Abstract - While the terrible attack on the World Trade Centers on September 11, 2001 caused a substantial short–run shock to New York City’s economy, the city demonstrated substantial economic resilience over the longer run. Prices for office space increased relative to the nation between 2001 and 2003, and demand for housing has been robust. Combined with a short–lived national recession, the 9/11 attack led to severe short–run fiscal pressure on the city. Budget deficits were addressed mainly through roughly equal amounts of additional debt and tax increases, plus modest expenditure cuts. Costs of 9/11 through the public sector, including both tax losses and expenditure increases, are estimated to range from 0.7 percent to 1.35 percent of 2002 personal income, depending on the time period. Total federal compensation, through direct grants and tax expenditures, will ultimately equal about $20.4 billion. Fiscal relief to the government of New York City offsets about a third of the public sector costs. Because of linked tax bases, the state of New York shared heavily in the fiscal shock from 9/11. Rather than direct aid, the main state response has been to allow New York City the fiscal flexibility to borrow and raise taxes. We argue that there is a strong case, both on equity and efficiency grounds, for sharing the costs of disasters between the federal and the local governments, and that general assistance to governments can play an important role in recovery.

INTRODUCTION

When two hijacked Boeing 767 aircraft struck the twin towers of the World Trade Center on the morning of September 11, 2001 and caused them to collapse, New York City suffered an enormous and horrifying blow. In this paper, we assess the economic and fiscal costs of 9/11, and the federal financial response to the disaster. The paper has four parts. The first section discusses the economic impacts. The second section describes the fiscal impacts. The third section describes the federal response. The fourth section considers some of the issues in intergovernmental compensation for disasters in cities. The fifth section concludes.

OVERALL ECONOMIC EFFECTS

The immediate economic losses were staggering. Estimates from the New York City Office of the Comptroller (2002) are
that some $13.4 billion of office space was destroyed, and $16.6 billion was damaged. Economic activity in lower Manhattan all but ceased for several weeks. Some 13,000 jobs, mainly in the financial sector, were immediately relocated outside of the city. Economic losses quickly spread from the immediate site of the attack to key New York City industries, including travel and tourism. Between 75,000 and 100,000 jobs were lost in New York City during the fourth quarter of 2001 as an immediate result of the attack. Gross City Product fell by $11.5 billion in the quarter following the attack and roughly $17.6 billion by July of 2002. Employment data from 2003 suggest that the impact of the attack, though still very substantial, was somewhat less than originally thought, down to 60,000, with income losses in the range of $5 billion (Bram, 2003). This reassessment reflects the fact that the decline in New York City’s economy in the period preceding the attack, from its cyclical peak of 3.8 million jobs in December of 2000, was greater than indicated by the initial data.\(^1\)

**Short–Run Effects**

Looking at both real estate and labor markets, we find evidence of significant dislocations to the short–run trajectory of New York City’s overall activity levels that can reasonably be attributed to the 9/11 attacks. The New York City Index of Coincident Economic Indicators, an employment and earnings based measure of economic activity in the city, began falling as the local recession commenced in January 2001 and declined nearly 0.95 percent in September 2001 alone. The total decline for the full 2001–2003 downturn was 8.9 percent. The rates of decline before and after September 2001 are approximately the same, suggesting that the ongoing national recession was an important factor in the adverse outcomes in the city economy. Nonetheless, the fact that the national economy began to grow sometime in late 2001 or early 2002 while the city continued to decline for 20 more months suggests that the attack had a significant negative effect on the short–run performance of the overall city economy.

Additional evidence of short–run effects of the attack may be found in the city’s real estate markets. Based on regression analysis using the New York City Housing and Vacancy Survey, we find that apartment rentals in most of New York were essentially flat relative to the nation.\(^2\) A remarkable exception to this pattern is the Downtown market, which strengthened both in absolute terms and relative to the nation. While part of the divergence between rental markets in Lower Manhattan and the rest of the city may be attributable to incentives for residents to locate in this area, our tentative conclusion is that rents in Lower Manhattan rose even net of the value of these subsidies.

The attack destroyed or rendered temporarily or permanently unusable nearly 28 million square feet of class A office space, 13.4 million of which was in the World Trade Center complex itself. In spite of these losses, the office vacancy rate in Manhattan rose in late 2001, led by a sharp increase in the Downtown market. The exodus of jobs from Lower Manhattan would, thus, appear to have exceeded those directly displaced from unusable space. However, there is some evidence that firms economized on space by reducing their allocations of space per employee, and that significant amounts of “shadow space”—available space that

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\(^1\) The employment rate of 18– to 64–year–old residents of New York City had actually begun declining eight months earlier, in April 2000 (Reimers, 2005). Hill and Lendel (2005) find that the pre–9/11 trend in jobs was regained somewhat between eight and 12 months after the attack.

\(^2\) Haughwout and Rabin (2005) describes the calculations in detail.
was not measured as vacant—served to absorb some of the employees displaced from Downtown (Fuerst, 2005).

Figure 1 shows trends in the rental price of office space in New York’s two central business districts—Downtown and Midtown—relative to the nation. It indicates that office rents declined nearly nine percent between 2001 and 2002, suggesting that demand fell at the same time as supply. A decline in demand is consistent with Glaeser and Shapiro’s (2002) view that the attack hastened the decline of Lower Manhattan as a principal site for New York City office locations. We conclude from Figure 1 that both Midtown and Downtown commercial rents softened significantly in the wake of the 9/11 attack.

**Long–Run Effects of 9/11**

We focus on building prices as an indication of changes in demand for New York City locations. Overall, we detect little evidence of permanent effects of an ongoing “terror tax” on either the city or suburban land markets, whether the land is currently occupied by businesses or households. We do, however, note some weakness in the expected future of the downtown office market.

Figure 2 shows the quarterly Office of Federal Housing Oversight single–family home price index for the New York metropolitan area, divided by the national index. There is little evidence here that the 9/11 attacks on the World Trade Center reduced the long–run demand for residential locations in the New York metropolitan area. Repeat–sale house prices in the metropolitan area were rising faster than in the rest of the nation both before and after the attack, as shown by the steady rise in the index on both sides of the 9/11 point. Thus, the New York area’s residential housing market gained ground on the rest of the nation immediately after the attack.

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**Figure 1.** Office Rent Indices (Class A Space, Manhattan Markets Relative to National Average)

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3 The data are from the National Real Estate Index. These data are collected for class A office space in 60 markets across the nation. To control for national conditions, appreciation indices are calculated relative to the nation as a whole.
Using the New York City Housing and Vacancy Survey (HVS), which allows consideration of rental apartments and condominiums, as well as single family homes, regressions show that housing prices in all geographic areas of New York City grew significantly more rapidly than the national Consumer Price Index for Urban Areas (CPIU) in 2002. Taken as a whole, there is no evidence of declines in prices for residential property that can be attributed to the 9/11 attack. Demand for residential locations in New York remained very robust.

**The Market for Office Buildings**

The relative sales price of office buildings depicted in Figure 3 reveals an interesting pattern both before and after 9/11. While holding essentially steady relative to the nation for the entire period between 1985 and 2003, the Downtown office market rallied from a trough in 1998. The relative price index stood at 111.5 on the eve of September 2001. By the close of 2001, the Downtown market had given back all its gains relative to the nation, and the index reached a recent low of 96.8 in 2002–Q3. There is modest evidence here of a rally in the Downtown market since that point, as the index rose back above the break-even point (at 101.6) by 2003–Q3.

Downtown office prices remain below the very high and perhaps anomalous peak they reached immediately prior to 9/11. However, the fact that the Downtown office market stabilized in the subsequent two years provides some indication that demanders continue to find locations there attractive. By the end of the period, the relative Downtown price index was about three percent higher than it had been three years earlier. Given the dislocations associated with the clean-up and re-design of the World Trade Center and surrounding areas, Downtown demand has held up reasonably well relative to the nation. On the other hand, there is some evidence, as suggested by Glaeser and Shapiro (2002), of a post–attack shift in demand to Midtown, where prices have rallied strongly relative to both the nation and to Downtown since mid–2001.
For Manhattan as a whole, the weighted average price increase shows an impressive 12.6 percent increase in relative office building prices between 2001 and 2003.

The challenge facing the city in the wake of 9/11 can, therefore, be characterized as a need to offset the effects of a large, but temporary, shock to the private economy. How the city managed its own finances is the subject of the next section.

THE FISCAL EFFECTS OF 9/11

The combination of national recession, the bursting of the high-tech bubble, and the 9/11 attack led to a severe deterioration in the fiscal condition of New York City. To cover operating deficits in the year of the attack, New York City issued an additional $2.1 billion in long-term debt, at an annual cost of about $165 million. To deal with large projected budget deficits—up to $6.4 billion, or 14 percent of total expenditures, in 2004—the city cut expenditures, raised taxes, and substituted federal for local spending. In this section, we estimate the public sector costs imposed on New York City by the 9/11 attack, and compare those costs to the level of federal compensation.

Though our goal in this section is to assess the fiscal costs of 9/11, our approach is based on changes in the welfare of the residents of New York City. The government’s function is to provide the services demanded by its residents and collect sufficient revenues to pay for those services. Economic well-being is assumed to depend on after-tax income and the level of public services. The loss suffered by New York residents due to the 9/11 attack can be separated into the loss in pre-tax income and the loss through the public sector. The loss through the public sector is equal to the increased tax rate required to offset the loss in tax base from the disaster and pay for any increase in service costs and transfers. The analytical approach for measuring public sector costs is presented in Chernick (2005).

**Measurement of Losses**

In this section, we provide estimates of the components of the public sector loss.
and federal compensation. Cost flows of more than one year are discounted at a social discount rate of 3.5 percent (Moore, Boardman, Vining, Weimer and Greenberg, 2004). Results are summarized in Table 1. The expenditure costs and tax losses are based on estimates from the New York City Office of the Comptroller and Office of Management and Budget. It should be stressed that most of the figures are approximations, depending as they do on educated guesses about what would have happened to tax revenues or Medicaid enrollment had there been no 9/11 attack.

As shown in Figure 4, public assistance and Food Stamp caseloads were little changed after 9/11. By contrast, Medicaid caseloads grew dramatically. From September 2001 to May 2002, the number of Medicaid recipients grew by 25 percent, from 1,617,000 to slightly more than two million. A major reason for this increase was the temporary relaxation of eligibility requirements after 9/11, called Disaster Relief Medicaid (DRM). Some 380,000 individuals signed up for DRM. Once the four-month period for DRM was over, about 138,000 enrolled in regular Medicaid.

**TABLE 1**

<table>
<thead>
<tr>
<th>Components of Public Sector Loss</th>
<th>Total Cost</th>
<th>Cost per Resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net cost (gain) from increase in Medicaid transfers (2002)</td>
<td>$520 million (total increase in Medicaid spending) – $130 million (New York City share) – $58.5 million (city share of state contribution) = $331 million</td>
<td>–$41</td>
</tr>
<tr>
<td>Increase in required expenditures (2002–2003)</td>
<td>$898.6 million</td>
<td>$111</td>
</tr>
<tr>
<td>Increase in required expenditures (2002–2006)</td>
<td>$1.09 billion</td>
<td>$135</td>
</tr>
<tr>
<td>Tax loss (2002–2010)</td>
<td>$3.95 billion</td>
<td>$488</td>
</tr>
<tr>
<td>New York City loss (2002–2003)</td>
<td>$3.04 billion</td>
<td>$400</td>
</tr>
<tr>
<td>New York City loss (2002–2010)</td>
<td>$4.71 billion</td>
<td>$582</td>
</tr>
<tr>
<td>Total loss per resident (2002–2003)</td>
<td>$400 + $59 (New York City share of New York State loss) = $459</td>
<td></td>
</tr>
<tr>
<td>Total loss per resident (2002–2010)</td>
<td>$582 + $59 = $641</td>
<td></td>
</tr>
<tr>
<td>Federal budgetary compensation</td>
<td>$762 million (unrestricted) + $550 million (interest savings on refinancing) = $1.312 billion</td>
<td>$162</td>
</tr>
<tr>
<td>Net cost per resident (2002–2003)</td>
<td>–$41 (transfer) + $111 (expenditures) + $389 (tax cost, New York City + New York State) – $162 (federal compensation) = $297 (0.7% of 2002 New York City personal income per capita)</td>
<td></td>
</tr>
<tr>
<td>Net cost per resident (2002–2010)</td>
<td>$479 (1.35% of 2002 personal income)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s compilation. See text for details.
Note: All multiyear estimates expressed as present discounted values in 2002.
The increase in Medicaid eligibility imposed a direct fiscal $130 million in annual city-funded Medicaid expenditures in FY02. Counties in New York pay 25 percent of regular expenditures under Medicaid. Hence, the total increase in transfers is equal to $520 million, four times the local contribution. City residents in their dual capacity as state taxpayers must also bear a proportionate share of the 25 percent of the Medicaid costs borne by the state. Hence, the net benefits to New York City residents of the increased Medicaid transfers can be approximated by:

$$\Delta T/N = \frac{[$520 \text{ million} - $189 \text{ million}]}{N} = \frac{$390 \text{ million}}{8.1 \text{ million}} = +$41 \text{ per capita.}$$

Other than Medicaid, the main sources of increased expenditure for New York City from 9/11 have been for increased overtime and security costs. The city also faces higher pension costs, and exposure to higher claims costs. The city has had to add as many as 1,400 officers a day for additional security measures, with overtime costs of $379 million. City liability for claims are estimated at $350 million. Extra pension expenses include $64.6 million for city employees who died in the attacks and potential expenses in the future from increased disability rates. Estimates of additional pension expenses are about $39 million per year from FY03 through FY06. Additional capital costs to replace damaged or destroyed equipment and buildings are estimated at $171 million.

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4 The 2002 estimate was that 9/11 would lead to additional spending of $130 million for an unspecified number of future years. This prediction was based on the assumption that one half of the DRM recipients would transition into regular Medicaid (New York City Office of the Comptroller, 2002).

5 The calculation of the net benefits is $\Delta T/N = \Delta \text{expend} - (\text{New York City Share} + \text{Indirect New York City Share of State Share}) = \Delta T - \Delta T [1 - m_f - m_s] + \alpha_m \Delta T$, where $m_f$ and $m_s$ are the federal and state shares, and $\alpha$ is the share of state revenues paid by New York City residents. We assume that none of the additional Medicaid spending was for nursing home care; hence, $m_s$ is 25 percent. The federal share is set at 50 percent, though it was raised to 52.95 percent from April 2003 through June 2004. New York City residents’ share of state income tax payments were a little less than 40 percent in 2002, but the city’s share of personal income was about 45 percent. We use the higher figure. Hence, the direct plus indirect cost to New York City residents from the increased Medicaid spending is $\Delta \text{Fiscal Cost of Transfers} = [$520 \text{ million} [1-0.5-0.25] + 0.45 \cdot 0.25 \cdot $520 \text{ million}] = $189 \text{ million.}$

6 Large amounts of overtime raised the salaries of many police and firefighters by substantial amounts. The inclusion of this extra pay in the pension calculation provided a strong incentive for many police- and fire-department members to retire after 20 years. In addition, the trauma of the attack itself has led to increased retirements.
million from FY02 to FY06. Adding all the costs, the Present Discounted Value (PDV) of the change in required expenditures for 2002 and 2003 is $898.6 million, or $111 per capita. Between 2002 and 2006, the estimate of increased expenditures is $1.09 billion, or $135 per capita.

Conceptually, the loss in tax revenues due to 9/11 is equal to:

\[
\Delta Tax_{9/11} = \tau \Delta B(\text{attack}) = \Delta Tax_{\text{actual}} - \Delta Tax_{\text{recession}} + \Delta Tax_{\text{policy}},
\]

where \( \tau \) is the pre–9/11 tax rate, \( \Delta B(\text{attack}) \) is the loss in tax base due to the 9/11 attack, and \( \Delta Tax_{\text{policy}} \) is the increase in revenues due to an increase in tax rates on the 9/11–induced lower tax base. The actual change in tax revenues from 2001 to 2002 was a negative $1.5 billion, or 6.4 percent of revenues. September 11–related tax losses were $926 million—4.3 percent of tax revenues—in 2002 and $1.6 billion—7.1 percent of revenues—in 2003 after accounting for policy changes (New York City Office of Management and Budget, 2004).7 Property tax losses are estimated at about $125 million at least until 2010. Over two years the per–capita loss is $330, ($2.472 billion), and over eight years it is $488.8

To address the FY03 and FY04 budget deficits, property, sales, and income tax rates were all increased substantially.9 Income taxes were increased by over $500 million per year between 2003 and 2005, while sales taxes were increased by about $300 million in 2003 and 2004. Figure 5 shows New York City’s overall tax rate as a percentage of personal income. Burdens declined substantially in the 1990s, reaching a level in 2000 not seen since the early 1960s. The solid line with the sharp upward slope after 2002 shows the tax response after 9/11. Since 2002, tax burdens have grown by almost a full percentage point.10 The magnitude of this increase, which exceeds substantially the increase associated with the previous economic downturn of the early 1990s, suggests the crucial role played by tax increases in closing large budget deficits caused by the 9/11 attack and the recession.

Tax revenues resumed their rise in 2003, up by 7.8 percent in that year, 21.8 percent in 2004, 11.2 percent in 2005, and a projected 5.4 percent in 2006 (New York City Office of the Comptroller, 2006). Most of the increase in 2003 and 2004 was due to increases in tax rates, but rate–adjusted revenues rose 12.1 percent in FY05, and 7.9 percent (projected) in FY06. The strong post–9/11 market for residential and commercial property, described in the first section, has translated into a sharp increase in revenues from property

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7 Assuming an overall tax rate of seven percent of personal income, or about 5.5 percent of Gross City Product, the estimated tax losses exceed by a considerable amount the losses that would be implied by our earlier estimate of a loss in GCP of $5 billion. A portion of the difference stems from the fact that the attack also left destroyed or damaged nearly 28 million square feet of office space, with a market value of about $30 billion dollars, causing significant losses in property tax revenue.

8 The calculation is: PDV of Tax Losses (02–10) = $926 million (02) + $1.546 billion (03) + $495 million (04) + $491 million (05) + $492 million (06–10) = $3.95 billion = $488 per capita.

9 Property tax rates were raised by 18.5 percent, the top bracket for the personal income tax (PIT) was increased from 3.65 percent to 4.45 percent for taxable incomes greater than $500,000, the sales tax rate was raised by 0.125 percentage points, bringing the combined rate to 8.625 percent, and there was a temporary suspension of the sales tax exemption on clothing for items costing less than $110.

10 A rough calculation is that about two thirds of the increase in the tax burden represents policy actions, while the remaining third represents the automatic increase in tax burdens when personal income declines. This calculation is made under the assumption that the property tax, which provided about 30 percent of tax revenues in 2001, is fixed in the short run.
Figure 5. City Tax Revenue as a Share of Personal Income

taxes and taxes on real estate transactions.\textsuperscript{11} The strong overall revenue performance allowed the mayor to rebate a substantial portion of the 2003–2004 residential property tax increase in 2005–2006.

Despite some evidence that past tax increases in New York City have had an adverse effect on the tax base, the robust growth in income and real estate values since 9/11 suggests that any such effect after 9/11 has been small (Haughwout and Rabin, 2005).\textsuperscript{12} Negative effects have been muted by the temporary nature of most of the increases, the historically low own–tax burden prior to 9/11, and the reduction in overlying federal and state income tax burdens in recent years, particularly for high-income taxpayers. Rates have also risen in the neighboring counties, reducing somewhat the competitive pressure that New York City would face if it were the only jurisdiction raising its taxes.

THE FISCAL ROLE OF NEW YORK STATE

In assessing the fiscal impact of disasters in cities, the state is both a casualty and a potential rescuer. The state’s own fiscal capacity will be directly affected by the loss of tax base in the affected areas, particularly if it shares the same tax base. The state may also shift some of the costs of the disaster from the residents to all residents of the state, by reallocating fiscal resources. In the 9/11 attack, the main effect was the concomitant loss of state fiscal capacity.

Because the New York City economy makes up more than 50 percent of gross state product, the fiscal shock to New York City was also a fiscal shock to New York State. The state effect is magnified because the city and the state share common tax bases for the sales and personal income tax, and the state’s 11 percent loss in revenue in 2002–2003 substantially exceeded the 6.4 percent loss to New York City. The reduction was greater for the state because all the major revenue sources for the state are sensitive to economic conditions in the short run, while the city’s property tax is more stable.

A rough estimate of the one–year loss in tax revenues to New York State due to 9/11 can be given by taking an estimate of the decline in Gross City Product of $17.5 billion (New York City Office of the Comptroller, 2002), and multiplying that amount by the average New York State tax rate of six percent.\textsuperscript{13} This gives an estimate of $1.05 billion. Multiplying by the personal income share in New York City yields a state tax loss to New York City residents of about $473 million, or $59 per capita. Adding this amount to the total city costs gives a total loss through the public sector equal to $459 per resident, and $641 through 2010.

The main state fiscal response to 9/11 was to grant New York City the legal authority to raise income and sales tax rates and issue additional long–term debt for operating expenses. Over the Governor’s veto, the state legislature also agreed to assume some $500 million of prior debt obligations of New York City. The state also signed off on the temporary relaxation of Medicaid eligibility rules and,

\textsuperscript{11} Revenues from the 2.5 percent tax on transactions went from $500 million per year in the early 1990s to $1.9 billion per year from 2003–2006. Property tax revenues rose six percent even in FY02, rose 15 percent in both 2003 and 2004 (reflecting the rate increase), and are projected to increase by about seven percent per year between 2005 and 2009.

\textsuperscript{12} The market value of real estate increased by 17 percent between 2004 and 2005, and real–estate–related taxes have increased strongly between 2003 and 2006 (New York City Independent Budget Office, 2004a).

\textsuperscript{13} This estimate is an upper bound to the indirect state tax effect of 9/11 because, as noted above, subsequent estimates of the 9/11 effect on GCP have been revised downward.
in conjunction with the federal government, relaxed categorical restrictions on a number of federal and state grants. The minimal state fiscal response is consistent with the trend in fiscal politics in New York State over the past decade, with policy changes tending to favor suburban and upstate areas relative to New York City.14

**Federal Compensation to the Government of New York City**

While typically the federal government does not provide general fiscal relief to governments that have been hit by natural disasters, in the case of the 9/11 attack about eight percent of the total federal reimbursement was provided to the city of New York. Of that amount, $762 million went for unrestricted budgetary relief. The other part of general relief was achieved by waiving federal rules on the one-time refinancing of municipal debt, thus allowing New York City to take advantage of lower interest rates for some of its general obligation and agency debt. The cost to the federal government of this provision is estimated at $937 billion. Estimated budget savings in FY03 are about $500 million (New York City Office of the Comptroller, 2002).15 Using the $500 million figure, general federal budget compensation was $1.31 billion, or $162 per capita.

**Net Public Sector Cost to New York City Residents**

Subtracting federal compensation of $162 per capita, the net public sector cost is $297, while the eight-year cost is $479. The net cost to residents over the period 2002–2003 is roughly eight tenths of one percent of personal income in 2002. The net cost from 2002 to 2010 is about 1.35 percent of 2002 personal income. Specific federal compensation to the government of New York City offsets about one third of the total public sector cost. Federal tax deductibility reduces the net burden of the tax increase from $389 per capita to $311 per capita.16 Taking into account deductibility and Medicaid matching, as well as specific compensation, the present discounted value of total federal compensation offsets about half of the public sector costs.

**FEDERAL AID TO NEW YORK CITY**

In the aftermath of 9/11, President Bush pledged $20 billion in aid to New York City to assist with recovery. The aid has come in three allotments: 1) September 11 Emergency Appropriations that totaled $11.235 billion and provided cash assistance to individuals, local governments and small businesses; 2) the Liberty Zone Economic Package, enacted in Spring 2002, that granted $5 billion in tax relief to businesses located in downtown Manhattan; and 3) a supplementary emergency

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14 A number of fiscal policy initiatives taken by the state in the 1990s have had an adverse impact on New York City’s fiscal base or its costs. These include the elimination of the commuter tax in 1999, a state funded property tax relief program with a distributional formula favoring the suburbs over the city, and state level intervention in collective bargaining for pension rights (see Center for an Urban Future (2002)). The distribution of state aid is discussed in Chernick and Reschovsky (2001). The elimination of the commuter tax is considered in Chernick and Tkacheva (2002).

15 In a later report, the Comptroller uses the $937 million figure (New York City Office of the Comptroller, 2004). The Liberty Zone Economic Package also includes $1.2 billion in savings from allowing New York City and New York State to issue $8 billion in tax exempt bonds, to be used for private investment in offices, residential units, and utilities.

16 Schlain (2004) estimates that the rate of offset for the income tax surcharge is 21 percent. Because income taxes are much higher than sales taxes in New York, very few taxpayers choose the option of deducting the sales tax. Property tax payments are spread more equally through the income distribution than the income tax surcharge. Hence, we use a lower figure of 15 percent as the average rate of deductibility.
appropriation package, enacted in July 2002, that appropriated an additional $5.436 billion to New York City. This brought federal appropriations to a total of $20.4 billion. The New York City Independent Budget Office (2004b) divides aid into three phases: the first—about 30 percent of the total funding, or some $6.33 billion—went for emergency response needs; the second, worth $4.43 billion, focuses on economic recovery; the third phase, for long–term rebuilding, is worth $9.71 billion.

A variety of geographically targeted tax benefits were enacted to benefit downtown businesses. These tax benefits were originally valued by the Congressional Joint Committee on Taxation at $2.9 billion over the 11–year period from 2002–2012. The benefits included $631 million in tax credits for businesses that hired or retained employees; $2.2 billion in accelerated depreciation for new equipment; and other changes. The deadline for getting the tax benefits was set to expire at the end of 2005. Take–up of these benefits has been substantially below the amount available, due to the slow pace of rebuilding in lower Manhattan. Moreover, portions of the accelerated depreciation benefits were superseded by increased depreciation for all firms under the 2003 Tax Act. Therefore, the mayor and the governor proposed that $2 billion be converted to tax incentives to generate funding for transportation infrastructure.

If adopted by Congress, the tax credit measure would terminate certain existing Liberty Zone tax incentives, while providing the city and the state with a new tax credit to be taken against the employer’s share of Medicare payroll taxes. Tax credits would be granted over a ten–year period, with an indefinite forward roll for any unused credits. The credit could be used for expenditures on any transportation project in or connecting to the Liberty Zone.

The largest component of the third phase of aid is $4.55 billion for rebuilding the transportation infrastructure in the downtown area. The Job Creation and Worker Assistance Act of 2002 contains a number of provisions to help rebuild parts of lower Manhattan. Chief among these is the $8 billion Liberty Bond Program, a new type of private activity bond to help finance the reconstruction of commercial and residential property in lower Manhattan. About $6.4 billion of the bond program is dedicated to commercial projects, and $1.6 billion, to residential projects. The estimated cost to the federal government of the extra bonding authority under the Liberty Bonds is $1.2 billion over the life of the bonds.

Liberty Bonds provide bonding authority that is outside of New York State’s volume limitation on private activity, so users do not have to compete for an allocation of the private activity volume limitation. In addition, the interest accruing on Liberty Bonds is not subject to the alternative minimum tax, which means that Liberty Bonds can be marketed at lower interest rates than traditional private activity bonds. Given the high proportion of New York City and state filers who are subject to the Alternative Minimum Tax (AMT), this latter provision increases the potential demand for the bonds by residents of New York City. Initially there was a more rapid take–up of Liberty Bonds for residential activity than for commercial activity and, as of 2004, the 20 percent residential portion was oversubscribed. This differential pattern of take–up reflects

17 The Comptroller reports that three years after the attack, only 8.4 percent of retailers and 13.7 percent of commercial establishments had applied for the credit (New York City Office of the Comptroller, 2004).
18 Liberty Bonds for construction may also benefit from the preferential rules afforded to construction financing, so net earnings from investment of bond proceeds during a project’s construction period do not have to be rebated to the Treasury Department if the bond proceeds are spent within two years of the issuance of the bonds.
the strong overall demand for housing in Manhattan and the change towards residential uses of space in lower Manhattan. As discussed in Section I, this change has been accelerated by the World Trade Center attack.

To date, the largest single commitment of Liberty Bond funds for commercial activity is $1 billion for building a new headquarters for the investment banking firm Goldman Sachs at Battery Park City. Although the use of tax exempt bonds to support one of the most profitable firms in the financial sector is dubious on equity grounds, Goldman Sachs is viewed as a crucial anchor tenant for the entire downtown area. Recent research on the highly localized nature of agglomeration economies in cities (Rosenthal and Strange, 2005) would seem to provide some support for this view.

FEDERALISM AND DISASTER RELIEF: ASSESSING THE 9/11 RESPONSE

The 9/11 attack has again demonstrated that the core economies of large cities tend to be quite resilient to disasters, whether from war, terrorism, or forces of nature. Nonetheless, when a catastrophic disaster strikes a city, there is likely to be strong pressure for publicly provided compensation for losses. What principles should underlie the intergovernmental fiscal response to disasters in cities?

The equity argument for compensation is that the citizens of a federation, by virtue of membership in the federation, are entitled to some minimum level of public services, at reasonable tax rates. When disaster strikes, this implicit contract binds governments, as the agents of the citizenry, to help each other in minimizing the interruption to vital public services. The federal government is the appropriate agent for implementing this contract. The extent of compensation for a disaster should conform to the equalization standards of the federation.

Some risk sharing among members of the federation can also be justified on efficiency grounds. However, the moral hazard argument is different for terrorism than for natural disasters. Terrorist attacks are likely to be more effective—i.e., cause more disruption to the economy and spread more anxiety—if carried out in large cities. It is the very density of settlement that makes cities attractive targets and increases the risk of attacks. This “terror tax” on density is fundamentally different than the inefficiencies from overdevelopment in flood plains or hurricane–prone areas. Given the importance of agglomeration economies to economy–wide productivity, the economy as a whole bears the cost of deconcentration in response to the perceived risk of terrorism. Though large cities can never be completely protected from terrorism, the deadweight loss from the terror tax will be reduced if some portion of the tax is shifted from local residents and workers to the nation as a whole.

To minimize the moral hazard from underinvestment in safety and overdevelopment of risk–prone areas, intergovernmental compensation should not

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19 Davis and Weinstein (2000) document the recovery of Hiroshima and Nagasaki from nuclear attack. Horwich (2000) discusses the rapidity with which regional output was restored in Kobe, Japan, despite the high level of devastation caused by the 1995 earthquake. However, he does not discuss the relative roles of the local and national governments in financing the recovery.

20 As pointed out by Wildasin (2006), these are important issues in the design of fiscal federalism, both because of the magnitude of the resources at stake and because the institutional design has important efficiency implications for both the regional and national economies.

21 In the aftermath of hurricane Katrina, the widespread dismay at the extent of suffering in New Orleans and the apparent ineffectiveness of the national response are a reflection of this implicit contract.

22 A recent study estimates the rate of federal offset to regional shocks at between ten and 20 percent (Melitz and Zumer, 2002).
offset completely the losses incurred. A significant proportion of the costs of 9/11 was borne locally, with little adverse effect on the city’s economy. To minimize ex-post strategic behavior on the part of cities, some of the compensation should carry with it a local matching requirement. In the case of 9/11, the federal government provided the equivalent of a lump-sum grant for immediate clean-up of the affected site. This is appropriate, since in this activity there is no possibility of substituting federal for local funds. Other federal funds going to New York have an implicit matching component in that the total available is probably less than needed to fully replace and improve the damaged infrastructure. Since local information is superior to higher level information, aid should be in as unrestricted a form as possible.

While it is frequently argued that compensation should go to people rather than governments, there is a strong rationale for providing some aid directly to local governments. Public services are crucial to both individual well-being and to firm productivity, and rapid restoration of vital services and stable tax rates provides a credible signal to private firms that reinvestment in the affected area is economically justified. Government action helps to solve a difficult problem of coordination for private firms in the aftermath of a disaster, since any individual firm may be reluctant to reinvest without the assurance that other firms will do so as well. Such coordination is a public good, whose benefit is realized by all firms and landowners in the disaster area. Compensation to individuals also suffers from high transactions costs because of the dangers of fraud. In equity terms, compensation to governments, provided, of course, that it is competently managed, automatically provides proportionally greater benefits to low- than to high-income individuals. Moreover, compensation to governments is less likely to crowd out private charitable contributions, which in the 9/11 attack went mainly to individuals.

The 9/11 example suggests the important role for general budgetary compensation in limiting the disruptions from disasters. Dividing federal assistance to New York into tax expenditures versus direct aid, tax expenditures make up about one quarter of the total package of assistance. Take-up rates have been slow for the tax benefits and there is concern that they will expire before they are fully utilized. Compensation through tax benefits to firms is hard to monitor and is relatively inefficient compared to direct federal outlays. Though there is a natural tendency to want to set tight time limits on tax benefits, such time limits are undesirable. The rebuilding process from a natural disaster is likely to be relatively slow. The more a city is forced to commit funds in the immediate aftermath of a disaster, the greater is the likelihood that the net stimulative effect of the subsidies will be diminished, as only the more opportunistic firms and developers will be in a position to take advantage of the subsidies.

The New York experience also suggests that subsidies should not be tied just to the immediately affected area and that they should be flexible as to the type of activity subsidized. Arbitrary geographic

23 The (lack of) state response in New York contrasts with the Los Angeles–Northridge earthquake of 1993. In the latter case, the state of California levied a surtax on the state sales tax, with the proceeds used to repair damaged infrastructure.

24 Glaeser (2005) argues that New Orleans was too large, given its basic geography and productivity. Hence, it would be better to provide cash subsidies to individuals, which would allow them to relocate to more economically productive areas.

25 In the 9/11 attack, about $2.8 billion of charitable contributions were received (Dixon and Stern, 2004). Most of these funds went to aid individual victims of 9/11 and first responders.
demarcations for subsidies—for example, only the downtown area in Manhattan—raise questions of equity and reduce the net benefits per dollar of federal tax compensation. Trying to rebuild the damaged area to the status quo ante may not be the most efficient policy. Subsidies should be geographically flexible enough to allow the city to rebuild in the way that will most benefit the city as a whole. Because a disaster that destroys capital may accelerate the gradual process of changing land uses—for example, from commercial to residential in lower Manhattan—tax subsidies should not be restricted to one type of land use, but should promote redevelopment patterns that are consistent with post–disaster market signals.

CONCLUSION

To summarize the economic impacts of 9/11, while the attack created substantial short–run dislocation, the long–run demand for city locations as a place to live or do business appears to have been little affected. Estimates suggest lost income for FY01–FY02 in the neighborhood of $5 billion attributable to lost jobs. Rental real estate markets weakened, but Downtown remained strong, perhaps in part because of targeted subsidies. Prices for Manhattan office buildings, an indicator of long–run demand, increased by 12.6 percent relative to the nation between 2001 and 2003. The market for office space in Midtown has been particularly strong, suggesting that 9/11 has accelerated the long–term shift in commercial activity from Downtown to Midtown. Demand for owner–occupied housing has been robust throughout the city.

Combined with a short–lived national recession, the 9/11 attack led to severe fiscal pressure on the city. Budget deficits were addressed mainly through roughly equal amounts of additional debt and tax increases, plus modest expenditure cuts. The present discounted value of costs of 9/11 through the public sector, including both tax losses and expenditure increases, are estimated to range from 0.7 percent to 1.35 percent of 2002 personal income, depending on the time period. Total federal compensation, through direct grants and tax expenditures, will ultimately equal about $20.4 billion. Fiscal relief to the government of New York City offsets about a third of the public sector costs. Inclusion of automatic federal cost sharing, through matching aid and tax deductibility, raises the federal offset to about half of the public sector costs. Because of linked tax bases, the state of New York shared heavily in the fiscal shock from 9/11. Rather than direct aid, the main state response has been to provide the city with enabling authority to raise debt and tax rates, and allowed the city temporarily to relax eligibility standards for Medicaid.

Though city economies are naturally resilient, the example of 9/11 suggests that a robust federal response can help to accelerate the recovery from natural disaster. The locality should bear as much of the cost of a disaster as its local economy permits. However, there is a strong case, both on equity and efficiency grounds, for intergovernmental assistance, mainly from the federal government. Assistance in the form of general aid to local governments, by encouraging the rapid restoration of vital services and preventing sharp tax increases, can be efficient in both minimizing the cost to individuals and providing a credible signal for reinvestment in the city. There is a role for both direct aid and tax expenditures, but the emphasis should be on the former. Tax expenditures should not be overly limited, both in the time and geography dimensions. Ex–ante rules, which specify that compensation will be only partial, forcing cities and states to share in the costs of recovery, can help to minimize moral hazards from underinvestment in safety.
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