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# NJTC Annual Score Card

A PERFORMANCE REVIEW OF THE NEW JERSEY TECHNOLOGY ECONOMY

*Presented by*



*Supporting Organization*



# ABOUT THE 2006 NJTC SCORE CARD

*Last Year The NJTC State of the New Jersey Technology Economy Report profiled a state holding a competitive position in the nation's high tech economy but also showing signs of fatigue in the underlying fundamentals. This year, as we focused our analysis more tightly around a specific set of technology capabilities, we see a clearer story emerging. The theme for this 2006 Score Card is the New Jersey high tech workforce & it's innovation capacity. This score card provides a measuring stick to gauge the competitiveness of New Jersey's technical talent base and the health of the economic fundamentals that drive innovation.*

*This year we see a continuation of many of trends, as the New Jersey technology economy continues to restructure itself and rebound from the severe contraction experienced earlier this decade. A recovery is underway, but the pace is measured. The state continues to benefit from a strong foundation of technical and business talent, but also continues to be challenged by below average performance in the capabilities closely related to the development of new technologies.*

*At the broadest level, the 2006 score card portrays a state that is no longer losing jobs at the dramatic pace triggered by the dot-com collapse. In fact, New Jersey's five-year job growth rate of 5.1% outpaced both the national average and that of its neighboring states. But there is evidence that the jobs being created are different than before. Per capita income continues to rise but not at as briskly as in the past and slower than in neighboring states. Statewide productivity remains high but is also slowing and many of the jobs being added appear to be of the low wage variety.*

*Within the high technology domain, the story is equally mixed. High tech industry employment has stabilized. However, while several high tech sectors have added to their payrolls, more have continued to trim their workforce. At the same times high tech industry productivity remains high but productivity growth is losing momentum. The information suggests that the state's global technology position is becoming more tenuous and that New Jersey's high tech industries might not be as competitive as they once were.*

*However, there are some encouraging signs of growth and perhaps evidence of an emerging competitive advantage. Despite tepid industry performance, the state has displayed strong growth in the employment of technical talent. New Jersey's science and engineering workforce has expanded by 10.4% over the last five years, twice the pace of the national average and far faster than either Pennsylvania or New York. This healthy expansion of technical jobs suggest that the state's traditional industries, those that typically lie outside the high tech domain, are making significant investments in the human capital required to improve existing infrastructures and build new capabilities.*

# ABOUT THE 2006 NJTC SCORE CARD CONT.

*Having a such a broad base of technical skills means New Jersey businesses can be more agile in the transition to new markets and speed the diffusion of new technologies throughout the company. There is also some evidence that the state has a healthy small business foundation, with many technical experts pursuing their start-up ambitions from their own homes. Not only do these findings suggest the existence of a less-visible set of capabilities, they remind us that industry metrics don't tell the whole story and that perhaps we need to rethink how we assess New Jersey's technology competitiveness.*

*Although the state's talent story is upbeat and promising, the same cannot be said of New Jersey's technology development capabilities. Perhaps the most striking finding in this score card is that the state's innovation infrastructure lacks much of the dynamism it once had. Investments in basic research, although on the rise, continue to lag the nation and statewide patent production is spiraling downward. Furthermore, risk capital flows to state technology companies remain stuck at modest levels. The causes underlying these challenges are many and complex. In part, New Jersey is trapped by a tepid national economy – many of the state's growth curves now piggyback on the national trend. For a state that once pioneered and propelled national growth, it is somewhat unsettling that in many important areas New Jersey now appear to follow national trends rather than drive them.*

*The story for this Score Card, then, is that the New Jersey technology landscape is still undergoing a transformation. The state's high tech industries remain competitive but are under assault by a more menacing global economy. The state's industries continue to produce globally competitive products & services, but occupy a less dominant position in the national and global market. The New Jersey workforce has the technical skills to compete but is not yielding the discoveries or developing the cutting edge technologies necessary to secure and maintain competitive advantage.*

*Action will be required to change the current direction. Some choices may require a new perspective and a rethinking of past assumptions to better suit an environment where competitive capabilities are distributed more broadly across the landscape. Due diligence demands that state leaders continue to monitor progress, develop support mechanisms to nurture emerging strengths and commit to providing sustained attention to current weaknesses before the downward inertia renders such actions infeasible.*

*This Score Card suggests that New Jersey is approaching a moment of truth. How the state responds to these challenges and the actions that civic leaders make today will determine New Jersey's place in the global economy.*

*Gregory M. Stoup  
President, SEI Consulting*

# WELCOME TO THE 2006 NJTC SCORE CARD

This 2006 Score Card is the first annual update to the NJTC State of the New Jersey Technology Economy Report published in October 2005. As an annual publication our objective for this Score Card is to provide a permanent foundation for the development of a statewide technology monitoring system that will support ongoing investigations of the state's technology assets and capabilities. The Score Card is an on-going supplement to the original 2005 report, much more data-oriented than the report and structured around a specific theme. Each theme will be tightly focused on a specific domain determined by NJTC. The theme for this year's Score Card is the New Jersey technology workforces and its relationship to New Jersey's innovation capacity.

We examine the direction and momentum of New Jersey's workforce both in terms of the employment of technical talent and their effects on industry productivity. We extend the analysis into those segments of the economy most closely related to technology development and innovation, placing particular emphasis on the state's research capacity and patent production. Choice of metrics was governed by how well they reflected the state's underlying strengths related to the theme and by the degree to which they are tethered to policy-actionable strategies.

Design is a signal of intent and our approach in the development and design of this Score Card was to create a tool that policy makers, community leaders, and the public can use to raise the level of understanding regarding the overall health and nature of the state's technology economy.

More specifically, the purpose of this Score Card is to:

- \* Provide policy makers and community leaders a tool to shape coherent technology strategies.
- \* Create an appropriate baseline for leaders to gauge performance and develop appropriate performance goals.
- \* Bring some consistency and continuity to the monitoring of statewide technology trends.
- \* Establish a common point of reference for dialog among community leaders, policy makers, the media and the public.
- \* Raise awareness of importance of the New Jersey technology economy and the role it plays in fueling statewide growth and enhancing overall standard of living.

# THE 2006 THEME

The coverage in this year's Score Card is focused tightly on New Jersey's high tech workforce & the state's capacity to commercialize new technologies. We have chosen a discrete set of metrics that we hope will become the foundation of a dialog on how to position New Jersey's technology economy for future expansion and sustained competitiveness. This Score Card provides a detailed examination of two specific dimensions of the New Jersey Technology Economy:

1. The industrial and occupational employment base that constitute the workforce foundation of the state's technology economy.
2. A set of highly interrelated activities that collectively contribute to the development of new technologies and expand the state's commercialization opportunities.

Specifically, the Score Card focuses on eight dimensions of New Jersey's technology economy:

- 1. High Technology Industry Employment***
- 2. High Technology Business Formations***
- 3. High Tech Industry Productivity***
- 4. Science & Engineering Occupational Employment***
- 5. Statewide Patenting Activity***
- 6. Basic R&D (Federally Funded Research)***
- 7. Applied R&D (Private Industrial Research)***
- 8. Risk Capital***

# OUR APPROACH

The selection of metrics was governed by the theme but also by an objective to focus a discussion on the core elements of the technology economy. The indicators provided in this report target the primary components of the state's technology economy that have well-defined linkages to public policy. The objective was to provide decision makers with an efficient tool to help bring greater alignment around specific elements of the technology landscape where astute policy is capable of having a significant impact. Designed as a supplement to the original 2005 report, the scope of this year's Score Card was limited to an analysis of the state's current competitiveness in terms of its technology workforce and commercialization capacity.

# SOURCE DATA

The 2006 Score Card is a quantitative report and is founded exclusively on measurable economic data. Most of the information provided in this Score Card was derived from raw data produced by federal government agencies, although several indicators did leverage information from private vendors. In a few rare cases where the available data was lacking or censored, proprietary algorithms and statistical tools were used to develop estimates. The Score Card was limited to quantitative information and used the most current data available at the time of publication. A list of data sources is included in the appendix.

# HIGH TECH INDUSTRY DEFINITION

As in the original report, in this score card we identified technology industries based on two criteria:

1. R&D activity
2. Employment of scientists and engineers

We identified industry patterns in terms of R&D activity and the employment of scientists and engineers across all industries in the U.S. economy. Not surprisingly, industries vary widely in the amount they invest in R&D and the extent to which they rely on technical talent. We designated industries as high-tech if they had substantial R&D budgets and employed a significant number of scientists and engineers.

Specifically, high tech industries were designated as those where R&D spending as percent of sales, was twice the national average for all industries and whose science and engineering workforce was fifty percent above the national average in terms of percentage of industry employment.

We consider this definition to be sound on methodological grounds and it has the added benefit of being consistent with other widely distributed published reports providing a common point of reference that can facilitate further benchmarking and review. A complete list of high tech industries is provided in the back of this document.

# Rating the New Jersey Technology Economy

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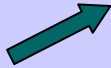



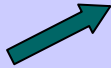

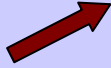
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A LOOK AT STATE  
PERFORMANCE ACROSS  
EIGHT DISTINCT  
TECHNOLOGY DIMENSIONS



# New Jersey Technology Economy Score Card

High Tech Category	Grade	Momentum	Comment
HT Industry Employment	C+		Declines have finally abated; signs of growth are emerging
HT Business Formations	B		Modest growth overall; high concentration of small firms
HT Industry Productivity	B-		Levels currently high but experiencing declines
S&E Occupational Employment	A		Science & Engineering employment expanding
Patenting	C-		Still strong but losing ground to nation & peers
Basic R&D	C		Growth in Fed R&D Grants just starting to accelerate
Applied R&D	B+		Industry R&D investments high but growth is flattening
Risk Capital	B-		VC investments still down but starting to turn around

# SUMMARY OF FINDINGS

## 1. High Tech Industry Employment

New Jersey's High Tech Industries have yet to fully recover from the contraction of the national technology economy that began in 2001 and accelerated in 2003. Where once New Jersey ranked among the fastest growing states in high tech industry employment, it now displays a growth pattern more consistent with the national average. There is growing evidence that several technology industries have turned the corner and are positioning themselves for future growth, but a larger number continue to struggle through a slow growth environment.

## 2. High Tech Business Formations

Since 2003 New Jersey has experienced a slow but steady rise in the number of new technology business establishments. The pace is measured, however, growth in new high tech businesses has exceeded growth in statewide high tech employment, suggesting that current establishment growth is being driven by an expansion of smaller business enterprises. There is also evidence that New Jersey has developed a relatively high concentration of home-based technology businesses. This not only suggest that the state is benefiting from a stable foundation of entrepreneurial talent, but that traditional means to measure high tech performance that focus exclusively on industry-related metrics, may be inadequate when gauging the true competitiveness of the state's high tech resources.

# SUMMARY OF FINDINGS

## 3. High Tech Industry Productivity

New Jersey's High Tech Industries continue to distinguish themselves with high levels of industry-wide productivity; however, over recent years the rate of productivity improvements have not kept pace with either the nation or its neighboring state's. The gap in productivity growth rates is modest, but such effects are cumulative and, left unabated, will impede the growth of high tech industry wages.

Furthermore, the ratio of High Tech productivity to statewide productivity is lower in New Jersey than in neighboring states. As we discuss later this drop in the high tech productivity ratio, however, may be a positive consequence of the expansion of the state's science & engineering workforce over a broader industrial landscape that increasingly includes more traditional industries, which collectively account for 88% of the state's employment base. The infusion of technical talent into these historically non-tech companies suggests that the state is providing more and more industries with the human capital foundation necessary for improving productivity and long term competitiveness.

## 4. Science & Engineering Employment

Over the last five years, New Jersey has experienced strong and steady growth in the employment of scientists and engineers. Examining state performance through an occupational rather than industrial framework, lead to different conclusions about the health and durability of the state's technology economy. Given the state's tepid performance in the growth of high tech industry jobs, expansion of New Jersey's science & engineering workforce is a good indication that the state is steadily expanding its technology capabilities. In the long run such investments in technical talent speed the diffusion of new technologies across industries, improving the rate at which businesses respond to technical challenges and commercialize new technologies.

# SUMMARY OF FINDINGS

## 5. Patents

Over the last five years, the decline in New Jersey patent production has begun to accelerate. The drop in patent awards is part of a broader national trend, however, the rate of decline in New Jersey is nearly three times the national rate. To the extent that New Jersey companies are successfully commercializing new discoveries developed outside their borders, the decline in patenting need not suggest a loss in competitiveness. However, taken together with the evidence of decline in high tech industry productivity, the drop in patent production might suggest that New Jersey companies are not commercializing home-grown technologies at the pace they once did.

## 6. Basic R&D (Federally Funded Research)

New Jersey's federal research base is smaller than one would expect given its size. By several measures of research intensity, New Jersey scores well below the national average in terms of federal research per dollar of state output and per state worker. This deficit has persisted over time, however, there is evidence that over recent years New Jersey has done a better job at capturing federal research grants. The state continues to capture a significant volume of Defense Agency related research and has experienced strong growth in NIH related funding. However, the gap remains large and the state will need to sustain current rates for many years to simply reach parity with the nation.

# SUMMARY OF FINDINGS

## 7. Applied R&D (Private Industrial Research)

New Jersey industries dominate the state's research activities to a degree much larger than in other states. Private industries account for nearly 90% of the state's research investments, much of which can be attributed to small number of large pharmaceutical companies. Unlike federally funded research which underwrites investigations into new science, industrial research tends to focus largely on the commercial development of existing technologies. These investments by private industry are essential to innovation and current figures suggest that New Jersey's industries continue to value the importance of applied research both in absolute terms and relative to their peers.

## 8. Risk Capital

New Jersey's risk capital market has yet to fully recover from the severe post 2001 contraction. Flows of venture capital to New Jersey companies are still far below the standard set five years ago and continue to parallel a stagnant national trend. However, the decline appears to have halted and the VC market does appear to be positioning itself for a modest recovery. In particular, the New Jersey Telecommunications industry has experienced a recent rise in VC dollar investments. The increase dollar flow is concurrent with a trend toward larger dollars per VC deal, so the larger dollar volume is targeting fewer New Jersey companies.

# NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

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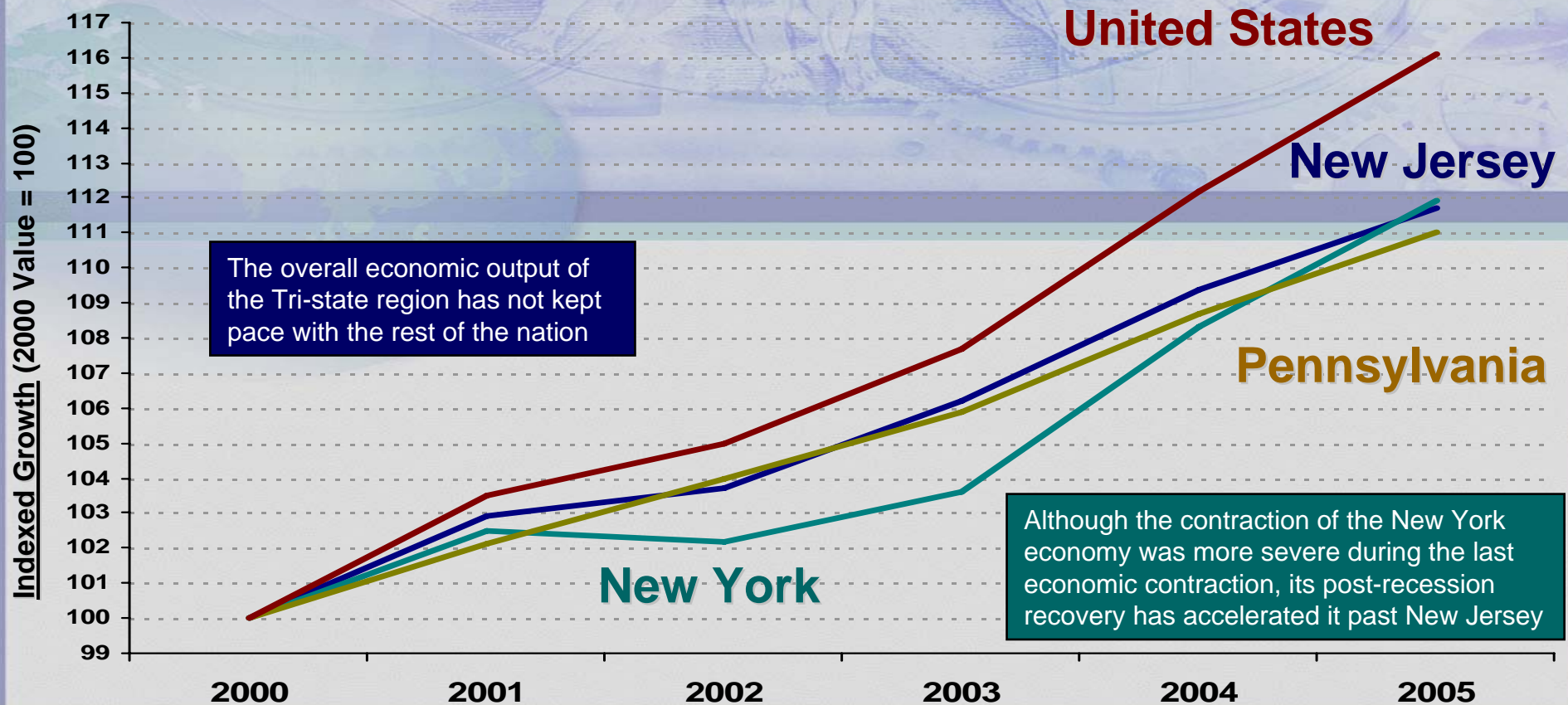
PREAMBLE

A LOOK AT THE HEALTH OF THE  
OVERALL NEW JERSEY ECONOMY

## Growth Trend in Real GSP, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	345,080	355,100	357,920	366,000	377,560	385,490	40,410	11.7%
New York	774,660	794,390	791,680	802,820	839,280	867,070	92,410	11.9%
Pennsylvania	387,660	395,630	402,970	410,360	421,440	430,310	42,650	11.0%
United States	9,503,700	9,836,500	9,981,800	10,237,200	10,662,100	11,035,600	1,531,900	16.1%

Raw Data Source: United States Bureau of Economic Analysis



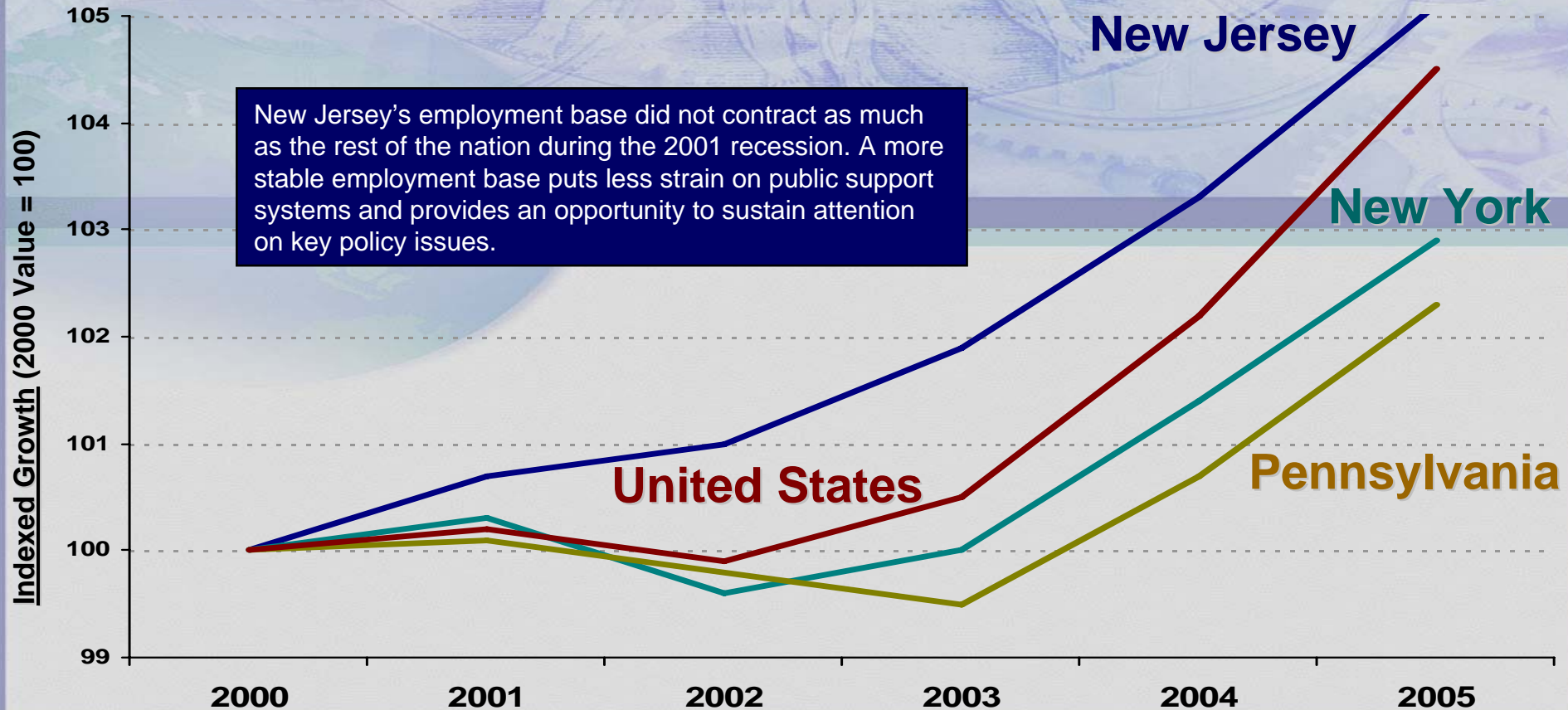
The overall economic output of the Tri-state region has not kept pace with the rest of the nation

Although the contraction of the New York economy was more severe during the last economic contraction, its post-recession recovery has accelerated it past New Jersey

## Growth Trend in Total Employment, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
<b>New Jersey</b>	4,755,300	4,789,200	4,804,300	4,845,900	4,911,900	4,997,700	242,400	5.1%
<b>New York</b>	10,455,400	10,491,000	10,415,100	10,460,300	10,598,700	10,760,400	305,000	2.9%
<b>Pennsylvania</b>	6,973,100	6,979,400	6,956,000	6,936,000	7,020,300	7,131,000	157,900	2.3%
<b>United States</b>	166,758,800	167,014,700	166,633,100	167,546,500	170,482,700	174,219,600	7,460,800	4.5%

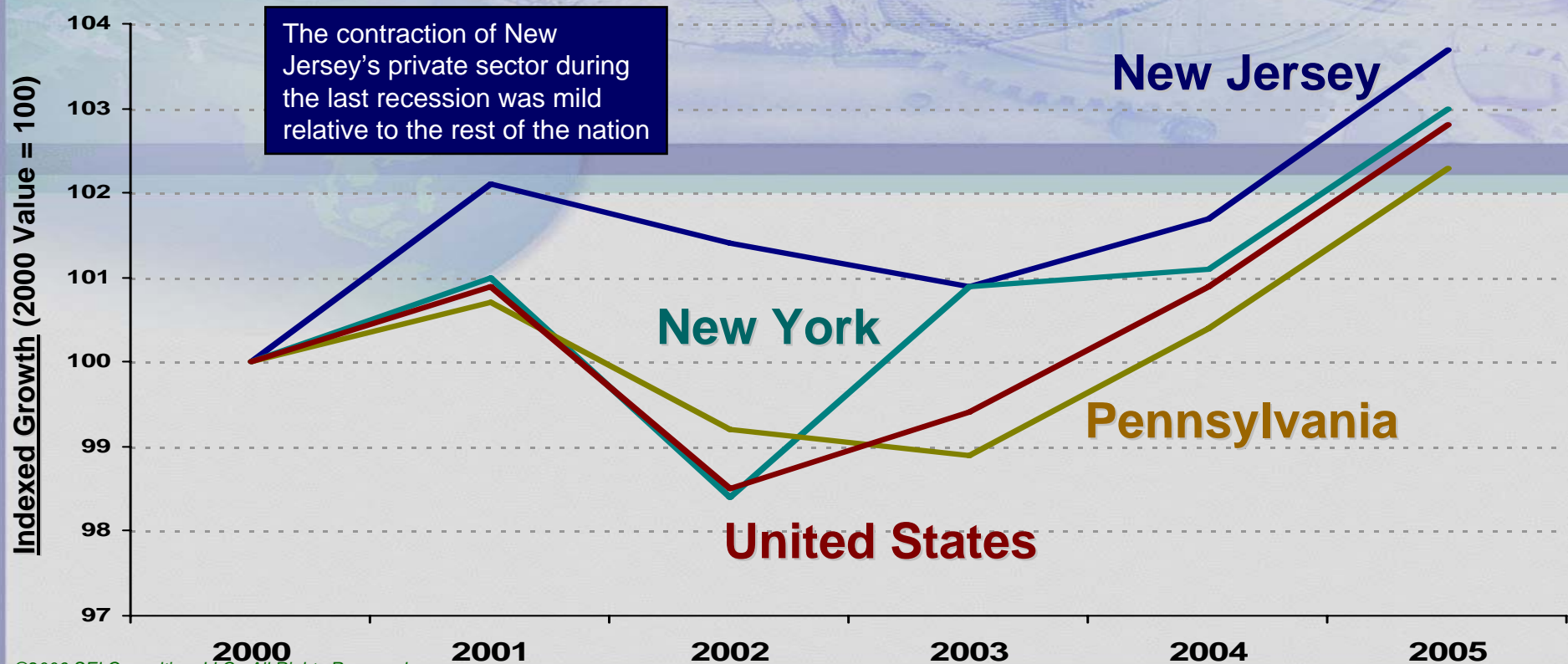
Raw Data Source: United States Bureau of Economic Analysis



# Growth Trend in Private Sector Employment, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005*	Net	Pct
New Jersey	3,548,400	3,622,700	3,596,900	3,579,000	3,609,600	3,678,200	129,800	3.7%
New York	7,353,200	7,428,300	7,234,900	7,416,600	7,433,600	7,574,900	221,700	3.0%
Pennsylvania	5,087,200	5,123,100	5,046,400	5,029,300	5,107,000	5,204,000	116,800	2.3%
United States	114,064,900	115,061,100	112,400,6500	113,398,000	115,074,900	117,261,300	3,196,400	2.8%

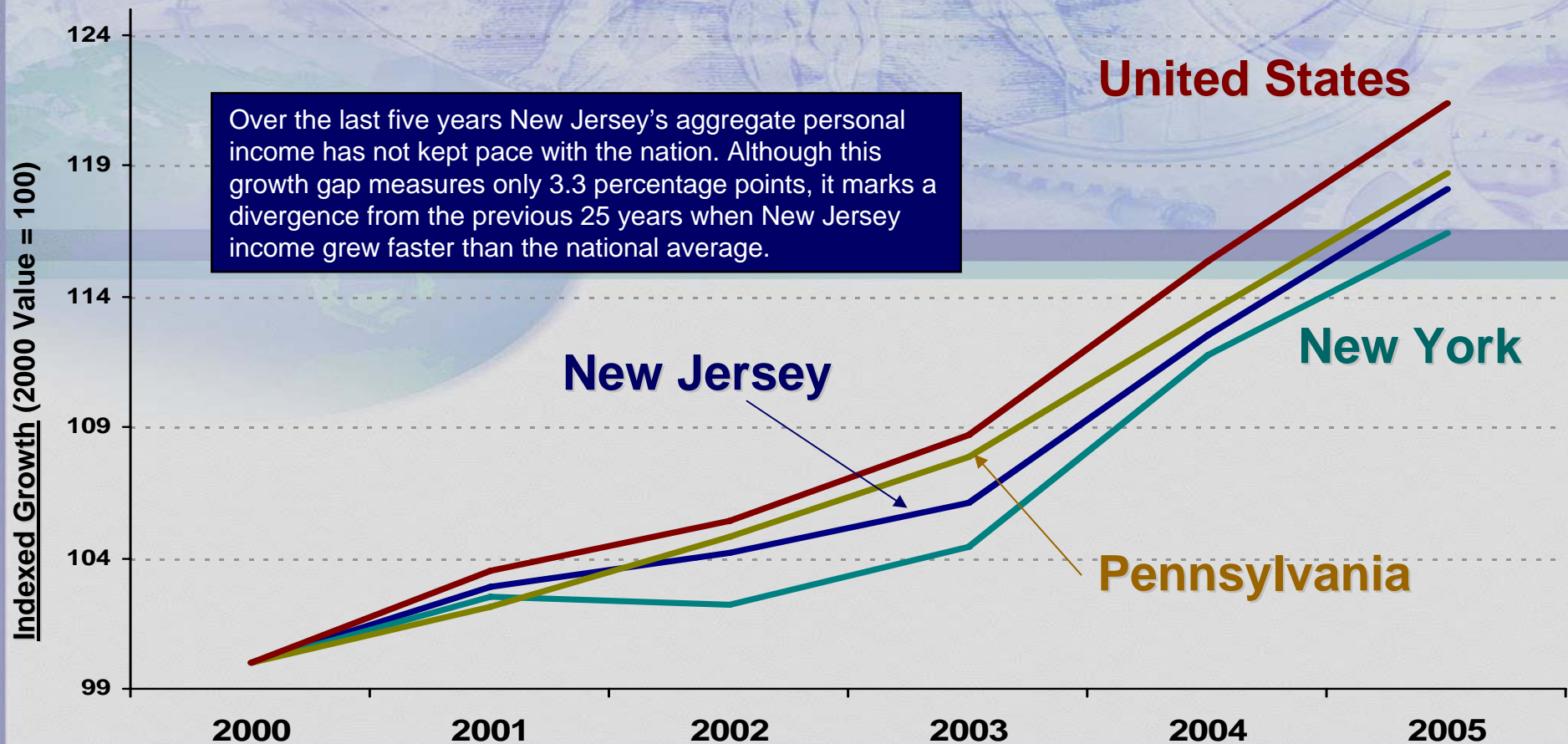
Raw Data Source: County Business Patterns (2006). \* State totals for 2005 were estimated from Bureau of Labor statistics employment data and SEI survey responses



# Growth Trend in Total Personal Income (In \$ Billions), 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	323.6	333.0	337.0	343.4	363.9	382.0	58	18.1%
New York	663.0	679.9	677.6	692.0	741.3	771.6	109	16.4%
Pennsylvania	364.8	372.3	382.3	393.7	413.6	433.1	68	18.7%
United States	8,422.1	8,717.0	8,872.9	9,150.9	9,717.2	10,224.8	1,803	21.4%

Raw Data Source: United States Bureau of Economic Analysis

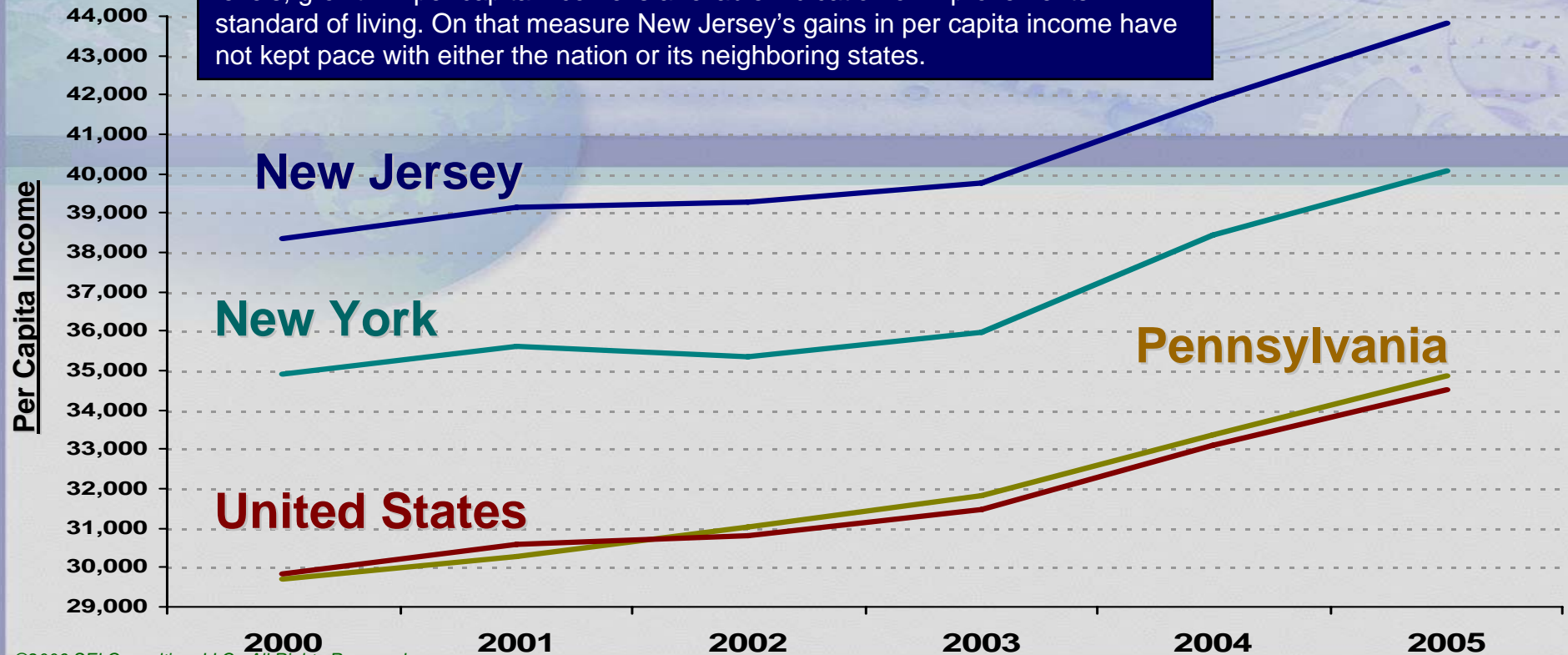


# Growth Trend in Per Capita Income, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	38,360	39,140	39,290	39,740	41,890	43,820	5,460	14.2%
New York	34,890	35,610	35,350	35,980	38,440	40,070	5,180	14.8%
Pennsylvania	29,690	30,280	31,010	31,840	33,360	34,840	5,150	17.4%
United States	29,840	30,570	30,810	31,460	33,090	34,490	4,650	15.6%

Raw Data Source: United States Bureau of Economic Analysis

Although local cost of living differences confound direct comparisons of income levels, growth in per capita income is a reliable indication of improvements in standard of living. On that measure New Jersey's gains in per capita income have not kept pace with either the nation or its neighboring states.



# OVERALL STATEWIDE PERFORMANCE

## PREAMBLE SUMMARY

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1. From 2000 to 2005 New Jersey's economic output expanded by 11.7%, roughly equal to that of New York & Pennsylvania but well below the national rate of 16.1%.
2. New Jersey weathered the latest recession well when compared to its neighboring states. Despite large employment declines within the state's high tech industries, New Jersey's economy was sufficiently diverse to provide employment opportunities for displaced workers.
3. Per capita income levels remains high, however personal incomes are not growing on pace with the nation, an indication that the employment gains over the last five years are coming largely in the form of lower paying occupations.

# SECTION 1.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

EMPLOYMENT IN  
HIGH TECH INDUSTRIES

GRADE: C+

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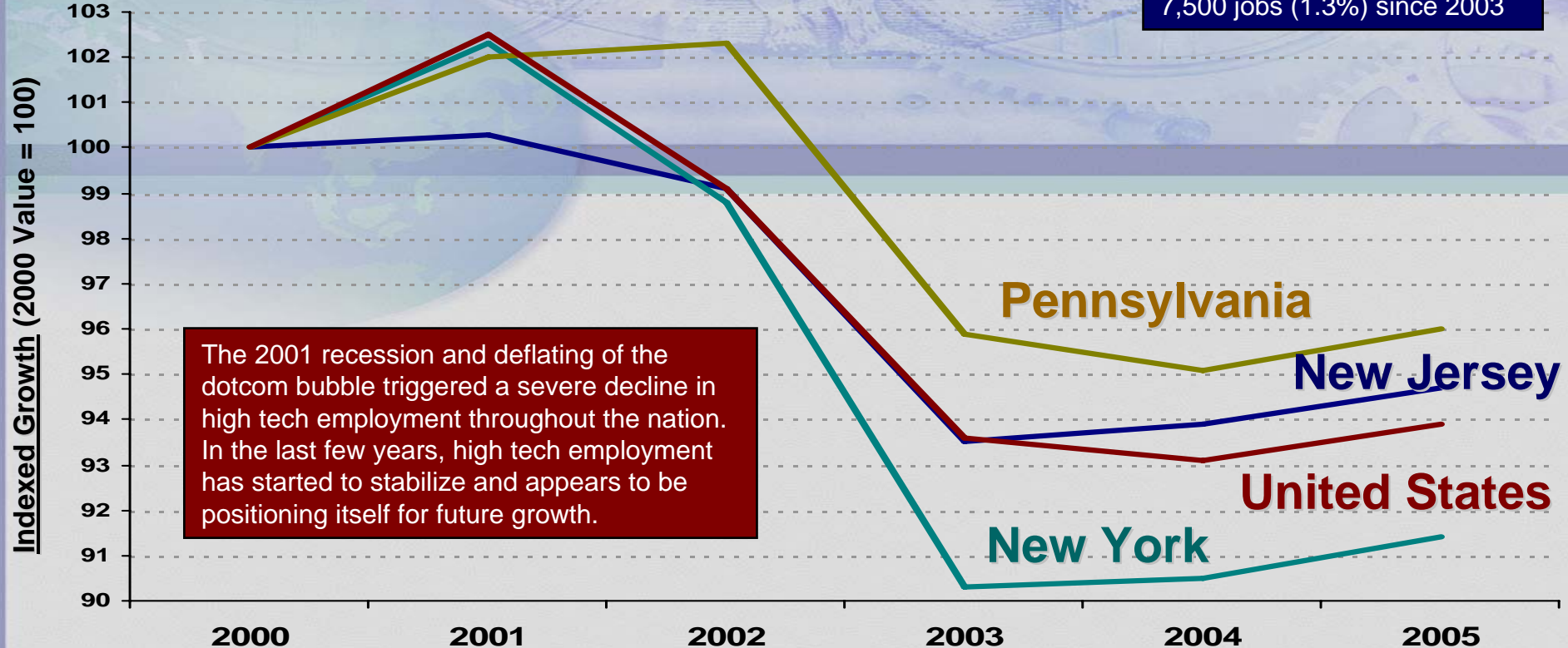
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# Growth Trend in High Technology Employment 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005*	Net	Pct
New Jersey	619,790	621,530	614,410	579,630	581,960	587,190	-32,600	-5.26%
New York	1,275,600	1,304,300	1,259,900	1,152,100	1,153,800	1,166,400	-109,200	-8.56%
Pennsylvania	849,130	866,070	868,730	814,510	807,230	815,410	-33,720	-3.97%
United States	19,070,000	19,540,700	18,898,500	17,851,700	17,747,000	17,906,800	-1,163,200	-6.10%

Raw Data Source: County Business Patterns (2006). \* State totals for 2005 were estimated from Bureau of Labor statistics employment data and SEI survey responses

New Jersey High Tech Employment grew by approx 7,500 jobs (1.3%) since 2003

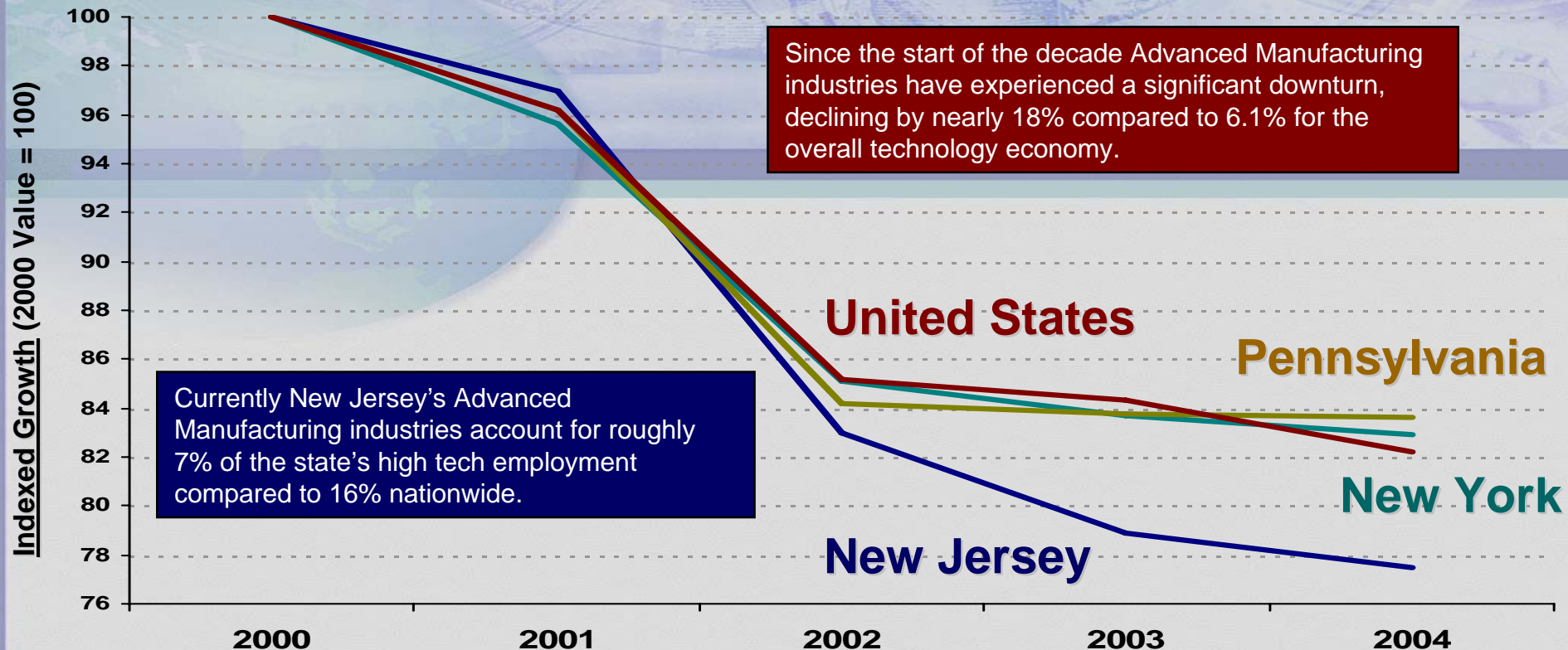


The 2001 recession and deflating of the dotcom bubble triggered a severe decline in high tech employment throughout the nation. In the last few years, high tech employment has started to stabilize and appears to be positioning itself for future growth.

# Employment Trend in Advanced Manufacturing Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	55,580	53,910	46,110	43,830	43,090	-12,490	-22.5%
New York	129,670	123,970	110,390	108,580	107,490	-22,180	-17.1%
Pennsylvania	143,380	137,910	120,670	120,080	119,920	-23,460	-16.4%
United States	3,511,200	3,377,100	2,993,100	2,959,000	2,887,500	-623,700	-17.8%

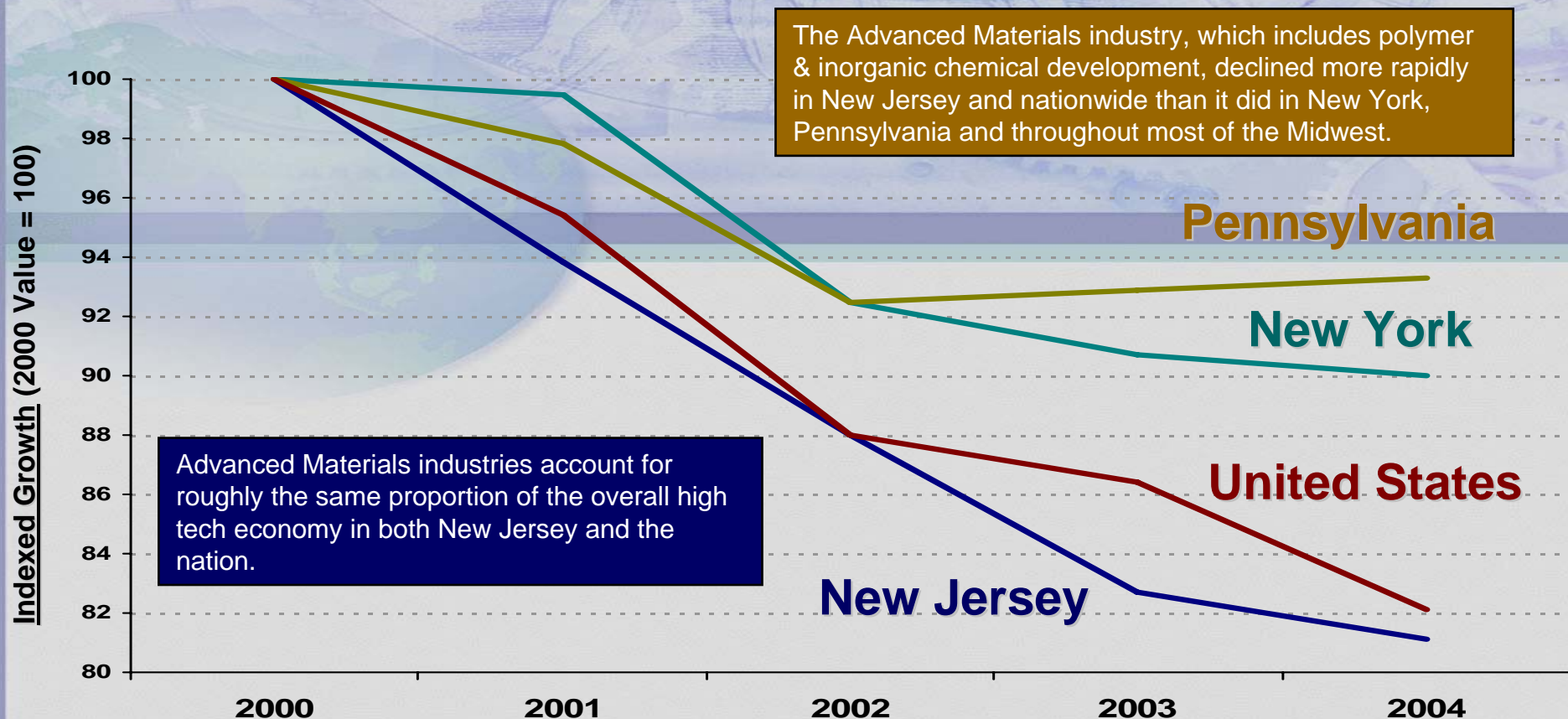
Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).



# Employment Trend in Advanced Materials Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	60,430	56,690	53,180	49,970	48,990	-11,440	-18.9%
New York	70,440	70,070	65,190	63,900	63,380	-7,060	-10.0%
Pennsylvania	68,410	66,930	63,280	63,560	63,840	-4,570	-6.7%
United States	1,585,200	1,512,200	1,395,670	1,370,060	1,301,830	-283,370	-17.9%

Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).

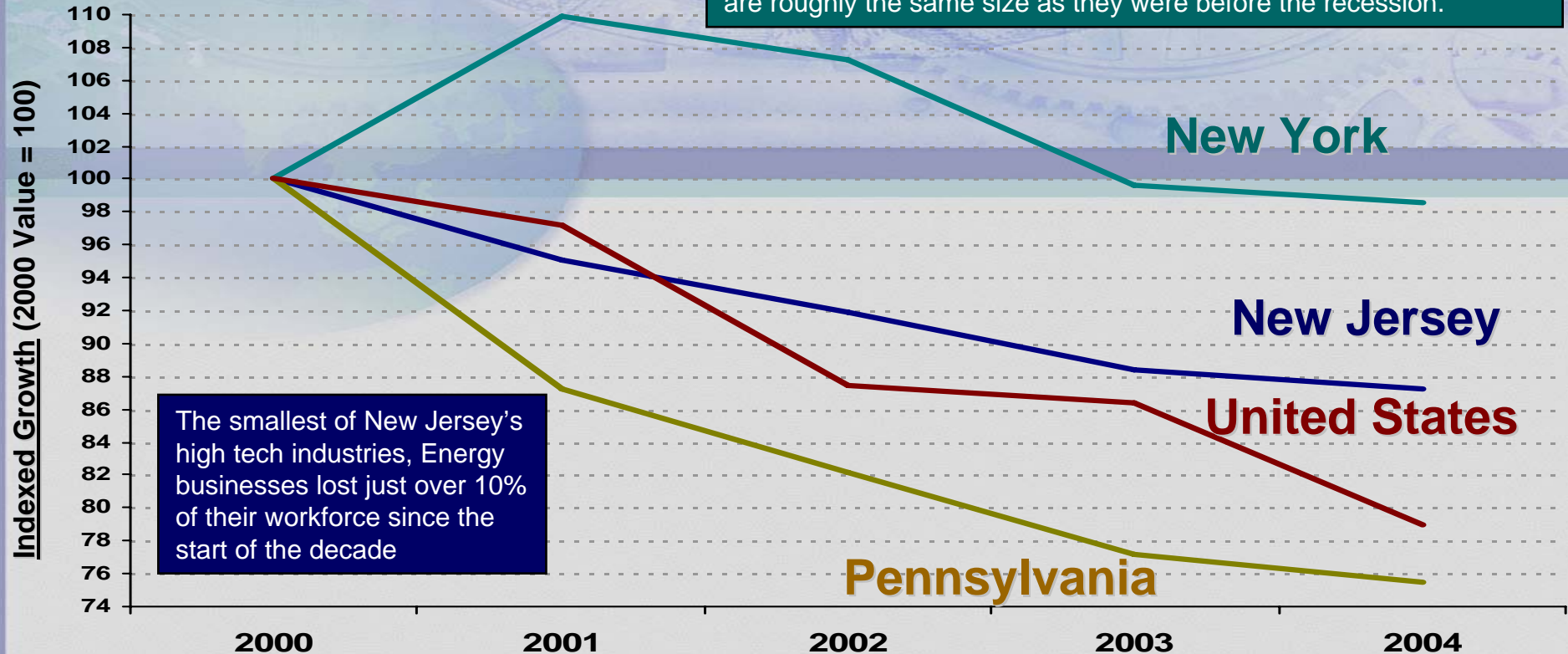


# Employment Trend in Energy Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	2,920	2,770	2,680	2,580	2,540	-380	-12.8%
New York	12,220	13,430	13,100	12,160	12,040	-180	-1.4%
Pennsylvania	9,200	8,020	7,560	7,100	6,940	-2,260	-24.5%
United States	203,720	198,030	178,310	176,070	160,990	-42,730	-21.0%

Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).

Despite significant declines nationwide, New York's Energy industries are roughly the same size as they were before the recession.

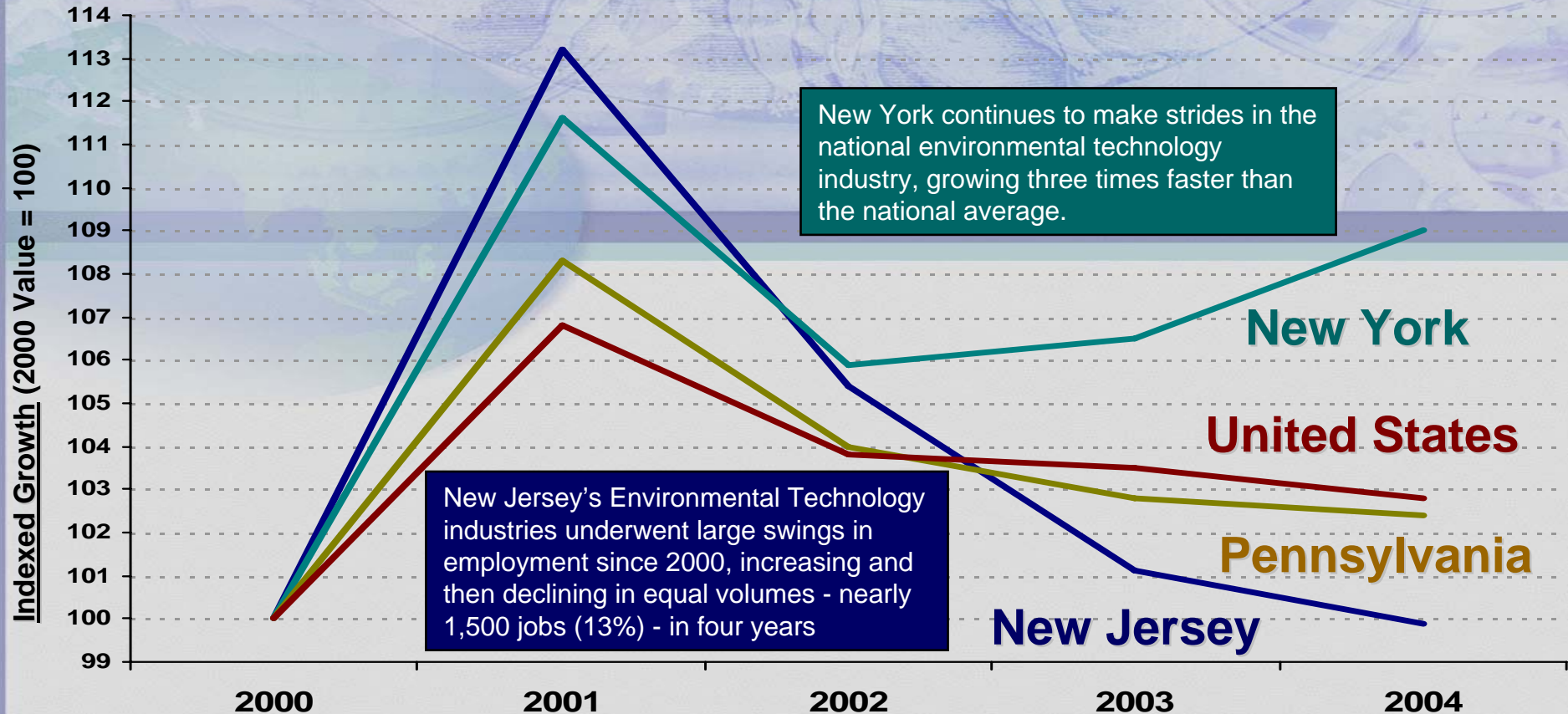


The smallest of New Jersey's high tech industries, Energy businesses lost just over 10% of their workforce since the start of the decade

# Employment Trend in Environmental Technology Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	11,260	12,750	11,860	11,380	11,250	-10	-0.1%
New York	18,220	20,340	19,300	19,400	19,860	1,640	9.0%
Pennsylvania	14,640	15,870	15,230	15,060	15,000	360	2.4%
United States	305,340	325,970	317,040	316,090	313,810	8,470	2.8%

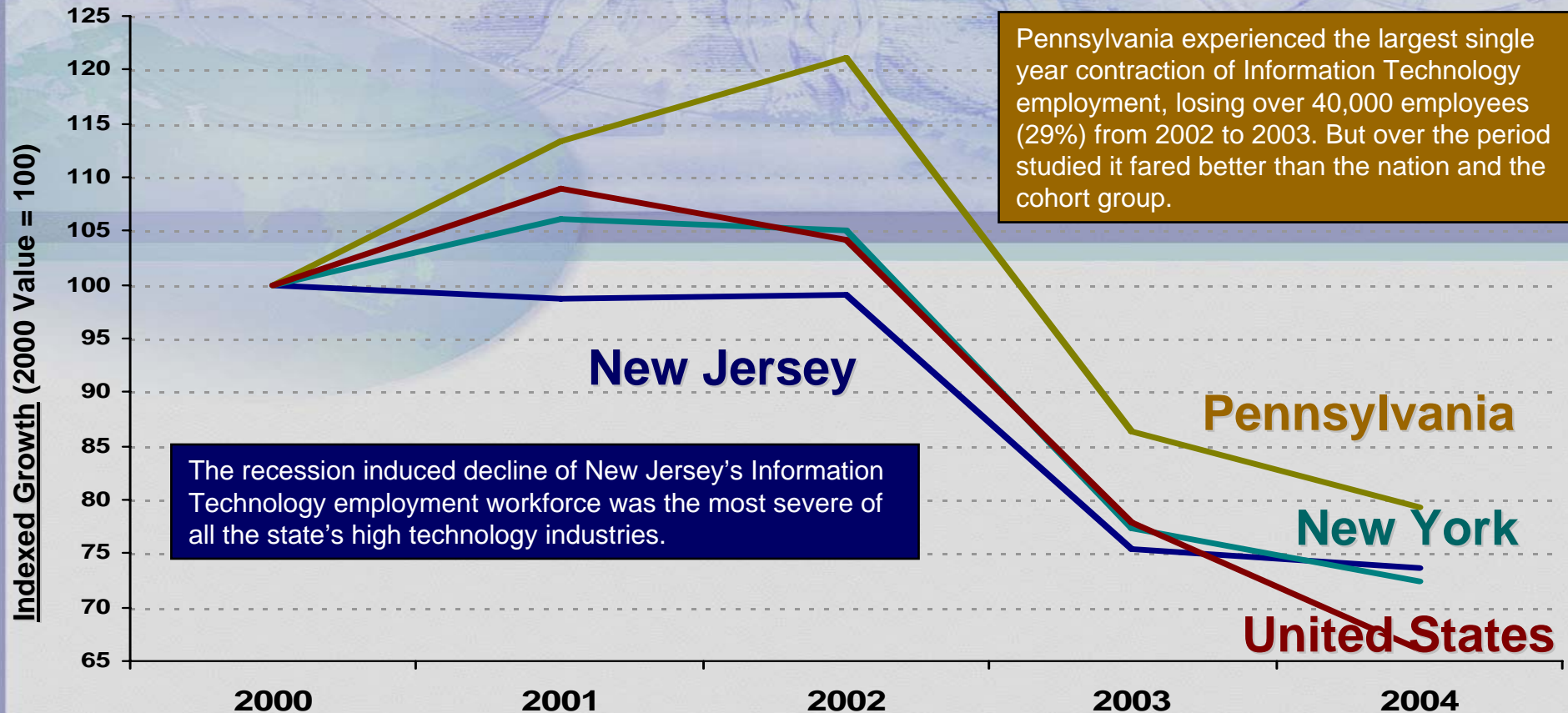
Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).



# Employment Trend in Information Technology Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	130,580	128,900	129,330	98,500	96,220	-34,360	-26.3%
New York	261,560	277,430	274,800	202,160	189,590	-71,970	-27.5%
Pennsylvania	118,530	134,420	143,620	102,430	93,990	-24,540	-20.7%
United States	3,263,600	3,554,000	3,396,800	2,543,300	2,153,900	-1,109,700	-34.0%

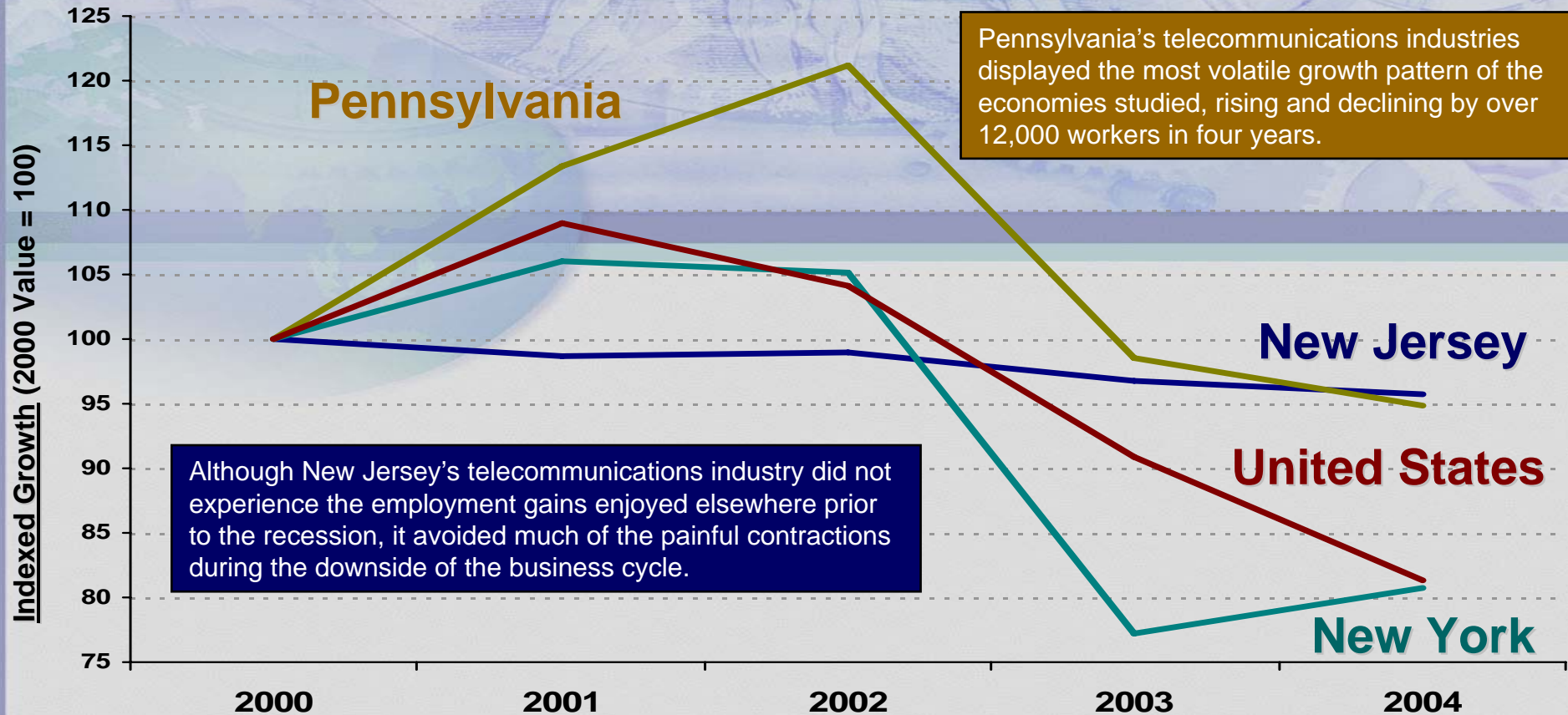
Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).



# Employment Trend in Telecommunication Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	65,290	64,450	64,660	63,130	62,570	-2,720	-4.2%
New York	130,780	138,710	137,400	101,0280	105,710	-25,070	-19.2%
Pennsylvania	59,260	67,210	71,810	58,460	56,170	-3,090	-5.2%
United States	1,631,800	1,777,000	1,698,400	1,483,500	1,327,400	-304,400	-18.7%

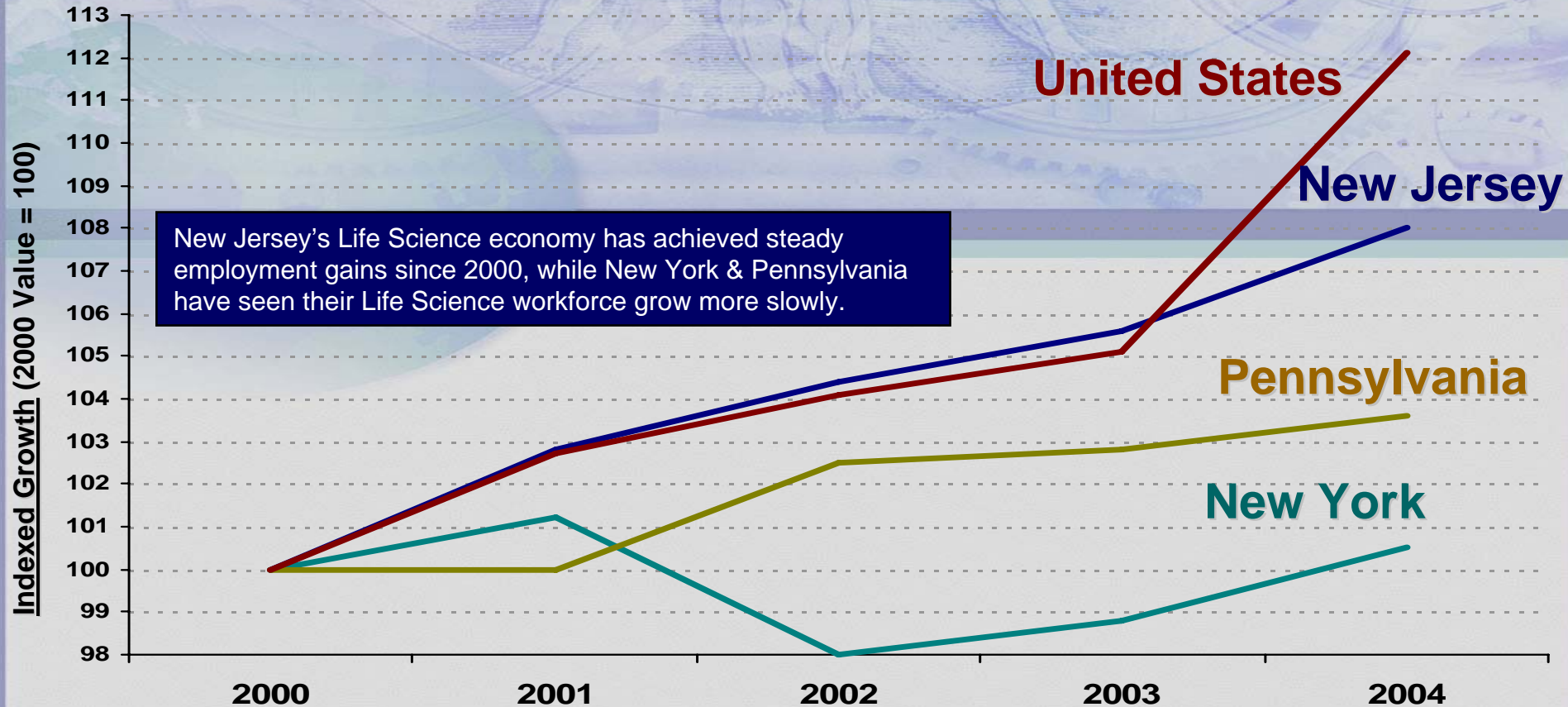
Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).



## Employment Trend in Life Science Industries, 2000 to 2004

Geography	2000	2001	2002	2003	2004	Net	Pct
New Jersey	293,710	302,040	306,550	310,210	317,260	23,550	8.0%
New York	652,740	660,390	639,780	644,900	655,780	3,040	0.5%
Pennsylvania	435,680	435,690	446,540	447,800	451,350	15,670	3.6%
United States	8,568,900	8,796,300	8,919,000	9,003,500	9,601,600	1,032,700	12.1%

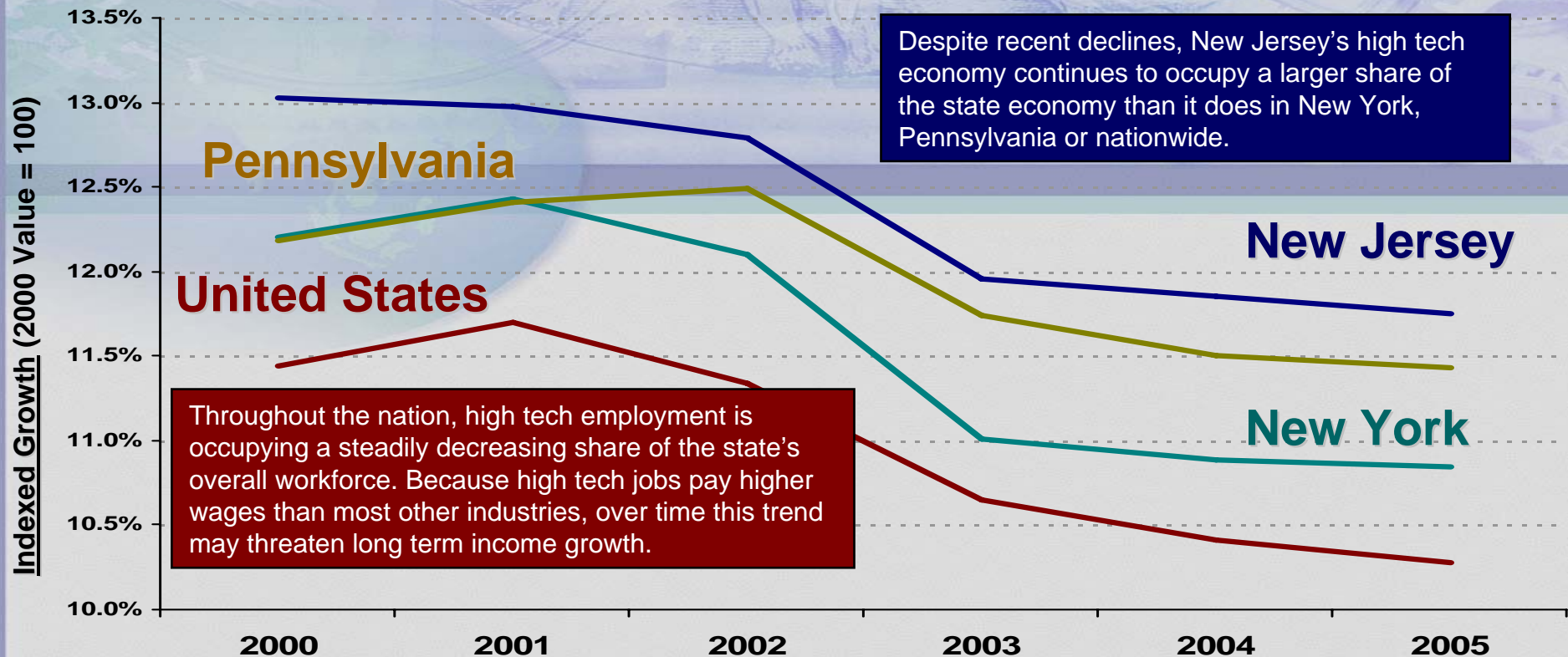
Raw Data Source: County Business Patterns (2006). Suppressed employment figures were estimated by SEI (roughly 3% of state industries).



# High Tech Industries as Percent of Total Employment, 2000 to 2005

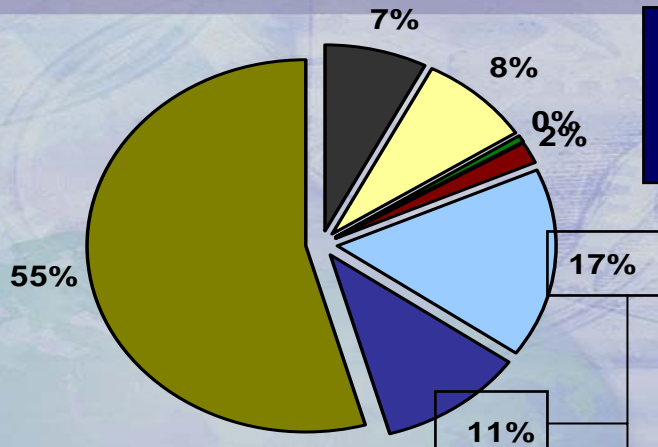
Geography	2000	2001	2002	2003	2004	2005*	Net
New Jersey	13.03%	12.98%	12.79%	11.96%	11.85%	11.75%	-1.28%
New York	12.20%	12.43%	12.10%	11.01%	10.89%	10.84%	-1.36%
Pennsylvania	12.18%	12.41%	12.49%	11.74%	11.50%	11.43%	-0.74%
United States	11.44%	11.70%	11.34%	10.65%	10.41%	10.28%	-1.16%

Raw Data Source: County Business Patterns (2006). \* State totals for 2005 were estimated from Bureau of Labor statistics employment data and SEI survey responses



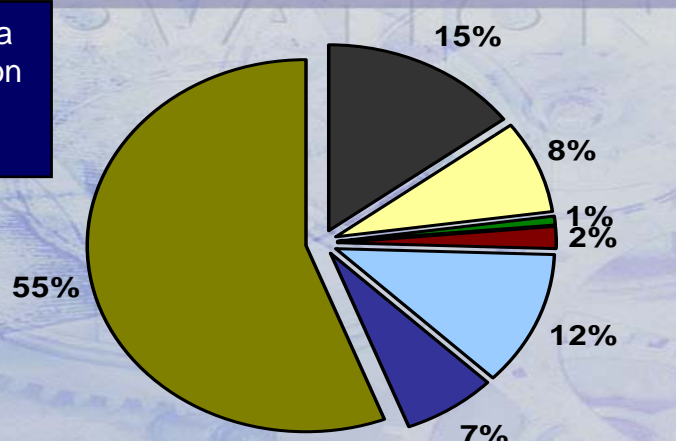
# Employment by High Technology Sector, 2004

## New Jersey



New Jersey continues to have a significantly higher concentration of IT and telecommunication employment than the nation.

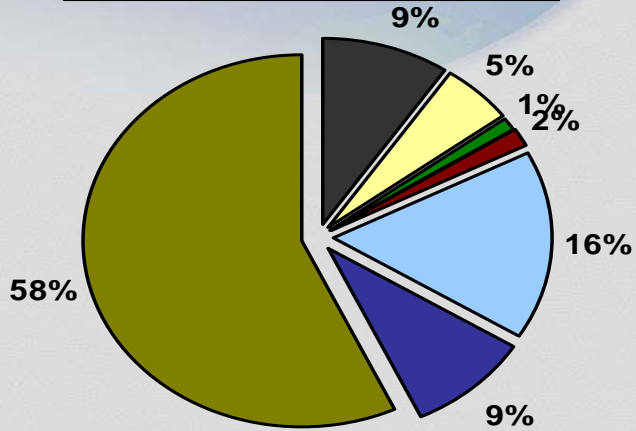
## Pennsylvania



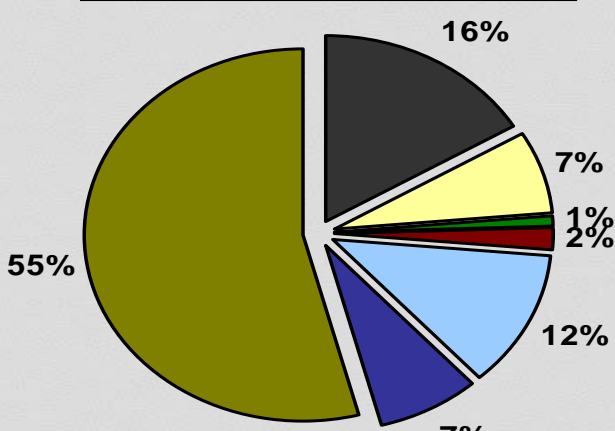
High Tech = 11.7% of NJ Total Employment

High Tech = 11.4% of PA Total Employment

## New York



## United States



High Tech = 10.8% of NY Total Employment

High Tech = 10.3% of USA Total Employment

### Industry Cluster

- Adv Mfg
- Adv Materials
- Energy
- Environ Tech
- Info Tech
- Telecomm
- Life Sciences

# HIGH TECH INDUSTRY EMPLOYMENT

## SECTION 1 SUMMARY

2

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1. After several years of steep decline New Jersey's High Technology employment base is beginning to expand, growing by 1.3% (7,500 jobs) since 2003.
2. However, several New Jersey High Tech industries, including Advanced Manufacturing, Advanced Materials & Energy have continued to experience workforce declines.
3. Consistent with the broader national trend, employment in New Jersey's IT industries declined sharply in 2003 but have since begun to stabilize.
4. New Jersey telecommunications industries contracted slightly (-4.2%) over the coverage period, but the declines were far less than those experienced in New York (-19.2%) and nationally (-18.7%).
5. New Jersey's large Life Science industry continues to drive the state's high tech economy, growing by 23,500 jobs since 2000.

# HIGH TECH INDUSTRY EMPLOYMENT

## SECTION 1 SUMMARY CONT.

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6. New Jersey high tech industries account for a larger share of the state's economy than they do in New York, Pennsylvania or the nation. However, like all the economies in our cohort, that measure of concentration has been declining since 2000.
7. Relative to the nation, New Jersey's IT and Telecommunications Industries account for a large share of the state's high tech employment base. Together they account for 28% of New Jersey High Tech employment compared to 19% nationally.

# SECTION 2.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

HIGH TECH BUSINESS  
FORMATIONS

GRADE: B

2

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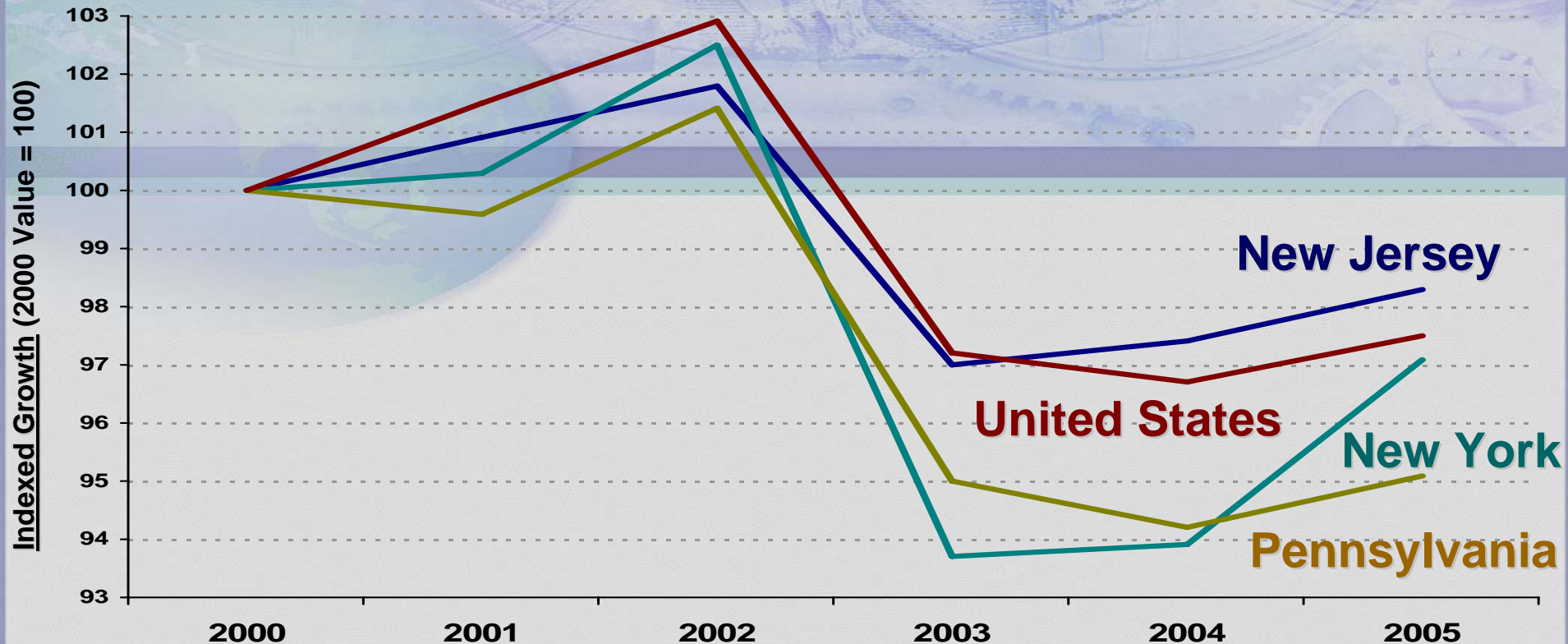
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# Growth Trend in High Technology Establishments, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005*	Net	Pct
New Jersey	28,740	29,010	29,250	27,890	28,000	28,250	-490	-1.71%
New York	44,610	44,740	45,740	41,820	41,890	43,340	-1,270	-2.85%
Pennsylvania	29,740	29,620	30,140	28,260	28,010	28,290	-1,450	-4.85%
United States	695,260	705,610	715,680	676,040	672,070	678,120	-17,140	-2.46%

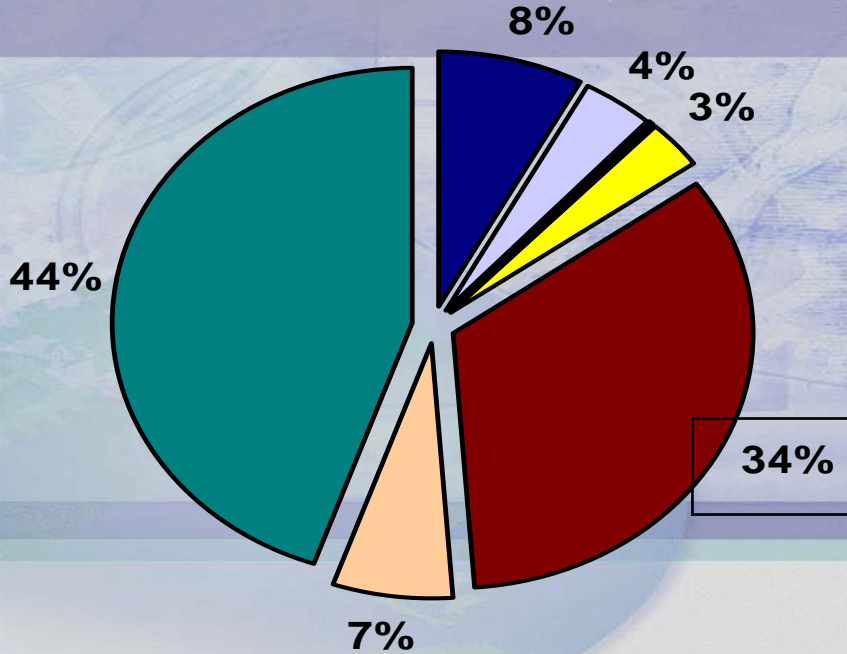
Raw Data Source: County Business Patterns (2006). \* State totals for 2005 were estimated from Bureau of Labor statistics employment data and SEI survey responses



# High Tech Business Establishments by Industry Segment

## New Jersey

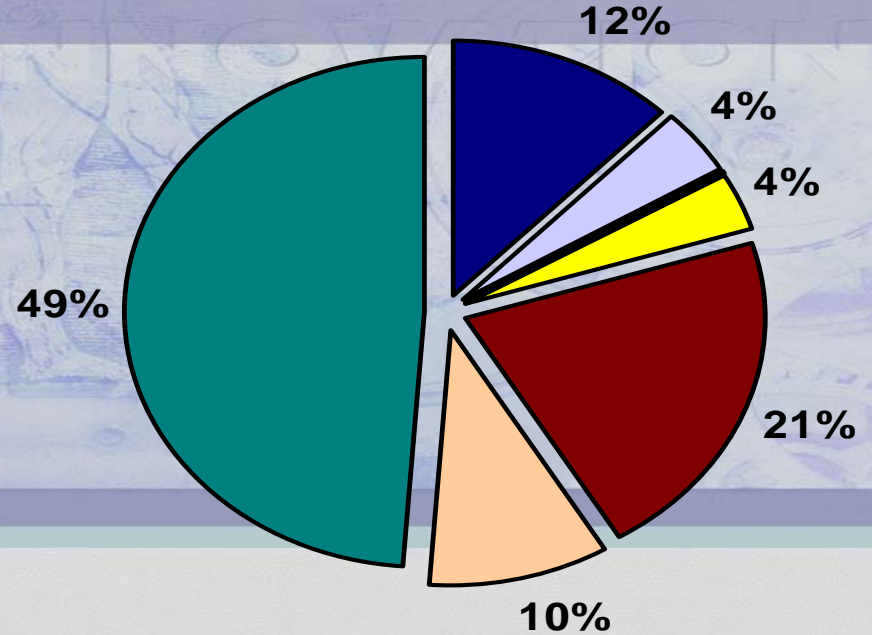
Total HT Establishments in NJ = 27,067



New Jersey's high concentration of telecommunication firms suggests a high degree of competitiveness in that industry relative to the nation.

## United States

Total Home-Based Businesses in USA = 610,967



Nationally, nearly half of all high tech establishments are life science firms. New Jersey has a slightly lower percentage because it is home to several large pharmaceutical companies.

Advanced Materials

Environmental Technology

Life Sciences

Advanced Manufacturing

Information Tech

Energy

Telecommunications

# Average Number of Workers per High Tech Establishment , 2005

*Number of workers per High Tech Company (State Average):*

**New Jersey** - 20.8

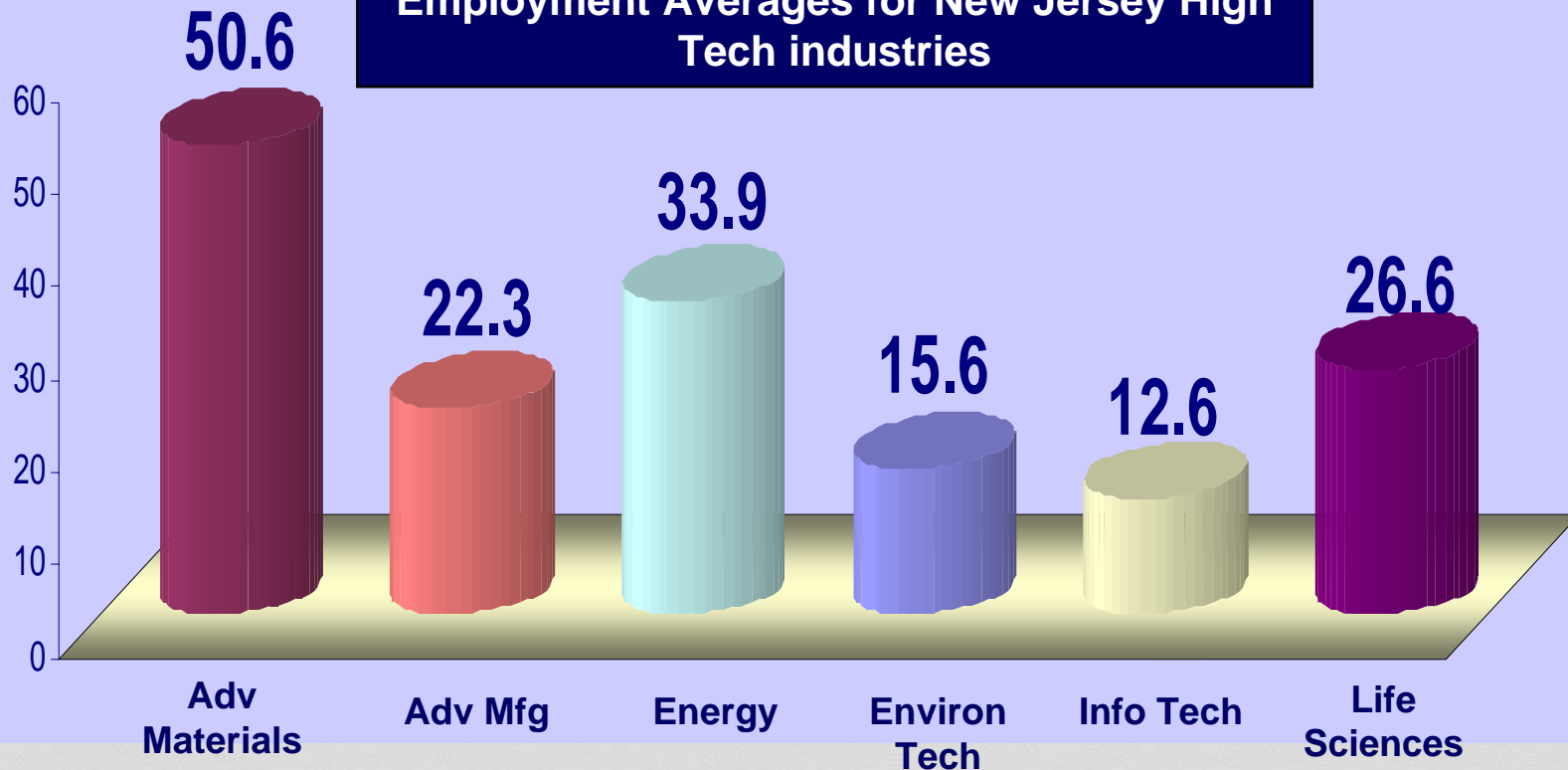
**Pennsylvania** - 28.5

**New York** - 25.5

**United States** - 26.7

New Jersey Average # of Worker per Establishment

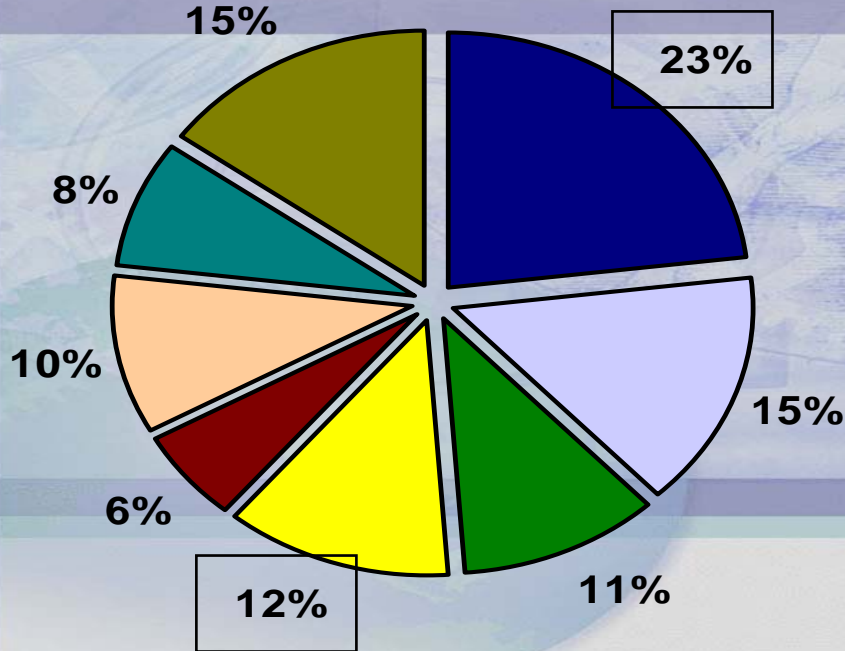
## Employment Averages for New Jersey High Tech industries



# Home-Based Businesses by Industry Segment

## New Jersey

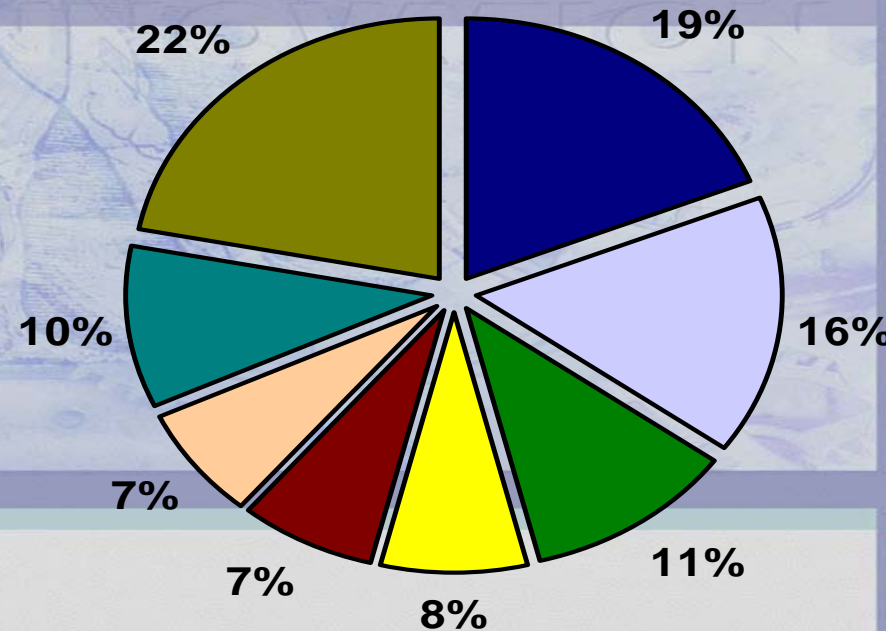
Total Home-Based Businesses in NJ = 255,780



New Jersey has a high concentration of home-based businesses in both the technology & administrative support service segments.

## United States

Total Home-Based Businesses in USA = 8,250,294



An often overlooked component of the economy, home-based business now account for nearly half of all businesses operations nationwide.

Professional, Scientific & Technical Services

Construction

Retail Trade

Administrative & Support Services

Health Care & Social Assistance

Real Estate & Rental

Other Services

All Other Types of Businesses

# HIGH TECH BUSINESS FORMATIONS

## SECTION 2 SUMMARY

2

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1. After two years of declines, New Jersey has begun to experience growth in high technology business establishments.
2. New Jersey has a high concentration of small high tech firms relative to the nation and its peer states. Many of these enterprises are home-based businesses which now account for a significant percentage of the state's high technology establishments.
3. New Jersey's technology companies are smaller, on average, than those in neighboring states. New Jersey information technology firms are the smallest average employing less than 13 workers.

# SECTION 3.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

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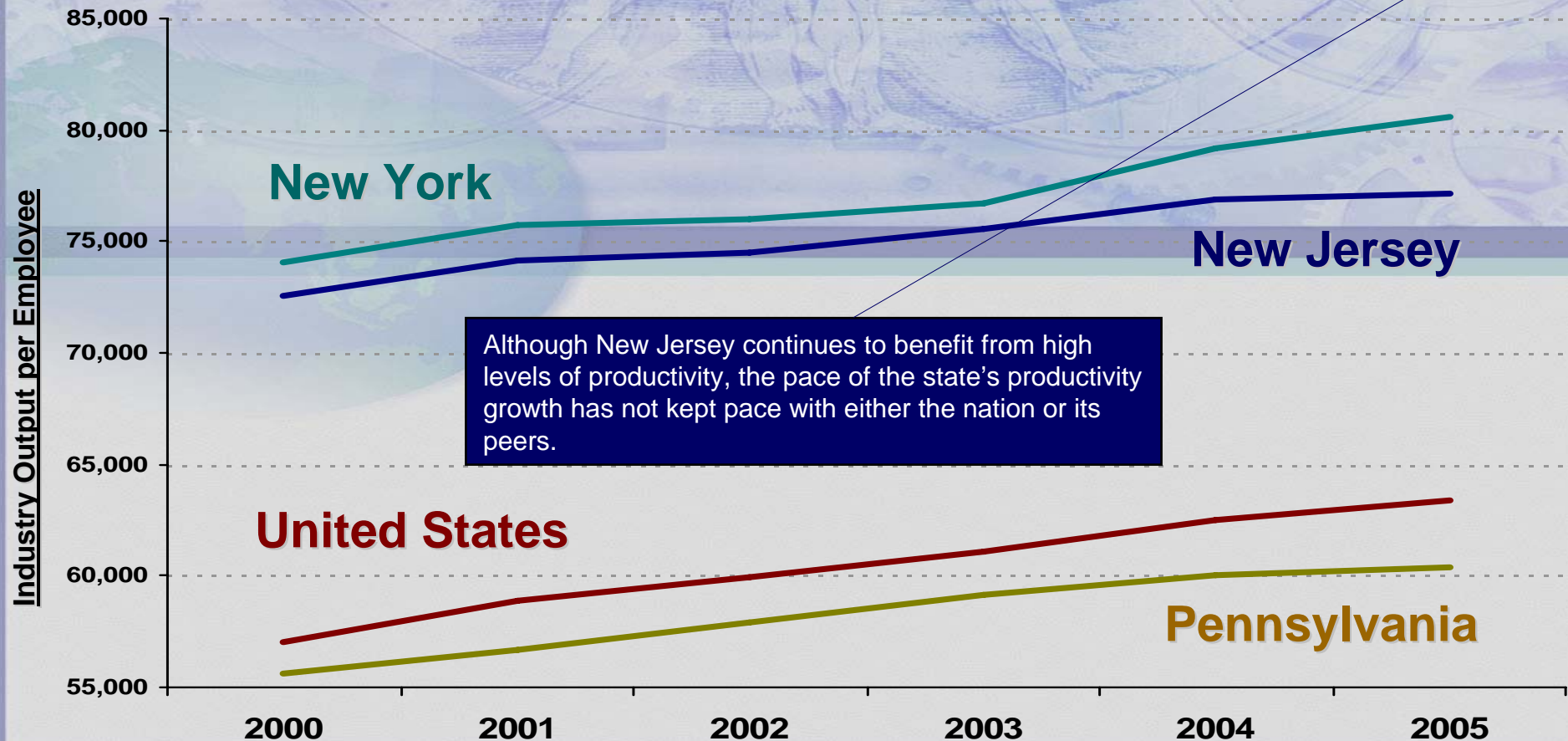
# PRODUCTIVITY

## GRADE: B-

# Growth Trend in Statewide Productivity (Output per Worker), 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	72,560	74,140	74,500	75,590	76,860	77,130	4,570	6.3%
New York	74,090	75,720	76,010	76,740	79,180	80,570	6,480	8.8%
Pennsylvania	55,590	56,680	57,930	59,160	60,030	60,340	4,750	8.5%
United States	56,990	58,890	59,9030	61,100	62,540	63,340	6,350	11.1%

Raw Data Source: United States Bureau of Economic Analysis; U.S. Census Bureau.



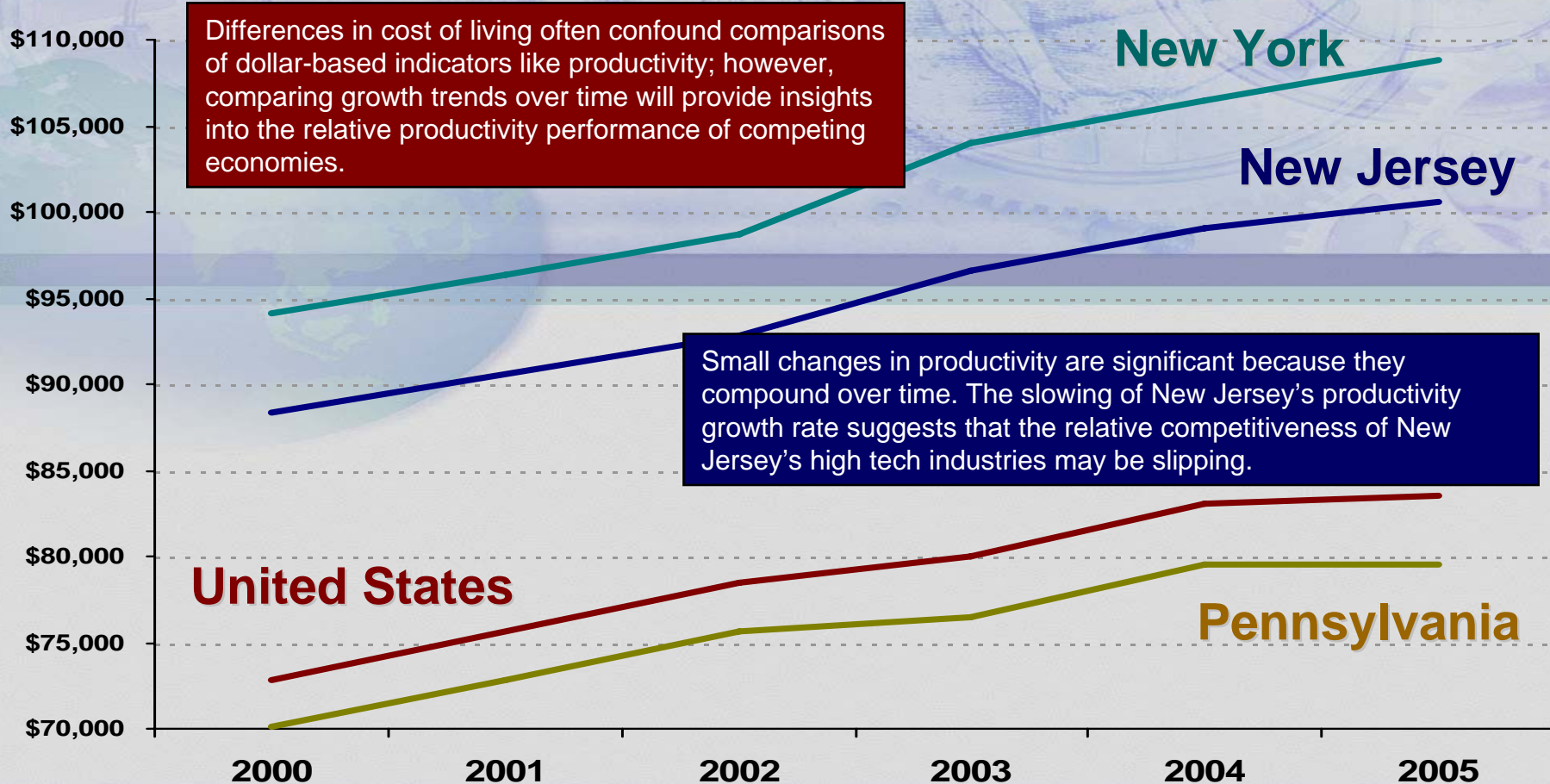
Although New Jersey continues to benefit from high levels of productivity, the pace of the state's productivity growth has not kept pace with either the nation or its peers.

# Growth Trend in High Tech Industry Productivity (Output per Worker), 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$88,360	\$90,570	\$92,830	\$96,620	\$99,030	\$100,600	\$12,240	13.9%
New York	\$94,100	\$96,360	\$98,670	\$103,970	\$106,470	\$108,850	\$14,750	15.7%
Pennsylvania	\$70,070	\$72,800	\$75,640	\$76,490	\$79,470	\$79,580	\$9,510	13.6%
United States	\$72,830	\$75,600	\$78,480	\$80,010	\$83,050	\$83,510	\$10,680	14.7%

Raw Data Source: United States Bureau of Economic Analysis; U.S. Census Bureau, County Business Patterns (2006).

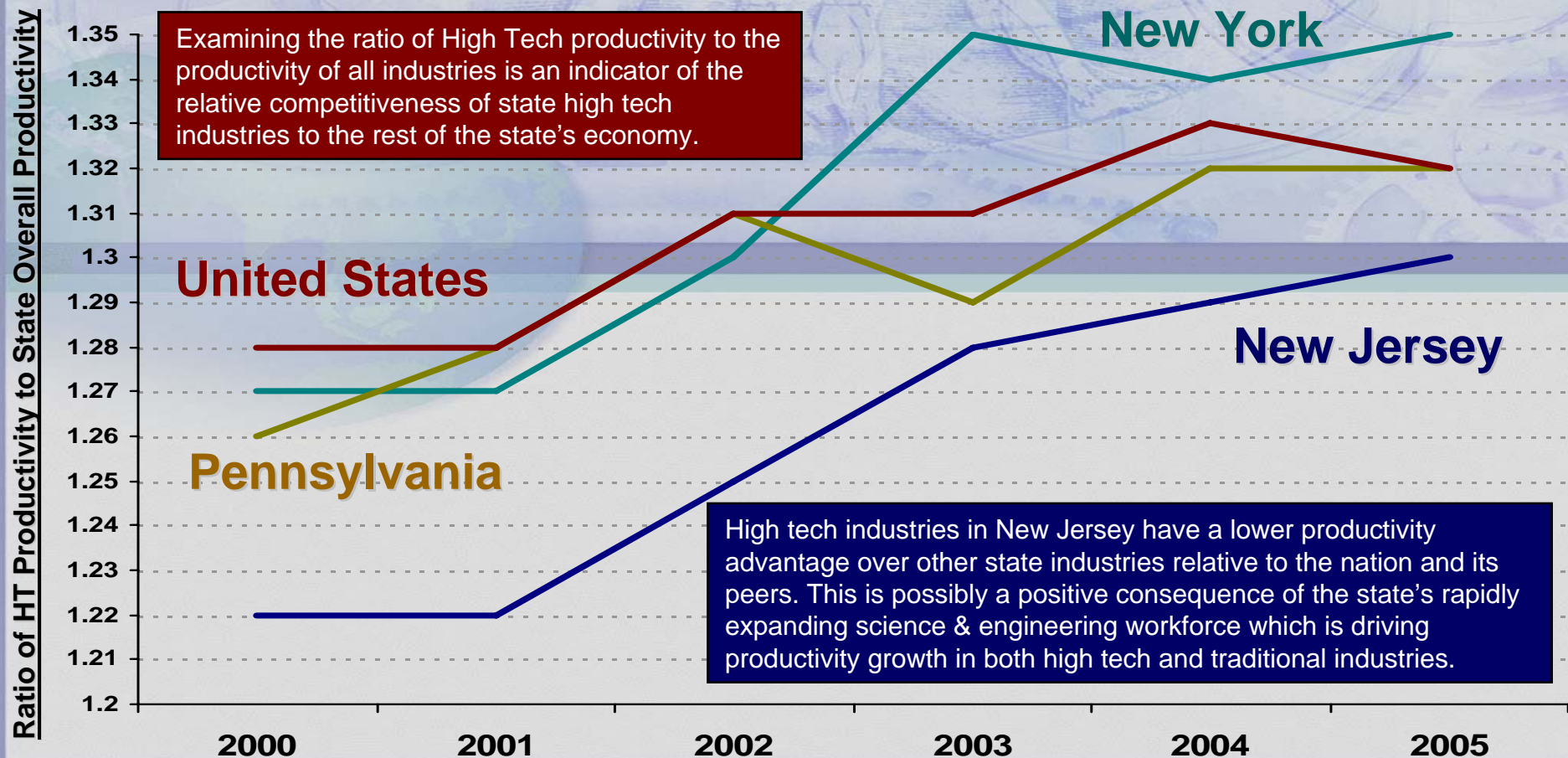
High Tech Industry Output per High Tech Worker



# Ratio of High Tech Productivity to Statewide Productivity, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005
New Jersey	1.22	1.22	1.25	1.28	1.29	1.30
New York	1.27	1.27	1.30	1.35	1.34	1.35
Pennsylvania	1.26	1.28	1.31	1.29	1.32	1.32
United States	1.28	1.28	1.31	1.31	1.33	1.32

Raw Data Source: United States Bureau of Economic Analysis; U.S. Census Bureau, County Business Patterns (2006).



# INDUSTRY PRODUCTIVITY

## SECTION 3 SUMMARY

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1. New Jersey's industries continue to operate at high levels of productivity, both within the traditional sectors of the economy and within the high tech industry clusters.
2. The growth of industry productivity, however, continues to slow relative to the nation and New Jersey's neighboring states. While the current gap in growth rates appears narrow, over time even modest declines in the rate of growth can hamper industry competitiveness.
3. New Jersey's high tech industries are relatively more productive than the state's traditional (non-high tech industries), yet less so than in neighboring states.

# SECTION 4.

2

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

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EMPLOYMENT IN  
SCIENCE & ENGINEERING  
OCCUPATIONS

GRADE: A

It is estimated that the nation's high tech industries employ only 65% of the Science & Engineering workforce. Therefore about one-third of the nation's technical talent is employed in non-high tech enterprises.

### Profile of Science & Engineering (S&E) Occupations, 2005

Geography	S&E Occupation Employment as Pct of Total Employment	Growth in S&E Occupation (2000 - 2005)	Ratio of S&E Wages to State Average
New Jersey	12.0%	10.6%	1.59
New York	12.6%	2.6%	1.51
Pennsylvania	10.3%	1.3%	1.71
United States	11.2%	4.3%	1.66

Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.

### Profile of High Technology Industries, 2005

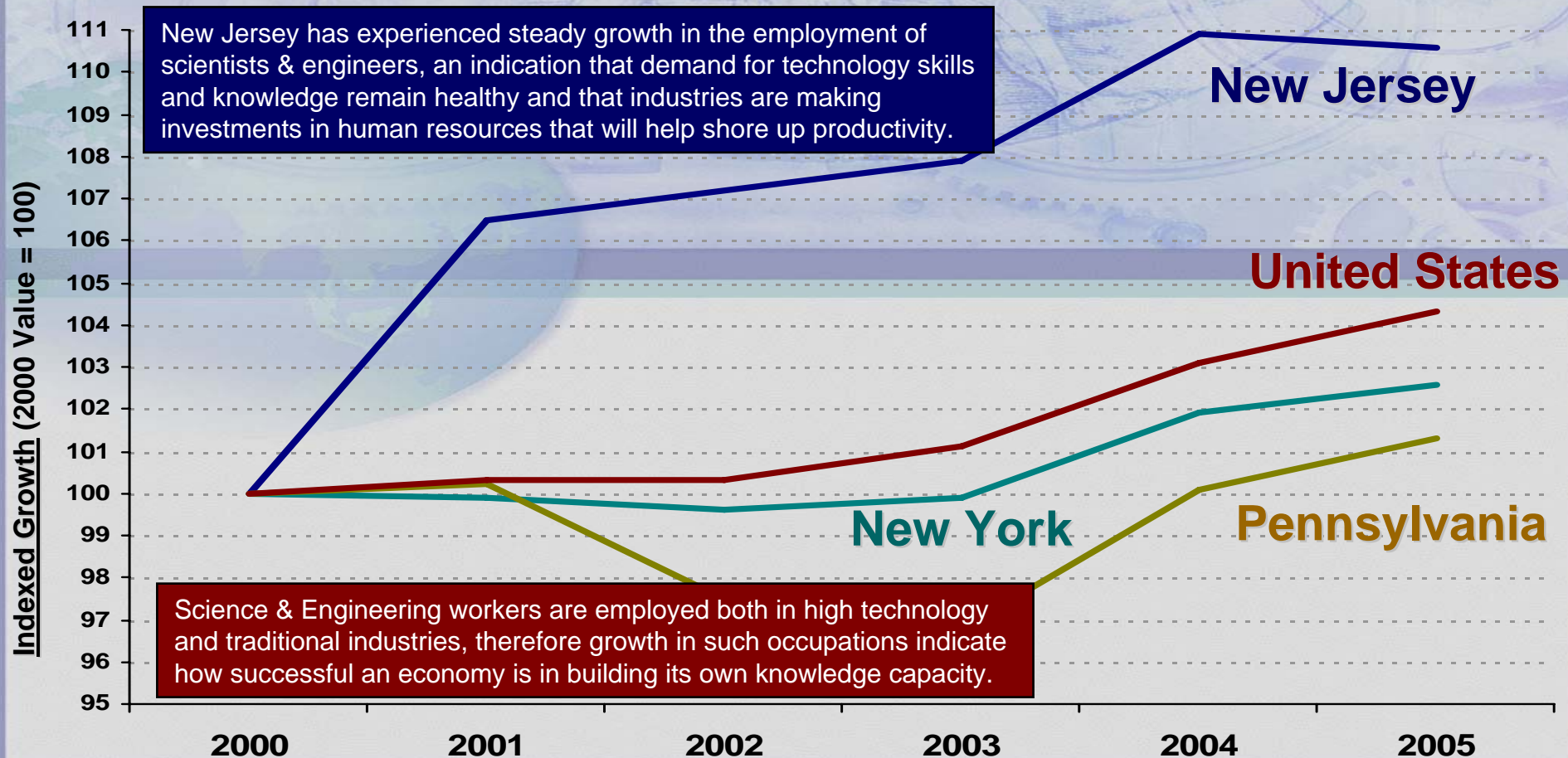
Geography	High Tech Employment as Pct of Total Employment	Growth in High Tech Employment (2000 - 2005)*	Ratio of High Tech Payroll to State Average*
New Jersey	11.7%	-5.3%	1.37
New York	10.8%	-8.6%	1.31
Pennsylvania	11.4%	-4.0%	1.39
United States	10.3%	-6.1%	1.39

Raw Data Source: County Business Patterns (2006). \* State totals for 2005 were estimated from Bureau of Labor statistics employment data and SEI survey responses

# Employment Trend in Science & Engineering Occupations, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	423,980	451,700	454,310	457,530	470,330	468,980	45,000	10.6%
New York	1,020,510	1,019,400	1,016,120	1,019,700	1,039,760	1,047,390	27,180	2.6%
Pennsylvania	566,950	567,940	552,530	549,070	567,770	574,280	7,330	1.3%
United States	13,997,900	14,041,100	14,034,900	14,148,400	14,432,500	14,599,400	601,500	4.3%

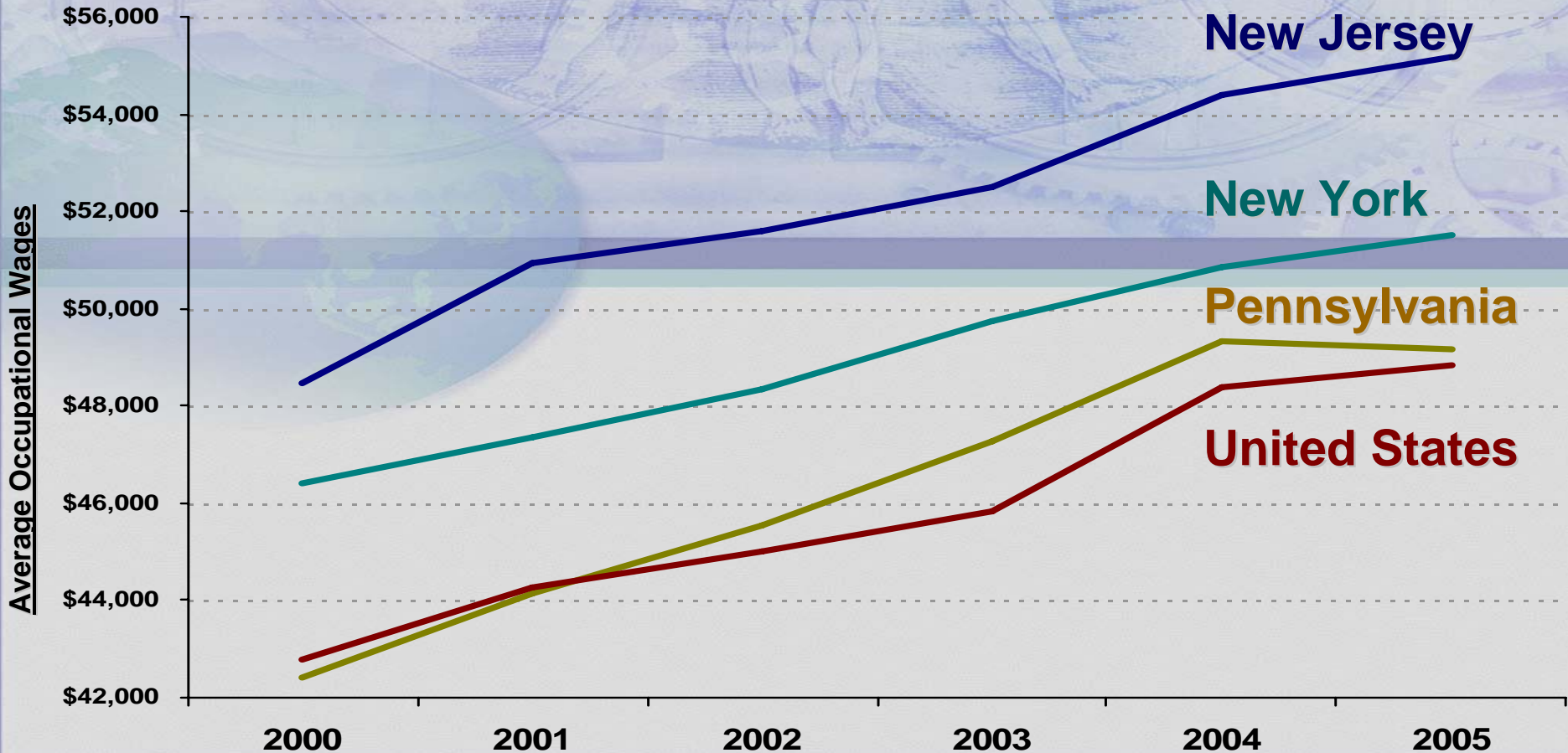
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.



# Salary Trends in Science & Engineering Occupations, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$48,440	\$50,920	\$51,590	\$52,500	\$54,410	\$55,160	\$6,720	13.9%
New York	\$46,400	\$47,370	\$48,320	\$49,750	\$50,850	\$51,490	\$5,090	11.0%
Pennsylvania	\$42,420	\$44,140	\$45,530	\$47,260	\$49,340	\$49,160	\$6,740	15.9%
United States	\$42,800	\$44,260	\$45,010	\$45,810	\$48,390	\$48,850	\$6,050	14.1%

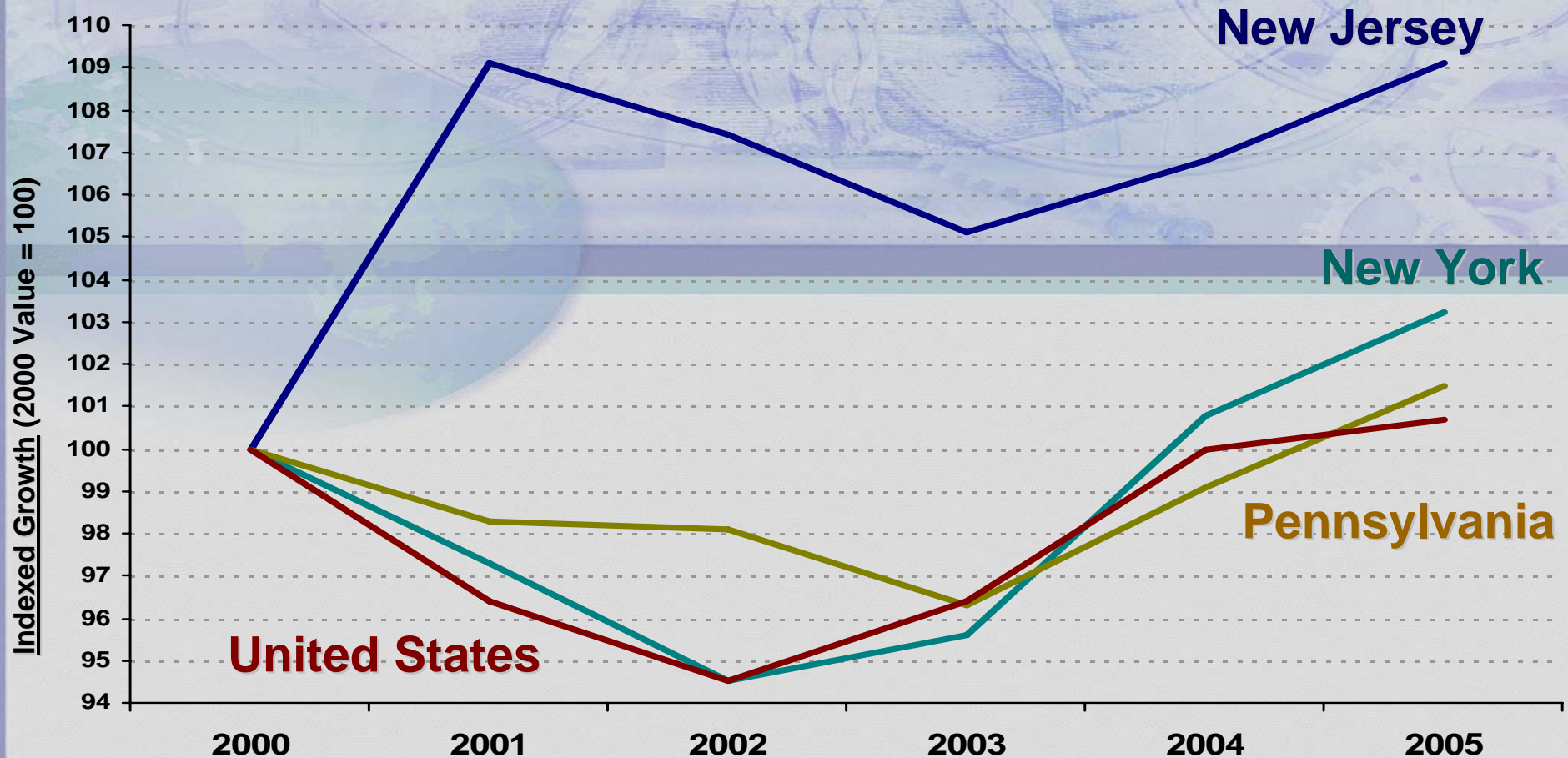
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.



# Employment Trend in Computer Scientists & Mathematicians, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	108,000	117,790	115,990	113,520	115,390	117,820	9,820	9.1%
New York	179,560	174,660	169,750	171,700	181,050	185,330	5,770	3.2%
Pennsylvania	105,950	104,160	103,960	101,980	105,020	107,580	1,630	1.5%
United States	2,932,800	2,825,80	2,772,600	2,827,000	2,932,700	2,952,700	19,900	0.7%

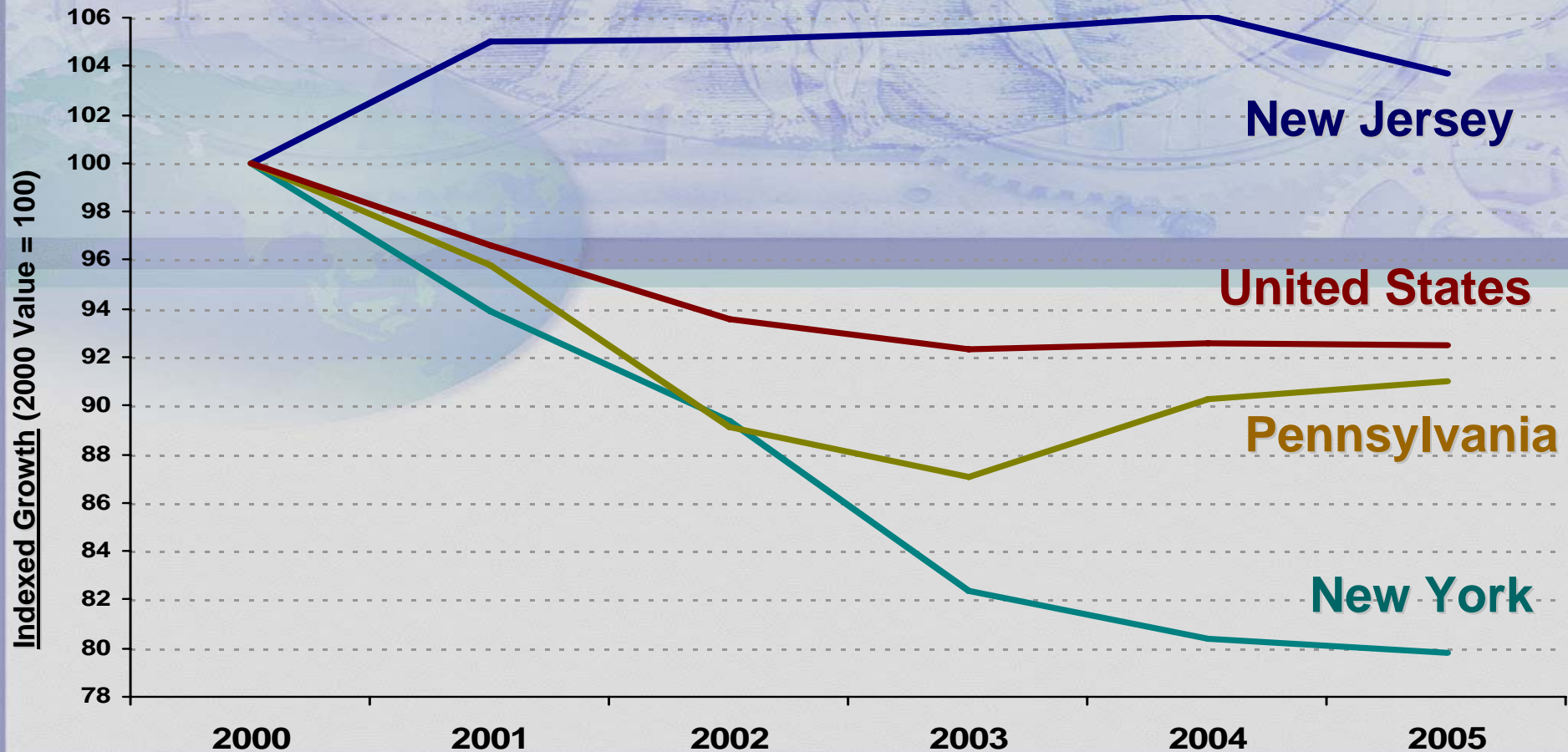
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.



# Employment Trend in Engineers & Architects, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	54,980	57,750	57,800	57,950	58,320	57,000	2,020	3.7%
New York	130,570	122,590	116,760	107,640	104,970	104,230	-26,340	-20.2%
Pennsylvania	100,490	96,220	89,580	87,560	90,780	91,490	-9,000	-9.0%
United States	2,575,600	2,489,000	2,411,200	2,376,600	2,385,600	2,382,400	-193,200	-7.5%

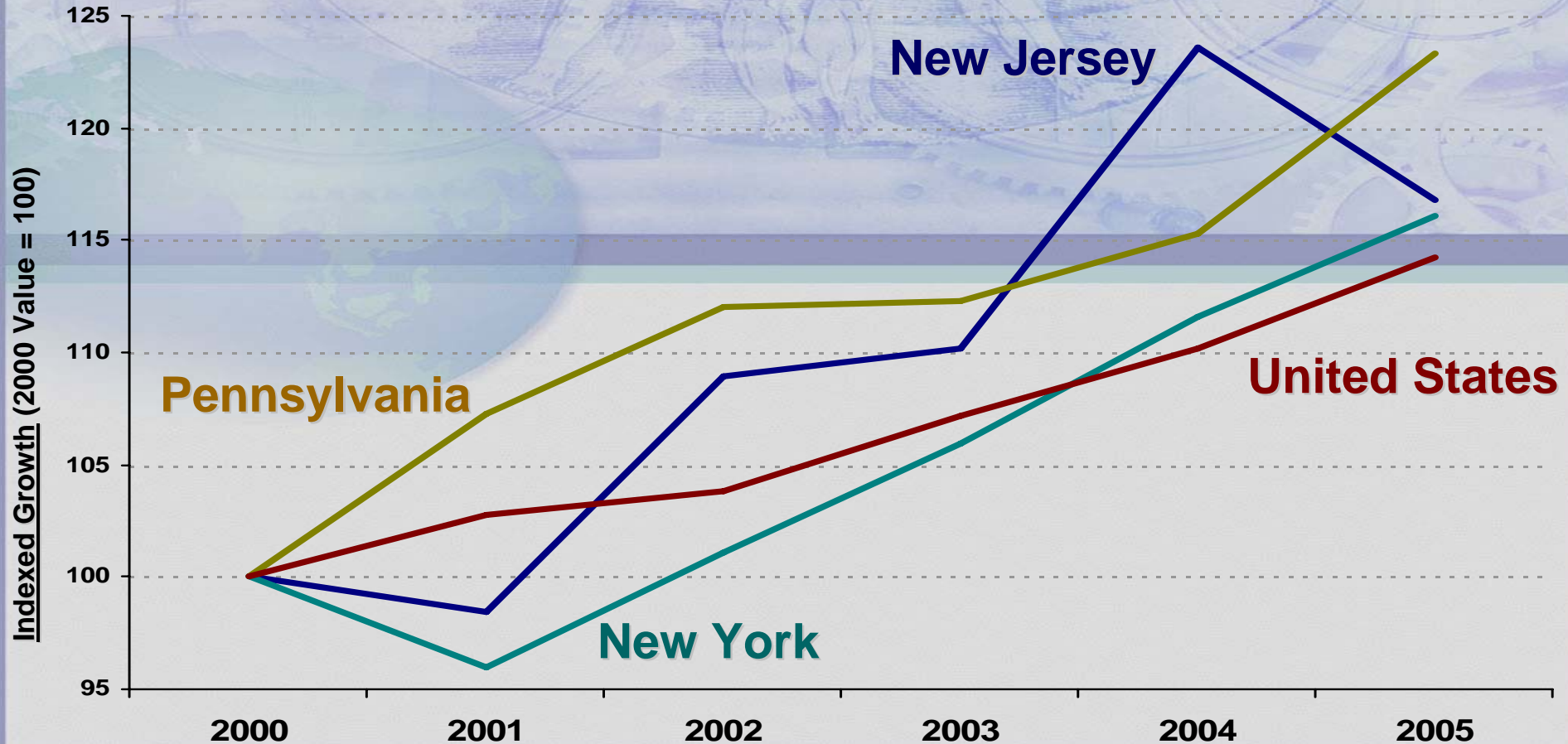
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.



# Employment Trend in Life & Physical Science Occupations, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	36,100	35,520	39,300	39,790	44,620	42,160	6,060	16.8%
New York	69,840	67,030	70,590	73,930	77,960	81,080	11,240	16.1%
Pennsylvania	40,570	43,540	45,430	45,580	46,770	50,010	9,440	23.3%
United States	1,038,600	1,067,700	1,078,600	1,113,100	1,144,200	1,185,700	147,100	14.2%

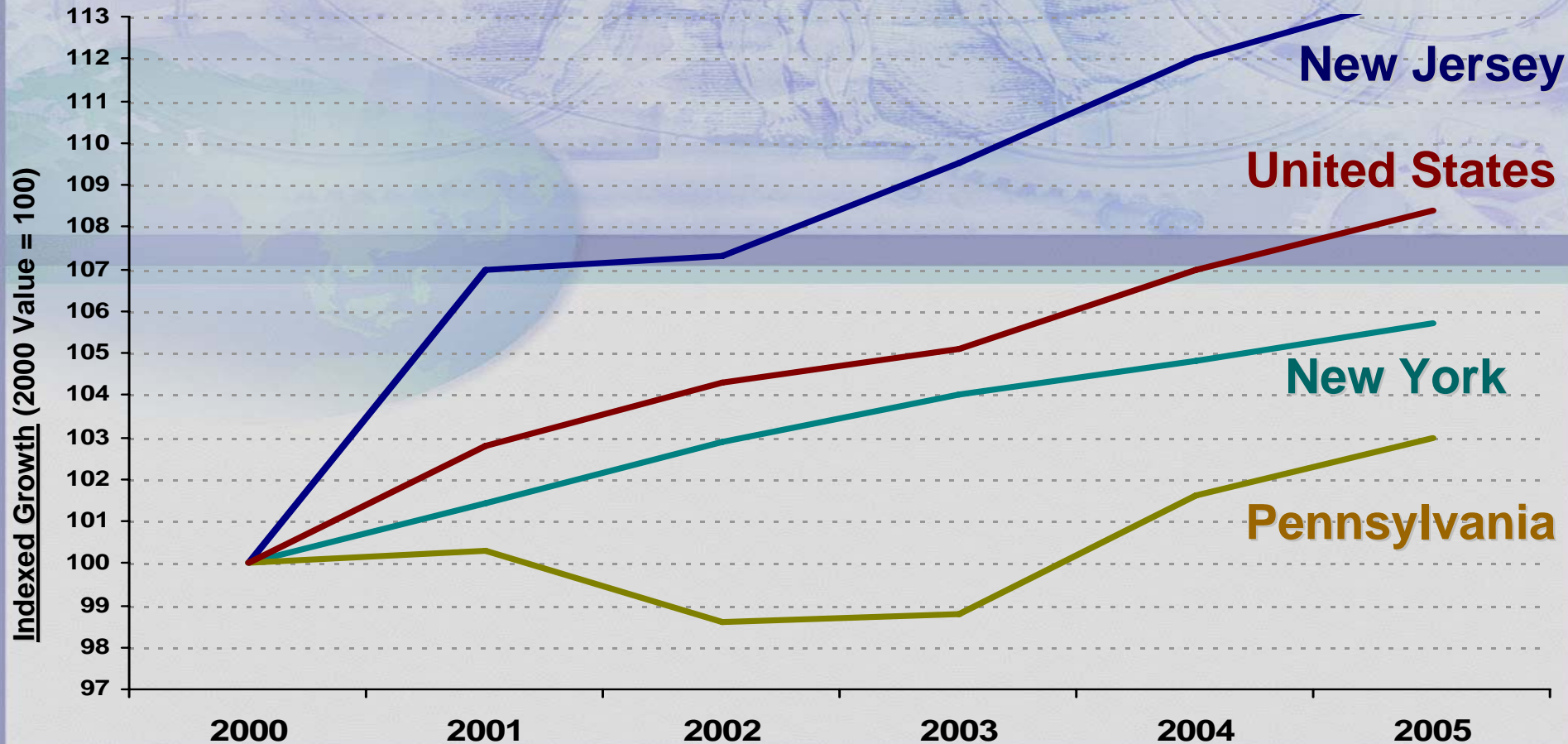
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.



# Employment Trend in Education & Training Occupations, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	224,900	240,640	241,220	246,270	252,000	255,430	30,530	13.6%
New York	640,540	649,780	659,020	666,430	671,590	676,750	36,210	5.7%
Pennsylvania	319,940	321,020	315,560	315,950	325,200	329,630	9,690	3.0%
United States	7,450,800	7,658,400	7,772,400	7,831,600	7,969,800	8,078,500	627,700	8.4%

Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.

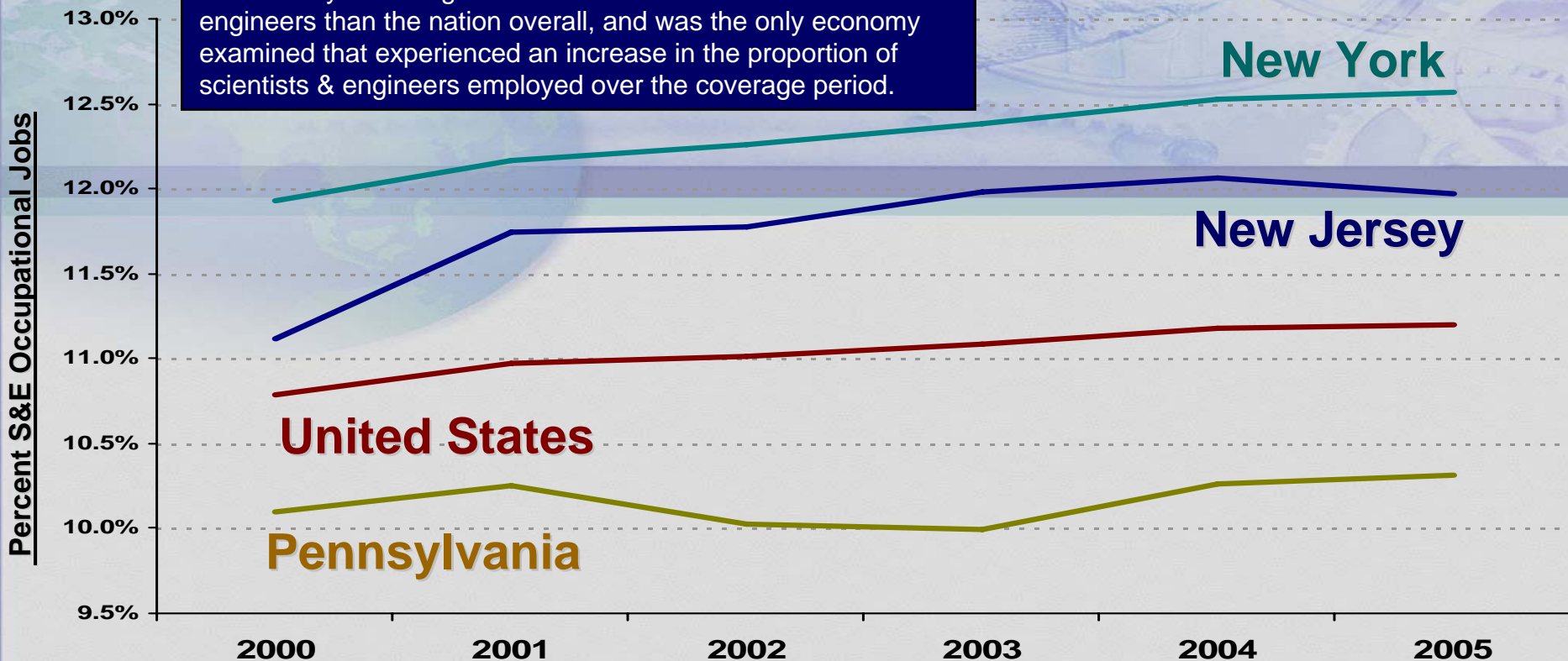


# Science & Engineering Occupations as Percent of All Occupations, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Diff
New Jersey	11.12%	11.74%	11.78%	11.98%	12.06%	11.97%	0.85%
New York	11.93%	12.17%	12.26%	12.38%	12.53%	12.57%	0.64%
Pennsylvania	10.10%	10.25%	10.02%	9.99%	10.26%	10.31%	0.21%
United States	10.79%	10.97%	11.01%	11.09%	11.18%	11.20%	0.41%

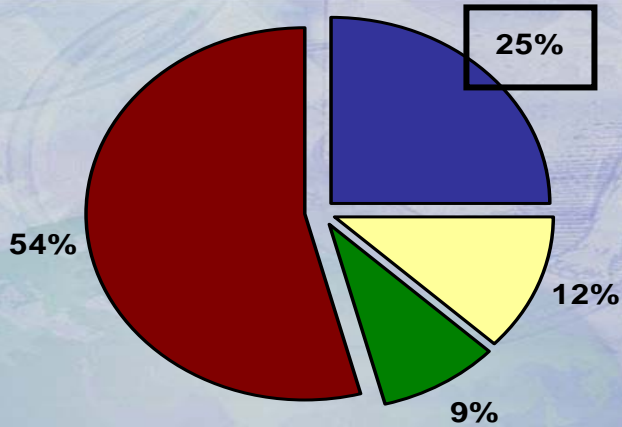
Raw Data Source: Bureau of Labor Statistics, Occupational Employment Surveys (2006). SEI S&E Employment & Wage Survey.

New Jersey has a higher concentration of scientists & engineers than the nation overall, and was the only economy examined that experienced an increase in the proportion of scientists & engineers employed over the coverage period.



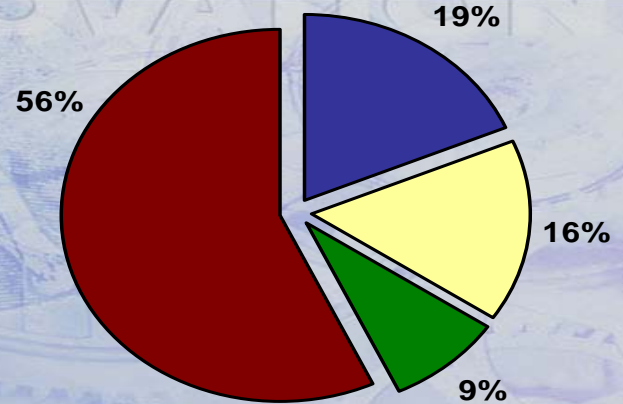
# Employment by Science & Engineering Occupation, 2005

## New Jersey



New Jersey's workforce has a high concentration of computer scientists & mathematicians. Among science & engineering occupations, these fields are the most diverse in terms of employment across high tech industries

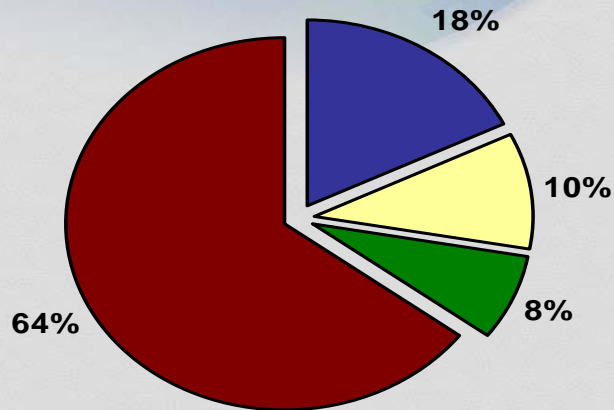
## Pennsylvania



S&E = 11.97% of all NJ Occupations

S&E = 10.31% of all PA Occupations

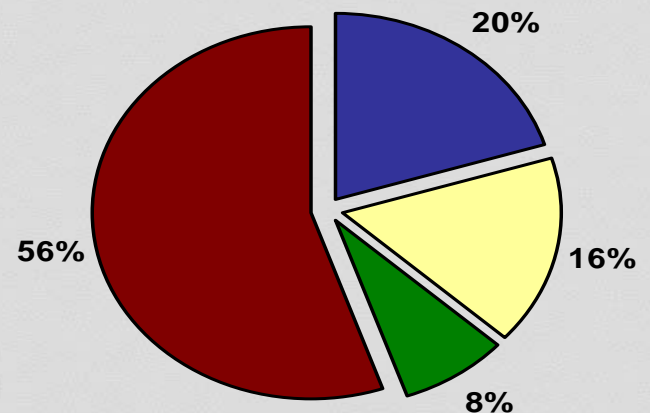
## New York



## United States

### S&E Occupation

- Computer Science & Mathematics
- Engineering & Architecture
- Life & Physical Sciences
- Education & Training



S&E = 12.57% of all NY Occupations

S&E = 11.21% of all USA Occupations

# SCIENCE & ENGINEERING EMPLOYMENT

## SECTION 4 SUMMARY

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1. If we shift perspectives from industry to occupational performance, New Jersey's High Tech workforce base has expanded considerably since 2000.
2. New Jersey's science and engineering workforce grew by 10.6% since 2000, far outpacing the nation and its Tristate peers.
3. New Jersey's science & engineering workforce saw salaries grow by 13.9% over the coverage period.
4. Computer scientists and mathematicians are New Jersey's fastest growing occupations within the state's science and engineering fields. The state added nearly 10,000 computer science & mathematics related jobs (9.1%) since 2000, growing 9 times faster than the nation and three times faster than New York.
5. New Jersey's was the only state examined that saw its science and engineering workforce expand its share of state employment since 2000. Science and engineering occupations now account for 12% of all occupations in New Jersey.

# SECTION 5.

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## NJTC Annual Score Card

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*A Profile of the New Jersey Technology Economy*

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### PATENT PRODUCTION

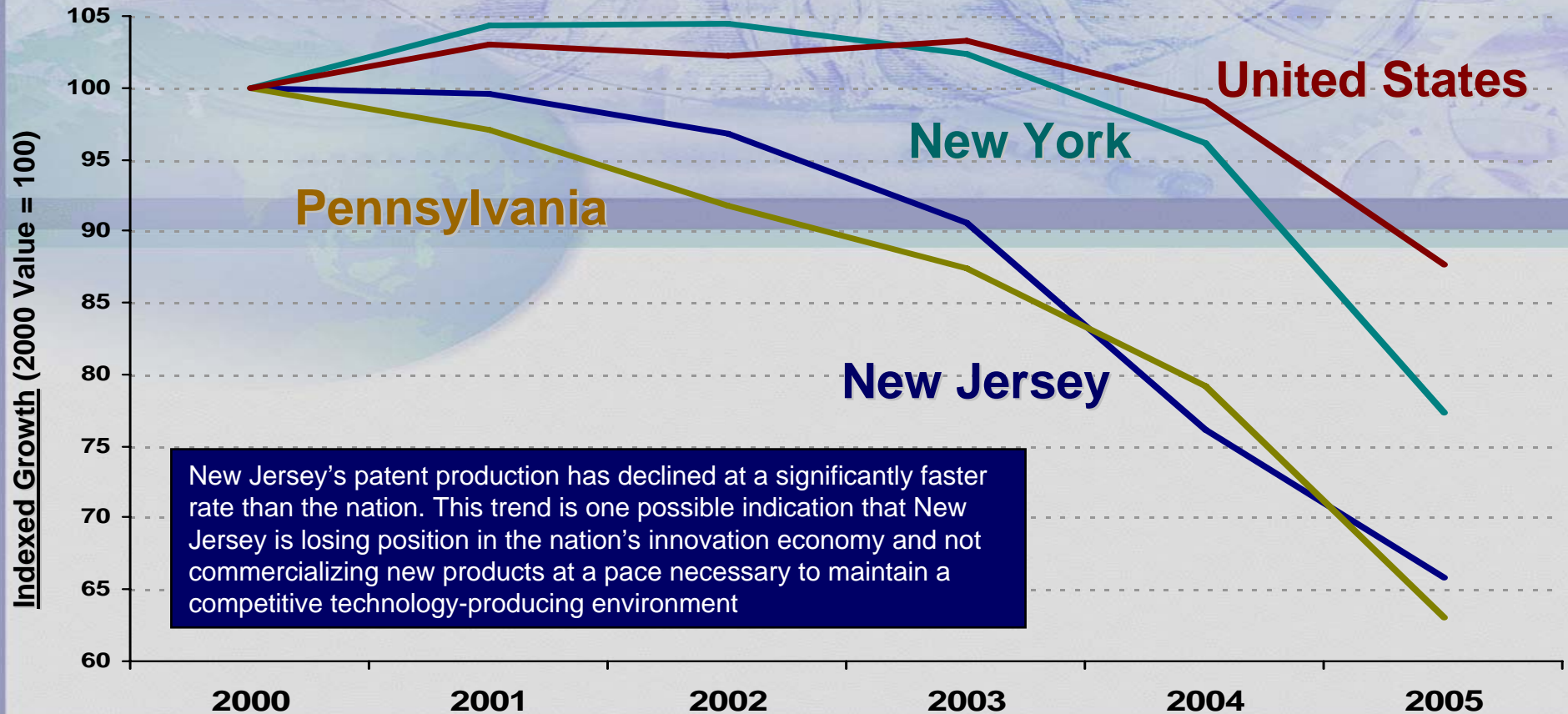
6

GRADE: C-

## Growth Trend in Patent Awards Received, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	3,886	3,872	3,761	3,522	2,957	2,557	-1,329	-34.2%
New York	6,086	6,346	6,360	6,234	5,846	4,703	-1,383	-22.7%
Pennsylvania	3,640	3,533	3,343	3,182	2,883	2,298	-1,342	-36.9%
United States	85,068	87,600	86,971	87,893	84,271	74,637	-10,431	-12.3%

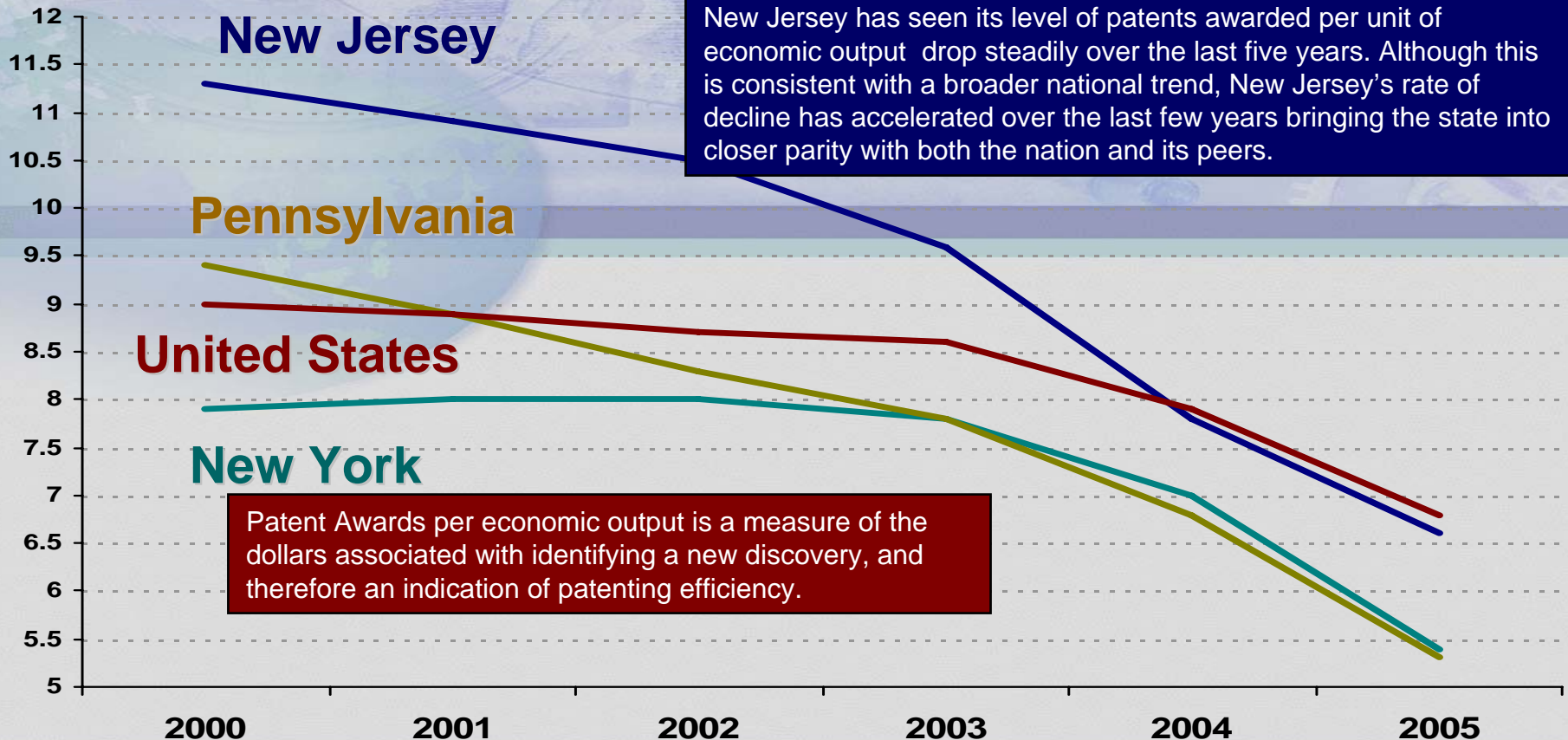
Raw Data Source: United States Patent & Trademark Office.



# Growth Trend in Patent Awards Per 1 Billion in State Output, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	11.3	10.9	10.5	9.6	7.8	6.6	-5	-41.1%
New York	7.9	8.0	8.0	7.8	7.0	5.4	-2	-31.0%
Pennsylvania	9.4	8.9	8.3	7.8	6.8	5.3	-4	-43.1%
United States	9.0	8.9	8.7	8.6	7.9	6.8	-2	-24.4%

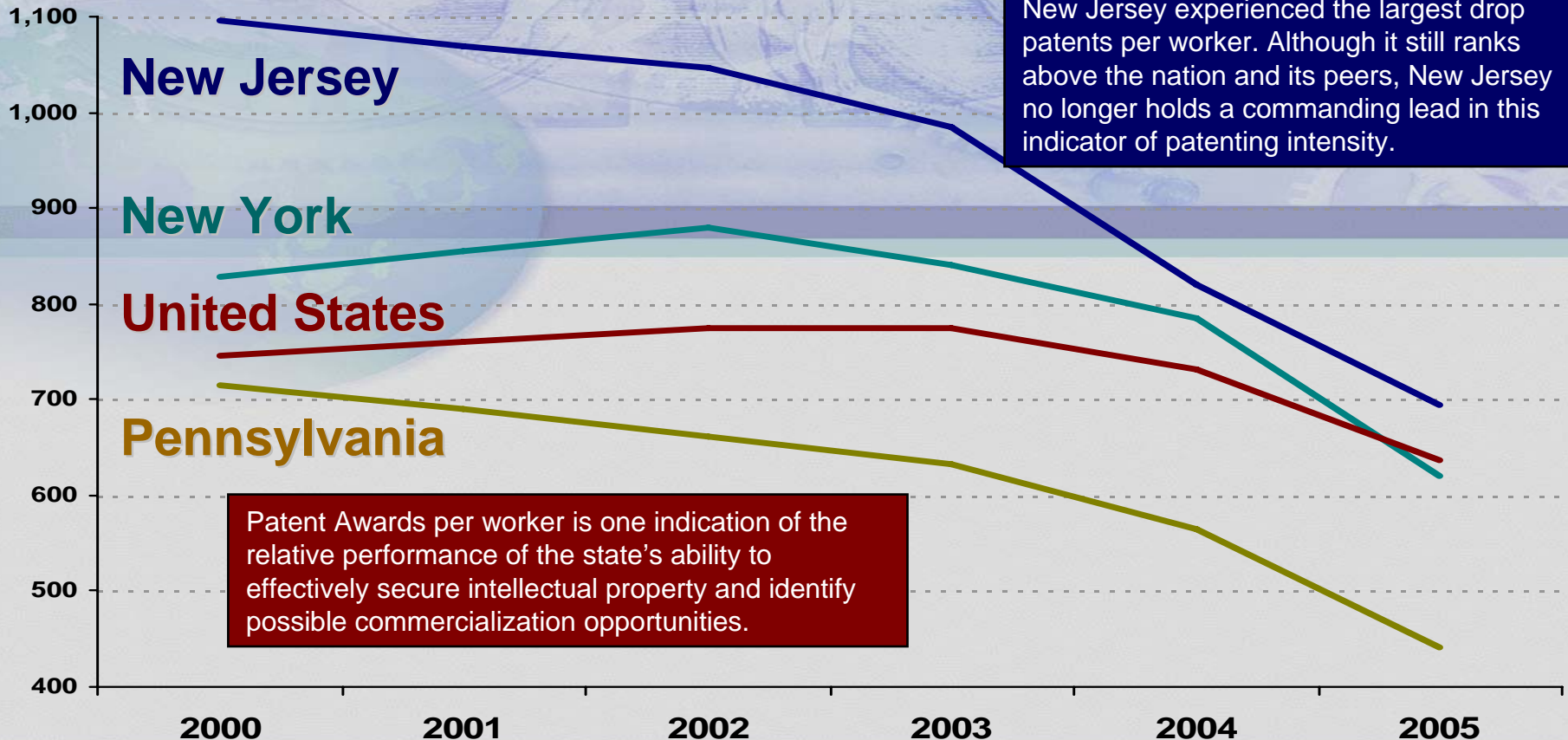
Raw Data Source: United States Patent & Trademark Office. United States Bureau of Economic Analysis.



# Growth Trend in Patent Awards Per 1 Million Private Sector Workers, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	1,095	1,069	1,046	984	819	695	-400	-36.5%
New York	828	854	879	841	786	621	-207	-25.0%
Pennsylvania	716	690	662	633	565	442	-274	-38.3%
United States	746	761	774	775	732	637	-109	-14.7%

Raw Data Source: United States Patent & Trademark Office. United States Census Bureau, County Business Patterns.



New Jersey experienced the largest drop patents per worker. Although it still ranks above the nation and its peers, New Jersey no longer holds a commanding lead in this indicator of patenting intensity.

Patent Awards per worker is one indication of the relative performance of the state's ability to effectively secure intellectual property and identify possible commercialization opportunities.

# PATENT PRODUCTION

## SECTION 5 SUMMARY

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1. New Jersey patent production has dropped by over 34% since the start of the decade, nearly three times faster than the national average.
2. Overall patenting intensity has declined at an accelerating rate. New Jersey now lags the nation in patent awards per dollar of state economic output.
3. Although New Jersey still leads the nation and its peers in patent productivity it has experienced a considerable drop in the number of patent awards it captures per worker.
4. Declines across each of these metrics is worrisome and suggest that New Jersey may be entering a period of slower innovation particularly in the fields of science and engineering.

# SECTION 6.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

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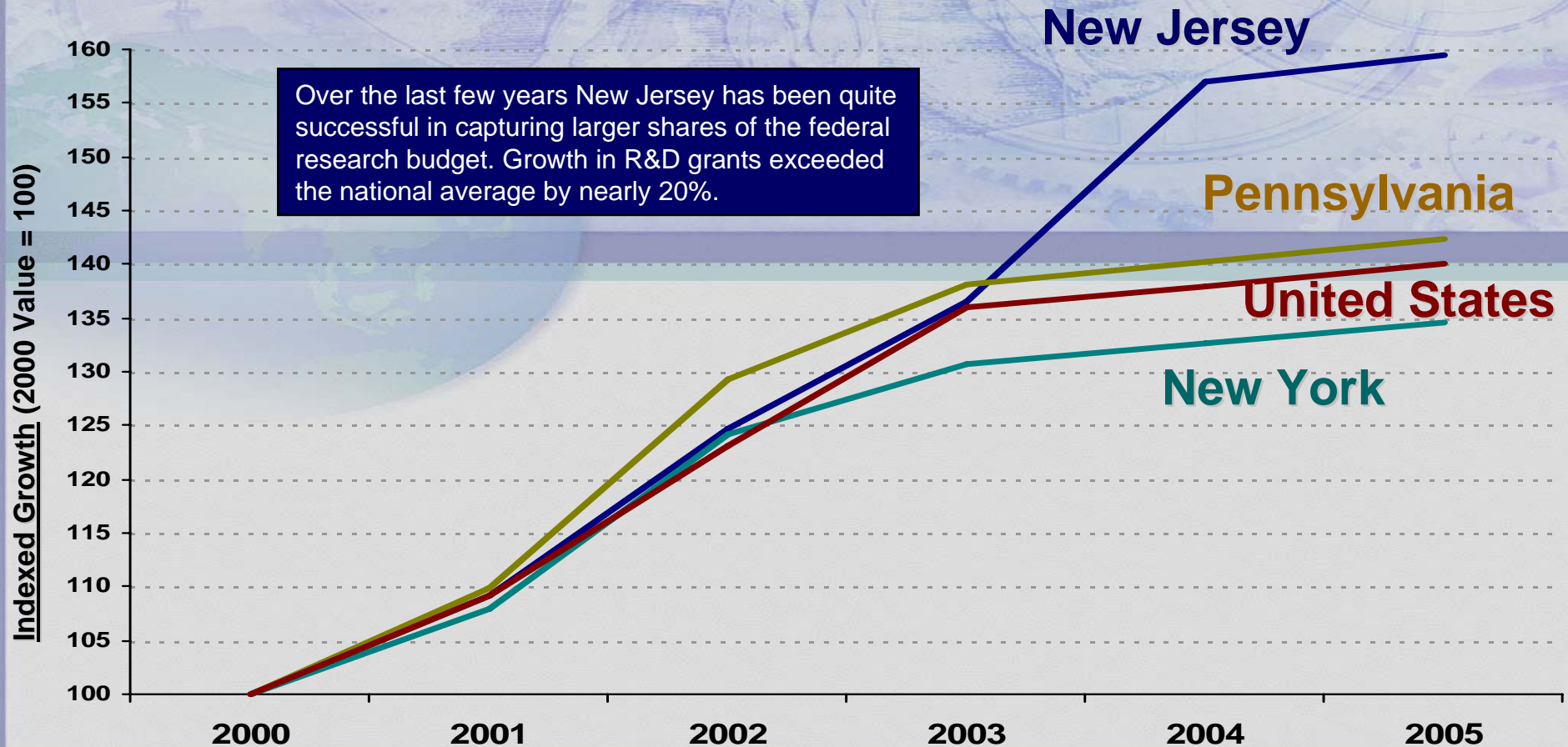
### BASIC RESEARCH

GRADE: C

# Growth Trend in Federal Research Grants Received, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	1,459,200	1,591,900	1,819,800	1,992,200	2,291,000	2,325,400	866,200	59.4%
New York	3,087,800	3,336,200	3,830,700	4,035,700	4,096,300	4,157,700	1,069,900	34.6%
Pennsylvania	2,366,300	2,601,600	3,060,000	3,269,800	3,318,800	3,368,600	1,002,300	42.4%
United States	78,439,900	85,570,800	96,540,100	106,649,100	108,209,000	109,832,100	31,392,200	40.0%

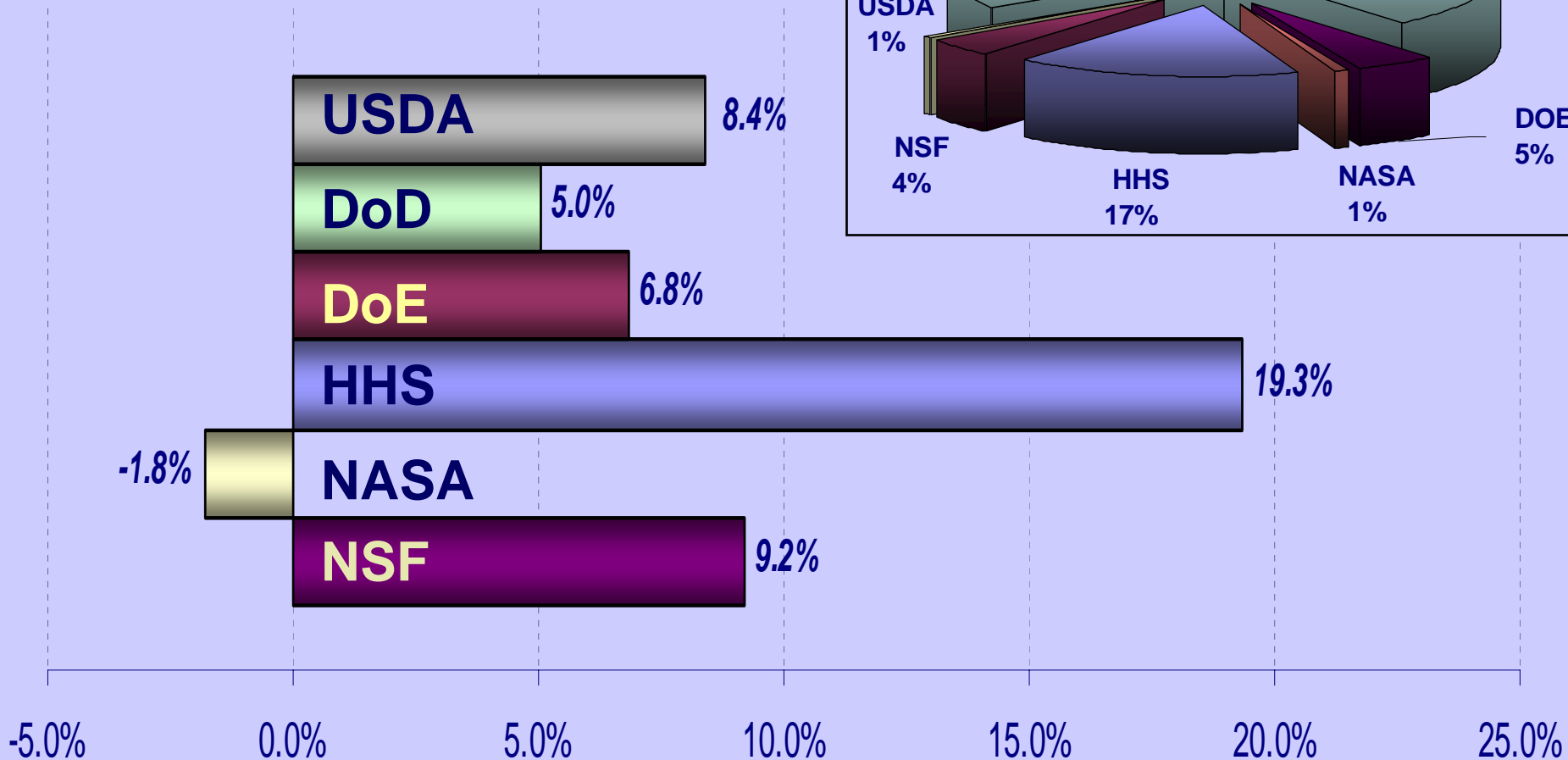
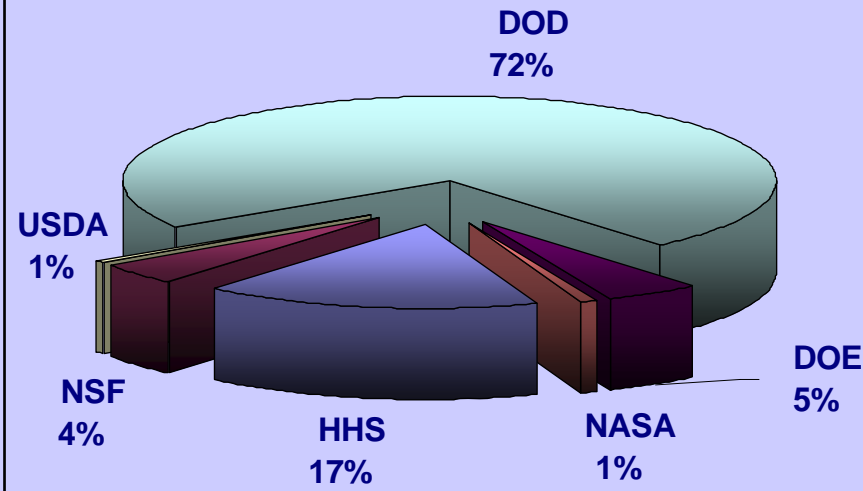
Data Sources: National Science Foundation; The American Science & Technology Academy. Analysis by SEI.



# Average Annual Growth in Federal Research Grants by Federal Agency, 2000 to 2005

Although Defense related grants account for the lion's share of New Jersey's federal R&D portfolio, growth in grants from the Health & Human Services Agency (nearly all of which comes from NIH) is driving the state's growth in new research dollars.

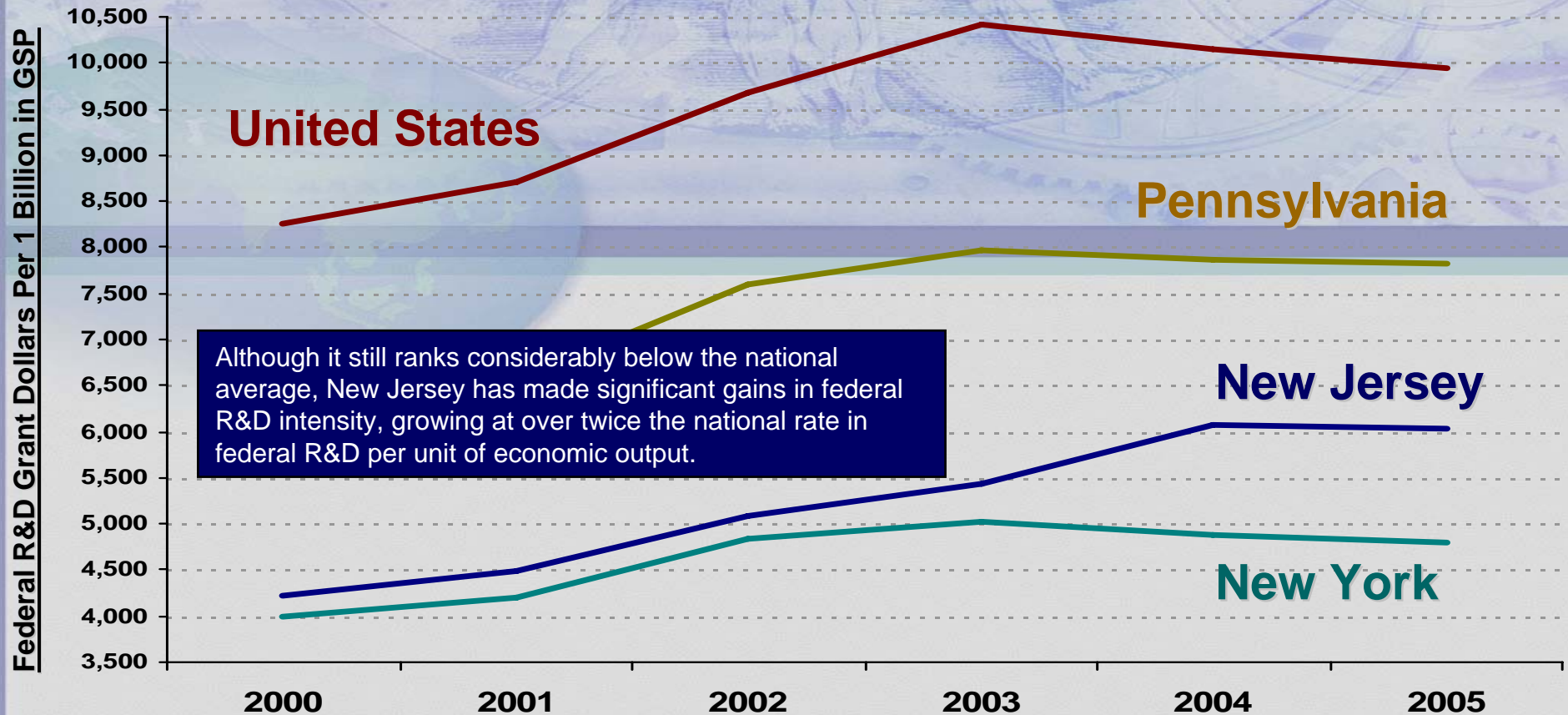
## Federal Funding by Source, 2005



# Growth Trend in Federal R&D Awards Per 1 Billion in State Output, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$4,220	\$4,480	\$5,080	\$5,430	\$6,060	\$6,030	\$1,810	42.7%
New York	\$3,980	\$4,200	\$4,830	\$5,020	\$4,880	\$4,790	\$810	20.3%
Pennsylvania	\$6,100	\$6,570	\$7,590	\$7,960	\$7,870	\$7,820	\$1,720	28.2%
United States	\$8,250	\$8,690	\$9,670	\$10,410	\$10,140	\$9,950	\$1,700	20.6%

Data Sources: National Science Foundation; The American Science & Technology Academy. Analysis by SEI.

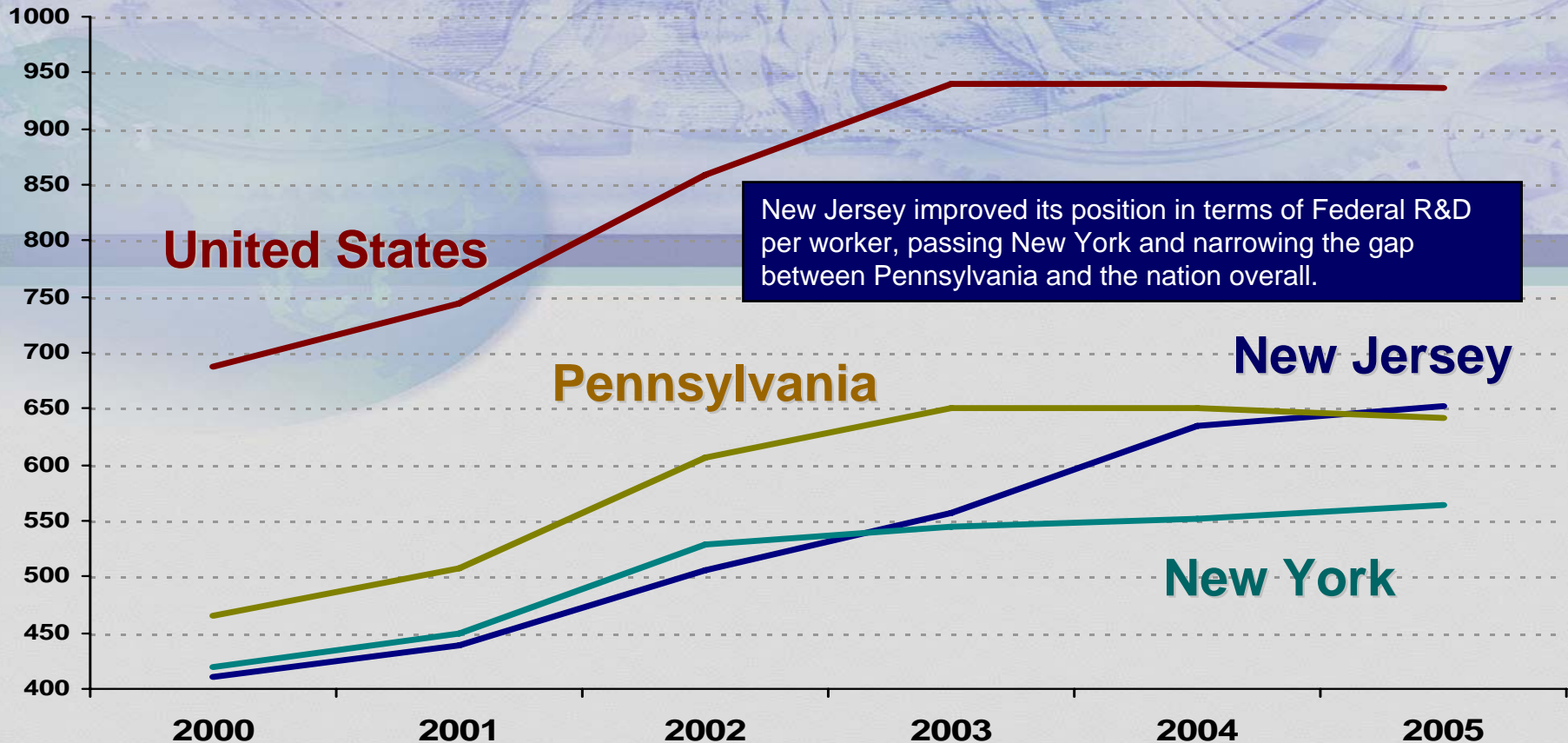


# Growth Trend in Federal R&D Awards Per 1,000 Private Sector Workers, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$410	\$430	\$500	\$550	\$630	\$650	\$240	58.7%
New York	\$420	\$440	\$530	\$540	\$550	\$560	\$140	34.5%
Pennsylvania	\$460	\$500	\$600	\$650	\$650	\$640	\$180	39.2%
United States	\$680	\$740	\$850	\$940	\$940	\$930	\$250	36.2%

Data Sources: National Science Foundation; The American Science & Technology Academy. Analysis by SEI.

Federal R&D Grant Dollars Per 1 Million Workers



New Jersey improved its position in terms of Federal R&D per worker, passing New York and narrowing the gap between Pennsylvania and the nation overall.

# FEDERALLY FUNDED RESEARCH

## SECTION 6 SUMMARY

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1. Over the last five years New Jersey has captured an increasing share of the nation's federal research budget. The state's rate of growth in federal grants exceeds that of both New York and Pennsylvania as well as the nation
2. New Jersey's federal R&D investments are dominated by grants from the Department of Defense.
3. Research grants from the NIH represent the fastest growing segment of New Jersey's federal R&D budget.
4. Although it still lags the national average, New Jersey has made strong gains in federal research intensity.

# SECTION 7.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

APPLIED RESEARCH

GRADE: B+

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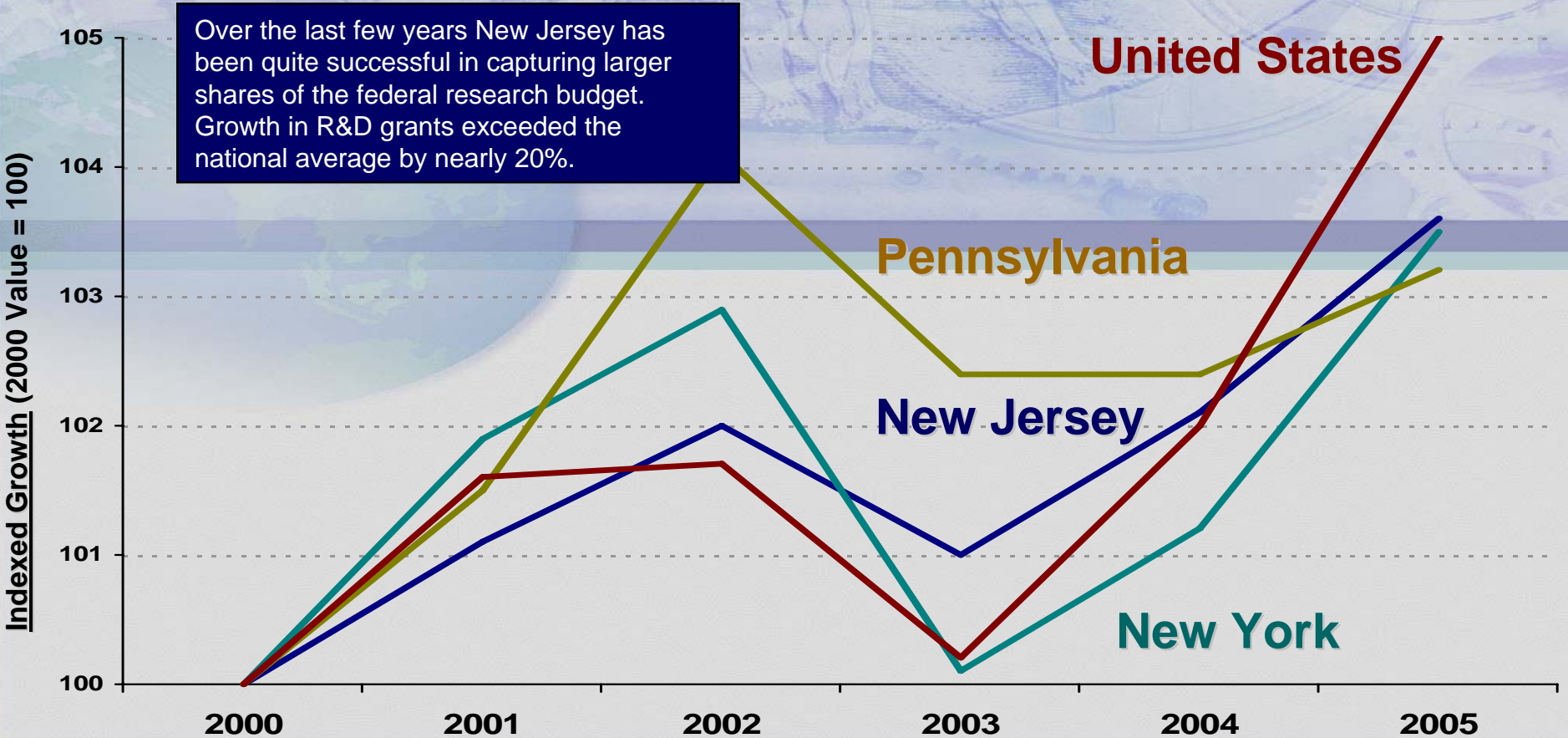
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# Growth Trend in Industrial R&D Spending, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
<b>New Jersey</b>	\$11,830	\$11,960	\$12,070	\$11,950	\$12,080	\$12,260	\$430	3.6%
<b>New York</b>	\$8,860	\$9,030	\$9,120	\$8,870	\$8,970	\$9,170	\$310	3.5%
<b>Pennsylvania</b>	\$7,570	\$7,680	\$7,880	\$7,7540	\$7,750	\$7,810	\$240	3.2%
<b>United States</b>	\$182,620	\$185,540	\$185,720	\$182,960	\$186,220	\$191,810	\$9,190	5.0%

Raw Data Source: Schonfield & Associates; The National Science Foundation; SEI Industry Surveys.

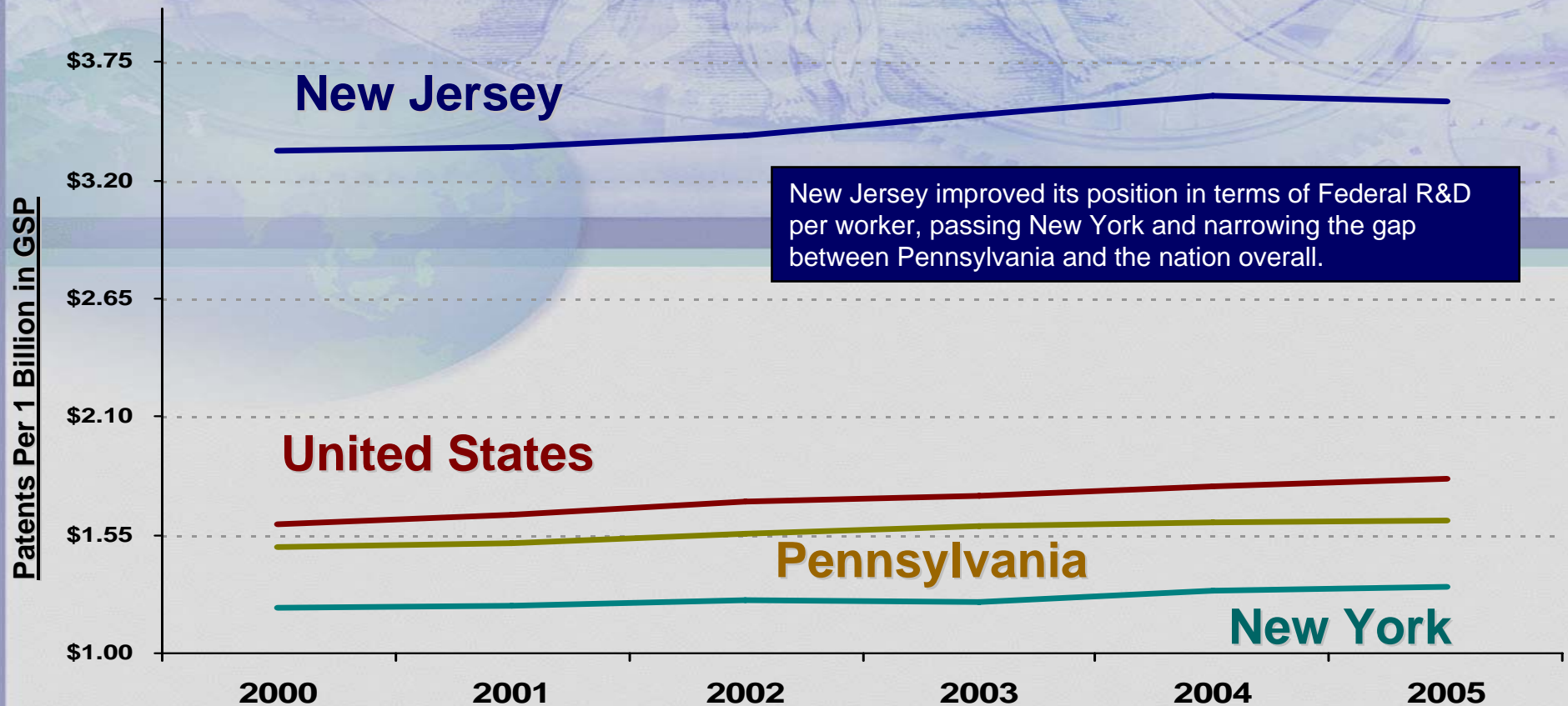
Over the last few years New Jersey has been quite successful in capturing larger shares of the federal research budget. Growth in R&D grants exceeded the national average by nearly 20%.



# Growth Trend in Industrial R&D Per 1,000 Private Sector Workers, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net
New Jersey	\$3.34	\$3.36	\$3.41	\$3.51	\$3.59	\$3.57	\$0.23
New York	\$1.21	\$1.22	\$1.25	\$1.24	\$1.29	\$1.31	\$0.10
Pennsylvania	\$1.49	\$1.51	\$1.56	\$1.59	\$1.61	\$1.62	\$0.13
United States	\$1.60	\$1.64	\$1.71	\$1.73	\$1.78	\$1.81	\$0.21

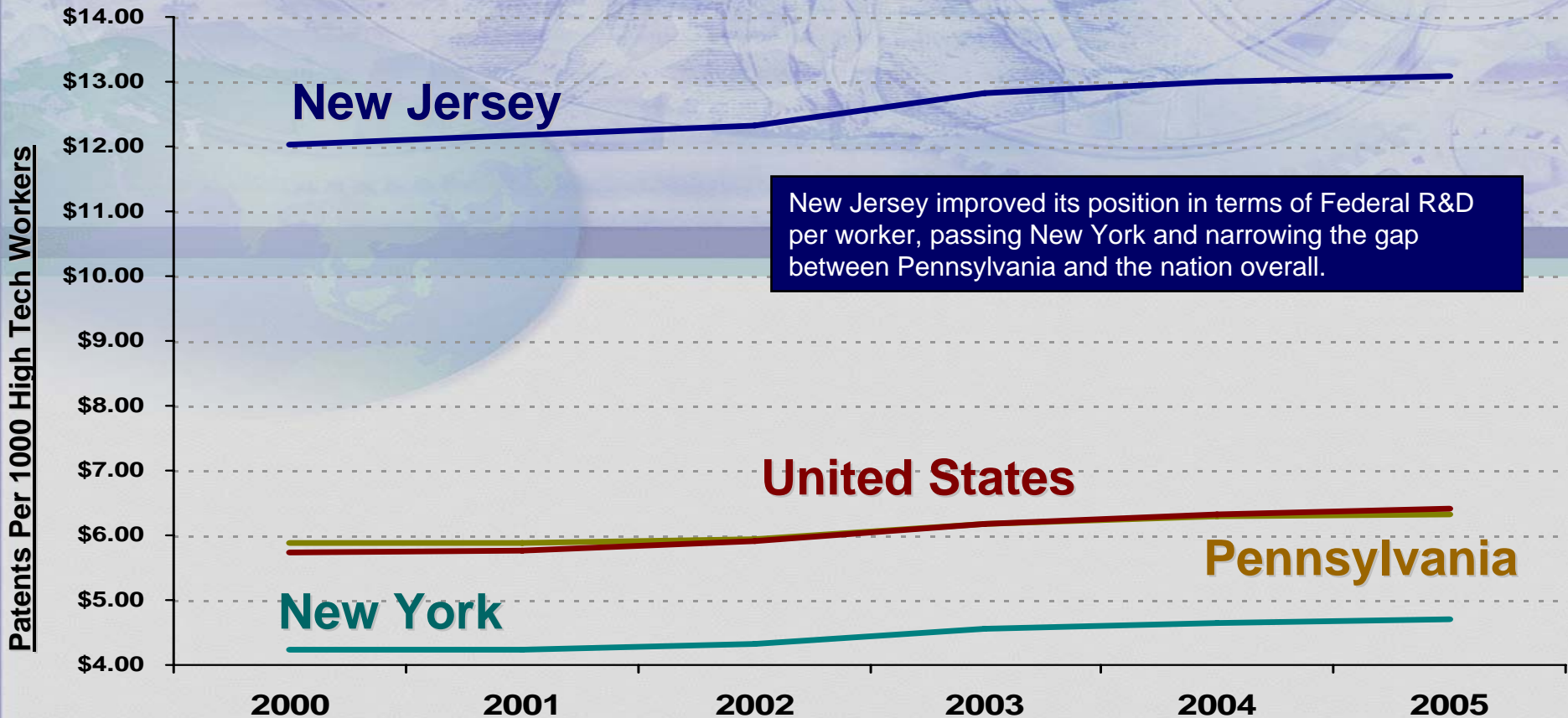
Raw Data Source: Schonfield & Associates; The National Science Foundation; SEI Industry Surveys.



# Growth Trend in High Tech R&D Per 1,000 High Tech Workers, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	PCt
New Jersey	\$12.03	\$12.19	\$12.31	\$12.83	\$13.00	\$13.08	8.7%
New York	\$4.24	\$4.25	\$4.31	\$4.55	\$4.65	\$4.70	10.9%
Pennsylvania	\$5.89	\$5.89	\$5.93	\$6.19	\$6.30	\$6.33	7.5%
United States	\$5.75	\$5.77	\$5.92	\$6.17	\$6.32	\$6.40	11.3%

Raw Data Source: Schonfield & Associates; The National Science Foundation; SEI Industry Surveys.



# INDUSTRIAL RESEARCH

## SECTION 7 SUMMARY

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1. New Jersey industries continue to invest in research at significantly higher levels than their peers.
2. Due largely to a high concentration of drug development companies with large R&D budgets, New Jersey scores high in all measure of private R&D intensity.
3. The growth rate of research investments among New Jersey industries exceeds that of its neighboring states but has fallen behind the national average.

# SECTION 8.

## NJTC Annual Score Card

*A Profile of the New Jersey Technology Economy*

RISK CAPITAL  
INVESTMENT ACTIVITY

GRADE: B-

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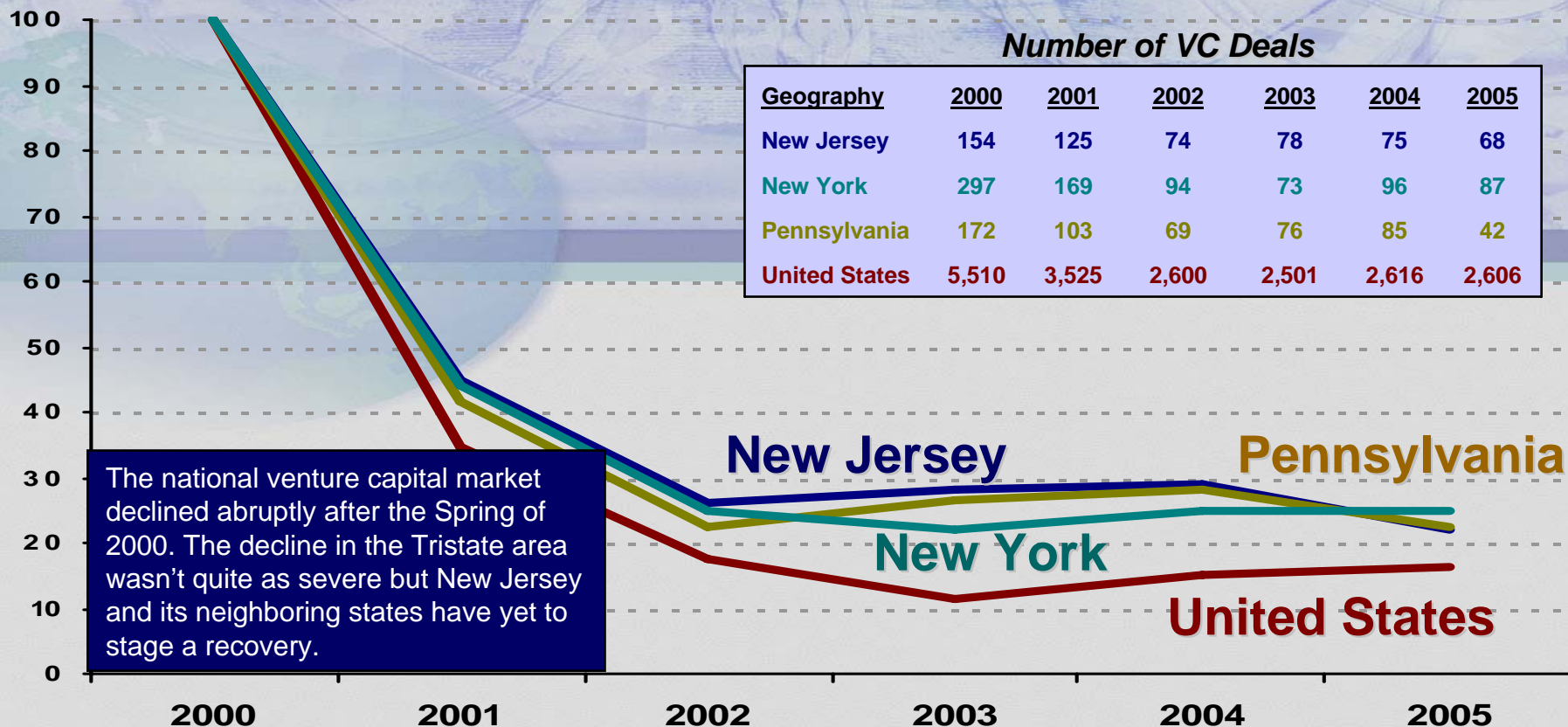
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# Venture Capital Investments in High Tech Companies, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$2,980	\$1,350	\$780	\$840	\$870	\$650	-\$2,330	-78.0%
New York	\$3,560	\$1,220	\$630	\$410	\$540	\$580	-\$2,980	-83.7%
Pennsylvania	\$1,850	\$770	\$410	\$490	\$520	\$410	-\$1,440	-77.5%
United States	\$78,020	\$34,320	\$19,700	\$17,430	\$19,400	\$19,360	-\$58,660	-75.2%

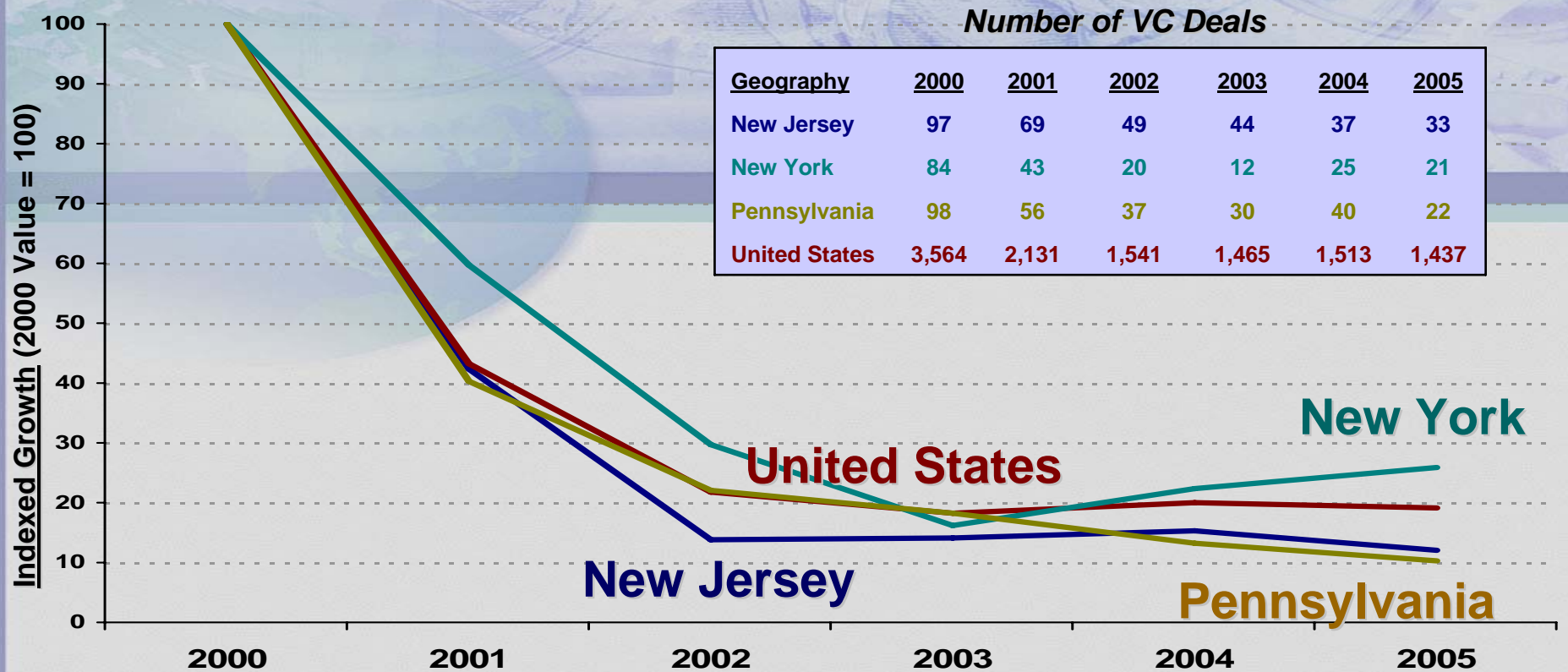
Raw Data Source: PriceWaterhouseCoopers.



# Venture Capital Investments in Information Technology Companies, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$2,040	\$860	\$280	\$280	\$310	\$240	-1,800	-88.0%
New York	\$1,330	\$790	\$390	\$210	\$300	\$340	-990	-74.1%
Pennsylvania	\$1,030	\$410	\$230	\$180	\$130	\$100	-930	-89.8%
United States	\$49,770	\$21,530	\$10,840	\$9,070	\$9,960	\$9,440	-40,330	-81.0%

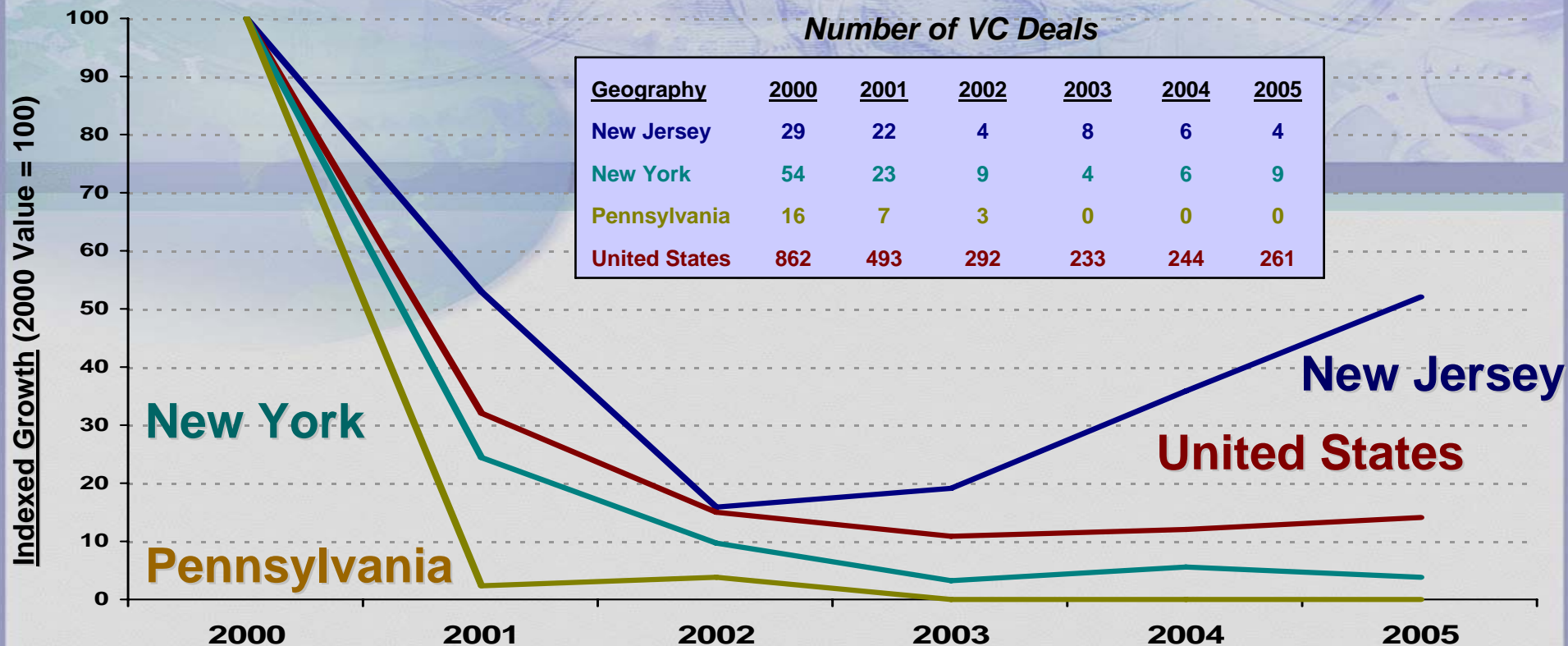
Raw Data Source: PriceWaterhouseCoopers.



# Venture Capital Investments in Telecommunication Companies, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$430	\$230	\$70	\$80	\$150	\$220	-\$210	-48.0%
New York	\$860	\$210	\$80	\$30	\$50	\$30	-\$830	-96.2%
Pennsylvania	\$360	\$9	\$10	\$0	\$0	\$0	-\$360	-100.0%
United States	\$16,830	\$5,410	\$2,460	\$1,850	\$2,070	\$2,400	-\$14,430	-85.7%

Raw Data Source: PriceWaterhouseCoopers.



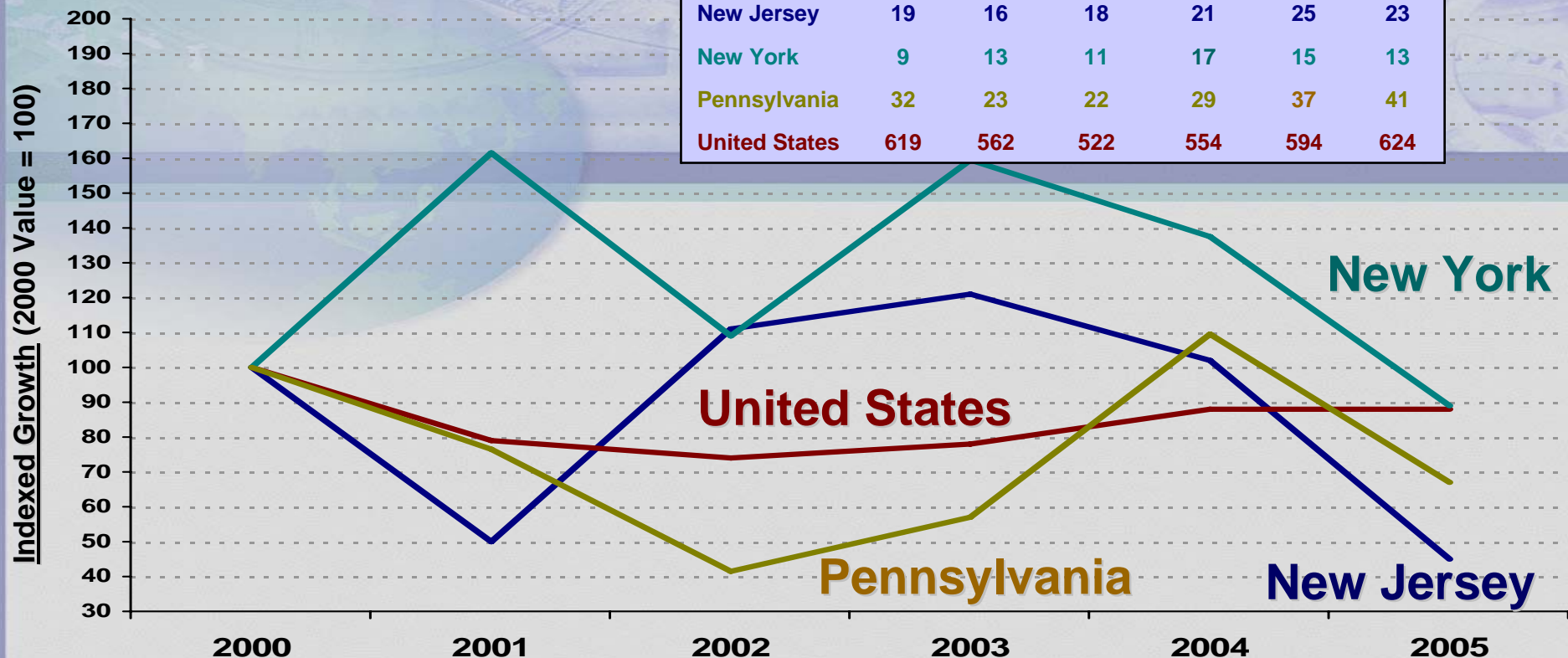
# Venture Capital Investments in Life Science Companies, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$370	\$180	\$420	\$460	\$380	\$170	-\$200	-54.8%
New York	\$90	\$160	\$100	\$160	\$130	\$80	-\$10	-11.1%
Pennsylvania	\$330	\$250	\$130	\$190	\$360	\$220	-\$110	-32.9%
United States	\$6,740	\$5,350	\$5,000	\$5,240	\$5,900	\$5,920	-\$820	-12.1%

Raw Data Source: PriceWaterhouseCoopers.

### Number of VC Deals

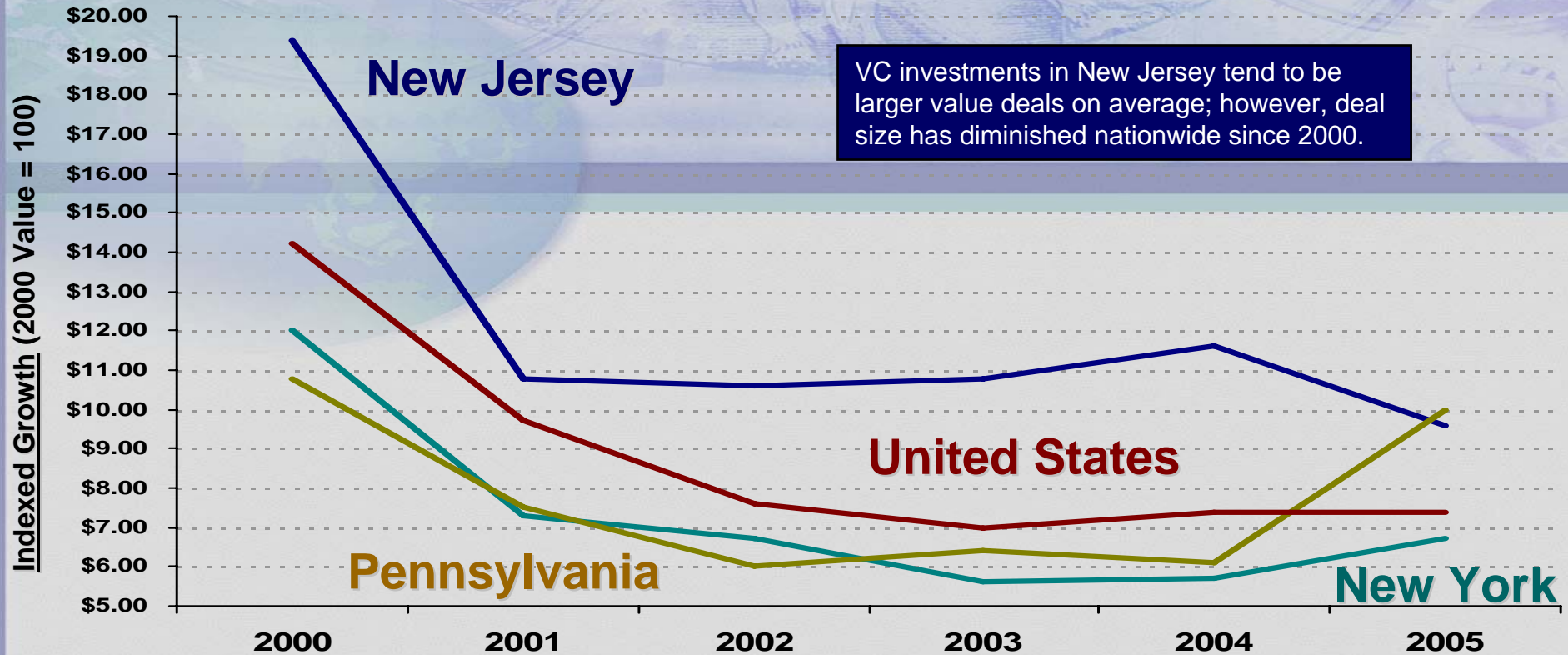
Geography	2000	2001	2002	2003	2004	2005
New Jersey	19	16	18	21	25	23
New York	9	13	11	17	15	13
Pennsylvania	32	23	22	29	37	41
United States	619	562	522	554	594	624



# Average Dollar Investment per VC Deal, 2000 to 2005

Geography	2000	2001	2002	2003	2004	2005	Net	Pct
New Jersey	\$19.4	\$10.8	\$10.6	\$10.8	\$11.6	\$9.6	-\$9.7	-50.2%
New York	\$12.0	\$7.3	\$6.7	\$5.6	\$5.7	\$6.7	-\$5.3	-44.5%
Pennsylvania	\$10.8	\$7.5	\$6.0	\$6.4	\$6.1	\$10.0	-\$0.8	-7.8%
United States	\$14.2	\$9.7	\$7.6	\$7.0	\$7.4	\$7.4	-\$6.7	-47.5%

Raw Data Source: PriceWaterhouseCoopers.



# RISK CAPITAL INVESTMENTS

## SECTION 8 SUMMARY

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1. New Jersey's venture capital market has yet to recover from the severe declines following the 2001 recession. This pattern is consistent with national growth trends.
2. The sudden drop in VC investments in 2001 coincided with a decrease in the average dollar investment per deal. Deal size has stabilized but current investments per VC deal are about half of what they were in 2000.
3. In recent years New Jersey's Telecommunication businesses have been successful in capturing larger volumes of venture capital investments, although the dollars are flowing to fewer companies.
4. After managing a strong recovery following the 2001 recession, New Jersey's Life Science industry has experienced a significant decline in VC investments.

# NJTC Annual Score Card

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FINAL  
SUMMARY



# TECHNOLOGY ECONOMY PERFORMANCE

## SCORE CARD SUMMARY

1. New Jersey's overall economy continues to enjoy above average job growth and high levels of income; however, the state's employment expansion is being driven increasingly by lower wage occupations.
2. New Jersey's High Tech economy continues its modest recovery from the 2001 recession. The data profile a complex system with indicators pointing upward, downward and sideways. The state's technology economy is still in a restructuring phase and the data reveal both strengths and weaknesses in the state's technology landscape. The rising level of competition between New Jersey and its national and global peers, dictates that to maintain current levels of competitiveness New Jersey must continue to build on its strengths and make a serious commitment to address and correct weaknesses.
3. New Jersey's high tech industries have only recently begun to expand their workforce, yet many high tech industry clusters continue to experience job erosion. This pattern is consistent with the broader national trend, suggesting that New Jersey is becoming a follower rather than a leader in the current national tech economy.
4. High tech business formations are beginning to expand once again and growth in new businesses is slightly better than the nation or its peer states. New Jersey has a dense concentration of small high tech enterprises, many operating as home-based business, suggesting that New Jersey's entrepreneurial climate is becoming more competitive.

# TECHNOLOGY ECONOMY PERFORMANCE

## SCORE CARD SUMMARY

5. Current estimates suggest that New Jersey continues to benefit from high levels of productivity, both within the broader industrial sector and specifically within high tech industries. However, New Jersey's productivity growth rate has begun to slow relative to the nation and its neighboring states. An ongoing decline in productivity growth over time will threaten the income potential of the state's industries and act to dampen statewide industry competitiveness.
6. New Jersey's science and engineering workforce is experiencing very healthy growth both in absolute terms and relative to the nation and its peers. This is significant because it suggests that New Jersey is expanding its technology talent base into both high tech and traditional industries. This is a good indication that many of the state's industries are making the human capital investments necessary to maintain and improve competitiveness. In the long run such investments will raise the state's innovation efficiency and act to improve industry productivity.
7. The decline in New Jersey patenting activity has continued to accelerate. As recently as five years ago New Jersey held a commanding lead in several measures of patenting intensity, but today it is producing patents at a pace more consistent with the national average.

# TECHNOLOGY ECONOMY PERFORMANCE

## SCORE CARD SUMMARY

8. New Jersey continues to capture too small a share of the federal R&D grant budget. However, the state has made strong strides over the last five years to expand the capture rate of federal R&D grants.
9. New Jersey continues to benefit from large R&D investments by private industries, driven primarily by drug development industries. Although the current investment volume remains high, the growth rate of those investments is beginning to slip.
10. The risk capital market has yet to rebound in New Jersey. Venture capital investment flows continue to parallel the national trend. Although, VC investments are much lower than they were five years ago, the decline appears to have halted and the market appears to be positioning itself for a modest recovery.

# NJTC Annual Score Card

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APPENDIX



# ACKNOWLEDGEMENTS

## **Acknowledgements**

This score card is the outcome of a highly collaborative process, advanced by the contributions of several individuals. Perhaps first among them was Molly Schnoke, who collected, processed, formatted and double checked reams of data. The author would also like to thank Thomas Mann for managing the development, distribution & analysis of all surveys. And a thank must go to the New Jersey Technology Council, in particular, Maxine Ballen and Joan Praiss and for their many insights and editorial guidance.



## **The New Jersey Technology Council**

The NJTC is a private, not-for-profit membership organization dedicated to providing networking opportunities, education, access to financing sources and other services to New Jersey's technology businesses. The Council offers its 1100+ member companies opportunities to network with colleagues and peers, become educated about the latest developments in their industries, access to financing sources to start and expand their businesses, and is an advocate for the technology industry with state government.



## **SEI Consulting**

SEI is a consulting firm specializing in the design and development of analytic tools that facilitate the creation of highly focused and tailored economic development strategies. Drawing on extensive experience, proprietary technology and proven processes, SEI has developed a set of tools and methods designed to help policy makers and civic leaders develop a better understanding of the innovation potential of their region and leverage that knowledge into strategies to yield broad-based economic growth. SEI helps public policy and economic development officials obtain higher levels of effectiveness and efficiency by bringing greater precision to their development efforts. Our organizing principal is innovation and through our tools and programs we help build policies to expand the innovative capacity inherent in every community, state and country.

# LIST OF DATA SOURCES

## Gross State Product

Gross State Product data are from *Regional Economic Accounts, Bureau of Economic Analysis* (<http://www.faea.doc.gov>), U.S. Department of Commerce (adjusted for inflation using the Bureau of Labor Statistics' inflation calculator).

## Population

Population Data are from the *American Community Survey 2003 (ACS)*, U.S. Census Bureau. ACS provides for the housing units and population of the counties participating in the 2003 survey. ACS is an annual survey of approximately 829,000 housing units. The ACS survey will replace the long form in future censuses (<http://www.census.gov>).

## Personal Income

Annual state per capita income data are from *Regional Economic Accounts, Bureau of Economic Analysis* (<http://www.bea.doc.gov>), U.S. Department of Commerce (adjusted for inflation using the Bureau of Labor Statistics' inflation calculator). Population data are from *Population and Household Economic Topics*, U.S. Census Bureau (as cited above), U.S. Department of Commerce.

## Industry Employment

Industry employment and payroll data are from *County Business Patterns*, U.S. Census Bureau. CBP provides data on the total number of establishments, mid-March employment, first quarter and annual payroll, and number of establishments by nine employment-size classes by detailed industry for all counties in the United States and the District of Columbia. Roughly 5% of CBP employment figures are censored to protect the confidentiality. In such Cases, SEI used an unsuppression algorithm to estimate employment.

## Occupational Employment

Data on occupations and wages are from the *U.S. Bureau of Labor Statistics*. The *Occupational Employment Statistics (OES)* program produces employment and wage estimates for over 800 occupations.

## Patents

Total patents by state are from the *U.S. Patent and Trade-mark Office* (<http://www.uspto.gov>). Raw data are from the *National Bureau of Economic Research* (<http://www.nber.org>). Patent totals include utility patents awarded to both institutional and individual inventors. Population data are from *Regional Economic Accounts: Population Estimates, Bureau of Economic Analysis* (<http://www.bea.doc.gov>), U.S. Department of Commerce (based on U.S. Census Bureau data).

## Venture Capital

Venture capital data are from *PriceWaterhouse Coopers MoneyTree Survey*. The *MoneyTree Survey* measures cash-for-equity investments by the professional venture capital community in private emerging companies in the U.S. Data is primarily obtained from a quarterly survey of venture capital practitioners.

## Research & Development (R&D)

R&D data are from the *Division of Science Resources Statistics; Directorate for Social, Behavioral and economic Sciences, National Science Foundation (NSF)*, <http://www.nsf.gov/sbe/srs>. Raw data are from four NSF surveys: *Survey of Industrial R&D*, *Survey of R&D Expenditures at Universities and Colleges*, *Survey of Federal Funds for R&D*, and *Survey of R&D Funding and Performance by Nonprofit Organizations*. Gross state product data are from, *Regional Economic Accounts, Bureau of Economic Analysis, U.S. Department of Commerce*. Population data are from *Regional Economic Accounts: Population Estimates, Bureau of Economic Analysis* (<http://www.bea.doc.gov>), U.S. Department of Commerce (based on U.S. Census Bureau data).

## Productivity

Productivity is calculated using *Industry employment and payroll data from the County Business Patterns, U.S. Census Bureau* (as cited above) and *The Bureau of Economic Analysis*.

# INDUSTRY DEFINITIONS AND NAICS CODES

## LIFE SCIENCES

## INFORMATION TECHNOLOGY

### *Bioscience Research & Research Support:*

In-vitro diagnostic substance mfg (325413)  
Laboratory apparatus & furniture mfg (339111)  
Testing laboratories (541380)  
R&D in physical, engineering & life sciences (541710)

### *Health Services:*

Offices of physicians (except mental health) (621111)  
Offices of physicians, mental health (621112)  
Offices of optometrists (621320)  
Offices of podiatrists (621391)  
Kidney dialysis centers (621492)  
Freestanding ambulatory surgery, emergency ctr (621493)  
All other outpatient care centers (621498)  
Medical laboratories (621511)  
Diagnostic Imaging centers (621512)  
Blood & organ banks (621991)  
General medical & surgical hospitals (622110)  
Psychiatric & substance abuse hospitals (622210)  
Other specialty hospitals (622310)

### *Biomedical Devices:*

Electromedical apparatus mfg (334510)  
Analytical laboratory instrument mfg (334516)  
Irradiation apparatus mfg (334517)  
Surgical & medical instrument mfg (339112)

### *Medical Equipment & Supplies:*

Surgical appliance & supplies mfg (339113)  
Dental equipment & supplies mfg (339114)  
Ophthalmic goods mfg (339115)  
Dental laboratories (339116)

### *Pharmaceuticals:*

All other basic organic chemical mfg (325199)  
Medicinal & botanical mfg (325411)  
Pharmaceutical preparation mfg (325412)  
Biological product (except diagnostic) mfg (325414)

### *Hardware:*

Electronic computer mfg (334111)  
Computer storage device mfg (334112)  
Computer terminal mfg (334113)  
Other computer peripheral equipment mfg (334119)  
Telephone apparatus mfg (334210)  
Radio, TV broadcast & wireless communications equip mfg  
(334220)  
Other communications equipment mfg (334290)  
Audio & video equipment mfg (334310)  
Bare printed circuit board mfg (334412)  
Semiconductor & related device mfg (334413)  
Electronic capacitor mfg (334414)  
Electronic resistor mfg (334415)  
Electronic connector mfg (334417)  
Printed circuit assembly (electronic assembly) mfg (334418)  
Other electronic component mfg (334419)  
Magnetic and optical recording media mfg (334613)  
Computer & office machine R&M (811212)

### *Software & Programming:*

Software reproducing (334611)  
Software publishers (511210)  
Custom computer programming services (541511)  
Computer systems design services (541512)  
Computer facilities management services (541513)  
Other computer related services (541519)

# INDUSTRY DEFINITIONS AND NAICS CODES

## TELECOMMUNICATIONS

*Radio networks (513111)*  
*Radio stations (513112)*  
*Television broadcasting (513120)*  
*Cable networks (513210)*  
*Cable & other program distribution (513220)*  
*Wired telecommunications carriers (513310)*  
*Paging (513321)*  
*Cellular & other wireless telecommunications (513322)*  
*Telecommunications resellers (513330)*  
*Satellite telecommunications (513340)*  
*Other telecommunications (513390)*

## ENERGY

*Turbine & turbine generator set unit mfg (333611)*  
*Speed changer, ind high-speed drive & gear mfg (333612)*  
*Mechanical power transmission equipment mfg (333613)*  
*Pump & pumping equipment mfg (333911)*  
*Air & gas compressor mfg (333912)*  
*Power, distribution, specialty transformer mfg (335311)*  
*Motor & generator mfg (335312)*

## ENVIRONMENTAL TECHNOLOGY

*Design & Management Service:*  
*Environmental consulting services (541620)*

*Environmental Control Equipment:*  
*Air purification equipment mfg (333411)*  
*Industrial & commercial fan & blower mfg (333412)*  
*Heating equipment (exc warm air furnaces) (mfg333414)*  
*Automatic environmental control mfg (334512)*

*Remediation & Waste Management:*  
*Sewage treatment facilities (221320)*  
*Nitrogenous fertilizer mf (325311)*  
*Polish & other sanitation goods mfg (325612)*  
*Hazardous waste treatment & disposal (562211)*  
*Solid waste landfill (562212)*  
*Solid waste combustors & incinerators (562213)*  
*Other nonhazardous waste treatment & disposal (562219)*  
*Remediation services (562910)*  
*Materials recovery facilities (562920)*  
*Septic tank & related services (562991)*  
*All other miscellaneous waste management (562998)*

# INDUSTRY DEFINITIONS AND NAICS CODES

## ADVANCED MANUFACTURING

### *Aerospace:*

*Aircraft Mfg (336411)*  
*Aircraft Engine & Engine Part Mfg (336412)*  
*Other Aircraft Part & Auxiliary Equip. Mfg (336413)*  
*Other Missile, Space Vehicle Part 7 Aux Equip Mfg (336419)*  
*Military Armored Vehicle, Tank & Tank Component Mfg (336992)*

### *Capital Equipment:*

*Machine Shops (332710)*  
*Precision Turned Product Mfg (332721)*  
*Metal Coating, Engraving & Allied Services (332812)*  
*Electroplating, Plating, Polish, Anodize, Coloring (332813)*  
*Construction Machinery mfg (333120)*

### *Mining Machinery & Equipment mfg (333131)*

*Oil & Gas Field Machinery & Equipment mfg (333132)*  
*Sawmill & Woodworking Machinery mfg (332210)*  
*Plastics & Rubber Industry Machinery mfg (333220)*  
*Paper Industry Machinery mfg (333291)*  
*Textile Machinery mfg (333292)*  
*Printing Machinery & Equipment mfg (333293)*  
*Food Product Machinery mfg (333294)*  
*Semiconductor Machinery mfg (333295)*  
*All other Industrial Machinery mfg (333298)*  
*Automatic Vending Machine mfg (333311)*  
*Commercial Laundry, Dryclean & Press Mach mfg (333312)*  
*Elevator & Moving Stairway mfg (333921)*  
*Conveyor & Conveying Equipment mfg (333922)*  
*Overhead Crane, Hoist & Monorail System mfg (333923)*  
*Fluid Power Cylinder & Actuator mfg (333995)*  
*Fluid Power Pump & Motor mfg (333996)*

### *Electronics, Instruments & Controls:*

*Office machinery mfg (333313)*  
*Optical instrument & lens mfg (333314)*  
*Photographic & photocopying equipment mfg (333315)*  
*Other commercial, service industry machinery mfg (333319)*  
*Scale & balance (except laboratory) mfg (333997)*  
*Electron tube mfg (334411)*  
*Electronic coil, transformer, oth inductor mfg (334416)*  
*Search, detection & navigation instrument mfg (334511)*  
*Industrial process control mfg (334513)*  
*Total fluid meter & counting device mfg (334514)*  
*Electricity measuring, testing instrument mfg (334515)*  
*Watch, clock & part mfg (334518)*  
*Other measuring & controlling device mfg (334519)*  
*Switchgear & switchboard apparatus mfg (335313)*  
*Relay & industrial control mfg (335314)*

### *Machine Tools:*

*Industrial mold mfg (333511)*  
*Machine tool (metal cutting types) mfg (333512)*  
*Machine tool (metal forming types) mfg (333513)*  
*Special die, tool, die set, jig & fixture mfg (333514)*  
*Cutting tool & machine tool accessory mfg (333515)*  
*Rolling mill machinery & equipment mfg (333516)*  
*Other metalworking machinery mfg (333518)*  
*Power-driven handtool mfg (333991)*  
*Welding & soldering equipment mfg (333992)*  
*Packaging machinery mfg (333993)*  
*Industrial process furnace & oven mfg (333994)*  
*All other general purpose machinery mfg (333999)*  
*All other miscellaneous mfg (339999)*

# INDUSTRY DEFINITIONS AND NAICS CODES

## ADVANCED MATERIALS

### Chemicals:

*Petrochemical mfg (325110)*  
*Industrial gas mfg (325120)*  
*Inorganic dye & pigment mfg (325131)*  
*Synthetic organic dye & pigment mfg (325132)*  
*Alkalies & chlorine mfg (325181)*  
*All other basic inorganic chemical mfg (325188)*  
*Gum & wood chemical mfg (325191)*  
*Cyclic crude & intermediate mfg (325192)*  
*Ethyl alcohol mfg (325193)*  
*Noncellulosic organic fiber mfg (325222)*  
*Phosphatic fertilizer mfg (325312)*  
*Fertilizer (mixing only) mfg (325314)*  
*Pesticide & other agricultural chemical mfg (325320)*  
*Paint & coating mfg (325510)*  
*Adhesive mfg (325520)*  
*Soap & other detergent mfg (325611)*  
*Surface active agent mfg (325613)*  
*Toilet preparation mfg (325620)*  
*Printing ink mfg (325910)*  
*Photo film, paper, plate & chemical mfg (325992)*  
*All other misc chemical product & prep mfg (325998)*

### Rubber & Plastics:

*Rubber & plastics footwear mfg (316211)*  
*Plastics material & resin mfg (325211)*  
*Synthetic rubber mfg (325212)*  
*Custom compounding of purchased resin (325991)*  
*Unsupported plastics bag mfg (326111)*  
*Unsupported plastics packaging film & sheet mfg (326112)*  
*Unsupported plastics film & sheet (except packaging) mfg (326113)*  
*Plastics pipe & pipe fitting mfg (326122)*  
*Laminated plastics plate, sheet & shape mfg (326130)*  
*Polystyrene foam product mfg (326140)*  
*Foam product (exc polystyrene) mfg (326150)*  
*Plastics bottle mfg (326160)*  
*Plastics plumbing fixture mfg (326191)*  
*Resilient floor covering mfg (326192)*  
*All other plastics product mfg (326199)*  
*Tire retreading (326212)*  
*Rubber & plastics hoses & belting mfg (326220)*  
*Rubber product mfg for mechanical use (326291)*  
*All other rubber product mfg (326299)*