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**Assessing the economic effects of the terror attacks  
on the US in September 2001:  
Growth prospects, trade patterns and the shipping market**

by

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**Abstract**

Surveying available evidence at the current stage (April 2002), this report argues that the effects of the terror attacks in September 2001 on global business cycle conditions, trade and economic growth were essentially temporary. So far it is hard to see that the “global macroeconomic picture” would have been much different without the attacks. Looking at the shipping market, it turns out that the events of September 11 did not include any of the elements, which traditionally warrant a strong response in freight volumes or freight rates. The identified direct effects of the attacks on the shipping market are of minor importance compared to the more general patterns of development in the world economy. We still note – as a part of our pessimistic scenarios – that subsequent developments related to the attack may trigger a serious escalation of international tensions (politically and trade matters), which may hurt economic growth and trade significantly.

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## 1. Introduction

### *Issue at hand*

This report assesses the impact of the terror attacks against the US on September 11 2001 (and the subsequent developments related to this event) on global business cycle conditions and growth prospects in general – and on trade patterns and the shipping market in particular. Throughout the chapter we attempt to disentangle the effects of this act of war from the more general effects of the developments in the US economy prior to September 11. We recall, of course, that US economic growth had slowed down to almost zero several months *before* the terror attacks took place. Moreover, we also recall that the recent downward revision of the US productivity growth figures for 1999 and 2000 – from astonishing levels fueling the “new economy” craze to more normal levels – had nothing to do with terror events. Thus, the overall issue is to assess the incremental effects of the terror attack in a situation, which in September 2001 already was characterized by both a business cycle slump (later officially defined as a recession by the NBER) and a less upbeat consensus view on the long-run trend growth rate of the US economy.<sup>1</sup>

As our point of departure, we discuss the various potential aggregate economic spill-over channels for transmission of the negative shock caused by the terror attacks on the US. The next step is to consider i) the significance of the various effects and channels, ii) the magnitudes involved, and iii) the effects on trade volumes and the shipping market. Section 2 surveys some experience from previous shocks and international crises with a particular focus on the shipping market. Then we consider the effects and prospects for aggregate economic activity in the global economy in section 3. Section 4 deals with trade patterns and the shipping market. Finally, section 5 offers some final remarks

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<sup>1</sup> On February 11 2002, it was officially announced by the US National Bureau of Economic Research’s (NBER) “Business Cycle Dating Committee” that a US recession started in March 2001. It follows that the NBER’s definition of a recession is not fully consistent with the usual rule of thumb, which defines a recession as a period of at least two consecutive quarters with negative GDP growth. The US GDP contracted in the third quarter of 2001 – but grew by 1.4 per cent (annualized) in the fourth quarter of 2002.

### *Spill-over channels*

The effects on the domestic US aggregate economy of the terror attack on September 11 works through several channels:

- *The direct and immediate effects of the loss of lives and destruction of buildings and equipment on southern Manhattan:* While the cruelty of the terror attacks is obvious to everybody, it is still clear that the direct effect on US GDP is small – and compares for example to the effects of a major earthquake.
- *The indirect effects on consumer confidence and business sentiment:* From a macroeconomic point of view these effects are potentially much more important than the direct effects. Clearly, the terror attacks may alter the expectations of households, investors and business executives about future economic conditions. More pessimism is likely to trigger slower consumption growth and less real investment spending, which both contribute to slower GDP growth.
- *The intermediate and long-run effects of induced changes in resource allocation and economic behavior:* These effects are hard to assess, but may still have strong effects on productivity, growth and welfare. What we have in mind is the potential effects of e.g. more investments in defence and security measures. Such investments do not contribute to the economic wellbeing of the average citizen in a direct sense. These investments may also introduce higher indirect costs related to traveling and various types of business activities, i.e. increased security measures on airports and in ports may be interpreted as an additional tax on travel and freight activities. Another potential long-run effect of the terror attacks is related to the decision makers' and citizens' attitude towards globalization. More protectionism and less international cooperation would certainly dampen economic activity. However, there is yet no indication that the attacks have had a detrimental effect on international cooperation.

What is the impact of the terror attacks on the US economy, and what are the induced economic effects on the US economy on the activity level of other economies? In

order to assess this question we must consider the range of various spill-over channels. We can identify at least three direct channels and one indirect channel:

- *The trade channel:* This channel is obvious. When the US economy is hit by a negative shock, American firms and individuals reduce their demand for imported goods and this hurts other countries' export industry. Clearly, countries with the largest export shares of their GDP to the US are most severely hit by this direct trade effect. It follows that countries like, for example, Canada, Mexico and Asian countries with very large exports of electronic components to the US (Singapore, Taiwan) are severely hit by this channel. On the other hand, the direct trade channel is not very important for Euroland or Norway.
- *The capital movement channel:* We should expect that a negative US shock would i) reduce the expected return on portfolio investments in the American financial markets, and ii) discourage foreigners' direct investments in the US  
This should – at least in principle – lead to a reallocation of capital from the US and into other economies. In turn, this should imply a boost in foreign stock and bond prices (relative to the corresponding US prices) as well as a depreciation of the US dollar. So far these effects seem, however, to be (almost) completely offset by the “safe haven” mechanism, which implies that much capital is still allocated to the US financial market in response to investors' perception of high global economic risks (even if these risks are in a sense created by the events in the US). In addition, we should also mention another important spill-over effect related to direct investments. Foreign investors' return on their direct investments in the US has declined significantly due to the stagnation of the US economy. For several countries this accounts for significant amounts, and Euroland is a relevant example in this context. The cash flows between firms in Euroland and their US subsidiaries, and between US firms and their subsidiaries in Euroland, exceed the value of the respective trade flows.
- *The sentiment channel:* A rather high cross-country correlation between US business sentiment and consumer confidence indicators on one hand and their counterparts in the rest of the OECD area on the other, suggests the existence of a

sentiment spill-over channel. The importance of this channel hinges, of course, on the strength of the relationship between the confidence indicators and real economic activity. For example, the terror attacks on the US put a downward drag on global travel activity in both the business and leisure segment for a time span of several months after the event.

- *Indirect effects (prices on raw materials, global repercussions):* Even economies with weak direct links to the US may suffer from a negative US shock, due to indirect effects (economic repercussions) in the global economy. For instance, an economy without overly strong direct trade links to the US, but with very strong links to other economies, which in turn have strong trade links to the US, will obviously suffer. Another example is the effects on the world prices of energy goods (crude oil in particular) and raw materials. The US is the major player of the world economy and lower US demand therefore contributes to lower prices on these goods. Consequently, the exporters of raw materials, among them several emerging economies, will be hit through this channel.
- *Diffusion of ideas and attitudes:* As discussed above, the terror attack may well lead to changes in resource allocation and economic behavior, e.g. significant investments in security measures (which in effect create increased travel and freight costs) and an increased skepticism towards globalization (protectionism, less international cooperation). Clearly, such potential developments – if they occur – are likely to take place on a global scale and not only in the US.

## 2. Shipping and international crises – A historical perspective

This section deals with the relationship between the shipping market and international crises in a historical context, with a view to establishing a typology of the events which affect the shipping market. Three main points will be made:

- It is impossible to establish a distinctive relationship between international crisis incidents and their effects on the shipping market. Events which are relatively unimportant in a geo-political context, may have large implications for the shipping market. Moreover, incidents which in an international context may be considered more significant – including acts of war – may be of little importance for the development of the shipping market.
- Two features characterize the events which affect the state of the shipping market in a fundamental manner. Such incidents typically either i) lead to changes in the volume or pattern of international commodity trade, e.g. through price hikes or the cutting off of major demand and supply centres, or ii) lead to changes in trade routes.
- The events of September 11 did not have any such effects. However, this does not imply that the events – as well as the repercussions – were insignificant for the shipping market. The demand side in the shipping market *per se* will be affected through indirect channels. Examples of such knock-on effects are the influence of September 11 on economic growth in general and international trade and US economic growth in particular. Accordingly, the channels outlined in Section 1 will have a certain amount of importance for the shipping sector. Moreover, certain market segments – the cruise industry being the most obvious example – were heavily affected by changes in market sentiments, in particular in the short term.

A casual glance at the development of the freight market in the postwar period clearly shows several instances of the peaks and troughs for which the shipping market is famous. Moreover, a closer inspection of the shipping cycles reveals that the peaks have been closely related to specific events. Table 1 shows the pre-1974 booms in the

shipping market and the reasons for the increasing rate levels in the tanker and dry bulk segments.

**Table 1. Freight Market Peaks before 1974**

PERIOD	RATE INCREASE (%)	EVENT	CAUSE
1950-51	Tankers.....252 Dry.....147	Korean War	Stockpiling in industrialized countries, tonnage level still lagging after World War 2
1956-57	Tankers.....380 Dry.....41	Middle East Crisis Suez nationalization	Suez Canal closure ⇒ increased trading distances
1967	Tankers.....290 Dry.....34	Six Day War	Suez Canal closure ⇒ increased trading distances (average crude distance +25 per cent, 1966-68)
1970-71	Tankers.....350 Dry.....52	Tapline damaged Libyan restrictions	Mediterranean supply reduction ⇒ increased importance of Persian Gulf
1973	Tankers.....384 Dry.....237	US policy change Libyan nationalization Yom Kippur War	US quota lift ⇒ expectations of high growth. Libyan nationalization ⇒ supply changes. The Yom Kippur War and OPEC I burst the bubble

Note: Rate increases are based on quarterly observations, taken from the NSN-spot market index. The quarterly peak rate level is compared with the lowest quarter in the previous year.

The data contained in the table give credence to our initial assertions. First, it is evident that booms in the shipping market have generally been caused by specific, unforeseen events – primarily of a political nature. Second, all of the pre-1974 peaks involved either changes in the volume of commodity trade (1950-51 and 1973) or in shipping lanes (1956-57, 1967 and 1970-71). The response to the changed conditions was more pronounced in the tanker market than in the dry bulk market.

The severe shipping crisis from 1974 onwards may also to a certain extent be explained by the influence of political events. However, the oil price increase *per se* had a more fundamental effect than the temporary embargo on oil exports to Israel-friendly countries. Moreover, the recession and the subsequent transformation of the economic policies in industrialized countries exacerbated the shipping sector's problems. Previous economic policies, aimed at high growth of production and trade, were replaced by policies designed to combat the twin evils of unemployment and inflation. The policies targeted at reducing inflation, led to lower growth in the short and intermediate run. The fact that world economic growth was relatively low after

1973 – a feature which adversely affected the shipping industry through demand reduction (tanker segment) or low demand growth (dry bulk segment) – thus partly reflected political considerations.

The effect on the shipping market of changes in shipping lanes or the volume of commodity trade depends on the state of the market prior to the transformation. This can be exemplified by the limited effect on freight levels of the 1975 reopening of the Suez Canal. The muted response must be understood on the basis of the supply overhang in the tanker market. The tonnage surplus had lowered the freight rate sufficiently to make the use of the Suez Canal less profitable.

Following the oil price increases of the early 1970s, the shipping market – particularly the tanker sector – remained depressed. However, two of the shipping booms after 1974 can be partly attributed to political developments.

**Table 2. Freight Market Peaks after 1974**

PERIOD	RATE INCREASE (%)	EVENT	CAUSE
1979-80	Tankers.....210 Dry.....46	Iran/ OPEC II Inefficiency	OPEC II and congestion ⇒ rate hike. Part-loading/ slow steaming reduced effective supply
1990-91	Tankers.....64 Dry.....7.5	Gulf War	Relatively small changes, and a quick dip in the market following the resolve

Note: Rate increases are based on monthly observations. Freight rates refer to VLCCs Gulf-Europe from the Clarkson Oil Tanker Databook/ Fearnley's for tankers and the NSN voyage freight index for dry bulk vessels.

The freight rate increase and lay-up reduction in the late 1970s occurred in a market still generally characterized by overcapacity. The scale of the rate hike was as much a result of supply side limitations (lay-ups, storage and slow steaming) as demand side influence. The negative development up until the mid 1980s confirmed that the rate increase may be considered a fluke. The response of the shipping market to the Iraqi invasion of Kuwait and the subsequent Gulf War was also relatively subdued, and not fundamentally different from more general business cycle-fluctuations.

The difference in magnitude between the pre- and post-1974 peaks indicates a qualitative shift in the shipping market's response to crises. Before 1974, the pronounced freight rate increases in response to specific political incidents, occurred in a market characterized by a strong growth trend and a latent demand surplus. Three elements can explain the more muted responses after 1974. First, short-term increases

in shipping supply have been easier to attain (lay-up reduction, faster speeds etc.) than before the crisis. Second, the demand for seaborne trade has not exhibited the strong upward trend of the 1950s and 1960s. The combined effect of these elements is that it is unlikely that unforeseen events will have dramatic effects on the freight rate. Finally, the shocks after 1974 – including the September 11 attack – have not been of the type which usually entail a strong freight rate increase.

### **3. Prospects for global economic activity**

#### *3.1. A global economy in stagnation at the outset*

In order to assess the impact of the terror attacks on economic growth in the short and long-run, we must recall that the global economy in September 2001 had already been characterized by stagnation for several months. The longest US expansion ever had ended in March 2001 according to the NBER. US GDP growth rates had dropped from very high annual levels around 5 per cent in 1999 and the first part of 2000, and down to barely above zero in the second quarter of 2001.

Indeed, we witnessed the dynamics of an old fashioned “investment boom and bust cycle” with different characteristics compared with most regular US business cycles after 1945. The long expansion had been triggered by widespread optimism related to the “new-economy”, and in turn the publication of very strong productivity figures during the last part of the 1990s.<sup>2</sup> This led to expansion of both supply and demand. Gradually, the result was debt-financed over-investments, and maybe even over-consumption. Inflation, as measured by CPI, remained fairly low due to increased production capacity, and interest rates were consequently maintained at low levels. However, we obtained asset price inflation (the Nasdaq bubble) and accumulation of imbalances like production over-capacity, accumulation of much debt in the private sector and large current account deficits.

Starting in the year 2000, boom gradually turned to bust in the US economy. The Nasdaq bubble burst, and the stock market in general performed badly. Corporate USA realized that far too much optimism and in turn accumulation of production over-capacity, large inventories and too high real capital stocks had paved the way for a substantial adjustment process. This process clearly started late in 2000 and accelerated throughout 2001. Thus, industrial production, inventories and real capital investments were on sharply declining trends before the terror attacks took place. This also applies to both consumer confidence and business sentiments (as measured by for example the ISM/NAPM indicator). Unemployment was increasing as well, and the unemployment rate had jumped significantly upwards in the months before September 2001.

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<sup>2</sup> Later data revisions showed that these recorded productivity gains were not particularly extreme after all. However, the figures still indicate that average productivity growth has increased after 1995, compared with the period 1974-1995.

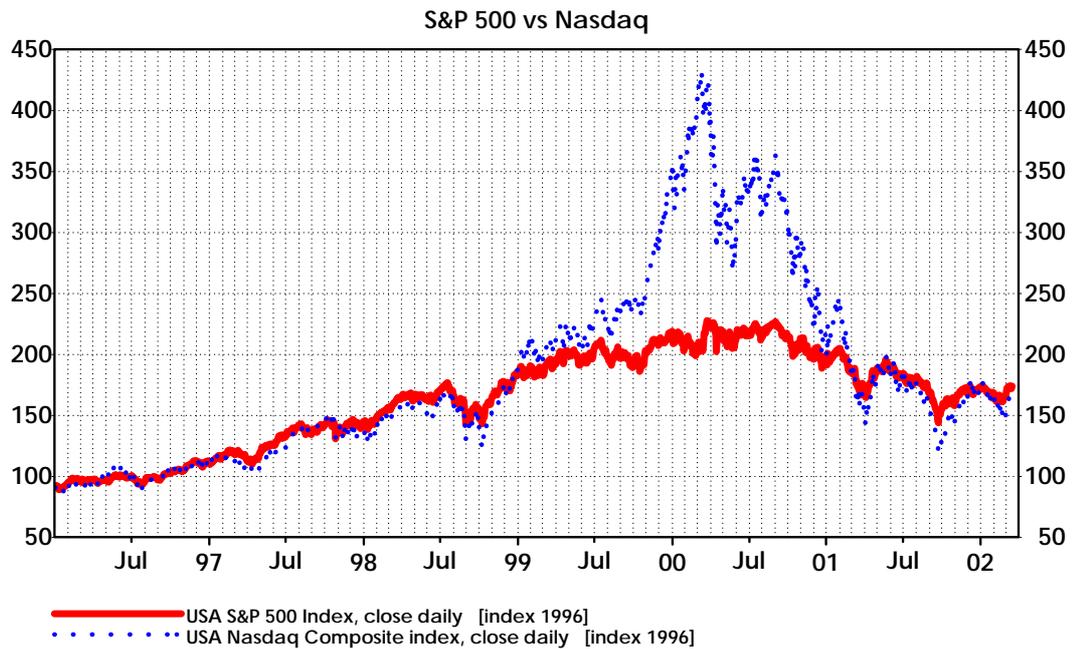
Prior to September 2001, most of the other economies were characterized by stagnation as well. The Euroland economy experienced much lower growth than in 2000, and the long-lasting problems facing Japan were still apparent. In both cases the negative spill-over effects from slower growth in the US mattered. However, it is important to recall that domestic impulses were important too (e.g. surprisingly weak domestic demand growth in Euroland, structural problems and decreasing private consumption in Japan). Several emerging market economies depending on strong export volumes to the US were experiencing recessions due to the spill-over effects of the US stagnation. This includes countries like Singapore, Taiwan and Mexico.

### *3.2. Business cycle effects – 2002 and 2003*

It follows from the description above that both the US economy and the global economy were very fragile when the terror attack was launched on September 11. Still, our assessment – at the current stage, slightly more than six months after the attack – is that the short-run business cycle effects have been temporary and small in a macroeconomic context.

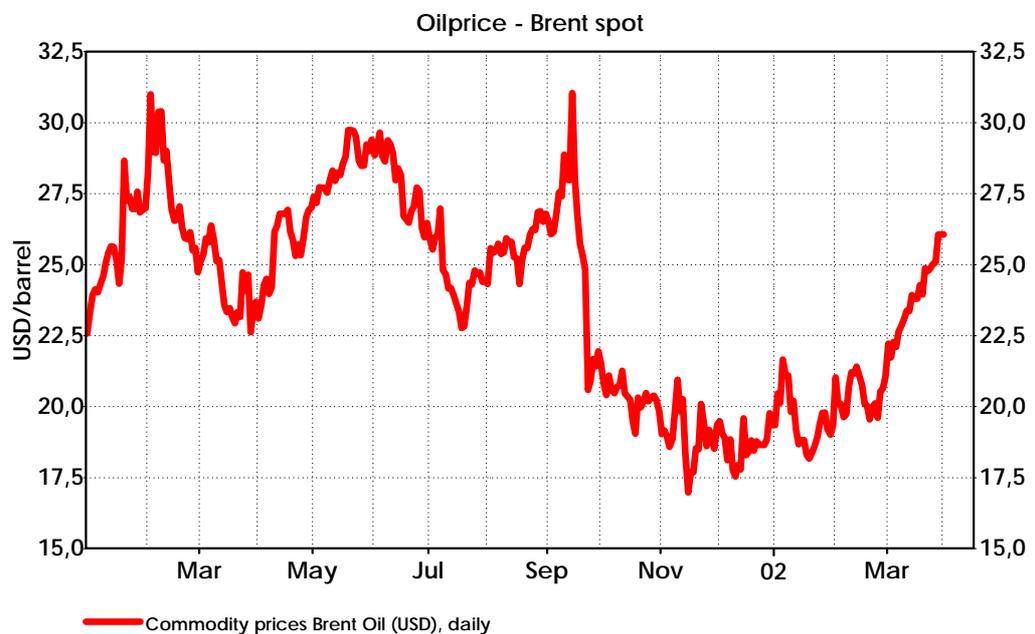
The terror attack triggered an immediate plunge in the stock market (Chart 1) and also an increase in crude oil prices (Chart 2) just after the attacks. As we observe from the charts, these effects were quickly reversed, however. After the initial jump, crude oil prices soon dropped to levels lower than the initial one. This reflected that the attack and subsequent developments in Afghanistan did not reduce the global supply of crude oil. Attention was instead directed to the effects of stagnating demand growth. Looking at the stock market, we observe that the trend level prior to September 11 was soon restored.

**Chart 1: The US Stock Market**



Source: Ecwin

**Chart 2: The Crude Oil Price**

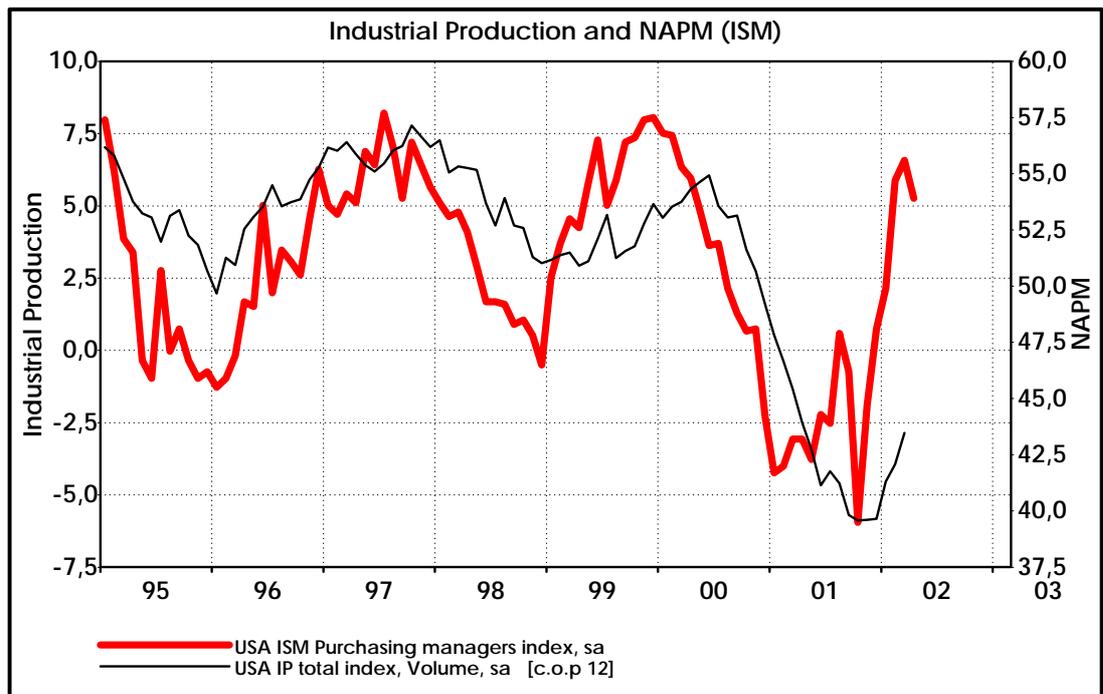


Source: Ecwin

The indicators for business sentiment (the ISM/NAPM indicator) and consumer confidence also took temporary dives in response to the attacks, see Chart 3 and Chart 4, respectively. As shown in Chart 3, the ISM/NAPM indicator soon

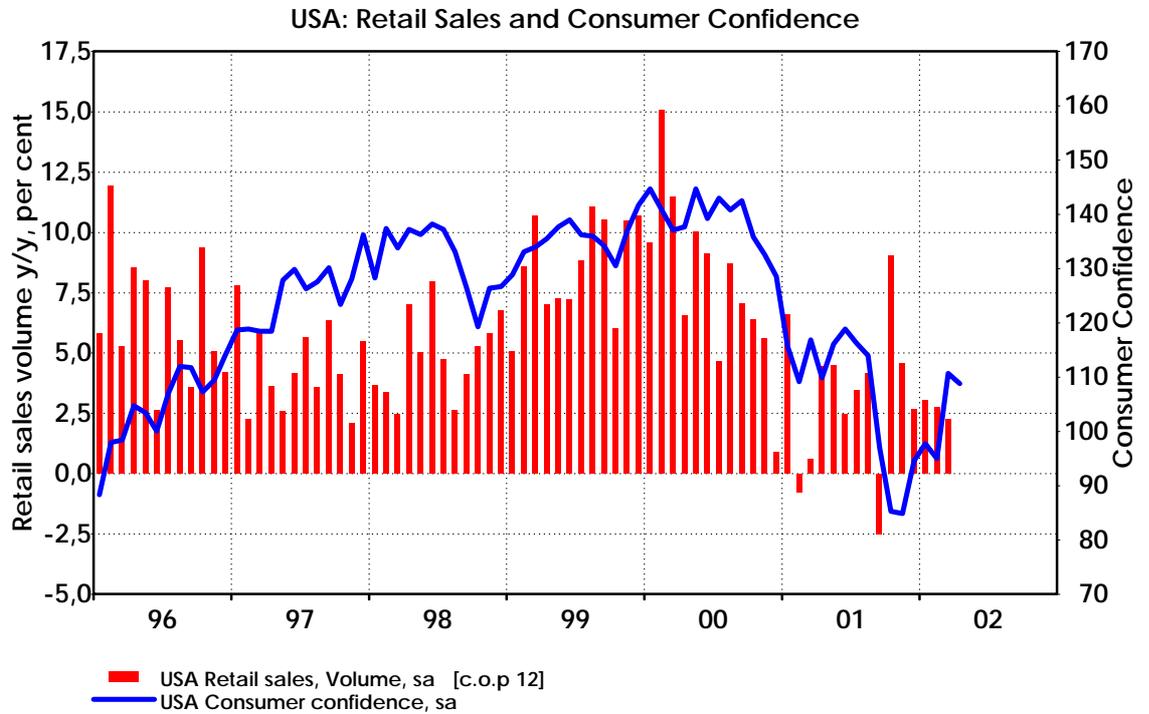
returned to its old level (and has increased even higher) and the tendency in industrial production has also improved lately, i.e. industrial production actually increased on a month-on-month basis in both January and February 2002. A possible hypothesis is that these signs of a rebound in corporate USA were delayed by a few months due to the attack. We believe, however, that this potential delay was insubstantial and that the current signs of a rebound essentially reflect the major inventory adjustment process throughout the last 14-16 months. Chart 4 shows that consumer confidence also undershot its current level. More importantly, the retail sales volume dropped in just one month, September, and then returned to strong growth.

**Chart 3: USA –Industrial Production and Business Sentiment**



Source: Ecwin

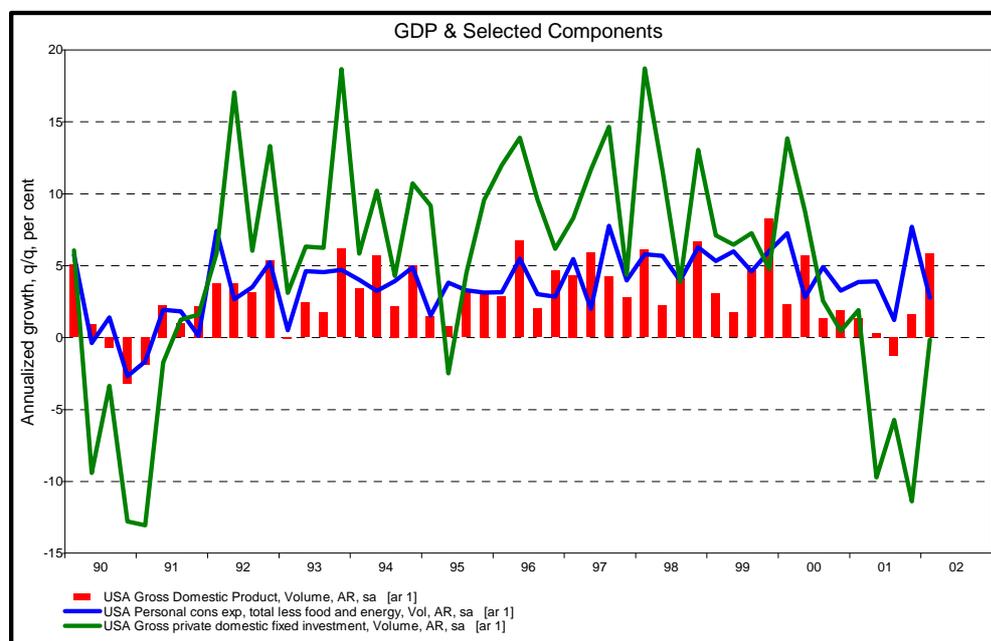
**Chart 4: USA – Retail Sales and Consumer Sentiment**



Source: Ecwin

Even though the direct business cycle effects of the terror attacks were rather short-lived, we can not exclude the possibility that the incremental effects of the attack were responsible for the negative GDP growth in the third quarter of 2001, see Chart 5. It seems likely that the growth figure, amounting to an annualized 1.3 per cent drop, would have been somewhat better without the attack. In fact, it is possible that the (temporary) effects of the terror attack were crucial for the NBER’s recession verdict – even if the recession started in March 2001 according to the official chronology. The reason is that the recorded decline in the US economy before the attacks may potentially have been too mild to qualify as a recession; “The attacks clearly deepened the contraction and may have been an important factor in turning the episode into a recession” according to the NBER’s Business Cycle Dating Committee.<sup>3</sup>

**Chart 5: USA – Economic Growth**



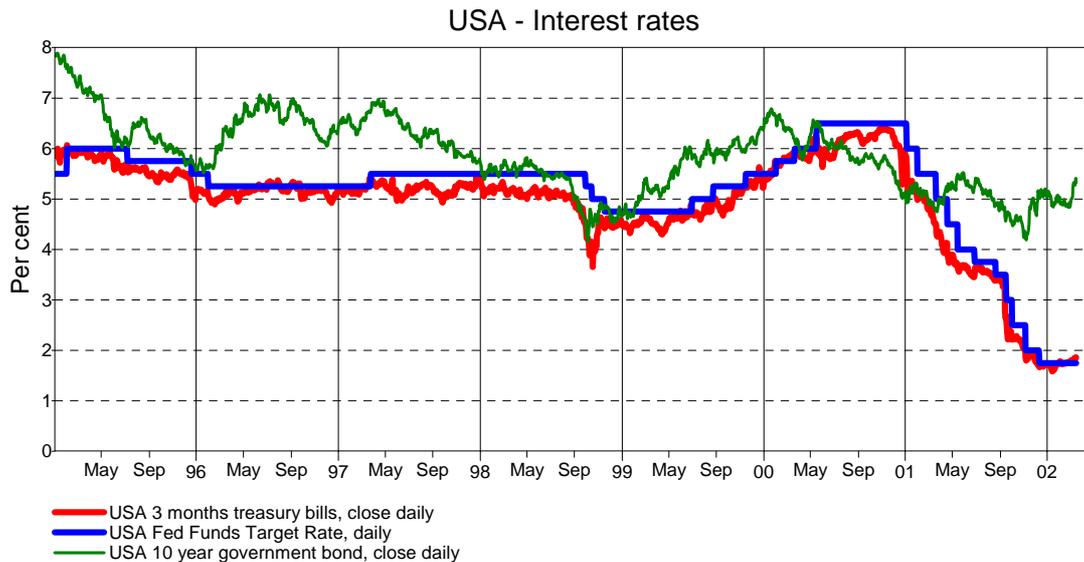
Source: Ecwin

It is also possible that the Fed fund target rate, i.e. the key interest rate of the Fed (The US Central Bank), would have bottomed out at a level higher than the current 1.75 per cent without the terror attacks, see Chart 6. This view reflects the fact that the Fed seemed to intensify its easing campaign just after the terror attacks. For example, the Fed implemented a 0.5 percentage point cut on September 17, independent of the regular meeting date of the interest rate setting FOMC committee.

While the international spill-over effects of the terror attack really mattered for selected sectors (notably air travel, security-services and -measures), the incremental spill-over effects of the terror-attacks seem to be fairly small. At the current stage (April 2002), there are signs of i) a mild rebound in Euroland, ii) continuing stagnation in Japan, and iii) stronger than expected growth in other parts of Asia (for example South Korea). It is hard to imagine that this situation would have been much different without the terror attack.

<sup>3</sup> See the web site of the NBER's Business Cycle Dating Committee, [www.nber.org/cycles/recession](http://www.nber.org/cycles/recession).

**Chart 6: USA – Interest Rates**



Source: Ecwin

Despite the fact that the global business cycle effects of the terror attack have been modest so far, it seems clear that alternative assumptions about future developments triggered by the terror attack lead to very different scenarios for economic growth into the last part of 2002 and 2003. What we have in mind are alternative assumptions about, for example, the outcome of the US' war against terror, the potential for more significant terror attacks against Western targets, escalation of the acts of war in Afghanistan and finally a potential escalation of other related conflicts (Iraq, Saudi Arabia, the conflict between Israel and the Palestinians). We imagine that an escalation of these types of developments is a likely trigger for a pessimistic scenario for economic growth in 2002 and 2003.

Table 3 below presents our three scenarios for annual growth rates in various countries and the world in 2002 and 2003. The scenarios can be interpreted as follow:

- *Base case scenario:* Our base case scenario assumes growth rates according to consensus forecasts (by “Consensus Economics Inc”, survey date March 11). The general impression is that these estimates are slightly on the optimistic side. Our interpretation is that these growth rates implicitly disregard any dramatic developments related to acts of war or terror attacks. We observe that the US rebounds quickly and reaches a high 3.5 per cent growth rate in 2003. Euroland is

lagging the US – but is still recovering to a more than satisfactory 2.7 per cent growth rate in 2003. Japan remains subdued in 2002, but rebounds slightly in 2003.

- *Pessimistic scenario:* The current signs of a global rebound are ruined by a fairly dramatic escalation of the conflicts induced by the terror attack on September 11. Such a dramatic escalation (for example a new war against Iraq in combination with additional significant terror attacks) is likely to depress growth substantially due to high crude oil prices, depressed consumer and business sentiment and consequently fairly low private demand growth. The growth rates decline in all regions compared to the base case scenario – but most dramatically in the US. Euroland will outperform the US in this scenario and we should expect a depreciation of the USD compared to the Euro.
- *Optimistic scenario:* This scenario assumes a surprisingly fast rebound in both the US and Euroland to 2003 growth rates, which reflect underlying trend growth rates around 4 per cent in the US and 3 per cent in Euroland. Clearly, this can be interpreted as the result of very high productivity growth rates, due presumably to “new economy” effects (i.e. IT investments raising productivity growth). Growth will be lagging in Japan in this scenario too, but to a less extent than in the other scenarios. This scenario assumes no crises like major terror attacks or significant acts of war.

**Table 3. Projected annual GDP growth rates 2002-2003, per cent**

	USA		Euroland		Japan		“World”	
	2002	2003	2002	2003	2002	2003	2002	2003
<b>Base case</b>	2.1	3.5	1.2	2.7	-1.1	1.0	1.4	3.0
<b>Pessimistic case</b>	1.1	1.5	0.9	2.2	-1.5	0.0	1.0	1.6
<b>Optimistic case</b>	3.0	4.2	2.0	3.3	0.8	2.5	2.1	4.0

### *3.3. Economic growth in the long-run, 2002-2012*

#### *The productivity debate*

Adopting a long, ten-year horizon, the growth performance in the developed parts of the world will depend mainly on productivity growth. This is reflected in “all” official long-run growth forecasts published in recent years. While official forecasts in various OECD countries all assume that the growth in labor supply will stagnate due to ageing populations (and also escalation of early retirement), they disagree widely when it comes to estimates of structural trend productivity growth. Whereas the US authorities subscribe to very optimistic productivity estimates, their European counterparts are much more pessimistic. In fact different assumptions about productivity growth account for almost the complete difference between long-run GDP growth estimates equal to approximately 3 per cent in the US and growth estimates equal to approximately 2 per cent (or below) in European countries.<sup>4</sup> This discrepancy boils down to different views on whether or not “new economy” issues have altered the structural trend productivity growth rate.

In order to assess this discrepancy, we must take a closer look at US productivity data over the last decades. We first note that productivity in the US increased by an average 1.4 per cent annual rate in the period 1975-1995. Almost all discussions about the productivity acceleration in recent years have used this figure as a basis for comparisons. Still, it is useful to recall that productivity increased by a significantly higher 2.7 per cent rate during the period 1959-1975.

After 1995 the measured productivity rate started to show an increasing tendency. As we know, this fuelled a lot of new economy optimism, which soon influenced economic and financial decision-makers all over the world. For example, financial analysts and investors tended to believe that increased productivity would give rise to very much higher earnings growth in the years to come. Moreover, several policy makers, e.g. Fed-chairman Mr. Allan Greenspan, adopted the new-economy gospel and kept interest rates low despite strong demand growth and a tight labor market. These effects were most pronounced in 1999 and 2000. The direct reason was

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<sup>4</sup> See for example the long-run GDP forecasts in the US “2001 – Annual report of the Council of Economic Advisers” and the government white papers “Stortingsmelding 30, 2001/2002” (the “Long Term Program”) and SOU 2000:7 in respectively Norway and Sweden.

astonishing figures for productivity growth, which averaged 3.4 per cent during these years.

The problem was that most economic and financial decision-makers (including not only IT-freaks and overly optimistic stock-brokers, but also Mr. Greenspan and his kind) seemed to believe that this figure was an appropriate estimate for trend-productivity growth. Recent data have changed that. First of all, we note that measurement errors have been significant. The recent revision of the productivity figures shows that the productivity growth rate for 1999-2000 has been adjusted downwards from 3.4 per cent to 2.6 per cent. Secondly, we note that several studies indicate that the improvements in real structural TFP (total factor productivity) growth are limited to a few industries, i.e. computer- and technology producers, retail trade and the securities business.

At the current stage, it is important to recall that average annual productivity growth over the period 1995-2000 amounts to 2.5 per cent after the latest revision. This is, of course, much lower than the initial figure for 1999-2000 – but still significantly higher than the 1.4 per cent rate of the period 1975-1995. Our basic view is therefore that the observed pessimism about new economy and productivity growth during the last year was exaggerated in the same way as many claims about the magnificent implications of the new economy were overly optimistic and way out of line back in 1999 and 2000. The figures cited above still suggest that trend productivity growth has accelerated significantly after 1995 (compared to the 1975-1995 period) and that IT and communication technologies are crucial to this development.

#### *Potential effects of the terror attacks on long-run growth*

To what extent may the terror attack on the US in September 2001 have altered the long-run trend growth rate of various economies? We can identify the following channels:

- *Larger investments in the defence sector and larger investments for security purposes in general:* While an increase in these investments may be perfectly wise given the perceived threats, they are still “wasteful”, in the sense that resources are re-allocated to a purpose which does not yield any direct gain to the citizens. Moreover, these investments are to some extent likely to crowd out other

investments, which might have contributed stronger to productivity growth across all (or many) sectors of the economy.

- *Traveling and transport become more burdensome:* As mentioned in the introduction, the implementation of additional security measures is likely to impose larger direct and indirect costs on travel activities and freight services. More time is lost in airports and ports. This in effect constitutes an indirect tax, which may reduce productivity growth.
- *Induced changes in behavior:* Individuals and firms may in principle alter their behavior if the perceived risks related to for example business travelling or other activities have increased. This is likely to dampen productivity growth.
- *Potentially less globalization:* Less international cooperation and more protectionism will potentially lead to a much more inefficient allocation of global economic resources, and may lead to significant drops in productivity growth.

It is, of course, hard to assess the magnitude of these different long-run growth effects of the terror attack (and the subsequent developments). Still, we are pretty confident that *so far* the last two channels have not mattered in a negative way. The degree of globalization, or the globalization process in general, has not been hurt. Rather, we observe intensified international cooperation (between for example Russia and the US) and also beneficial progress in the WTO negotiations. The general tendency to implement protectionist measures has not changed.<sup>5</sup> We will also argue that the observed changes in behavior observed after the attack (less traveling in particular) seem to be temporary. Turning to the first bullet points above, we have indeed observed increases in security measures of different types and also a tendency to increase the public expenditures on defence in the US. It is too early to have strong opinions about the magnitudes of these effects, however. Still, we believe in our base case scenario below that these effects will influence aggregate economic trend growth only marginally.

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<sup>5</sup> We are aware of the recent US decision to introduce new steel tariffs, but that does not change our general conclusion. A successful outcome of the proposed WTO-round will be important as a boost for

Table 4 below presents our three scenarios for projected trend GDP growth rates during the period 2002 and 2012. We imagine that the distinction between the various scenarios could be attributed to essentially two issues. The first issue is to what extent the “new economy” claim about increased structural productivity growth due to developments in IT and communication technology is true. The second issue is to what extent the current fairly satisfactory developments in international politics and cooperation (including questions related to the globalization process) will be maintained.

Regarding the latter issue, both our base case scenario and our optimistic scenario assume that this satisfactory development will indeed continue. The pessimistic scenario assumes, however, that the fragile situation in (or related to) e.g. Saudi Arabia, Iraq or Israel-Palestine will escalate (potentially due to developments triggered by the terror attack on the US) and put a serious downward drag on globalization. Regarding the productivity issue, both our base case scenario and our pessimistic scenario are characterized by a mildly upbeat attitude towards the productivity gains created by information technology. The optimistic scenario assumes that “new economy” mechanisms will trigger an even stronger increase in structural productivity gains in the US and gradually also in Euroland and Japan.

***Table 4. Projected trend GDP growth rates 2002-2012 (annual)***

	<b>USA</b>	<b>Euroland</b>	<b>Japan</b>
<b>Base case</b>	3.3	2.3	1.2
<b>Pessimistic case</b>	2.0	1.5	0.7
<b>Optimistic case</b>	3.8	3.2	2.5

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international trade. This general, positive development is likely to neutralize the negative effects of sector-specific measures.

## **4. Trade patterns, transport and the shipping market**

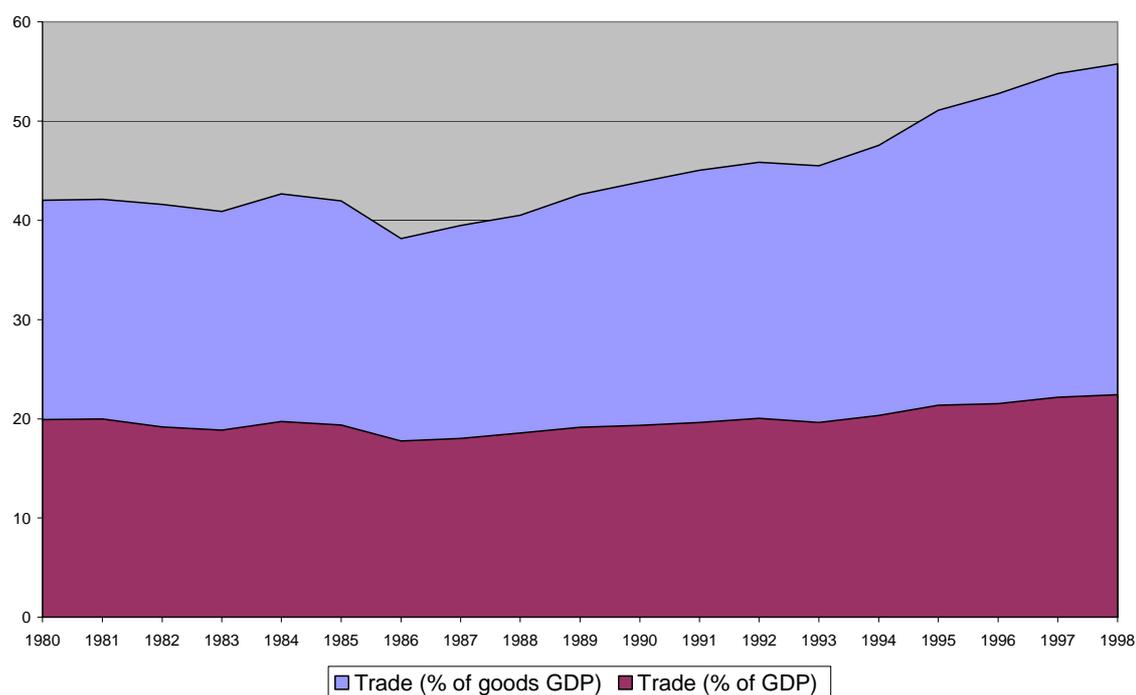
### *4.1. Trade*

When assessing the economic impact of September 11, it is important to have in mind that the world today is distinctly different from what it was 20-30 years ago. This becomes even more important when we want to consider the impact of this type of shock on production, trade and the shipping market. Trying to project the effects of September 11 based on the analysis of previous shocks, such as the oil crises in the 70s and the 1990 Gulf War and their aftermath, may therefore lead to erroneous conclusions. In this section we explain this issue, and discuss the factors that should be taken into account when analyzing the effect of a shock like this. Moreover, we address the question of whether the events of September 11 are likely to have stronger impact on some sectors than others, and what this implies for economic development in general and for trade and transport in particular. Again, we want to point to the danger of comparing September 11 with other shocks, as they may differ substantially in their impact across sectors. As we have argued before, what characterizes September 11, is not the magnitude of the impact as such. In this respect it may more be regarded as incremental (by Paul Krugman compared to a major earthquake or hurricane), but the “timing” of the event, and its psychological sectoral effects.

### *A globalized world*

In 1970 world trade (exports) accounted around 14% of world GDP, in 1982 the equivalent share was 19% while today it is around 26%. The rising international interdependencies become even clearer if we concentrate on trade in goods as a share of GDP (excluding services and construction), which approaches 60% (see Chart 7).

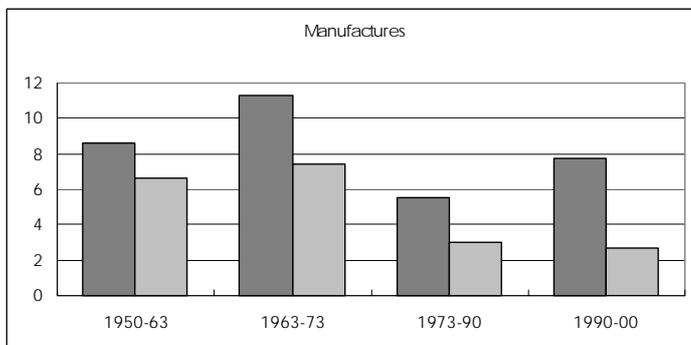
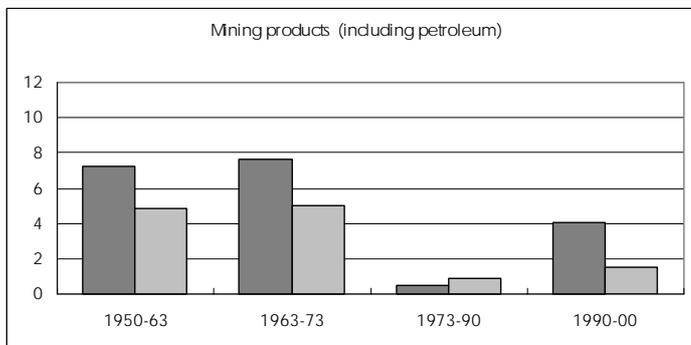
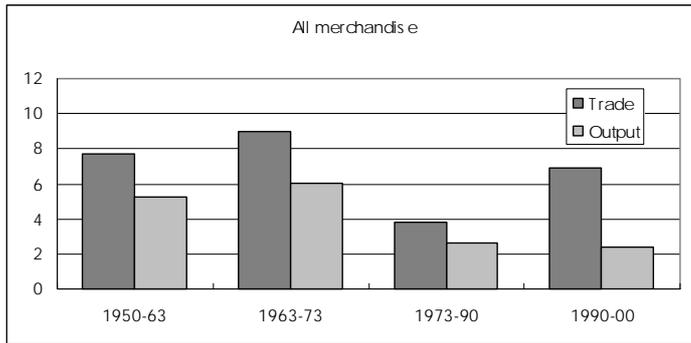
**Chart 7: World Trade**



*Source: World Development Indicators 2001 (The World Bank)*

Chart 7 illustrates that the increase in trade in goods over the last two decades has been much more dramatic than the growth of overall trade. However, it might also be worth noting that in a historical perspective the most dramatic increase in trade in goods took place in the period 1963-73. This is true also if we look at the different commodities; agricultural products, mining products, and manufactures, see Chart 8. In the 1990s the type of commodities that experienced the most significant increase in trade, was manufactures.

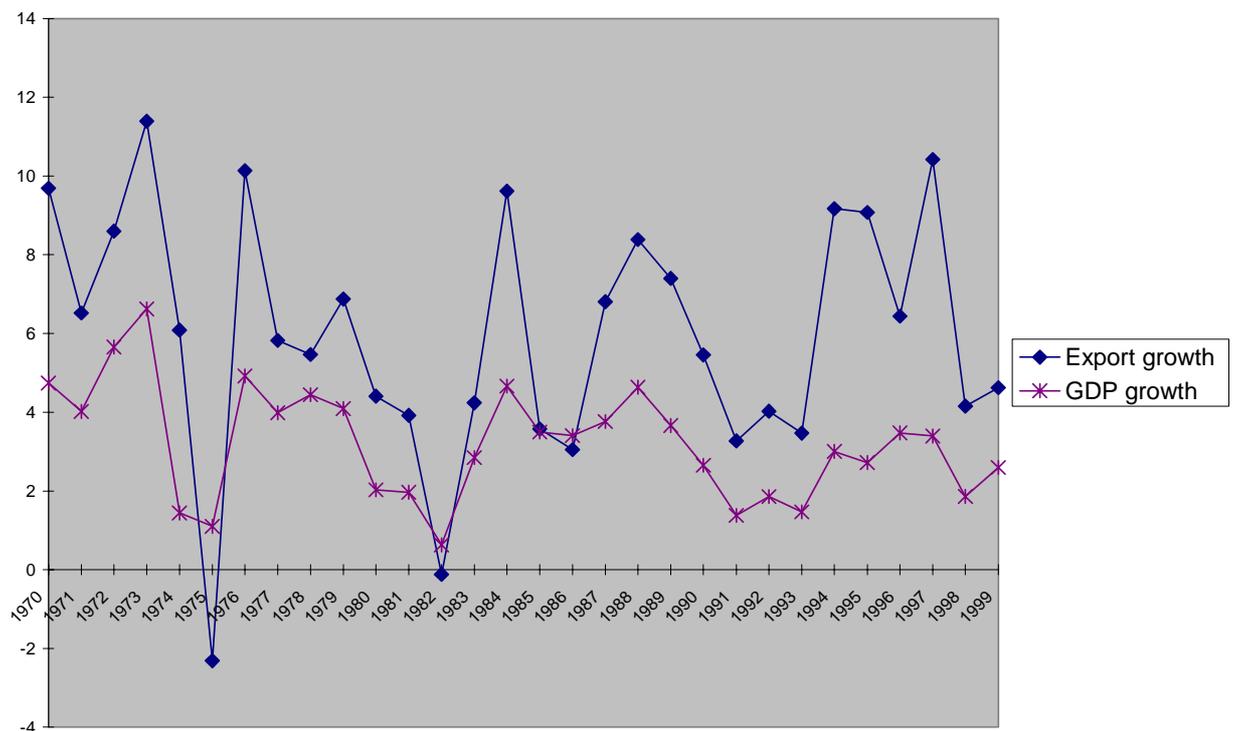
**Chart 8: World Merchandise Trade and Output by Major Product Group, 1950-2000 (Average annual percentage change in volume terms)**



Source: Trade Statistics 2001 (WTO)

As for world export growth and world GDP growth, the former is more sensitive to the economic developments than the latter. In other words, there are stronger fluctuations in export growth than there are in GDP growth (see Chart 9). It is further a well-known fact that world export growth and world GDP growth are strongly correlated. But the rising importance of international trade in the world economy does not necessarily imply that these two figures have become more synchronised – which appear to be a rather widespread belief. Chart 9 gives the development in world export growth and world GDP growth for the last three decades. While it illustrates the correlation between the two, simple eyeballing indicates what statistical analysis confirms, namely that this correlation has not increased in magnitude over time: it rose between the 70s and the 80s, but then declined again in the 90s. The correlation between world export and world GDP was around 0.80 in the 90s, which is in fact lower than it was in the 70s.

**Chart 9: Growth in World Export and World GDP**



Source: World Development Indicators 2001 (The World Bank)

### *International Fragmentation of production*

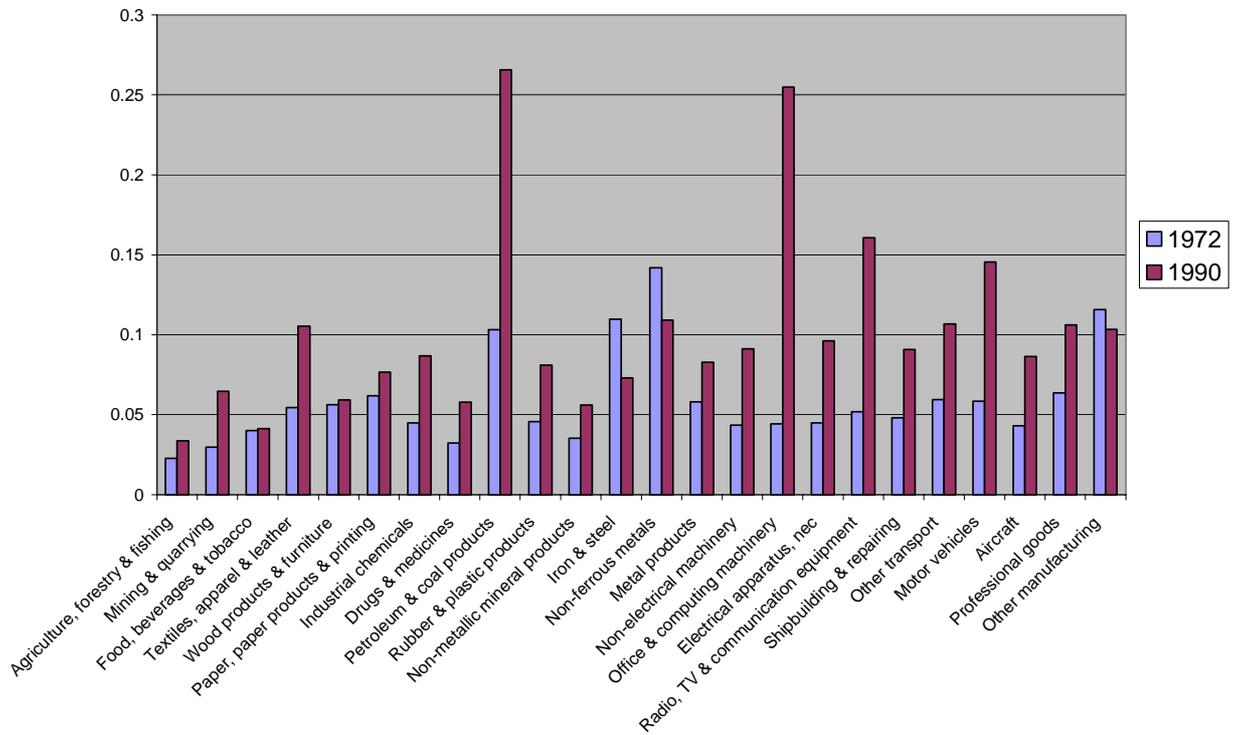
The world economy today is characterized by a significant – and rising – degree of international fragmentation, i.e. global outsourcing. The fact that firms buy a rising share of their intermediates from abroad, means that international linkages within the producing sector have been strengthened. This in turn implies three things:

- i) that a regional specific shock – such as September 11 to the US, may be transferred in a more direct way today, than what was the case 20-30 years ago;
- ii) that a significantly greater part of international trade and transport is related to the trade and transport of parts and components, and
- iii) that trade and transport therefore may be affected more directly by a regional and/or sector specific shock.

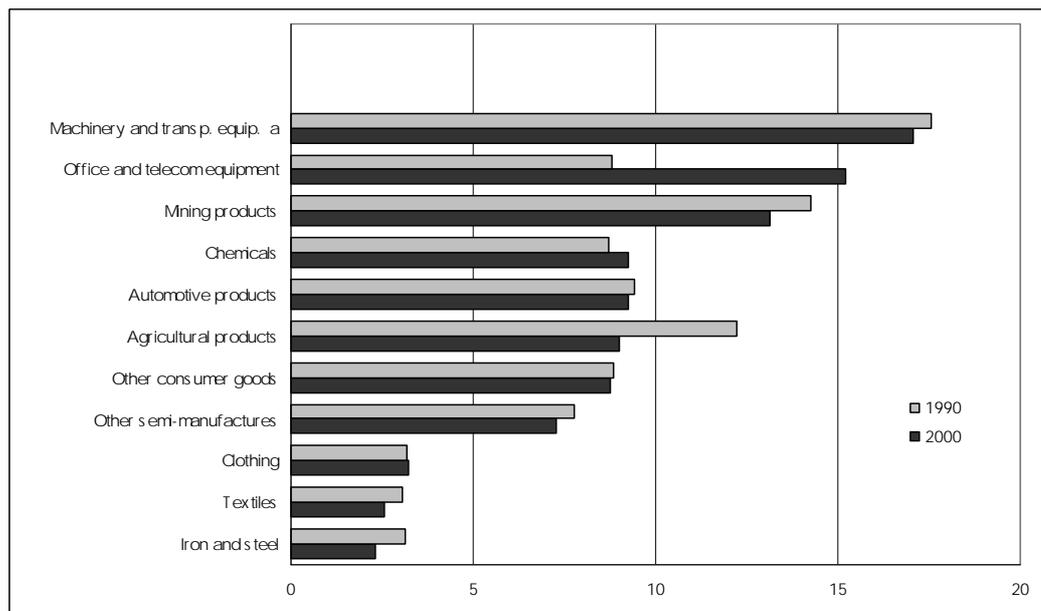
The trend towards more outsourcing is well documented by looking at the US manufacturing industry, and the share of intermediates. Chart 10 gives the imported shares of intermediates used in the respective industries. We see that with few exceptions, there has been a substantial increase in global outsourcing across all industries. The most dramatic change is seen with respect to petroleum and coal products, office and computing machinery, radio, TV and communication equipment, and motor vehicles. What makes this finding even more interesting is the fact that the three latter industry groups are among the commodities with fast growing consumption in the 1990s. In its Survey of Current Business, December 2001, the Bureau of Economic Analysis reports the fast growing commodities among those that account for at least 1 percent of total consumption in 1998. These commodities, which together accounted for 43.5 percent of total consumption, are predominantly services, but the three mentioned industry groups are among the few manufacturing industries on the list. Still, to be noted is the fact that the growth rate of these industries did, however, slow dramatically towards the end of the 90s.

The evidence on global outsourcing and consumption growth both points to the rising importance of petroleum and coal products, office and computing machinery, radio, TV and communication equipment, and motor vehicles for trade and transport. This is also in line with the export levels and export growth we observe when considering world merchandise export, see Chart 11.

**Chart 10: Imported Intermediates as Share of Total Use of Intermediates, US Producing Industries**



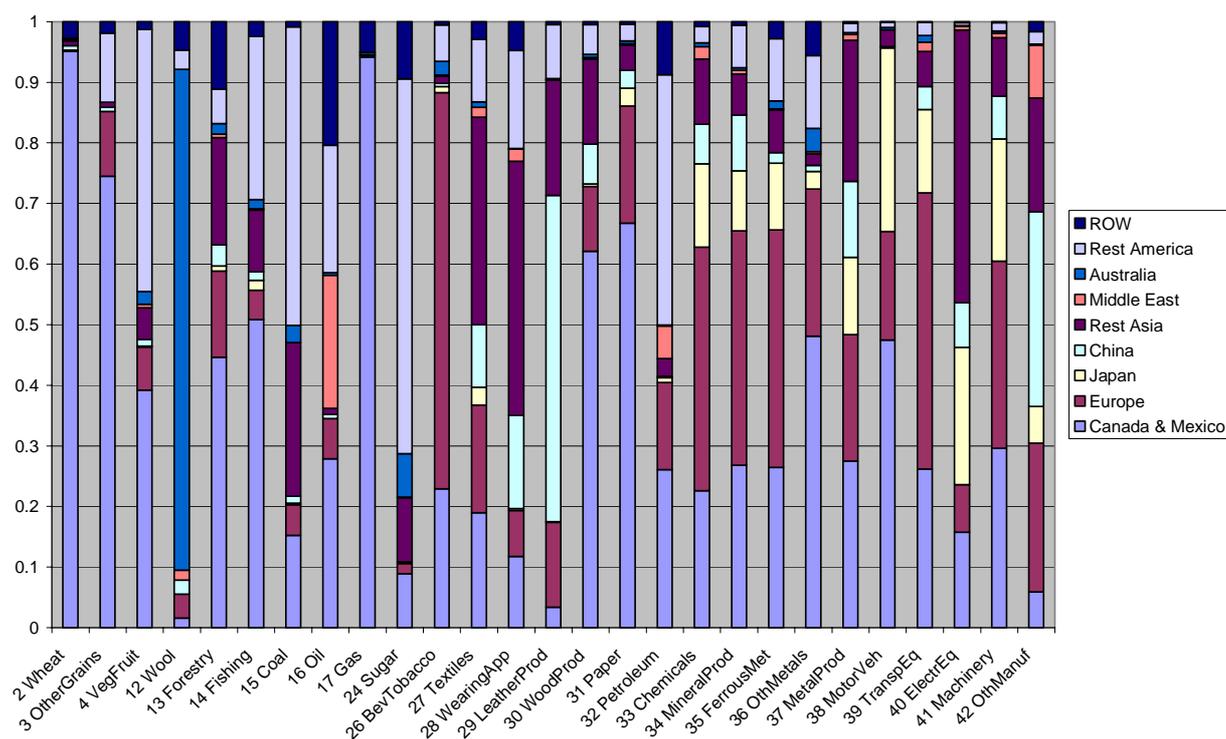
**Chart 11: World Merchandise Exports by Product, 1990 and 2000 (share based on value)**



### US Geographical trade patterns

In order to assess the impact of a shock on trade and transport, we moreover need insight regarding the sectoral geographical trade patterns, i.e. the source of imports. Given the focus on a US shock, we still concentrate on US imports. Chart 12 provides an overview of the regional origin of various imported commodities, i.e. gives the share of the respective region in sector specific US import. Most evident is the significant role played by Canada and Mexico – and Asia. Whereas Canada and Mexico’s share in a number of agricultural products import is substantial, Asia is more dominant in several manufactures. When assessing the role of shocks with a sectoral bias, this pattern is again important to bear in mind, in order to project the impact on geographical trade and transport patterns.

**Chart 12: Geographical Distribution of US Imports, Selected Industries, 1994**



Source: GTAP

### *Sectoral backward linkages in the US economy*

The US economic development over the last decade has been characterized by expansion and a continuation of the long term shift in the composition of US output from traditional goods to services. The latter trend is reflected both by intermediate consumption and personal consumption.

Most goods have backward linkages that exceed 2.0 (see Table A-1 in the appendix), indicating that a \$ 1 increase in final demand for goods result in at least another \$1 of demand for goods and services from the supplying industries. However, most services have linkages that are less than 2.0 (see Table A-1). The asymmetry in backward linkages between goods and services industries, implies that the total impact of a shock very much depends on whether it has a bias towards service or goods industries.

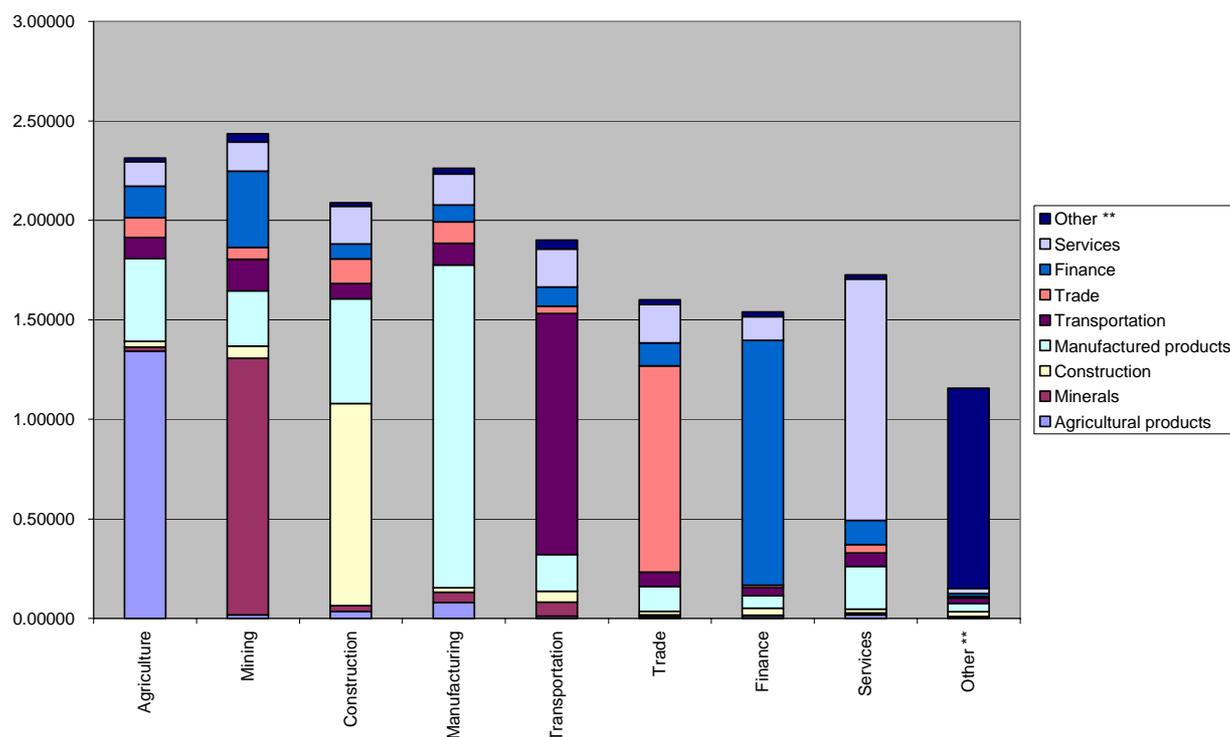
In order to assess the impact of a shock on trade and shipping market it is necessary to review the sectoral differences in demand for water transport in the production process – as means of transporting intermediate inputs to the assembly plants. Table A-2 (in the appendix) gives the increase in the demand for transport services triggered by a \$ 1 increase in the demand for the listed commodities. Not surprisingly, it reveals that there are distinct differences across sectors with respect to the demand for transport, and for the various modes of transport.

### *September 11*

Regarding the impact of September 11, what we have seen so far is mainly a decline in the demand for travel and tourism services. However, there is already evidence of rebound in these sectors. Furthermore, the fact that service sectors like these have relatively weak linkages to all other industries, suggests that a negative shock to these sectors has less effect on the economy in general, and thus less effect on production, trade and transport.

As pointed out above, it seems likely that the major effect of September 11 will mainly relate to defence industries, as more effort and resources are allocated to strengthening national defence. The increased demand facing defence industries will – due to the stronger backward linkages in manufactures relative to other sectors – transfer into an increased demand for other sectors' commodities, and especially for other manufacturers. This is easily seen in Chart 13, which gives the backward linkages for the main sectors.

**Chart 13: Backward Linkages (sector distributed), 1998**



\*\* "Other" consists of government enterprises and other I-O special industries; for more information see Appendix A. Industry

Source: US Department of Commerce, Bureau of Economic Analysis

Each bar gives the requirement of intermediate inputs for the respective sector. The height of the bar illustrates total requirements, while its division across sectors suggests how much that is needed from each sector. However, despite significant backward linkages to other industries, escalating military spending is not likely to have a big impact on trade and shipping markets. The main reasons are that i) the booming industries are indeed producing for domestic consumption – not for exports, and ii) the same industries may import some of their intermediates, but these are typically non-transport intensive intermediates (such as e.g. electronic components).

What then remains to be taken into account, are the possible long term effect of increased military spending on the US economy – and thus on GDP growth and trade growth in general. Two issues deserve special attention here. Defence experts have argued that the multiplier effect of defence spending is relatively slow and small

– “...defence dollars move very slowly into the economy...” (Markusen, 2002)<sup>6</sup>. In order to stimulate the economy, it is thus argued that defence buildup is not an efficient instrument. There is however, also a rather contracting view, based on the argument that defence investments encourage the development of high-tech industries, thereby boosting research and development, and is associated with spillovers also to non-defence industries. In sum, we will not disregard the argument that defence investments are likely to have a positive impact on economic growth.

### *Summary*

- In a globalized world, trade plays a more significant role than it did 30 years ago. However, this does not imply that trade and transport developments have become more sensitive to the business cycle.
- Rising global outsourcing in fast growing industries means that regional specific shocks – like September 11 – are more easily and directly transferred to other regions and reflected through changes in trade and transport demand.
- General long term effects of September 11 on the US economy – triggered by e.g. a shift in spending from civilian to military spending – is likely to have a greater impact on the trade and transport of intermediate manufactures than what was the case one or two decades ago.
- September 11 is likely to have a special impact on the defence industries, but it is not likely that this in turn has a significant impact on trade and transport demand.
- However, if the war against terrorism results in escalating military intervention, this may indeed have much more significant impact on transport demand.

### *4.2. Shipping*

As explained in section 2, the events of September 11 did not include any of the elements which warrant a strong reaction from the shipping market. The volume or pattern of commodity trade did not change, and shipping lanes remained unaffected. Moreover, the apparent transformation of the shipping markets’ response to sudden events, makes large freight rate responses unlikely. Nevertheless, this lack of direct effects does not imply that the events are unimportant for the shipping market.

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<sup>6</sup> See Markusen, J.R. (2002): “Expensive weapons won’t ensure security”, Christian Science Monitor, February 26, 2002.

The immediate response to the September 11 attack was dramatic on several counts, primarily due to the unexpected nature of the event and the subsequent increase in uncertainty. The initial overreaction has today gone a long way towards being neutralized. Still, we will highlight five direct links between September 11 and the shipping industry:

- *The stock market response:* As explained in section 3, the plunging stock markets in the wake of September 11 reflected both the event *per se* and an anticipation of lower global growth. A share price decline affects the balance sheets of shipping companies with investments in the stock market, as well as the possibilities and costs of acquiring additional capital. Following the sharp decline until late September, international share prices have largely regained previous levels.
- *Insurance increases:* The considerable increase in insurance premiums following September 11 will affect the cost of providing maritime transport. In future, insurance premiums are likely to constitute a significantly larger share of shipping costs. The development of insurance premiums will be dealt with separately.
- *The cruise industry:* The effect of September 11 on the cruise industry has to some extent been similar to the stock market development. Initially, the cruise industry was affected by the increase in uncertainty, leading to cancellations and a “wait and see” attitude among potential customers. However, the positive development at the beginning of 2002 illustrates that the incident has not had a lasting effect on the demand for cruise shipping services.
- *Terrorism:* The Achille Lauro-hijacking in 1985 showed that the maritime industry might be a target for terrorist attacks. Several groups, particularly in the Middle East and some turbulent Asian countries (Sri Lanka and the Philippines in particular), have maritime attack capabilities. In general, we still believe it is unlikely that the maritime industry has become a more likely target for terrorist activities following September 11. Rather, there has been increased focus on the safety aspects and potential threats both with regard to vessels and ports. These issues will also be discussed in much more depth separately.

- *Transparency*: The establishment of a link between the terrorist network of Osama bin Laden and ships registered in Flag of Convenience-countries, may affect the shipping sector. The difficulties of identifying bin Laden's "phantom fleet" highlight the sometimes peculiar links of ownership in the shipping industry. It is likely that the demand for better transparency in the financial sector – linked to the quest for terrorist funds – will be mirrored by similar measures targeted at the shipping sector. Such a development is likely to be positive for credible shipowners, and may indeed benefit Norwegian shipping.

## 5. Final remarks

The discussion in the last subsection above shows that there are direct links between September 11 and the shipping industry. Still an essential message of this report is to emphasize that the development of the world economy in general is far more important for the shipping business than isolated acts such as the September 11 incident. Accordingly, the actions of groups such as OPEC are likely to have more far-reaching consequences for the shipping sector than the direct effects of events such as the September 11 attack. This can be illustrated by the development of certain freight rates in the last part of 2001.

**Table 5. Freight rate development, autumn 2001, monthly movements (%)**

PERIOD	TANKER SPOT	TANKER TC	DRY SPOT	DRY TC	NOTE
Aug-Sep	+69.3	-5.8	-2.9	-3.2	Dry: negative trend due to lower ec. growth. Tankers increase temporarily after September 11
Sep-Oct	-24	-16.4	-6.1	-6.7	Tankers and dry: negative due to adverse economic growth impact. Jet fuel effect.
Oct-Nov	-51.3	0	-4.6	-7.1	Tankers: OPEC production cut agreement. Markets adapt to potential effects of recession
Nov-Dec	+7.8	+5.8	+0.8	0	

Note: Rate developments are based on average monthly freight rates in US dollar/day, taken from the Platou monthly. Rates refer to modern VLCCs for the tanker sector and Handymax vessels for the bulk sector.

World economic and trade growth will continue to be the decisive factor for the development of the shipping market in the future. The growth in the US, Euroland and Japan – as well as the actions of groups such as OPEC – will be crucial to the future development. In the long term, an escalation of international tensions – both politically and in trade matters – may have important negative impacts. The spread between the pessimistic and optimistic long-term growth projections presented in this report (1.7-1.8 percentage points) illustrates the large divergence between the possible outcomes. However, the stability of the growth trend in the postwar period (divided into the periods pre- and post-1973), indicates that long-term growth rates are able to withstand the influences of isolated events such as September 11.

## Appendix: Tables

**Table A-1: Industrial Forward and Backward Linkages, US 1998**

Industry	Industry \ Industry	Forward Linkage	Backward Linkage
Livestock and livestock products		1.708	2.958
Other agricultural products		2.329	1.983
Forestry and fishery products		1.230	2.079
Agricultural, forestry, and fishery services		1.766	1.730
Metallic ores mining		1.522	2.227
Coal mining		1.466	2.013
Crude petroleum and natural gas		4.632	2.744
Nonmetallic minerals mining		1.398	1.755
New construction		1.000	2.040
Maintenance and repair construction		3.867	2.003
Ordnance and accessories		1.020	1.829
Food and kindred products		2.466	2.626
Tobacco products		1.083	1.626
Broad and narrow fabrics, yarn and thread mills		2.602	2.357
Miscellaneous textile goods and floor coverings		1.292	2.474
Apparel		1.342	2.530
Miscellaneous fabricated textile products		1.146	2.302
Lumber and wood products		2.538	2.298
Furniture and fixtures		1.095	2.051
Paper and allied products, except containers		2.890	2.161
Paperboard containers and boxes		1.629	2.275
Newspapers and periodicals		1.538	1.641
Other printing and publishing		2.136	1.793
Industrial and other chemicals		4.554	2.275
Agricultural fertilizers and chemicals		1.556	2.368
Plastics and synthetic materials		2.850	2.383
Drugs		1.202	1.735
Cleaning and toilet preparations		1.220	2.122
Paints and allied products		1.247	2.165
Petroleum refining and related products		2.300	3.021
Rubber and miscellaneous plastics products		3.281	2.144
Footwear, leather, and leather products		1.427	2.662
Glass and glass products		1.391	2.040
Stone and clay products		1.748	1.939
Primary iron and steel manufacturing		4.778	2.171
Primary nonferrous metals manufacturing		4.230	2.381
Metal containers		1.223	2.938
Heating, plumbing, and fabricated structural metal products		1.702	2.089
Screw machine products and stampings		1.897	2.112
Other fabricated metal products		2.349	1.995
Engines and turbines		1.341	2.265
Farm, construction, and mining machinery		1.282	2.079
Materials handling machinery and equipment		1.100	2.154
Metalworking machinery and equipment		1.378	1.797
Special industry machinery and equipment		1.200	2.035
General industrial machinery and equipment		1.654	1.936

**Table A-1: Industrial Forward and Backward Linkages, US 1998, continues**

Industry \ Industry	Forward Linkage	Backward Linkage
Miscellaneous machinery, except electrical	1.833	1.792
Computer and office equipment	1.588	2.679
Service industry machinery	1.260	2.110
Electrical industrial equipment and apparatus	1.759	1.975
Household appliances	1.049	2.365
Electric lighting and wiring equipment	1.258	1.988
Audio, video, and communication equipment	1.268	2.296
Electronic components and accessories	3.041	2.152
Miscellaneous electrical machinery and supplies	1.231	2.142
Motor vehicles (passenger cars and trucks)	1.067	2.828
Truck and bus bodies, trailers, and motor vehicles parts	1.992	2.479
Aircraft and parts	1.485	1.981
Other transportation equipment	1.119	2.084
Scientific and controlling instruments	1.419	1.862
Ophthalmic and photographic equipment	1.122	1.687
Miscellaneous manufacturing	1.252	1.946
Railroads and related services; passenger ground transportation	1.738	1.703
Motor freight transportation and warehousing	4.141	1.882
Water transportation	1.450	2.151
Air transportation	1.844	1.862
Pipelines, freight forwarders, and related services	1.620	1.813
Communications, except radio and TV	2.618	1.777
Radio and TV broadcasting	1.460	2.133
Electric services (utilities)	2.601	1.628
Gas production and distribution (utilities)	2.502	3.004
Water and sanitary services	1.188	1.938
Wholesale trade	7.988	1.596
Retail trade	1.423	1.556
Finance	3.983	1.724
Insurance	2.078	2.077
Owner-occupied dwellings	1.000	1.255
Real estate and royalties	6.206	1.421
Hotels and lodging places	1.514	1.788
Personal and repair services (except auto)	1.392	1.686
Computer and data processing services, including own-account s	2.480	1.766
Legal, engineering, accounting, and related services	3.803	1.548
Other business and professional services, except medical	6.561	1.441
Advertising	1.470	1.494
Eating and drinking places	1.554	2.043
Automotive repair and services	1.937	1.939
Amusements	2.143	1.717
Health services	1.072	1.695
Educational and social services, and membership organizations	1.279	1.812
Federal Government enterprises	1.552	1.641
State and local government enterprises	1.832	2.024

**Table A-2: Industrial Forward Linkages to the Transport Sectors, US 1998**

	Motor freight transportation and warehousing	Water transportation	Air transportation	Pipelines, freight forwarders, and related services
Livestock and livestock products	0.068	0.002	0.008	0.007
Other agricultural products	0.034	0.002	0.006	0.004
Forestry and fishery products	0.019	0.028	0.010	0.005
Agricultural, forestry, and fishery services	0.025	0.001	0.016	0.004
Metallic ores mining	0.044	0.003	0.009	0.005
Coal mining	0.037	0.004	0.009	0.005
Crude petroleum and natural gas	0.017	0.003	0.008	0.004
Nonmetallic minerals mining	0.035	0.001	0.007	0.004
New construction	0.037	0.001	0.006	0.003
Maintenance and repair construction	0.037	0.002	0.006	0.004
Ordnance and accessories	0.016	0.001	0.010	0.002
Food and kindred products	0.055	0.003	0.010	0.005
Tobacco products	0.015	0.000	0.005	0.002
Broad and narrow fabrics, yarn and thread mills	0.038	0.002	0.008	0.004
Miscellaneous textile goods and floor coverings	0.051	0.002	0.010	0.005
Apparel	0.035	0.001	0.011	0.004
Miscellaneous fabricated textile products	0.036	0.001	0.010	0.004
Lumber and wood products	0.060	0.004	0.008	0.005
Furniture and fixtures	0.037	0.001	0.008	0.003
Paper and allied products, except containers	0.065	0.002	0.009	0.005
Paperboard containers and boxes	0.080	0.002	0.010	0.006
Newspapers and periodicals	0.021	0.001	0.006	0.002
Other printing and publishing	0.035	0.001	0.007	0.003
Industrial and other chemicals	0.055	0.003	0.009	0.007
Agricultural fertilizers and chemicals	0.097	0.004	0.009	0.007
Plastics and synthetic materials	0.052	0.003	0.009	0.006
Drugs	0.014	0.001	0.006	0.002
Cleaning and toilet preparations	0.037	0.002	0.009	0.004
Paints and allied products	0.054	0.003	0.008	0.005
Petroleum refining and related products	0.027	0.006	0.008	0.046
Rubber and miscellaneous plastics products	0.059	0.002	0.008	0.005
Footwear, leather, and leather products	0.055	0.001	0.013	0.005
Glass and glass products	0.045	0.003	0.008	0.004
Stone and clay products	0.095	0.005	0.007	0.006
Primary iron and steel manufacturing	0.062	0.004	0.009	0.005
Primary nonferrous metals manufacturing	0.066	0.002	0.010	0.005
Metal containers	0.072	0.002	0.012	0.006
Heating, plumbing, and fabricated structural metal products	0.041	0.001	0.008	0.003
Screw machine products and stampings	0.044	0.002	0.008	0.004
Other fabricated metal products	0.036	0.001	0.008	0.003
Engines and turbines	0.048	0.001	0.011	0.004
Farm, construction, and mining machinery	0.038	0.001	0.009	0.003
Materials handling machinery and equipment	0.036	0.001	0.010	0.003
Metalworking machinery and equipment	0.028	0.001	0.008	0.003
Special industry machinery and equipment	0.028	0.001	0.009	0.003
General industrial machinery and equipment	0.026	0.001	0.008	0.003
Miscellaneous machinery, except electrical	0.025	0.001	0.007	0.002
Computer and office equipment	0.020	0.001	0.015	0.003
Service industry machinery	0.032	0.001	0.009	0.003

	Motor freight transportation and warehousing	Water transportation	Air transportation	Pipelines, freight forwarders, and related services
Electrical industrial equipment and apparatus	0.029	0.001	0.009	0.003
Household appliances	0.046	0.002	0.011	0.004
Electric lighting and wiring equipment	0.033	0.001	0.008	0.003
Audio, video, and communication equipment	0.020	0.001	0.011	0.003
Electronic components and accessories	0.021	0.001	0.010	0.003
Miscellaneous electrical machinery and supplies	0.033	0.001	0.010	0.003
Motor vehicles (passenger cars and trucks)	0.048	0.002	0.015	0.005
Truck and bus bodies, trailers, and motor vehicles parts	0.046	0.002	0.012	0.004
Aircraft and parts	0.017	0.001	0.012	0.003
Other transportation equipment	0.034	0.001	0.009	0.003
Scientific and controlling instruments	0.018	0.001	0.008	0.002
Ophthalmic and photographic equipment	0.020	0.001	0.006	0.002
Miscellaneous manufacturing	0.030	0.001	0.007	0.003
Railroads and related services; passenger ground transportation	0.018	0.001	0.007	0.012
Motor freight transportation and warehousing	1.235	0.007	0.015	0.043
Water transportation	0.014	1.244	0.007	0.068
Air transportation	0.010	0.001	1.066	0.104
Pipelines, freight forwarders, and related services	0.015	0.002	0.012	1.027
Communications, except radio and TV	0.009	0.001	0.007	0.002
Radio and TV broadcasting	0.009	0.001	0.006	0.002
Electric services (utilities)	0.013	0.004	0.005	0.003
Gas production and distribution (utilities)	0.015	0.002	0.010	0.010
Water and sanitary services	0.037	0.001	0.006	0.004
Wholesale trade	0.012	0.001	0.009	0.003
Retail trade	0.010	0.001	0.006	0.002
Finance	0.016	0.001	0.006	0.002
Insurance	0.012	0.001	0.009	0.002
Owner-occupied dwellings	0.003	0.000	0.001	0.000
Real estate and royalties	0.007	0.000	0.004	0.001
Hotels and lodging places	0.017	0.001	0.008	0.017
Personal and repair services (except auto)	0.015	0.001	0.006	0.002
Computer and data processing services, including own- accounts	0.008	0.001	0.007	0.002
Legal, engineering, accounting, and related services	0.008	0.001	0.006	0.001
Other business and professional services, except medical	0.010	0.001	0.007	0.002
Advertising	0.007	0.000	0.004	0.001
Eating and drinking places	0.028	0.001	0.008	0.003
Automotive repair and services	0.022	0.001	0.009	0.005
Amusements	0.010	0.001	0.006	0.002
Health services	0.012	0.001	0.008	0.002
Educational and social services, and membership organizations	0.015	0.001	0.007	0.002
Federal Government enterprises	0.041	0.030	0.029	0.008
State and local government enterprises	0.027	0.008	0.005	0.004
Noncomparable imports	0.000	0.000	0.000	0.000
Scrap, used and secondhand goods	0.000	0.000	0.000	0.000
General government industry	0.000	0.000	0.000	0.000
Rest of the world adjustment to final uses	0.000	0.000	0.000	0.000
Household industry	0.000	0.000	0.000	0.000
Inventory valuation adjustment	0.000	0.000	0.000	0.000
Forward linkage	4.141	1.450	1.844	1.620