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The Manufacturing Research Institute of New York State (MRI) is the research, policy, and educational arm of the Manufacturers Alliance of New York, a statewide coalition led by The Manufacturers Association of Central New York (MACNY). The MRI conducts research to increase awareness among the general public, educators, policymakers, and the media about the importance and necessity of manufacturing sustainability to New York State's future economic stability and overall quality of life. The MRI is the first and only research institute for manufacturers solely dedicated to the promotion and advancement of New York State manufacturing. This report was commissioned by the MRI, and prepared by the Nelson A. Rockefeller Institute of Government, the public-policy research arm of the State University of New York, at the University of Albany.



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# Twenty-First-Century Manufacturing: A Foundation of New York's Economy

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# **Executive Summary**

ecades after scholars announced the "post-industrial society," manufacturing remains a key element of the economy in every part of New York State. Upstate, in particular, counts on this sector for a major share of overall income and economic vitality. And manufacturing is most critically important in those communities that have been hit hardest by decades of economic stagnation and decline. Key points in this report include:

- The number of manufacturing jobs statewide, once more than 2 million, fell to fewer than 500,000 in 2009. Historically, losses have been much sharper in New York than in the United States as a whole, but the recent recession has hit the state and the nation equally hard. Based on the broadest measure of economic activity contribution to gross state product New York manufacturing grew by 20 percent, the same rate as the nation's, from 2003 through 2008.
- The most important metric for assessing manufacturing's contribution in the twenty-first century may be the paychecks that workers bring home and spend, largely in their local communities. By this measure, manufacturing remains a foundation of the Empire State's economy, especially in the regions north and west of Albany. Including spinoff jobs, manufacturing supports one in three payroll dollars in much of Upstate New York.
- Based on employment alone, Upstate ranks ahead of 28 states as a manufacturing location. In the Southern Tier and Finger Lakes, industrial employment directly provides close to one in every four dollars of private-sector payrolls. Western New York and Central New York also have relatively high proportions of manufacturing income. Those wages,

The decade ending in 2009 was difficult for American manufacturers generally.

- and the overall "value added" that manufacturers create, support thousands of additional jobs in expanding sectors such as health care, education, and government.
- Yet New York City is the largest single center of manufacturing in the state, with more than 81,000 jobs and \$4.2 billion of payroll in 2009.
- New York ranks sixth among the states in total manufacturing employment within a national economy that boasts the largest manufacturing sector in the world.
- Computers and electronics represent the largest manufacturing subsector in the state with more than 64,000 jobs, \$5.4 billion in total payroll, and average salary of \$84,292. Other key subsectors include fabricated metals, food, machinery, and chemicals.
- Manufacturing plants tend to be small and medium-sized businesses; as of 2009, average employment in the 18,888 establishments in New York was 25 jobs.
- Overall payrolls in the manufacturing sector are large because wages are high at an average \$57,145 statewide, far above positions in most other sectors.
- Manufacturing in New York is a high-value enterprise, with value added per dollar of final shipments 27 percent above the national average. That means products made in New York tend to generate relatively high levels of employee compensation and spinoff economic activity.
- The Empire State's manufacturers spent \$5.1 billion on capital investments in 2008. That represented an increase of 12 percent from the previous year and roughly \$10,000 in long-term investment for each manufacturing job.
- Manufacturing is an especially dynamic sector of the economy. According to one estimate, existing jobs that disappear and new positions that replace them represent a churn rate of nearly one in every five jobs in manufacturing nationwide.

# Manufacturing in New York: Historical Trends

In the days when every factory needed a smokestack, it was easy to see the locus of industrial activity — and of manufacturing employment — in communities throughout New York and the nation. For well over a century, starting with the opening of the Erie Canal and continuing through World War II, the Empire State was the national leader.

"The opening up of the West after 1825 created new markets for manufacturers, and the commercialization of agriculture generated profits sufficient to enable farmers to purchase eastern manufactured goods. The growth of regionally based processing industries in the areas serviced by newly built canals and railroads also

Table 1. Manufacturing Employment, By State  Jobs numbers in thousands, ranked by 2009 total							
State	1999	2009	% Change,	% of US			
0 1:0			1999-2009	Total, 2009			
California	1,829.4	1,280.9	(30.0)	10.8			
Texas	1,062.6	840.0	(20.9)	7.1			
Ohio	1,027.6	629.2	(38.8)	5.3			
Illinois	882.1	577.6	(34.5)	4.9			
Pennsylvania	864.3	573.6	(33.6)	4.9			
New York	771.3	477.1	(38.1)	4.0			
Michigan	898.6	462.4	(48.5)	3.9			
North Carolina	776.5	447.7	(42.3)	3.8			
Indiana	666.2	440.0	(34.0)	3.7			
Wisconsin	594.8	435.6	(26.8)	3.7			
Georgia	550.1	357.0	(35.1)	3.0			
Florida	477.8	323.0	(32.4)	2.7			
Tennessee	499.9	309.7	(38.0)	2.6			
Minnesota	395.4	300.1	(24.1)	2.5			
New Jersey	422.4	267.3	(36.7)	2.3			
Washington	343.4	265.9	(22.6)	2.2			
Massachusetts	400.3	258.6	(35.4)	2.2			
Missouri	373.2	255.7	(31.5)	2.2			
Alabama	357.5	247.8	(30.7)	2.1			
Virginia	366.8	239.0	(34.8)	2.0			
South Carolina	336.1	213.8	(36.4)	1.8			
Kentucky	309.0	213.2	(31.0)	1.8			
Iowa	252.7	203.7	(19.4)	1.7			
Connecticut	240.2	171.8	(28.5)	1.5			
Kansas	204.0	167.6	(17.8)	1.4			
Oregon	224.3	167.3	(25.4)	1.4			
Arkansas	240.7	164.1	(31.8)	1.4			
Arizona	207.4	153.1	(26.2)	1.3			
Louisiana	181.2	142.3	(21.5)	1.2			
Mississippi	232.9	141.2	(39.4)	1.2			
Oklahoma	176.7	129.6	(26.7)	1.1			
Colorado	187.4	129.5	(30.9)	1.1			
Maryland	171.9	118.6	(31.0)	1.0			
Utah	126.0	112.5	(10.7)	1.0			
Nebraska	112.9	93.5	(17.2)	0.8			
New Hampshire	101.2	67.6	(33.2)	0.6			
Idaho	68.9	54.7	(20.6)	0.5			
Maine	80.6	52.5	(34.9)	0.4			
West Virginia	76.9	50.7	(34.1)	0.4			
Rhode Island	72.1	41.7	(42.2)	0.4			
Nevada	41.0	40.2	(2.0)	0.3			
South Dakota	44.2	37.9	(14.3)	0.3			
Vermont	45.3	31.2	(31.1)	0.3			
New Mexico	41.2	30.1	(26.9)	0.3			
Delaware	44.0	27.9	(36.6)	0.2			
North Dakota	22.8	23.6	3.5	0.2			
Montana	22.5	17.4	(22.7)	0.1			
Hawaii	15.9	13.7	(13.8)	0.1			
Alaska	11.8	13.0	10.2	0.1			
Wyoming	10.2	9.2	(9.8)	0.1			
U.S. total	17,462.2	11,821.4	(32.3)	100.0			

Source: Bureau of Labor Statistics.

contributed to the boom in manufacturing. Simultaneously, in New York City, manufacturing output rose as a result of the restructuring of established handicraft industries."<sup>1</sup>

Industrial employment peaked in New York at more than two million during the early 1950s. Nationwide, the broad growth continued for more than two additional decades.

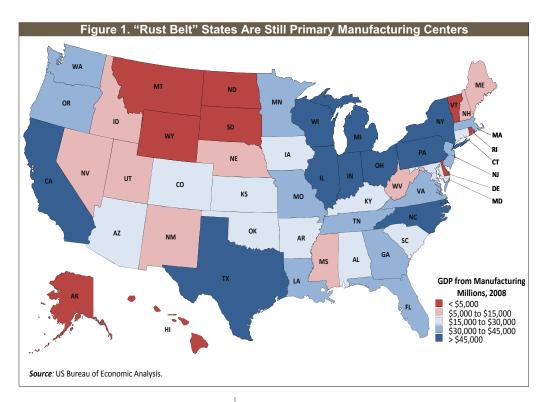
The last half-century brought punishing losses to New York's industrial sector. From 1960 through 2009, three of every four manufacturing jobs disappeared — compared to 29 percent nationwide.<sup>2</sup> While some jobs disappeared due to productivity gains, most manufacturing jobs lost by Northeastern states from 1970 to 1990 moved elsewhere in the United States, according to a Brookings Institution study.<sup>3</sup>

The decade ending in 2009 was difficult for American manufacturers generally. As shown in Table 1, total manufacturing employment across the country declined by just less than a third, or 32 percent. Only two states with small economies, North Dakota and Alaska, posted job gains in the sector. Most of the largest states posted losses of 30 percent or more.

The pace of loss in New York during the period was significant, and modestly higher than the national average, at 38 percent. Over the decade, only five states lost a larger proportion of existing manufacturing jobs than the Empire State. Yet during 2009, the most recent year for which complete data are available, New York fared slightly better than the national average with a manufacturing employment loss of 10 percent, compared to 12 percent nationally. During the first six months of 2010, seasonally adjusted data show manufacturing employment rising slightly across the nation, and holding steady in New York.

# New York Remains a Leader in Manufacturing

Employment losses may make it tempting to conclude that manufacturing no longer matters much. Yet there's good news from the sector, too. Whether measured by employment or by the value of economic activity, New York remains a national leader in manufacturing. The state ranked sixth in overall manufacturing employment in 2009, according to U.S. Bureau of Labor Statistics data. New York now has more manufacturing jobs than Michigan, where sharp declines in the auto industry and other sectors produced the largest percentage drop of any state



from 1999 to 2009. Table 1 shows manufacturing employment in each state in 1999 and 2009, and the change over the period.

Maintaining a leading position in American manufacturing makes New York one of the bigger fish in a very large pond. The overall U.S. manufacturing sector is the largest in the world - still far ahead of traditional competitors such as Japan, Germany, and the United Kingdom. China is now the second-largest industrial

power in the world and closing in on the United States, whose more than century-long leadership is likely to be challenged in the years ahead.

The U.S. Bureau of Labor Statistics classifies manufacturing establishments as those engaged in "the mechanical, physical, or chemical transformation of materials, substances, or components into new products." It adds: "Establishments in the Manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment. However, establishments that transform materials or substances into new products by hand or in the worker's home and those engaged in selling to the general public products made on the same premises from which they are sold, such as bakeries, candy stores, and custom tailors, may also be included in this sector. Manufacturing establishments may process materials or may contract with other establishments to process their materials for them."

The U.S. Bureau of Economic Analysis estimates the value of economic activity both for the overall economy, and for sectors including manufacturing. While New York and other industrialized states in the Northeast and Midwest have suffered disproportionate employment losses in recent decades, those regions remain home to seven of the ten most productive manufacturing states in the nation, according to BEA. Manufacturing's share of overall economic activity in the Empire State — some 6 percent of the total — is only about half the national average of 11.6 percent. Still, the overall value of manufacturing in New York, as measured by the sector's contribution to gross state product, far outpaces the majority of states, as shown in Figure 1.

The overall value of manufacturing in New York far outpaces the majority of states.

The computerselectronics sector provides the largest total payrolls, nearly \$5.5 billion; and the highest average salary at \$84,292.

## **Key Manufacturing Sectors in New York**

Although commonly envisioned as one sector, manufacturing includes a broad swath of activity that adds value to the economy. There are the businesses that, in one form or another, go back centuries: cutting and stitching of apparel, printing, or fabrication of metal products. Then there are the industries that are only a few decades old, such as computers and certain specialized machinery.

Table 2 shows the largest subsectors of manufacturing in New York State in 2009, as measured by employment counts. A high-tech sector, computers and electronics, leads the way. The industry includes manufacturing of semiconductors and other components, magnetic and optical media, navigational and control instruments, and communications equipment (from telephones to wireless and broadcast equipment) — as well as computers, related storage devices, and terminals. The computers-electronics sector provides the largest total payrolls, nearly \$5.5 billion; the highest average salary at \$84,292; and one of the highest increases in average salaries over the last decade.

Other sectors that include especially significant numbers of jobs, and large numbers of establishments, include production of fabricated metal products, foods, machinery, and chemicals. Sectors that declined by especially large proportions over the past decade include transportation equipment (primarily important in sections of Upstate) and apparel (centered in New York City). Both sectors, however, remain major employers in the Empire State with more than 20,000 jobs each statewide.

The various manufacturing subsectors contribute to the state's economic vitality in different ways. Besides offering especially high wages and salaries, computers and electronics is among the most important U.S. export industries, thus bringing wealth from around the world into the national economy and New York in

Table 2. Key Manufacturing Sectors in New York State (Ranked by 2009 Employees)										
		Employees			hments	Employees per	Wages (\$ millions)		Average salary	
Sector	2000	2009	% change, 2000-09	2009	% change, 2000-09	establishment, 2009	2009	% change, 2000-09	2009	% change, 2000-09
Total Manufacturing	745,585	474,263	(36.4)	18,888	(20.7)	25.1	27,102	(15.3)	57,145	33.2
Computer & electronic products	86,885	64,899	(25.3)	1,057	(5.3)	61.4	5,470	4.6	84,292	40.0
Fabricated metal products	69,268	49,660	(28.3)	2,431	(11.3)	20.4	2,408	(6.9)	48,483	29.8
Food	54,966	48,306	(12.1)	2,078	(2.7)	23.2	1,915	8.8	39,634	23.8
Machinery	68,893	44,884	(34.8)	1,157	(20.4)	38.8	2,835	(16.5)	63,172	28.1
Chemicals	67,104	43,187	(35.6)	654	(4.2)	66.0	3,077	(14.0)	71,244	33.6
Miscellaneous	54,933	35,042	(36.2)	2,393	(12.9)	14.6	1,734	(11.6)	49,489	38.5
Printing & related support activities	43,793	26,482	(39.5)	2,071	(24.4)	12.8	1,216	(32.1)	45,902	12.2
Transportation equipment	45,078	24,773	(45.0)	426	(11.4)	58.2	1,579	(38.7)	63,758	11.5
Apparel	65,182	21,327	(67.3)	1,557	(56.9)	13.7	1,076	(40.6)	50,437	81.4
Plastics & rubber products	33,124	20,255	(38.9)	518	(23.3)	39.1	901	(18.8)	44,480	32.9
Paper	27,353	16,922	(38.1)	335	(25.7)	50.5	885	(23.6)	52,326	23.4
Nonmetallic mineral products	22,635	15,516	(31.5)	703	(5.8)	22.1	788	(14.3)	50,804	25.0
Furniture & related products	23,227	13,857	(40.3)	1,152	(11.5)	12.0	546	(21.6)	39,419	31.4
Elec. equipment, appliances & components	22,368	13,481	(39.7)	368	(11.3)	36.6	753	(13.1)	55,836	44.3
Primary metals	16,664	10,277	(38.3)	211	(1.4)	48.7	591	(22.9)	57,480	25.0
Wood products	11,078	7,071	(36.2)	546	(15.0)	13.0	256	(21.7)	36,211	22.7
Beverage & tobacco products	7,039	6,232	(11.5)	245	49.4	25.4	469	19.9	75,212	35.4
Textile product mills	7,763	4,455	(42.6)	392	(11.1)	11.4	195	(11.8)	43,731	53.7
Textile mills	11,546	3,982	(65.5)	328	(53.7)	12.1	213	(64.0)	53,452	4.3
Petroleum & coal products	2,972	1,901	(36.0)	131	(12.7)	14.5	123	(16.8)	64,585	30.0
Leather & allied products	3,714	1,754	(52.8)	137	(30.5)	12.8	72	(31.0)	41,203	46.1
Source: NYS Department of Labor.										

The largest single center of manufacturing in the state is New York City.

particular. Sectors that tend to be based in relatively smaller establishments — such as printing and metal fabrication — may provide individual entrepreneurs a particularly promising route to creating a profitable small business. Food production is a significant employer throughout the entire state, with more than 1,000 jobs in each of the 10 regions analyzed for this report.

New York State was home to 18,888 manufacturing establishments in 2009, according to the state Labor Department. The average plant employs 25. While such figures vary from sector to sector, the great majority of manufacturing plants are relatively small employers. (Such facilities may, however, be installations of larger corporations.) The typical furniture, leather, or textile plant employs a dozen or so individuals, while an average computer or chemical factory provides 60 or more jobs, as shown in Table 2.

# Importance of Manufacturing, by Region

The largest single center of manufacturing in the state, based on sheer numbers, is *New York City*. Even after losing more than half its manufacturing employment over the past decade (with the apparel industry a key contributor to those losses), the Big Apple remained home to more than 81,000 industrial jobs in 2009. *Long Island* was not far behind, with over 74,000 manufacturing jobs and a comparatively smaller decline over the decade, as shown in Table 3.1.

Manufacturing plays a big role in the *Hudson Valley* economy, as well. The average salary for the sector there is the highest in the state, at more than \$78,000. And the region is the only area of the state to show a significant gain in overall wages over the past decade.

Still, as a share of the overall employment and wage base, manufacturing is clearly most important through the stretch of Upstate New York that lies north of the Catskills and west of the Hudson River. In the *Mohawk Valley, the North Country, Central New York, Southern Tier, Finger Lakes*, and *Western New York*, the sector provides disproportionately high levels of jobs and payroll. Upstate's total manufacturing employment of just under 300,000 would rank the region ahead of 28 entire states.

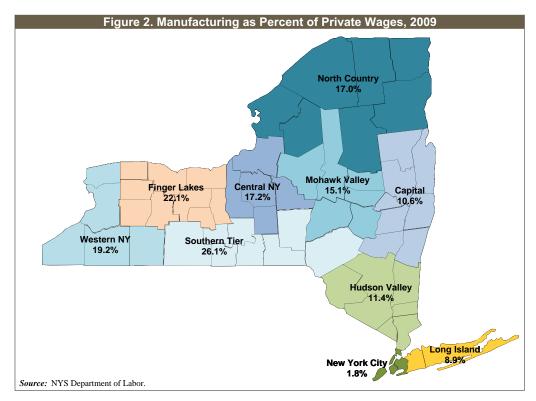
The combination of a relatively high proportion of overall employment, and high wages, makes manufacturing an especially important element of the regional economy in the Southern Tier, the Finger Lakes, and Western New York. The sector generates high proportions of overall wages in Central New York, the North Country, and Mohawk Valley as well, as shown in Figure 2.

In every region of the state, manufacturing payrolls support thousands of additional jobs. While specific estimates vary, economists generally agree that manufacturing jobs generate more spin-off employment than positions in other sectors where wages are lower and incomes are based on taxpayer support or local trade, rather than exports to other states or nations. One common estimate holds that every two manufacturing jobs pay for one additional job in transportation and warehousing, retail or wholesale trade, education, health services, government, or other sectors.<sup>4</sup>

Table 3.1. Employees and Establishments								
	Em	ployees		Manufacturing as %	Establish	nments		
Labor Market Area	2000	% change		of private jobs, 2009	2009	% change, 2000-09		
Capital	38,751	28,723	(25.9)	7.6	888	(7.2)		
Central	50,899	33,278	(34.6)	12.1	754	(13.9)		
Finger Lakes	110,176	69,760	(36.7)	15.8	1,579	(7.7)		
Hudson Valley	65,192	51,150	(21.5)	7.3	1,854	(12.5)		
Long Island	103,202	74,297	(28.0)	7.5	3,459	(15.6)		
Mohawk Valley	28,406	17,820	(37.3)	12.3	541	(20.9)		
New York City	172,266	81,493	(52.7)	2.7	6,497	(34.5)		
North Country	17,808	11,686	(34.4)	11.0	340	(13.5)		
Southern Tier	52,154	38,132	(26.9)	18.2	647	(13.3)		
Western New York	104,686	66,570	(36.4)	13.3	1,755	(11.0)		
NYS Total	745,585	474,263	(36.4)	6.9	18,888	(20.7)		

Source: NYS Department of Labor.

Table 3.2. Wages and Salaries									
	Wages	(\$ millions)		Manufacturing as %	Average salary				
Labor Market Area	2000	2009	% change, 2000-09	of private wages, 2009	2009	% change, 2000-09			
Capital	1,686	1,660	(1.5)	10.6	57,803	32.9			
Central	2,220	1,887	(15.0)	17.2	56,700	30.0			
Finger Lakes	5,194	3,927	(24.4)	22.1	56,290	19.4			
Hudson Valley	3,711	4,000	7.8	11.4	78,196	37.4			
Long Island	4,579	4,292	(6.3)	8.9	57,766	30.2			
Mohawk Valley	876	722	(17.6)	15.1	40,518	31.3			
New York City	6,152	4,197	(31.8)	1.8	51,498	44.2			
North Country	688	588	(14.6)	17.0	50,282	30.2			
Southern Tier	2,163	2,168	0.2	26.1	56,848	37.1			
Western New York	4,627	3,528	(23.7)	19.2	53,004	19.9			
NYS Total	31,995	27,102	(15.3)	6.7	57,145	33.2			
Source: NYS Departmen	Source: NYS Department of Labor.								



Based on such estimates, manufacturing payrolls support one in every three wage and salary dollars throughout much of Upstate New York.

Table 4 shows wages and average salaries for manufacturing jobs in each of the state's 62 counties, as of 2009. In 11 counties mostly rural areas in the state's western and Southern Tier regions - such positions directly provide more than 30 percent of all payroll dollars. In dozens of small Upstate communities where population and jobs have drained away for decades, the local factory provides the only significant connection to the global economy and a bright future.

Manufacturing's contribution to local economic vitality is most crucial in the regions of New York that are most in need of a shot in the arm. Western New York, for example, saw its population fall by 4.6 percent from 1998 through 2008, according to Census Bureau estimates. The region has lost representation in both Congress and the state Legislature due to longer-term population losses. The area counts on industrial jobs for nearly one

				Total Private		-	
County	Manufacturin	<u> </u>			wages (\$ mill	•	Manufacturing as % of
	2000	2009	% change	2000	2009	% change	private wages, 2009
Allogany	414	396 106	(4.5)	5,461	7,000 302	28.2	5.7
Allegany Bronx	102 344	106 295	4.1 (14.4)	245 5,952	8,804	23.0 47.9	35.2 3.3
Broome	734	604	(17.8)	2,341	2,586	10.5	23.4
Cattaraugus	208	206	(0.9)	586	670	14.3	30.7
Cayuga	145	150	3.5	510	629	23.2	23.9
Chautauqua	470	439	(6.7)	1,134	1,292	14.0	33.9
Chemung	292	279	(4.6)	909	1,065	17.2	26.2
Chenango	151	143	(5.7)	334	398	19.2	35.9
Clinton	201	213	5.9	655	881	34.4	24.1
Columbia	81	56	(31.1)	434	518	19.4	10.8
Cortland	120	117	(2.8)	354	434	22.7	26.9
Delaware	149	189	26.4	308	401	30.4	47.1
Dutchess	647	1,156	78.5	3,199	4,098	28.1	28.2
Erie	2,951	2,319	(21.4)	11,766	14,289	21.4	16.2
Essex	49	47	(4.3)	244	306	25.6	15.3
Franklin	25	13	(45.7)	237	315	32.6	4.2
Fulton	95	61	(35.6)	324	422	30.1	14.5
Genesee	124	126	1.5	429	540	25.8	23.3
Greene	33	51	52.5	207	289	39.6	17.6
Hamilton	1	1	77.6	18	23	28.3	6.2
Herkimer	122	97	(20.7)	316	340	7.8	28.4
Jefferson	131	102	(22.1)	675	973	44.1	10.5
Kings	1,158	749	(35.3)	11,933	16,782	40.6	4.5
Lewis	50	50	(0.9)	100	122	21.9	40.8
Livingston	78	74	(4.5)	276	378	37.3	19.7
Madison	95	93	(2.4)	422	536	27.1	17.4
Monroe	4,203	2,922	(30.5)	12,676	13,823	9.1	21.1
Montgomery	122	123	0.1	372	507	36.3	24.2
Nassau	1,702	1,287	(24.4)	20,154	24,596	22.0	5.2
New York	3,108	2,013	(35.2)	152,370	183,933	20.7	1.1
Niagara Oneida	895 470	459 391	(48.8) (16.8)	1,953 2,251	1,810	(7.3) 20.7	25.3 14.4
Onondaga	1,626	1,367	(15.9)	6,977	2,718 8,507	21.9	16.1
Ontario	291	274	(6.0)	1,025	1,377	34.4	19.9
Orange	378	319	(15.7)	2,582	3,580	38.7	8.9
Orleans	56	84	50.3	158	257	63.1	32.6
Oswego	233	159	(31.7)	709	853	20.3	18.7
Otsego	46	43	(6.9)	441	638	44.6	6.7
Putnam	68	92	35.7	572	857	49.9	10.8
Queens	1,485	1,084	(27.0)	15,394	19,868	29.1	5.5
Rensselaer	174	132	(24.5)	1,226	1,594	30.1	8.3
Richmond	58	56	(3.9)	2,519	3,326	32.0	1.7
Rockland	584	783	34.0	3,122	4,229	35.5	18.5
Saratoga	317	289	(8.8)	1,490	2,361	58.5	12.3
Schenectady	393	437	11.3	1,927	2,544	32.0	17.2
Schoharie	21	8	(63.0)	140	172	23.0	4.5
Schuyler	23	25	6.8	70	108	54.2	22.8
Seneca	85	87	1.9	196	254	29.5	34.2
St. Lawrence	231	161	(30.3)	703	834	18.6	19.3
Steuben	345	338	(1.8)	1,618	1,323	(18.2)	25.6
Suffolk	2,877	3,005	4.4	17,553	23,791	35.5	12.6
Sullivan	21	36	71.8	423	593	40.1	6.0
Tioga	298	407	36.4	405	565	39.3	72.1
Tompkins	170	184	8.1	1,280	1,847	44.2	9.9
Ulster	227	154	(32.2)	1,176	1,415	20.3	10.9
Warren	138	179	29.6	781	1,087	39.1	16.4
Washington	135	121	(10.1)	284	334	17.5	36.3
Wayne	255	257 1 461	(18.2)	616	746	21.0	34.5
Westchester	1,786	1,461	(18.2)	16,148	20,353	26.0	7.2
Wyoming	73 30	70 34	(4.0)	212 106	276 151	30.2 43.0	25.2 22.3
Yates NYS Total	31,995	27,102	13.9 (15.3)	326,950	405,754	24.1	6.7
Source: NYS Depa		21,102	(13.3)	320,330	403,734	24.1	0.7

Manufacturing is an especially dynamic sector, with some jobs disappearing and others being created each year.

in five payroll dollars, substantially above the statewide average. The Southern Tier, Central New York, Mohawk Valley, and Finger Lakes regions all lost population over the decade; all depend heavily on manufacturing wages to keep their local economies moving.

One county in particular — Tioga, home to some 51,000 New Yorkers just north of the Pennsylvania state line west of Binghamton — provides a striking example of manufacturing's importance. In 2009, jobs in the sector generated \$407 million in wages, representing fully 72 percent of all private-sector wages in the county. The average salary in the sector: \$80,438, according to the New York State Labor Department.

Some 150 miles to the east, Dutchess County is another illustration of the centrality of manufacturing. The sector generated more than \$1.1 billion of payroll in 2009 — a 78 percent increase from 2000, and more than 28 percent of all private-sector wages. The average annual salary for manufacturing jobs in Dutchess County, where computer and electronic products dominate the sector: \$98,753.

Table 5 shows the scope of 17 manufacturing subsectors — those producing more than 5,000 jobs statewide — in each region of the state as of 2009. Metal fabrication remains especially important in Western New York and the Mohawk Valley; chemicals make a disproportionate contribution to the Long Island economy; papermaking continues to fuel the North Country economy; food production employs more than 14,000 in New York City.

Across the nation and in New York, manufacturing is an especially dynamic sector of the economy. One in-depth analysis of U.S. employment shifts during the 1970s and 1980s found that, over a typical 12-month period, "about one in ten manufacturing jobs disappear nationwide, and a comparable number of new manufacturing jobs open up at different locations." That combination of jobs created and jobs destroyed in any given year represents a churn rate of nearly one in every five positions in manufacturing.<sup>5</sup>

While the specific patterns of such churning can be expected to change over time, it remains true — in New York as elsewhere

Sector	Capital	Central	Finger	Hudson	Long	Mohawk	New York	North	Southern	Western	New York
Manufacturing	28,723	33,278	Lakes 69,760	Valley 51,150	Island 74,297	Valley 17,820	City 81,493	Country 11,686	Tier 38,132	New York 66,570	State 474,263
Computer & electronic products	1,265	5,507	8,950	14,223	14,520	1,475	2,903	214	12,295	3,388	64,899
Fabricated metal products	2,327	3,431	7,912	4,608	7,922	2,604	6,470	616	2,775	10,922	49,660
Food	1,926	1,784	5,561	4,816	5,872	2,222	14,021	1,156	2,493	8,308	48,306
Machinery	4,372	4,197	13,385	2,079	5,192	1,208	1,824	194	3,911	8,348	44,884
Chemical	3,100	1,155	8,656	7,779	10,425	235	3,341	1,622	1,685	5,045	43,187
Miscellaneous	3,008	2,332	4,774	3,395	5,482	687	9,599	803	1,074	3,764	35,042
Printing & related activities	1,878	1,189	2,888	1,778	5,271	1,047	7,514	470	1,679	2,746	26,482
Transportation equipment	427	2,216	3,218	961	4,699	1,353	1,649	837	4,639	4,630	24,773
Apparel	113	NA	835	447	838	171	17,942	93	20	792	21,327
Plastics & rubber products	1,204	1,590	5,029	1,879	2,593	726	1,619	638	488	4,461	20,255
Paper	2,955	1,745	1,615	1,351	2,161	504	1,995	2,211	503	1,867	16,922
Nonmetallic mineral products	2,040	1,013	1,554	1,434	1,304	378	2,019	493	2,259	2,987	15,516
Furniture & related products	1,526	1,126	709	1,127	2,634	430	3,499	79	956	1,687	13,857
Electrical equipment & appliances	364	1,341	1,576	1,552	2,116	384	1,699	461	1,341	2,582	13,481
Primary metals	164	2,542	431	966	201	2,041	355	1,076	NA	2,094	10,277
Wood products	709	652	491	624	774	657	826	335	885	1,109	7,071
Beverage & tobacco products	519	816	1,420	825	372	231	802	101	327	791	6,232

— that even long-term declines in employment numbers include numerous periods of growth. In New York's Southern Tier, for example, manufacturers added 1,500 jobs from March 2005 through March 2008, according to the state Labor Department. The job count has fallen since then, but the data illustrate that chronic decline is not the only possible path for manufacturing employment.

#### **The Production Function**

Not all manufacturing jobs are on the factory floor — the sector also includes executives, scientists engaged in basic research, business managers, support staff and other positions. But the majority of employees in manufacturing are classified as production workers.

These jobs provide some of the best opportunities for workers without advanced degrees to earn high wages and good benefits — one of the hallmarks of manufacturing. Two-thirds of overall manufacturing jobs in New York are classified as production positions, a proportion slightly lower than the national average, as shown in Table 6.

### **Investing for the Future**

U.S. manufacturing is a capital-intensive enterprise. Even as overall manufacturing employment has declined sharply both in New York and across the nation, expenditures on machinery and physical plant required for production create jobs in supplier industries and other spinoff impacts. Such investments are essential to future manufacturing employment — the global marketplace for high quality at low cost makes the lack of investment in cutting-edge production capacity a likely step to failure.

In 2008, manufacturers spent \$5.1 billion on capital investments in New York, an increase of 12 percent from the previous year. That figure represented roughly \$10,000 in capital expenditures for each manufacturing job, according to the Census Bureau's Annual Survey of Manufactures. For every dollar manufacturers spent on payroll during the year, capital costs represented another 21 cents of investment in the Empire State.

Table 7 shows capital expenditures, in New York and nation-wide, by manufacturing sector. Sectors with especially high levels of investment in the Empire State include computers and electronics; chemicals; petroleum and coal products; transportation equipment; and food production. New York's manufacturing sector represented 3 to 4 percent of the nation's total in 2008, based on indicators including total shipments, value added by manufacturers, and employment. Overall capital investment in recent years has been at the low end of that range, which may present some reason for concern regarding the mid- to long-term future.

#### A High-Value Enterprise — Especially in New York

As indicated by wages that are typically better than those in most other sectors, manufacturing is a high-value sector of the economy. That's especially the case in New York.

Production jobs provide good opportunities for workers without advanced degrees to earn high wages and good benefits.

Т	able 6. Prod	uction Wor	kers, By St	ate
Ctata	1998	2008	% Change,	% of Manufacturing
State	1998	2008	1998-2008	Total, 2008
United States	12,189,518	8,872,903	(27.2)	69.4
Alabama	271,053	203,280	(25.0)	76.4
Alaska	9,999	10,901	9.0	83.2
Arizona	123,669	99,004	(19.9)	60.5
Arkansas	190,659	137,867	(27.7)	79.4
California	1,201,146	861,764	(28.3)	63.1
Colorado	113,066	91,953	(18.7)	67.3
Connecticut	153,236	107,774	(29.7)	60.8
Delaware	31,777	23,014	(27.6)	70.4
District of Colum.	1,944	1,153	(40.7)	56.6
Florida	287,921	208,212	(27.7)	65.4
Georgia	408,466	292,706	(28.3)	76.0
Hawaii	10,355	8,301	(19.8)	62.4
Idaho	50,734	44,771	(11.8)	75.0
Illinois	629,620	437,373	(30.5)	68.3
Indiana	479,093	363,104	(24.2)	73.6
Iowa	187,409	160,460	(14.4)	72.9
Kansas	148,306	128,469	(13.4)	70.4
Kentucky	225,236	179,707	(20.2)	76.8
Louisiana	123,535	106,485	(13.8)	73.9
Maine	61,479	41,760	(32.1)	71.6
Maryland	110,547	75,388	(31.8)	62.0
Massachusetts	254,848	163,406	(35.9)	59.6
Michigan	628,594	390,372	(37.9)	71.7
Minnesota	262,560	218,403	(16.8)	65.7
Mississippi	188,313	121,048	(35.7)	77.3
Missouri	263,833	199,706	(24.3)	72.9
Montana	15,682	12,461	(20.5)	67.3
Nebraska	86,532	74,527	(13.9)	77.1
Nevada	27,111	33,121	22.2	66.7
New Hampshire	69,380	48,738	(29.8)	61.6
New Jersey	267,326	182,515	(31.7)	62.7
New Mexico	28,924	22,624	(21.8)	68.6
New York	537,681	334,181	(37.8)	66.0
North Carolina	598,864	354,463	(40.8)	75.3
North Dakota	17,075	19,330	13.2	75.1
Ohio	740,861	525,891	(29.0)	71.8
Oklahoma	123,289	105,816	(14.2)	73.5
Oregon	159,912	123,067	(23.0)	70.2
Pennsylvania	601,572	442,768	(26.4)	70.5
Rhode Island	54,331	29,840	(45.1)	62.8
South Carolina	264,193	174,611	(33.9)	75.6
South Dakota	33,348	31,359	(6.0)	76.1
Tennessee	373,265	253,490	(32.1)	73.0
Texas	680,792	579,211	(14.9)	67.9
Utah	85,322	77,766	(8.9)	66.5
Vermont	31,420	21,831	(30.5)	64.1
Virginia	269,735	186,438	(30.9)	70.2
Washington	218,642	170,431	(22.1)	64.2
West Virginia	56,445	43,142	(23.6)	74.9
Wisconsin	423,725	340,470	(19.6)	71.6
Wyoming	6,693	8,431	26.0	75.6
Source: US Census	Bureau, Annual	Survey of Mai	nufactures.	

In its annual surveys of U.S. manufacturing activity, the Census Bureau measures a variety of indicators including total value of shipments, and value added. The former is self-explanatory — the market value of all goods sent to customers, including other units of a common corporate parent. Calculation of "value added" starts with the total value of shipments and subtracts the cost of materials, supplies, fuels, purchased electricity, and contract work (with some additional adjustments). In other words, "value added" is wealth that manufacturers' workers and investors have created and added to the economy.

Manufacturers in New York reported total shipments of \$165 billion, with \$87 billion of that total representing value added. The work done at manufacturing facilities in the Empire State, then, created an average 52.7 percent of the total value of shipments. Costs for materials represented the second-largest contributor to total value of shipments, at \$78 billion, while payroll costs were \$24 billion.

Nationwide, manufacturers shipped \$5.5 billion worth of goods in 2008. Value added by manufacturers represented just less than \$2.3 billion, or 41.5 percent, of that total. The value-added contribution of manufacturers in the Empire State, then, was an average 27 percent higher than that of their counterparts nationwide.

"Value added" is the measure that explains why manufacturing computers and electronic products, for example, is more beneficial to the local and regional economy than, say, production of pet food. If a company invests \$1 million in computer production, and the same amount in making food for cats and dogs, a higher level of innovation and skills will go into the former than the latter. The additive work carried out by manufacturing firms creates value

which the marketplace will reward. Such newly created wealth is distributed broadly, including in employee paychecks. The higher proportion of value added in New York manufacturing, compared to most other states, helps explain why payrolls represented 14.6 percent of the total value of manufacturing shipments here in 2008, compared to the nationwide average of 11 percent.

Table 7. Manufacturing Capital Ex	penditures,	2008 (\$ milli	ions)				
Manufacturing Sector	NY	US	NY share of US				
Computer & electronic products	872	23,176	3.8%				
Chemicals	862	21,508	4.0%				
Fabricated metal products	588	11,310	5.2%				
Food	513	15,649	3.3%				
Machinery	326	9,746	3.3%				
Printing & related support activities	302	4,155	7.3%				
Transportation equipment	226	16,574	1.4%				
Miscellaneous	224	4,618	4.9%				
Paper	215	6,268	3.4%				
Plastics & rubber products	209	7,957	2.6%				
Nonmetallic mineral products	185	5,965	3.1%				
Primary metals	164	9,976	1.6%				
Beverage & tobacco products	115	3,862	3.0%				
Elec. equipment, appliances & components	105	3,142	3.4%				
Petroleum & coal products	56	19,019	0.3%				
Furniture & related products	52	1,237	4.2%				
Wood products	47	2,518	1.9%				
Apparel	31	227	13.7%				
Textile product mills	17	625	2.8%				
Textile mills	15	884	1.6%				
Leather & allied products	7	89	8.1%				
Total Manufacturing	5,132.7	168,505.2	3.0%				
Source: US Census Bureau, Annual Survey of Manufactures.							

#### Conclusion

Despite reduced employment counts, manufacturing remains a foundation of New York's economy. Communities across Upstate are especially dependent on local factories, often for more than 25 percent of all private-sector payrolls. New York's manufacturing sector is not as large proportionally as those in most other states yet its high rate of value added in production and high-paid jobs make it possible for the state to retain its position as a national industrial leader.

More than ever, manufacturers are driven by exports, and count on markets far from home to survive and thrive. That leaves

American companies subject to the influence of foreign currency exchange rates, international trade and taxation rules, and other factors that are difficult or impossible for individual companies or the state as a whole to influence. At the same time, manufacturing in the twenty-first century is predominantly a high-tech sector — not only in obvious areas such as computer production but in much older industries as well — and thus one where change comes rapidly, continuously and dramatically.

In such a marketplace, survival and growth for New York manufacturers will depend on innovation and adaptation — continually finding new ways to improve products and reduce costs. For the state itself, creating and maintaining an environment conducive to solving such challenges may be the best way to promote a strong manufacturing sector for decades to come.

#### **Endnotes**

- 1 Milton M. Klein, ed., *The Empire State: A History of New York* (Ithaca, NY: Cornell University Press, 2001).
- 2 This report primarily uses data from the NYS Department of Labor. In addition, we use data from the following sources for state-by-state and national analysis: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, and U.S. Census Bureau.
- 3 Robert W. Crandall, Manufacturing on the Move (Washington, DC: Brookings Institution Press, June 1993).
- The Manufacturing Institute, *The Facts About Modern Manufacturing 8th Edition* (Washington, DC: The Manufacturing Institute, 2009), 10 (citing data from U.S. Bureau of Economic Analysis).
- 5 Steven J. Davis, John C. Haltiwanger, and Scott Schuh, *Job Creation and Destruction* (Cambridge, MA: The MIT Press, 1998).