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Assessing the Effects of the Terrorist Attacks on the U.S. Economy

Kiel Working Paper, No. 1077

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Assessing the Effects of the Terrorist Attacks on the U.S. Economy

by

Hubert Strauß

September 2001

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Assessing the Effects of the Terrorist Attacks on the U.S. Economy*

Abstract:
The terrorist attacks of September 11 have challenged the view that the U.S. economy is on the brink of recovery. This article discusses the effects of the attacks on real GDP taking the Kiel Institute's forecast of September 10 as the baseline scenario. The focus is on assessing the direct production losses in the week of September 10–16. Anecdotal evidence is combined with economic reasoning (on the non storability of services, the role of air transports and on the complementarity between services). As to the indirect effects, I assume that the downturn in sentiment will be severe but short-lived. Under the technical assumption of a stabilizing political situation economic activity in 2002 will recover more vigorously than previously thought due to postponed purchases and a more expansionary stance of economic policies.

Key words: Business Cycle, U.S. economy, terrorist attacks, air transportation, services

JEL classification: E32, E37, L80, L93

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Assessing the Effects of the Terrorist Attacks on the U.S. Economy

A. More than An Earthquake

America is not what it used to be after the terrorist attacks of September 11, 2001. There is hardly one person feeling as secure as before, the reluctance to using airplanes exemplifies that personal consumption habits and social behavior are under revision, and members of the government prepare the people of the United States to a long and costly war against terrorism. These few examples make clear that if one can find any historical parallels to judge the impact of the horrible events, the Kobe earthquake with its even positive impact due to the subsequent construction boom is not amongst them. From a business-cycle perspective, September 11 has challenged the view that the U.S. economy is on the brink of recovery. All observers of the U.S. economy are therefore required to present their knowledge in order to reduce the extreme amount of uncertainty in the present situation. This paper contributes to this difficult task in a fashion that is far from being exhaustive. It focuses on the immediate aftermath of the attacks and tries to assess the direct production losses while treating the likely evolution of consumer and business confidence more or less by assumption.[1]

The terrorist attacks against the United States have not changed my medium-term outlook for the world's largest economy. In the short run, however, the

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1 In my view it is too early to know if the current situation has any precedent, e.g. the time of the outbreak of the Gulf War. The discussion on consumer and business confidence is thus highly speculative and may be addressed with more success in one or two months.

economic effects will be substantial. The terrible events of September 11 and their immediate consequences are regarded as a negative temporary output shock. It will postpone by one quarter the turnaround I was expecting for the autumn of 2001. This does not mean that I abstract from negative effects on consumer and investor confidence; but I am convinced that they will be short-lived. Firstly, both monetary and fiscal policy have become more expansionary in response to the recent events and will be loosened further in the near future. The resulting stimulus to aggregate demand will ultimately contribute to a stabilization of private agents' expectations. Secondly, turning to the supply side, interruptions of the production process basically lasted one week and thus were temporary. However, the following assessment rests on the main assumptions of no further terrorist attacks comparable to those of September 11 and of U.S. military operations (if any) which are closely focused.

B. Analyzing the Effects

The revisions I have made to the "baseline scenario" of the Kiel Institute's forecast of September 10 (Gern et al. 2001) can be roughly divided into four factors:

(1) production stoppages in the immediate aftermath of the attacks (direct production losses)
(2) a partial "catching-up" of these direct production losses
(3) output losses indirectly caused by the terrorist attacks due to their negative impact on business and consumer confidence
(4) stronger GDP growth due to a making-up for postponed durables consumption and fixed investment in the course of a normalization of business and consumer confidence.

While GDP in the third quarter of 2001 will be depressed by the dominance of factors (1) and (3) over factor (2), production will be dampened by factor (3) in the course of the fourth quarter with factor (4) showing up only slowly. Yet in 2002, especially in the first half of the year, factor (4) is expected to dominate clearly.

I. Production Stoppages in the Week of September 10–16

1. Anecdotal Evidence

We will have to wait for "hard" data on economic activity until the middle of October. At present, the assessment of direct production losses basically relies on anecdotal evidence and "informed speculation". What is known from various reports is that

- transportation was suspended,
- businesses were closed,
- financial markets were shut,
- most sporting events were cancelled,
- public services (firemen, hospitals, police, army) worked overtime to face the enormous challenges.

From this non exhaustive list I tentatively divide the economy into industries heavily affected, slightly affected, and not affected. The government sector has probably increased its output during the critical week. Table 1 summarizes the estimated production losses during the week of the attacks. These figures can hardly pretend to be more than speculative. The following subsections document the assumptions underlying these results and try to motivate qualitatively the shape of the sectoral distribution of the losses.

Table 1: Tentative Assessment of Production Losses in the Week of September 10–16 (Factors (1) and (2))

Degree	Industries	Weight in 1999[a]	Estimated loss (in workdays)
Heavily affected	Transportation	3.3	1.8
	Retail trade (incl. restaurants)	9.1	0.6
	Hotels and other lodging places	0.9	2.9
	Amusement and recreation services	0.8	2.0
	Other services	19.5	0.5
	Finance, insurance and real estate	19.1	0.7
Slightly affected	Communications	2.8	0.1
	Electricity, gas and sanitary services	2.3	0.1
	Wholesale trade	6.8	0.2
	Manufacturing	16.0	0.2
	Construction	4.5	0.1
Not affected	Agriculture, forestry, fishing	1.3	0
	Mining	1.2	0
With higher output	Government	12.4	–0.5
Overall	**All sectors**	**100.0**	**0.38**

[a]In percent. Corrected for statistical discrepancy.

Source: Lum and Moyer (2000); own calculations and estimates.

2. Immediate Output Losses Shaped by Non Storability of Services

Our assessment of strong drawbacks in the output of services and only mild effects on industrial production is motivated by the simultaneity of production and consumption in the service economy. This characteristic makes the service sector very vulnerable to temporary breakdowns in either demand or supply. If demand overshoots once the breakdown is over, excess demand can be met only to the extent of existing spare capacity before the disruption and by a more efficient use of installed capacity. There was not much spare capacity in U.S. non manufacturing industries before September 11 as the slowdown in economic activity was by and large concentrated on industrial production. In manufacturing, mining and agriculture, however, fluctuations in both demand and supply are readily absorbed by changes in inventories. This is why scattered reports on

production stoppages in these sectors on September 11 are comparable to strikes, i.e. losses have probably been made up for almost fully during the same week. As stockpiling also exists for inputs, the suspension of air transports may not have created substantial bottlenecks in the aftermath of the attacks. An exception can be made for establishments which fully rely on just-in-time processes supported by air transportation. For these reasons the estimated losses in slightly affected industries are small but not nil in Table 1.

In addition to this fundamental difference between production of goods and production of services I want to stress two qualitatively important points which further explain why the SIC divisions Retail trade, Services and Transportation have probably been hit disproportionately and why the negative effects might be unevenly distributed among sectors. The first point regards the importance of air transports both as a direct contributor to aggregate output and as an input provider for other industries. The second point discusses the strong complementarity between hotel accommodation and restaurant services on the one hand and transportation services on the other hand.

3. Air Transports As a "Lubricant" for the Economy

As can be seen in Table 1, transportation contributes 3.3 percent to national income. The share of air transports in the overall value-added originating from the transportation sector was 26 percent in 1996 according to the U.S. Transportation Satellite Accounts (Figure 1). It is probably close to 30 percent today due to more than proportionate growth in air transports during the late nineties. This share combined with six days of suspended air transports results in a loss equivalent to 1.8 workdays' value-added, as highlighted in Table 1.[2]

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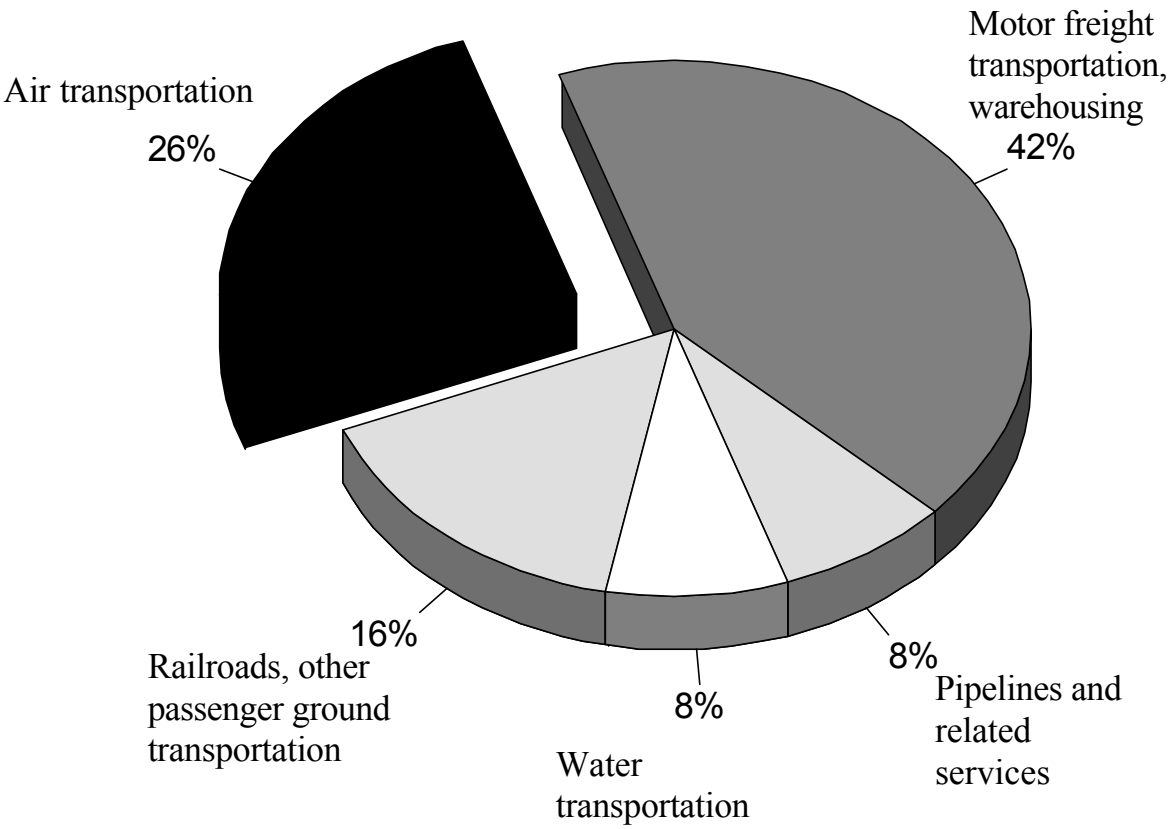
[2] Effects on other means of transportation are ambiguous and therefore neglected. While airport shuttle busses created virtually no value-added during the week of turmoil, taxi drivers could well have earned more than usually.

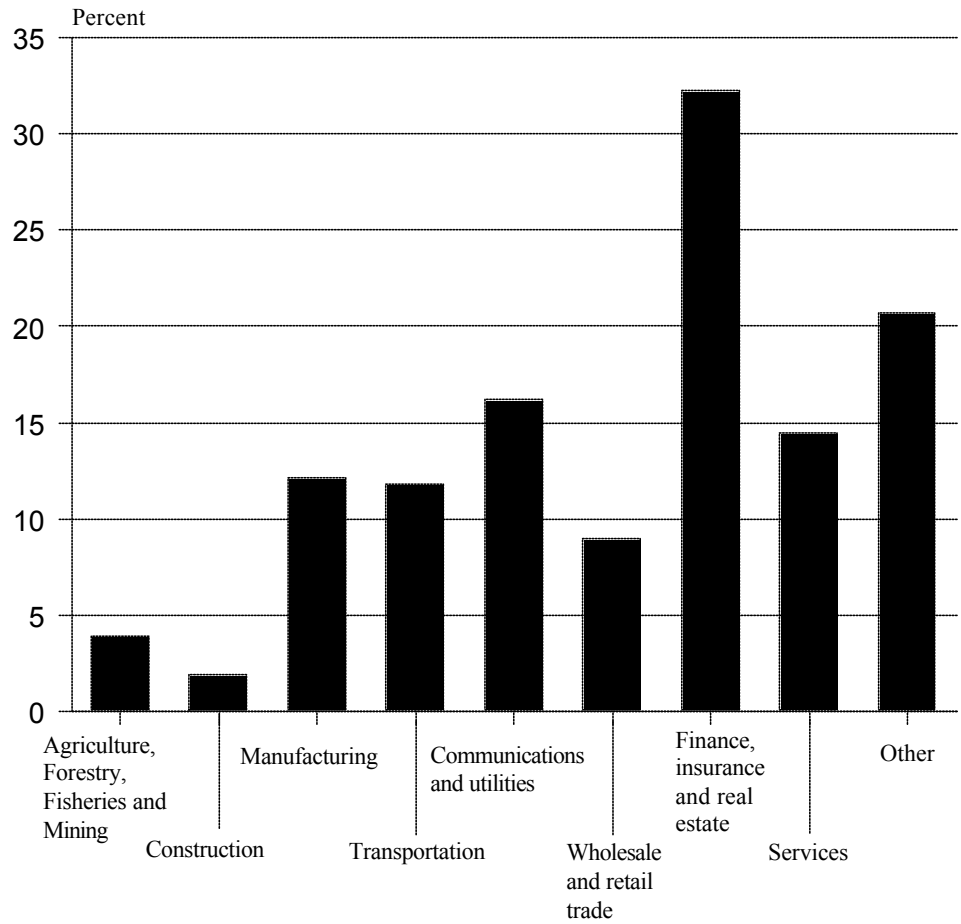
Figure 1: The Weight of Air Transports Within the Transportation Sector



Source: Fang et al. (2000); own calculations.

The Transportation Satellite Accounts also illustrate the role of air transports as an input to other sectors. It turns out that service-producing industries make stronger use of air transports than goods-producing industries. On top of the list is the sector Finance, insurance, and real estate, which covers one-third of its transportation needs by air transports (Figure 2).

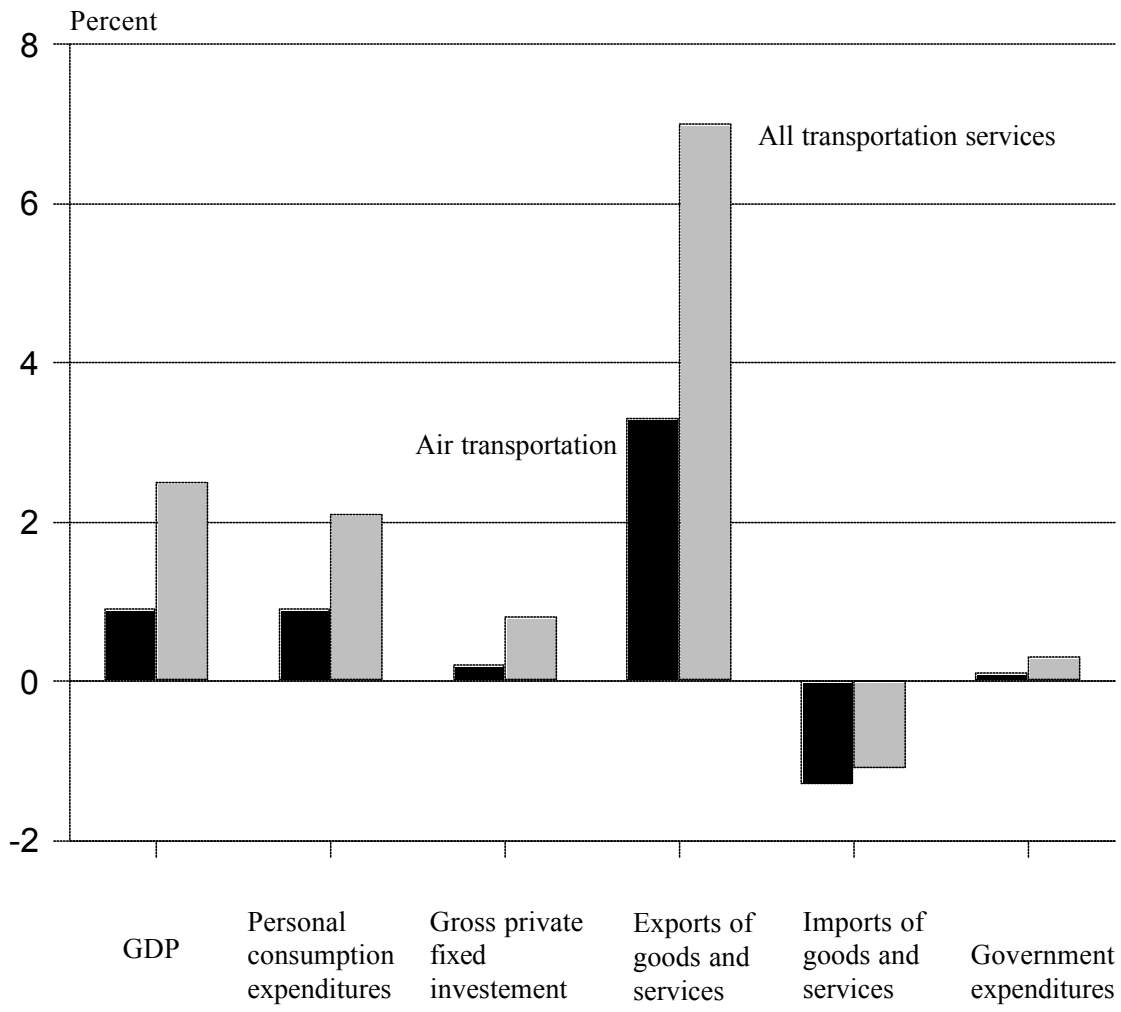
Figure 2: How Industries Cover Their Transportation Needs: Share of Air Transportation



Source: Fang et al. (2000); own calculations.

When assessing how the expected output losses affect the expenditure components of GDP, it is useful to look at the air transport intensity of GDP by expenditure. Exports and personal consumption expenditures turn out to be affected the most by suspended domestic transportation (Figure 3). This has been taken into account when the losses in third-quarter GDP were distributed over the expenditure components (see Chapter C.). It is noteworthy that the apparent difference between exports and imports as to their transportation intensities does not rest on economic grounds but is rather an accounting phenomenon: As imports are c.i.f. and exports f.o.b., the columns for imports in Figure 3 only cover transportation from U.S. ports or airports to the importing company while the column for exports also includes transportation outside the United States.

Figure 3: Air Transportation Intensity of GDP Components



Source: Fang et al. (2000); own calculations.

4. Strong Complementarity Between Retail Trade, Services, and Transportation

In the Standard Industry Classification (SIC), which will not be replaced by the North-American Industry Classification System (NAICS) for purposes of the National Income and Product Accounts (NIPA) until 2003,[3] hotels and other lodging places are part of "Services" whereas restaurant services are attributed to

[3] See Kort (2001: 12 and 10) for an overview of the precise timing of the replacement of SIC by NAICS and the changes in the definition of sectors.

"Retail trade".[4] Both SIC sectors have suffered from the suspension of air transports because of strong complementarities between transportation on the one hand and hotel accommodation as well as purchases of meals on the other hand. Demand for hotel accommodation arises when people stay away from home, and their demand for restaurant services is usually higher when they are travelling. To give a rough assessment of overall production losses in the retail sector assumptions have to be made on the motivation for trips—business (two-thirds) versus holiday trips (one-third)—and on the means of transportation used—ground (two-thirds) versus air transportation (one-third). Within the group of air travellers I further let hotels and other lodging places have lost a six workdays' value-added for both professionals and tourists not travelling and gained two a days' value added for guests unable to return to their residences. I also subtract two and three workdays for private and professional travellers (respectively) using ground transportation. This brings the total loss to $(6-2)*(1/3) + 2*(2/3)*(2/3) + 3*(1/3)*(2/3) \approx 2.9$ workdays (Table 1). Losses are much smaller for restaurants as travellers are not the only persons to purchase meals at eating and drinking places. I subtract one workday's value-added from restaurants while other retail trades are supposed to have lost 0.5 workdays of output. Given the assumed weight of 25 percent for restaurants, the loss for the retail sector as a whole amounts to $(1/4)*1 + (3/4)*0.5 \approx 0.6$ workdays.

For the rest of this year I expect virtually no making up for holiday flights that were cancelled during the six days of closed skies. I even think that flights

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4 In the NAICS a separate industry sector "Accommodation and food services" will be introduced (cf. Parker (2001), who presents an interesting discussion of consequences for the interpretation of monthly sales and inventory data). In the sources cited in this paper no distinction between restaurant and other retail services is made with respect to value added. I assume the share of restaurants to be 25 percent, a choice motivated by the share of purchased meals in Personal consumption expenditures (28 percent in 1999). This share might be at the high end of plausible estimates as consumption expenditures in restaurants represent gross (not net) output for the innkeeper.

planned for the second half of September are partially cancelled by tourists for security reasons. Business trips have resumed since September 17, but catching-up of cancelled business trips has been strongly limited both because many professional travellers had fixed agendas for the rest of the month and because companies have been cutting travel budgets radically to improve the security of their employees and to cut costs.

The non storability of services also limits production catch-ups in the financial services industry. Financial markets were closed from September 11 to 14, so virtually all transactions directly linked to U.S. financial markets were interrupted nationwide for four days. Under the assumption that this kind of transaction represents about one-sixth of the sector's total value added[5] and that other financial transactions suspended in the turmoil of September 11 have been carried out in the following days, this results in the approximately 0.7 workdays' loss shown in Table 1. The partial destruction of lower Manhattan, the financial core of New York State (which produces about 8 percent of the nation's GDP (Beemiller and Downey 2001)) appears quantitatively less important on a national scale.

Professional sporting events were cancelled during the weekend after the attacks leading to a loss in "Amusement and recreation services". It is true that those baseball and football matches will take place some day but probably not on weekends, so less spectators will follow the events in stadiums and on television. In addition, many cultural events (concerts, theatre, new films in cinemas) were cancelled. Altogether, the loss of two workdays shown in Table 1 seems to be largely justified.

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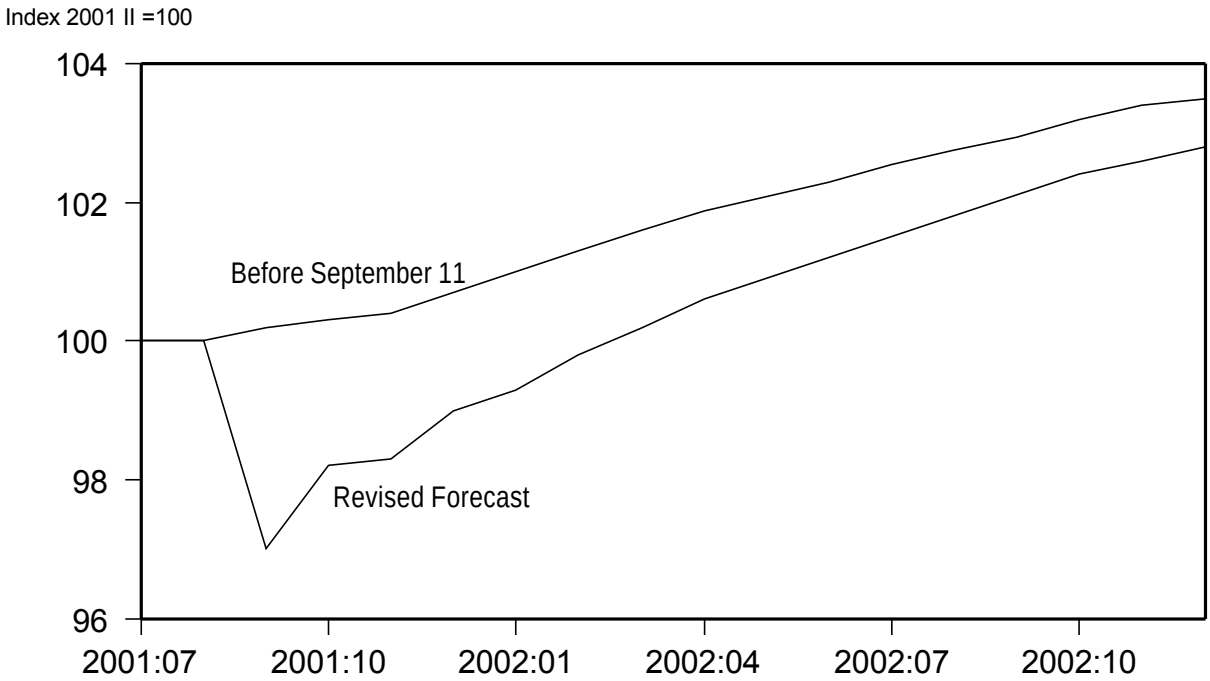
5 According to Lum and Moyer (2001: 29, Table 1), security and commodity brokers generated 8.5 percent of nominal value added in finance, insurance, and real estate. I roughly double this share to take account of the fact that other financial institutions are involved in stock market transactions, too.

II. Confidence-Driven Output Losses Postpone Recovery by One Quarter

The immediate slowdown in production due to firms correcting expected sales downward after September 11 (factor (3)) is at least as important as the production stoppages described above and has probably outweighted by much the immediate "catching-up" of lost production (factor(2)). A well-founded estimation of the net dampening effect resulting from these factors is impossible at the moment. This net effect is assumed to be almost as large as the output loss in Table 1, and I subtract another 0.25 workdays from our pre-attack baseline for the third quarter. This brings the overall loss to 0.63 workdays of production (or $22.7 bill.). Given the real GDP level of $9,338.4 bill. at an annual rate in 2001 II, this leads to a downward correction of the projected annualized rate of change in real GDP by 3.8 percentage points for the third quarter.

In the fourth quarter of this year the situation will hardly improve and pessimism will be widespread throughout the economy. For October and November I assume that the stimulus due to immediate catching-up (factor (2)) will disappear but that factor (3) will put an undiminished strain on economic activity as consumer confidence is additionally affected by large-scale layoffs in the most strongly hit industries. In contrast to September, the dampening is not confined to the last 20 days of the period but the effects are fully felt subtracting an equivalent of presumably 0.4 workdays of output in each month. Only in the very end of 2001 business conditions will start normalizing and will continue to do so into next year. To illustrate the time profile of overall economic activity for the near future a "fictitious" real GDP indicator is plotted (Figure 4). It is constructed such that the changes in its quarterly averages correspond to our revised quarterly GDP forecast given in Figure 5.

Figure 4: Monthly Profile of a "Fictitious" Real GDP Indicator



Source: Own calculations and forecast.

Aggregate demand is expected to resume strongly during the first half of next year, as pessimism progressively fades away in a stabilizing political environment. Repairing damages in New York and Washington, D.C., will go hand in hand with a reversal of precautionary saving and the undertaking of postponed investment.[6] However, only about two-thirds of the output losses will be caught up until the end of the forecasting horizon: In 2001 IV real GDP at annual rates stands $174 bill. below the pre-September 11 baseline, and in 2002 IV it will still be almost $60 bill. lower than previously thought.

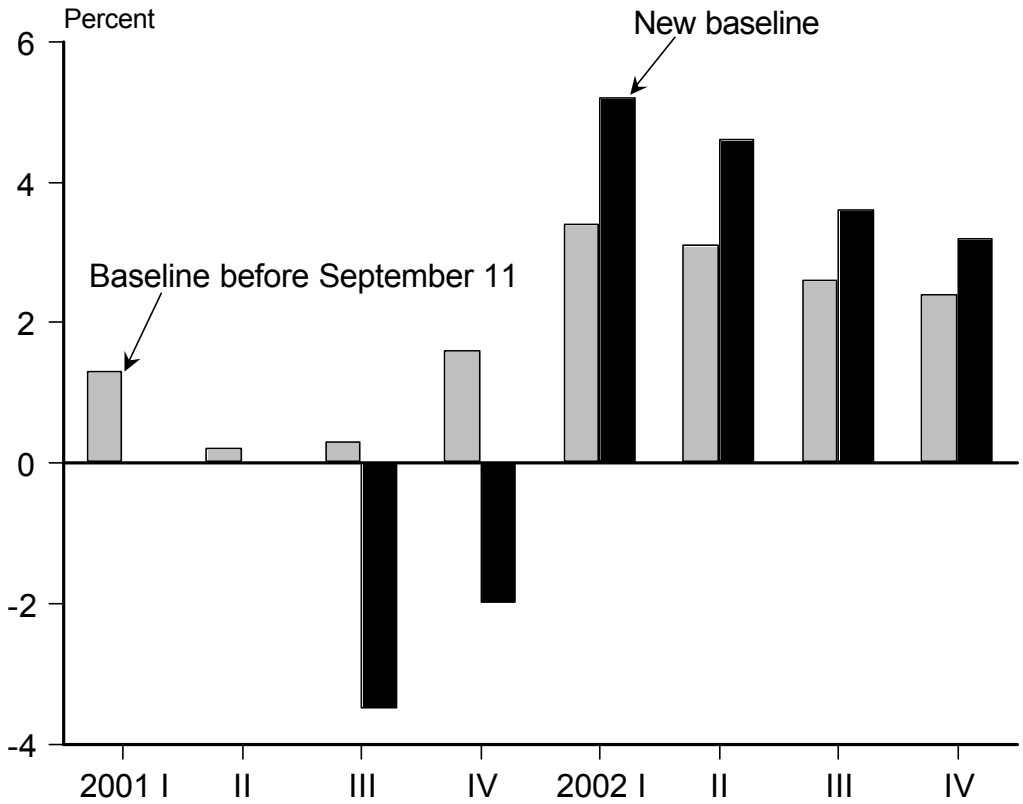
C. Revised U.S. Forecast for 2001 and 2002

In a nutshell, overall production suffers both from direct losses and from an expectation-driven slowdown in the third quarter. Direct losses are not expected

6 The expectation of a fairly quick return to normal is shared by the IMF (2001).

for the fourth quarter, but the overall business climate will remain under pressure because of the uncertain political situation. In 2002, the effects of stronger monetary expansion and substantial fiscal impulses will lead to an improvement of economic conditions. As a result, real GDP growth will be stronger than previously thought in the course of next year (Figure 5).

Figure 5: Old and Revised Outlook for Real GDP of the United States[a]



[a]Change over previous quarter at annual rate.

Source: U.S. Department of Commerce (2001); own forecast.

When adjusting the expenditure components of GDP to this revised forecast several special factors have to be taken into account. Losses in foreign trade volumes are likely to be particularly strong in the third quarter due to their high average air transportation intensity. The same holds for personal consumption expenditures, although to a smaller extent. Consumption shrinks mainly due to direct production stoppages in the third quarter and due to indirect effects in the

fourth. However, given that huge quantities of goods could not be delivered during the week of the attacks and that air traffic has not fully resumed, substantial stock-piling must have occurred within expedient companies. It is therefore plausible to assume a positive temporary effect on private inventories in September that will dampen industrial production in October and November of 2001. The decrease in private fixed investment, which has been dramatic for equipment and software, will probably last for the rest of the year (Table 2) unlike the bottoming-out expected before.

Apart from residential investment, government spending is the only bright spot in the otherwise gloomy current GDP picture. Congress has approved an additional amount of $40 bill. to federal outlays in fiscal 2001/2002, and this is reflected in an upward revision of the forecast for real government consumption and gross investment (Table 3). The revision may appear to be mild but one has to bear two aspects in mind. Firstly, only about half this sum will become effective on the demand side of GDP as higher interest payments ($2 bill.) and substantial subsidies to the airline industry ($17 bill.) do not lead to any final demand by the government sector. Part of the remaining $21 bill. might be used to increase grants-in-aid to State and local governments and will be spent by them. For simplicity I ruled out this possibility by assumption and added about $20 bill. to real Federal consumption and gross investment; at the same time I did not allow for higher spending at the State and Local level for the reason of improved grants-in-aid budgets. Secondly, even if State and local governments increase spending in an effort to promote security, this effect is clearly dominated by the traditionally pro-cyclical spending pattern at lower levels of government.[7]

All in all, real GDP will grow by 0.7 percent in 2001 (instead of 1.4 percent) and by 2.0 percent in 2002 (instead of 2.2 percent). Compared to the downward

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7 In some states budget deficits are prohibited by the constitution.

revisions of the Consensus forecast between September 10 and 25 (Hubbard and Skies 2001: 2), the analysis presented in this paper thus leads to a much steeper output loss this year but to a relatively healthy average growth rate for 2002.

Table 2: Revised Forecast for the U.S. Economy, 2001–2002 (Quarterly Data)
– Annualized quarter-to-quarter changes in percent unless stated otherwise –

	2001				2002			
	1. Q.	2. Q	3. Q.	4. Q.	1. Q.	2. Q.	3. Q.	4. Q.
Real Gross Domestic Product	1.3	0.2	–3.5	–2.0	5.2	4.6	3.6	3.2
Personal Consumption Expenditures	3.0	2.5	–4.0	–4.0	4.0	3.5	3.0	2.5
Government Cons. Expenditures and Gross Investment	5.3	5.4	2.1	2.7	2.2	3.2	4.1	3.7
Gross Private Fixed Investment	1.9	–9.8	–11.3	–7.2	3.5	3.8	2.8	2.9
Equipment and Software	–4.2	–15.1	–15.0	–10.0	5.0	5.0	3.0	3.0
Nonresidential (Structures etc.)	12.4	–13.4	–10.0	–7.0	0.0	2.0	3.0	4.0
Residential	8.6	5.7	–2.0	0.0	2.0	2.0	2.0	2.0
Change in Private Inventories (bill $)	–27.1	–38.4	–20	–35	5	30	32	40
Final Sales to Domestic Purchasers	3.2	0.8	–4.3	–1.4	3.4	3.5	3.5	2.9
Domestic Demand	0.6	0.4	–3.5	–3.7	5.6	4.8	3.4	3.3
Exports	–1.2	–12.2	–9.0	2.0	5.0	9.0	9.0	7.0
Imports	–5.0	–7.7	–7.0	–10.0	7.0	9.0	6.5	6.5
Change in Net Exports (bill. $)	16.5	–6.0	1.6	42.7	–11.8	–8.6	0.7	–4.8
Implicit GDP Deflator	3.2	2.2	2.2	2.0	2.5	2.5	3.0	3.0
Unemployment Rate (Percent of Civilian Labor Force)	4.2	4.5	4.9	5.6	6.0	5.6	5.3	5.2
Federal Funds Rate	5.6	4.3	3.5	2.5	2.5	3.0	3.5	4.0
Consumer Price Index (y-o-y change)	3.4	3.4	2.6	2.3	2.0	2.0	2.7	2.9

Source: U.S. Department of Commerce (2001); Federal Reserve Bank of St. Louis (2001); own estimates and forecast.

Table 3: Annual Data for the U.S. Economy, 1999–2002, Old and Revised Forecast
– Percentage Changes unless stated otherwise –

		Before September 11				Revised Forecast	
	2000	1999	2000	2001[a]	2002[a]	2001	2002
	bill. $						
Real Gross Domestic Product	9224.0	4.1	4.2	1.4	2.2	0.7	2.0
Pers. Consumption Expenditures	6257.8	5.0	4.8	2.7	1.8	1.8	1.1
Government Cons. Expenditures and Gross Investment	1572.6	3.3	2.7	3.2	2.5	3.4	3.0
Gross Private Fixed Investment	1716.2	7.8	7.6	–1.2	0.2	–2.4	–1.4
Equipment and Software	1087.4	11.8	11.1	–3.8	–0.1	–5.4	–2.1
Nonresidential (Structures etc.)	272.8	–2.0	6.2	3.6	–1.2	2.4	–2.5
Residential	371.4	6.7	0.8	1.3	1.9	1.2	1.4
Chg. in Private Inventories (bill $)	—	62.1	50.6	–22.6	27.5	–30.1	26.8
Final Sales of Domestic Product	9173.4	5.2	4.9	2.2	1.7	1.5	1.3
Gross Domestic Purchases	9594.7	5.0	4.8	1.4	2.3	0.6	1.7
Exports	1133.2	3.2	9.5	–1.0	4.9	–2.4	2.9
Imports	1351.7	10.5	13.4	0.0	4.8	–1.9	1.3
Change in Net Exports (bill. $)	—	–95.8	–82.2	–11.0	–18.6	1.6	12.3
Implicit GDP Deflator	—	1.4	2.3	2.3	2.7	2.3	2.5
Unemployment Rate (Percent of Civilian Labor Force)	—	4.2	4.0	4.6	5.0	4.9	5.5
Federal Funds Rate	—	5.0	6.2	4.2	3.9	4.0	3.3
Consumer Price Index (y-o-y chg.)	—	2.2	3.4	2.8	2.4	2.9	2.4

[a]Forecast.

Source: U.S. Department of Commerce (2001); Federal Reserve Bank of St. Louis (2001); own estimates and forecast.

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