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The Stock Transfer Tax and New York City: Potential Employment Effects

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Summary of a Partnership Economic Impact Study*

- Periodically, various interest groups propose that Albany revive New York State's stock transfer tax (STT) to help close budget gaps for the city and state. STT proponents believe that a very small charge on trades would raise considerable money from traders worldwide, with the taxpayers hardly noticing.
- In November 2003, the city's Independent Budget Office reported on a current STT proposal that would be calculated at 0.0625 cents to 2.5 cents/share, and would be subject to a \$175 cap on any trade. Assuming there were no loss in trading volume, IBO estimates that this new STT could raise approximately \$5 billion.
- Margins on trading costs are now so small that trading volume would probably be affected by any STT, which in turn would have an immediate negative impact on the exchanges and on New York City's economy. Other countries, including Sweden and Japan, have experienced the negative consequences of imposing a STT:
 - In 1984, when Sweden reintroduced a 2% STT, 30% of all trading in listed Swedish companies shifted from the Stockholm Exchange to London's. After the opposition party's election, the tax was abolished in late 1991.
 - In Japan, a 0.3% STT was abolished in April 1999 as part of that government's response to the nation's slumping economy. At the time, the Japanese government said, "if the cost, including transaction fees and turnover taxes, remains high relative to the international standard, the transactions themselves may shift outside Japan."
- Since reinstatement of the STT is likely to result in a decline in trading volume, revenues would be reduced and collateral damage to the economy would be substantial. Even as little as a 10% decline in trading volume at the New York exchanges could cost the securities industry 10,000 to 11,000 jobs.
- These job losses in the securities industry could trigger job losses in multiple sectors:
 - 2,700 to 3,700 jobs in the retail sector;
 - 7,900 to 11,200 jobs in the services sector;
 - 7,200 to 9,100 in the business services sector; and
 - 500 to 1,200 jobs in the eating and drinking places sector.
- **In total, 23,000 to 33,000 private sector jobs could be lost as a result of a 10% drop in trading volume.**
- Using annual wage data, a loss of 10,000 to 11,000 jobs in the securities sector would result in about \$2.5 billion in lost wages.
- In the retail, services, business services, eating and restaurant sectors, estimated employment losses of 18,000 to 25,000 jobs imply \$800 million to \$1.1 billion in lost wages.
- In addition, an STT could accelerate the trend toward electronic trading and further undermine the New York Stock Exchange, which is the anchor of New York City's position as the world financial capital. The NYSE has significant symbolic as well as financial value to the city and state economy.
- Therefore, based on the damage a STT would do to the city's financial markets and other sectors, as well as to the shape and earnings power of the city's labor force, reinstatement of the STT is not an option that should be considered.

**The complete study is available at the Partnership's website, www.pfnyc.org.*

The Stock Transfer Tax and New York City: Potential Employment Effects on Wall Street and Other Sectors

Jonathan A. Schwabish*
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Summary

New York State and New York City each face significant budget problems in fiscal 2005 and in the years ahead. The primary problems are growing structural gaps between government spending and existing tax revenue streams. To close these gaps, elected officials are looking for ways to raise revenues that will be politically palatable. One recurring idea in New York is to reinstate the stock transfer tax (STT) on the city's stock exchanges, on the theory that a very small charge on trades would raise considerable money from traders around the world, with the taxpayers hardly noticing. In fact, margins on trading are now so small that trading volume would be affected by any STT with a resulting immediate negative impact on the exchanges and on New York City's economy.

If the reinstatement of the STT resulted in a 10% decline in trading volume in New York City, the securities industry would shed 10,000 to 11,000 jobs.¹

- The job losses in the securities industry could be accompanied by job losses in multiple sectors:
 - 2,700 to 3,700 jobs in the retail sector;
 - 7,900 to 11,200 jobs in the services sector;
 - 7,200 to 9,100 in the business services sector; and
 - 500 to 1,200 jobs in the eating and drinking places sector.
- For the entire private sector, excluding the securities industry, a 10% fall in trading volume could cost the city 12,800 to 22,200 jobs.
- In total, 23,000 to 33,000 private sector jobs could be lost as a result of 10% drop in trading volume, brought on by a creation of a new STT.
- Using annual wage data, job losses in the securities sector would translate to losses in wages of about \$2.5 billion.
- In four specific sectors examined here (retail, services, business services and restaurants), the estimated employment losses of 18,000 to 25,000 jobs imply \$800 million to \$1.1 billion in lost wages.
- Overall, a 10% decrease in trading volume could cause wages in the private sector to fall by between \$3.1 billion and \$3.7 billion.

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Introduction

The condition of New York City's financial markets—the New York Stock Exchange, the American Stock Exchange, the NASDAQ, the bond market and commodity exchanges—is a barometer often used to measure the performance of the nation's economy. The most clearly defined responses to economic news are visible in these marketplaces. The markets' response to economic news not only reflects judgments about the economic environment but also reflects investors' expectations about the future. Hence, the performance of market indicators, such as the Dow Jones Industrial Average, the NASDAQ and the S&P 500, are of interest to policy makers, the general public and economists. All of these markets, especially the NYSE, are anchors of the city's financial services sector, which in turn is the largest generator of income, wealth and tax revenue for New York City.

New York City is widely acknowledged as the global center for financial markets. To a large degree, the city's economy is dependent on the health of the financial services sector. Even though this sector's contribution to the private sector job base is just under 15%, the roughly 438,000 jobs in this sector account for nearly 25% of total personal income (BEA, 2004). These jobholders purchase goods and services in and around the city and pay substantial city and state taxes. Wall Street bonus payouts are a major source of tax revenue. In 2003, Wall Street produced pretax profits of \$16.75 billion.

Yet the wealth-generating power of the Wall Street sector and the tax revenues it pumps into the city and state should not obscure the trends that are transforming financial markets here and overseas. In response to 9/11 and its implications for security and business continuity, companies are diversifying the location of their staffs and business functions. Technological advances are making electronic trading more common, a trend that could further erode the need for physical space to trade stocks in New York City.

Interest in imposing new taxes on Wall Street is another challenge. A stock transfer tax would raise transaction costs and lower traded volume on the stock exchanges. These decreases in traded volume could have three primary effects on the New York City economy. First, lower trading volume could reduce securities industry employment. Second, the tax could create other distortions in the market, such as adjustments in stock prices. And third, members of the stock market exchanges could move trading offices to locations where no such transfer fees exist.

This Partnership study, which is an extension of existing research designed to inform the debate on new revenue sources for government, offers answers to two questions. First, to what degree would a STT reduce employment in the securities industry in New York City? And second, how would changes in securities industry employment affect employment in other sectors, such as retail and business services?²

Historical Context

New York State first imposed a stock transfer tax in 1909 at the state level. In 1966, the state gave up this revenue source and turned this into a NYC tax. Between 1979 and 1981, the state phased out the tax but reimbursed the city for part of the lost revenue. Since 1981, state reimbursements have declined, and in 2001 the state stopped payments to the city altogether. In fact, although the tax technically remains, the state immediately rebates it to the taxpayer so that there is no effective tax.

At the time of its repeal in 1981, the tax operated on a sliding scale based on the price of the traded stock. The tax was 1.25 cents/share for stocks under \$5 and rose to 5 cents/share for stocks selling at \$20 a share or above. The tax also had a cap of \$350 for a given trade.

Stock transfer taxes are in place in other parts of the world, though many have been eliminated. In 1984, following Sweden's reintroduction of a 2% stock transfer tax (there were smaller taxes in the early part of the 20th century), 30% of all trading in listed Swedish companies shifted from the Stockholm Exchange to the London Exchange. After the election of the opposition party, the tax was abolished in December 1991 (Waldenström, 2002).

In Japan, a 0.3% STT was abolished in April 1999 as part of that government's response to the nation's slumping economy. At the time the STT was abolished, the Japanese government said, "if the cost, including transaction fees and turnover taxes, remains high relative to the international standard, the transactions themselves may shift outside Japan" (Ono and Hayashida, 2003).

The experience in Sweden and Japan, however, has not diminished interest in a STT in New York. Periodically, various interest groups propose that the Governor and the State Legislature revive the stock transfer tax to help close budget gaps for both governments. For fiscal 2005, New York State faces a \$5.1 billion budget gap while New York City faces a \$1.8 billion gap. Outyear gaps for both are expected to be larger. While the stock transfer tax would arguably raise substantial revenue for the City and State—some estimates run as high as \$7 billion—a STT would have significant side effects.

One of the most recent attempts to forecast the impact of a new STT on the city's economy was produced by New York City's Independent Budget Office (IBO). Under a new STT proposal described in a November 2003 report by IBO, the STT would be reinstated at half its original rate. The new tax would range from 0.0625 cents to 2.5 cents/share, and would be subject to a \$175 cap on any trade. This would represent an approximately 23% increase over existing NYSE and AMEX transaction costs. Recent transaction costs-trading volume elasticity estimates by Domowitz et al (2000) indicate that this cost increase would be accompanied by an 18% decline in trading volume. Aside from any negative market reactions to the imposition of the tax (such as other business cost adjustments), the IBO estimates that this new STT would raise approximately \$5 billion.

In its report, IBO developed a model and found a trading volume-securities industry elasticity of 0.52, which implies that a 10% decrease in trading volume would reduce the city's securities industry employment by 5.2%.³ According to IBO, an 18.0% decline in trading volume would translate into a loss of 19,400 securities industry jobs, with a further reduction in overall city job growth of 80,000 people by 2007.⁴

Finally, using the IMPLAN input-output model over the 1995-2000 period, the New York State Comptroller estimates that each new securities industry job leads to the creation of two additional jobs in other sectors of the city (NYS Comptroller, 2004). In addition, each securities industry job generated one additional job in the rest of New York State, primarily due to commuters' consumption spending. The estimates presented below are comparable to the estimates from both IBO and the Comptroller.

Methodology

The Partnership has designed a model that is similar to Amihud and Mendelson's (2003a, 2003b) to estimate the effect a decline in traded stock market volume would have on securities industry employment.⁵ The Partnership model also estimated the impact a reduction in securities industry employment would have on other sectors of the New York City economy. The models included seasonal controls, a control for the national economy (growth in real Gross Domestic Product), a control for unobserved technological growth over time, and an indicator for the terrorist attack of 9/11. The variables of interest are traded volume in the stock market measured by the S&P 500 and sector-specific employment using the U.S. Bureau of Labor Statistics data organized by Standard Industrial Classification (SIC) code.⁶

The IBO estimation bases its analysis of the economic impact of a new STT on an 18% decline in trading volume (see endnote 4). It is also possible that the declines in trading volume brought on by partial reinstatement of a STT could result in declines of a lesser magnitude. With that in mind, the Partnership decided to test the economic impact of trading volume declines of 5% and 10% as well.

Results

Using quarterly data between January 1965 and December 2002, the Partnership's model estimates a stock market volume-securities industry employment elasticity of 0.61 to 0.64 (see endnote 6).⁷ These elasticities imply that a 10% decrease in traded volume will decrease securities industry employment by 6.1% to 6.4%, or—based on 2002 employment levels—a loss of 10,000 to 11,000 jobs. These estimates are slightly larger than the estimates found in IBO (primarily due to model differences) and Amihud and Mendelson (primarily due to data differences) but still imply substantial job loss in that sector alone.

The second step of the estimation shows what effect securities industry employment has on other forms of employment. These potential spillover effects are substantial; like

everyone else, workers in the securities industry consume goods and services throughout the city—they eat lunch downtown and in Midtown, shop at stores, and work with people in other business sectors. Because these spillover effects may affect particular sectors—sectors such as retail trade, services, business services, and eating and drinking places—more than others, the model focuses on these sectors rather than every possible job type.⁸

The elasticity estimates for these four sectors plus all other total private jobs are shown in the table on page 7. All of the estimates are—in both statistical and qualitative terms—significant.⁹

- The results suggest an elasticity of between 0.10 and 0.14 for the retail sales sector (Row 2), considerably smaller than the 0.39 and 0.47 for business services (Row 4).
- The elasticity estimates for the retail sector, however, are larger than the estimates of 0.09 to 0.12 for the services sector (Row 3) and the 0.05 to 0.11 estimates for the eating and drinking place sectors (Row 5). (The elasticity of, say, 0.11 implies that a 10% increase in SI employment will increase employment in the retail sector by 1.1%).

Converting these elasticities to jobs illustrates how the scale of these estimates affects other sectors.

- For the five specific sectors shown in Rows 1 through 5, a 5% decline in trading volume would cost the city between 5,200 and 5,500 securities industry jobs.
- Under this 5%-decline scenario, these securities industry job losses would translate to losses of:
 - 1,300 to 1,900 jobs in the retail sector;
 - 4,000 to 5,600 in the services sector, and so on.
 - For all five individual sectors, a 5% decline in trading volume would cost the city between 14,400 and 18,000 jobs, or 0.5% to 0.6% of the city's workforce; and
 - Overall, a 5% decline in trading volume could cost the city 11,600 to 16,600 private sector jobs, as shown in Row 10.

In the next set of columns, the estimates assume a 10% decline in trading volume—a little more than half the 18% estimated by IBO. At this level of decline in trading volume, the Partnership's model forecasts that the city would stand to lose 29,000 to 36,000 jobs in the five specific sectors. When the effect of a 10% decline in trading volume is applied to all private sector jobs (see Row 10), the city could lose between 23,000 and 33,000 jobs.

Finally—as was noted above—in its November report, IBO estimated that a 0.034% tax would add 23% to the basic costs of trading and would cause trading volume to decline by 18% (see endnote 4). This loss of trading volume suggests that the New York City economy would stand to lose approximately 52,000 to 65,000 jobs in these specific

sectors, or roughly 1.7% to 2.2% of its total private sector workforce. Overall, the city could lose between 42,000 and 60,000 private sector jobs (Row 10).

In sum, the results imply a range of elasticities of between 0.05 and 0.47, depending on the sector. Using the 18% trading volume decline estimated by IBO, the Partnership estimates that total job loss in the city could exceed 40,000 jobs. The Partnership estimates are similar to those found by IBO and the State Comptroller—all generate a ratio of other employment to securities employment of around two.

Table. Employment Effects of a Stock Transfer Tax

Sector	Elasticity estimate ⁺		Employment 2002 ⁺⁺⁺	Effect of trading volume decline of 5%		Effect of trading volume decline of 10%		Effect of trading volume decline of 18%	
(1) SI employment	0.612	0.637	170,200	5,207	5,419	10,415	10,838	18,746	19,509
(2) Retail	0.104	0.134	430,100	1,369	1,835	2,737	3,670	4,927	6,606
(3) Services	0.090	0.121	1,442,700	3,973	5,558	7,945	11,117	14,301	20,010
(4) Business Services	0.389	0.469	304,200	3,620	4,543	7,241	9,085	13,034	16,354
(5) Eating and Drinking Places	0.053	0.113	159,400	258	574	517	1,147	931	2,065
(6) Total Private - SI	0.073	0.121	2,880,000	6,432	11,096	12,865	22,191	23,156	39,945
(7)									
(8)	Total [(1)+(2)+(3)+(4)+(5)] =			14,427	17,929	28,855	35,857	51,938	64,543
(9)	as % of total jobs ⁺⁺			0.5%	0.6%	0.9%	1.2%	1.7%	2.1%
(10)	Total [(1)+(6)] =			11,640	16,515	23,279	33,030	41,903	59,454
(11)	as % of total jobs ⁺⁺			0.4%	0.5%	0.8%	1.1%	1.4%	1.9%

⁺ The first column includes controls for the national (real GDP growth) economy. Both columns includes seasonal controls.

⁺⁺ Note: Total private sector jobs in NYC in 2003 = 3,050,200. Employment data from US Bureau of Labor Statistics.

⁺⁺⁺ Figures will not sum to total private sector jobs because not all sectors are represented.

Potential Wage Effects

In 2002, New York City workers in all sectors except the securities industry earned an average wage of \$53,044.¹⁰ At the employment levels found in the Partnership's model and at sector-specific wage levels, a 10% decline in trading volume would reduce wages in the retail, services, business services, and eating/drinking places sectors by \$800 million and \$1.1 billion for the four sectors examined (see the Appendix Table).

Employees in the securities industry earned much higher salaries (\$232,890) than the average New Yorker in 2002. At the levels of employment loss for a 10% decline in trading volume, those security industry job losses would be equivalent to a loss of \$2.4 billion to \$2.5 billion in annual wages. All told—using total private sector employment—this Partnership analysis estimates that a STT could cost the city economy between \$3.1 billion and \$3.7 billion in wages.

Were trading volume to decline by 18% as outlined by IBO, the city could lose between \$5 billion and \$7 billion over the next two years. These calculations exclude potential losses in other tax revenues—income, sales, property *or* business—or decreases in New York City's Gross City Product. Estimates of these effects would surely increase the negative ramifications for the city's economy.

Related Issues

The larger issue behind the renewed interest in the STT is whether the interest groups that advocate a new STT have a sufficient appreciation of the financial sector's role as a driver of job creation and economic growth in other sectors of the city's private sector economy.

Aside from employment directly and indirectly connected to the markets, other companies that locate in New York City to do business on the exchanges generate billions of dollars of profits and tax revenues for the city, state and federal governments. Relocation of these markets or a significant loss of market share (trading volume) would be serious blows to the health and stability of both the local and state economies.

A second issue confronting financial markets domestically and abroad is the exponential growth of electronic trading, which reduces the need for physical trading space. Electronic trading firms, such as E*Trade and AmeriTrade, have grown both in terms of size and value over the past decade. Further growth of such online trading erodes the need for a physical trading floor. In fact, the New York Stock Exchange has adjusted to this change in the industry. Recently, the NYSE has increased the amount of orders eligible for online trading through its DirectPlus electronic trading system. Since 2002, the DirectPlus system has seen orders increase by 140%, the number of trades by 151% and share volume increase by 111% (NYSE, 2004).

Conclusion

Overall, the estimates for all private sector jobs imply that a 10% decline in trading volume would cost New York City between 23,000 and 33,000 jobs, or approximately 1% of its workforce. The job-loss estimates can be converted to losses in wages by using data from the New York State Department of Labor. With average annual wages of around \$53,000 in 2002, the 12,000 to 23,000 jobs lost in the private sector would translate to losses in wages of between \$600 million and \$1.2 billion (for a 10% decline in trading volume). Adding wage losses from the securities sector would cost the city's economy an *additional* \$2.4 billion to \$2.5 billion, producing a total wage loss of \$3.1 to \$3.7 billion.

The reinstatement of the STT in New York City is not an option that should be considered, based on the damage this would do to the city's financial markets and other sectors, as well as to the shape and earnings power of the city's labor force. If the STT pushes the financial markets toward different forms of trading, the financial services industry, which currently makes up a substantial part of the city's labor force, could see

demand for services change in significant ways. The spillover effects for other sectors—job losses in retail trade, services, business services, and eating and drinking places—could be significant.

References

- Amihud, Yakov and Haim Mendelson. 2003a. "Effects of a New York State Stock Transaction Tax," unpublished manuscript (November).
- 2003b. "Critique of 'Evaluation of a Proposal to Reinstate the New York Stock Transfer Tax' by Pollin and Heintz," unpublished manuscript (November).
- Domowitz, Ian, Jack Glen and Ananth Madhavan. 2000. "Liquidity, Volatility, and Equity Trading costs Across Countries and Over Time," Working Paper No. 322 (April 10 version).
- Heaton, John C. and Andrew W. Lo. 1995. "Securities Transaction Taxes: What Would Be Their Effects on Financial Markets and Institutions?" In *Securities Transaction Taxes: False Hopes and Unintended Consequences*, Suzanne Hammond, ed. Catalyst Institute. Burr Ridge, IL: Irwin Professional Publishing.
- Independent Budget Office. 2003. "Reviving the New York Stock Transfer Tax: Revenue and Risks," New York City Independent Budget Office Background Paper (written by David Belkin) (November).
- New York State Comptroller. 2004. "The Impact of Wall Street On Jobs and Tax Revenues," Report 1-2005, New York State Office of the State Comptroller. April.
- New York Stock Exchange. 2004. "NYSE Direct+." www.nyse.com.
- Ono, Hiroyuki and Minoru Hayashida. 2003. "A Turnover Tax, Transactions Cost and Stock Trading Volume: The Case of Japan," unpublished manuscript, http://www.kitakyu-u.ac.jp/economy/wpaper/Hayashida/Ono_Hayashida1.pdf.
- Pollin, Robert and James Heintz. 2003. "Evaluation of a Proposal to Reinstate the New York Stock Transfer Tax," Political Economy Research Institute, University of Massachusetts Amherst (April).
- United States Bureau of Economic Analysis. 2004. "Personal Income by major source and earnings by industry (NY, NY), Table CA05N," www.bea.gov.
- Waldenström, Daniel. 2002. "Why are securities transactions taxed? Evidence from Sweden, 1909-1991," *Financial History Review* 9 (2) (October): pp. 169-194.

Appendix Table. Income Implications of Employment Losses in New York City					
	Mean	Effect of trading		Total Income	
	Income*	volume decline of 5%		(\$2003 millions)	
		(see Table)			
(1) SI employment	\$232,890	5,207	5,419	\$1,213	\$1,262
(2) Retail	\$26,555	1,369	1,835	\$36	\$49
(3) Services	\$48,654	3,973	5,558	\$193	\$270
(4) Business Services	\$52,931	3,620	4,543	\$192	\$240
(5) Eating and Drinking Places	\$20,644	258	574	\$5	\$12
(6) Total Private less SI	\$53,044	6,432	11,096	\$341	\$589
(7) Total [(2)+(3)+(4)+(5)] =				\$427	\$571
(8) Total [(1)+(6)] =				\$1,554	\$1,851
	Mean	Effect of trading		Total Income	
	Income*	volume decline of 10%		(\$2003 millions)	
		(see Table)			
(1) SI employment	\$232,890	10,415	10,838	\$2,425	\$2,524
(2) Retail	\$26,555	2,737	3,670	\$73	\$97
(3) Services	\$48,654	7,945	11,117	\$387	\$541
(4) Business Services	\$52,931	7,241	9,085	\$383	\$481
(5) Eating and Drinking Places	\$20,644	517	1,147	\$11	\$24
(6) Total Private less SI	\$53,044	12,865	22,191	\$682	\$1,177
(7) Total [(2)+(3)+(4)+(5)] =				\$853	\$1,143
(8) Total [(1)+(6)] =				\$3,108	\$3,701
	Mean	Effect of trading		Total Income	
	Income*	volume decline of 18%		(\$2003 millions)	
		(see Table)			
(1) SI employment	\$232,890	18,746	19,509	\$4,366	\$4,543
(2) Retail	\$26,555	4,927	6,606	\$131	\$175
(3) Services	\$48,654	14,301	20,010	\$696	\$974
(4) Business Services	\$52,931	13,034	16,354	\$690	\$866
(5) Eating and Drinking Places	\$20,644	931	2,065	\$19	\$43
(6) Total Private less SI	\$53,044	23,156	39,945	\$1,228	\$2,119
(7) Total [(2)+(3)+(4)+(5)] =				\$1,536	\$2,057
(8) Total [(1)+(6)] =				\$5,594	\$6,662

* Source: Covered Employment and Wages (ES202) data, NYS Department of Labor.

Endnotes

¹ The Partnership's estimates for job losses and other losses due to the STT involve an instrumental variable estimation and builds on work in previous studies by Heaton and Lo (1995), IBO (2003), Pollin and Heintz (2003), and Amihud and Mendelson (2003a, 2003b). For a more thorough review of the literature and the model employed here, see "Employment Spillover Effects in New York City with an Application to the Stock Transfer Tax," available at the Partnership for New York City website.

² As defined here using U.S. Bureau of Labor Statistics data, based on the SIC data series, the term "securities industry employment" refers to "Security and Commodity Brokers."

³ The IBO (2003) model:

$\ln(\text{SI employment}_t) = 5.8747 (0.9106) + 0.5199 \cdot \ln(\text{NYSE volume}_t) (0.0761) - 2.2824 \cdot \ln(\text{SI employment-US}_t) (0.4635) - 0.0404 \cdot (d911_t) (0.0154) - 0.2984 \cdot (\text{PRTRPCT}_t) (0.0930)$, where NYSE volume = NYSE trading volume; SI employment-US = employment in the securities industry in the rest of the United States; d911 = dummy variable representing the 9/11 terrorist attacks; PRTRPCT = NYSE program trading volume share; ln = natural logarithm; and standard errors are in parentheses.

⁴ The 18% figure is derived from IBO's estimate that a 0.034% tax would add 23.0% to the basic costs of trading and a turnover elasticity estimate of 0.78 from Domowitz et al. (2000).

⁵ The Amihud and Mendelson (2003b) model:

$\Delta \ln(\text{SI employment}_t) = -0.007 (0.90) - 0.008 \cdot \Delta \ln(\text{volume}_t) (0.20) + 0.079 \cdot \Delta \ln(\text{volume}_{t-1}) (1.65) + 0.069 \cdot \Delta \ln(\text{volume}_{t-2}) (1.93) + 0.166 \cdot \Delta \ln(\text{volume}_{t-3}) (4.28) + 0.080 \cdot \Delta \ln(\text{volume}_{t-4}) (1.82) + 0.106 \cdot \Delta \ln(\text{volume}_{t-5}) (2.87) + 0.065 \cdot \Delta \ln(\text{volume}_{t-6}) (1.78) - 0.0005 \cdot (\text{Trend}_t) (2.54) - 0.070 \cdot (d911_t) (7.61)$, where volume = S&P 500 trading volume; Trend is a time index; d911 = dummy variable in 4Q01 representing the 9/11 terrorist attacks; ln = natural logarithm; Δ = first difference of the respective variable; t-statistics are in parentheses; and cumulative effect of the trading volume is 0.557 (3.88).

⁶ The Partnership for New York City model employs an instrumental variable technique that uses traded volume in the stock market as an instrument for employment in the securities industry. The model—in general form—is as follows:

Stage 1. $\Delta \ln(\text{SI employment}) = \beta_1 + \beta_2 \cdot \Delta \ln(\text{volume}_t) + \beta_3 \cdot \Delta \ln(\text{volume}_{t-1}) + \beta_4 \cdot \Delta \ln(\text{volume}_{t-2}) + \beta_5 \cdot \Delta \ln(\text{volume}_{t-3}) + \beta_6 \cdot \Delta \ln(\text{volume}_{t-4}) + \beta_7 \cdot \Delta \ln(\text{volume}_{t-5}) + \beta_8 \cdot \Delta \ln(\text{volume}_{t-6}) + \beta_9 \cdot (\text{Trend}_t) + \beta_{10} \cdot (d911_t) + \beta_{10} \cdot (\text{REALGDPGR}_t) + \varepsilon_t$

Stage 2. $\Delta \ln(\text{non-SI employment}) = \beta_1 + \beta_2 \cdot \text{predicted}(\Delta \ln(\text{SI employment}_t)) + \beta_3 \cdot (\text{Trend}_t) + \beta_4 \cdot (d911_t) + \beta_5 \cdot (\text{REALGDPGR}_t) + \varepsilon_t$

where SI employment = employment in the NYC securities industry; volume = S&P 500 trading volume; d911 = dummy variable representing the 9/11 terrorist attacks; REALGDPGR = growth in real Gross Domestic Product; ln = natural logarithm; and Δ = first difference. In the table on page 7, the estimates in the first column are derived from the model that includes the macroeconomic control while the second column does not. All estimates included controls for seasonal variation in the form of quarterly dummy variables. An in-depth, technical analysis of the model and thorough discussion of the data and previous literature can be obtained by contacting the author.

⁷ Employment data for the business and services sector is only available from 1975-2002, so for that sector, the model is estimated with fewer observations than the other sectors.

⁸ The services sector includes businesses primarily engaged in providing a wide variety of services. It includes, among others, hotels and other lodging places, and healthcare, legal and other professional

services. Note that the business services sector is a sub-sector of the services sector and that the eating and drinking places sector is a sub-sector of the retail sector. Thus, while adding these results may be double counting, it is useful for illustrative purposes.

⁹ In models that did not include seasonal controls (not reported), the estimated elasticities were for the most part smaller in magnitude and generally not statistically significant. Neither Pollin and Heintz (2003) nor Amihud and Mendelson (2003b) included seasonal controls in their models (IBO (2003) used annual data and thus seasonal controls are unnecessary). In previous versions of this paper, the employment data was based on the new North American Industrial Classification System (NAICS) categories, which are a bit better at identifying particular industries. However, that data is only available back to 1990 and the model produced *significantly* larger estimates, perhaps in part due to the small number of observations. In a second set of sensitivity tests, the sample was broken into pre- and post-1983 periods to test whether the relationship differed before and after the tremendous credit crunch of the 1980-1982 period. The estimates in the later period are larger than the estimates for the whole period, while the estimates for the early period were uniformly smaller and not statistically significant. The total impact on jobs from this later period is slightly larger than the estimates shown in the Table. An in-depth, technical analysis, which contains these sensitivity analyses, can be obtained by contacting the author.

¹⁰ All dollar figures are expressed in \$2003. These figures come from the Covered Wages and Employment (ES202) data set at the NYS Department of Labor.