

1. Introduction

In November 2002, just over a year after the attack on the World Trade Center in New York City, the Federal Reserve Bank of New York (FRBNY) published a special volume of its *Economic Policy Review* that explored some of the key economic consequences of the attack. The six articles in the volume fell into three broad groups: 1) detailed accountings of economic costs—those incurred as a direct consequence of the September 11 attack and those arising from efforts to prevent future attacks, 2) studies of the effects of the attack on the payments and securities settlement systems, and 3) analyses of New York City's economic prospects after September 11.¹ Around the same time, reports were released by several organizations focusing on estimating the effects of the attack on various aspects of the city's economy.² Since the production of that special volume, economists at the FRBNY have conducted several follow up studies that have monitored the recovery of the city's economy.

In this article we review the findings of both the original FRBNY volume and the subsequent follow up studies regarding the impact of the attack on the New York City economy. We begin by presenting our initial estimates of the cost of damage and destruction of the physical infrastructure in the area of the attack. These estimates were made based on the information available as of June 2002, the end of the initial recovery phase at the World Trade Center site. The estimates turn out to be broadly consistent with revised estimates of capital losses presented in another article in this collection.³ We then focus specifically on the labor market impacts of the attack, highlighting the estimated incremental job shortfall in New York City, which started at 64,000 in October 2001 and diminished through the end of 2002, and the associated losses in real incomes. We also trace out the timing and magnitude of the job losses in several industries that were particularly adversely affected as they became apparent in the months following the attack. Despite the initial pronounced impact on employment, updated estimates of the job shortfall confirm our earlier estimates that suggested the adverse impacts of the attack on total employment in New York City had largely worn off by the end of 2002. Notably, these estimates of the job losses related to the attack are based on the results of a time series econometric model that simulates the counterfactual path of employment in the city had there been no attack.

¹ Federal Reserve Bank of New York (2002).

² See for example, Asian American Federation of New York (2002), Fiscal Policy Institute (2001), New York City Office of the Comptroller (2001), and the New York City Partnership and Chamber of Commerce (2001).

³ See Grossi (2009).

We then turn to our initial assessment of the attack on the city's longer-term economic prospects, or, simply put, whether the city and Lower Manhattan would maintain their status as desirable places to live and work.⁴ There, we highlighted the relatively favorable trends in the city's labor and real estate markets and its strong fiscal position at the time of the attack, and pointed to several key policy responses that could help mitigate potentially serious adverse longer-term consequences. Subsequent monitoring of these markets as well as a variety of other indicators show that the attack was far less damaging to the city's long-term economic prospects than many had predicted. In particular, prices of residential real estate continued to reflect strong demand for locations both throughout the city and in Lower Manhattan even shortly after the attack, and prices for commercial property also ultimately strengthened.

2. Shorter-Term Impacts

Capital Costs of the Attack

The capital losses directly resulting from the attack on the World Trade Center include the damage and destruction of the public and private physical capital stock in Lower Manhattan and the permanent loss of the productivity of the almost 3,000 workers who lost their life in the attack. The physical losses include: about 30 million square feet of commercial office space and about 100 retail stores in the World Trade Center area, subway tunnels (Lines 1 and 9), the Port Authority Trans-Hudson train station at the World Trade Center, the streets surrounding the attack site, and parts of the telecommunications and power infrastructure in Lower Manhattan. In order to put a monetary value on these losses, we first group the components into three categories: 1) the cost of site cleanup and restoration, 2) the cost of replacing the damaged and destroyed buildings and their contents, and 3) the cost of repairing the damage to the infrastructure. Our estimate of the value of each of these losses as of mid-2002 is shown in **Table 1**.

As of June 2002, the site cleanup and restoration was largely completed at a cost of approximately \$1.5 billion. The cost of replacing the destroyed buildings in the World Trade Center complex and adjacent area was estimated to be \$6.7 billion (\$6.4 billion); the cost of repairing the damaged buildings in the World Trade Center area was estimated to be \$4.5 billion (\$5.5 billion), and the cost of replacing the contents was estimated at \$5.2 billion (\$5.2 billion). These

⁴ See Bram, Haughwout and Orr (2002, 2004).

three categories total \$16.4 billion (in \$2001). The cost of the repairs to the major elements of the damaged public infrastructure was \$3.7 billion (\$5.2 billion). Combining these cost estimates yields a total cost of the damage and destruction of \$20.1 billion (\$2001).⁵

Table 1: Capital Losses

<u>Category</u> <u>Cost (\$2001 Billion)</u>	<u>Estimated</u>
• Cleanup & Site Restoration	1.5
• Destroyed Buildings in WTC Complex	6.7 (6.4)
• Damaged Buildings in WTC Area	4.5 (5.5)
• Contents of Buildings in WTC Complex	5.2 (5.2)
• Public Infrastructure	3.7 (4.3)
- Subway	0.85
- PATH	0.55
- Utilities	2.30
• Loss of Human Capital (life)	7.8
• Total	29.4

Source: Bram, Orr, Rapaport (2002). Numbers in parentheses are updated estimates for comparable categories of losses taken from Grossi in this volume.

The death of almost 3,000 people in the attack was a loss to New York City and the nation. This number includes workers in the World Trade Center buildings, firefighters and police responders, and tourists and other visitors who were in the complex that morning. The method we use to value this loss of life is based on the concept of human capital which is defined as the skills, education

⁵ These damage estimates are somewhat lower than estimates reported immediately following the attack. The main source of the difference was the estimated cost of cleaning up and restoring the World Trade Center site. Estimates by both the New York City Office of the Comptroller (2001) and New York City Partnership and Chamber of Commerce (2001) turned out to be roughly \$3-4 billion higher than the actual cost. Part of the reason for this higher estimate was the inclusion of costs related to repairing potentially hidden or less-visible structural damage to the site. A report by the Government Accountability Office (2002) compares these initial damage assessment estimates.

and experience of the workers. This human capital is the main factor determining a worker's current and expected future earnings over the course of his or her career. Estimates of the present value of individual losses are computed by summing the pretax annual income from the year of death to the year of expected retirement, assuming that these earnings would grow at the rate of inflation and assuming a time rate of discount. Total earnings losses are then calculated by summing over the individual losses. Using estimates of the average earnings of the workers who died, their average age, and an expected age at retirement of 62, and a rate of inflation equal to the discount rate, we calculated the total earnings loss at \$7.8 billion.⁶ Combining the cost of site restoration of \$1.5 billion, the physical capital losses of \$21.6 billion and these earnings losses of \$7.8 billion yields a total capital loss estimate of \$29.4 billion (\$2001).

Both the human and the physical losses will tend to reduce the productive capacity of New York City. While the lives lost can never be replaced and we do not attempt to put a dollar value on the anguish caused by this tragedy, the earnings loss noted above reflects the present value of the loss of their potential contribution to the economy.⁷ In terms of physical capital, resources have to be devoted to rebuilding in order to bring it back to pre-attack levels. The resources for rebuilding in the city following the attack, however, did not come exclusively from the businesses or residents of the city. In fact, a relatively large share of the private rebuilding costs and other losses was paid for from insurance proceeds while a large part of the restoration of public facilities was supported by the Federal government. In the latter case, this support was a cost to the nation. Focusing on this federal aid, the headline amount of federal support dedicated to the city was \$20.8 billion. But this amount was not simply made available to the city to use; rather, the purposes and amounts for which the aid was to be used were fairly rigidly defined, and to be paid over time as the recovery progressed through different stages. The broad categories of assistance and their amounts as of June 2002 are outlined in **Table 2**. Roughly \$6 billion was channeled through the Federal Emergency Management Agency (FEMA) for the cleanup of the site and the repair of the damaged public utilities.⁸ Restoration of these facilities was largely complete within the first six months following the attack. The remaining

⁶ See Bram, Orr, and Rapaport (2002) for details on this calculation. It is unclear how much of this loss would accrue specifically to New York City; clearly many of the deceased workers would not have continued to work in the city for the rest of their lives—so this should be thought of as an upper bound and/or a loss to the nation.

⁷ Given the mobile and dynamic nature of the U.S. labor market, it is reasonable to assume that businesses in the city have been able to draw human capital from other parts of the country without too much additional cost; thus, the human capital loss should be thought of more as a loss to the nation than to New York City specifically.

⁸ In responding to the 9/11 attack, FEMA changed its approach to administering disaster funds. These changes mainly took the form of an expansion of the types of costs that FEMA would

funding categories included place-based grants and loans intended to encourage people to live and work in Lower Manhattan and thus hold activity in the area together. The \$3.4 billion in grants/loans were direct expenditures of Federal funds that were provided to firms and residents in the area. Longer-term, subsidies encouraged businesses to invest in the area, and for improvements to the transportation infrastructure taking people into and out of the area.⁹

Table 2: Estimated Federal Support for Cleanup, Rebuilding and Economic Revitalization in New York City

<u>Program</u>	
<u>Estimated Assistance (\$2001 Billion)</u>	
• FEMA emergency response	6.0
- Cleanup	
- Public utilities repair	
• Grants/loans	3.4
- Job creation grants/loans	
- Business recovery grants	
- Small Business attraction and Retention	
- Cultural attractions funding	
• Economic Stimulus	5.0
- Tax – exempt construction bonds	
• Transportation Projects	5.0
- Intermodal hub	
- PATH terminal	
• Other	1.4
• Total	20.8

Source: Same as Table 1

As the recovery proceeded, one of the issues that arose was whether there was sufficient flexibility across the funding categories to match what the city

reimburse and were prompted, in part, by the unique nature of the attack and the commitment of \$20 billion in Federal disaster relief shortly after the attack. This was the first time that the amount of disaster assistance was set early in the recovery process. See the Government Accountability Office (2003) for details on the level, type, and timing of assistance provided by FEMA to New York City and for a comparison with FEMA’s traditional approach.

⁹ See New York City Office of the Comptroller (2002) for additional details on the stimulus package.

wants or needs, particularly with regard to the aid that was provided beyond the immediate site cleanup and the repair of the public infrastructure.¹⁰ Part of the aid provided through the economic stimulus package, for example, was valued as the amount of tax revenue lost through the tax-exempt nature of the bonds used to fund reconstruction in a broad area of Lower Manhattan and in other parts of the city. While this form of aid gave a certain degree of flexibility to the redevelopment process, it was also associated with some underutilization of the funds as the pace and direction of the reconstruction at the World Trade Center site and throughout the area evolved. For instance, the time period for eligibility to fund projects using these tax exempt construction bonds had to be extended beyond its original 2004 deadline.

Our analysis in subsequent sections will show that by most measures the World Trade Center area has recovered from the attack. The federal support appeared to play a significant role in the immediate aftermath of the attack as well as in the longer-term redevelopment of the area. Nevertheless, the reconstruction process has taken time and, as of late 2008, the majority of the physical capital losses at the World Trade Center site—namely, most of the 10 million of lost commercial office space--have not been duplicated. While the plans for the site have been drawn up, at the time of this writing the construction is not expected to be fully completed until 2013, eleven years after the attack.¹¹

Employment Effects of the Attack

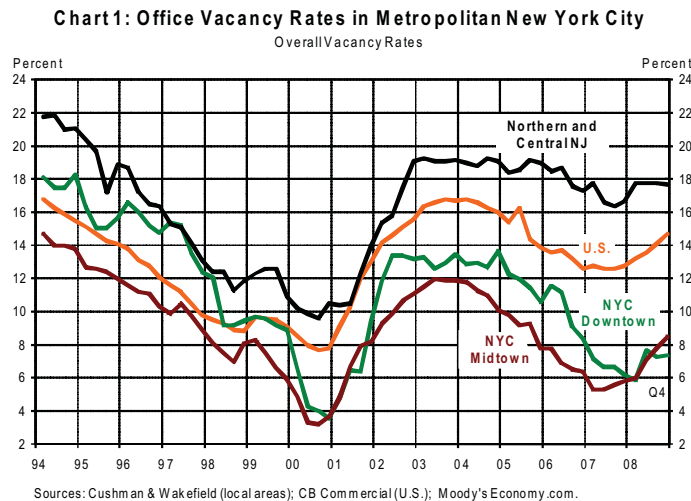
Over and beyond the massive destruction of capital and human life, the attack also had a highly disruptive effect on economic activity in the area for a period of time. Quantifying the effects of the attack on the economy over time is difficult, and there are many ways to go about this exercise. Geographically, as would be expected, localized employment data clearly indicate that areas closest to Ground Zero saw the largest percentage declines in employment (and, implicitly, economic activity). To illustrate this, in the quarter following the attack, employment was down 1.9% from a year earlier in the New York metro area, by 3.9% in New York City (the 5 boroughs), and by 5.5% in Manhattan; estimates for Lower Manhattan indicate a decline of 10.3% (see <http://assembly.state.ny.us/comm/WAM/20050520/lowermanhattan.pdf>).

Simply put, geographic areas outside Lower Manhattan faced cross-currents from the fallout of the attack: on the one hand, these areas saw some marginal

¹⁰ See the reports by the Independent Budget Office (2002; 2003).

¹¹ Current plans for the reconstruction at the World Trade Center site can be found in “World Trade Center Report: A Roadmap Forward” October 2, 2008, available at http://www.panynj.gov/pdf/wtc_report_oct_08.pdf.

increment to employment due to some influx of jobs relocating from Ground Zero; on the other hand these areas experienced some job loss due to negative spillover effects on the demand side (a general decline in regional economic activity). Thus, for example, the net effect on employment was evidently negative in some areas—notably Queens (which includes two major airports) and Midtown Manhattan, where office vacancy rates climbed after the attack (**Chart 1**), even though Midtown Manhattan was found to be the top destination for jobs

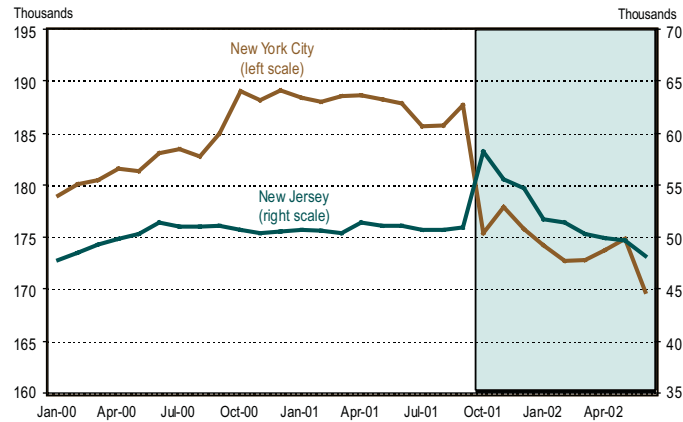


being relocated from Downtown¹². However, the immediate net effect was clearly positive in other areas, such as northern New Jersey, where many financial firms already had secondary facilities that could accommodate displaced workers (**Chart 2**). It should be noted, however, that most of the job relocations were temporary.

Our analysis of the attack's economic impact focused on citywide employment. We used the city because it is a well-defined municipal entity with uniform taxing and spending authority, and because there exists a long and consistent time-series of monthly economic data. We used employment as the

¹² See <http://www.tenantwise.com/reports/072002wtc.asp>

Chart 2: Securities Industry Jobs in New York City & New Jersey
Seasonally Adjusted



Source: New York State Department of Labor, New Jersey Department of Labor, Moody's economy.com, FRBNY Calculations.
Note: Shading denotes post-9/11 period.

basis for our analysis because it is tallied on a monthly basis and is considered the most reliable monthly indicator. The thrust of our analysis was to estimate the net impact of the attack on the path of New York City employment over time in the months following 9/11. We estimated the monthly shortfall due to the attack as the difference between the actual (measured) level of employment and the estimated “counterfactual” level—that is, what the level would have been if the attack had not occurred (**Chart 3**).

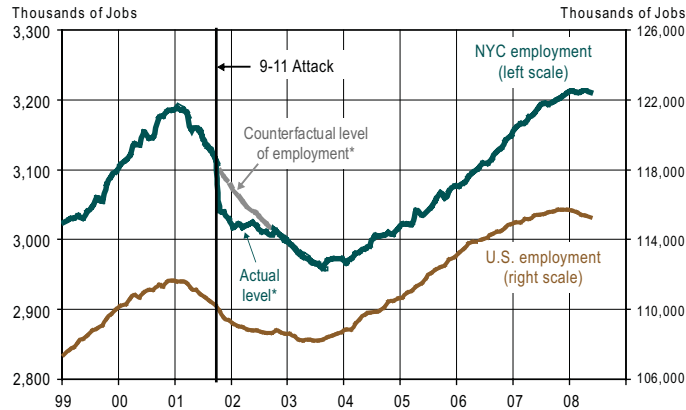
Clearly, there are difficulties in estimating this counterfactual path. First, because so many factors affect economic activity (and employment), any forecast of post-9/11 employment based solely on pre-attack data is subject to large standard errors, especially as one goes further out in time. Second, it is virtually impossible to disentangle the effects of 9/11 from effects of other one-time events that occurred around the same time—i.e. the dotcom bust, the anthrax scare, etc. While the second issue is difficult to resolve, we address the first issue by using the path of post-attack employment for the U.S excluding New York City. In effect, we assume that the attack did not significantly affect employment outside

New York City¹³ and then exploiting the relationship between local and national employment to estimate the counterfactual path for New York City.

Specifically, we use time-series regression techniques to simulate the path that employment would have taken if the attack had not occurred. Clearly, this simulation is highly sensitive to a number of underlying assumptions—an issue that we discuss in more depth below. The equation used to simulate private-sector employment is based on NYC employment growth (e), and US employment growth (E), as follows: [Both e and E are in LOG-difference form, which closely approximates percent change.]

$$\hat{e}_t = \alpha + \sum_{i=1}^8 \beta_i \hat{e}_{t-i} + \sum_{j=0}^8 \gamma_j E_{t-j} \quad (1)$$

Chart 3: New York City Private-Sector Employment
The 9-11 Effect



* Estimated path of private sector employment if the 9-11 attack had not occurred. See Bram and Orr (2006).
Sources: N.Y. State Dept. of Labor, US Bureau of Labor Statistics, FRBNY Estimates, Moody's economy.com.

First, in order to estimate the historical relationship between current NYC job growth and lags of itself, as well as current and lagged values of US job growth, we run this regression on data from January 1979 to August 2001 to

¹³ This may seem a bold assumption; however, while the attack likely did affect employment nationally to some extent, the magnitude was clearly minimal relative to the impact in New York City. We also tried an alternate specification using US employment excluding NYC, but the results were not substantially different; one conceptual problem in subtracting out NYC, is that a large number of jobs relocated temporarily to northern New Jersey, which actually registered a jump in employment following the attack. Also, the impacts of the 9/11 attack in western Pennsylvania and in Washington, DC are not a subject of analysis in this paper.

estimate the coefficients. Then we sequentially estimate each subsequent month's employment growth level for New York City, using 8 lags of itself, as well as current and lagged US employment growth. These simulated values of city job growth are then fed back in as inputs in place of actual lagged values for periods after August 2001. From the simulated percent changes, we convert back to levels. The simulation is done through the end of 2003, by which point the actual and simulated series had converged for a number of months.

As previously noted, the most fundamental decision in simulating employment involved whether to use actual contemporaneous (post-attack) U.S. data or whether to simulate U.S. employment data based solely on pre-attack trends. In the initial study (Bram, Orr, Rapaport, 2002), we used only pre-attack U.S. data, with the thought that post-attack employment might be "tainted" by effects of the attack and thus be inappropriate to use in a no-attack simulation. Since U.S. employment was much slower to recover than in earlier business cycles, this decision has substantial ramifications for the simulation. Because evidence gathered after our initial report suggested that the slower-than-normal recovery in US employment following the 2001 recession was largely attributable to a factors other than the attack, our follow-up analyses used actual post-attack US data in the simulation of New York City employment.¹⁴ Another argument for using actual post-attack US data is based on the premise that the attack's net effect on US employment (including or excluding NYC) was modest and short-lived, especially compared with its effect on New York City. Using simulated, rather than actual, US employment for the post-attack period implicitly attributes all of the unanticipated weakness in national job growth to the attack.¹⁵

The simulation is also somewhat sensitive to a number of other decisions: using 8 lags in the auto-regressive model, starting the simulation in September 2001 (as opposed to October), not subtracting out New York City from the U.S. employment series, and using some post-attack data to compute seasonal factors. While the initial impact (first few months) was fairly robust across these alternative specifications, the duration of the effect—time of convergence—was fairly sensitive to some of the variations; the set of assumptions we used, in effect, produced results that fell near the middle of the various scenarios.¹⁶

A more recent analysis, based on final, revised employment data through 2004 indicated that the attack resulted in a roughly 65,000 shortfall in

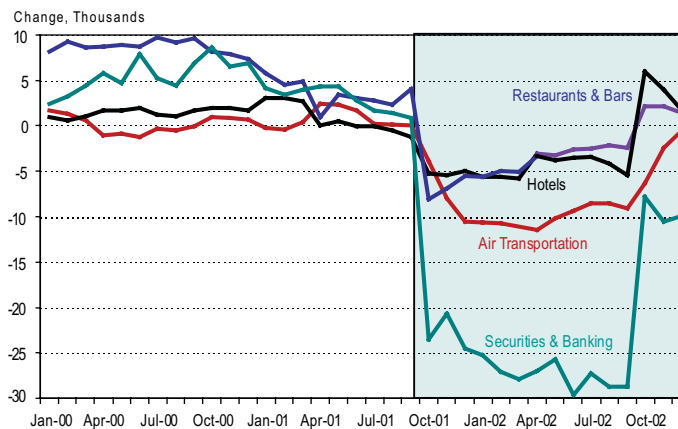
¹⁴ See Groshen and Potter (2003).

¹⁵ A full discussion of these issues can be found in Bram and Orr (2006).

¹⁶ In particular, using a 3-lag structure led to a more prolonged effect (no convergence until 2004). In contrast, starting the simulation in October rather than September led to quicker convergence (May 2002). The estimated path of employment does not differ significantly when (1) the data are seasonally adjusted using only pre-attack data; or (2) employment for the US excluding NYC is used in place of total US data.

employment during the first month after the attack (October), which then diminished to a statistically insignificant level by the end of 2002.¹⁷ While the 2006 study did not include estimates of the attack's effect on personal (wage and salary) income, a rough estimate can be made based on the employment effect discussed above, combined with estimates, made in the 2002 study, of average incomes associated with lost jobs. Clearly, it is difficult to estimate, with any confidence, exactly how the income distribution of jobs was affected by the disaster. However, one can get a somewhat better handle on the pay levels of jobs lost due to the attack by examining the industries that appear to have been most affected, and by assuming that the attack-related job losses within those industries paid at the industry average for Manhattan. While the high-paying securities industry registered the steepest post-falloff in jobs, by far, there were also fairly sharp declines in city-wide employment in air transportation, hotels, and restaurants and bars (**Chart 4**).¹⁸

Chart 4: Employment in Selected NYC Industries
Net Change from a Year Earlier



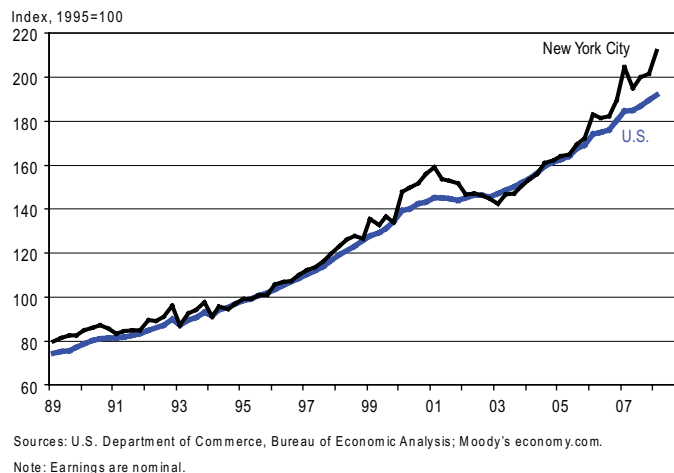
Source: New York State Department of Labor, Moody's economy.com.
Note: Shading denotes post-9/11 period.

¹⁷ See Bram and Orr (2006). Convergence is assumed to occur when the employment shortfall declines to less than 0.5% of total private-sector employment.

¹⁸ While we estimate the duration of the employment shortfall due to the attack to have been 15 months, it would be interesting to compare this with other natural and man-made disasters. Unfortunately, dating such downturns is difficult and there appears to be substantial heterogeneity in recovery dynamics (Chang and Miles, 2004; Rose 2008) and we are unaware of a comprehensive estimate of typical durations.

In the 2002 study, based on tallying up the estimated job losses across industries, the estimated income shortfall due to the attack was in the range of \$3.6-6.4 billion as of June 2002; however, it is now evident that the employment shortfall persisted for an additional six months, which would tend to boost that estimate. On the other hand, this is offset by the fact that our later analysis—based on revised employment data and somewhat different assumptions—implies a smaller job shortfall through June 2002 thus reducing the estimated income shortfall. Assuming the average income of the attack-related job loss in 2001 was in the range of \$115,470-\$142,775 (Bram, Orr and Rapaport, 2002), and assuming an average monthly shortfall of 32,360 jobs during the 16 months after the attack (based on the latest analysis, discussed earlier) the income shortfall would be in the range of \$5.0-6.2 billion (\$5.7 - \$7.1 billion in \$2006). In fact, the actual peak-to-trough decline in wage and salary earnings was closer to \$15 billion; however, much of this decline is assumed to have been related to the pre-downturn in the local economy, and particularly in the securities and new media-related industries. Moreover, it should be noted that this overall decline in wage and salary income was from a very elevated level following the late-1990s boom (Chart 5).

Chart 5: Total Wage & Salary Earnings
United States and New York City



3. Potential longer-term impacts

In the immediate aftermath of the September 11 attacks, there was a widely held view that the future of New York City, and indeed for dense agglomerations of

activity throughout the nation, was in grave doubt. For many, the success of the attack in killing citizens and disrupting the City and national economies was evidence of a technological shift in favor of terrorism that had been occurring largely out of sight for some time. Many commentators, including some academic economists, argued that tall buildings provided extremely tempting targets for terrorists, and that the likely result would be decentralization of activities both within metropolitan areas (that is, increasing suburbanization) and across cities (that is, movement from large to small- and medium-sized cities).¹⁹

In the weeks and months immediately following a disaster, the short run economic effects become increasingly obvious – workers killed, capital destroyed, and jobs relocated or lost altogether. During this period, more than the usual amount of uncertainty clouds the economic future, and it is difficult to forecast how private actors will react to the events that are unfolding. When the disaster is a result of natural forces, actors use it to gather information about what the future is likely to hold: Hurricane Katrina, for example, provided substantial information about the vulnerability of New Orleans to major storms; the Northridge earthquake taught Southern California residents about both the likelihood and the potential damage of a major seismic event.

In the case of 9/11, the uncertainty was compounded by the fact that the attackers were sophisticated, malevolent actors themselves and that the “war” was not over. It was thus extremely plausible to conclude that residents and businesses would perceive *permanently* higher risks and would thus reduce their evaluation of urban areas in general, and especially locations in New York City. A long tradition in urban economics research has established that cities depend on density and diversity to foster activity and growth.²⁰ As discussed above, the initial shock to the city was very substantial, but unlikely to itself lead to a complete unraveling of the city’s agglomeration benefits. ²¹Yet a permanent “terror tax” – an increase in the expected cost of locating in high density places – could potentially trigger a downward spiral in the city.

In the immediate aftermath of the attack, short run activity measures indicated a sharp contraction in the city and, to a lesser extent, the region. Bram, Haughwout and Orr (2002) use a general equilibrium framework to argue that relative land values in the city are a useful measure of private actors’ long run expectations for the city economy. Like other durable, physical assets the value of a plot of land at time t is the present discounted value of its expected stream of returns from t to the distant future. Because the location of a plot of land is fixed, its value will depend on bidders’ expectations of conditions in the area surrounding the plot. Thus land in areas that are expected to host high levels of

¹⁹ See Mills (2002), which builds on the early work of Alonso (1964).

²⁰ See Rosenthal and Strange (2004) and Glaeser, Kolko and Saiz (2001).

²¹ See Harrigan and Martin (2002).

activity and growth will, other things equal, command higher prices than those in low activity or declining areas.

Thus land prices – both residential and commercial – in New York shortly after the attack offer an indication of private actors’ expectations of future conditions in the city, in light of the new information available about terrorists’ capabilities and intentions. If the “terror tax” is expected to be substantial in the long run, it should show up in a decline in land prices in New York relative to the rest of the nation.

Scaling the city’s market by conditions in the rest of the US is important for two reasons. First, real estate is a particular asset class, with overall demand affected by such national factors as interest rates and federal taxes and their expected future paths. The demand for land in a particular area is an indicator of these factors as well as the attractiveness of that area; only by controlling for the value of land elsewhere can we get a clear read on the valuations that actors place on New York, versus evaluations of real estate more generally. Second, and closely related, is the fact that the 9/11 attack took place during a national recession. In order to distinguish the effects of the attacks from the downturn, we must control for changes in the demand for real estate elsewhere in the nation.

In principal and in the absence of binding land use regulations, households and firms compete for land in local markets: when households place the highest value on a particular plot, it will be developed for residential use, when firms are the high bidders the land will be devoted to commercial or industrial use.²² In practice, real estate capital is also durable, and conversion from one use to another can be costly. In addition, New York City is heavily regulated.²³ Because of these features, we choose to examine residential and commercial land separately (we exclude consideration of industrial land, a relatively small part of the New York market).

We use four sources of real estate data to explore how private actors were evaluating New York in late 2001 and through 2002. In three of the cases, we scale the variable by the same measure for the US as a whole. Recall that concerns about New York’s – and other big cities’ – future in early 2002 were focused on two dimensions: *intra*-metropolitan decentralization (suburbanization) and *inter*-metropolitan decentralization (from large to smaller MSAs). Our measures offer insight into both inter- and intra-metropolitan location choice by households, and into the inter-metropolitan location choices of firms.

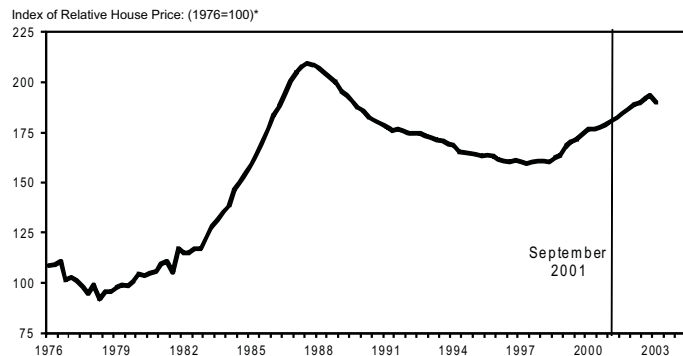
²² See Roback (1982).

²³ See Glaeser, Gyourko and Saks (2005).

Perceptions of New York as a Residential Location

New York City has for many years enjoyed a reputation as a glamorous and desirable residential location, a fact which is reflected in both its well-known concentration of very wealthy residents and its high overall housing costs. **Chart 6** reports the New York City MSA OFHEO house price index, a repeat sales measure of prices of homes financed by mortgages securitized by the Government Sponsored Enterprises Fannie Mae and Freddie Mac.²⁴ In the Figure, the New York index is expressed relative to the US, to create an index that measures price movements in New York relative to the rest of the nation. It is apparent from the figure that relative prices in New York were on a strong upward trend both before and after 9/11. Since this is an MSA-level index, we take it as evidence that housing markets in the MSA as a whole did not falter in response to the 9/11 attacks. That is to say, we do not find evidence of a significant decentralization away from the nation's largest MSA – New York – in favor of smaller urban areas.

**Chart 6: New York City Area House Prices
Relative to U.S. Average**



Source: Office of Federal Housing Enterprise Oversight; FRBNY Calculations.

*Index is based on ratio of repeat-sales price measure for existing single-family homes in the NYC metro area to the nation.

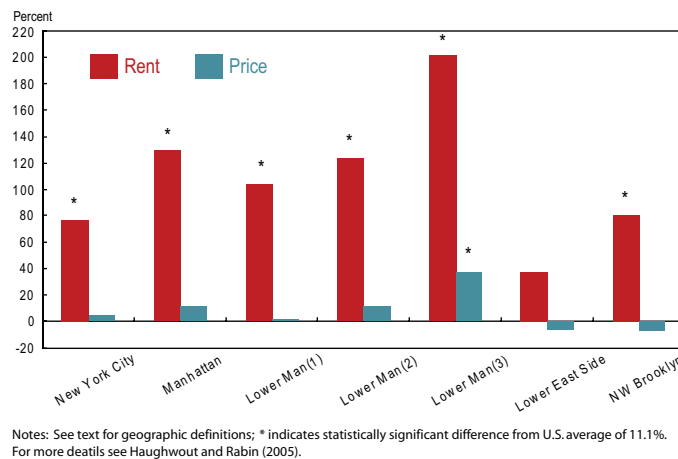
Note: See Haughwout and Rabin (2005).

A second dimension of the 9/11 attack was that fear of a future terrorist attack would lead to more intra-metropolitan residential decentralization – suburbanization. If this were the case, we would anticipate a reduction in demand for locations in New York City's five boroughs (the central city of the MSA)

²⁴ See <http://www.ofheo.gov/hpi.aspx> for more information.

relative to the rest of the nation.²⁵ We address this concern using information from a unique data source – the New York Housing and Vacancy Survey, a detailed survey of housing conditions and prices in New York conducted for the City triennially by the US Census Bureau. **Chart 7** reports the changes from 1999-2002 in the premia paid for various locations in the city both annually (rents) and as a present discounted value (prices). In addition to New York City as a whole, we report results for several areas that might be expected to have experienced a disproportionate reduction in demand. Lower Manhattan (1) refers to the financial district and Greenwich Village, along with the Lower East Side and Northwest Brooklyn. Lower Manhattan (2) excludes Northwest Brooklyn, and Lower Manhattan (3) is limited to the area immediately proximate to the attack. Also referenced on the chart is the change in shelter costs nationwide over this period, computed from the Bureau of Labor Statistics’ Consumer Price Index series.

Chart 7: Residential Rent and Price Appreciation, NYC 1999-2002

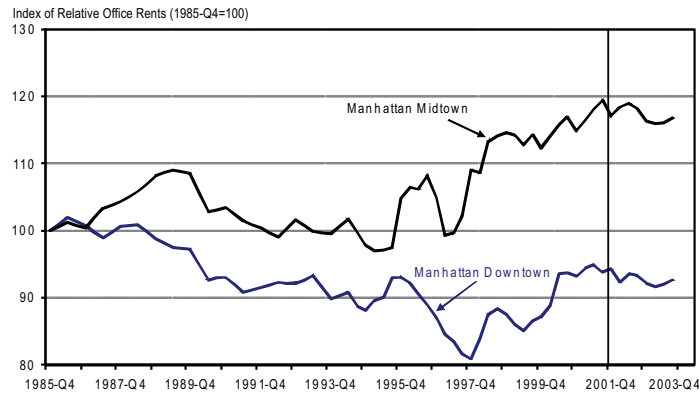


Asterisks indicate statistically significant differences between appreciation in the city and that in the nation as a whole. Again, the data indicate little evidence that apartment prices in New York fell behind the nation; indeed they seem to have gained significantly relative to the nation across all neighborhoods. Rents, which reflect perceptions of conditions over the life of the contract – typically a year or two – are far weaker but indicate that the city roughly kept pace with the nation. Again, the downtown market was exceptionally *strong* relative to the nation during this period.

²⁵ Ideally, we would compare housing prices in New York City to those in the suburbs. However, a detailed dataset for the latter is not available. The OFHEO index is dominated by single-family detached units, which are a rarity in New York City, particularly in Manhattan, so it is reasonable to think of this index as a measure of prices in the NY suburbs relative to prices nationwide.

The two panels of **Chart 8** show a similar set of metrics for the two major New York City office markets. Again, the prices (and rents) are expressed relative to national measures for class A office space. Here we observe little action in rents (**Chart 8a**) in response to the attack. In both the midtown and downtown markets, rents remained fairly constant relative to the rest of the nation both before and after the attack. The price graph (**Chart 8b**), however, shows evidence

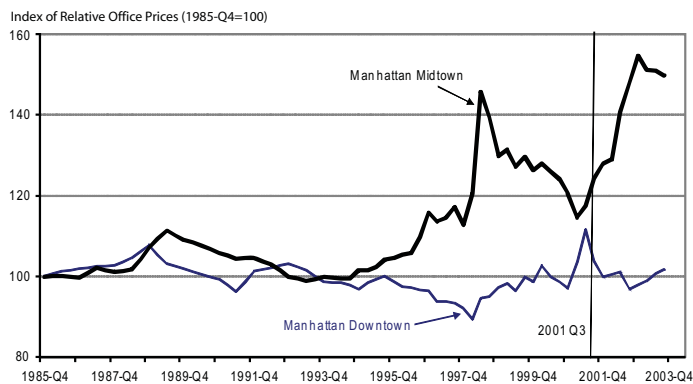
Chart 8a: Office Rent Indices
Class A Space, Manhattan Markets Relative to National Average



Source: National Real Estate Index; FRBNY Calculations.

*Index is based on ratio of Office Prices in Manhattan to that of the U.S. See Haughwout and Rabin (2005).

Chart 8b: Office Price Indices
Class A Space, Manhattan Markets Relative to National Average



Source: National Real Estate Index; FRBNY Calculations.

*Index is based on ratio of Office Prices in Manhattan to that of the U.S. See Haughwout and Rabin (2005).

of some dramatic movement. In the downtown submarket, prices are either flat or down after the attack (depending on what one makes of the increase in prices observed just before the attack), while in midtown relative prices surge after 9/11.

It is important to recall that, unlike the residential market, commercial space in Downtown Manhattan experienced a significant supply shock as a result of the destruction of the World Trade Center and damage to surrounding buildings. This reduction in supply would be expected to *increase* market clearing prices, had demand remained fixed.²⁶ So the fact that prices declined or remained constant Downtown indicates that the 9/11 attack may have led to a downward shift in demand for office space Downtown. But the data indicate that some or all of this reduction “reappeared” in Midtown, where prices rose sharply in spite of fixed supply. Indeed, Haughwout and Rabin (2005) calculate that the total value of class A office space in these two Manhattan markets increased 12.6% between 2001 and 2003. So the decrease in values Downtown was more than offset by an increase in Midtown.

As a final measure of the effects of the attack, we look at the price of underdeveloped or vacant land. Haughwout, Orr and Bedoll (2008) provide time series plots of the value of land in New York MSA for the period 1999-2006Q2 (**Chart 9**).²⁷ Over this period, the price of land, especially land for residential purposes, grew sharply. There exists modest evidence of a temporary setback in the upward trajectory for residential prices in the wake of 9/11, but this decline is quickly reversed in subsequent quarters. For commercial land, which had experienced virtually no appreciation since 1999, prices again slipped slightly, then recovered. Recall that while the World Trade Center and the surrounding commercial buildings was the site of substantial amounts of office space, they occupied just 16 acres of land. While this land became unavailable for occupancy after 9/11, it represents a very small share of the land in the metropolitan area.

Our detour into the region’s real estate markets indicates that in spite of the dramatic impact of the terrorist attack on the City economy in the short-run, market participants were undeterred in their willingness to invest in the city for the long run. We observe evidence of strong demand for city locations as places to live and do business. One possible exception is a decrease in demand for commercial space in the downtown Manhattan market, which was a pre-existing trend possibly hastened by the attack.²⁸ But this reduction was offset by

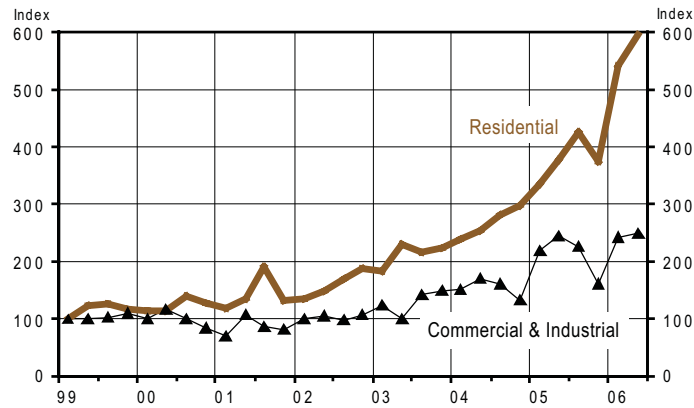
²⁶ However, there was apparently a large amount of space being held in inventory by many commercial renters in New York, and much of this space was used to house displaced tenants or released into the market after the 9/11 attack, which to some degree offset the overall loss of space.

²⁷ There is no comparably constructed national figure for land prices.

²⁸ See Glaeser and Shapiro (2002).

increased demand for commercial locations in Midtown Manhattan and increased residential demand downtown.

Chart 9: Index of Land Prices in the New York City Metropolitan Area



Source: Author's calculations, based on data from the CoStar Group.
Note: See Haughwout, Orr, and Bedoll (2008).

4. Summary

The loss of human life and the damage and destruction of commercial property and infrastructure that resulted from the September 11, 2001 attack significantly reduced the productive potential of the New York City economy. Moreover the attack disrupted economic activity not only in the industries in the area of the World Trade Center, but also in a number of other industries throughout the city, further reducing employment. In the immediate aftermath of the attack there was widespread concern about potentially serious long-term adverse consequences for the city's economy. As the data presented in this article show, these concerns were not borne out: The city proved to be resilient. Our initial analyses, conducted roughly one year after the attack, indicated that the shortfall in employment in the city directly due to the attack had begun to ease significantly. Additionally, there were signs that the market for residential real estate in the city had begun to strengthen.

Updates of our analyses undertaken several years after the attack confirmed these initial findings. An analysis undertaken five years after the attack, based on final, revised employment data through 2004 indicated that the shortfall in employment had diminished to a statistically insignificant level by the end of 2002. Analyses of the real estate market in the city, using a variety of data sets on

both residential and commercial land and property, show virtually no evidence of a diminished demand for city locations as places to live and work.

Our analyses focused on the New York City economy, but the attack, and the associated damage, destruction and loss of human life, was as much an attack on the nation as it was on New York City. The effects of the attack were thus also felt outside the city. Following the attack, there were substantial redistributions of activity within the New York metropolitan area between the city and the suburbs, and a number of industries, such as travel and tourism, experienced sharp downturns nationwide. This fuller range of these effects of the attack is addressed in the articles in this volume. As with our updated study, they have the benefit of hindsight which allows firmer conclusions as to the effects of the attack to be drawn.

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