

# IV. ECONOMIC CONSEQUENCES OF TERRORISM

## Introduction and summary

On the morning of Tuesday 11 September 2001, the United States was hit by a set of unprecedented terrorist attacks, calculated to inflict massive civilian casualties and damage. Four hijacked commercial jets crashed, two into the World Trade Center towers in Manhattan, which collapsed shortly thereafter, one on the Pentagon in Washington DC, and the last one in Pennsylvania. Over 3 000 people were killed, including hundreds of rescue personnel. The US President declared the aggression to be an act of war and in early October military action commenced in Afghanistan. Even though this was not the first attack in the United States, the horrific scale of destruction and the boldness of the terrorists ushered in a period of greater uncertainty. Half a year later, however, the direct economic effects seem to have largely vanished. The first phase of the military operations in Afghanistan was over in a matter of weeks. Confidence and equity prices bounced back rapidly. Consumption and activity showed more resilience than initially feared, not least thanks to a vigorous response by policymakers and the private sector. Even though the short-term macro-economic impact has largely dissipated, the attacks and the response they have elicited may still have long-lasting implications. In addition, further terrorist attacks remain a prominent danger, as several subsequent thwarted attempts testify.

*The terrorist attacks ushered in a period of greater uncertainty...*

This paper analyses the economic consequences of terrorism, both in terms of immediate policy response in the aftermath of the attacks and of medium-term policy implications for regulatory, trade and fiscal policy. The first section covers the short-term impact of the attacks and the crisis management decisions taken by the authorities to limit or offset their direct negative economic impact. The second section looks at the reaction of the insurance industry to the increased threat of terrorism and discusses whether governments should intervene when the private insurance sector fails to cover terrorism. The third section examines the impediments to international trade that could result from tighter security screenings of border crossings. The fourth section discusses the rise in national defence and domestic security spending, which may divert resources away from directly productive uses and contribute to a deterioration of the fiscal outlook.

*... with possible medium-term economic consequences*

A first main message of this paper is that the vigorous policy response after the attacks has played a very important role in averting a short-term negative economic impact. A second message is that medium-term policies aimed at enhancing protection against the threat of terrorism need to be properly designed. This has several policy implications:

- Crisis management played a key role after 11 September to restore confidence, safeguard the financial system and avoid a self-fulfilling depression. Decisions taken by the Federal Reserve, other central banks and governments were essential in this respect. One lesson of this crisis is that when policymakers have to

*Good crisis management helped restore confidence rapidly*

take rapid decisions in an environment of deep uncertainty and imperfect information, priority ought to be given to liquidity management. Financial support to any sector or industry should focus on short-term loans or guarantees, rather than on grants or other direct budget outlays. After the immediate crisis response, more attention can be devoted to longer-term measures, if necessary.

*New market-based insurance mechanisms are emerging*

- In reaction to the attacks, the insurance industry raised its premiums, reduced coverage and called on governments to step in and cover risks deemed too large for the private sector. Indeed, risks related to terrorism are difficult to price, not least because of the possibility that several catastrophic events occur at once (correlated risk). However, private sector initiatives specifically tailored to provide insurance for this type of risk are emerging. Market-based instruments, such as catastrophe bonds, are also available, although they are at present not actively traded. Private sector coverage of some types of terrorism risk may therefore be restored in the future. Government intervention to fill the gap in the meantime should be considered with caution and limited in time and scope. Mega-terrorism risk poses special challenges that cannot be fully addressed by the private sector and may require international action.

*Tighter border controls could have detrimental economic consequences*

- The disruptions in the transportation system following the attacks have illustrated the importance of efficient and open borders for the daily operations of firms. The just-in-time supply chain management system, increasingly common in industry, depends to a large degree on the efficiency of border crossings. The severe tightening of border controls following the September attacks resulted in long waiting times that disrupted the operations of manufacturing companies, especially at the US-Canada border. Border controls have now been relaxed and waiting times reduced, but some observers feel that the porosity of borders creates a security threat. Attempts to reinstate comprehensive controls at the borders would have long-lasting detrimental consequences for economic growth. Industrial sources estimate that proposed security measures may increase the *ad valorem* cost of trading internationally by 1 to 3 percentage points. Given that the elasticity of trade flows with respect to transaction costs may be in the –2 to –3 range, this could lead to a significant drop in international trade, negatively affecting openness, productivity and medium-term output growth. Thus, the right balance between efficiency and security at the border needs to be found, preferably in agreement with trading partners and on a non-discriminatory basis.

*Public spending on security threatens fiscal consolidation*

- To combat terrorism, public spending on homeland security and military operations has been raised significantly in the United States and to a lesser extent in other OECD countries. Private sector spending is likely to be on the rise as well to improve the security of premises, employees and information. This may crowd out the accumulation of directly productive capacity, increase the cost of capital, raise wages and divert research and development (R&D) activities toward military projects. Therefore, the benefits associated with the peace dividend may be reduced. Rough calibrations suggest that an increase in public military-security spending by 1 per cent of GDP and private security spending by 0.5 per cent of GDP would reduce output by about 0.7 per cent after five years. Hence, the step-increase in anti-terrorism spending ought to be accompanied by a hard look at the costs and benefits of other military programmes, along the lines of what is intended more generally in the budget for non-defence spending. In addition, tighter security may reduce the level of productivity as, for instance, waiting times lengthen at airports

and borders. Public financial support to strategic industries (such as aviation) and protectionist measures could also distort competition and reduce productivity growth. Although these effects should remain small based on measures currently announced, caution needs to be exercised.

## Short-run impact and crisis management

The 11 September attacks inflicted casualties and material damages on a far greater scale than any terrorist aggression in recent history. The destruction of physical assets was estimated in the national accounts to amount to \$14 billion for private businesses, \$1.5 billion for State and local government enterprises and \$0.7 billion for Federal government.<sup>1</sup> Rescue, cleanup and related costs have been estimated to amount to at least \$11 billion. Lower Manhattan lost approximately 30 per cent of its office space and scores of businesses disappeared. Close to 200 000 jobs were destroyed or relocated out of New York City, at least temporarily.<sup>2</sup> Within weeks of the attacks, bio-terrorism came to the fore. Lethal anthrax spores were found to have contaminated mail, causing several deaths. At the same time, awareness of a number of other sources of threats increased. Concerns were raised about the vulnerability of critical infrastructure (power plants, nuclear facilities, chemical factories, dams, bridges, pipelines and water supply). The threat of mega-terrorism ceased to be considered as pure fiction (Box IV.1).

*The scale and impact of the attacks dwarfed earlier ones*

### The adverse conjunctural impact was sharp but temporary...

By early September 2001, household and business confidence in the United States as well as in most other OECD countries had already weakened considerably compared with their 2000 peaks (Figure IV.1). The attacks further dented confidence. In the United States, consumer and business surveys showed falls in the overall confidence measures akin to those observed in the wake of the Iraqi invasion of Kuwait in 1990, and much larger than those following terrorist attacks in the 1990s. In Europe and Japan, confidence was also weakened, albeit less sharply. Forecasters responded with one of the largest one-time collective downward revisions in recent history. Thus, the consensus forecast for US real GDP growth was instantly downgraded by 0.5 percentage point for 2001 and 1.2 percentage points for 2002 (Figure IV.2). The implied projected cumulative loss in national income through the end of 2003 amounted to 5 percentage points of annual GDP, or half a trillion dollars.<sup>3</sup>

*Confidence sagged...*

With production severely disrupted and consumers temporarily limiting shop visits, real GDP shrank in the third quarter. But in the fourth quarter, demand held up better than initially feared, and GDP increased. Private sector fixed investment registered a steep decline, and inventories were slashed. Offsetting these forces, however,

*... but in the event, activity held up fairly well...*

1. These property losses are reflected in the national accounts as an increase in the consumption of fixed capital and therefore a reduction in net domestic product, but not in GDP, which measures the production of goods and services.
2. See DRI-WEFA (2002).
3. It should be borne in mind, however, that in September 2001, forecasters were most probably on course to revise their projections downwards anyhow, so that not all of the observed revision can unambiguously be ascribed to the terrorist attacks.

### Box IV.1. How to prepare for the risk of mega-terrorism

Over the past few decades, dozens of aggressive movements have emerged espousing varieties of nationalism, religious fundamentalism, fascism and apocalyptic millenarianism. Terrorist threats and actions have come in many guises, including aircraft hijackings in the 1970s, the 1983 suicide attack on US and French contingents of the multinational peacekeeping force in Beirut, the 1993 attack on the World Trade Center, the 1993 bombing in the City of London, the 1995 sarin gas attack in the Tokyo metro and the 1996 bombing of a US military compound in Saudi Arabia, which put terrorism at the forefront of the subsequent G7 summit. Recent terrorist attacks (Oklahoma City, Khobar Towers, US Embassies in Kenya and Tanzania) have been increasingly more destructive and claimed a growing number of victims.

The 11 September attacks exceeded in scale and audacity those of previous events. Yet, attacks on an even broader scale may occur. The US government, intelligence and military leadership have warned that new attacks may happen in the near future. Attacks using weapons of mass destruction, although considered to have a remote probability, are not ruled out by security experts. The US government is taking the risk seriously and has reportedly activated, immediately after the 11 September attacks, a contingency plan (*Continuity of Operations Plan*) that involves housing senior officials in nuclear shelters.<sup>1</sup> The US Vice-President is also subject to special security procedures.

According to security specialists, terrorists could at some stage attempt to explode a nuclear device or release contagious viruses in a populous metropolitan area.<sup>2</sup> During the Cold War, the Soviet Union developed "suitcase" nuclear bombs that could be carried by a single person. Although the Russian authorities have taken steps to protect nuclear material from theft, it is not clear that all devices can be accounted for.<sup>3</sup> Even a crude nuclear device could create an explosive force of 20 000 tons of TNT, demolishing an area of about three square miles. If detonated in lower Manhattan, the whole Wall Street and financial district would be destroyed. Hundreds of thousands of people would die suddenly.

Assessing the economic impact of such a terrorist attack is nearly impossible. Nonetheless, orders of magnitude may be helpful to evaluate what governments would have to deal with. An attack against, for instance, New York City using a nuclear weapon could leave most of the metropolitan area uninhabitable for years. The direct impact would reduce the country's production potential by about 3 per cent,<sup>4</sup> that is, the equivalent of a small OECD country's GDP. The brunt of the direct impact would be borne by the financial industry, which represents the bulk of the city's economy. Wall Street would be closed for a protracted period of time and the recovery of financial transactions would depend on the availability of back-up facilities and data duplication. Hence, supervisory measures to ensure the continuity of businesses after a destructive attack may be desirable.<sup>5</sup> Another local impact with broad implications would be the severe disruption to the transportation system. New York's port and airports would be closed for a long time, and other transportation facilities would be subject to severe security measures, meaning a much slower and less predictable delivery system.

Nation-wide, both household and business confidence would be badly shaken, as well as the trust in the Government's capacity to protect the country. The displacement of the surviving population to non-contaminated areas would create the need for new housing. As standard insurance policies exclude nuclear attacks, the cost of reconstruction would fall on the budget, and the fiscal outlook would deteriorate markedly. The existing shrinkage of coverage for terrorism-related risks would also leave most businesses dangerously exposed. Over the long term, such an attack would sharply reduce the readiness of persons and businesses to agglomerate in metropolitan areas.<sup>6</sup> The trend would therefore be to disseminate in less populated areas, which may have a negative impact on innovation and productivity growth. Overall, a second terrorist attack could have longer-lasting effects, especially one using weapons of mass destruction. In view of this, preparedness should be seen as essential, even if the possibility of such an attack is considered as remote.

1. *Washington Post*, 3 March 2002.

2. See Stern (1999).

3. See Allison (2001).

4. The gross state product of the State of New York was \$755 billion in 1999, about 8 per cent of the country's GDP. Using labour force statistics, the city of New York appears to account for about 40 per cent of the State. Hence, a rough estimate is that New York City represents about 3 per cent of the country's total output.

5. See Ferguson (2002).

6. See Glaeser and Shapiro (2001).

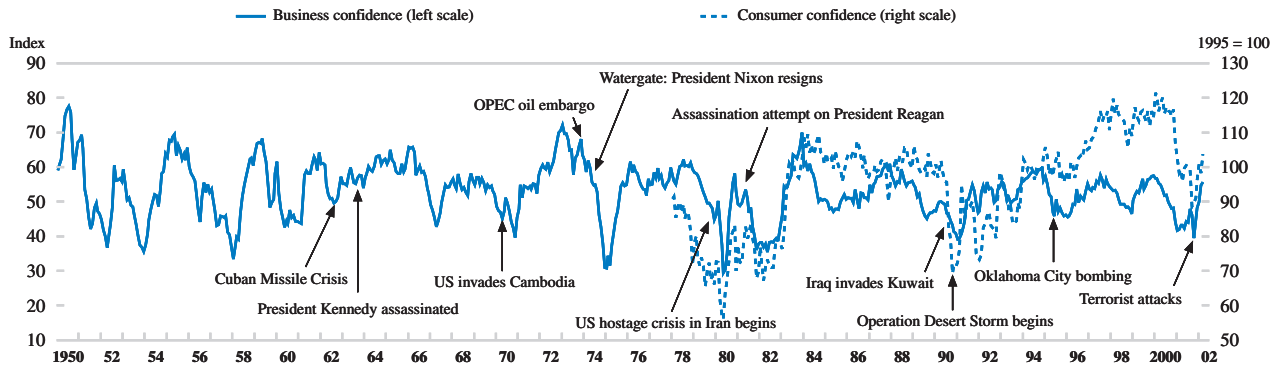
were household consumption, helped by falling energy prices, and government spending. Defence spending, in particular, grew by about 9½ per cent in real terms in the fourth quarter, at a seasonally adjusted annual rate.

#### *... even though some sectors and countries were hard hit*

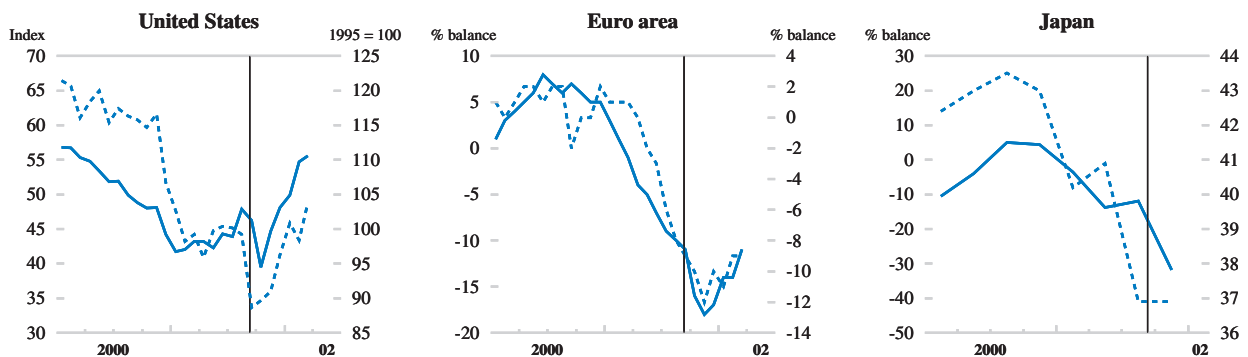
While overall demand proved fairly resilient, a number of sectors were hit hard. Airlines, many of which were already in mediocre financial shape prior to the attacks, suffered a substantial loss in capital and in demand, both in the United

Figure IV.1. Confidence

## A. United States over the long run



## B. Since January 2000



Source: OECD, *Main Economic Indicators*.

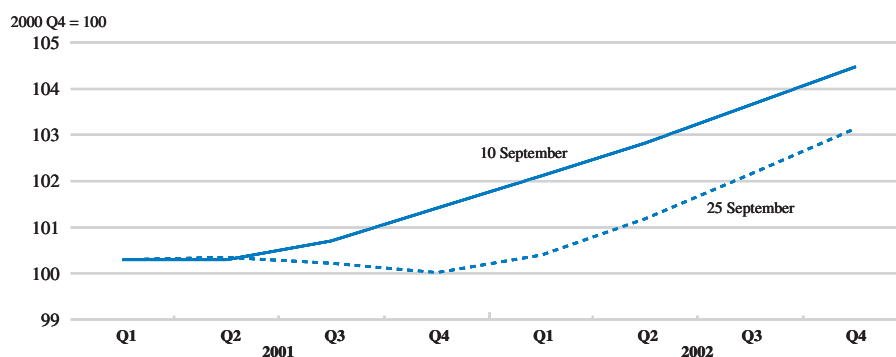
States and in many other OECD countries. Aircraft manufacturers almost immediately saw orders curtailed. The insurance sector faced a catastrophe of unprecedented severity. Hotels, restaurants, travel agencies and other tourism-related businesses confronted a sharp drop in demand, in the United States but also in many other countries, in particular in the Caribbean and in the Middle East. Some sectors or firms, however, witnessed an increase in demand, notably in the area of security and information technology.

The initial reaction of the financial markets was a “flight to quality”. Equity prices tumbled. Spreads between corporate and government bond yields, as well as spreads between emerging market and US bond index yields widened. Implied volatility as derived from traded options on equity indices, government bond prices, short-term interest rates, exchange rates and commodities spiked upwards. These indicators pointed both to lessened risk appetite and to higher perceived risk.<sup>4</sup> But as during earlier wartime episodes (Table IV.1), equity prices soon bounced back,

*Following a brief dip,  
asset markets recovered*

4. Separating the two is difficult. For a recent attempt, see Kumar and Persaud (2001).

Figure IV.2. **A step-adjustment in forecasts**  
US real GDP level



Source: *Consensus Forecasts*, various issues, Consensus Economics Inc.

in many cases to well above their 10 September levels. In addition, spreads had generally narrowed and implied volatility had declined significantly. On the whole, the shock to financial markets thus seems to have been largely transitory.

Table IV.1. **Stock price recoveries**

<i>S&amp;P 500, per cent changes</i>			
	Reaction period	Reaction	One year later <sup>a</sup>
Pearl Harbor	7 to 29 Dec. 1941	-10.2	15.3
Korean War	23 June to 17 July 1950	-12.9	31.4
Cuban missile crisis	23 Aug. to 26 Oct. 1961	-8.8	36.6
Tet offensive, Vietnam War	31 Jan. to 5 Mar. 1968	-5.6	13.7
Iraqi invasion of Kuwait	2 Aug. 1990 to 16 Jan. 1991	-11.1	32.3
11 September, 2001	11 to 19 Sep. 2001 <sup>b</sup>	-7.0	15.0

a) Six months later in the case of the 11 September attacks.

b) The reaction period is defined as ending when the US military build-up starts.

Sources: Bank of England, *Financial Stability Review*, December 2001 and OECD.

## Large temporary liquidity injection by the Federal Reserve safeguarded the financial system

### *Liquidity was injected on an unprecedented scale*

The attacks destroyed or disabled whole portions of New York's financial infrastructure, with potentially devastating domestic and international reverberations. Financial markets were shut down, and remained closed until Monday 17 September. The Federal Reserve instantly indicated that it stood ready to inject virtually unlimited amounts of liquidity to avoid payment failures and cascading defaults.<sup>5</sup> Against this

5. The Federal Reserve's New York trading desk, operating from its primary emergency backup site, engaged in massive repo operations. The Federal Reserve also lent money directly to banks through the discount window, lifting the stigma normally associated with this facility. Furthermore, the Federal Reserve gave credit for deposited checks being cleared through its books before the amounts were deducted from other banks' accounts. It also kept the Fedwire open late into the night to facilitate payment execution.

background, the effective Federal funds rate plunged to levels last seen in the early 1960s, troughing at 1.2 per cent on 19 September. On the international front, the Federal Reserve established or expanded 30-day swap lines with the European Central Bank, the Bank of England and the Bank of Canada, totalling a record \$90 billion, so as to enable them to provide dollars to their financial institutions. These and other major central banks also provided their market participants with extra liquidity.

In the days following the attacks, important efforts were made to rebuild communication and power connections and to ensure the smooth and timely reopening of markets. As the financial markets and payment infrastructure returned to normal, loans were repaid, and the temporarily bloated balance sheet of the Federal Reserve shrank rapidly. Over the next two days, the effective Federal funds rate moved back up to around 3 per cent. As in previous episodes of financial stress – such as the 1987 stock market crash, the 1998 Russian default and Long Term Capital Management (LTCM) debacle, and the Y2K scare – the Federal Reserve managed to preserve the integrity of the financial system.<sup>6</sup>

*Soon, settlements returned to normal*

## The macroeconomic policy response was vigorous and swift

Monetary policy was eased aggressively, with central banks around the world lowering interest rates substantially in the weeks following the attacks. In the United States, the fiscal response was also swift. On 14 September, just three days after the attacks, Congress cleared a \$40 billion emergency spending package.<sup>7</sup> A few days later, Congress authorised \$5 billion in direct grants plus \$10 billion in federal loan guarantees for the US airlines.<sup>8</sup> Limited discretionary fiscal stimulus action was taken in other OECD countries, not least because many of them had less room for manoeuvre. State aid was granted to airlines in the European Union as compensation for the losses resulting directly from the four-day closure of US airspace, but on a smaller scale.<sup>9</sup>

*Monetary policy was eased and emergency spending was authorised*

The US authorities also promptly took a number of regulatory measures. Border controls were tightened. An executive order was issued freezing the US assets of terrorists, terrorist organisations and their sponsors and associates, and banning financial dealings with them. At the international level, the mandate of the Financial Action Task Force (FATF) was broadened.<sup>10</sup> Security-related restrictions were imposed or reinforced in most OECD countries. Governments also stepped in to provide

*Regulatory policy measures were taken*

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6. The fact that banks and securities firms generally had strong capital bases and sound liquidity positions also helped to avoid a systemic breakdown after the attacks.
  7. At least half of the money was to be used for relief related to the destruction in Manhattan, at the Pentagon and in Pennsylvania.
  8. While the grants were swiftly disbursed, only one company requested a loan guarantee. The guarantees are not very attractive as they are conditional on the beneficiary giving the government options on its own stock.
  9. For example, France granted 55 million euros. Rescue financing was arranged for Swissair and Sabena, which went bankrupt.
  10. On 31 October 2001, the FATF agreed to a set of Special Recommendations on Terrorist Financing which commit members to: take immediate steps to ratify and implement the relevant United Nations instruments; criminalise the financing of terrorism, terrorist acts and terrorist organisations; freeze and confiscate terrorist assets; report suspicious transactions linked to terrorism; provide the widest possible range of assistance to other countries' law enforcement and regulatory authorities for terrorist financing investigations; impose anti-money laundering requirements on alternative remittance systems; strengthen customer identification measures in international and domestic wire transfers; and ensure that entities, in particular non-profit organisations, cannot be misused to finance terrorism.



temporary backstop insurance for terrorism risk, although in the United States more ambitious initiatives to that effect failed to be approved by Congress.

*Overall, good crisis management lessened the economic impact*

Overall, the short-term adverse economic impact of the attacks was far less than feared initially, thanks in large part to good economic crisis management. The Federal Reserve, the Administration and Congress acted quickly to restore confidence, inject liquidity and provide resources to deal with the consequences of the attacks. Lowering the price of credit and temporarily providing vast amounts of liquidity helped safeguard the integrity of the financial system and save firms from bankruptcy, and was perhaps more important than bailing out firms with budgetary resources. International co-operation, not least at the level of the monetary authorities, also helped.

## Medium-term economic consequences

*Medium-term consequences should not be under-estimated*

Even though the strong policy response mitigated the short-term direct impact, medium-term implications from the attacks should not be under-estimated. In general, little research is available regarding the long-lasting impact of terrorism. A case study on the terrorism-prone Spanish Basque region suggests a permanent drop in output, but this is largely related to the displacement of economic activities to more secure regions and does not apply to a large national economy.<sup>11</sup> Half a year after the events, nonetheless, it appears clearly that three important consequences will be long-lasting: insurance coverage for terrorism-related activities is more difficult to obtain and premiums have increased considerably; pressure is mounting to tighten security at the borders and better screen the vast flows of merchandise entering OECD countries; public spending on security and military operations is on the rise. These three channels are discussed below.

### The shrinkage of affordable insurance coverage: should governments intervene?

*Insured losses were the largest ever...*

The losses from the terrorist attacks for the insurance industry (including reinsurance) are estimated at between \$30 billion and \$58 billion, with the main uncertainty deriving from payments on liability insurance. The attacks represented the largest insurance event in history, dwarfing the \$21 billion of losses incurred when Hurricane Andrew hit Florida in 1992.<sup>12</sup> Even if the final cost is close to the lower estimate, insured losses in 2001 are likely to have been the highest ever (Figure IV.3).

*... but no major bankruptcy has occurred*

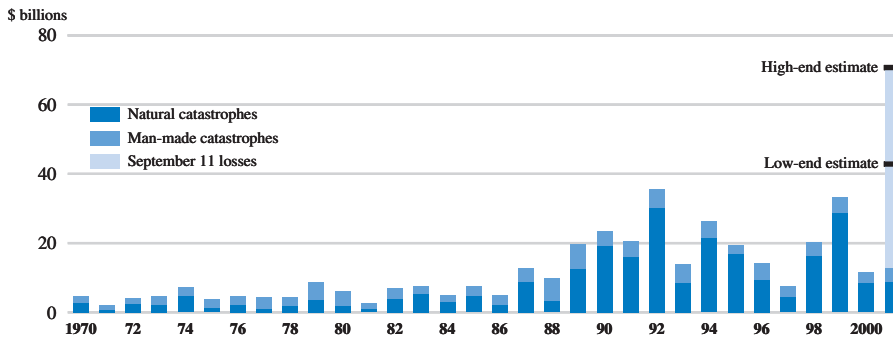
In spite of the magnitude of these payments, no major bankruptcies have occurred in the industry, in part because the risk was spread over a number of companies and countries. It is estimated that reinsurers, most of them European, will

11. See Abadie and Gardeazabal (2001).

12. As of the end of January 2002, claims for \$27.4 billion had been filed, mostly for commercial insurance. Claims from the 1993 bombing of the World Trade Center amounted to \$0.5 billion. The 1992 Los Angeles riots were the most expensive man-made disaster to date, with claims of \$0.8 billion. These costs were almost entirely concentrated in property insurance claims. In contrast, the 11 September attacks have led to claims on a variety of types of policies: life, property, auto, airplane, workers compensation and business interruption insurance.



Figure IV.3. Insured losses  
2001 prices



Source: Swiss Re, Economic Research & Consulting and OECD.

incur over half of the losses. The capital base of many insurance and reinsurance companies has been severely hit, the shock having come on top of a series of other recent disasters (including some major storms) and portfolio losses associated with stock market declines. As a result, it is likely that several companies would not be in a position to withstand another shock of a similar magnitude.<sup>13</sup>

Following the attacks, primary insurers and reinsurers have hiked their premiums and curtailed or dropped altogether coverage for terrorism-related risk.<sup>14</sup> The hikes in insurance premiums have hit several industries. The strongest impact has been on aviation, but other sectors, including transportation, construction, tourism and energy generation have also been affected. Overall, it is estimated that commercial property and liability insurance rates have been raised by 30 per cent on average, with “target” structures such as chemical and power plants and “iconic” office buildings seeing steeper increases. This should be seen in the context of a sharp decline of premium rates in the 1990s, which in the case of reinsurance, had only started to be reversed in 2000 (Figure IV.4). Even with the projected hikes, reinsurance rates should remain well below the peaks reached in 1993, especially given enhanced competition in the industry, which limits the scope for further rate increases.

*Insurance rates have risen from low levels*

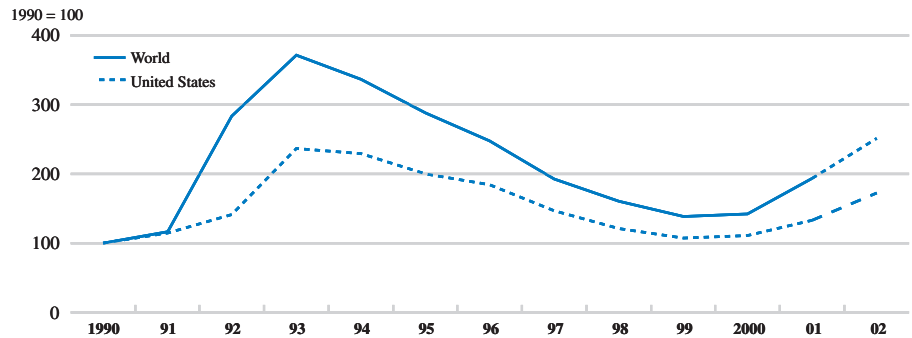
Another channel through which developments in the insurance sector may have economy-wide implications is the reduction in coverage. Uncertainty negatively affects the capital accumulation process and the existence of instruments to share and limit risk – which help reduce uncertainty – are often associated with increased investment.<sup>15</sup> These instruments have included over time the creation of limited liability corporate structures, the development of hedging instruments in financial markets and the growth of the insurance industry, the size of which is positively correlated with GDP. To the extent that it increases uncertainty related to investment decisions, reduced insurance coverage may thus have a negative impact on growth.

*Coverage has been reduced*

13. See Cummins *et al.* (2002).

14. US General Accounting Office, 2002.

15. See Bassanini and Scarpetta (2001), Dixit and Pyndick (1994), Hartman (1972) and Leahy *et al.* (2001).

Figure IV.4. Reinsurance rates<sup>1</sup>

1. "Rate on line" data, referring to the rate which, when multiplied by the indemnity, would produce the premium. Dotted line for 2002 are Secretariat estimates, assuming a 30 per cent increase in rates.  
 Source: Guy Carpenter ([www.guycarp.com](http://www.guycarp.com)) and OECD.

*Insurance firms will eventually price terrorism risk*

The reduction in the coverage of risks is in large part the result of the difficulties insurance firms face in pricing large terrorist attacks. Until 11 September, the risk of a large magnitude event was considered low and was seldom formally incorporated into premium rates. Primary insurers and reinsurers are now facing the complex task of pricing the risks related to terrorism, which is difficult not least because it involves "correlated risk", *i.e.* the possibility that several catastrophic events occur simultaneously. With time, however, insurance companies will become better equipped to model "patterns" and risks of terrorist attacks, much as they already do for natural catastrophes. Indeed, a group of European insurance and reinsurance companies has recently announced their intention to set up a pool to cover against some types of terrorism risk. In the United States, airlines are in the process of creating a mutual company, Equitime, with similar purposes, although the proposed scheme has the Government act as a reinsurer of last resort.<sup>16</sup> Finally, the use of mechanisms to transfer insurance risks to the financial markets could also play an important role in increasing coverage against terrorism. The market for insurance bonds – sometimes known as "catastrophe bonds" – launched in 1996, has remained thin, as the fear of information asymmetries reduced demand and the availability of cheaper sources of finance discouraged issuance from insurance companies.<sup>17</sup> It is conceivable, however, that the increase in the industry's capital needs and ongoing efforts to repackage insurance bonds in forms more familiar to financial markets may increase liquidity and lead to a larger role for capital markets in providing alternative risk transfer mechanisms in the future.<sup>18</sup>

*Hence, long-lasting government intervention is not always justified...*

The efficient modelling of "patterns", the building of adequate private insurance capacity and the development of risk transfer mechanisms for terrorism insurance are likely to take a few years. In the meantime, incomplete markets for sharing risk may be construed as a market failure, which could in theory justify government intervention.

16. Several insurance or reinsurance companies, specialised either in terrorism risk insurance or in the aviation industry, have also been created in the Bermudas since the attacks.
17. See Niehaus (2002). Insurance ("catastrophe") bonds are debt instruments carrying a premium reflecting the agreement by investors to forgive some of the principal and/or interest payment in case a specified catastrophe occurs.
18. See A.M. Best's Review, February 2002. Since 1996, approximately \$13 billion of insurance bonds have been issued – a relatively small amount.

Indeed, several OECD governments have long had schemes in place to cover terrorism risk (Box IV.2). Many of those schemes were introduced to deal with a particular set of political events, which had led to a re-evaluation of risks and the reduction of coverage. Often, they were thought of as a temporary state response to market failure, in the expectation that with time, the insurance industry's capacity would develop and efficient risk-sharing arrangements would be re-established. The fact that many of these schemes have endured beyond their original mandate is an indication that either the market failure was not temporary or that government intervention crowded out private sector responses. Finally, the design of support schemes is necessarily dependent on the particularities of domestic judicial processes. For instance, the *Pool Re* scheme in the United Kingdom, which does not provide reinsurance for liability coverage, would be less applicable in the United States, where the judicial system allows a much wider scope for litigation on third-party liability cases. These differences also complicate international pooling efforts.

Overall, even though it has been hit by the largest amount of reimbursements ever recorded, the insurance industry has escaped bankruptcy, and some large reinsurers are still able to distribute dividends to their shareholders. In reaction to the terrorist attacks, commercial insurance premium rates have been raised significantly, but this partly offsets the decline recorded in the last decade. This pricing power encourages the entry of new capital in the industry, which will spur competition and help contain further rate increases. More worrying is the shrinkage of coverage for

*... and should be limited in scope*

#### Box IV.2. State mechanisms to provide insurance or reinsurance against terrorism risk

Several OECD countries that have experienced lasting pressures from terrorists have established government-sponsored insurance coverage schemes.

In the UK, a pool reinsurance company, *Pool Re*, was established in 1993 to ensure the continued availability of insurance cover for damage and loss caused by terrorist actions, which had become largely unavailable after a spate of IRA attacks. *Pool Re* functions as a reinsurance company for its (voluntary) members, while the Government provides reinsurance to *Pool Re*. The first £100 000 lies with primary companies, with *Pool Re* intervening only above that amount. Losses from underwriting activities are covered by accumulated premia or, if needed, by an additional call on members (limited to 10 per cent of the annual premium). Beyond that, claims are met by the Government. This scheme enables insurers to cover terrorism without the need to restrict the sums insured, but does not encompass third-party liability insurance.

In Spain, the state insurance compensation fund (*CCS, Consorcio de Compensación de Seguros*) was created in 1928 and now covers a variety of "extraordinary" risks, including terrorism. Premia are collected through a surcharge on all policies in specific risk categories. Traditionally, *CCS* has provided subsidiary cover and served as a guarantor if a primary insurer is declared insolvent, so it did not technically provide reinsurance. After the 11 September attacks, however, the fund has started providing reinsurance

for air transportation against war and terrorism risks (third party liability only).

In France, since December 2001, the state-owned *Caisse Centrale de Réassurance* under government guarantee, covers physical and property damages caused by terrorism attacks above an annual 1.5 billion euros ceiling. Under this amount, the insurance and reinsurance markets cover the risks. Other countries that have special mechanisms to deal with terrorism risks include South Africa (where *SASRIA, the South African Special Risk Insurance Association*, created in 1979, insures against political risks) and Israel (where the Property Tax and Compensation Fund, financed by a nation-wide property tax, covers property and casualty insurance claims from terrorism-related losses). Several countries, including Switzerland and Japan, have some type of government scheme to insure against "catastrophes", but these do not specifically include terrorism.

In the United States, following the 11 September attacks, the administration proposed a transitional three-year "Share Loss Compensation Programme" to address the risk of a shrinkage of affordable insurance. Under the programme, which has not been approved by Congress, the share of insurers in loss compensation would have been capped (as a percentage of total losses), with Government stepping in beyond that limit. The cap was to be increased gradually until 2004, when government involvement would have been phased out.

commercial properties deemed too risky and for terrorism risk altogether. The private insurance sector may eventually decide to re-enter the market for some types of terrorism-related risks, but such a prospect is at present elusive not in the least because the industry may not be in a position to face losses of a similar magnitude of that of 11 September. Hence, close monitoring is warranted. If government involvement proves justified, it should be limited in scope, be conceived in partnership with the private sector and be accompanied by the introduction of some type of user fee. In that regard, multi-pillar risk sharing mechanisms, involving insurers, reinsurers, pooling structures, capital markets, and possibly governments as a last resort insurer may offer a valid alternative. Government involvement is likely to be especially justified in the case of potential losses arising from mega-terrorism (such as a nuclear attack), which is typically excluded from standard insurance policies. In that regard, international options may also be considered.

### **Increased shipping costs: is there a trade-off between efficiency and security?**

#### ***The attacks led to short-term disruptions in transportation***

Following the 11 September terrorist attacks, the air transportation system was shut off for four days and the Port Authority of New York and New Jersey closed its operations for two days. More generally, the US transportation system was subject to severe disruptions largely resulting from the tightening of security measures. The most severe disruption occurred at the US-Canada land border, where on average half a million vehicles and \$1.4 billion in bilateral trade cross each day. There, beside the opportunity cost of long waits, the slowdown of border crossings had a strong impact on the operations of firms, especially in the automotive industry, where the breakdown of just-in-time supply chains led to several factory shutdowns on both sides of the border.<sup>19</sup> As security measures were gradually lifted, and more security personnel was hired, the flow of trucks across the land borders was brought back close to normal, with the average crossing time only slightly longer than before the attacks. The signing in December 2001 of the US-Canada “smart border” initiative to facilitate trade through improved technology, co-ordination and information sharing helped in this regard.<sup>20</sup>

#### ***New security measures have been introduced for air and sea shipments***

Beyond the short-term impact, tighter security requirements and a series of surcharges have also affected the cost of transporting goods by sea and air. For international sea shipments, this has included notification requirements, more frequent Coast Guard inspections and tugboat escort obligations, which have resulted in increased costs and longer waiting times. For airfreight, higher security-related costs at airports led to the application of security charges, higher commercial insurance premia and war surcharges for certain sensitive regions.<sup>21</sup>

#### ***Underlying transportation costs may have increased***

In spite of the new security requirements, six months following the attacks most available indices show little evidence of an increase in shipping costs and some of them have declined. Maritime shipping rates increased by 5 to 10 per cent on average

19. See Andrea and Smith (2002).

20. In March 2002, a similar initiative for the US-Mexico border was unveiled.

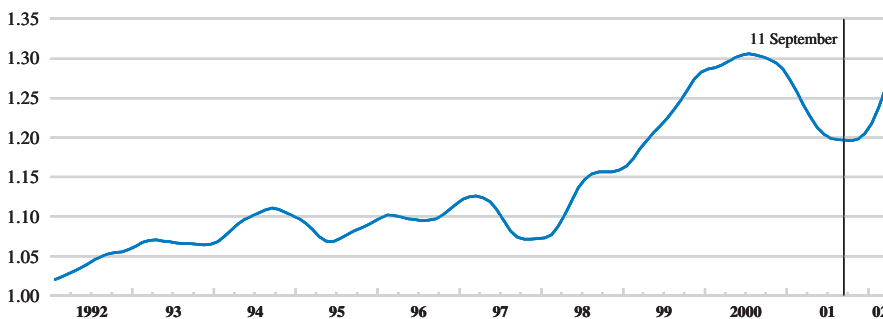
21. Security charges for airfreight have been increased by \$0.10 to \$0.15 per kilogram of cargo in North America, Europe and Asia. Commercial insurance premia were raised for both sea and air cargo, by between 0.03 and 0.05 per cent *ad valorem*. War surcharges have been applied to ocean freight cargo transiting the Middle East, the Red Sea, the Suez Canal and the Eastern Mediterranean. Besides neighbouring countries, this has also affected important Europe-Far East trade lanes (OECD, 2002).

in the two weeks following the attack, but that rise was soon reversed. Airfreight rates, on the other hand, were about 10 per cent higher in late 2001 than before the attacks.<sup>22</sup> Given the sharp deceleration of aggregate demand observed since 2000 and the drop in fuel costs following the attacks,<sup>23</sup> a steeper decline in freight costs should have occurred (Figure IV.5). The relative resilience of freight rates, despite lower fuel costs and under-utilised shipping capacity, would tend to suggest that underlying transportation costs may have increased.

Even though transportation is subject to more security screening than before the attacks, especially air transport, some observers remain concerned that US borders are still too porous and that, as a consequence, the country is vulnerable to further terrorist attacks.<sup>24</sup> Permanently tighter security measures have been advocated to make the borders less permeable. For example, the US Coast Guard has proposed to the International Maritime Organisation a series of measures for the prevention and suppression of acts of terrorism against shipping, and the US Customs Service has recommended initiatives to increase the security of containers, which account for some 60 per cent of the volume of world trade. For that purpose, it has been proposed that work start in partnership with authorities responsible for the ten large ports that account for nearly half the containers shipped to the United States.<sup>25</sup> This would involve improved procedures and technology, requiring significant capital investment in ports, ships and containers. Cargo originating in one of these ports would then be able to go through

*Further security requirements are being advocated...*

Figure IV.5. **Transportation costs**<sup>1</sup>  
Cass Price Index



1. "Transportation costs" refer to an implicit price index based on the Cass Information Systems index of the transport industry in the United States (see [www.cassinfo.com/jfrindex.html](http://www.cassinfo.com/jfrindex.html) for details). The index is calculated as the ratio between shipment expenditure and shipment volumes, is seasonally adjusted and slightly smoothed.

Source: Cass Information Systems and OECD.

22. The Bank of Japan estimates that the international air freight transportation cost index in December 2001 was 11.2 per cent higher than three months earlier. Ocean freight rates on the other hand, were 1.2 per cent down in the same period (Bank of Japan Monthly Report on the Corporate Service Price Index, December 2001).

23. According to the Air Transport Association, the average price of fuel used by the US airline industry has fallen from 92.2 cents a gallon in December 2000 to 79.6 cents in September 2001 and 60.1 cents in December 2001. Fuel costs account for between 10 and 15 per cent of total operating costs in the US airline industry – compared with 0.3 to 0.6 per cent for insurance costs and 1.8 to 2 per cent of total operating expenses for landing fees.

24. See Flynn (2002).

25. The ten ports are Bremerhaven, Genoa, Hong Kong, Kaohsiung, Pusan, Rotterdam, Shanghai, Singapore, Tokyo and Yantian.

### Box IV.3. What future for supply chain management after the attacks?

The disruptions caused by the terrorist attacks have raised concerns for the future of the supply chain management model increasingly used by firms in OECD countries. After 11 September, the US authorities have tightened security compliance requirements. More careful background checks are being required for truck drivers, tugboat escort requirements in ports are more stringent, access to aircraft cargo bays has been restricted and the transport of hazardous material is more closely regulated. Insurance rates have also been raised and security surcharges added. All these security measures involve additional costs and can lead to more unpredictable transit times. Although those effects are small under present circumstances, they may be large enough to encourage industries to reconsider the reliance on just-in-time inventory management and include just-in-case buffers in their stocks. This could have an impact on the cost of carrying inventories.<sup>1</sup>

Business logistics (*i.e.* the management of inbound material resources and outbound products) represent a sizeable, though declining, fraction of overall production costs. Estimates by sector specialists put annual spending on business logistics in the United States at about \$1 trillion in 2000.<sup>2</sup> This includes approximately \$590 billion in transportation costs, the bulk of it being accounted by truckload and air-freight services.<sup>3</sup> The cost of carrying inventories is estimated at \$380 billion per year, which includes capital cost, management of stocks, insurance, inventory depreciation and warehousing facilities. The remainder is accounted by administrative costs.

This cost of business logistics is estimated to have fallen from 16 to 10 per cent of GDP during the last twenty years, for two main reasons. *First*, improved supply chain management models have made it possible for companies to operate with thinner inventories and therefore cut back on carrying costs. Indeed, some companies in the automobile or computer sectors are reported to operate with only one or two days of stocks of material inputs. Thus, the sharp fall in overall inventories, from 25 to 15 per cent of GDP in the last twenty years, presumably stems from the increased reliance on just-in-time models. *Second*, the cost of transportation services has dropped in relation to other producer prices since the deregulation of the early 1980s.

The terrorist attacks could encourage companies to hold larger inventories as a precaution against possible disruptions in the supply chain. It is admittedly difficult to estimate what new level of inventories businesses would be comfortable with. For illustrative purposes, raising inventories back to the level of 1990 in relation to GDP would require approximately \$300 billion in working capital. This would in turn impose an inventory carrying cost of about \$75 billion per year (0.7 per cent of GDP). Some companies have indeed announced that they would raise their level of input inventories as a precaution against the uncertainty of deliveries. The trend of private stocks therefore should be kept under monitoring, although some time will be needed to distinguish between short-term cyclical movements and structural changes.

1. See MIT Center for Transportation Studies (2001).

2. See Delaney and Wilson (2001).

3. Measuring the production of the transportation sector is fraught with numerous difficulties. The US Bureau of Economic Analysis and the Bureau of Transportation Studies produce Transportation Satellite Accounts attempting to assess the contribution of transportation to overall output. For 1996, the value-added of the transportation sector is estimated at \$379 billion, the equivalent of 4.8 per cent GDP, significantly less than the cost measured by sector specialists, perhaps because of differences in definitions and methodology.

more expeditious custom procedures when entering the United States, effectively zooming through a “fast lane”.

*... but they are likely to lead to higher costs*

These proposed new security requirements are likely to affect the cost of transporting goods across borders, through both higher direct costs and longer delivery times. Affordable airfreight and the decline in overall shipping costs have been important factors shaping supply chain management over the last decade.<sup>26</sup> A number of industries have internationalised their supply chains and introduced just-in-time systems, most of them highly dependent on the speed and reliability of delivery provided by an efficient transportation system. This has increased opportunities for global specialisation of production and allowed a reduction in business inventories and their related carrying costs (Box IV.3). This greater openness to international trade has contributed to the increase in productivity levels over the

26. Bovet and Sheffi, 1998.



#### Box IV.4. The cost of trading internationally

In spite of the long-term decline in transportation and transaction costs, there is strong evidence that national borders and geography still impede international trade and investment. It is estimated that on average trading internationally costs between 10 to 25 per cent more than trading domestically.<sup>1</sup> This is the result of several factors, including tariffs, non-tariff barriers, currency conversion costs and differences in legal and payments systems, as well as shipping costs.

- Average tariff rates in OECD countries (on a domestic-production-weighted basis) vary between 3 and 10 per cent. Non-tariff barriers are estimated to have an effect in the same order of magnitude (Anderson and Neary, 2001). These barriers can be significantly steeper for “sensitive” products however, including steel, textiles, footwear and agricultural products.
- The cost of border clearance, which includes the cost of collecting, producing, transmitting and processing required information and documents, can also be significant. These “compliance” costs are estimated at between 2 and 7 per cent *ad valorem*,

but can be considerably higher in some developing countries.<sup>2</sup> Once the cost of time delays is added, border clearance can cost between 5 and 13 per cent of the value of the traded good.<sup>3</sup>

- Shipping costs vary widely, depending *inter alia* on the good shipped, the origin and destination. The share of transportation and insurance costs in the custom value of goods traded by the United States has remained relatively stable at about 3½ per cent in the past few years, with insurance alone typically costing between 0.10 and 0.15 per cent *ad valorem*. There are wide differences however, between for example trade in medicinal and pharmaceutical products (classified under SITC 54) and trade in vegetables and fruits (SITC 05) – with shipping costs at respectively 1 and 15 per cent of customs value in 2000. Average costs are typically higher for other countries, with less efficient port facilities and less significant economies of scale and scope in the shipping industry.

1. See Obstfeld and Rogoff (2001).

2. See OECD (2002), Ernst and Whinney (1987) and European Commission (1999).

3. It is estimated that each extra day of shipping time is worth on average 0.5 per cent *ad valorem* (Hummels, 2001).

last decade, and has therefore helped increase potential output.<sup>27</sup> It has also been an important factor in spurring growth in emerging economies and combating poverty in many regions of the developing world. Reversing the trend towards higher affordability of transportation and tightening border crossing indiscriminately would risk scaling back openness and could have a long-lasting negative impact on growth both OECD-wide and among non-member economies.

Overall, industry experts have estimated soon after the attacks that the total cost of security-inspired measures could amount to between 1 and 3 per cent *ad valorem*.<sup>28</sup> At first glance, this range pales compared with other costs of trading internationally (Box IV.4). The direct impact on trading costs is, however, of a similar scale to that of the reduction in developed countries’ bound tariffs on the imports of industrial goods, of 2.5 percentage points, agreed under the Uruguay Round.<sup>29</sup> To the extent that the extra cost applies to international trade only, it will increase the cost of foreign goods compared with domestic ones. Even small differences in the cost of trading internationally, compared with domestically, may suffice to explain a strong home bias in goods spending. Thus, the trade costs associated with international transactions is found to explain a substantial portion

*Even small increases in costs can have a strong impact on trade*

27. Bassanini and Scarpetta, 2001.

28. See Leonard (2001).

29. Although the direct impact on trading costs is of a similar scale, the welfare effect of changes in tariff rates are different, since account needs to be taken of dynamic (secondary) effects, including on government revenues. Bound tariffs on developed country imports of all industrial products were reduced from 6.3 to 3.8 per cent on average with the Uruguay Round of multilateral trade negotiations.



### Box IV.5. The impact on developing countries

The limited short-term economic impact of the attacks on advanced economies helped allay fears over the fallout on developing countries. The widening of bond spreads, the fall in commodity prices and the weakening of currencies that plagued many emerging markets soon after the attack, have been quickly, if sometimes only partly, reversed. If domestic demand recovers as expected in OECD countries, prospects for emerging markets should improve further.

Over the longer term however, the overall impact of the terrorist attacks on developing countries could be substantial. This impact could come from three main channels: shipping costs, the tourism industry and workers' remittances:

- The effect of the proposed tightening of security on the cost of trading internationally is likely to be asymmetrical. Developing country exports often have higher *ad valorem* transportation costs (notably bulky commodities and perishable goods transported by air) and should thus be affected disproportionately. A “certification” procedure with selected foreign ports could be discriminatory if developing country ports fail to qualify. “Know-your-partner” initiatives, whereby pre-registered intermediaries go through simplified border procedures, may also favour large trading companies over smaller developing country-based firms. These proposed measures risk creating a “slow lane” for developing country exports, increasing relative compliance costs and eroding their competitiveness.
- Heightened fear of travelling following the attacks led to a number of cancellations and a drop in new bookings. Reservations world-wide fell by an estimated 12 to 15 per cent in October 2001 compared with the previous year, and had still not fully

recovered by early 2002 according to the World Tourism Organisation. In developing countries, travel services account on average for about 7 per cent of total exports of goods and services and 2 to 3 per cent of GDP. The number is considerably higher in the Caribbean, the South Pacific and for some countries in the Middle East and North Africa region (Egypt, Jordan, Morocco and Tunisia) as well as in South and Southeast Asia (Nepal, Sri Lanka, Thailand and Vietnam). The drop in tourism traffic has also been asymmetrical, with some of the countries that depend most heavily on the industry experiencing the largest number of cancellations. Although the tourism industry is expected to recover as consumers gradually revert to a business-as-usual attitude towards travelling, the increase in the perception of risk for some destinations is likely to be more permanent.

- For security reasons, visa requirements and the control of illegal immigration have started to be tightened in advanced countries.<sup>1</sup> This has the potential to lower the number of developing country workers employed abroad, affecting the level of remittances. The fact that a disproportionate share of these emigrants work in the tourism industry (hotels especially) should also affect transfers. Emigrants' remittances are an important source of income for most of Central America, the Caribbean and South Asia, as well as for some countries in the Pacific and in Southeast Asia. Although the exact level of transfers is difficult to determine, since part of them transit through unofficial channels, emigrants' remittances are higher than exports for several countries.<sup>2</sup>

1. Human Rights Watch, 2001.

2. Puri and Itzema, 1999.

of observed international market segmentation.<sup>30</sup> Hence, the possibility that security measures may have a significant impact on trade flows should not be discarded. Elasticity of trade flows with respect to transaction costs are estimated to range between  $-2$  and  $-3$ , implying that even a relatively small increase in the costs of trading internationally in the order of 1 per cent would lead to a drop in trade flows of between 2 and 3 per cent.<sup>31</sup>

#### *A co-operative approach is needed*

Even though a trade-off between security and efficiency of border crossings cannot be fully avoided in the short-term, it is likely that this trade-off can be eliminated in the medium-term. New security measures can be formulated in a

30. See Frankel (2000), Obstfeld and Rogoff (2001) and Parsley and Wei (2000). Obstfeld and Rogoff discuss the role of international trading costs in the existence of a strong home bias in goods spending, as well as in the holding of assets and in the financing of investment expenditures.

31. See Limão and Venables (2001).

way that does not diminish the efficiency of merchandise border crossings. New regulations should for instance be subject to risk-management analyses to ensure that they address the most critical risks. The additional costs can also be minimised by a co-operative approach between the private and the public sector in both the design and implementation phases. Security measures should be introduced with a sufficiently long implementation lag and enough flexibility to allow business to find the least costly way of meeting new requirements. The air cargo security regime introduced by the United Kingdom in the wake of the Lockerbie disaster of 1988 is a good example in this regard. The global impact of security measures should also be carefully taken into account. Bilateral agreements between customs authorities to organise “fast lanes” for containers originating from secure ports appear at first glance to be an efficient solution, but they could be discriminatory, especially against developing countries (Box IV.5). International co-operation and consensus building would help make new security measures more efficient while reducing their potentially negative impact on trade flows.

### The impact of growing security and military spending: has the “peace dividend” been reversed?

Immediately after the attacks, the US Administration and (to a lesser extent) other OECD governments increased public spending to help reconstruction, strengthen domestic security and combat terrorism. These additional appropriations resulted in a sharp increase of general government spending in the fourth quarter of 2001, which helped support aggregate demand and avoid a decline in domestic output. Such a temporary increase is not unusual after large catastrophes or natural disasters (Table IV.2) such as the Kobe earthquake or the windstorms that struck part of Europe in December 1999.

*US government spending increased sharply*

Further to this additional appropriation, the President has requested from Congress an expansion of security-related programmes in the context of the budget for FY2003. Additional spending of \$48 billion was proposed for national defence (an increase by

*Further increases are planned...*

Table IV.2. Fiscal support to domestic demand in the aftermath of selected catastrophes

*saar in per cent*

Episode	Public spending in the subsequent quarter		
	quarter-on quarter change	contribution to GDP	
Italy	November 1980 earthquake	4.1	0.9
Spain	August 1983 flood	3.1	0.5
United States	August 1992 hurricane Andrew	2.1	0.4
United States <sup>a</sup>	January 1994 Los Angeles earthquake	0.7	0.1
Japan <sup>b</sup>	January 1995 Kobe earthquake	3.5	0.8
Turkey <sup>c</sup>	August 1999 earthquake	13.1	1.1
France	December 1999 storms	3.6	0.9
<b>United States</b>	<b>11 September 2001 attacks</b>	<b>10.2</b>	<b>1.8<sup>d</sup></b>

a) The increase in the next following quarter was much higher (+8%).

b) The increase in the next following quarter was much higher (+15%).

c) Refers to government consumption spending only.

d) Of which 0.7 percentage points at the federal level, with half thereof falling under national defence.

Source: OECD.

14 per cent from the previous year). In addition, the President asked Congress for an appropriation of \$38 billion to boost “homeland security”, compared to \$20 billion spent in 2001. This seeks to improve the preparedness of “first responders” (firemen, police, rescue workers), enhance defences against biological attacks, secure borders and improve information sharing, and includes \$8 billion for domestic defence spending.<sup>32</sup>

*... and will require additional government borrowing*

The additional spending is being financed by government borrowing. There is little indication that taxes will be raised to finance this effort. The Administration has proposed to hold back the increase in other non-discretionary spending to no more than 2 per cent in nominal terms. This would require an unprecedented degree of discipline in such spending, which might not be accepted by Congress.

*Spending will increase to a lesser extent in other countries*

Other Member countries do not appear to have increased their security-related budgetary spending to a similar extent, but have nonetheless diverted resources within existing budgets to improve preparedness and finance counter-terrorism actions. Thus, additional resources are being devoted to the military and the police in several cases (Table IV.3). Canada has started to implement a five-year programme to fight terrorism, costing 0.7 per cent of GDP. Germany has approved an anti-terror package equivalent to 0.1 per cent of GDP. The armed forces in the United Kingdom have requested an additional 0.7 per cent of GDP to meet the requirements of the war against terrorism. Limited information is readily available for the time being on actions taken by other OECD countries (a better picture will emerge when draft budgets for 2003 are presented). Based on anecdotal evidence, it seems that both military and domestic security spending is set to rise, although less than in the United States.

*This additional spending does not entirely reverse the peace dividend*

The recent rise in security spending started from a relatively low initial level, as most North Atlantic Treaty Organisation (NATO) countries had reduced military spending since the 1980s. In the United States, defence spending dropped to 3 per cent of GDP in 2000, well below the peak of over 6 per cent of GDP at the climax of

Table IV.3. Spending on defence and police in selected countries

*As a percentage of GDP*

	2000			2001			2002		
	Defence	Police	Total	Defence	Police	Total	Defence	Police	Total
United States <sup>a</sup>	3.0	0.1	3.1	3.0	0.1	3.1	3.3	0.1	3.4
Japan <sup>a</sup>	1.0	0.1	1.0	1.0	0.1	1.0	1.0	0.1	1.1
Germany <sup>b</sup>	..	..	1.3	..	..	1.3	..	..	1.3
France	2.6	0.3	3.0	2.6	0.3	2.9	2.5	0.3	2.8
Italy <sup>c</sup>	1.1	1.5	2.6	1.2	1.5	2.8	1.3	1.6	2.8
United Kingdom <sup>a</sup>	1.9	0.8	2.7	1.9	0.9	2.7	1.8	0.9	2.7
Canada <sup>a</sup>	..	..	1.3	..	..	1.5	..	..	1.5

*Note:* Figures in this table are based on national budgets (and not on national accounts) and are therefore not strictly comparable across countries.

*a)* Fiscal year basis, federal (or central) government only.

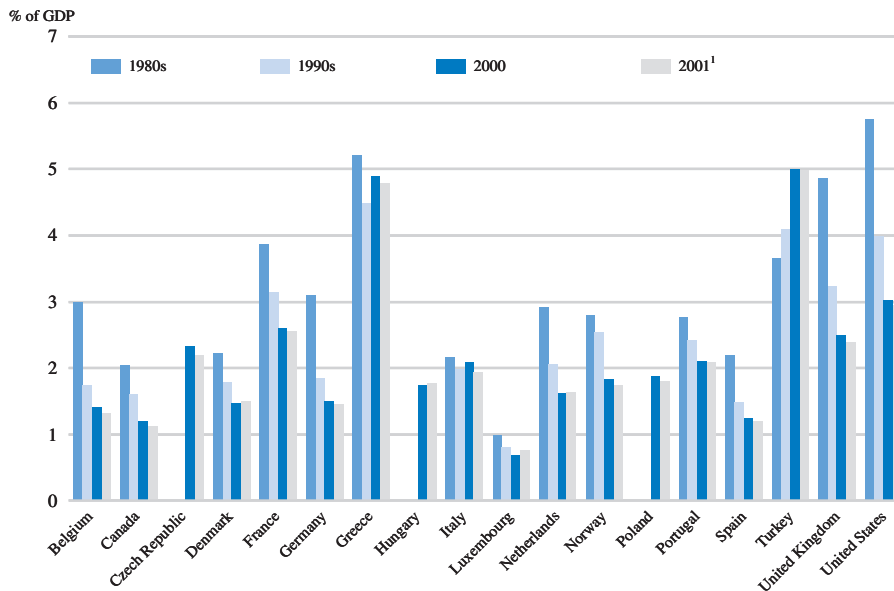
*b)* Includes an anti-terrorism package equivalent to 0.07 per cent of GDP in 2002 which is budgeted as a separate item from defence and public order. There is a break in functional budget definitions between 2000 and 2001 for defence.

*c)* State sector (central government).

*Source:* National budgets.

32. In March 2002, an additional \$27 billion emergency funding request was made, involving supplemental appropriations for FY2002 (of which \$19 billion going to defence and homeland security).

Figure IV.6. Military spending in NATO countries  
Current spending as a percentage of GDP



1. Estimates.  
Source: NATO.

the Cold War build-up in the mid-1980s. The proposed increase of national defence and homeland security outlays in the United States would keep spending below 4 per cent of GDP, *i.e.* below the levels recorded until the mid-1990s (Figure IV.6). The increase in military spending actually started before the recent terrorist attacks. World military expenditure<sup>33</sup> reached a low point in 1998 and increased subsequently. All of this suggests that the era of the so-called “peace dividend” is winding down and that OECD economies have entered a new era of increased spending on military operations and domestic security. If previous periods of military build-ups are used to draw a parallel, such increases in public spending could undermine the trend of fiscal consolidation.

The impact of military spending on economic growth has been the topic of theoretical and empirical research, as the “peace dividend” associated with the end of the Cold War was expected to result in positive welfare gains. Analyses suggest that military spending affects medium-term growth negatively through several channels (such as lower capital accumulation, reduced civilian labour force, losses resulting from capital reallocation). Empirical studies have, however, produced ambiguous results. Econometric studies typically have difficulties identifying the impact of military spending on growth because such spending boosts growth in the short-run, even though it may lower it after a lag. Some earlier research suggests a significant negative impact of military spending on growth using panel data estimation, but more recent work finds no strong relations between military expenditure and either investment or growth.<sup>34</sup> Overall,

*Increased spending may divert resources from productive use*

33. There are several widely known databases on military spending: data compiled by the Stockholm International Peace Research Institute (SIPRI) are considered to be the best for the purpose of economic analysis because they apply a consistent definition of expenditure across countries (SIPRI, 2002); other publicly available international databases are kept by the NATO and the International Monetary Fund (IMF).

34. See Knight *et al.* (1996), Ramey and Shapiro (1998) and Smith and Dunne (2001).

the conventional wisdom is that military build-ups are likely to have a detrimental long-term impact on economic growth, but this impact is likely to be small, and in any case much smaller than other traditional determinants of growth.<sup>35</sup>

*Private sector spending on security is also on the rise*

In addition to the rise in public spending, it is likely that private sector spending on security is rising as well. Limited data are available on private security spending, but it may attain \$40 billion annually in the United States.<sup>36</sup> Nearly half of the total spending for security by the private sector is composed of a single category, security guards and other protective service employees. The rest of the spending falls into such categories as alarms systems, computer security, locks and safes, fencing, surveillance cameras, safety lighting and guard dogs. This considerable amount is comparable to what is spent on Federal, State and local police, excluding the armed forces. Higher private spending on security would involve hiring more labour, such as information and communication technology (ICT) experts and security guards protecting commercial premises, and would therefore reduce the level of labour productivity. Like pollution-reducing spending, private efforts to enhance security improve welfare, but do not produce output the way it is traditionally measured. Other security measures, such as time-consuming controls at airports and borders, would also lead to a lower level of productivity. The medium-term impact of a sharp increase in private security spending is, however, generally gauged to be small. A doubling of private security spending might reduce the level of potential output by 0.6 per cent after five years and the level of private sector productivity by 0.8 per cent.<sup>37</sup>

*Higher security spending could have adverse effects in the long run*

The increase in public and private sector spending on domestic security and the armed forces, even though it does not reverse the peace dividend, cannot be considered as entirely negligible. To calibrate the possible economic impact, the US block of OECD's Interlink model was used to simulate a permanent increase of military spending by 1 per cent of GDP and of government employment by 0.5 per cent of the labour force, spread between 2001 and 2003 and financed by government borrowing. Private spending on security is assumed to increase permanently by 0.5 per cent of GDP. The short-term boost on aggregate demand would increase output above the baseline level during three years. Afterwards, however, higher real long-term interest rates, assumed to exceed the baseline by 30 basis points, would weigh on capital accumulation. The level of labour productivity would be reduced by 0.5 per cent over three years and the real exchange rate would appreciate by about 3 per cent. Hence, starting in the fourth year, output would start falling below the baseline level. After five years, real GDP would be reduced by about 0.7 per cent compared to the baseline.<sup>38</sup> The lesson of this simulation is that public expenditure restraint needs to be exercised, so that high public borrowing does not undermine potential growth and labour productivity is not unduly reduced.<sup>39</sup>

*To sum up*

Overall, even though the short-term recovery from the terrorist attacks has been faster than expected, negative medium-term consequences through various indirect channels cannot be excluded. As noted, the rise in security-related public and private

35. Smith and Dunne (2001) for instance calculate that, based on commonly accepted parameters, an increase in military spending by one percentage point of GDP is likely to reduce potential output growth by 0.25 per cent during a transition period.

36. See Anderson (1999).

37. See US Council of Economic Advisors (2002) and Hobijn (2002).

38. The decline in welfare from heightened security risks is likely to exceed this figure. This cannot be easily captured by this type of exercise, however.

39. See Baily (2001).

spending is likely to have a small, permanent negative effect on production factors and the level of productivity. The shrinkage of terrorism-related insurance coverage may have a detrimental impact on investment, as lenders become wary of greater potential risks, although there is no strong evidence yet of such a pattern. The international trade system is dangerously exposed, with potentially large repercussions for supply chain management. Another devastating terrorist attack would exacerbate these trends. In sum, close attention needs to be paid to the medium-term consequences of terrorism. Measures to reduce the risk and the economic consequences of further attacks should be both security-effective and growth-friendly.

## BIBLIOGRAPHY

- ABADIE, A. and J. GARDEAZABAL (2001),  
 “The economic costs of conflict: a case-control study for the Basque country”, *NBER Working Paper*, No. 8478.
- ALLISON, G. (2001),  
 “Could worse be yet to come?”, *The Economist*, 1 November.
- ANDERSON, D. (1999),  
 “The aggregate burden of crime”, *Journal of Law and Economics*, Vol. 42, No. 2.
- ANDERSON, J. and J. NEARY (2001),  
 “The mercantilist index of trade policy”, *mimeo*, Boston University and University College, Dublin, July.
- ANDREA, D. and B. SMITH (2002),  
 “The Canada-US border: an automotive case study”, Center for Automation Research, Ann Arbor, Michigan, January.
- BAILY, M. (2001),  
 “Economic policy following the terrorist attacks”, *International Economic Policy Briefs*, Institute for International Economics, October.
- BASSANINI, A. and S. SCARPETTA (2001),  
 “The driving forces of economic growth: panel data evidence for the OECD countries”, *OECD Economic Studies*, No. 33, 2001/2.
- BOVET, D. and Y. SHEFFI (1998),  
 “The brave new world of supply chain management”, *Supply Chain Management Review*, Spring.
- CUMMINS, J., N. DOHERTY and A. LO (2002),  
 “Can insurers pay for the ‘big one’? Measuring the capacity of the insurance market to respond to catastrophic losses”, *Journal of Banking and Finance*, Vol. 26, No. 2-3.
- DELANEY, R. and R. WILSON (2001),  
 “Managing logistics in a perfect storm”, Presentation of the 12th annual “State of Logistics Report”, National Press Club, Washington DC.
- DIXIT, A. and R. PYNDICK (1994),  
*Investment under Uncertainty*, Princeton University Press, Princeton.
- DRI-WEFA (2002),  
*Financial Impact of World Trade Center Attack*, Prepared for the New York State Senate Finance Committee, January.
- ERNST & WHINNEY (1987),  
 “The cost of ‘Non-Europe’: border related controls and administrative formalities”, in: *Research on the Cost of “Non-Europe” – Basic Findings*, Vol. 1 (Commission of the European Communities).
- EUROPEAN COMMISSION (1999),  
 “Trade facilitation in relation to development”, submission of the European Communities to the World Trade Organisation, G/C/W/143 and WT/COMTD/W/60.
- FERGUSON, R. (2002),  
 “A supervisory perspective on disaster recovery and business continuity”, Remarks delivered before the Institute of International Bankers, 4 March, Washington DC.
- FLYNN, S. (2002),  
 “America the vulnerable”, *Foreign Affairs*, Vol. 81, No. 1.
- FRANKEL, J. (2000),  
 “Globalization of the economy”, in *Governance in a Globalizing World*, J. Nye and J. Donahue (Eds.), Brookings Institution Press, Washington DC.



- GLAESER, E. and J. SHAPIRO (2001),  
“Cities and warfare: the impact of terrorism on urban form”, *NBER Working Paper*, No. 8696.
- HARTMAN, R. (1972),  
“The effects of price and cost uncertainty on investment”, *Journal of Economic Theory*, Vol. 5, No. 2.
- HOBIIJN, B. (2002),  
“What will homeland security cost?”, Federal Reserve Bank of New York, *mimeo*, February.
- HUMAN RIGHTS WATCH (2001),  
“No safe refuge: the impact of the September 11 attacks on refugees, asylum seekers and migrants in the Afghanistan region and worldwide”, *Human Rights Watch Backgrounder*, October 18.
- HUMMELS, D. (2001),  
“Time as a trade barrier”, Purdue University, *mimeo*, July.
- KNIGHT, M., N. LOAYZA, and D. VILLANUEVA (1996),  
“The peace dividend: military spending cuts and economic growth”, *IMF Staff Papers*, Vol. 43, No. 1.
- KUMAR, M. and A. PERSAUD (2001),  
“Pure contagion and investors’ shifting risk appetite: analytical issues and empirical evidence”, *IMF Working Paper*, No. 01/134.
- LAKE, A. (2000),  
*6 Nightmares*, Little, Brown and Company, New York.
- LEAHY, M., S. SCHICH, G. WEHINGER, F. PELGRIN and T. THORGEIRSSON (2001),  
“Contributions of financial systems to growth in OECD countries”, *OECD Economics Department Working Papers*, No. 280.
- LEONARD, J. (2001),  
“Impact of the September 11, 2001 terrorist attacks on North American trade flows”, Manufacturers Alliance/MAPI e-Alerts, October, Arlington, Virginia.
- LIMAO, N. and A. VENABLES (2001),  
“Infrastructure, geographical disadvantage, transport costs and trade”, *World Bank Economic Review*, Vol. 15, No. 3.
- MIT CENTER FOR TRANSPORTATION STUDIES (2001),  
“Global terrorism and its impact on supply chain management”, Audio Conference (<http://web.mit.edu/cts/www/news/current/terrorism.htm#jitua>).
- NIEHAUS, G. (2002),  
“The allocation of catastrophe risk”, *Journal of Banking and Finance*, Vol. 26, No. 2-3.
- OBSTFELD, M. and K. ROGOFF (2001),  
“The six major puzzles in international macroeconomics: is there a common cause?”, *NBER Macroeconomics Annual 2000*, MIT Press, Massachusetts.
- OECD (2002),  
“The impact of the terrorist attacks of 11 September 2001 on international trading and transport activities”, Working Party of the Trade Committee, March, TD/TC/WP(2002)9/FINAL.
- PARSLEY, D. and J. WEI (2000),  
“Explaining the border effect: The role of exchange rate variability, shipping costs, and geography”, *NBER Working Paper*, No. 7836.
- PURI, S. and T. RITZEMA (1999),  
“Migrant worker remittances, micro-finance and the informal economy: prospects and issues”, *International Labour Organization Social Finance Unit Working Paper*, No. 21.

- RAMEY, V. and M. SHAPIRO (1998),  
“Costly capital reallocation and the effects of government spending”, *Carnegie-Rochester Conference Series on Public Policy*, Vol. 48, No. 1.
- SMITH, R. and P. DUNNE (2001),  
“Military expenditure growth and investment”, *mimeo*, Birbeck College and Middlesex University Business School, April.
- STERN, J. (1999),  
*The ultimate terrorists*, Harvard University Press, Cambridge.
- STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE (2002),  
*Recent Trends in Military Expenditure*, [www.sipri.org](http://www.sipri.org)
- UNITED STATES COUNCIL OF ECONOMIC ADVISORS (2002),  
*Economic Report of the President*, Washington DC.
- UNITED STATES GENERAL ACCOUNTING OFFICE (2002),  
*Terrorism Insurance: Rising Uninsured Exposure to Attacks Heightens Potential Economic Vulnerabilities*, GAO-02-472T, Washington DC.