How Workforce Development in Target Industries Can Put NYC Ahead

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NYC EDC

Agenda

- The situation: How NYC's economy has evolved in the 21st century
- The opportunity: Occupational overview of upcoming sectors
- The advantage: What NYC offers relative to other labor markets
- The impact: Using RIMS and REMI to estimate the benefits to NYC

Definitions

- An opportunity occupation is defined as Standard Occupational Classification (SOC) code for which the median annual wage is over $50,000 and for which the typical entry level education requirement is below a Bachelor's degree.
- Life Sciences is defined as the following aggregation of North American Industry Classification System (NAICS) codes: 3254 Pharmaceutical and Medicine Manufacturing; 3391 Medical Equipment and Supplies Manufacturing; 54171 Research and Development in the Physical, Engineering, and Life Sciences; and 6215 Medical and Diagnostic Laboratories.
- Tech is defined as the following aggregation of NAICS codes: 3341 Computer and Peripheral Equipment Manufacturing; 3342 Communications Equipment Manufacturing; 3344 Semiconductor and Other Electronic Component Manufacturing; 3345 Navigational, Measuring, and Control Instruments Manufacturing; 3364 Aerospace Product and Parts Manufacturing; 4541 Electronic Shopping and Mail Houses; 5112 Software Publishers; 517 Telecommunications; 5182 Data Processing, Hosting, and Related Services; 5191 Other Information Services; 5415 Computer Systems Design and Related Services; and 5417 Scientific Research and Development Services.

NYC Employment has changed since 2000

- The 21st century has seen the emergence of several new industry sectors, as legacy industries in the city diminished.
- Despite being the second largest industry sector by employment in 2000, NAICS 52 Finance and Insurance was one of three sectors with lower employment in 2019, diminishing by 5.7% over that time period.
- 31-33 Manufacturing, 42 Wholesale Trade, and 51 Information also saw their share of total NYC private employment – despite rising employment in Information –decrease from 2000 to 2019, while other sectors grew in importance.
- In 2021, following the COVID-19 pandemic, NYC private employment is dominated by 62 Health Care and Social Assistance and 54 Professional, Scientific, and Technical Services, both of which account for about a third of the total.

Source(s): Employment figures from QCEW.

Life Sciences and Tech grew faster than most

- Since 2010, Life Sciences and Tech have both grown rapidly.
  - Tech (+84%) and Life Sciences (+52%) especially have risen faster than any other 2-digit NAICS sector with more than 100,000 employees.
  - In addition, job postings in these sectors rose noticeably.

	Life Sciences	Tech	NYC Private
Employment	18,363	211,044	3,501,799
10-21 Employment Growth	+52%	+84%	+15%
10-21 Annual Employment Growth	+3.9%	+5.7%	+1.3%
% of Private Employment	0.5%	6.0%	100%
Average Annual Wage (2021 $)	$140,529	$208,939	$116,450
Gross City Product ($B)	$5.0	$143.7	$1,090.0
10-21 GCP Growth	+93%	+271%	+53%

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Source(s): Employment and wage figures from QCEW. GCP figures from Moody's.

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Life Sciences Sector Overview

- Although a fast-growing sector, the highly specialized nature of Life Sciences jobs suggests the sector doesn't offer as many opportunities for workers without Bachelor's degrees in this field as other sectors and doesn't lend itself well for limited-scope workforce development programs.
- As the sector grows, however, the potential for increased reliance on less-specialized support occupations exists, which could make such programs more valuable to an expanding Life Sciences cluster around NYC.
  - We observe a similar trend in Health Care and Social Assistance, where Home Health and Personal Care Aides' share of total industry job rose from about 21% in 2010 to over 38% in 2021.
  - Whether such support occupations would have a median annual wage above $50,000 remains a question, however.

NYC/EDC Source(s): LightCast

Most Common Life Sciences Occupations

SOC Code	Occupation	Share of Sector	Median Annual Wage (2022 $)	Typical Entry Level Education Requirement
29-2018	Clinical Laboratory Technologists and Technicians	42.2%	$79,230	Bachelor's degree
19-1042	Medical Scientists, Except Epidemiologists	14.8%	$82,430	Doctoral or professional degree
19-4099	Life, Physical, and Social Science Technicians, All Other	13.1%	$64,270	Associate's degree
19-4021	Biological Technicians	7.1%	$50,660	Bachelor's degree
11-9121	Natural Sciences Managers	5.9%	$157,530	Bachelor's degree
19-1029	Biological Scientists, All Other	4.6%	$105,330	Bachelor's degree
19-2031	Chemists	4.3%	$82,210	Bachelor's degree
19-4031	Chemical Technicians	2.2%	$61,330	Associate's degree

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Source(s): LightCast. Employment based on occupations, not industry. Wages and Education Requirements from NYSDOL.

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31-9097	Phlebotomists	5.2%	$50,650	Postsecondary non-degree award
19-1042	Medical Scientists, except Epidemiologists	3.6%	$82,430	Doctoral or professional degree
15-1252	Software Developers	3.1%	$120,730*	Bachelor's degree
11-1021	General and Operations Managers	2.9%	$161,960	Bachelor's degree
43-5021	Couriers and Messengers	2.6%	$38,950	High school diploma
29-2034	Radiologic Technologists and Technicians	2.3%	$81,360	Associate's degree
51-9081	Dental Laboratory Technicians	2.2%	$63,670	High school diploma

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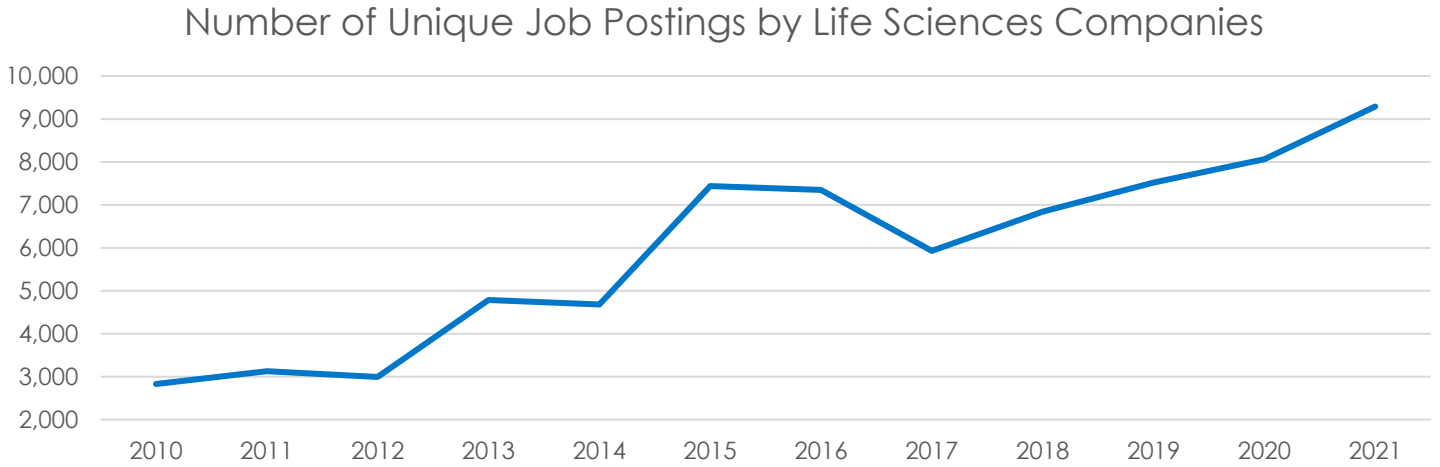
Source(s): LightCast. Employment based on industry, not occupations. Wages and Education Requirements from NYSDOL.
* Information at the national level.

Hiring in Life Sciences has continuously increased

- There were roughly 2,800 unique job postings by Life Sciences companies in 2010. In 2021, that number was up 228% to reach 9,292.
- The most common required qualification in 2021 was a Phlebotomy Certification. The most commonly required skill was in Pharmaceuticals, although marketing and selling techniques also featured prominently.



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Tech Sector Overview

- Unlike Life Sciences, Tech occupations tend to be more accessible, and the sector overall is more conducive to workforce development programs. In fact, Tech is already the most common focus of existing programs in NYC.
- Tech occupations also tend to be present in most industry sectors, even beyond our NAICS definition of “Tech” companies. Simultaneously, companies within our NAICS definition has several support occupations not directly related to specific tech skills.
- Whereas almost two thirds of 2021 unique job postings by Life Sciences companies explicitly required a Bachelor’s degree, about 49% of tech postings had such a requirement.

NYC/EDC Source(s): LightCast

Most Common Tech Occupations

SOC Code	Occupation	Share of Sector	Median Annual Wage (2022 $)	Typical Entry Level Education Requirement
15-1252	Software Developers	22.9%	$120,730**	Bachelor's degree
15-1232	Computer User Support Specialists	9.3%	$62,740*	Some college, no degree
11-3021	Computer and Information Systems Managers	8.7%	$212,950	Bachelor's degree
41-3011	Advertising Sales Agents	5.9%	$82,680	High school diploma
15-1244	Network and Computer Systems Administrators	5.7%	$102,110*	Bachelor's degree
15-1211	Computer Systems Analysts	5.7%	$105,9960*	Bachelor's degree
15-1241	Computer Network Architects	3.0%	$131,790*	Bachelor's degree
15-2051	Data Scientists	3.0%	$100,910**	Bachelor's degree
15-1251	Computer Programmers	2.9%	$83,420*	Bachelor's degree
15-1231	Computer Network Support Specialists	2.7%	$79,410*	Associate's degree

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Source(s): LightCast. Employment based on industry, not occupations. Wages and Education Requirements from NYSDOL.
* Information at the state level. ** Information at the national level.

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Most Common Occupations in Tech

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15-1252	Software Developers	13.7%	$120,730**	Bachelor's degree
41-3091	Sales Representatives of Services, except Advertising, Insurance, Financial Services, and Travel	5.5%	$74,500*	High school diploma
13-1161	Market Research Analysts and Marketing Specialists	4.2%	$82,280	Bachelor's degree
11-1021	General and Operations Managers	3.7%	$161,960	Bachelor's degree
15-1232	Computer User Support Specialists	3.5%	$62,740*	Some college, no degree
11-3021	Computer and Information Systems Managers	3.4%	$212,950	Bachelor's degree
43-4051	Customer Service Representatives	3.0%	$48,680	High school diploma
13-1082	Project Management Specialists	2.9%	$94,500**	Bachelor's degree

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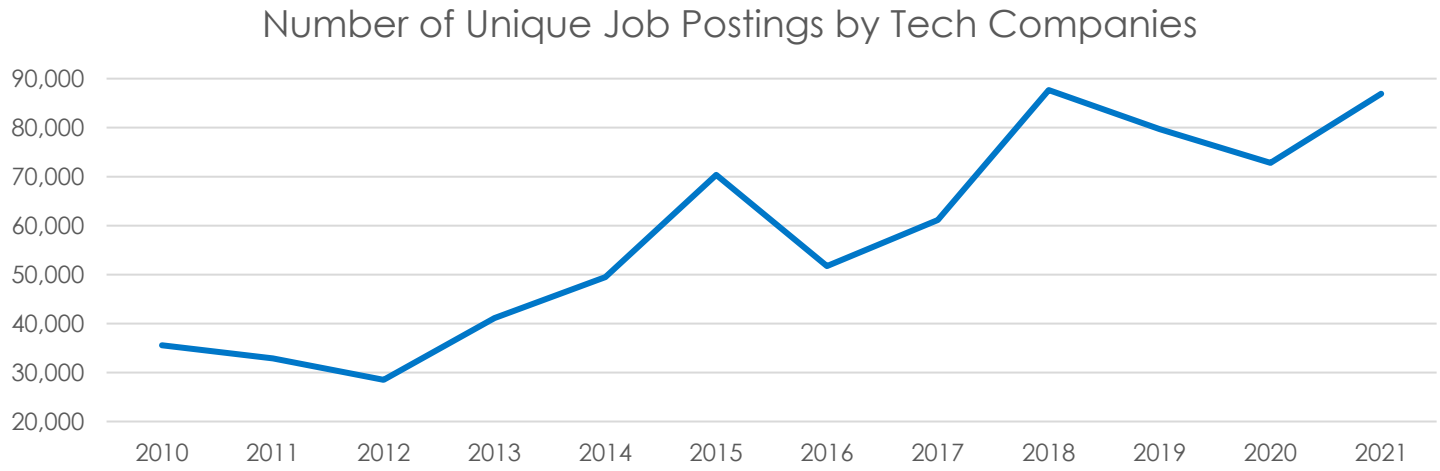
Source(s): LightCast. Employment based on industry, not occupations. Wages and Education Requirements from NYSDOL.
* Information at the state level. ** Information at the national level.

Hiring in Tech has continuously increased

- There were roughly 35,570 unique job postings by Tech companies in 2010. In 2021, that number was up 144% to reach 86,911.
- Unlike Life Sciences, Tech job postings focused more a specialized software skills than on certifications, with experience in SQL, Excel, Python, and Java being the most commonly required.

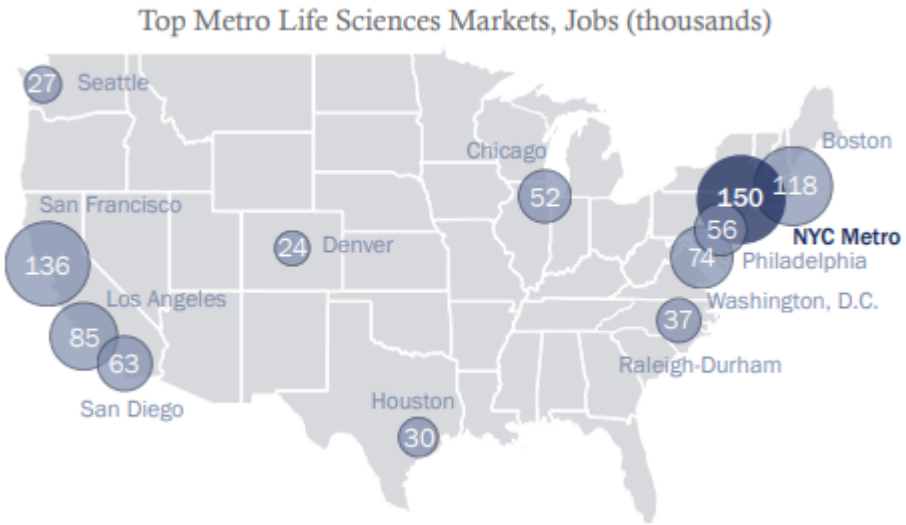


Source(s): LightCast.

NYC's Competitive Advantage

Life Sciences

- The NY metro area is already the largest Life Sciences cluster in the nation in terms of job.
- Although Northern New Jersey accounts for a sizeable chunk of this cluster, NYC is well positioned to capture more of Life Sciences jobs in the future.
- NYC has a strong pipeline of specialized graduates with STEM degrees, with over 39,000 completions in NYC institutions from 2018 to 2020.

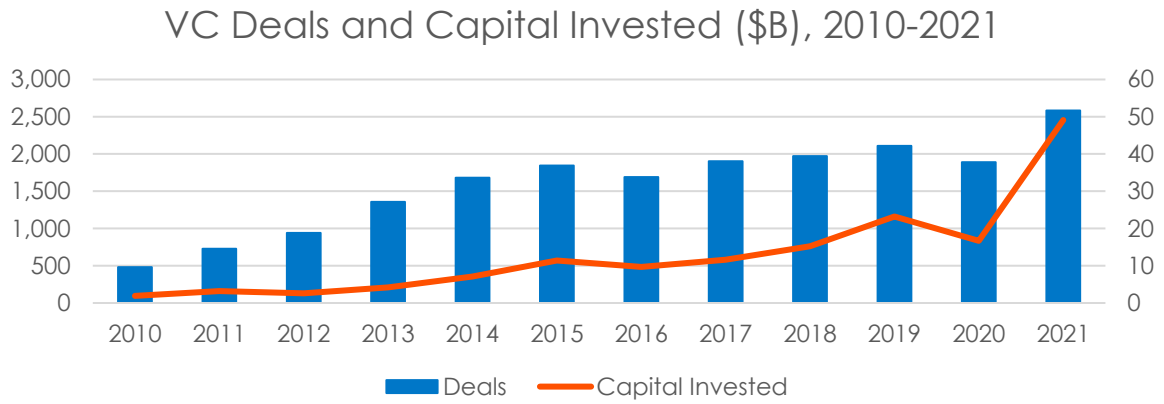


Source(s): NYC Department of City Planning. Education figures from NCES.

NYC's Competitive Advantage

Tech

- Computer Sciences degrees were the most popular fields of study from 2018 to 2020 in terms of completions, with roughly 23,000 completions over that period.
- In 2020 alone, Computer Science degrees accounted for over 26% of all degree completions.
- VC funding has risen sizably over the past decade to reach record heights in 2021.



Source(s): VC figures from Pitchbook. Education figures from NCES.

NYC's Competitive Advantage

Overall

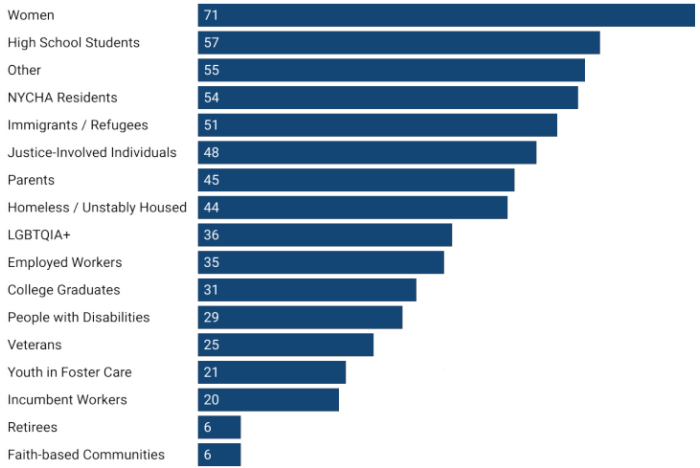
- Companies surveyed highlighted both the availability of a skilled labor pool along with access to VC funding as major or minor factors in their decision to relocate or expand to NYC.
  - 47.8% listed access to NYC's skilled labor pool as a major factor.
  - 30.4% listed access to NYC's skilled labor pool as a minor factor.
- Although the COVID-19 pandemic has impacted several workforce development programs, NYC has experience with those, especially in Tech.
  - Participants in a tech-focused workforce development program surveyed by NYCEDC reported strong job placement in tech companies following program completions.
  - Though hard to pin down the program's exact impact in this metric, participants reported consequential wage increases post-programming.
  - Although most participants had a Bachelor's degree, the gains were just as sizable for those with a High School diploma or an Associate's degree.

Source(s): NYCEDC.

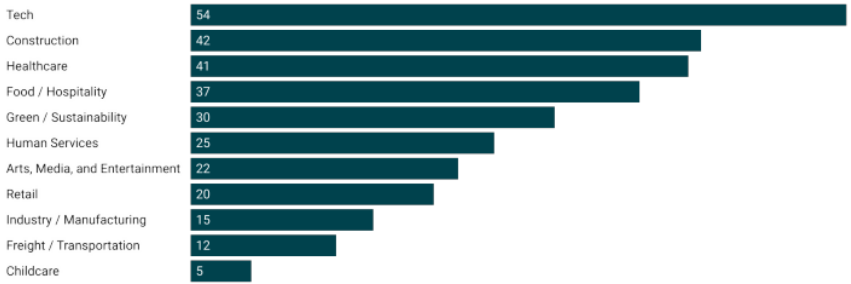
NYC is already home to several programs

- NYC is already home to over a 140 organizations providing workforce development services at nearly 250 locations across the city.
- These cover a broad array of industry sectors and cover many population groups that tend to be less educated and receive lower wages than the overall population.

Populations served by NYC's workforce



Sector-Specific Trainings Offered in NYC

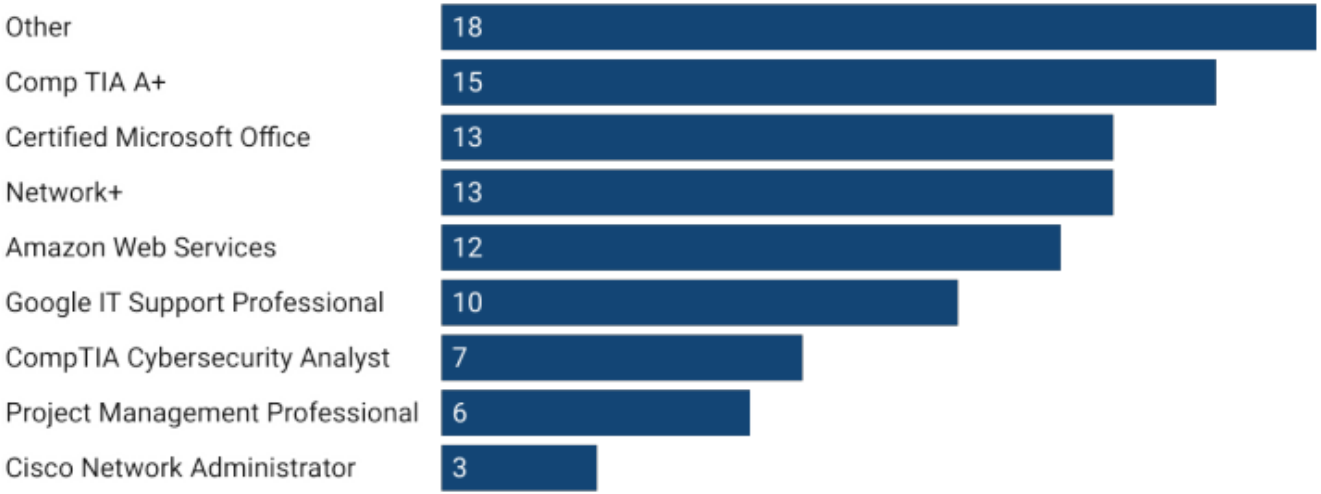


Source(s): NYC Employment and Training Coalition; Workforce Professionals Training Institute; and the Center for New York City Affairs at The New School.

Tech is the most-represented sector in these programs

- Of all the programs, 114 focused on tech-related certifications, covering material often desired by employers in the Tech sector.

Number of Tech training programs resulting in certificates



Source(s): NYC Employment and Training Coalition; Workforce Professionals Training Institute; and the Center for New York City Affairs at The New School.

Estimating the impact of training programs

- Although difficult given uncertainties related to a workforce development program's job placement and subsequent wage increases for participants, we can try to estimate the impact of such programs using two different techniques.
  - First, we use RIMS multipliers from the U.S. Bureau of Economic Analysis (BEA). These help us gauge the impact of local "shocks" on total gross output, value added, earnings, and employment.
  - Second, we use REMI to model an increase in the labor supply for certain occupations using the "Occupational Training (Supply)" variable to expand the labor pool in select occupations.
  - In both cases, we used the sector's annual employment growth of each sector from 2010 to 2021 as the "shock". As such, the boost to Life Sciences and Tech will be 3.9% and 5.7%, respectively.

NYC EDC Source(s): U.S. BEA.

The Impact: Using RIMS Multipliers

- Based on our NAICS definition of Tech and Life Sciences, we use QCEW employment data to construct weighted RIMS multipliers for each sector by aggregating the individual RIMS associated with individual NAICS subsectors.
- Due to the inability of RIMS multipliers to capture the dynamic effects of labor market adjustments, they are probably not well suited for this analysis. Conversely, REMI offers this ability.

Metric	Life Sciences	Tech
Total Output ($M)*	**$417**	**$13,104**
Direct ($M)	$269	$8,401
Indirect/Induced ($M)	$148	$4,703
Total Employment	**1,436**	**37,070**
Direct	716	12,030
Indirect/Induced	720	25,040

* Since this analysis uses 2020 RIMS multipliers, all output figures have been inflated to 2021 dollars.

The Impact: Using REMI

- We can use the Occupational Training (Supply) variable within REMI to estimate the impact of increasing the available labor pool in both Tech and Life Sciences and capture the dynamic nature of the labor market.
- For Life Sciences, we expand the labor pool in three occupational groups: (1) Life Scientists; (2) Life, Physical, Social Science Technicians, and Occupational Health and Safety Specialists and Technicians; and (3) Health Technologists and Technicians.
- For Tech, we expand the labor pool in four occupational groups: (1) Computer Occupations; (2) Engineers; (3) Media and communication equipment workers; and (4) Electrical and electronic equipment mechanics, installers, and repairers.
- In both cases, the increase occurs in 2023, with an immediate market response. In addition, the expansion is distributed between each occupational group based on current employment in NYC.

Underwhelming results

- Increasing the supply of Life Sciences occupations results in an additional 95 jobs across all industries over 10 years and has very little impact on overall GDP. The three most "impacted" sectors in terms of employment are: (1) Ambulatory Health care Services; (2) Construction; and (3) Retail Trade.
- Increasing the supply of Tech occupations leads to 1,195 additional workers across all industries over 10 years and has very little impact on overall GDP. The three most "impacted" sectors in terms of employment are: (1) Construction; (2) Retail Trade; and (3) Ambulatory Health Care Services.

Metric (2023-2033)	Life Sciences Change	Tech Change
Total Employment	+95	+1,195
GDP (2021 $M)	+$13	+$275

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- Do these results imply that workforce development programs are pointless?

Building a new control to forecast a different market

- The simulation output is based on how REMI models the business response to said increase: increased labor supply → lower wages → Changes in productivity, but few changes to overall employment
- While we should probably expect more from workforce development programs, these are dependent on business activities in the concerned sectors.
- To address this issue, we can modify our regional control to lower the Labor Access Index variable to simulate an environment in which certain sectors are growing while experiencing difficulties in hiring new workers.

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Metric (2023-2033)	Life Sciences Change	Tech Change
Total Employment	+96	+1,238
GDP (2021 $M)	+$13	+$279

Managing Expectations

- Workforce development programs, while helpful as evidenced by several studies on their return on investment, cannot stand as the be-all and end-all of an economic development strategy.
- Without concurrent growing business activity in the relevant sectors, the impact is relatively minor. However, Tech and Life Sciences have both far outpaced other NYC industry sectors over the past decade and the outlook is generally positive, despite recent uncertainties.
  - Tech remains a catalyst for growth both at the national and local level. In addition, it remains an accessible industry to workers and has already been an area of focus in NYC's existing workforce development program.
  - Life Sciences, while still more "niche" than other sectors, continues to grow. While it still relies on a highly specialized workforce, there exists occupations within that sector that are accessible and could lend themselves to sectoral programs similar to those focused on healthcare.

Acknowledgments and Questions

- NYCEDC's Economic Research & Policy team
- NYC Department of City Planning – Life Sciences in the NYC Metro
- NYC Employment & Training Coalition; Workforce Professionals Training Institute; and the Center for NYC Affairs at The New School – New York City's Workforce Landscape