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The Impact of the Terrorist Attacks of 11 September 2001 on International Trading and Transport Activities

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**THE IMPACT OF THE TERRORIST ATTACKS OF 11 SEPTEMBER 2001 ON INTERNATIONAL
TRADING AND TRANSPORT ACTIVITIES**

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TABLE OF CONTENTS

| | |
|---|----|
| Executive summary | 4 |
| 1. Background..... | 5 |
| 2. Changes in frictional costs of trade | 5 |
| 2.1 Air transport | 6 |
| 2.2 Maritime transport | 8 |
| 2.3 Road and rail transport..... | 10 |
| 3. Implications for international trade | 10 |
| 3.1 Implications across commodities and factor movements..... | 13 |
| 3.2 Implications across countries | 14 |
| 4. Longer-term impacts | 18 |

THE IMPACT OF THE TERRORIST ATTACKS OF 11 SEPTEMBER 2001 ON INTERNATIONAL TRADING AND TRANSPORT ACTIVITIES

Executive summary

In the wake of the terrorist attacks on New York City and Washington, D.C., emergency measures were taken to tighten security at air and seaports as well as land border crossings. Some disruption of trade flows during the immediate aftermath of the attacks seemed almost inevitable, yet additional frictional trading costs due to tighter security have affected trade not only in North America but also world-wide and have potential to continue to do so in the medium to long term.

Anecdotal evidence suggests that the short-term business environment of transport operators and trading companies has been affected by new security measures and the increased perception of the risk of terrorist attacks. Businesses faced longer delays at airports, seaports, and land-border crossings, higher expenditures on security equipment and personnel, and augmented insurance fees. There were major disruptions of trade flows in the immediate aftermath of the terrorist attacks, but over time trade operations seemed to have returned towards normal again. Also, flexible responses of businesses and customs services to the new border situation have helped to remove some temporary bottlenecks. Yet, some modest increase in frictional costs due to increased security concerns is likely to persist, even though the exact amount is hard to predict, as general economic developments mask the effect of the terrorist attacks.

Some have likened the higher frictional trading costs to additional taxes on business activity or increases in border tariffs. Yet, a comparison with business spending on mandatory pollution abatement equipment seems more appropriate, as the higher expenses for the private sector provide benefits to the general public (higher environmental quality and lower risk of terrorist attacks, respectively), but are generally not accompanied by additional tax or tariff revenues for governments.

Not all commodities and countries will be affected to the same extent by the increases in frictional costs. Differences across products are due to varying ratios of transport and insurance costs to goods-value, divergences in prevailing transport modes, and differing roles in the production process. For example, just-in-time deliveries in the automotive industry were markedly affected by delays due to more elaborate customs inspections. Concerning cross-country effects, intra-NAFTA trade was naturally strongly impeded by the tightening of security at US borders, but the trade of other countries with substantial exposure to North American markets, notably imports and exports of Latin American countries, were also significantly disturbed by the longer delays at borders and other frictional cost increases.

1. Background

1. In addition to trade-impacts from a general economic downturn, there are direct costs of the 11 September attacks being imposed on the trading system in the form of higher transport, handling, insurance, and customs charges. In the immediate aftermath of the attacks, international transport and trade were severely disrupted, as most notably exemplified by the three-day long closure of all airports in the United States. Yet beyond the initial disruptions, additional security measures and increased perception of the risk of terrorist attacks have the potential to affect international transport and trade in the medium to long term. Businesses currently face longer delays at airports, seaports, and land-border crossings, higher expenditure on security equipment and personnel, and augmented insurance fees, and might continue to do so. These increased frictional costs will tend to make trading activities more expensive and as a result reduce trade flows.

2. This paper aims to provide a preliminary assessment of the impact of changes in frictional trading costs on international trade flows. As relatively little time has elapsed since the terrorist attacks on New York City and Washington, D.C., the analysis is naturally confined mainly to short term effects. The assessment presented in this paper tries to complement analysis by other organisations concerning the impacts of 11 September on issues such as economic growth, international stockmarkets, and the insurance industry by explicitly focusing its analysis on effects with respect to costs arising in the trading process, notably costs relating to transport, handling, insurance, and customs.

3. The paper addresses a number of questions: What have been the effects of the terrorist attacks on transport costs? To what extent have customs procedures become more cumbersome? Has the increase in the perceived risk of terrorist attacks been translated into higher insurance fees for shipments? Are all transport modes, products, and countries affected to the same extent? How persistent are the effects likely to be? Are the changes in frictional costs important compared with the value of shipments? How much of the increase in frictional costs to trade will be passed on to consumers?

4. The remainder of the paper is organised in three parts. Section 2 reports on available empirical evidence, which to date is mostly of an anecdotal nature, of the terrorist attacks of 11 September on the business environment for transport and trading companies. Section 3 evaluates the importance of the changes for import and export activities, and the final section 4 briefly raises some longer-term issues .

2. Changes in frictional costs of trade

5. Because of the fear of future terrorist attacks, the 11 September events have triggered a variety of regulatory measures and demands on transport companies that entail new costs and longer delays at border crossings. The prevalence and thoroughness of inspections at airports, seaports, and land borders has been increased, shipping companies have had to face expenditures for additional security equipment and personnel, and transport insurance rates have been augmented. These developments have been most pronounced in North America, but are similarly felt in other parts of the world.

6. Within North America, most trade is undertaken by truck, even though water transport is almost as important in terms of transported weight (Table 1). Naturally, air and water transport dominate for overseas trade. The following sub-sections contain a collection of mostly anecdotal evidence on how different modes of transport have been affected by the tightening of security.

Table 1: US merchandise trade with Canada and Mexico by transportation mode, 2000 (in per cent)

| Transportation mode | Value | Weight |
|----------------------------|--------------|---------------|
| Truck | 65.6 | 35.1 |
| Rail | 14.4 | 17.4 |
| Air | 6.9 | 0.2 |
| Water | 5.0 | 32.4 |
| Pipeline | 3.6 | 14.8 |
| Other modes and unknown | 4.5 | 0.1 |

Source: US Department of Transportation, Bureau of Transportation Statistics, June 2001.

2.1 Air transport

7. Tightening security on airports and aircraft has been one of the foremost priorities of public authorities. Immediately after the attacks, all US airports were closed for three days to review and strengthen security procedures. Around the world, access to airports and aircraft was tightened, training programmes for ground and flight staff were initiated, and more sophisticated alert and airspace management systems were launched. Concerning passenger traffic, more thorough controls of passengers and their luggage have been implemented, the classification of objects in hand luggage that could potentially be used as weapons has been modified, and in-flight protection has been stepped up by blocking cockpit access and putting armed air marshals on flights.

8. Air freight transport has been similarly affected. Since the 11 September events, x-ray machines to examine cargo boxes and check whether the contents match shipping labels have been used more extensively. Other precautions taken include earlier drop-off deadlines at airports, bans on shipments from unknown customers, and waiting periods before shipments are put on planes.

9. In response to increased security provisions and insurance costs (Box 1), many airlines began to apply "security surcharges". Generally, fee increases amounted to up to \$8 per passenger or fell within the range of \$0.10-\$0.15 per kg of cargo (Table 2). In addition to increases in security fees, cargo shipments have been affected by frequent hold-ups and detours. During the three-day shutdown of the US air transport system, many transportation providers had to shift from air transport to road or rail transport to maintain shipment commitments.¹ Later on, many airlines in North America, Europe, and Asia dropped flights from schedules, because of the weakening of passenger confidence and demand for air transport. On a year on year basis, world-wide passenger traffic dropped by 23 per cent in October and freight traffic by 9 per cent.² This decrease was far more pronounced than the reduction in air traffic during the Gulf War, for example.³ Yet, traffic volumes seemed to be recovering to normal levels by the end of 2001.

10. The marked decline in passenger traffic in autumn 2001 caused delays in the movement of goods that are carried in the belly space of passenger planes. Also, several airlines closed some of their freight handling facilities as a result of decreasing cargo volumes. For example, American Airlines temporarily closed its freight handling operations at the international airports of Buffalo-Niagara, Greater Rochester, and Salt Lake City.⁴ As a result, cargo had to be routed through other transport hubs.

1. See "Attacks force cargo to shift from air to ground," Logistics Management, 1 October 2001.

2. See press release no. 36, International Air Transport Association, 30 November 2001.

3. See "Industry briefing," International Air Transport Association, September 2001.

4. See "US update: air, vessel, land border, customs status." Expeditors Newsflash, 27 September 2001.

Box 1. Developments in airline insurance costs

Following the 11 September events, insurers and re-insurers modified their aviation plans considerably whenever a "war and allied perils clause" in existing contracts authorised such changes. Coverage was reduced while premiums went up. Premia for air and sea cargo shipments were raised by between 0.027 per cent and 0.05 per cent of total insured fleet value.ⁱ Additional premia of \$1.25 to \$1.85 per passenger have been charged in passenger transport.

Also, insurers decided to limit the cover for third party damages caused by terrorist action to \$50 million (instead of \$1.5 billion). In order to avoid major disruptions of air traffic due to lack of insurance coverage, regulators in several countries enforced short-term measures to support third party insurance for airline companies in case of a new terrorist attack with damages above \$50 million.ⁱⁱ

According to insurance industry representatives, airline insurance prices were already rising before the 11 September events. In this context, industry representatives see the fee increases partly as the result of the need to cover losses incurred in previous years, and to restore a level of profitability comparable to other branches of the insurance industry. Hence, the terrorist attacks on New York and Washington might not be responsible for the full amount of insurance fee increases, but will certainly have accelerated the implementation of the increase.

Moreover, in overall terms insurance costs are not a major cost item in air transport. Prior to 11 September, they were estimated to amount to 0.5 per cent to 1 per cent of airline operating costs.ⁱⁱⁱ Hence, only very substantial increases in premia have the potential to fundamentally alter the economics of air transport.

i) See "Survey of members: national measures in respect of war risk insurance," International Air Transport Association, 27 November 2001.

ii) Other short and long-term insurance aspects of the terrorist attacks, including property, casualty, and life insurance, have been discussed in industry or policy for a, such as the OECD Insurance Committee.

iii) See "Global investing," by Anthony Bor, Financial Times, 19 November 2001; and "Survey - business travel," by Roger Bray, Financial Times, 30 November 2001.

Table 2: Adjustments in the airline industry, October 2001

| | Cargo surcharges (per kg) | Capacity cuts (per cent) | Job losses (announced) |
|---------------------------|------------------------------|-----------------------------|---------------------------|
| <i>North America</i> | | | |
| Air Canada | .. | 20 | 5 000 |
| American Airlines | \$0.10 | .. | 20 000 |
| Delta Airlines | \$0.10 | 16 | 13 000 |
| Northwest Airlines | \$0.10 - \$0.13 | 20 | 10 000 |
| United Airlines | \$0.10 | 23 | 20 000 |
| <i>Europe</i> | | | |
| Air France | \$0.15 | 3-16 | .. |
| British Airways | \$0.10 | .. | 5 400 |
| Iberia | \$0.13 | 11 | 2 500 |
| KLM | \$0.13 | 20 | 2 500 |
| Lufthansa | \$0.13 | 20 | 4 800 |
| <i>Asia & Pacific</i> | | | |
| All Nippon Airways | .. | .. | 400 |
| China Airline Cargo | .. | 22 | .. |
| Ewa Airways | \$0.06 - \$0.15 | .. | .. |
| Japan Airlines | .. | .. | 600 |
| Qantas | .. | .. | 2 000 |

Note: "..": no information available.

Source: OECD Secretariat based on internet information.

2.2 *Maritime transport*

11. A large share of overseas trade moves through seaports. Yet, in the past the facilities often lacked security equipment, such as x-ray devices, and had relatively lax controls of access to docks and ships. After 11 September, more extensive security checks and use of surveillance cameras and cargo scanners have been a priority. The Port Authority of New York and New Jersey closed its operations for two days, and more intensive screening of cargo loads in US and Canadian harbours has caused substantial delays before cargo could be picked up.⁵ These hold-ups disturbed shipping timetables world-wide during the first weeks following the terrorist attacks. As ships to and from North America have experienced delays, subsequent routes have been affected by delays as well.

12. Other precautionary measures in Canada and the USA have consisted of mandatory 96-hour advance arrival notices and more frequent onboard Coast Guard inspections of crews and cargo.⁶ Also, ships have had to travel at slow speeds inside US harbours, flanked on each side by a tugboat in order to protect, for example, bridge supports against abrupt changes in direction. Shipping companies have been charged \$1 000 to \$1 500 for the required tugboat escorts.⁷

5. See "Freight-transportation system gets more expensive, slower." Wall Street Journal of 27 Sept. 2001.

6. See "Coast guard still on heightened alert." International Transport Journal of 18 October 2001.

7. See "Freight-transportation system gets more expensive, slower." Wall Street Journal of 27 Sept. 2001.

13. Over time, emergency measures taken immediately after the 11 September events have been relaxed, transport operators have adjusted to the new procedures, and transport and trading activities seemed to be running relatively smoothly again by the end of 2001. In the longer run, technological and procedural progress might make it possible to further reduce the post-11 September delays and procedural costs while providing the desired high level of security (Box 2).

Box 2. Developments in customs and security procedures

In the longer term, the attention and resources devoted to customs inspections after the 11 September events might trigger efforts to develop more efficient security procedures and improve border management. Measures to facilitate trade could include the reduction of the number of in-transit cargo inspections, the electronic collection of customs duties, and improved information sharing between authorities. As a result, customs services could become more able to reconcile policing of borders with smooth and open trade flows. The benefits of customs harmonisation have recently been illustrated through research by Japan's Ministry of Economy, Trade, and Industry and the Mitsubishi Research Institute that shows that the introduction of automated customs would lower the direct costs of customs clearance by the equivalent of 0.2 per cent of the value of traded goods. If furthermore the indirect benefits of a reduction in customs related delays are taken into account, additional cost reductions of up to 1 per cent of merchandise value could be realised.ⁱ

Some concrete results of trade facilitation efforts following the 11 September events have already materialised. For example, on 12 December 2001 Canada and the USA signed a "smart border declaration" that outlines a 30-point action plan to collaborate in identifying and addressing security risks while expediting the flow of people and goods back and forth across the Canada-USA border. The action plan aims to enhance security and strengthen cross-border commerce through improved technology, co-ordination, and information sharing.ⁱⁱ

Market incentives for private firms could similarly lead to more efficient security devices and services. If the increased demand for security equipment makes it possible for producers to realise benefits from economies of scale and mass production, unit costs of production will fall. For example, when air bags first became available, they were only installed in luxury cars because of their high costs. Over time, producers were able to improve their production processes, reduce manufacturing costs, and lower prices, such that air bags have become standard safety features in passenger cars. Similar developments may occur with respect to cargo screening and other security equipment.

Another means to improve the efficiency of security provision could be closer co-operation among firms along the production and operation chain. For example, in October 2001, the aircraft manufacturer Boeing and Israel's airline El Al announced their intention to form a joint venture that would aim to further integrate the security demands of airlines into the aircraft production process. By considering best practice solutions for security features from the early stages of aircraft design, the partners are hoping to provide a higher level of security at reduced costs.

i) See "Dynamic effects of the 'new age' free trade agreement between Japan and Singapore," by Thomas W. Hertel, Terrie Walmsley, and Ken Ikatura, *Journal of Economic Integration* 24(2001)8, pp. 1019-1049.

ii) See "Canada and the United States sign smart border declaration." Government of Canada News Release No. 162, 12 December 2001.

14. Similar to developments in the air transport industry, war-risk insurance premia for maritime transport rose sharply after the terrorist attacks on New York City and Washington, D.C. In response, ship owners and vessel operators have implemented war risk surcharges on ocean freight cargo transiting the Middle East, Red Sea and Eastern Mediterranean. Beginning in early October, ocean carriers operating in

the Europe/Far East and certain Middle East trade lanes announced war risk surcharges for traffic to and from specific ports as well as cargo transiting the Suez Canal, regardless of the origin and destination ports. War risk surcharges range from \$10 to \$450 per Twenty Foot Equivalent Unit of full container loads, and from \$5 to \$12 per cubic metre of less than full container loads.⁸ The application of the surcharges meant that total insurance rates for shipments from India to Persian Gulf ports, for example, went up by about 50 per cent.⁹ However, by the end of 2001 it was unclear to what extent the insurance surcharges would be permanent rather than merely temporary.

2.3 Road and rail transport

15. The reinforcement of US customs vigilance during the processing of commercial vehicles led to lengthy delays immediately after the terrorist attacks. The US-Mexican border was closed for a short period, but hold-ups at the US-Canadian border were at least equally substantial. In Detroit, Port Huron, and Buffalo waiting times amounted to 10 to 12 hours in mid-September. Later, delays were reduced as additional customs personnel took up duty and logistics were improved by posting wait times on the US customs internet-site.¹⁰ But by the end of September, truck operators still reported four-hour backups at the US-Canadian border while loads were searched by customs agents. Prior to 11 September, delays at the border had typically lasted only about 30 minutes.¹¹

16. Road transportation companies themselves have been taking a variety of new measures against terrorist attacks. Some are fencing unsecured freight yards and terminals, conducting background checks on drivers, and issuing identity badges to employees, while others have installed satellite-tracking systems to monitor the exact location of trucks and trailers or equipped their vehicles with sensors that can detect whether a cargo container has been opened before reaching its destination. Similarly, train operators have taken precautionary measures such as more frequent inspections of tracks, bridges and tunnels, strengthening critical buildings and communication facilities, and installing fibre optic cables along tracks to detect tampering.

3. Implications for international trade

17. Prior to the terrorist attacks, estimates of the cost of time delays, paperwork, and compliance related to border crossing ranged from 5 per cent to 13 per cent of the value of the goods involved, depending on the types of goods traded. Industry experts have estimated that the total costs of extra security measures could add 1 to 3 percentage points to this value-share, which would correspond to an increase of annual production costs of traded goods of \$5.6 billion to \$16.8 billion.¹² However, these estimates were made soon after the 11 September events, and seem to represent an upper bound for the impacts. To the extent that the new border security measures persist, the ensuing costs will be ongoing, though perhaps declining over time as technical and procedural progress is realised. On the other hand,

8. See "War risk surcharge summary," Fritz Transportation International, December 2001.

9. See "Ocean rates rising in Indian region," by N. Vasuki Rao, *Journal of Commerce*, 25 September 2001.

10. See "Opening Address" of US Commissioner of Customs Robert C. Bonner at the Trade Symposium 2001 of 27 November 2001.

11. See "Freight-transportation system gets more expensive, slower." *Wall Street Journal* of 27 September 2001.

12. See Leonard, J.A., 2001. "Impact of the September 11, 2001 Terrorist Attacks on North American Trade Flows." *Manufacturers Alliance e-Alert*, 2 October 2001.

new terrorist attacks could give rise to renewed security concerns with implications for the level of frictional costs to international trade (Box 3).

18. Some have likened the higher frictional trading costs for private enterprises to additional taxes on business activity or increases in border tariffs. Yet a comparison with business spending on mandatory pollution abatement equipment seems more appropriate, as the higher expenses for the private sector provide benefits to the general public (higher environmental quality and lower risk of terrorist attacks, respectively), but are not accompanied by additional tax or tariff revenues for governments. If the higher frictional costs are incurred by public sector agencies, such as in the case of additional training programmes to improve the efficiency of customs services in emergency situations, they will have to be financed through higher user fees, increases in taxes, or reductions in other government spending.

Box 3. The trade implications of further terrorist attacks

Further terrorist attacks involving the air, maritime, rail, or road system would likely trigger even tighter security measures with ensuing cost increases for transport operators and traders. If in this context increasing the number of customs inspectors and x-ray machines were seen as not providing adequate security at air and seaports or land border crossings, additional control measures, like systematically examining containers at the origin, might be envisaged. Such additional levers of control would add an entirely new category of costs to most types of imports and could have a corresponding impact on trade flows.

In air transport, an upper estimate for security-related expenses might be seen in the amount that Israel's El Al spends on checking, screening, and surveying passengers and cargo. Even though no official figures exist, it is estimated that El Al uses about 2 per cent of its revenues for security measures (for three-quarters of which it gets reimbursed by the Israeli government), i.e. almost ten times the share that North American and European airlines spent before the 11 September events.ⁱ

Other forms of terrorism could also fundamentally disrupt trade. The anthrax mailings shortly following the plane attacks on New York and Washington raised concerns about possible threats from bio-terrorism. Policies such as mandatory registration of foreign food processors with local authorities, advance notice of importation and pre-shipment inspection, and lengthened quarantine periods could easily develop into major impediments to trade.

i) See "After September 11: the challenge facing American business," The Conference Board, 28 September 2001. Other sources put the total security-related spending of El Al at 4 per cent of its costs (with the Israeli government spending the equivalent of another 3 per cent), compared with 2 per cent of costs for US airlines. See "Economic policy following the terrorist attacks," by Martin N. Baily, Institute for International Economics, October 2001.

19. Most operators will try to pass along any new frictional trading costs to their clients, although excess capacities and resulting price competition might make it difficult to raise prices in the short term. For example, during the first weeks following the 11 September attacks, many airlines actually lowered their fares for passenger transport as demand collapsed. One major reason for the demand reduction was the substantial decline in travel for tourism purposes. People were concerned about potential further attacks by terrorists and postponed or cancelled their travel plans. Destinations world-wide were affected. The lower demand for passenger transport triggered reductions in the number of flights offered and these capacity adjustments made it subsequently possible for airlines to re-adjust their prices upwards again.

20. Excess capacity has also been an issue in the cargo industry. For example, during the first nine months of 2001 freight traffic with Germany-based Lufthansa Cargo was reported to be down by 7 per cent compared with the same period in 2000, and the cargo load factor of 61 per cent was more than

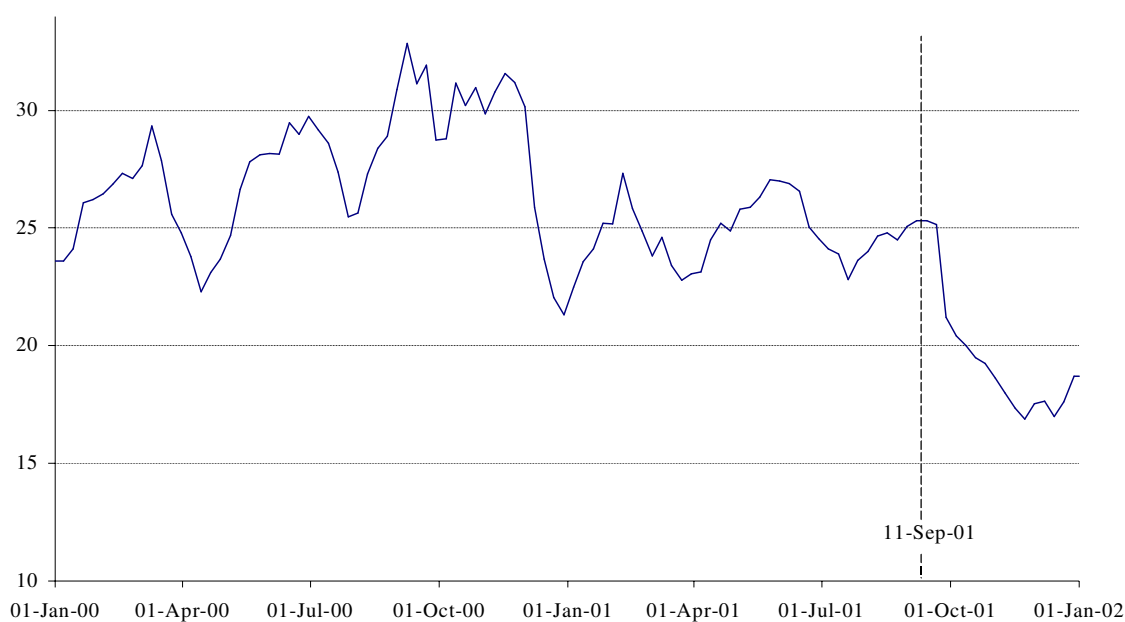
6 percentage points below the one in the previous year.¹³ Hence, airlines might not be able to pass on higher security-related costs. At the same time, developments for fuel prices have been favourable during autumn 2001, lowering overall operating costs for transport companies (Box 4).

Box 4. Developments in oil prices

Transport activities are fuel-intensive, and expenditure on propulsion fuels accounts for a large share of operating costs. Thus, increases in fuel costs have a substantial impact on transport operators. In past incidents of war and terror in the Middle East, oil prices tended to increase markedly, because of concern over a possible disruption of supplies. For example, after Iraq's invasion of Kuwait in 1990, oil prices shot up from less than \$20 to more than \$35, triggering a slowdown in global economic growth as well as a substantial increase in transport costs.

Oil price developments after the 11 September events have in comparison been rather atypical. During the first month after the events, oil prices were on average about \$4 per barrel lower than during the preceding month (see figure below). Throughout the subsequent military action in Afghanistan, oil prices stayed below \$20 per barrel. The corresponding decline in fuel costs facilitated the adjustments to new security arrangements for transport operators. Indeed, several North American and European airlines, including Northwest Airlines, British Airways, and Lufthansa, eliminated previously existing fuel surcharges that had been introduced earlier in response to then rising expenditures on fuel.

World oil prices (weekly data), Jan. 2000 - Dec. 2001 (US Dollar per barrel)



Source: OECD Secretariat based on data from the US Department of Energy.

13 . See "Lufthansa traffic falls." Air Cargo World, 30 October 2001.

21. Some researchers have empirically estimated the impact of changes in transport costs on trade. For example, a recent study of bilateral trade between 103 countries reported an elasticity of trade flows with respect to the trade cost factor of about -3, implying that a transport cost increase of 1 per cent would lead to a reduction in trade volume of 3 per cent.¹⁴ Also, concerning delays at borders, researchers estimated that the daily cost of hold-ups equals on average a 0.5 per cent ad-valorem tariff, with lower values for raw commodities and higher values for intermediate and consumer goods.¹⁵

22. The impacts of higher frictional costs following the 11 September events will vary across products and countries. In cases where frictional costs increase strongly in relative terms, importing the particular commodity from the particular country will become less attractive and buyers will tend to search for substitutes from other countries or domestic suppliers. The following sub-sections provide some discussion on the implications of changes in frictional costs across commodities and countries.

3.1 *Implications across commodities and factor movements*

23. All commodities are not going to be affected to the same extent by increased trading costs. Differences across products are due to varying ratios of transport and insurance costs to goods-value, divergences in prevailing transport modes, and differing degrees of vulnerability or danger inherent in traded products. Moreover, particular commodity groups are going to be affected to a differing extent by delays, due to their degree of perishability or role in the production process.

24. In the USA, transport and insurance costs amounted on average to 3.9 per cent of customs value in 2000 (Table 3). Yet, the cost shares ranged from about 1 per cent for pharmaceuticals to more than 23 per cent for crude fertilisers. Increases in transport and insurance costs will naturally have a greater impact on those commodities for which frictional costs are more important. Hence, trade in commodities with a high ratio of weight and volume relative to value, like fertilisers, coal, and certain fruits and vegetables, will tend to be more impeded by higher frictional costs than imports and exports of, for example, transport equipment, pharmaceuticals, and natural gas.

25. A second cross-commodity consideration concerns the prevailing transport mode. Air transport has been relatively most affected by the tightening of security after the 11 September events, so that commodities that are to a large extent shipped by aircraft will likely be subject to higher relative increases in transport costs than commodities that go normally by ship, train, or truck. Goods that are typically transported by air tend to be light, high-value products that need to be delivered quickly, as they are typically subject to frequent lifecycle or fashion changes. Examples include electronics equipment and apparel. However, as indicated in the preceding paragraph and table 3, frictional costs generally represent only a small percentage of the value of these products.

26. Thirdly, transport of dangerous materials is likely to be subjected to even tighter security regulations than before the 11 September events. The attacks on New York City and Washington, D.C., were carried out with planes fully tanked with jet fuel. This has further raised the awareness of the risk of terrorist attacks on transport of dangerous substances, like fuels, certain types of chemicals, and atomic materials, triggering additional security provisions.

14. See "Infrastructure, geographical disadvantage, transport costs and trade," by Nuno Limao and Anthony J. Venables, working paper, World Bank, 2000.

15. See "Time as a trade barrier," by David Hummels, working paper, Purdue University, July 2001.

27. Besides higher transport and insurance costs, longer delays at air and seaports, as well as land border crossings represent another type of international trade impact. Such security-related delays may make producers of perishable products, such as vegetables or fish, reluctant to ship overseas. The risk of spoilage at airports may induce producers to limit their distribution to distances that can be served by truck or train, for example.

28. Moreover, about half of all trade between the USA, Canada, and Mexico is in machinery and transportation equipment, in particular automotive products. Over the past years many automotive companies have adopted just-in-time inventory practices that depend on frequent and predictable shipments from suppliers, including those located in other countries. In this context, unforeseen delays at border crossings can have immediate, disruptive effects on production runs. According to an industry survey in the USA, 30 per cent of transportation service buyers reported that the 11 September events had a significant impact on their operations.¹⁶ In response to the disruptions industry observers expect a security driven increase in lead times that will take six to twelve months to be fully implemented, but no large-scale changes in inventory practices.¹⁷

29. In addition to impacts on trade in particular commodities, the events of 11 September could indirectly affect trade volumes by changing the travel behaviour of businessmen. Business travel is often essential for arranging contracts and making commercial transactions. A reduction of business flights due to concerns about aircraft security could to some extent be compensated for by more intensive use of teleconferencing, for example. But not all types of contacts lend themselves to these communication methods, so that a decrease of long-range business relationships and trade volumes might ensue.

30. Another differential trade impact might arise as a result of more stringent controls on people movement. In particular, additional border measures could raise impediments to services trade dependent on (mode 4) movement of service providers.

3.2 *Implications across countries*

31. It can be expected that the tightening of security measures and the impact on trade flows will be most pronounced in the countries and regions directly affected by the terrorist attacks and the subsequent "war on terror", i.e. North America and the Middle East. Hence, trade with countries in these regions might be subject to relatively steep increases in frictional costs following 11 September. Naturally, all US trade was affected by the tightening of security at US borders, but as more than 80 per cent of Canadian exports go to the USA, Canada was almost as strongly exposed to the new measures as the USA itself.

16. See "Recovery from terror," *Logistics Management*, 1 October 2001.

17. See "The impact of counter-terrorism measures on US manufacturing," by Yossi Sheffi, conference on "Global terrorism and its impact on supply chain management," MIT Center for Transportation Studies, 2 November 2001.

Table 3: Share of transport and insurance costs in US customs value by commodity group
(in per cent)

| Product | Transport and insurance costs (in per cent of customs value) | | | Customs value (in million USD) |
|--|---|-------------|-------------|-----------------------------------|
| | 1998 | 1999 | 2000 | 2000 |
| <i>Food and Live Animals (SITC 0)</i> | 7.37 | 7.53 | 7.68 | 36 792 |
| <i>of which:</i> Fish, Crustaceans, Mollusks (SITC 3) | 5.16 | 5.29 | 5.12 | 9 906 |
| Vegetables and Fruit (SITC 5) | 14.34 | 14.17 | 14.86 | 9 283 |
| Coffee, Tea, Cocoa, Spices (SITC 7) | 3.77 | 4.37 | 5.00 | 4 849 |
| <i>Beverages and Tobacco (SITC 1)</i> | 5.73 | 5.24 | 5.15 | 9 259 |
| <i>of which:</i> Beverages (SITC 11) | 6.22 | 5.55 | 5.34 | 8 132 |
| Tobacco and Tobacco Manufactures (SITC 12) | 3.23 | 3.37 | 3.78 | 1 127 |
| <i>Crude Materials, Inedible, Except Fuels (SITC 2)</i> | 7.90 | 7.63 | 7.77 | 22 366 |
| <i>of which:</i> Cork and Wood (SITC 24) | 5.53 | 4.95 | 5.64 | 8 235 |
| Crude Fertilizers (SITC27) | 23.78 | 22.44 | 23.25 | 1 401 |
| Crude Animal/Vegetable Materials (SITC 29) | 9.80 | 9.94 | 10.61 | 2 684 |
| <i>Mineral Fuels, Lubricants and Related Materials (SITC 3)</i> | 7.82 | 5.41 | 4.52 | 133 590 |
| <i>of which:</i> Petroleum, Petroleum Products (SITC 33) | 8.62 | 5.80 | 4.82 | 117 174 |
| Gas, Natural and Manufactured (SITC 34) | 2.21 | 2.04 | 1.97 | 12 899 |
| Coal, Coke and Briquettes (SITC 32) | 14.91 | 15.67 | 15.78 | 805 |
| <i>Animal And Vegetable Oils, Fats and Waxes (SITC 4)</i> | 5.43 | 5.47 | 6.63 | 1 400 |
| <i>of which:</i> Animal Oils and Fats (SITC 41) | 4.37 | 5.16 | 4.84 | 51 |
| Fixed Vegetable Fats and Oils (SITC 42) | 5.64 | 5.51 | 6.77 | 1 188 |
| Animal/Vegetable Fats/Oils Processed (SITC 43) | 4.15 | 5.21 | 6.17 | 160 |
| <i>Chemicals And Related Products, N.E.S. (SITC 5)</i> | 3.30 | 3.04 | 2.98 | 73 633 |
| <i>of which:</i> Organic Chemicals (SITC 51) | 2.91 | 2.45 | 2.16 | 28 563 |
| Medicinal/Pharmaceutical Products (SITC 54) | 0.89 | 0.79 | 1.10 | 14 694 |
| Plastics in Primary Forms (SITC 57) | 4.23 | 4.44 | 4.20 | 6 434 |
| <i>Manufactured Goods Classified by Material (SITC 6)</i> | 4.80 | 5.12 | 5.13 | 133 968 |
| <i>of which:</i> Nonmetallic Mineral Manufactures (SITC 66) | 4.86 | 5.51 | 5.50 | 25 714 |
| Iron And Steel (SITC 67) | 8.01 | 8.11 | 7.94 | 17 818 |
| Manufactures Of Metals (SITC 69) | 4.24 | 5.13 | 5.41 | 21 987 |
| <i>Machinery and Transport Equipment (SITC 7)</i> | 1.81 | 1.94 | 1.95 | 553 188 |
| <i>of which:</i> Data Processing Machines (SITC 75) | 1.59 | 1.88 | 2.20 | 92 165 |
| Electrical Machinery and Appliances (SITC 77) | 1.59 | 1.80 | 1.80 | 108 813 |
| Road Vehicles (SITC 78) | 1.88 | 1.89 | 1.73 | 161 682 |
| <i>Miscellaneous Manufactured Articles (SITC 8)</i> | 3.84 | 4.65 | 4.86 | 200 902 |
| <i>of which:</i> Furniture and Parts thereof (SITC 82) | 5.84 | 7.76 | 8.86 | 18 927 |
| Apparel/Clothing Accessories (SITC 84) | 3.68 | 4.20 | 4.38 | 64 296 |
| Miscellaneous Manufactured Articles (SITC 89) | 4.18 | 5.14 | 5.25 | 56 718 |
| <i>Commodities not Classified Elsewhere (SITC 9)</i> | 1.23 | 1.08 | 1.00 | 51 790 |
| TOTAL | 3.36 | 3.39 | 3.39 | 1 216 888 |

Note: The transport and insurance costs (in per cent of customs value) are calculated as the ratio of general import charges to general customs value. General import charges represent the aggregate costs of all freight, insurance, and other charges (excluding U.S. import duties) incurred. The customs value is the value of imports as appraised by the U.S. Customs service. This value is defined as the price actually paid or payable for a merchandise, excluding U.S. imports duties, freight, insurance, and other charges.

Source: OECD Secretariat based on data from the U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission.

32. More generally, Table 4 provides an overview of the trade exposure of different regions to North America and the Middle East. It shows, for example, that in 2000 more than half of all trade of Latin American countries was with North America, so that exporters and importers in Latin America seem strongly exposed to the increases in delays and transport and insurance costs, while traders in Central and Eastern Europe seem far less so. Moreover, trade of Asian countries seems relatively more affected by developments in the Middle East than that of other regions (not taking into account intra-regional trade between Middle Eastern countries).

Table 4: Merchandise trade with North America and the Middle East by region, 2000
(in per cent of total value of regional imports and exports)

| | Exports to North America | Imports from North America | Exports to Middle East | Imports from Middle East |
|----------------------------|-------------------------------------|---------------------------------------|-----------------------------------|-------------------------------------|
| North America | 39.7 | 26.2 | 1.9 | 2.8 |
| Latin America | 61.4 | 50.3 | 0.8 | 0.9 |
| Western Europe | 10.8 | 8.9 | 2.4 | 1.9 |
| Central and Eastern Europe | 4.2 | 2.8 | 2.4 | 0.7 |
| Asia | 25.6 | 16.0 | 2.6 | 8.8 |
| Africa | 18.3 | 10.0 | 1.5 | 8.3 |
| Middle East | 15.7 | 13.5 | 6.3 | 11.0 |

Source: World Trade Organization, *International Trade Statistics*, Geneva, 2001.

33. When this study was prepared, official statistics on actual changes in post 11 September trade flows were only just becoming available for the two to three months after the attacks. Yet, even before the terrorist attacks, growth in trade flows was expected to slow down. Based on data for the first half of 2001, the World Trade Organization forecasts an increase of world trade by merely 2 per cent for the year, compared with 12 per cent trade growth in 2000.¹⁸ This 2 per cent increase now appears optimistic, given the economic slowdown and uncertainty following the terrorist attacks. The effects of the 11 September events on trade have been felt world-wide, although it is difficult to determine to what extent the increase in frictional costs of trade, the general economic downturn, or other factors have driven the developments.

34. In the USA, goods trade turnover for the first 8 months of 2001 was already 1.9 per cent lower than in the comparable period during the previous year. The 11 September events will tend to have further accelerated the downward trend, and (non seasonally adjusted) US imports and exports in September 2001 were down by more than 15 per cent compared to the same month in the previous year (Table 5). It is expected that 2001 will be the first year since 1982 when goods trade turnover in the USA declined on a year-on-year basis. Trade in most other OECD countries also decreased in autumn 2001 (Table 5).

18. See World Trade Organization, 2001. *International Trade Statistics*. Geneva.

Table 5: Changes in value of exports and imports in selected OECD countries

| Exports | | | | | | |
|----------------|--|------------------|------------------|---|-----------------|-----------------|
| | Percentage change to same month in 2000¹ | | | Annual percentage change² | | |
| | <i>Sep. 2001</i> | <i>Oct. 2001</i> | <i>Nov. 2001</i> | <i>2000</i> | <i>2001 (f)</i> | <i>2002 (f)</i> |
| Australia | -0.5 | -1.4 | .. | 10.6 | 9.7 | 7.3 |
| Canada | -7.4 | -10.1 | -9.8 | 8.7 | -3.4 | 0.6 |
| Denmark | -8.3 | -2.2 | -0.5 | .. | .. | .. |
| EU-15 (extra) | -9.0 | -1.0 | -8.0 | .. | .. | .. |
| Germany | 1.3 | 0.7 | -4.5 | 12.5 | 3.9 | 3.1 |
| Japan | -11 | -9 | -9.2 | 9.4 | -10.0 | -1.3 |
| Korea | -17.7 | -20.7 | -17.1 | 21.6 | 2.1 | 4.7 |
| New Zealand | 7.9 | -0.6 | -3.4 | 5.6 | 5.2 | 3.4 |
| Sweden | -10.2 | -3.0 | -8.5 | .. | .. | .. |
| Switzerland | -9.0 | 4.5 | -3.4 | .. | .. | .. |
| USA | -17.6 | -13.6 | -14.2 | 11.3 | -5.2 | -3.0 |

| Imports | | | | | | |
|----------------|--|------------------|------------------|---|-----------------|-----------------|
| | Percentage change to same month in 2000¹ | | | Annual percentage change² | | |
| | <i>Sep. 2001</i> | <i>Oct. 2001</i> | <i>Nov. 2001</i> | <i>2000</i> | <i>2001 (f)</i> | <i>2002 (f)</i> |
| Australia | -10.0 | -0.8 | .. | 7.5 | 3.8 | 6.3 |
| Canada | -7.1 | -7.0 | -9.3 | 9.5 | -4.4 | 2.3 |
| Denmark | -8.9 | -5.6 | -7.1 | .. | .. | .. |
| EU-15 (extra) | -14.0 | -10.0 | -15.0 | .. | .. | .. |
| Germany | -3.5 | -3.6 | -7.0 | 10.2 | 1.8 | 3.9 |
| Japan | -7.8 | -4.6 | -7.9 | 10.9 | -3.7 | -10.4 |
| Korea | -11.9 | -18.3 | -18.3 | 20.0 | -3.6 | 7.2 |
| New Zealand | -11.6 | 2.7 | -4.5 | 3.6 | 0.7 | 2.5 |
| Sweden | -16.3 | -4.3 | -8.5 | .. | .. | .. |
| Switzerland | -6.3 | -1.5 | -12.6 | .. | .. | .. |
| USA | -15.8 | -10.5 | -13.8 | 13.5 | -3.7 | -1.9 |

Notes: 1) Data compiled from the US Department of Commerce, the US Treasury and the US International Trade Commission, Statistics Canada (seasonally adjusted data), Federal Statistical Office Germany (non-seasonally adjusted data), The Statistics Bureau and Statistics Center Japan, Statistics Sweden (seasonally adjusted data), Swiss Federal Statistical Office, Statistics Denmark, Korea National Statistical Office, Eurostat (non-seasonally adjusted data), IMF International Financial Statistics, December 2001.

2) For USA, Canada, Germany and Japan: OECD Economic Outlook forecasts; For Australia, Korea and New Zealand: Pacific Economic Outlook forecasts, International Economic Databank, The Australian National University. (f): forecast.

“..”: no information available.

Source: OECD Secretariat.

35. Non-OECD countries, particularly those in the Middle East and Central Asia, have often experienced even more marked impacts on trade flows than OECD countries, as their trading routes were directly or indirectly affected by the military action in Afghanistan. For example, in Pakistan exports decreased by about 21 per cent in the two months following 11 September, compared with the same time period in 2000. Moreover, orders placed with Pakistani exporters dropped by 40 per cent compared with

the previous year.¹⁹ Imports into Pakistan have also been affected, as some foreign exporters have reported difficulties in obtaining insurance coverage for their cargo.

36. The information on changes in imports and exports (Table 5) in the context of the 11 September events should be interpreted with care. Only some part of the changes is likely to be due to higher frictional trading costs and general economic developments and country-specific factors might well be much more important in determining the direction and magnitude of trade flows. Hence, particularly strong reductions in trade in some European and Asian OECD countries in autumn 2001 are not necessarily linked to the attacks on New York and Washington. At the time when this study was finalised, the available data did not make it possible to properly assess the impacts of the 11 September events on imports and exports in individual countries, or on trade between different regions.

4. Longer-term impacts

37. The preceding discussion provided a preliminary assessment of the effects of the 11 September events on international trading and transport activities. The analysis focused largely on the short-term effects of the terrorist attacks, and it remains unclear to what extent the generally modest, but existing increases in frictional costs will persist. Also, the impact on trade flows will depend partly on how businesses and public authorities will adjust to the new security environment. Evidence to address these longer-term issues will only become available over time, so that a certain degree of uncertainty concerning the frictional cost effects of 11 September remains.

19. See "US-Asia trade after September 11." Speech by Deputy United States Trade Representative Jon M. Huntsman, November 29.