the shippers to mitigate risk, should the unexpected happens;
- Results of this study survey suggest that the cost of cargo insurance to shippers is very low compared to the value of the cargo, often below 0.1%. The low cargo insurance premium rates are a reflection of the very low rate of loss and damage. This low premium rate may explain the high propensity (about 75-80%) of shippers to buy cargo insurance to protect its cargo liability;
- Friction costs of carrier liability can be conveniently defined as those from loss, damage, delay and consequential losses ('actual losses') plus those arising from the administration of the regime that supplies insurance and deals with claims ('administrative costs'). These administrative costs are incurred by the stakeholders mentioned above;
- A convenient accounting framework is used in the study to translate rates of risk and insurance ratios into quantitative estimates of friction cost of carrier liability.
- Carriers and forwarders use insurance to mitigate their carrier liability risk. Interestingly, only about 20-30% of the cargo insurance claims is recovered from the carrier insurance. This could be due to the fact that many insurance companies provide both carrier and cargo insurance and/or that the administrative cost for recourse is too high to be financially worthwhile;
- Friction costs of carrier liability vary for different types of journey depending particularly on consignment (cargo) value, journey length and the level of risk. For

typical National, intra-Europe and extra-Europe journeys friction costs of carrier liability amount to 6.3, 3.9 and 2.4 % of freight charges;

- Friction costs of carrier liability amount to less than 0.2% of consignment (cargo) value;
- The total friction cost of carrier liability for existing intermodal transport operations in Europe is estimated to be about 500-550M Euro per annum;
- The UNCTAD/ICC Model Rules, which are based on the network principle, have filled a gap in intermodal transport liability left by the failure of the 1980 UN Convention on Multimodal Transportation of Goods to attract sufficient support and as a consequence failed to enter into force;
- Shippers and forwarders make widespread use of contracts, such as FIATA FBL and BIMCO's Multidoc95 and BIFA STC, which are predicated upon the Model Rules;
- Although these Model Rules give the impression of simplicity they mask the precedence of the international Conventions and the contracts adopting these Rules are effectively private contacts which are subject to different interpretations by different courts. The result is remaining uncertainty in the terms of liability and legal position;
- Harmonisation of conditions, such as uniform liability limit for all modes, to facilitate intermodal transport could yield savings in friction costs of up to 50M Euro per annum; and
- Intermodal transport's friction costs of carrier liability could be reduced by internet and e-commerce applications but this benefit is likely to be small (about 20-30M Euro per year). However, the same applications should be applicable to unimodal transport yielding major saving of over 500M Euro per annum.

S.2 Recommendations

In the light of the main findings and conclusions the below forms the recommendations as 'a way forward':

- The EC should invest time and effort on greater harmonisation of conditions of carrier liability to secure the potential reduction in friction costs which should help intermodal transport;
- It would be sensible for the EC to seek incremental improvements focussing first on harmonising the conditions for the road, railway and inland water modes, which form the core modes for intra-EU freight;
- It would be more pragmatic to aim for a regional solution covering the EU, the accession countries and the neighbouring countries as this should prove easier as the CMR and CIM/COTIF conventions have similar spatial coverage and the CMNI conventions is very much a pan-European affair;
- The EC and many other international institutions, e.g. UN/ECE, OECD, CMI and UNCITRAL, are currently pursuing further development in carrier liabilities for multimodal transport and it will be sensible for the EC to work with the various institutions;
- The EC to engage the EU Member States to include national level operations - warehousing, terminal, infrastructure – as part of the process to create harmonisation across the transport supply chain from end to end; and
- Above all the EC should facilitate the use of common language for EU15 at local level and support further work on internet and e-commerce business-to-business platforms which bring benefits to both intermodal and unimodal transport.

1 Introduction

1.1 Background

Until quite recently freight transport carrier liability systems developed along unimodal line, notably maritime (Hague, 1924, amended by Visby 1968), air (Warsaw, 1929), road transport (CMR, 1956) and railways (COTIF/CIM, 1980). This reflected the way freight was mainly moved – on a unimodal basis. More recently freight is increasingly seen as part of a transport supply chain which often involves intermodal transport. The recognition of this role of intermodal transport prompted the Multimodal Transport Convention, 1980. Whilst this was not adopted in its original form it has been followed by the emergence of regimes such as the UNCTAD/ICC Rules, 1992 and the FIATA FBL model, 1996 that are based on a network of the unimodal liability regimes. However, even these network liability regimes are plagued by uncertainty – the actual liability depends on the ability to identify the mode and/or place within the transport supply chain where loss/damage occurred.

The Communication on Intermodality and International Freight Transport (COM(97) 243) established that a lack of uniform carrier liability arrangement is an impediment for further development of freight intermodalism in the European Union. It is recognised that any uncertainty tends to lead to additional (ie friction) costs and hence would reduce the attractiveness of intermodal freight transport to the detriment of the consumers and the environment.

A group of learned experts, sponsored by the EC (EC Contract Nr. EI-B97-B27040-SIN6954-SUB), has recommended a non-mandatory uniform liability arrangement as a means to overcome the lack of uniform liability impediment. The experts' proposal was discussed at an EC organised meeting in January 1999. At the meeting it was proposed that as a sensible step towards crafting a new strategy for a more user-friendly intermodal freight transport carrier liability regime, the underlying economics of the situation should be quantified. This led to the EC commissioning IM Technologies, United Kingdom, and Studiengesellschaft für den kombinierten Verkehr e.V., Germany, as sub-consultant to carry out this study.

1.2 Scope of the Report

This study examines the loss and damage characteristics of shippers and their use of insurance to mitigate risk in Task 1. In Task 2 the friction costs of the current freight transport liability arrangements for all actors from the perspective of the supply chain were analysed. The analysis covers both the direct and indirect costs related to freight transport liability and its out-turn cost implications to the final consumers. This is followed by an assessment of the costs and benefits of wider adoption of the UNCTAD/ICC Model Rules and further harmonisation of carrier liabilities in Task 3. Also the impact of internet and e-commerce was broadly examined. This report is the fifth of the series of deliverables and forms the draft Final Report for the study as a whole.

Following this introductory section, the next section sets out the freight transport chain by outlining the different conditions under which freight might be moved – mode(s) used, possible use of freight forwarders, possible purchase of cargo insurance, the stakeholders involved, the carrier liability regimes applicable. Section 3 follows by giving an account of the shippers' loss and damage characteristics and their use of insurance to mitigate their risk. The penultimate section provides a framework to account the friction

costs of carrier liability and summarises the cost characteristics of different stakeholders. The final section brings together the individual stakeholders' costs and characteristics to give an estimate of the friction costs of typical journeys and sum these costs for the EU as a whole and examines potentials for friction cost reductions.

2 Freight Transport Supply Chain and Carrier Liability

2.1 Alternative Arrangements of Moving Freight

In deciding how to move freight a shipper has to make 3 inter-linked decisions:

1. Should the services of a freight forwarder be used?
2. What mode(s) should be used (this decision may be left in the hands of the freight forwarder)? and
3. Should the goods be moved with the protection of “all risk” cargo insurance?

The above inter-linked sequence of decisions gives 8 possible arrangements for a shipper to move freight.

In the context of carrier liability, it is important to differentiate those freight forwarders who act as a principal and those who are not. The key issue is how many counter parties will the shipper have. In some EU countries, such as Austria and Germany, freight forwarders have no option but to act as principal due to recent changes in the law, eg Transport Law Reform Act, 1998, in Germany. Freight forwarders tend to act as principal and provides the shipper with a single contract. Freight forwarders who act as principal are intermodal transport operators (ITO) and in effect are carriers. In theory these freight forwarders will decide on the mode(s) to be used. However, in practice some shippers also specify the mode(s) to be used or not used when using the service of a freight forwarder who acts as principal. Some freight forwarders act as agent, ie effectively providing an out-sourcing service to the shipper to choose the best combination of modes to move the freight – for a multi-leg journey the shipper would end up with a series of contracts.

Where a shipper decides on the mode(s) used, the key issue is whether it will be a unimodal or intermodal journey. While the carrier liability terms and conditions of say the road mode are different from those of the rail mode, uncertainty of the liability is only applicable in the case of intermodal transport. In the case where an intermodal transport operator is used the shipper will benefit from having to deal with only one counter party, ie the intermodal transport operator, should something go wrong. However, intermodal transport operators by and large employ a liability regime, such as FIATA FBL, which is based on the network principle and hence the limit of liability is not pre-determined – it will vary depending on where, and whether, the source of damage or loss is identified. Where the shipper employs several unimodal carriers to form an intermodal transport chain it is his responsibility to deal with the carriers in order to ascertain who is responsible for the loss/damage.

Some shippers rely entirely on the carrier’s liability to cover any loss/damage. Others insure the cargoes moved with “all risk” cargo insurance. Cargo insurance allows the shippers to insure the value of the goods above the base level(s) provided by the carrier(s) and, because the insurer is responsible for pursuing claims, to reduce their administrative burden in the event of a claim. Compared to liability insurers, cargo insurers tend to be quicker at paying claims thus helping the cashflow of the shipper. However cargo insurance comes at a price, ie the premium.

2.2 Stakeholders

From the possible arrangements of moving goods, the stakeholders of the transport supply chain can be summarised as:

- Shipper (as sender and receiver of the goods);
- Freight forwarder;
- Carrier(s); and
- Insurer (for both carrier liability and cargo insurance).

In addition with intermodal journeys there are the terminal operators. To complete the transport supply chain picture there is, but often overlooked, infrastructure operator, eg Railtrack for railways in the UK. However these two stakeholders are tertiary to the shipper as their costs are most often bundled into the freight charges levied by the carrier and/or freight forwarder.

Figure 1 illustrates the stakeholders of an intermodal transport supply chain.

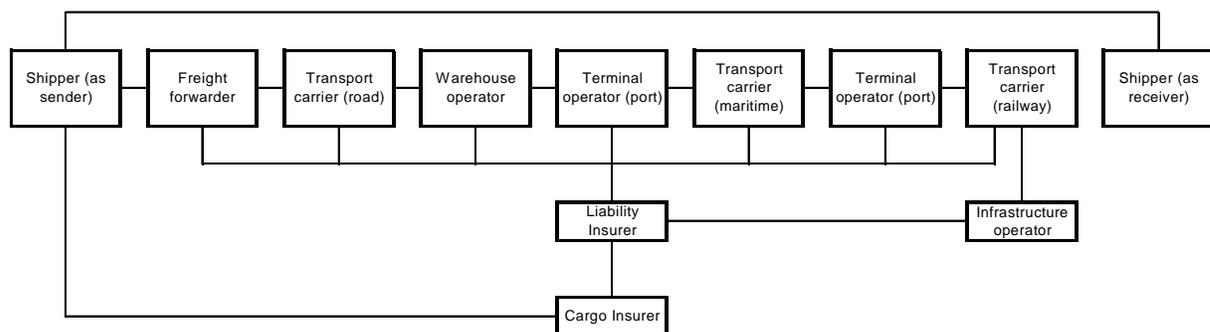


Figure 1 Stakeholders

2.3 Transport Carriers and Liability Regimes

In the EU transport liability regimes that exist at a national level are governed by the individual national case law, rules and regulations. However, as indicated in section 1 the principles of carrier liability for cross-border freight have evolved over the years and are governed by a series of international conventions. These international conventions are enshrined in national laws.

In the EU countries the following forms the carrier liability of the main unimodal modes:

- Warsaw Convention for air transport;
- Hague Visby for maritime transport;
- COTIF/CIM for railway transport; and
- CMR for road transport.

Inland waterway, although relatively important in the EU, was not governed by an international carrier liability regime until the CMNI convention of 1999 was introduced.

Figure 2 sketches the broad picture of freight transport liability and shows the stakeholders, the carrier liabilities and their inter-relationships. The UNECE¹ provides a comprehensive summary of the different carrier liability regimes. Some key details are given below.

¹ 'POSSIBILITIES FOR RECONCILIATION AND HARMONIZATION OF CIVIL LIABILITY REGIMES GOVERNING COMBINED TRANSPORT', Overview of provisions in existing civil liability regimes covering the international transport of goods. UN/ECE, April, 2000.

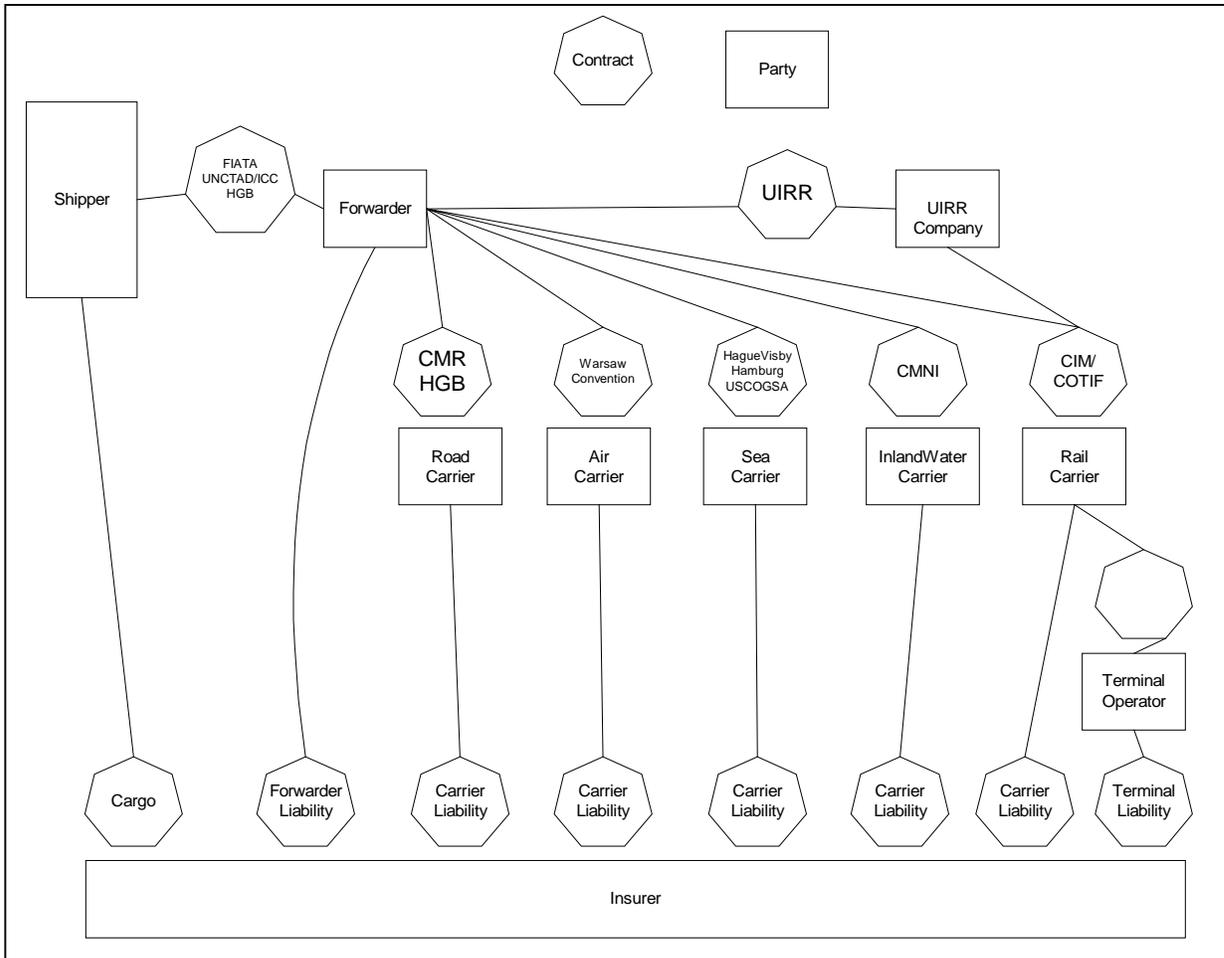
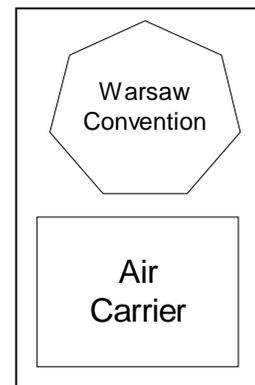


Figure 2: The interrelationships between stakeholders and liability contracts

2.3.1 Air transport

Carriage by air plays a small role in freight moved between EU countries (about 0.1%) and external trade (0.9% of exports, 0.32% of imports). These shares are based on weight whereas if value is the criterion then the figures increase to 4.0%, 24.5% and 23.3% respectively.

The liability regime relevant for movement by air has been defined by the Warsaw Convention which originates from 1929. This is a mandatory regime for international movements. The recent Montreal Convention (ratified by 52 States in 1999) makes some amendments to this regime. The major features of the liability regime are shown in table 1 below.



	WARSAW	MONTREAL
DATE	1929	1999
PERIOD OF APPLICATION:	From acceptance through delivery or release during carriage by air	Comprises the period during which the cargo is in charge of the carrier

CONTRACT OF CARRIAGE	Air waybill – 12 minimum particulars	Air waybill – 3 essential particulars
BASIS OF LIABILITY	Presumed fault of carrier for loss, damage, delay. If carriage by land, sea or river performed outside an aerodrome for the purpose of loading, delivery or transshipment then damage is presumed, subject to proof to the contrary.	Presumed fault for damage to, destruction of or loss of cargo.
DELAY IN DELIVERY	No provision	No provision
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS	No restriction on damage occasioned by delay in carriage	No restriction on damage occasioned by delay in carriage
LIMITATIONS OF LIABILITY	17 SDR/kg	17 SDR/kg
EXTENSION OF THE RESPONSIBILITY - HIGHER LIMITS OF LIABILITY	Consignor must make a specific declaration of the value and pay a supplement	By special declaration of interest, subject to payment of a supplementary sum.
NOTICE OF CLAIM	Damage: Within 7 days from receipt of the goods Delay: within 14 days after the date on which goods have been placed at his disposal	Damage: Within 14 days from receipt of the goods Delay: within 21 days after the date on which goods have been placed at his disposal
OTHER PROVISIONS	In the case of combined transport performed partly by air, these rules apply only to carriage by air Cargo insurance is not required	In the case of combined transport performed partly by air, these rules apply only to carriage by air

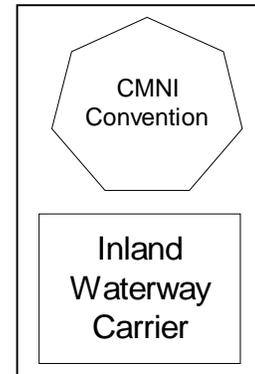
Table 1: Major features of air carrier liability regime

One situation that arises on a regular basis in intra-European traffic is an air freight carrier substituting truck or rail for air movement (referred to in German as 'ersatzverkehr'). In this case the liability regime of the transport mode is applicable (CMR/CIM/HGB), even though the accompanying document is the airway bill. The only exception to this is shipments that have a declared value exceeding the liability limits according to the applicable liability regime. Then these shipments are carried under the terms and conditions of the Warsaw Convention/Montreal protocol No. 4; this applies only if this part of the transport is arranged by the air cargo carrier, and the shipment is accompanied only by an airway bill on this part of the journey.

2.3.2 Inland water transport

Carriage by inland water plays a significant role in freight moved within the EU (12.9% in 1997) and external trade (12.9%) in terms of weight. If value is the criterion then the figures are dramatically reduced to 1.1 and 0.9% reflecting a low value to weight ratio.

The liability regime relevant for international movement by inland water is defined by the 'CMNI' convention of 1999 and the major features of this regime are given in table 2 below. This is a very new liability regime and it appears that prior to its introduction, if any, the relevant liability regime for road (CMR) or the maritime transport was sometime adopted – eg CMR in Germany and Hague Visby in the United Kingdom.



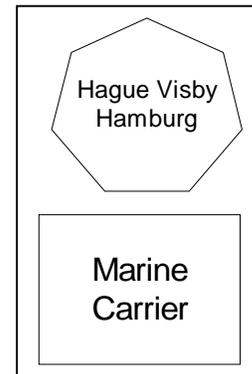
	CMNI
DATE	1999
PERIOD OF APPLICATION	From taking over until delivery
CONTRACT OF CARRIAGE	Consignment note required if requested
BASIS OF LIABILITY	Liability for loss, damage and delay
DELAY IN DELIVERY	Delivery period as agreed period
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS	Cost for evaluating damage
LIMITATIONS OF LIABILITY	8.33 SDR/kg Delay 3x value of freight
EXTENSION OF THE RESPONSIBILITY - HIGHER LIMITS OF LIABILITY	
NOTICE OF CLAIM	Apparent loss, damage – on delivery at latest Non apparent loss: 7 days after delivery Delay: 21 days after delivery
OTHER PROVISIONS	

Table 2: Major features of inland waterway carrier liability regimes

2.3.3 Maritime transport

Carriage by sea plays an important role in freight moved within the EU (29.7% in 1997) and external trade (69.0% of export and 70.0% of import) in terms of weight. If value is the criterion then the figures are significantly reduced to 23.1%, 42.6% and 42.1% reflecting a low value to weight ratio (in intra-EU trade – 0.8 Euro/kg).

The liability regime relevant for international movement by maritime transport is defined by the Hague Rules of 1924 and the Brussels Protocol (Hague Visby) of 1968. A more recent maritime liability regime is the Hamburg Rules of 1978, however at least 6 EU Countries, ie Belgium, Greece, Ireland, Netherlands, Spain and United Kingdom, are not signatories of these latest rules. Furthermore, for those EU countries which have signed the Hamburg Rules, the Hague Visby limitations of liability still apply. It is noteworthy that the USA, which is a major EU trading partner, only incorporates the 1924 Hague Rules in her maritime law, ie COGSA. The major features of the liability regime are summarised in table 3 below.



	Hague Visby	Hamburg
DATE	1924, amended by Brussels Protocol 1968	1978
PERIOD OF APPLICATION:	From loading of goods until discharging from vessel Special responsibilities before the start of the voyage	From period when carrier is in charge of goods at loading port through to discharging port
CONTRACT OF CARRIAGE	Bill of lading	Bill of lading serves only as the contract evidence
BASIS OF LIABILITY	For loss or damage	Liability for presumed fault or neglect for loss resulting from loss of, damage and delay in delivery If caused by fire and claimant proves that fires arose from fault or neglect on the part of the carrier Fault or neglect of carrier, his servants or agents, in taking all measures that could reasonably be required to put out the fire and avoid or mitigate its consequences; has to be proved by the claimant that Deck cargo without agreement by the shipper
DELAY IN DELIVERY	Delay excluded	Not within the time expressly agreed upon In the absence of an agreement, within the time

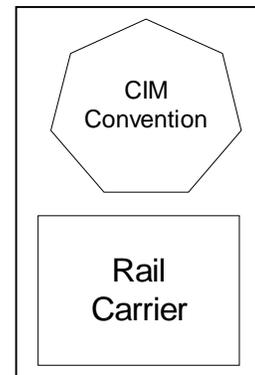
		which it would be reasonable to require of a diligent carrier, having regard to the circumstances of the case Right for claimant to treat the goods after 60 consecutive days as lost
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS		
LIMITATIONS OF LIABILITY	2 SDR/kg 666.67 SDR/package	2.5 SDR/kg 835 SDR/package 2.5x the freight payable for delay
EXTENSION OF THE RESPONSIBILITY - HIGHER LIMITS OF LIABILITY	By agreement Increase or reduction shall be embodied in the bill of lading	Carrier may assume a greater liability
NOTICE OF CLAIM	Writing to carrier or his agent at the discharge port before or at the time of the removal of the goods into the custody of the person entitled to delivery Non apparent loss: 3 days after	Apparent loss or damage : 1 day after handing over Non apparent loss or damage : 15 consecutive days after handing over
OTHER PROVISIONS	Loading, handling, stowage, carriage, custody, care and discharge of goods shall be subject to the responsibilities Compensation is computed by reference to the value of the goods at the place and time they are discharged from the vessel Liability in case of nuclear incidents	Arbitration

Table 3: Major features of maritime carrier liability regimes

2.3.3 Rail transport

Carriage by rail in terms of weight constituted 5.1% of intra-EU15 trade in 1997, and slightly less if the criterion is value (4.2%). For extra-EU15 trade rail carries 5.3% of exports and 4,1% of imports by weight. Intra-EU trade had a value density of 0.9 Euro/kg in 1997 rather less than freight carried by road (1.6 Euro/kg).

The liability regime relevant for movement by rail has been defined by uniform regulations covering contracts for the international transport of goods by rail ('CIM'), which constitute Appendix B to the convention on international rail transport



('COTIF') of 1980. This is a mandatory regime for international movements. A recent protocol (1999) makes some amendments to this regime. The major features of the liability regime are shown in the table 4 below.

	CIM/COTIF	PROTOCOL
DATE	1980	1999
PERIOD OF APPLICATION:	From time of acceptance for carriage over the entire route up to delivery	The cargo is in charge of the carrier
CONTRACT OF CARRIAGE	Acceptance of the goods with consignment note	Acceptance of the goods with consignment note
BASIS OF LIABILITY	<p>Strict liability for loss or damage resulting from the loss or damage and from the transit period being exceeded</p> <p>Liability for wastage in transit only if wastage exceeds specific allowances</p> <p>For loss, non-use or misuse of documents</p> <p>For fault in completing administrative formalities</p> <p>For failure to execute orders</p>	<p>Strict liability for loss or damage resulting from the total or partial loss of, or damage to, the goods and for the loss or damage resulting from the transit period being exceeded</p> <p>Presumed liability for the loss or damage resulting from the loss of, or damage to, the vehicle or to its removable parts and for loss or damage resulting from exceeding the transit period</p> <p>Restricted liability for wastage in transit only if wastage exceeds specific allowances</p> <p>For any consequences arising from the loss or misuse of the documents referred to in the consignment note and accompanying it or deposited with the carrier</p> <p>Failure to carry out an order or failure to carry it out properly</p>
DELAY IN DELIVERY	By the international tariffs applicable; not within transit periods agreed by the railways participating in the carriage. If no indication: transit period must not exceed that which would result from the application of 27 § 2 which determines the maximum transit periods	<p>Not within agreed transit period</p> <p>In the absence of an agreement, the transit period must not exceed that which would result from the application of 16 § 2, which determines the maximum transit periods</p>
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS	Consignor liable for any loss or damage arising from absence, insufficiency of or irregularity in documents	In case of interest in delivery
LIMITATIONS OF	17 SDR/kg	17 SDR/kg

LIABILITY	4x the carriage charges for delay	4x the carriage charges for delay For partial loss caused by delay 4x the carriage charges in respect of that part of the consignment which has not been lost
EXTENSION OF THE RESPONSIBILITY - HIGHER LIMITS OF LIABILITY	Further reduction of limitation of liability under certain tariffs in the case of exceeding of the transport period	Carrier may assume a greater liability; in case of declaration of interest in delivery
NOTICE OF CLAIM	Ascertainment according to Art. 52 before acceptance; if not: extinction of right of action Non apparent loss: 7 days after acceptance Exceeding transport period: 60 days	Ascertainment according to Art. 42 before acceptance; if not: extinction of right of action Non apparent loss or damage : 7 days after acceptance
OTHER PROVISIONS	Liability in respect of rail-sea traffic If carrier proves that loss occurred in course of the sea journey between loading on board and unloading from ship he has more exception clauses (e.g.: nautical fault; fire; saving life or property at sea) Handing over of goods is governed by provisions in force at forwarding station; - Consignor liable for all consequences of defective loading carried out by him	Responsibility for loading and unloading: carrier for packages, consignor for full wagon loads, consignee for unloading after delivery Presumption in case of re-consignment, loss of goods Liability in respect of rail-sea traffic if carrier proves that loss occurred in course of the sea journey between loading on board and unloading from ship he has more exception clauses (e.g.: fire; saving life or property at sea)

Table 4: Major features of rail carrier liability regimes

UIRR companies in Europe adopt UIRR conditions, which bear a close resemblance to CIM conditions. Other Combined Transport companies carrying out similar roles adopt different contractual conditions, usually based on Forwarders' conditions (e.g. FIATA, BIFA). UIRR conditions specifically refer to CIM under basis and limitations of liability. However differences do exist. For instance Limitations of Liability include the following:

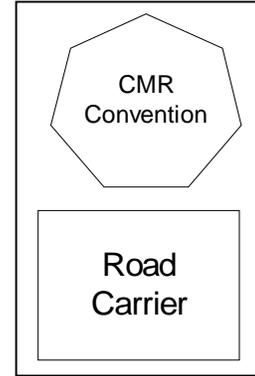
LIMITATIONS OF LIABILITY	<i>Outside the period of rail forwarding:</i> 8.33SDR/kg of gross weight lost or damaged, not exceeding 300,000 SDR/transport unit nor 2 million SDR/loss if more than 6 transport units are involved. Loss exceeding 2 million SDR: amount is divided between customers in proportion to the gross weight of each unit
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	<i>Delay, loss of documents, failure to comply with contractual obligations: indemnity in respect of a material, direct and certain loss to customer: 2 x price of the transport/transport unit</i>
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2.3.5 Road transport

Carriage by road plays a major role in freight moved between EU countries (42.1% in 1997) and external trade (18.1% of exports, 5.5% of imports). These shares are based on weight. If value is the criterion then the figures change to 60%, 25% and 19% respectively. This reflects a value to weight ratio in intra-EU trade of 1.62 Euro per kg.

The liability regime relevant for domestic movement by road varies for different countries. In the UK, for instance, there are two sets of conditions that are used – the RHA Conditions mainly used by carriers and the FTA Conditions which tend to be used by those employing carriers. In Germany HGB Conditions apply. As far as international movements across borders is concerned Conditions defined by the 1956 CMR Convention are mandatory. The major features of the liability regime are shown in table 5. The vast majority of contracts (over 90% for all major carriers) are between carriers and forwarders, who consolidate shipments.

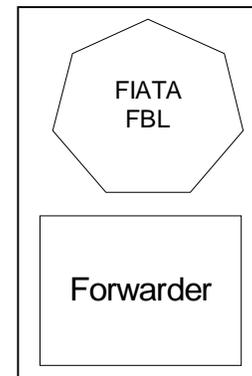


	CMR
DATE	1956
PERIOD OF APPLICATION:	From taking over to delivery
CONTRACT OF CARRIAGE	Confirmation by consignment note
BASIS OF LIABILITY	Presumed fault of carrier for loss, damage, delay Consequences arising from loss or incorrect use of documents. Failure to carry out instructions
DELAY IN DELIVERY	Not within agreed time limit Exceeds time needed by diligent carrier
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS	Carriage charges Customs duties
LIMITATIONS OF LIABILITY	8.33 SDR/kg for delay 1 x value of freight
EXTENSION OF THE RESPONSIBILITY HIGHER LIMITS OF LIABILITY	Against payment of surcharge
NOTICE OF CLAIM	Damage: Within 7 days not including weekends Delay: within 21 after goods placed at consignee's disposal
OTHER PROVISIONS	Applicable to the whole of the carriage unless proved that loss was not caused by carrier by road (Goods not unpacked from container)

Table 5: Major features of road carrier liability regime

2.3.6 Forwarders and similar roles

Freight forwarders often carry out a wide range of functions organising and sometimes executing the movement of a consignment. From a liability point of view the distinction between forwarder and carrier is important. Similarly the distinction between a forwarder acting as agent (for cargo interests) or as principal has implications for the liability regime which is relevant. German Law (the beginning of the fourth chapter of the German Commercial Code - HGB) defines a forwarding contract as 'one in which the freight forwarder is bound to organise the carriage of the goods'. This 'organisation' includes the 'conception phase' (deciding the mode of transport and the route), the 'performance phase' (selecting the carrier, agreeing the carriage, storage and freight forwarding contracts and giving the carrier information and instructions) and the 'subsequent phase' involving the securing of any claims for damages by the consignor. In German law duties which fall outside the core of the freight forwarder's duties include insuring the cargo, packing it, marking it and organising customs clearance. However the freight forwarder can be liable for organising contracts to fulfil these services.



A freight forwarder has a choice of whether to prepare a contract in his own name or in the name of his principal (cargo interests). In the first case the forwarder is the principal and in the latter an agent. Where the freight forwarder acts (in part) as a carrier, or organises the collection of cargo from different sources onto the same vehicle, then the legal implication is that the freight forwarder assumes the rights and duties of the carrier. Another distinction that is sometimes drawn is that, when freight-forwarding costs are agreed at a fixed rate, the freight forwarder is treated as a carrier.

In some legal systems a third party exists between the freight forwarder and the carrier. Known as the *commissionnaire de transport* in French and Belgian law and *transportondernemer* in Dutch law, he is a contractual carrier who subcontracts the whole carriage to a carrier. The role is now of limited relevance except in France.

In recent years traditional carriers have sometimes extended their activities to other links in a multimodal chain. A sea carrier may offer door-to-door carriage, either by subcontracting to a land carrier or developing his own facilities. In such cases the operator is referred to as a multimodal transport operator (MTO) or combined transport operator (CTO). In the United States another intermediary (between the shipper and the operator of a ship) is the non-vessel-operating common carrier (NVOCC). It may occur that the MTO or CTO still contracts with a freight forwarder rather than the shipper. UIRR companies also act as intermediaries organising transport on behalf of other parties; in most cases they deal with freight forwarders on one side and rail companies on the other.

There are two extreme liability regimes that might be used with multimodal transport:

- The *network (or chameleon) liability system* whereby the existing mandatory rules governing unimodal carriage will apply when 'loss, damage or delay' occurs on that particular mode; and
- The *uniform liability system* whereby the same rules apply throughout the duration of the contract whichever mode is used.

In practice under a network system the carrier still has considerable flexibility in establishing new rules and exemptions – for those stages where no mandatory rules exist

(warehousing, inland water for instance) and for non-localised damage (when the leg of the transport where damage occurred cannot be determined). Consequently because of these modifications reference is made to a *modified network system*.

Attempts to develop a compromise between the two extremes led first to model rules drafted by the International Chamber of Commerce (ICC) in the 1970s, followed by the 1980 UN Multimodal Convention which aimed for a uniform liability system. The Convention still remains inoperative. In 1992 the UNCTAD with the ICC (International Chamber of Commerce) set up rules, which integrate the unimodal liability regimes into a network of rules, for governing the liability of moving goods by intermodal means. These UNCTAD/ICC rules are embodied in the FIATA FBL model by the International Association of Freight Forwarding Associations. The FIATA FBL or the national variances, eg BIFA in the UK, are widely adopted by freight forwarders. The BIMCO (Baltic and International Maritime Council) Multidoc 95, which is also based on a network structure, is quite widely used in the Scandinavian region, although the level of usage is believed to be way below that of the FIATA FBL^{2,3}. Another important liability regime related to intermodal transport in Europe is that adopted by the UIRR companies. The UIRR conditions are closely related to the CIM conditions. Table 6 summarises the key liability terms of freight forwarders and multimodal transport operators.

	FIATA Model Rules	UNCTAD /ICC Rules
DATE	1996	1992
PERIOD OF APPLICATION:	From taking the goods in charge until delivery	From taking the goods in charge until delivery
CONTRACT OF CARRIAGE	Bill of Lading Transport Document	MT document evidences MT Contract
BASIS OF LIABILITY	Presumed liability for loss and damage	Presumed liability for loss, damage and delay (if declaration of interest of timely delivery has been accepted by MTO)
DELAY IN DELIVERY	In no event be liable for loss following from delay unless expressly agreed in writing,	In no event liable for loss following from delay unless expressly agreed in writing.
LIABILITY FOR INDIRECT OR CONSEQUENTIAL LOSS (see below)	In no event liable for indirect or consequential loss such as, but not limited to, loss of profit and loss of market.	Consequential loss or damage other than loss of or damage to the goods
LIMITATIONS OF LIABILITY	Not exceeding 2 SDR/kg gross weight of the goods unless a larger amount is recovered from a person for whom the Freight Forwarder is responsible. Delay: not exceeding the	2 SDR/kg or 666.67 SDR/package 8.33 SDR/kg if no carriage by sea/water Delay, consequential loss 1 x amount of freight Limit of unimodal Convention

² 'POSSIBILITIES FOR RECONCILIATION AND HARMONISATION OF CIVIL LIABILITY REGIMES GOVERNING COMBINED TRANSPORT', Results of two expert group meetings ("hearings") on civil liability regimes for multimodal transport. UN/ECE, September 2000.

³ Soren Larsen, BIMCO, Private communication, September 2000.

	remuneration relating to the service giving rise to the delay.	if loss/damage localised
EXTENSION OF THE RESPONSIBILITY - HIGHER LIMITS OF LIABILITY	Not addressed	By agreement fixed in the MTO document
NOTICE OF CLAIM	Non apparent loss or damage - 6 consecutive days after handing over	Non apparent loss or damage - 6 consecutive days after handing over 9 months after (supposed) delivery or after 90 days (treatment of the goods as lost)
OTHER PROVISIONS	No insurance will be effected except upon express instructions given in writing.	MTO has to add clauses on:- routing, freight and charges, liens, both-to-blame collision, general average, jurisdiction, arbitration and applicable law

Consequential loss may include costs of waiting time, cost of replacement transport, stoppage or delay in production, non-use or delayed use of the goods transported, and even loss of reputation or market share.

Table 6: Carrier liability regimes for freight forwarders and multimodal transport operators

2.3.7 Other Parties

As highlighted in figure 1, within the freight transport supply chain are the terminal and infrastructure operators. These are national in character and adopt a variety of conditions evolved over the years according to national customs and practice. Any harmonisation of liability conditions across the transport supply chain to facilitate international intermodal transport will probably have to exclude these stakeholders because of their national nature and the subsidiarity principle. However, their liabilities are often covered by carriers, eg UIRR, using the facilities. A similar point also applies to the use of warehousing. The regime used in this context is subject to individual national based agreements.

3 Loss and Damage and Carrier Liability

3.1 Introduction

Carrier liability arises from delivering of goods for a fee by third-party transport operators. The principles of liability defines the conditions under which carriers are obligated to deliver and might be excused from his duty. These principles establish the liability with respect to loss and damages, and, for certain modes, delay of goods moved.

The key driver of the economics of carrier liability is the actual loss and damage incurred. If there were to be a transport system with no loss and damage there would be no need for any liability system and its associated administrative arrangements and costs. Hence to appreciate the economics of freight transport carrier liability a fundamental need is to understand shippers' experience of the level of loss and damage and insurance cost. This touches on the value of cargo being moved and the carrier liability regime of the transport contract.

The information for this analysis is not readily available. To fill this information gap surveys of shippers, forwarders, carriers and insurers were carried out as part of this study. Details on survey methods, coverage, responses, etc can be gained in the appendix.

3.2 Cargo Values

Figure 3 gives the distribution of cargo values of the shippers who responded to the study survey. This shows that a very high proportion, ie one quarter of respondents, has shipments with a value of over 17 SDR/kg (about 23.2 Euro/kg), while 67 per cent is within the value of carrier liability limits of the CMR Convention (carrier liability applicable to cross-border road mode) of 8.33 SDR/kg (about 11.4 Euro/kg).

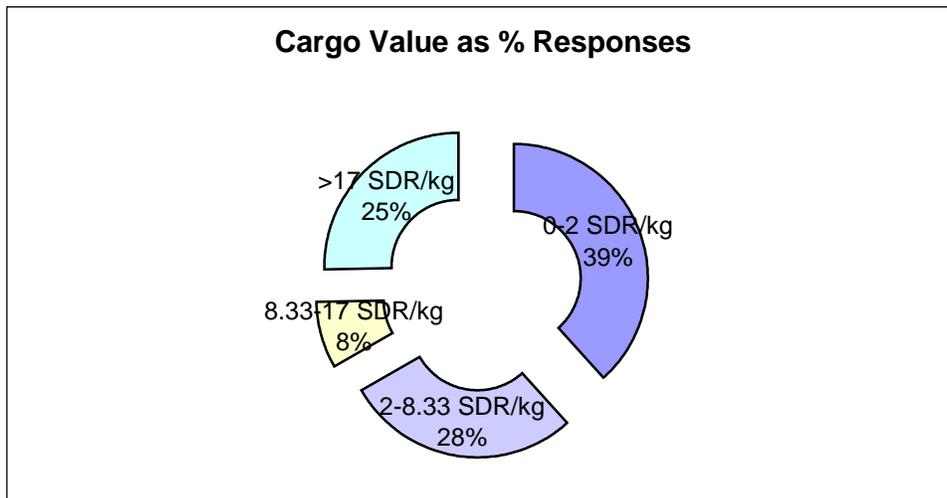


Figure 3: Cargo value

It is often said that much of EU countries' trade is of high value, nonetheless, it is noteworthy that a very high proportion (39%) of cargoes has a value of not more than 2 SDR/kg (about 2.7 Euro/kg); 2 SDR/kg is the liability limit of maritime carriers. These

figures in terms of responding shippers are at variance to figures in terms of weight given by Eurostat. The *EU Transport in Figures Statistical Pocketbook 1999* shows that the average value of intra-EU15 freight, which varies with mode used, is rather low. This shows that the average value of goods moved by mode as:

- 44.65 Euro per kg for air;
- 1.62 Euro per kg for road;
- 0.93 Euro per kg for railway;
- 0.88 Euro per kg for sea; and
- 0.10 Euro per kg for inland water.

3.3 Loss and Damage

Crucial in understanding the opportunity cost of carrier liability to shippers is the scale of loss and damage. Figures 4 to 7 show the loss and damage characteristics of responding shippers

Most respondents (82 per cent for movements to the USA, 74 per cent for movements to other EU countries and 71 per cent for inter-home movements) as highlighted in figure 2 indicated rates of losses of below 0.1 per cent of cargo value or consignments. This also includes cases where no losses are incurred. The lowest rates of loss are those reported for the movements to the USA (11 per cent of respondents indicated rates of losses of between 0.1-0.2% of cargo value and 7 per cent indicating losses of between 0.2-0.5%. No further losses are reported for movements to USA). For movements to other EU countries, 15 per cent of respondents indicated rates of losses of between 0.1-0.2% of cargo values and 8 per cent indicated rates of losses of between 0.2-0.5% of cargo value. A further 2 per cent of respondents indicated rates of losses of over 0.5% of cargo value. For intra-home movements, 18 per cent of respondents indicated rates of losses of between 0.1-0.2% of cargo values and 5 per cent indicated rates of losses of between 0.2-0.5% of cargo value. A further 6 per cent of respondents indicated rates of losses of over 0.5% of cargo value.

The reported patterns of loss and damage suggest that USA-bound freight has a slightly better record than intra-EU freight. This could be due to the loading unit and/or the mode used. Certainly, maritime and air carriers often assert that freight under their charge suffers less loss and damage than under other modes. However, it is generally accepted that containerised freight suffers from lower rate of loss and damage than non-containerised freight. Much of intra-EU freight is moved in non-secured loading units, such as swapbodies with canvas side-covers.

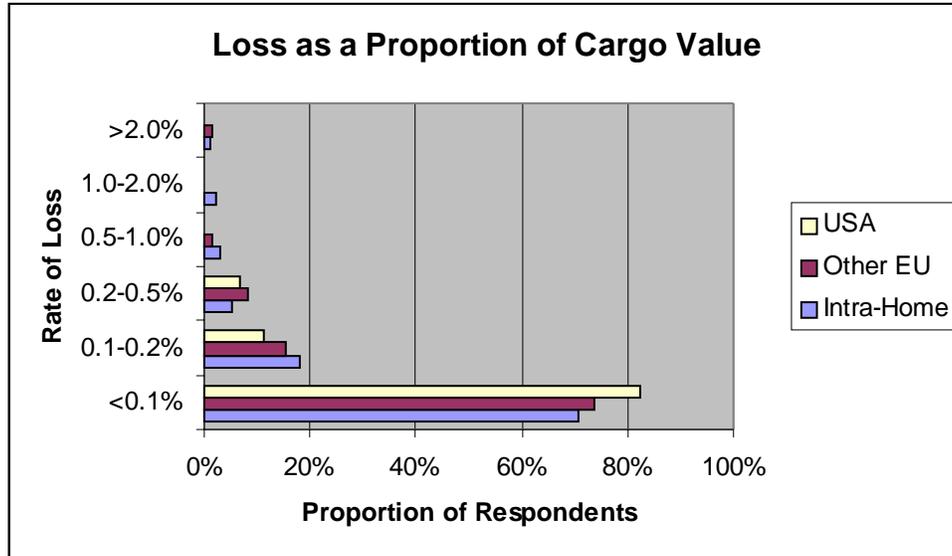


Figure 4: Level of loss and damage

Figures 5 to 7 highlight the distribution of rates of loss and damage for different cargo destinations by 'carrier' type. Some distributions are based on very small sample of respondents. Nevertheless, the figures show that the performance of own transport and road carriers is less good, particularly for intra-home-country movements. Rail is also less favourable, but this is based on very small sample. The loss and damage pattern for own transport is somewhat counter intuitive as one would typically take extra care on something which one has a large self interest. Perhaps, this should not be surprising as own transport is typically made up of road transport, which has the least favourable record. Also noteworthy is that freight forwarders who act as principal appear to have a better record than their agent counterparts.

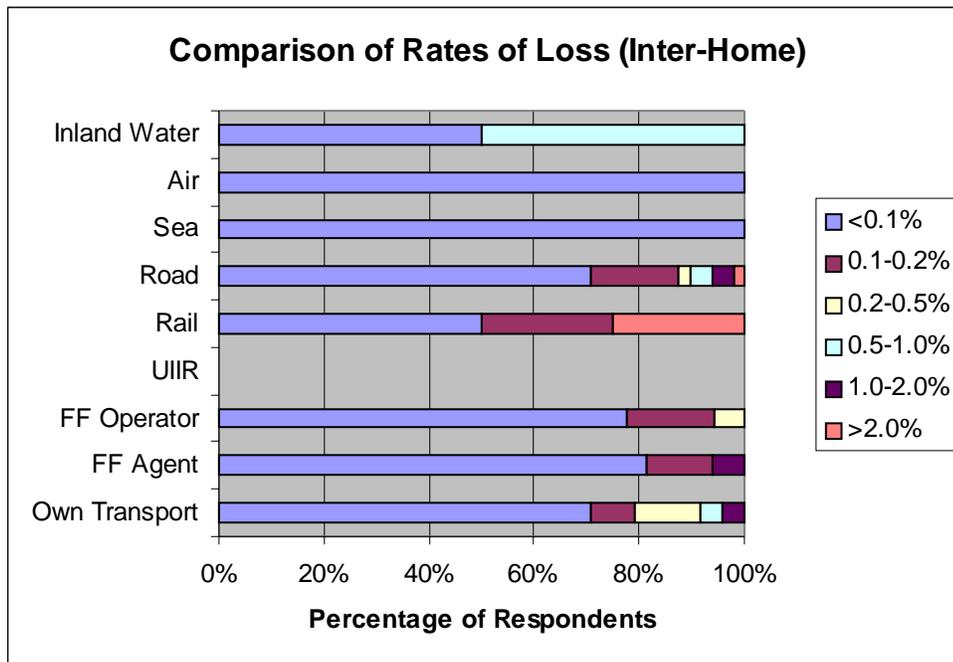


Table 5: Level of loss and damage by mode for intra-home-country freight

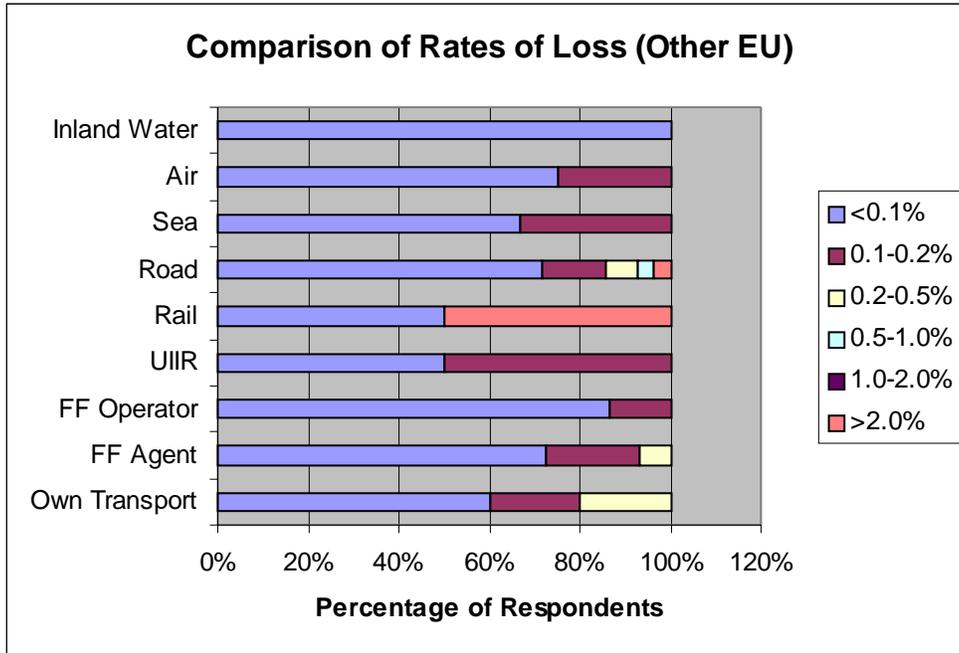


Table 6: Rate of loss and damage by mode for other EU freight

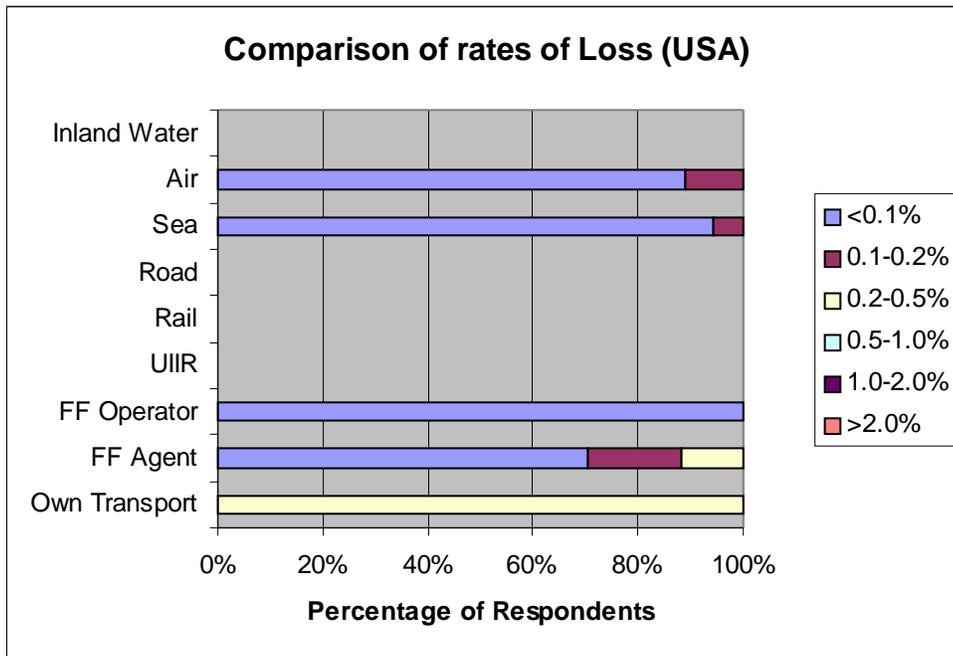


Table 7: Level of loss and damage by mode for USA freight

The study encountered great difficulty to obtain time series information on loss and damage. As a “second best” to provide some information on the temporal stability of the level of loss and damage, shippers were asked their perception of the trend on loss and damage for the last 5 years. Their response is given in figure 8 and this shows that the general perception of the rate of loss over the past five years, however, indicates a trend

towards lower level of losses for all geographical movements. This is an interesting and helpful result as the propensity of loss and damage falls, the friction costs of carrier liability also decrease.

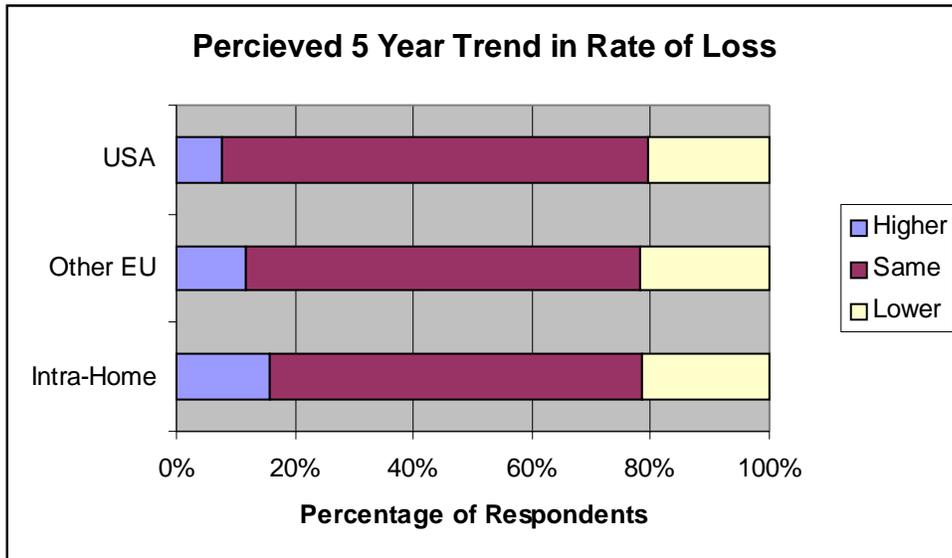


Figure 8: Trend on rate of loss and damage

3.4 Terms of Transport Services and Litigation

It would appear that shippers are not very conversant with the terms of their carriers' liability. The survey results of contractual terms and conditions appear incomplete and inconclusive. Figure 9 gives the response rate of shippers on contract terms. Only 32 per cent of respondents attempted to answer the question asking for the terms and conditions for intra-home country movements. The level increased to 46 per cent for movements to other EU countries, but dropped to 21 per cent for movements to the USA. Moreover, those who did attempt to answer indicated to a very high degree conditions that were mode specific.

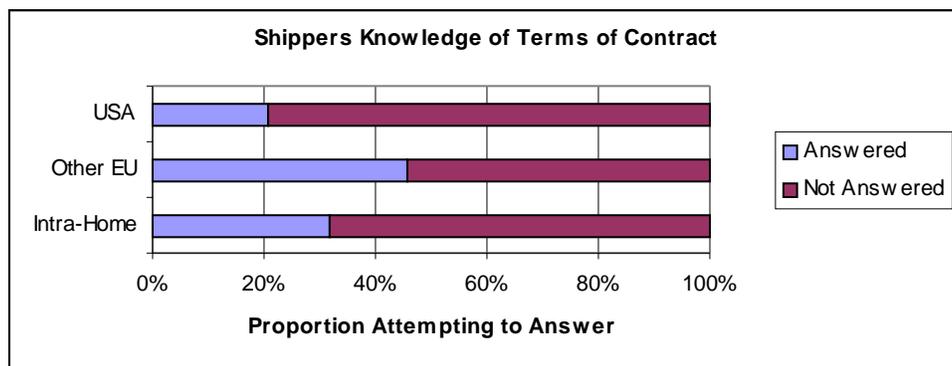


Figure 9: Response rate of shippers on transport contract terms

Figure 10 indicates that the proportion of claims leading to litigation is not necessarily specific to the geographic movement. A very high proportion of respondents (93 per cent

for USA, 91 per cent for other EU countries and 91 per cent for intra-home countries) indicated litigation levels of less than 1 per cent of claims, including the case for no litigation. Then, there are two clusters, one for small number of litigation between 1-5 per cent of claims, the other for equally small numbers of cases where more than 50 per cent of claims lead to litigation. The latter is perhaps an indication of the possibility of the existence of a claims department within the shipper's organisation dedicated to dealing with claims issues and, if necessary, litigation, or of reliance on self insurance.

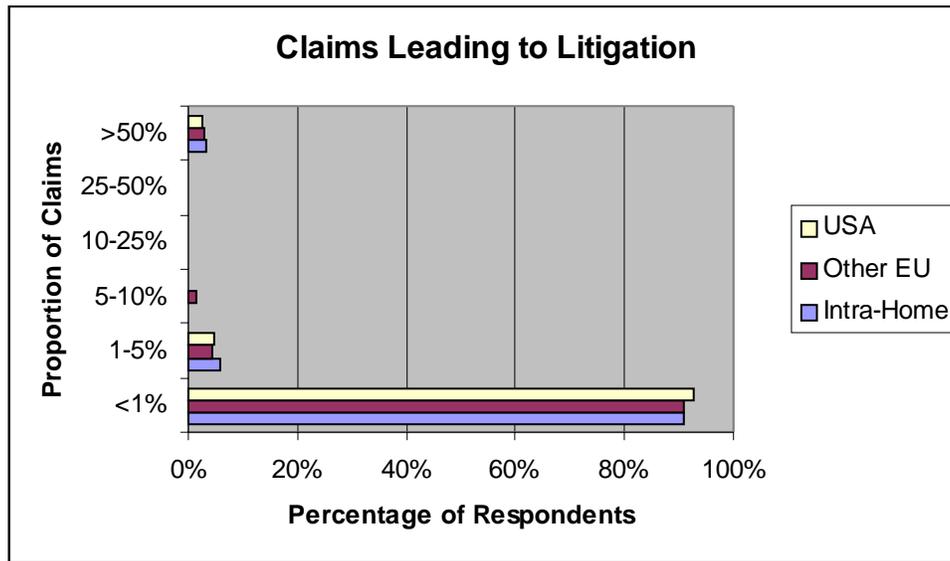


Figure 10: Level of recourse to courts

The low level of litigation could be due to the use of cargo insurance by shippers to mitigate risk of loss and damage. Typically cargo insurer will deal with claims against carriers if appropriate.

3.5 Cargo Insurance

When asked for the level of cargo insurance cover as a proportion of their freight volume, large proportions of respondents indicated that they take cargo insurance cover for all their cargo. This level is highest for movements to the USA, 81 per cent of those responding taking cover for 91 to 100 per cent of their freight. This figure is 64 per cent for both intra-home-country movements and those to other EU countries. For intra-home-country movements, 20 per cent of respondents indicated that at least 30 per cent of their freight is covered by cargo insurance. In addition, 23 per cent of respondents for movements to other EU countries, and 16 per cent of respondents for movements to the USA takes the same level of cover. Figure 11 displays the cargo insurance take-up rates of shippers.

The results indicate that as shipments are sent further field from the home territory, the likelihood of shippers taking cargo insurance becomes higher; according to an authoritative USA study, USA shippers also tend to buy cargo insurance for international shipment. It would appear that distance creates uncertainty and the use of cargo insurance is a means to mitigate the risk. Another major reason is the low liability limit provided by the Hague Visby and USCOGSA rules – 2 SDR/kg (about 2.7 Euro/kg). Perhaps, the high level of cover for the USA-bound movements could also be an indication of the litigious nature of claim processing in the country. However, even for

intra-EU freight movements, the use of cargo insurance is high – over 60%. This could be linked to that 50 percent of respondents indicated they buy a single cargo insurance policy to cover all the freight moved.

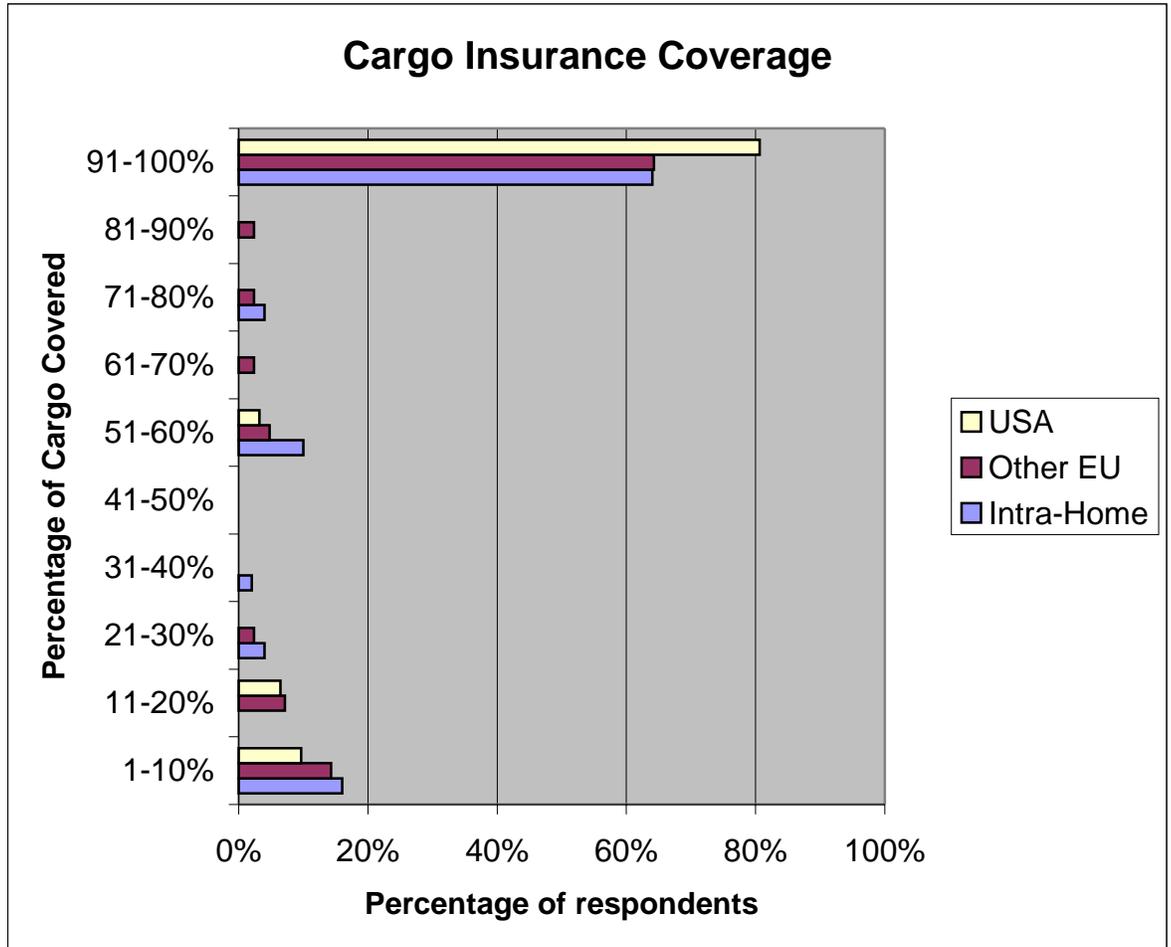


Figure 11: Use of cargo insurance

Figure 12 demonstrates that the high cargo insurance coverage (90-100 percentage coverage) shippers are not drawn from a selected group of high cargo value shippers. Indeed the figure shows that the lower value cargo shippers are just as, if not more, likely than the highest cargo value shippers to buy cargo insurance. This indicates cargo insurance is generally taken irrespective of the value of freight. It is not possible to tell from the survey data if other considerations may be involved in the decision making process.

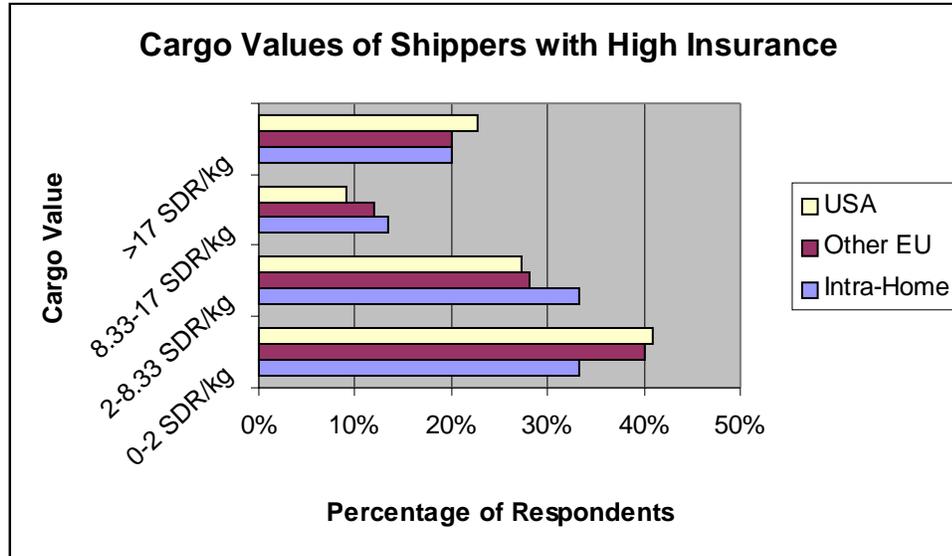


Figure12: Cargo values of high cargo insurance shippers

Insurance companies and brokers often claim that cargo insurance is very 'cheap', in terms of percentage of cargo value. This would appear to be corroborated by the shippers response. Figure 13 highlights the cargo insurance premium rates paid by shippers. The highest proportion of respondents pays premium rates of less than 0.1 per cent of their cargo value. This level is 57 per cent of the respondents for intra-home, movements, 53 per cent for movements to other EU countries and 56 per cent for movements to the USA.

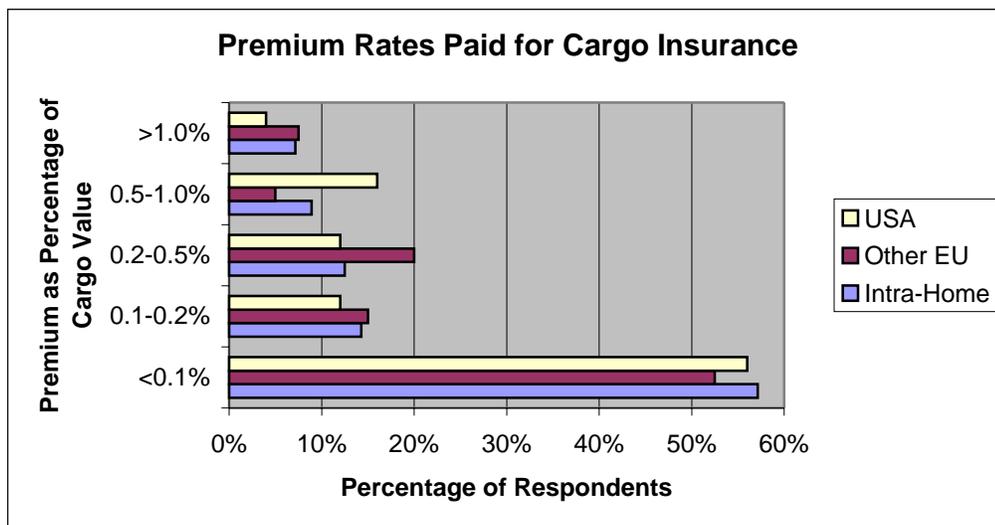


Figure 13: Cargo insurance premium rates

4 The Elements of Friction Cost

4.1 Friction Cost Characteristics

The friction cost characteristics of cargo and carrier liability can be exemplified in an accounting framework as shown in figure 14. This shows the inter-relationships of the key stakeholders' costs that derive from the underlying loss.

At the left hand side is the actual losses (loss, damage, delay and other consequential losses) incurred by a set of shippers and receivers during a period of time. Additional friction costs are incurred by these parties pursuing claims in the form of administrative costs. Claims against insurers (under liability or cargo insurance) are less than total losses due to self insurance. Shippers effectively self insure in two ways; *ex ante* as a result of calculated management decision related to uncovered losses under the terms of the policy (if any). And *ex post* due to misinterpretation and/or ignorance of carrier liability rules that emerge after a claim has been made. As highlighted in section 2.1 two types of shippers are distinguished - those who use cargo insurance and otherwise.

The comparison of columns 4 and 5 also demonstrates that claims paid will fall short of claims when it is revealed that some claims are not covered by the insurance policy. Others will fail due to an inability to provide sufficient evidence within the set time scale.

Although many insurers provide both carrier liability and cargo insurance they are differentiated in the diagram to demonstrate their different roles and the inter-relationship by way of subrogation of claims paid from the carrier liability insurer to the cargo insurer. The carrier elements combine both carriers' and forwarders' friction costs as most freight forwarders are effectively performing the carrier function. This keeps the diagram more transparent by excluding the sub-contracting chain (which may be even more complex with the introduction of terminal operators).

The Cargo Insurer's column shows that claims paid by a cargo insurer are paid partly by the cargo insurer and partly by the carriers' insurance via subrogation. The level of cargo insurers' premiums is the sum of claims paid and the administrative costs of policy and claim handling. The shipper also incurs administrative costs concerned with policy arrangement (as well as that related to claim handling).

The last three columns are concerned with carriers' insurance and show that the carriers' insurance premium is the sum of claims paid (directly or via subrogation) and the liability insurers' administrative costs (policy organisation, claim handling and an element of profit/loss). Finally, it is possible to say that the set of costs that need to be recovered in the carriers' freight charges is the sum of three elements - the insurance premium, the administrative costs of insurance and those claims paid that are not covered by insurance (*ex ante* self insurance and deductions).

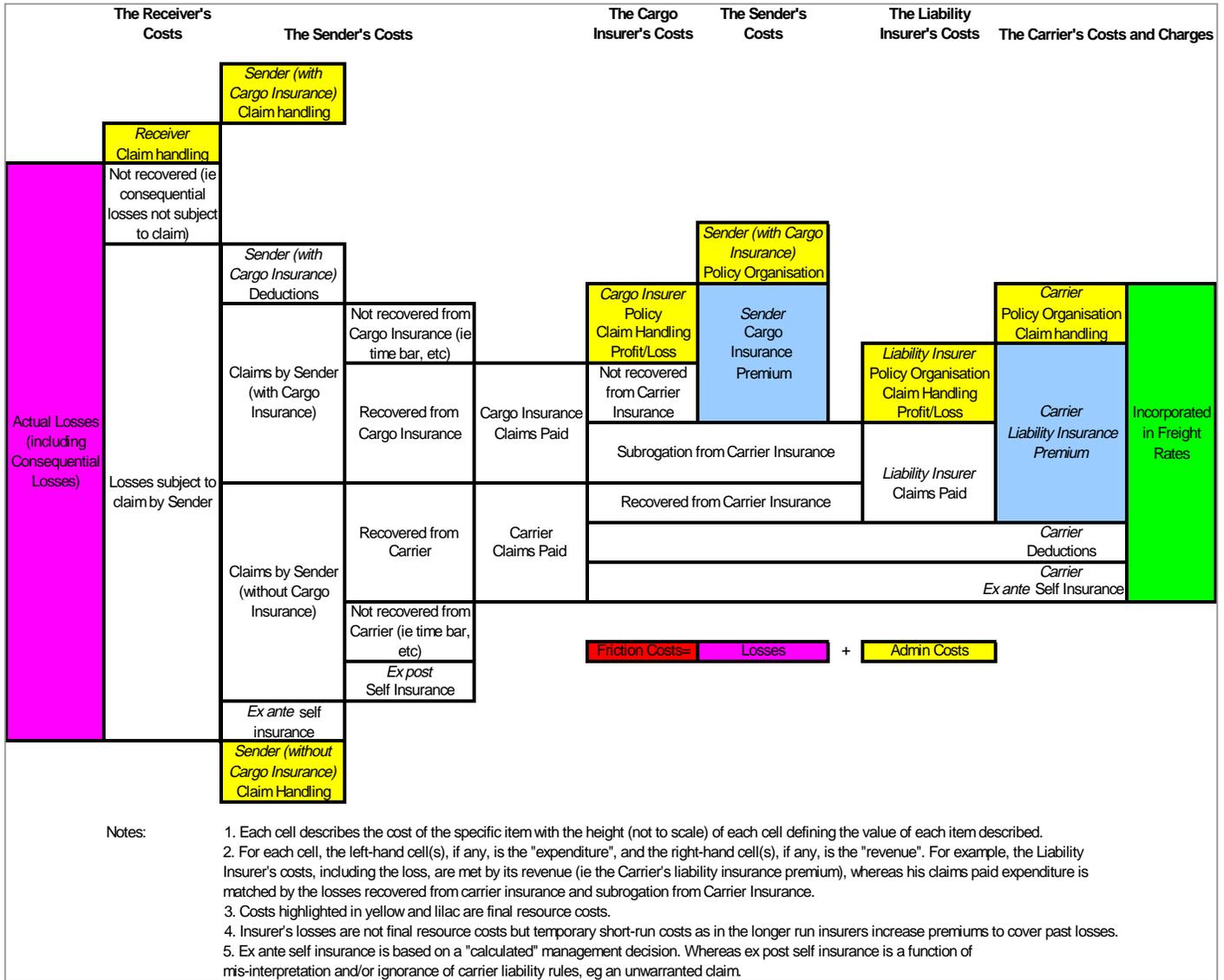


Figure 14 Accounting for Friction Costs in a Risk-Liability Framework

The estimate of the total friction costs emanating from risk in this system can be made in two ways. First, it can be seen that the total costs to the shipper are –

- The cargo insurance premium,
- The carrier liability costs incorporated in freight rates,
- The shipper's (sender and receiver) administration costs *plus*
- The shipper's self insurance costs.

Alternatively, the friction costs can be seen as equivalent to

- The actual losses *plus*
- The administration costs of all the stakeholders - the shipper (sender & receiver), carrier and insurers – in response to the risk of these losses

The latter is probably the more helpful way as it demonstrates the cost shares of the different stakeholders in the supply chain, and is the approach adopted in the following

discussion. Either way these friction costs that are incurred by the shipper also represent the friction cost to the ultimate stakeholder, the consumer.

4.2 Losses

The loss rate (including damage, delay and consequential losses) is a key driver in the determination of friction costs. It should be noted that the full costs of the latter two are underestimated. The only losses in these two categories that are effectively included in the figures that follow are those that were considered worthy of a claim. Costs stemming from a delay (or at least those stemming from a small delay) often do not fall within the terms of an insurance agreement. The values derived from shippers summarised in section 3.3 do not allow a precise estimate of the loss rate as responses were in the form of ranges (over 70% replied in the range '*less than 0.1%*'). Further consideration of some of the higher figure and discussions with insurers lead to an assumption of an average figure in the range 0.05% to 0.07% for the three typical journeys. Note that loss rates are not simply related to distance; the risk of damage and loss is highest at transfer points.

4.3 Shippers

Friction costs are directly (i.e. not through freight charges) incurred by shippers in the form of any premiums for cargo insurance, uncovered losses (either *ex ante* or *ex post*) and administrative costs. Section 3.5 indicates a high use of cargo insurance irrespective even where the value of goods is low. Supplementary analysis indicates cargo insurance coverage of the order of 75% for both intra-national and inter-EU freight and 80% for North Atlantic freight.

Actual premium rates vary with the risk of cargo being moved. Analysis of figures in terms of typical journeys suggests an average rate of 0.06% for National movements with a rather higher figure of 0.09% for Intra-Europe. In the case of North Atlantic movements the figure is estimated as similar to National movements.

Interviews with shippers suggest that they, except some large businesses, are poorly informed about their administration costs of organising cargo insurance policy and (sender and receiver) claims handling. Nor are they usually aware of the self-insurance costs incurred be they *ex ante* or *ex post*. This is not surprising as the rate of loss/damage is very small and hence many shippers include these administration tasks and costs as part of other activities. Also the costs (*vis-à-vis* others) are not large enough for management to pay attention to.

The administrative costs of shippers with cargo insurance appear to be of the order of 15% of the cargo insurance premium paid. Much of these costs relate to claims handling with policy organisation forming a very small element. No comparable figures are directly available for shippers without cargo insurance. However estimates derived from insurers operating characteristics suggest that the comparative figures for these shippers without cargo insurance would be about 10-percentage point higher than that for shippers with cargo insurance.

4.4 Forwarders

Friction costs are incurred by forwarders in the form of premiums for carrier liability insurance, uncovered losses (either *ex ante* or *ex post*) and administrative costs. A small survey of UK, German and French forwarders based on over 6 million consignments revealed wide differences in experiences. This is perhaps not surprising considering the forwarders differed in their mix of national and extra-national work, the use of different

modes and the proportion of LCL traffic. The range of answers found is shown in the table 7.

	Range
Claims for 'loss, damage or delay' (% of consignments)	0.05 - 0.15
For Loss (%)	10 - 60
Damage (%)	35 - 85
Delay (%)	5
Average claim (Euro)	500 - 4500
Median weight (kg)	150 - 650
Claims going to litigation (%)	0.4 – 3.0
Cargo insurance arranged (%)	<1 – 10
Estimated cargo not insured by owner (%)	30 - 75

Table 7: Range of statistics found in forwarder survey

All interviewed forwarders purchase liability insurance. However some have agreed to quite a high deduction and/or to process the lower value claims by shippers to minimise their premium. Premiums usually include an excess of GBP 250 (400 Euro) for liability claims and GBP 500 (800 Euro) for errors and omissions. If the forwarder acts as a carrier then additional premiums are charged. Premium rates of 0.3-0.4% of turnover were reported and are not out of line with insurers' typical figure of 0.4%. However, one forwarder – with a good claims record and relatively high deduction level - reported paying as low as 0.1% of turnover.

Like shippers most forwarders claimed to have little difficulty and therefore incurred minimal cost to organise the liability insurance. Some forwarders de-centralise claims handling and so were unable to establish precisely the administration costs related to claims handling. Others gave the administration costs as between 20% to 60% of premium paid; the high figure relates to the very low premium case above. Figures of between 30 and 34% are adopted in the calculations for the different journeys.

4.5 Carriers

Friction costs are incurred by carriers in the form of premiums for carrier liability insurance, uncovered losses (either *ex ante* or *ex post*) and administrative costs. Interviews were carried out with road, maritime, inland waterway, rail and intermodal operators. The survey information indicates most carriers, except (ex-) state-owned ones, purchase liability insurance. Premium rates vary by mode, origin-destination and claims record. The premium rates paid range from a low of 0.01% to over 1.0% of freight charges for a maritime container and road carrier respectively. However, figures of 0.05% for air, 0.1% for rail, 0.2-0.5% for road (depending on intra- and inter- national), 0.3% for inland water and 0.4% for UIRR carriers are more typical. For land based operations a figure between 0.25 and 0.3% is adopted; a substantially lower figure of 0.1% is chosen for the maritime container movement (which only contributes partly to the Extra-Europe journey).

Not surprisingly carriers are less forthcoming with figures for administrative costs because some do not know and some are unwilling to elaborate on grounds of company confidentiality. However from the available statistics provided by the more helpful carriers, the administration costs are 18-25% of the premium paid.

On claims paid that are borne by carriers (rather than insurers) available figures indicate a range of 25-32% of premium paid.

4.6 Insurers

Friction costs are incurred by insurers in the form of administrative costs associated with arranging insurance and handling claims. Other intermediaries in these processes – brokers and underwriters – are included in this generic heading. Insurers play two key roles in the supply chain. On the one hand they offer cargo insurance to shippers in order to mitigate the latter's risk and administration costs. On the other they insure carriers to mitigate the latter's liability. In the context of this study insurers need to be differentiated into cargo insurers and liability insurers because they are associated with different supply-chain stakeholders; shipper and carrier respectively.

Three vital pieces of information from insurers are required to complete the friction cost picture. First, the proportion of cargo insurance premium received that is used for paying claims to the shipper. This is of course dependent on the operating costs – sales, underwriting, claims handling, profit, etc – of cargo insurers. Second, the equivalent figure for carrier insurers. And third, the proportion of the claims paid to a shipper by his cargo insurer that is subrogated from the carriers' liability insurer.

Revisiting the insurers' information from Task 1 and the additional information gained in this Task indicate that both cargo and liability insurers have very similar cost profiles. A substantial proportion of the operating costs relates to brokerage and profit. Although there are many mutual liability insurers (e.g. the P&I clubs) cargo insurance is mainly provided by shareholder insurance companies. One insurer, who provides both cargo and liability insurance, also indicated that liability insurance is generally more competitive and hence less profitable.

In broad terms the operating costs of cargo and carrier insurers are respectively about 40% and 30% of premiums received. This might lend some credibility to some pundits' claim that liability insurance, which pays a higher proportion of premium as claims, is more efficient.

Insurance companies are exceedingly reluctant to reveal the subrogation rates from carrier insurance to cargo insurance. The level of subrogation is strongly influenced by the two facts. First, some insurers providing both liability and cargo insurance do not pursue claims against themselves. And second, the administrative costs for recourse for small claims are proportionally too high to be worthwhile. A well-organised shipper with cargo insurance mentioned a rate of just over 10%. One source in Germany and an authoritative US document⁴ reporting on Europe suggest a rate of about 20-30%. A figure of 20% is chosen.

⁴ US Department of Transportation, *Cargo Liability Study*, 1998.

5 Friction Costs

5.1 Journey Costs

In order to illustrate the share of friction costs in the total transport costs of moving a consignment three markets are referred to:

- National;
- Intra-Europe (i.e. including Eastern Europe); and
- Extra-Europe (within this market a transfer between Europe and North America).

The figures in these examples refer to an average for all modes. National and Intra-Europe movements include road, rail and inland waterway movements. National refers to journeys to longer than average journeys and those concerned with trunking rather than local distribution. This is the market in which intermodal potentially plays an important role. Intra-Europe refers to international journeys both within the EU and between the EU and Eastern Europe. Intermodal transport plays a large role in this market. Both these markets have a high use of load units. The Extra-Europe example of North Atlantic movements refers to container movements by sea and air. Given the different circumstances found within these markets, it must be emphasised that the averages referred to in the table disguise the wide variety of journey and consignment types found within these markets.

Table 8 shows the basic assumptions made about the average journey by a consignment in these three markets. The value of the consignment (which influences the cargo insurance premium and the value of losses) is the product of the value density of the goods and the consignment size. The value of an Intra-Europe consignment is estimated at nearly double that of a National at 24,780 Euro. Not surprisingly the Extra-Europe journey, which includes 2 land-based journeys, 2 transfers, the highest freight charges. The other vital assumptions are the length of journey and the freight rate per km which together define the total freight charge (which determines the level of carrier liability premiums). The individual figures are based on evidence from various sources including *EU Transport in Figures*, 1999.

Input	Type of journeys			Source
	Intra-National	Intra-Europe	Extra-Europe	
Cargo value (euro/kg)	1.38	1.77	1.78	DETR, Eurostat, IM Technologies
Consignment size (tonnes)	10	14	12	EC X-Mod1 Study (1999), IM Technologies
Journey length (km)	150	800	500+5500	DETR, EC, IM Technologies, UIRR
Freight charge (euro)	180	800	600+1000	EC X-Mod1 Study(1999), SGKV
Loss rate (% cargo value)	0.05	0.07	0.05, 0.05	Study survey
Cargo insurance premium rate (% cargo value)	0.06	0.09	0.06, 0.06	Study survey
Cargo insurance administration, sales, profit costs (% premium)	40	42	42	Study survey, IM Technologies
Cargo insurance claims paid subrogated from liability insurance (% claims paid)	20	20	20	Study survey, US DOT
Carrier liability insurance premium rate (% freight charge)	0.25	0.3	0.25, 0.10	Study survey
Forwarder liability insurance premium rate (% freight charge)	0.4	0.4	0.4	Study survey
Liability insurance administration, sales, profit costs (% premium)	30	32	32	Study survey, IM Technologies
Carrier and forwarder administration costs (% premium)	30	30	30	Study survey
Carrier and forwarder deductions (% premium)	20	20	20	Study survey
Use of cargo insurance (% shippers)	75	75	80	Study survey
Shipper with cargo insurance administration costs (% premium)	15	15	15	Study survey
Shipper without cargo insurance administration costs (% premium)	25	25	25	Study survey, IM Technologies
Use of forwarder (% shippers)	75	90	90	Study survey

Table 8 Assumptions Used for Three Journeys

In order to trace the friction costs for these typical journeys it is necessary to apply various loss and insurance ratios that are found in the market. Combining these ratios and basic journey/consignment characteristics using the logic described in Figure 14 leads to the derivation of the individual stakeholders' friction costs for the typical journeys – intra-national, intra-Europe and extra-Europe (shown in Table 9 and Figure 15). Friction costs are shown as a percentage of transport costs for the three typical journeys.

Friction Costs	National	Intra-Europe	Extra-Europe
Actual Losses	3.83	2.17	1.33
<i>of which</i>			
Shipper	1.21	0.31	0.09
Carrier	0.17	0.20	0.15
Cargo Insurer	2.07	1.21	0.74
Carrier Insurer	0.39	0.45	0.34
Administration Costs	2.46	1.71	1.09

<i>of which</i>			
Shipper	0.81	0.49	0.27
Carrier	0.11	0.13	0.10
Cargo Insurer	1.38	0.88	0.54
Carrier Insurer	0.17	0.21	0.17
Total	6.29	3.88	2.42
Consumer % of Goods Value	0.08	0.13	0.18

Table 9 Breakdown of Friction Costs as a Percentage of Freight Charges

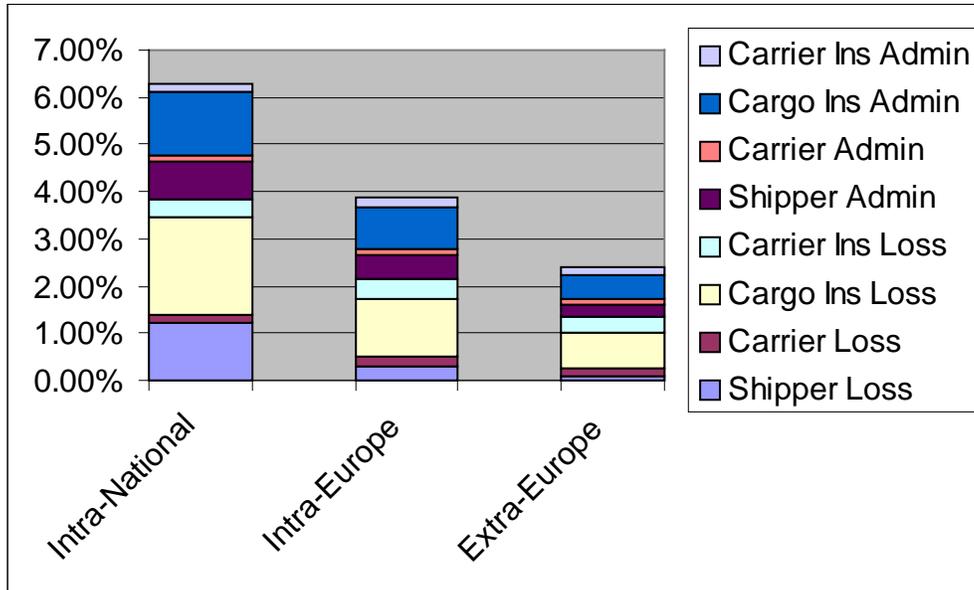


Figure 15 Friction Costs of Risk as a Percentage of Transport Costs

The table shows that just over 6% of the freight charges for the National journey can be attributed to the friction costs of risk and the insurance arrangements surrounding it. This figure falls to under 4% for the Intra-Europe and about 2.5% for the Extra-Europe journey. The difference can be almost entirely explained by the lower ratio of transport costs compared to the value of the consignment (which affects losses). The largest proportion of these losses is borne by the cargo insurer. The share of administrative costs in these totals is between 40 and 45%. Administrative costs of the insurers are somewhat over 50% of the total.

The final row of Table 9 shows that the contribution of risk and liability arrangements to the price of the goods in the consignments is less than 0.2%. This is not the share in the price to the final consumer. The value of the consignment refers to (in part) intermediate products and excludes any retailer margins. Thus the final figure can be expected to be considerably lower.

5.2 Intermodal Transport Friction Costs in the EU

In order to estimate the total friction costs incurred by intermodal transport it is first necessary to estimate the number of consignments moved in a year and the freight rates incurred. The size of the market of interest can be roughly estimated from statistics given in Intermodal Freight Transport-Key Statistical Data from EUROSTAT. According to that

source 8M TEUs were transported by rail in the EU-15 during 1996 (chart 4.1). Of this just under half (3.9M) were carried by UIRR companies. As far as the number of intermodal units (which we refer to as 'consignments') are concerned the figure is somewhat less. Taking account of the size of UIRR consignments (estimated at 2.3 TEUs) and the widespread use of 40' containers the figure for consignments can therefore be estimated at roughly 4M. Within this figure national movements account for perhaps 0.8M (a detailed breakdown is available for UIRR operators and ICF).

In the case of Inland Waterways just under 2M TEUs were carried in 1996, and the corresponding figure for consignments is just over 1M. A major source of intermodal movement is that of maritime containers through the ports. The total in 1996 for TEUs moved by land was 21.3. Assuming a split in the use of 20' and 40' containers, the number of consignments in this market amounts to an additional 13M. Approximately 2M of these were by rail (16.9%). Ro-Ro movements are not included. The freight traffic of Europe's major airports (which comprise over 90% of total freight traffic) was over 8Mt in 1996. In terms of consignments this equates to perhaps 2M intermodal movements. Taking all these estimates together it is possible to say that the number of consignments that move across international borders and use intermodal transport in 1996 was approximately 18M. The figure now in the year 2000 is perhaps 21M.

Detailed figures are not available to estimate the average distance travelled by this set of consignments (either within Europe or to the final destination). UIRR reports an average distance of 640 for national movements and 780 for international giving an average of 716km. The figure for other rail movements should be similar. Inland waterway distances are probably shorter (particularly recognising the importance of Antwerp-Rotterdam in the figures). Movements to ports is also likely to be rather less but given the source (and destination) of goods in each country that passes through ports the figure is in the range 500-600km. Finally the average distance travelled to/from airports will lie in the range 150-250km. This suggests a total intermodal market in Europe of about 11-14billion Euro (this range reflects the uncertainty surrounding average distance travelled per consignment and the cost per km).

Using the share of friction costs (Table 9) for the three markets and weighting them by their share of intermodal consignments (out of a total of 21M) gives a total friction cost figure of approximately 450-550M Euro incurred by intermodal operators in Europe. Of this nearly half is incurred on moving sea containers. Friction costs incurred by operations *across* the North Atlantic and *delivery* to American destinations is excluded from this calculation.

5.3 Generalised Used of UNCTAD/ICC Model Rules

5.3.1 Introduction

As intermodal transport grew in size and importance, it became apparent that the existing liability framework led to uncertainty, and possibly higher administrative and legal costs. The 1980 UN Convention on Multimodal Transportation of Goods, which in principle adopts a uniform system of liability for claims arising out of multimodal contracts, failed to attract sufficient support and, as a consequence, did not enter into force. A substitute emerged in the form of the UNCTAD/ICC Model Rules. However, these do not have the status of mandatory law, but may be incorporated into a (private) contract. They do, however, give precedence to mandatory law (Rule 13). The Rules are based on the so-called 'network principle'. This means (Rule 6.4), providing that the unimodal stage of the transport where the loss occurred can be established, then the liability limit that applies is that which corresponds to the national or international law that would have applied for

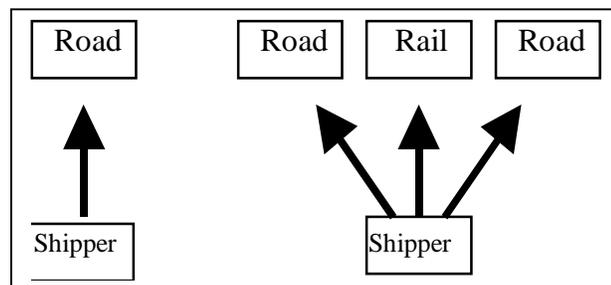
that stage under a unimodal contract⁵. That this set of rules was a compromise has been reiterated a number of times⁶ “None of the sets of Multimodal Rules, including the latest UNCTAD/ICC Rules 1992, provides those operating the supply chain with a truly multimodal solution”.

Since the publication of the Rules they have been adopted formally in standard documents such as FIATA FBL 1992 and BIMCO’s Multidoc 95. In addition the BIFA contract and recent German legislation (HGB 1998) for cross-border freight follow closely the principle of ‘network liability’ enshrined in the rules.

5.3.2 Unimodal or intermodal - the shipper’s perspective

In order to understand the relevance of these Model Rules (or the adoption of closely related conditions) to intermodal transport, it is necessary to understand the friction costs associated with intermodal transport and the associated liability regimes.

First of all we can examine the relative costs of an intermodal compared to a unimodal trip for a shipper that does not use an organisation (freight forwarder or intermodal transport operator) to arrange different links in the chain. In the intermodal case the administration costs of arranging the door-to-door movement are higher; there are dealings with three parties rather than one. As far as the insurance element is concerned there are a number of reasons why the friction costs associated with intermodal transport may be higher, notably:



As far as the insurance element is concerned there are a number of reasons why the friction costs associated with intermodal transport may be higher, notably:

- Losses are higher – whilst the survey of different modes did not reveal a significant difference between modes there is evidence that risks are high at interchange points, and these are more numerous in intermodal journeys;
- Administration of claims is likely to be somewhat higher, in particular more resources will be required in locating the point of loss;
- Some losses are not recovered due to the difficulty of localising the loss. Whilst this is a cost to the shipper it is not a cost to the system as a whole – merely a transfer from one stakeholder to another; and
- In some cases cargo insurance (with its associated administrative costs) may be taken because of the risk of not being able to localise loss. As far as friction costs are concerned the costs of pursuing claims are transferred from the shipper to the insurer. The issue is complicated by the question of the whether the resources devoted by an average cargo insurer to a claim are less than those of an average shipper. The low rate of subrogation found suggests that this may be the case, and therefore the friction costs in the system as a consequence are reduced.

Intermodal’s relative disadvantage from insurance might be tentatively calculated as follows. Losses amount to about 1.71% of transport costs for an intra-Europe journey.

⁵ “These Rules shall only take effect to the extent that they are not contrary to the mandatory provisions of international conventions or national law applicable to the multimodal transport contract.”

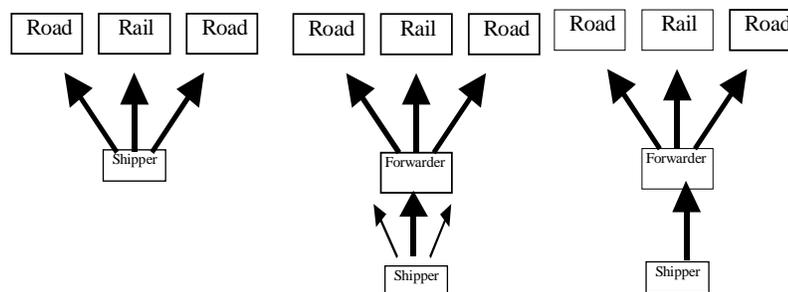
⁶ Kindred and Brooks, *Multimodal Transport Rules*, The Hague, 1997

Administration costs of the shipper concerned with these losses (mainly claim handling) add approximately 0.49%. Assuming that losses are 20% higher due to the necessity of interchanges and that locating the source increases the cost of handling a claim for an intermodal journey by 50%, then the additional friction costs amount to 0.46% (0.34% + 0.12%). Potential savings due to the use of cargo insurance are ignored. The assumptions used to derive this result must be regarded as extremely tentative. They are based on a small sample of estimates from forwarders and insurers, rather than large samples of risks and detailed analysis of costs incurred.

5.3.3 Unimodal or intermodal – introducing a multimodal contract

The next stage is to consider what happens when a shipper chooses to use a forwarder (or ITO operator), which in practice is the most common arrangement for intermodal and international journeys. Forwarders are perceived as more efficient either in terms of the prices they achieve from carriers and/or in the administration costs that they incur during the contractual period. The scale of their operations and their experience yield these advantages. Whilst they may have lower administrative costs, there is no inherent reduction in the activities that need to be undertaken in arranging contracts with individual mode carriers or in subsequent insurance claims. Indeed a new contract, with its administrative costs both in setting it up and consequent claims, adds an extra link in the process.

In theory a forwarder can offer a contract which simply transfers individual mode contracts to shippers. In practice the forwarder generates a new form of contract which is closely related to the UNCTAD/ICC Model Rules and incorporating the network principal. Forwarders judge that these contracts are more attractive to the market than one based on a transfer of the contracts with the carriers. Major examples are FIATA FBL (a bill of lading), BIFA STC (a contract), and BIMCO's Multidoc95.



What advantage does such a contract give to the shipper compared to a set of individual contracts? The impression is that its prime attraction is in the simplicity in its terms, with apparently standard conditions on limits etc. However this is somewhat illusory because behind the simplicity are the mode conditions, referred to as exceptions (the details are not included). In respect of the key element concerned with the liability limit the shipper gains nothing compared to a set of unimodal contracts, if the loss is localised – the limits are the same. In terms of loss/damage that is not localised then the shipper receives the minimum (2 SDR or 8.33 SDR subject, of course, to contractual conditions) rather than nothing at all under the unimodal arrangement. This may be regarded as a benefit to the shipper (though, being a transfer payment, it does not reduce the total friction costs in the system as a whole). This conclusion is tempered by the fact that such a change may be accompanied by a change in the use of cargo insurance. With a unimodal arrangement cargo insurance may have been vital; now with the floor of 2SDR guaranteed it may no longer be considered necessary.

5.3.4 Costs and benefits of adopting UNCTAD/ICC type contract

Judging by the surveys undertaken in Finland, France, Germany, Italy, Netherlands, Spain and the United Kingdom it appears that shippers are not only aware of the contracts based on the Model Rules but also make extensive use of them. The market therefore might appear to be working efficiently and making choices available to customers. Surveys have not been undertaken in all countries of the EU but the impression from discussions with freight forwarders is that the use of such contracts is widespread and there are no serious failures by the market to respond to shippers' preference for a multimodal contract.

The main issue is whether a such multimodal contract based on the network principle helps reduce friction costs *vis-à-vis* a set of unimodal contracts. And thereby possibly reducing intermodal costs *vis-a-vis* unimodal transport. There seems to be 5 main points:

- There seems no reason to expect the adoption of such a contract to affect the level of losses. The pressure on parties in the system to behave responsibly does not change.
- A standard contract is marginally cheaper for a forwarder to draw up.
- The shipper probably prefers the multimodal contract with its apparent simplicity, though it is difficult to translate this benefit into friction costs.
- If loss is localised then the multimodal contract makes no difference to the sum that is recovered. However if it is not localised then the shipper receives the minimum rather than nothing, a fact which might persuade a small number of shippers to decide not to take out cargo insurance. Whilst this may appear to be a reduction in friction costs (one administrative layer is removed) it is complicated by the tendency for cargo insurers not to pursue small-amount claims (and hence reduce friction costs).
- The introduction of the Model Rules offers little, if any, reduction in uncertainty concerned with responsibility of contracting parties and options where certain claims may be pursued.

Overall, therefore, the introduction of such a multimodal contract offers fairly modest benefits in terms of a reduction in friction costs.

Does the contract lead to a change in the relative advantage of intermodal *vis-a-vis* unimodal? From the shipper's perspective the complexity of the different contracts and the concern about localising in the loss in the intermodal case may have disappeared with the new contract. However these difficulties have merely been passed on to the forwarder (and they are presumably reflected in his charges). The decision whether to use an intermodal solution may pass to the forwarder but the basic disadvantage of the intermodal solution – higher loss and greater claim complexity – remain. It is perhaps an ironic conclusion that the way that the latter is reduced is by non-pursuit of claims. Thus cargo insurance though increasing administrative costs (with the introduction of a new process into the system) actually reduces overall friction costs through not pursuing some claims. (Friction costs of administration are minimised if no claims are pursued. Whether total friction costs are minimised depends on the effect of such a policy on losses.)

The widespread adoption of multimodal contracts based on the Model Rules suggests that the players in the market perceive a definite benefit from its introduction. Forwarders (and ITOs) believe shippers prefer it and gain some benefit. However appears that this benefit should not be exaggerated. Shippers appear to gain from a simplicity in the

agreement with the forwarders, but this is partly illusory as uncertainty about the limit of liability is not removed (given the localised loss constraint). It makes no substantial difference to the total administration costs of the various stakeholders.

5.4 Harmonisation of Carrier Liability Regimes

5.4.1 Perceptions on weaknesses of current regimes

One particular source of friction costs associated with the Model Rules is regarded as of particular importance by some commentators. In the report *Intermodal Transportation and Carrier Liability*⁷ prominence was given to the uncertainty inherent in certain regimes and the friction costs emanating from it (though these were not quantified). Three forms of uncertainty were identified:

- Uncertainty over the location where the loss occurred;
- Uncertainty concerning the contract and the identity of the carrier. This especially applies if the ITO (forwarder, agent, spediteur) is not the carrier and/or the point of loss cannot be established; and
- Uncertainty as to the applicable legal regime and its effects. The various legal regimes that may be relevant to a particular intermodal journey have different requirements for the successful institution of legal proceedings (e.g. time limits) and different onus of proof. For a particular loss there may also be a choice of country where proceedings may be brought.

This led to the conclusion that⁸ “...it is clear that substantial costs associated with claims handling and litigation could be avoided by both cargo interests and operators (or their liability insurers), if the legal-liability framework were simpler and less fragmented.” Another source⁹ comments “There is a large number of transport Conventions which are potentially applicable to any contract. This means that enormous sums, which would be better applied commercially, are spent in legal disputes as to whether the contract terms or a Convention and, if so which Convention, should apply to govern relations between contracting parties.” It goes on to suggest “The best way forward would be to abolish all the individual Conventions and introduce one which would govern all transport contracts, by whatever means of transport and whether unimodal or multimodal. This may mean legal expenditure in the short term, while precedents are established for the construction of such a Convention, but in the long term it would save costs.”

Others¹⁰, such as the International Multimodal Transport Association and BASF, a major chemical multi-national company, have also voiced that the Model Rules do not provide the necessary needs of the market for further development and use of intermodal transport. What is absent in the market are contracts that:

1. provide ‘strict and full’ insurance for the cargo throughout its journey (regardless of its value) thus possibly removing the need for cargo insurance; and

⁷ European Commission , 1999.

⁸ Op. Cit.

⁹ *The Problems Arising from Multimodal Transport*”, by Diana Faber, Lloyd's Maritime and Commercial Law Quarterly, November 1996, p. 503-518

¹⁰ ‘Possibilities For Reconciliation And Harmonisation Of Civil Liability Regimes Governing Combined Transport’, Results of two expert group meetings (“hearings”) on civil liability regimes for multimodal transport. UN/ECE, September 2000.

2. greater harmonisation across modes on issues such as notice of loss, time bar, exemption from liability, liability for delay – thus removing at least some of the uncertainty inherent in the current system.

It is useful to briefly consider what might be gained if such contracts were to be introduced.

5.4.2 Potential benefits of harmonisation

It is difficult to see how introduction of a 'strict and full' liability regime, eg "Invoice+10%" proposed by the Intermodal Transport and Carrier Liability Study, will significantly reduce the actual loss and damage incurred in moving freight. The rate of loss/damage is already very small. With greater simplicity and clarity, and full liability, shippers could do away with cargo insurance and hence saving cargo insurance premium cost. However, without reduction in actual loss/damage, any loss previously met by cargo insurance as claims paid will be met by liability insurance – by way of higher freight rates - with no net gain in system costs.

However in contracts based on Hague-Visby the liability exclusion conditions are so extensive that cargo insurance could still be judged desirable. Assuming a regime which persuades more shippers not to take cargo insurance, the relevant question is what business processes are eliminated thus leading to lower friction costs? It would appear that the main gains would be the avoidance of brokerage cost and some duplications of insurance administration. However evidence of loss still has to be provided. Claims against the carriers still have to be pursued - by the shippers instead of by the cargo insurer. In this new situation the cost of pursuing claims could rise as shippers are less experienced than cargo insurers in handling claims. Also shippers might attempt to pursue more claims (in terms of cases) than cargo insurers (who pursue a low proportion) and curiously from a friction cost perspective this means that total administrative costs are reduced. If cargo insurance is taken out to avoid the 'hassle' of claims, then cargo insurers could still perform this function or new intermediaries might emerge to assist shippers.

Strict and full liability on balance would therefore be beneficial in terms of reducing friction costs, though the potentials for reducing friction costs may not be as big as some proponents might have thought.

Another means for reducing friction costs is greater harmonisation of conditions among the international conventions resulting in common legal positions across the EU. Selected EU countries, such as Austria and Germany, have recently introduced harmonised carrier liability regime for intra-national transport irrespective of modes, except sea transport.

Harmonisation of conditions would remove uncertainty associated with network regimes. This would help to reduce claim costs. Whether the take-up of cargo insurance increases or decreases would depend on the limit of liability adopted and the exclusion conditions. As pointed out earlier cargo insurance, curiously perhaps, can lead to an overall reduction in friction costs as claims may not be pursued with such diligence under a cargo insurance regime.

Interviews with shippers, forwarders, carriers and insurers suggest that the savings from removing these three types of uncertainty, and hence eliminating time and cost consuming resolution of claims (with possible litigation), would not amount to more than 20% of administrative costs. Most of the benefit would accrue in the first instance to forwarders and insurers, the two parties mainly concerned with the pursuit of claims. As

far as intermodal transport is concerned, therefore, this saving amounts to not more than 50M Euro per annum (based on a maximum total friction cost of 550M Euro).

This potential saving in friction costs for existing intermodal transport is the maximum prize from reducing uncertainty through greater harmonisation of carrier liability. Even with a move towards harmonisation it is perhaps important to point out that the elimination of all uncertainty is an elusive target. The revision of existing regimes creates, by its very nature, further uncertainties.

APPENDIX

A.1 Nature of Surveys of Stakeholders

Data for this study are not readily available. To bridge the information gap surveys by way of questionnaires and interviews were carried out with shippers, carriers, forwarders, insurers and their trade association representatives. The surveys were aimed at understanding the different actors' business practice and friction costs in respect of carrier liability.

Shipper Surveys

The shipper survey was carried out on selected EU businesses that were considered to be users of transport services. The broad methodology of the survey was dictated by the requirements of the original Terms of Reference. The main survey was carried out by means of a questionnaire, which was prepared in 6 languages and was sent to 994 companies in 7 EU countries (Finland, France, Germany, Italy, Netherlands, Spain and United Kingdom). Local agents were established to aid in the selection of the target list, translation of survey material and general support in facilitating data collection. Most of the shipper questionnaires were sent out between mid-February and early March this year. Typically, following a 3 weeks gap, a reminder was sent to the shippers who have yet to respond.

The targeted shippers were provided with information explaining the background to the project set out the aims of the survey and the target sample was given a choice of responding via fax, by post using supplied pre-paid reply envelopes, or on-line using a secure internet-based interactive web site. Some additional background to the project and information on the project team members were also made available on the web site. Every shipper was assigned a unique two-part user ID number. This was the basis of primary access control to the interactive web-based questionnaire and was also used throughout the data processing and analysis period to distinguish respondents.

Survey questionnaires were sent to selected companies that broadly represented industries and market sectors identified in the Terms of Reference and the Inception Report. The breakdown by country of the survey sample is as follows:

Countries	Sample	No. of Responses	%	Spoilt Responses	as % of Responses	Net Usable Responses	%
Netherlands	150	9	6%	1	11%	8	5%
France	128	9	7%	2	22%	7	5%
Spain	163	28	17%	0	0%	28	17%
Finland	155	32	21%	1	3%	31	20%
Italy	151	11	7%	2	18%	9	6%
UK	161	15	9%	2	13%	13	8%
Germany	86	11	13%	0	0%	11	13%
Total	994	115	12%	8	7%	107	11%

Of the 994 questionnaires sent, 107 were responses that could be used in the analysis, representing 11 per cent of the total sample. Responses made on-line using the interactive web site were 12, representing 11 per cent of the respondents. Variations between countries ranged from 5 per cent response rates from Netherlands and France to 20 per cent response rate from Finland. In terms of the market sectors, a broadly

balanced response rate was achieved for the five target sectors of automotive, building material, chemical, electrical/electronic and retail.

Sector	Responses	As %
Automotive	20	19%
Building Material	16	15%
Chemical	21	20%
Electrical/Electronic	17	16%
Retail	21	20%
Others	12	11%

The questionnaire survey of shippers was supplemented by some interviews with selected shippers.

Other Stakeholders Surveys

The shipper surveys were supplemented by surveys with the other key stakeholders (ie carrier, forwarder and insurer) of the transport supply chain. In total some 30 businesses and trade association representatives based in Belgium, Germany, Netherlands, Spain, and United Kingdom collaborated. The surveys took the form of self-completion questionnaires and interviews.

A.2 Impact of Internet and E-Commerce

This study has cursorily examined the impact of internet and e-commerce on friction costs of carrier liability. Three areas would appear relevant:

- Impact on the physical distribution
- Impact on modal choice
- Impact on administration costs of friction costs

Physical distribution

Internet and e-commerce are likely to have three key effects on the physical distribution of goods. First, some delivery of goods will no longer be required. Prominent examples include on-line delivery of software, music and printed information, including this study report. This would reduce the amount of physical transport demand. On the other hand internet shopping will result in more contracted deliveries as “do-it-yourself” collections are replaced by home deliveries and hence increase carrier-shipper relationships. A third development is increased demand for high reliability deliveries as businesses increasingly guarantee delivery date and sometimes time of delivery. This is likely to place a greater emphasis on delay as a condition of liability – most current liability regimes exclude delay as a condition of liability. However, most long-haul deliveries are likely to remain as present. Hence, excluding delay, which is excluded from most current liability regimes, changes in physical distribution are likely to have minimal overall impact.

Modal choice

Emerging e-commerce deliveries show many of the characteristics of today's express and parcel delivery services (such as executed by DHL, UPS and FedEx). Highly integrated full service companies may sub-contract (or franchise) some physical transport operations, but the whole transport chain will be under tough control of the “umbrella” corporation. Again, these companies will look, at first hand, for extreme punctuality and reliability of service. For the time being, this aims mainly at the choice of road transport with an exchange of long-haul operation to short haul operation at major hubs, possibly

using swap bodies. For distances of more than 500 km that show dense express cargo flow characteristics could be covered by dedicated express cargo trains carrying such swap bodies. Such a network has been installed recently by Deutsche Post AG in co-operation with DB Cargo in Germany. Conditions for such intermodal developments are limited: ultimate reliability of rail service, high speed rail service, distances of some 500 km and more, and high demand, eg concentrated express cargo flows. Hence, major change in intermodal transport friction costs of carrier liability is likely to be mute.

Administration costs of carrier liability

The administration of carrier liability will be improved by wide-spread on-line insurance policy organisation and claims handling. This is not likely to yield big savings as many insurers and large carriers are already highly computerised. However, if a common on-line business-to-business platform which includes both the freight contract and the insurance administrations, and the monitoring of the status of deliveries from source to sink to ease the identification of the party responsible for loss and damage then major savings could be had. Assuming a 10% saving of the administrative costs of carrier liability for existing intermodal transport would yield a saving of 20-30M Euro per year. This system should be applicable to both intermodal and unimodal transport carrier liability and hence the total benefits could be 500M Euro per year or greater. These estimates are preliminary and should be subject to more detailed research which is beyond the scope of this one.