EVALUATION OF TAX INCENTIVES

Analysis of High Technology Programs

A Report to the Legislature

Washington State Department of Revenue
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CHAPTER ONE

EXECUTIVE SUMMARY

This report is submitted to the Legislature pursuant to RCW 82.04.4452 and 82.63.020(3). It contains the results of an evaluation of the two tax incentives for high technology firms – a sales tax deferral for research and development facilities and equipment and a B&O tax credit for expenditures on research and development. The B&O tax credit is codified as RCW 82.04.4452 and the sales tax deferral/exemption appears in chapter 82.63 RCW. These programs were adopted in 1994 and are presently scheduled to expire on January 1, 2015. This chapter provides a brief synopsis of the result of the study conducted during 2009 of these two programs by the Department of Revenue (Department).

A firm must conduct research and development in the fields of advanced computing, advanced materials, biotechnology, electronic device technology, or environmental technology to qualify for a high tech incentive. Participants in the incentive programs are involved in at least one of these five technologies but may span multiple industry groups.

Through 2008, the Department has approved 669 high tech deferral projects out of the 898 project applications received. Chapter 3 discusses in detail the amount of deferred tax that these projects accounted for. In 2008, 524 firms used the high tech credit for a total of $22.9 million. The average credit per firm was $43,702. Out of the total credit taken, 17.7 percent has been from firms located in rural counties.

The statutes require an assessment of and report on these programs, specifically measuring the effects of the programs on the following factors of the state's economy:

- Job creation,
- Jobs created for Washington residents,
- Company growth,
- Introduction of new products,
- Diversification of the state's economy, and
- Movement of firms or the consolidation of firms into the state.

The analysis for this study uses a reduced number of industries that cover all five of the technologies; and also accommodate disclosure limitations. The industry groups selected account for nearly 80 percent of the activity in these incentive programs.

Evidence of job creation by program participants is mixed. Washington's increase in the relative share of employment for high technology industries compared to the U.S. appears coincidental to the growth and relative stability in employment of program participants. However, the effects of these programs are diluted because many of the firms participate in other tax incentives such as the sales tax exemption for manufacturing machinery and equipment. This limited the ability to

identify specific correlations of these programs and job creation. In general program participants are positively influencing jobs created in the state.

Analysis for job creation and movement of activities into the state also showed that while many high-tech activities seem to be supported by in-state employment, overall manufacturing employment in the state is declining. This result does not support the notion that these high-tech firms use in-state businesses to manufacture or distribute their products, indicating that the state is missing out on a major portion of the benefits of inventions in the state.

Survey responses by participants in the 2004 to 2008 period indicate favorable growth trends in movement of operations into the state. There are mixed results when this data is coupled with patent data; however, multistate participants did indicate a preference to a Washington location when compared to non-participants.

Diversification of the state's economy was analyzed using patent data. It appears that Washington's expertise in the high technology sector has continued to expand, both relative to the U.S. and selected states. While trends in Washington's technological breadth and depth have increased, largely due to participants in these programs, they do not speak to diversification in actual production of products. Manufacturing employment in Washington, as well as the nation, has continued to decline since the inception of these programs. However, participants still report more manufacturing activity to total activity than non-participants in the same high tech industries.

Chapter 5 of this report analyzes Washington's competitiveness compared to selected states. The analysis shows that Washington compares well to six other competitive states. The B&O tax credit has modest effects on Washington's competitive position. The high tech deferral for new R&D facilities consistently improves the competitive position of Washington businesses. Both programs provide more tax relief on average than the other states' incentives considered in the report.

CHAPTER TWO

OVERVIEW OF TAX INCENTIVE PROGRAM

One of the older tax incentives in Washington is the two-part program that was intended to encourage the development of high technology industries in this state. These incentives were adopted in 1994, effective on January 1, 1995. They are presently scheduled to expire on January 1, 2015.

Eligible firms must be engaged in research and development in one of five specified "high tech" industries:

- **Advanced computing**: The design and development of computing hardware and software, including innovations covering the full spectrum of computer equipment, ranging from hand-held calculators to super computers.

- **Advanced materials**: Development of materials with engineered properties created through specialized processing and synthesis technology, including ceramics, high value-added metals, electronic materials, composites, polymers, and biomaterials.

- **Biotechnology**: The application of technologies such as recombinant DNA techniques, biochemistry, molecular and cellular biology, genetics, cell fusion, and new bioprocesses involving the use of living organisms.

- **Electronic device technology**: Microelectronics involving semiconductors, electronic instrumentation, optical devices, data and digital communications, and imaging devices.

- **Environmental technology**: Assessment and prevention of threats to human health or the environment, environmental cleanup, alternative energy sources.

The term research and development means activities performed with the goal of discovering technological information and the use of such information in developing new or improved products, processes, techniques, formulas, inventions, or software. It includes development of new uses for existing drugs, devices, or biological products for which licensing by the Federal Drug Administration are required. R&D does not include adaptation of existing products which are not substantially improved, studies or surveys undertaken for market research or testing purposes, or quality control.

SALES TAX DEFERRAL

One part of the program offers a deferral/exemption of state and local retail sales tax for construction of qualified research and development facilities and pilot scale manufacturing plants, as well as the purchase of related machinery and equipment. Eligible firms do not need to repay the deferred sales tax if they maintain program requirements, thereby making the deferral an outright tax exemption.

Application with the Department is required prior to construction or purchase of eligible equipment. A deferral certificate is issued by the Department for applications that are approved. Leased facilities qualify for the tax deferral/exemption if the benefit is passed on to the lessee by the lessor. For existing structures, the investment must increase floor space or production capacity of the plant. Each participating business must file annual surveys, the project must be audited and certified as complete by the Department, and the facility must be in operation for its intended purpose for at least the succeeding seven years after completion in order to avoid repayment of the deferred tax.

B&O TAX CREDIT

The original statute in 1994 allowed qualified firms to credit against their state business and occupation tax liability any eligible expenditures for R&D purposes which exceeded 0.92 percent of the firm's taxable gross receipts. A major change in the calculation of the credit occurred in 2004. This calculation was phased in from 2006 through 2009. The average tax rate calculation ends after calendar year 2009, and the program goes back to a set rate that applies to all eligible expenditures in excess of the 0.92 percent threshold. Participating firms must file an annual survey to receive the credit and are subject to audit for verification of credits taken.

Expenditures eligible for the B&O credit include operating expenses, wages and benefits, compensation of proprietors and partners, consumable supplies, computer expenses, and payments to public educational or research institutions. In addition, 80 percent of any cost of contracted research is available for the credit, and the credit may be assigned to the contracting business. The cost of capital and overhead expenses are not eligible for the credit. The maximum tax credit per firm is $2 million annually.

Over the past fourteen years an estimated 300 firms have taken advantage of the sales tax deferral program and over 1,900 have used the B&O tax credit. Since 1995, the total investment associated with the sales tax deferral/exemption has been approximately $8.8 billion. The estimated amount of state retail sales tax deferred or forgiven is $574.6 million; the local sales tax impact is approximately $188.2 million. The amount of B&O tax credit taken by the participating firms has amounted to $341.2 million.

Table 2.1 illustrates the use of the high technology sales tax deferral/exemption program since enactment.

Table 2.1
Use of the High Tech Sales and Use Tax Deferral
(Approved R&D Project by Date of Application)

Year	Number of Participants	Number of Applications	Estimated Project Costs	Estimated State and Local Sales Tax Deferred or Exempted
1995	21	42	$268,776,231	$21,433,708
1996	20	32	323,877,817	27,443,798
1997	28	39	215,831,123	18,483,830
1998	18	40	418,986,860	35,953,424
1999	28	54	532,956,349	44,667,780
2000	55	66	607,300,841	52,919,341
2001	36	62	314,018,936	24,809,601
2002	27	46	163,271,136	14,324,078
2003	16	38	118,595,184	8,223,089
2004	15	42	298,604,863	25,850,407
2005	14	43	129,769,037	12,224,022
2006	15	60	1,874,343,320	160,510,034
2007	13	48	1,866,704,847	165,985,274
2008	13	57	1,679,315,122	149,914,429
Total	319	669	$8,812,351,666	$762,742,814

Table 2.2 illustrates the use of the high technology B&O tax credit program since enactment.

Table 2.2

Use of the B&O Tax Credit for High Tech Firms

Year Credit Taken	Number of Participants Taking a Credit	Amount of Credit Taken
1995	426	$18,538,814
1996	500	24,270,643
1997	568	29,480,860
1998	624	29,651,077
1999	630	26,968,006
2000	638	29,211,593
2001	600	27,512,859
2002	637	25,734,570
2003	643	31,234,137
2004	603	21,966,165
2005	612	16,832,182
2006	563	17,251,432
2007	558	19,661,695
2008	524	22,899,784
Total		$341,213,817

REQUIRED ANNUAL SURVEY

Since 2005, participants have been required to file a survey annually with the Department. The survey asks for information relating to the amount of sales tax deferred; the number of new products or research projects associated with the investment; the number of trademarks, patents, or copyrights developed at the facility; and total employment by the firm, including information on wages paid and benefits provided. Except for the amount of tax benefit received, the information reported on the survey is confidential and may not be disclosed for specific firms. Aggregate data provided by participants is reported to the Legislature annually in a publication entitled, "Descriptive Statistics for Tax Incentive Programs."

HISTORY OF THE PROGRAM

Following is an outline of the major statutory changes to the high tech tax incentive programs.

1995 Sales tax deferral is converted to outright exemption, if program requirements are maintained for seven years following the year the project was certified as complete.

1997 Calculation of the B&O credit revised. Originally the credit amount was 2.5 percent of R&D spending above 0.92 percent of total taxable receipts (0.515 percent for nonprofits); this rate was reduced to 1.5 percent (0.484 percent for nonprofits).

2004 Originally scheduled to expire in 2004; the termination date for both programs was extended to the current January 1, 2015. Revision in the calculation of the B&O tax credit, based on the firm's average tax rate phased in from 2006 through 2010. State universities added to sales tax deferral program. Requirement for participants in both programs to file annual reports was established.

2005 B&O tax credit calculation revised again; firms may use their average tax rate or a specified percentage which is phased in from 2007 to 2010 to calculate the amount of the credit. Changes made to the annual reporting, including requirement that the report be filed electronically.

2009 A new category of eligible facility is authorized: multiple qualified buildings. These are defined as more than one structure which is leased to the same firm, if the buildings are located within a five-mile radius and construction of all structures is initiated within a five-year period.

CHAPTER THREE

PROGRAM PARTICIPATION

SALES TAX DEFERRAL/EXEMPTION

High Tech Deferral Participation

From 1995 through 2008, the Department received applications for 898 high tech deferral projects. One project may have multiple applicants; project counts exclude the lessor when a lessee also applies for the deferral. The chart below shows the number of projects along with the actual number of applications received.

Table 3.1
Status of R&D Sales and Use Tax Applications
1995 through 2008

Status of Application	Applications	Projects
Approved	686	669
Approved - Cancelled	46	46
Withdrawn	73	73
Denied	109	109
Pending - Needs Review	1	1
Total	915	898

Approved Projects

The Department approved applications for 669 high tech sales and use tax deferral projects between 1995 and 2008. Project costs for these applications total $8.8 billion to date. State and local sales and use taxes deferred for these projects are estimated to be $762.7 million.

Cancelled Projects

Another 46 investment projects were approved by the Department, but the applicant cancelled the project. In most instances the applicant never started the project because of a financial decision, so the certificate was never used.

Withdrawn Projects

Withdrawn applications are similar to cancelled applications, except the project was cancelled before the application was approved. The main reasons for an application to be withdrawn were: (1) both a lessee and lessor applied for the same structure costs or (2) the applicant decided against the project.

Denied Projects

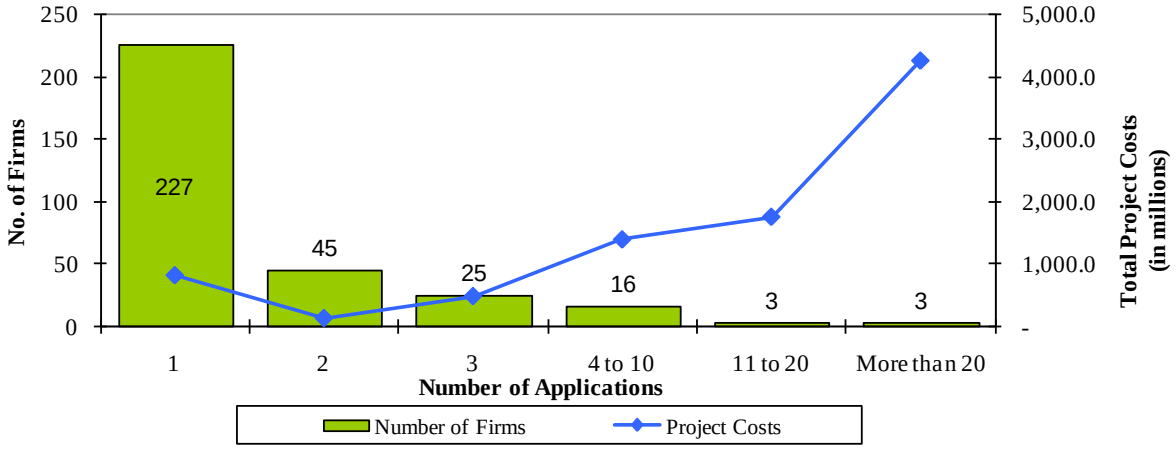
The Department denied 109 applications. The two most frequent reasons for denial were: (1) taxpayers began construction or acquired machinery and equipment prior to the application date or (2) taxpayers did not provide enough information to determine whether they were performing qualified R&D. The Department made multiple attempts to verify information before denying applications.

Sales and Use Tax Deferral by Firm

It should be noted that the 669 approved high tech sales and use tax deferral projects are distributed among 319 firms. While over 70 percent of the firms have only one approved project, many other firms have several projects in the program.

The 227 firms with only one approved project account for $812.5 million or 9.2 percent of the total approved project costs. At the other end of the spectrum, there are three firms that each has more than 20 approved projects. Those three firms account for 48.3 percent of the total approved project costs.

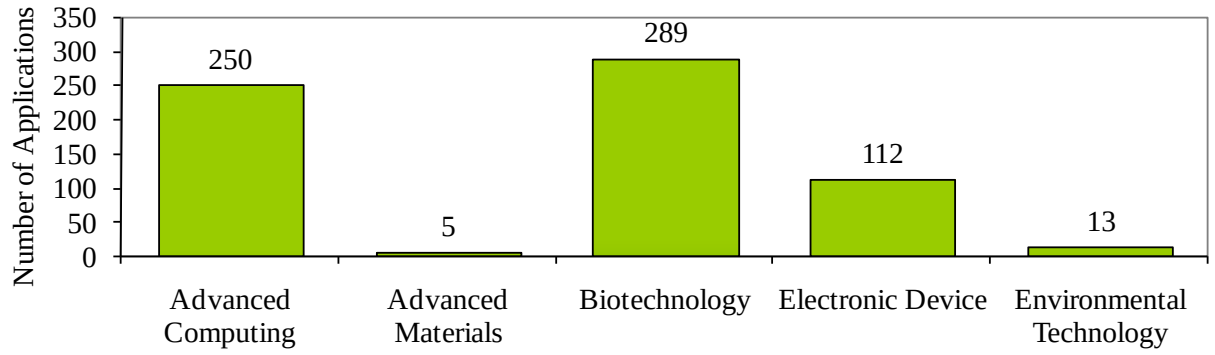
Chart 3.1
Approved Applications Per Firm



Sales and Use Tax Deferral by Qualifying Technology

Most of the high tech deferral applications are for projects in the biotechnology (43 percent) and advanced computing (37 percent) technologies. Electronic device firms are responsible for 17 percent of the deferral projects. The other two areas covered by the program, environmental technology and advanced materials, are represented by only a few projects.

Chart 3.2
Approved R&D Projects by Qualifying Technology



While biotechnology has the largest number of approved applications, the largest project costs are found in the advanced computing technology. Advanced computing accounts for $4.7 billion of the estimated project costs (53 percent), while biotechnology has estimated project costs of $3.8 billion (40 percent). Electronic device, advanced materials, and environmental technology make up the remaining 4 percent of the estimated project costs.

Chart 3.3
Project Costs for Approved R&D Projects

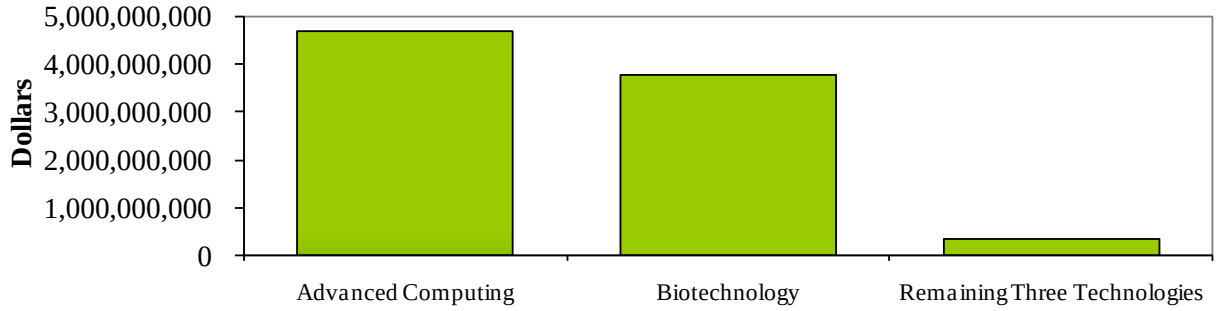


Table 3.2
Approved R&D Projects by Date of Application

Count of Projects (Excluding Certain Lessors)

Year	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
1995	22	1	12	5	2	42
1996	9	0	12	11	0	32
1997	22	0	13	2	2	39
1998	19	0	15	6	0	40
1999	26	0	21	7	0	54
2000	35	0	18	12	1	66
2001	18	0	33	9	2	62
2002	10	0	32	3	1	46
2003	7	1	24	6	0	38
2004	9	0	19	13	1	42
2005	13	0	22	8	0	43
2006	21	3	23	11	2	60
2007	14	0	19	14	1	48
2008	25	0	26	5	1	57
Total	250	5	289	112	13	669

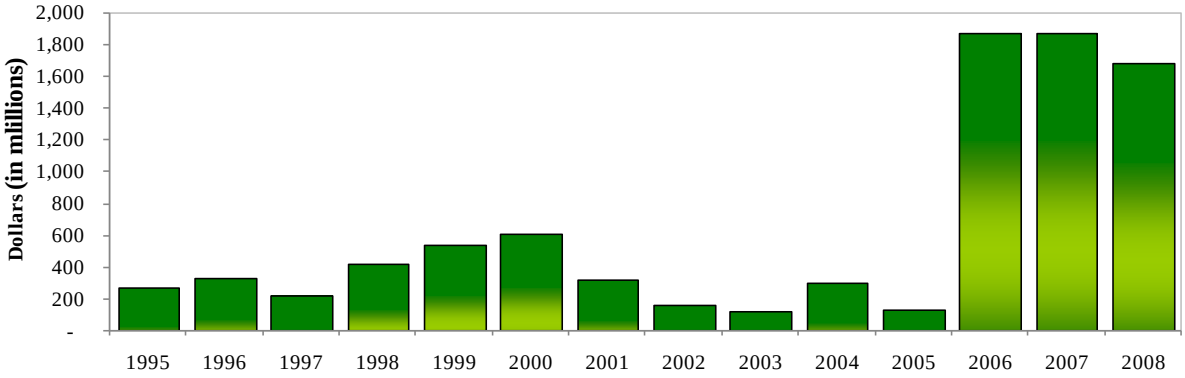
Note: 2001 to 2003 saw the collapse of the Dot Com Bubble. The number of applications in the Advanced Computing technology substantially dropped during that period.

Table 3.3
Estimated Project Costs

Year	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
1995	$208,582,247	$3,663,024	$36,156,014	$20,167,532	$207,414	$268,776,231
1996	162,565,742	0	144,281,493	17,030,582	0	323,877,817
1997	156,396,701	0	53,991,310	5,279,447	163,665	215,831,123
1998	384,346,215	0	22,365,177	12,275,468	0	418,986,860
1999	384,991,629	0	138,556,081	9,408,639	0	532,956,349
2000	213,255,541	0	366,508,175	27,532,537	4,588	607,300,841
2001	208,983,307	0	100,349,375	3,736,254	950,000	314,018,936
2002	21,452,984	0	137,474,538	4,216,533	127,081	163,271,136
2003	2,924,062	146,040	114,313,892	1,211,190	0	118,595,184
2004	94,851,069	0	199,729,663	4,024,131	0	298,604,863
2005	89,203,029	0	38,878,228	1,687,780	0	129,769,037
2006	1,127,169,839	5,617,387	724,923,727	16,567,774	64,593	1,874,343,320
2007	82,028,038	0	1,586,521,423	197,455,386	700,000	1,866,704,847
2008	1,547,605,000	0	130,102,434	1,389,599	218,089	1,679,315,122
Total	$4,684,355,403	$9,426,451	$3,794,151,530	$321,982,852	$2,435,430	$8,812,351,666

Chart 3.4

Estimated Total Project Costs Per Year



Note: The spike in 2006 through 2008 was caused by large advanced computing and biotechnology projects.

Table 3.4

Estimated State and Local Sales Tax Deferred or Exempted

Year	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
1995	$16,925,918	$148,874	$2,800,276	$1,541,632	$17,008	$21,433,708
1996	13,743,696	0	12,275,824	1,424,278	0	27,443,798
1997	13,468,164	0	4,547,555	454,032	14,079	18,483,830
1998	32,975,083	0	1,923,406	1,054,935	0	35,953,424
1999	32,021,652	0	11,857,092	789,036	0	44,667,780
2000	18,377,360	0	32,182,515	2,359,108	358	52,919,341
2001	16,124,699	0	8,277,674	326,478	80,750	24,809,601
2002	1,887,863	0	12,051,572	374,858	9,785	14,324,078
2003	248,546	12,852	7,856,851	104,839	0	8,223,089
2004	8,633,221	0	16,741,239	326,562	149,385	25,850,407
2005	7,821,158	0	4,118,010	284,854	0	12,224,022
2006	95,009,534	499,718	63,604,341	1,391,105	5,337	160,510,034
2007	7,178,595	0	141,191,991	17,555,888	58,800	165,985,274
2008	138,485,300	0	11,288,619	123,063	17,447	149,914,429
Total	$402,900,790	$661,444	$330,716,964	$28,110,667	$352,949	$762,742,814

Table 3.5
Estimated STATE Sales Tax Deferred or Exempted

Year	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
1995	$13,515,615	$122,491	$2,220,694	$1,312,315	$13,482	$17,184,597
1996	10,894,393	0	9,730,836	1,128,632	0	21,753,861
1997	10,544,709	0	3,475,700	343,164	10,641	14,374,213
1998	26,068,313	0	1,453,737	816,443	0	28,338,493
1999	25,351,181	0	9,001,085	613,348	0	34,965,613
2000	14,426,016	0	24,325,406	1,794,365	298	40,546,085
2001	12,399,639	0	6,287,104	254,132	61,750	19,002,625
2002	1,406,232	0	8,937,916	275,830	8,260	10,628,237
2003	195,362	9,386	5,805,257	82,842	0	6,092,847
2004	6,376,811	0	13,017,559	255,740	110,341	19,760,451
2005	6,027,726	0	3,088,855	235,818	0	9,352,399
2006	73,445,181	368,993	47,165,138	1,084,897	4,199	122,068,408
2007	5,332,688	0	103,124,825	12,836,941	45,500	121,339,953
2008	100,594,325	0	8,456,658	90,142	14,176	109,155,301
Total	$306,578,191	$500,871	$246,090,769	$21,124,607	$268,647	$574,563,085

Table 3.6
Estimated LOCAL Sales Tax Deferred or Exempted

Year	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
1995	$3,410,303	$26,383	$579,582	$229,317	$3,526	$4,249,111
1996	2,849,303	0	2,544,988	295,646	0	5,689,937
1997	2,923,455	0	1,071,855	110,868	3,438	4,109,617
1998	6,906,770	0	469,669	238,492	0	7,614,931
1999	6,670,471	0	2,856,007	175,688	0	9,702,167
2000	3,951,344	0	7,857,109	564,743	60	12,373,256
2001	3,725,060	0	1,990,570	72,346	19,000	5,806,975
2002	481,631	0	3,113,657	99,028	1,525	3,695,841
2003	53,185	3,466	2,051,594	21,997	0	2,130,241
2004	2,256,410	0	3,723,680	70,822	39,044	6,089,956
2005	1,793,432	0	1,029,155	49,036	0	2,871,623
2006	21,564,353	130,725	16,439,203	306,208	1,138	38,441,627
2007	1,845,907	0	38,067,166	4,718,947	13,300	44,645,320
2008	37,890,975	0	2,831,960	32,921	3,271	40,759,128
Total	$96,322,598	$160,573	$84,626,195	$6,986,061	$84,302	$188,179,729

Geographic Location of Participants Using the High Tech Deferral

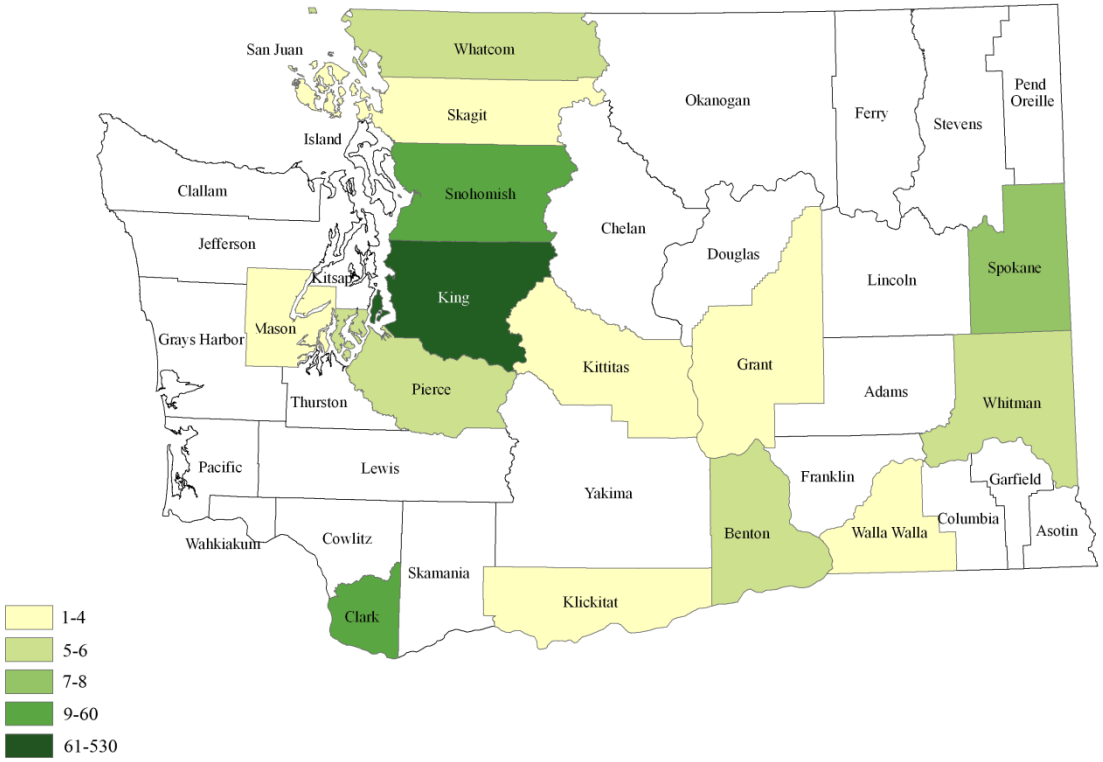
The data indicate that investment in construction and machinery and equipment for R&D and pilot scale manufacturing appears to take place almost exclusively in the urban counties. Seven counties are defined as urban: Clark, King, Kitsap, Pierce, Snohomish, Spokane, and Thurston. All other counties in the state of Washington are rural counties. The definition of a rural county is the same as for the rural tax incentive programs.

Table 3.7
Estimated Project Costs

	Project Costs	Percent
Urban	$8,610,481,871	97.7%
Rural	201,869,795	2.3%
Total	$8,812,351,666	100.0%

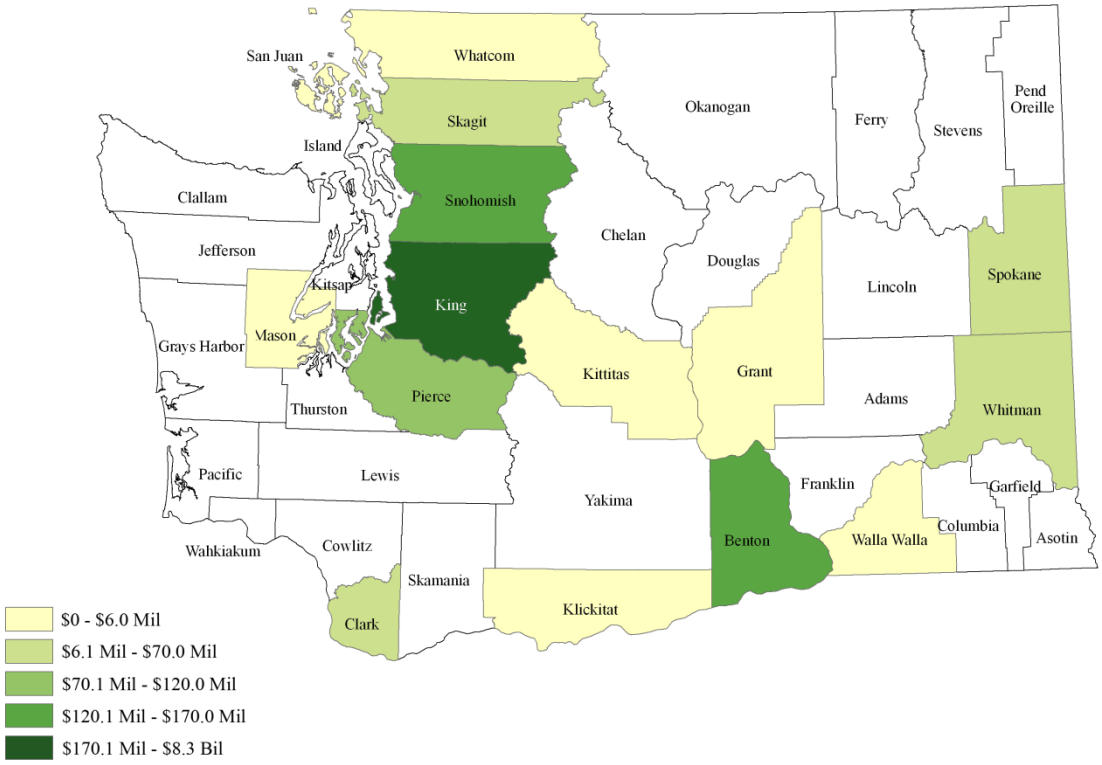
Projects are located in 15 counties throughout the state of Washington. Seventy-nine percent of the projects are located in King County. The next two counties with the highest number of projects are Clark County with 8 percent and Snohomish County with 7 percent of the projects.

Chart 3.5
High Tech Deferral
Approved Applications By County (1995 - 2008)



Again, project costs by county differ somewhat from the number of applications. Projects located in King County account for 94 percent of the estimated project costs, and the remaining 6 percent of the project costs are distributed between 14 other counties.

Chart 3.6
High Tech Deferral
Project Costs By County (1995 - 2008)



Over 90 percent of the project costs for the advanced computing technology and biotechnology are located in King County. In addition, King County has the highest percent of project costs for both the electronic device and advanced materials technologies.

Table 3.8
Estimated Project Costs As a Percent by County
Approved R&D Projects

Project County	Advanced Computing	Advanced Materials	Biotechnology	Electronic Device	Environmental Technology	Total
KING	97.4%	57.9%	91.4%	75.9%	6.8%	94.0%
SNOHOMISH	0.4%	3.2%	3.1%	10.1%	8.4%	1.9%
BENTON	0.1%	0.0%	3.1%	0.0%	0.0%	1.4%
PIERCE	1.9%	38.9%	0.0%	1.2%	39.0%	1.1%
WHITMAN	0.0%	0.0%	1.7%	1.5%	0.0%	0.8%
SPOKANE	0.1%	0.0%	0.5%	2.0%	0.0%	0.4%
CLARK	0.0%	0.0%	0.0%	8.5%	5.5%	0.3%
SKAGIT	0.0%	0.0%	0.2%	0.0%	9.0%	0.1%
WHATCOM	0.0%	0.0%	0.0%	0.7%	28.7%	0.0%
SAN JUAN	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MASON	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%
KLICKITAT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
KITTITAS	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GRANT	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Project Costs	4,684,355,403	9,426,451	3,794,151,530	321,982,852	2,435,430	8,812,351,666

Due to rounding, some counties may have a 0.0%, but a small percent of the estimated project costs are located in that county.

- 0%
- More than 0% up to 0.1%
- More than 0.1% up to 10%
- More than 10% up to 50%
- Over 50%

Completed Projects

Through 2008, 669 projects have been approved and 555 have been completed. The Department conducts audits of deferred sales and use taxes once projects are operationally complete. Audits have been completed on 493 of the projects amounting to $226.6 million in deferred taxes, almost 30 percent of all deferrals.

Table 3.9 shows amounts of deferred sales and use taxes audited or remaining to be audited. Most of the audits have been conducted on projects with application dates in the earlier years of the incentive program. Recipients are required to notify the Department when projects are operationally complete. It should be noted that there are often several years between project application and completion.

Table 3.9
Audited and Unaudited Deferred Sales and Use Taxes

Application	Audited Amount	Unaudited	Total	Audited
1995	$21,388,608	$45,100	$21,433,708	99.8%
1996	27,279,798	164,000	27,443,798	99.4%
1997	17,970,840	512,990	18,483,830	97.2%
1998	35,853,664	99,760	35,953,424	99.7%
1999	19,795,901	24,871,879	44,667,780	44.3%
2000	50,859,872	2,059,469	52,919,341	96.1%
2001	9,577,321	15,232,280	24,809,601	38.6%
2002	12,809,807	1,514,271	14,324,078	89.4%
2003	7,767,941	455,148	8,223,089	94.5%
2004	5,985,401	19,865,006	25,850,407	23.2%
2005	4,803,817	7,420,205	12,224,022	39.3%
2006	11,912,343	148,597,691	160,510,034	7.4%
2007	535,591	165,449,683	165,985,274	0.3%
2008	33,063	149,881,366	149,914,429	0.0%
Total	$226,573,967	$536,168,847	$762,742,814	29.7%

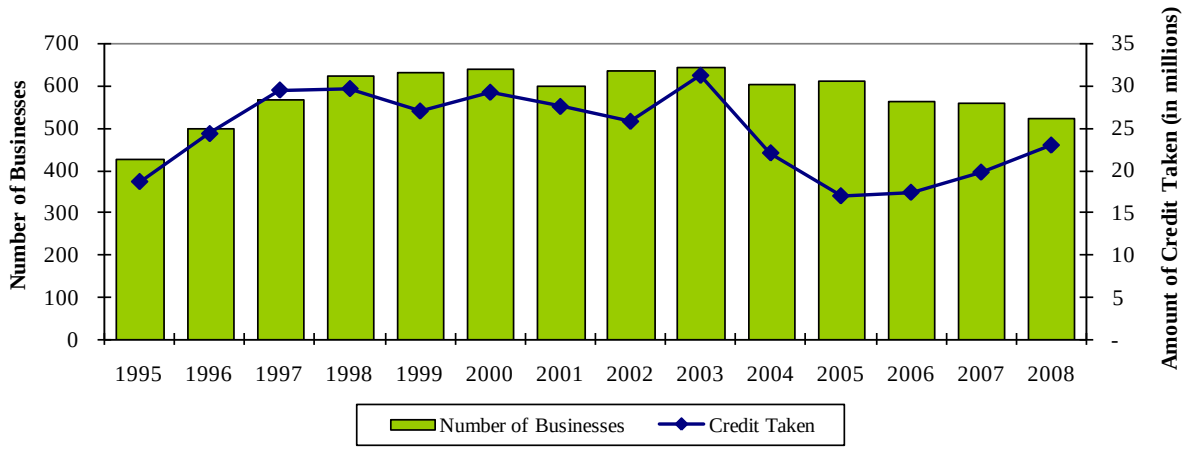
B&O TAX CREDIT

High Tech Credit Participation

The chart below shows the number of firms taking the B&O tax credit for high technology R&D and the amount of credit taken. A major change in the calculation of the credit occurred in 2004.

Chart 3.7

Businesses Taking the High Tech Credit



Beginning June 10, 2004, an eligible firm subtracted 0.92 percent of its taxable gross receipts from the total qualified R&D expenditures for the year, and multiplied this amount by:

- For the period June 10, 2004, through December 31, 2006, their average tax rate for the calendar year for which the credit was claimed.

- For the calendar year ending December 31, 2007, the greater of their average tax rate for that calendar year or 0.75 percent.

- For the calendar year ending December 31, 2008, the greater of their average tax rate for that calendar year or 1 percent.

The table below shows the average credit taken per firm before and after the change in the calculation of the credit.

Table 3.10
High Tech Credit

Year Credit Taken	Number of Counties With at Least One Business Taking a Credit	Number of Businesses Taking a Credit	Amount of Credit Taken	Average Credit Taken Per Business
1995	22	426	$18,538,814	$43,518
1996	24	500	24,270,643	48,541
1997	25	568	29,480,860	51,903
1998	26	624	29,651,077	47,518
1999	23	630	26,968,006	42,806
2000	26	638	29,211,593	45,786
2001	24	600	27,512,859	45,855
2002	25	637	25,734,570	40,400
2003	27	643	31,234,137	48,576
2004	24	603	21,966,165	36,428
2005	25	612	16,832,182	27,504
2006	25	563	17,251,432	30,642
2007	26	558	19,661,695	35,236
2008	24	524	22,899,784	43,702
Total			$341,213,817	

Geographic Location of Participants Taking the High Tech Credit

The data indicate that firms taking the high tech credit mainly reside in urban counties. Seven counties are defined as urban: Clark, King, Kitsap, Pierce, Snohomish, Spokane, and Thurston. All other counties in the state of Washington are rural counties. The definition of a rural county is the same as for the rural tax incentive programs.

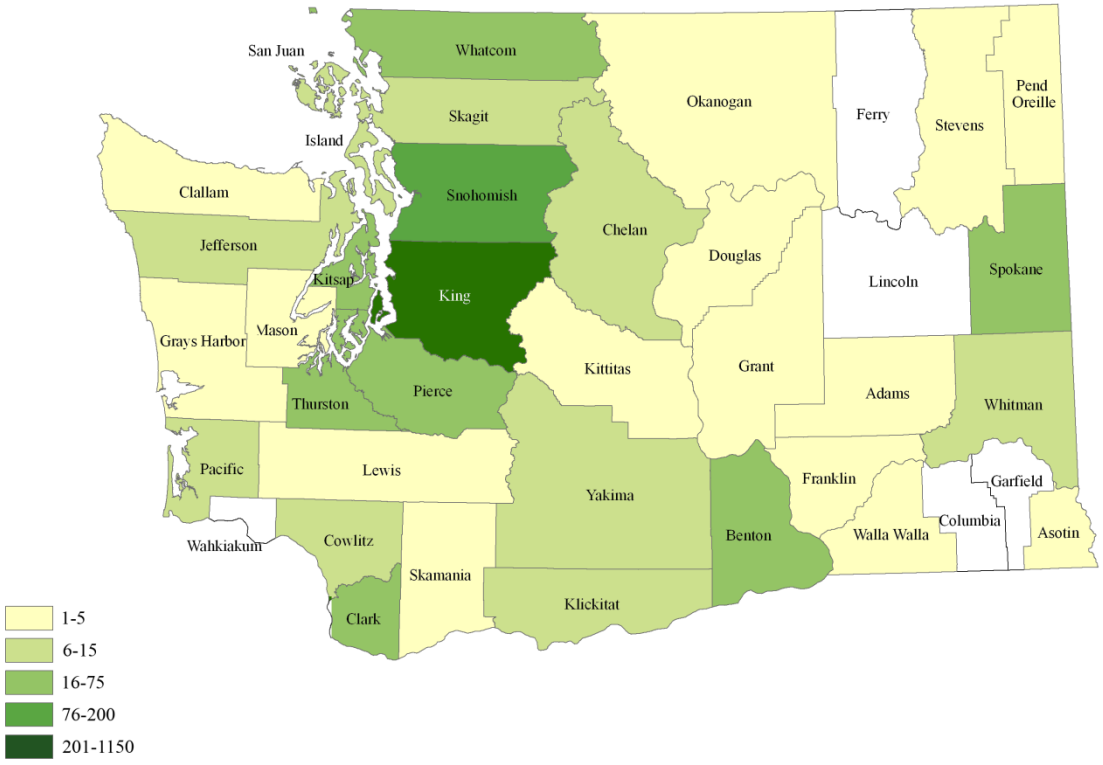
The table below shows the distribution of credit between urban and rural counties.

Table 3.11
Credit Taken

	Credit	Percent
Urban	$254,976,991	74.7%
Rural	60,437,982	17.7%
Unknown Location	25,798,844	7.6%
Total	$341,213,817	100.0%

Since the inception of the program, firms located in 34 counties have taken the credit. The five counties where a credit has not been taken are Columbia, Ferry, Garfield, Lincoln, and Pacific.

Chart 3.8
High Tech Credit
Number of Businesses Taking Credit (1995- 2008)

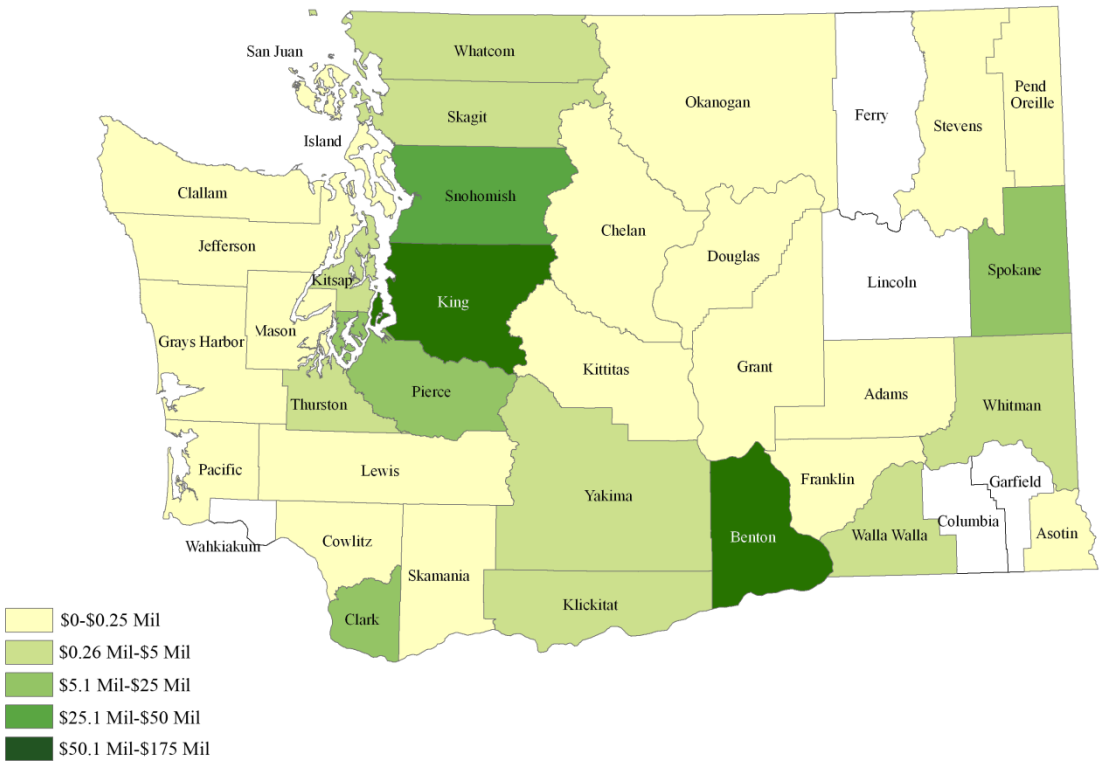


The project costs differ slightly from the number of applications. Projects located in King and Benton counties account for the majority of the estimated project costs.

Chart 3.9

High Tech Credit

Amount of Credit Taken (1995- 2008)



CHAPTER FOUR

EVALUATION OF THE TAX INCENTIVE

The Legislature identified several areas of interest for analysis within RCW 82.04.4452(8) and RCW 82.63.020(4) and the intent statement in RCW 82.63.005.

- Job creation,
- Jobs created for Washington residents,
- Company growth,
- Introduction of new products,
- Diversification of the state's economy,
- Growth in research and development investment, and
- The movement of firms or consolidation of firms' operations into the state.

This chapter attempts to identify trends in data provided by participants in these programs or information available from other sources to give insights into these questions.

Washington's high technology incentive programs include five technology groups, although the participants in these programs are involved in perhaps 100 industry groups. Many of these participants are active in more than one of the five technology groups. For analysis, the number of industries was summarized to a manageable number which also accommodated disclosure limitations. The NAICS groups selected for analysis account for approximately 80 percent of activity in these programs.

- **Manufacturing (NAICS 32)**
  - Chemical (325)
  - Plastics and Rubber Products (326)
  - Nonmetallic Mineral Products (327)
- **Manufacturing (NAICS 33)**
  - Primary Metal (331)
  - Fabricated Metal (332)
  - Machinery (333)
  - Computer and Electronic Products (334)
  - Electrical Equipment, Appliances, and Components (335)
  - Transportation Equipment (336)
  - Furniture and Related Products (337)
  - Miscellaneous (339)
- **Information (NAICS 51)**
  - Publishing Industries (511)
  - Motion Picture and Sound Recording (512)
  - Telecommunications (517)
  - Data Processing, Hosting, and Related Services (518)
  - Other Information Services (519)
- **Professional, Scientific, and Technical Services (541)**
- **Waste Management and Remediation Services (562)**
- **Ambulatory Health Care Services (621)**

Job Creation

Tests for causality of the employment increases related to these two incentive programs were not performed. However, looking at employment patterns, Washington's increase in relative share of employment for high technology industries compared to the U.S. may be due to the growth and relative stability in employment of program participants. This relative increase has averaged about 0.2 percent compared to the early 1990s. However, the high technology participants also participate in other incentive programs, such as the machinery and equipment sales tax exemption and aerospace incentives, which reduce the effect of these specific high tech programs on employment.

These NAICS groups identified above were used to accumulate non-participant and participant employment for comparison. Table 4.1 uses employment data from the Employment Security Department for participant and non-participant firms. From the table it can be seen that Washington's combined employment in these industries has varied considerably over the 1995 to 2008 period and reached a peak in 2001 before the dot-com bust. By 2008, employment for the entire group had not yet recovered to the 1995 level. When comparing participants and non-participants in the high technology sectors, it appears that most employment growth in the state was enjoyed by the participants in the high technology programs during the period from 1995 to 2000 and has been nearly flat since then. Additionally, during the recession years of 2001 to 2004, participant firms had a lower level of employment decline than non-participant firms.

Table 4.1
Employment in Washington's High Technology Sectors: Selected NAICS

Year	Participant Employment	Non-Participant Employment	Total Employment	Participants as a Percent of Total
1995	51,893	493,927	545,821	9.5%
1996	58,260	434,084	492,344	11.8%
1997	77,751	459,948	537,699	14.5%
1998	85,238	477,300	562,538	15.2%
1999	92,249	464,674	556,923	16.6%
2000	102,310	468,624	570,935	17.9%
2001	98,147	474,804	572,951	17.1%
2002	94,737	445,238	539,975	17.5%
2003	90,885	364,531	455,415	20.0%
2004	85,809	361,592	447,401	19.2%
2005	87,254	382,132	469,386	18.6%
2006	90,762	398,407	489,169	18.6%
2007	90,436	416,513	506,949	17.8%
2008	97,234	427,924	525,157	18.5%

Table 4.2 shows a comparison of Washington's employment in the high-tech NAICS groups compared with the U.S. levels, using data from the U.S. Department of Labor. From this table it can be seen that the state's share of U.S. employment has increased for most of these industry groups over the nine-year period. Since employment for non-participants was largely declining for most of this period, Washington's relative share increases were caused by growth and relative stability in employment for the program participants.

Tests for causality of the employment increases related to these two incentive programs were not performed. There are many factors related in the decision to add employees, of which taxes are only one. There are other state incentive programs, and local assistance, that firms can take advantage of which were not accumulated for this study. For example, based on survey responses during the last four years, the state machinery and equipment sales tax exemption has exceeded the level of the high tech credit for participants; therefore, if the effect of the credit on employment were to be calculated, it would be less than half of the apparent impact.

Table 4.2
Washington Employment as a Percent of U.S. in the High Technology Sectors

NAICS	2001	2002	2003	2004	2005	2006	2007	2008
Select Manufacturing (32)*	1.0%	1.0%	1.0%	1.1%	1.1%	1.2%	1.3%	1.3%
Select Manufacturing (33)**	2.1%	2.0%	2.0%	1.9%	2.0%	2.2%	2.3%	2.4%
Select Information (51)***	2.8%	2.9%	3.0%	3.1%	3.3%	3.4%	3.6%	3.8%
Scientific Services (541)	2.0%	2.0%	1.9%	1.9%	1.9%	1.9%	2.0%	2.1%
Waste Management (562)	4.1%	4.1%	4.0%	4.0%	4.0%	3.8%	4.0%	4.1%
Health Care Services (621)	2.2%	2.2%	2.2%	3.7%	2.2%	2.2%	2.2%	2.2%
Average	2.4%	2.4%	2.4%	2.6%	2.4%	2.5%	2.6%	2.6%

*Chemical, Plastics and Nonmetallic Mineral Manufacturing

**Metal, Machinery, Computer, Electrical, Transportation and Miscellaneous Manufacturing

***Software Publishing, Motion Picture Recording, Telecommunications and Data Processing

Jobs Created for Washington Residents

Three of the technology groups in the programs have had an increase in share of Washington residents hired as compared to earlier years, although the percentage varies by year. In a 2000 survey, the ratio was 59 percent but it increased to over 80 percent in 2008 for most technologies. When new technologies emerge, it is reasonable to expect that more employees would be hired from outside the state to obtain the necessary talent; this increasing trend towards hiring Washington residents likely represents an increase in more qualified local employees being available in these technologies. In Advanced Materials and Environmental Technology, a decline in Washington resident hiring has occurred in recent years, although the hiring proportions were still higher than in 2004.

Comparisons of wages and benefits between participants and non-participants in the high technology industries found that participant firms provide better benefits and pay higher wages than non-participant firms. Washington participant firms also appear to pay better than the average U.S. wage in the same industries. See Tables 4.3 through 4.10 on the following pages.

The data used in analyzing wages had noticeable anomalies during the period from 1999 to 2002. It is apparent that employers included stock options and bonuses for employees in total wages reported to the Employment Security Department. Specifically in the manufacturing sector, NAICS 32, there was one firm that biased average wages, but the increase in average wages was also evident in some of the other high tech industries. Because of these anomalies, analyzing the average wage of participants verses non-participants skewed the results in favor of participants. However, even ignoring these anomalies, participants in these incentive programs have much higher average wages than non-participants and the nation.

Tables 4.3 and 4.4 show average wages for the detailed industries analyzed and overall average wages for participants and non-participants compared to the national average wages among the same high technology industries.

Table 4.3
Average Wages in High Technology Industries: Participants and Non-Participants

Participants	2001	2002	2003	2004	2005	2006	2007	2008
Select Manufacturing (32)	$ 79,080	$191,668	$ 89,608	$ 70,888	$ 85,705	$ 75,381	$ 76,196	$ 74,538
Select Manufacturing (33)	$ 56,732	$ 58,891	$ 62,751	$ 65,360	$ 68,781	$ 71,245	$ 74,279	$ 80,913
Select Information (51)	$194,431	$173,402	$174,785	$133,962	$117,487	$134,220	$142,650	$151,672
Scientific Services (541)	$ 70,942	$ 72,113	$ 77,618	$ 81,397	$ 84,902	$ 88,605	$ 99,615	$ 95,253
Waste Management (562)	$ 65,145	$ 67,975	$ 74,574	D	D	D	$ 89,215	$ 95,618
Health Care Services (621)	$ 33,750	$ 35,586	$ 38,079	$ 39,884	$ 39,609	$ 43,020	$ 44,282	$ 48,596
NON-Participants								
Select Manufacturing (32)	$ 36,973	$ 37,840	$ 38,452	$ 39,703	$ 40,427	$ 42,197	$ 45,404	$ 46,001
Select Manufacturing (33)	$ 52,408	$ 55,912	$ 40,839	$ 42,163	$ 43,473	$ 45,779	$ 47,962	$ 49,217
Select Information (51)	$ 50,966	$ 47,684	$ 47,759	$ 50,883	$ 54,760	$ 59,512	$ 60,456	$ 65,638
Scientific Services (541)	$ 46,279	$ 47,332	$ 50,879	$ 52,454	$ 54,619	$ 58,836	$ 65,192	$ 65,790
Waste Management (562)	$ 55,569	$ 56,828	$ 59,662	$ 55,362	$ 56,713	$ 52,879	$ 55,123	$ 56,804
Health Care Services (621)	$ 33,731	$ 35,457	$ 36,640	$ 38,508	$ 40,302	$ 42,361	$ 44,995	$ 47,747

D = Data have been withheld to avoid disclosure where less than three firms participated.

Table 4.4
Average Wage Comparison: Participants, Non-Participants, Washington and the U.S.

	2001	2002	2003	2004	2005	2006	2007	2008
Average Wages All Participants	$ 83,347	$ 99,939	$ 86,236	$ 78,298	$ 79,297	$ 82,495	$ 87,706	$ 91,098
Average Wages Excluding Software	$ 61,130	$ 85,247	$ 68,526	$ 64,382	$ 69,749	$ 69,563	$ 76,718	$ 78,983
Average Wages Non-Participants	$ 45,988	$ 46,842	$ 45,705	$ 46,512	$ 48,382	$ 50,261	$ 53,188	$ 55,200
Average Wages WA	$ 50,250	$ 54,062	$ 52,442	$ 52,146	$ 54,381	$ 56,619	$ 60,238	$ 62,013
Averge Wages U.S.	$ 47,299	$ 47,895	$ 49,328	$ 51,732	$ 53,404	$ 55,588	$ 59,002	$ 60,332

In 2000 a survey of high technology program participants indicated that Washington residents made up 59 percent of newly hired employees. The annual surveys that participants submitted during 2004 to 2008 yield the following results seen in Table 4.5. The overall trend in all the technology groups shows a general increase of new hires being Washington residents.

Table 4.5
Percent of New Employees Hired from Washington: High Tech Credit and Deferral Programs

	2004		2005		2006		2007		2008	
Technology	Firm Count	Percent WA	Firm Count	Percent WA	Firm Count	Percent WA	Firm Count	Percent WA	Firm Count	Percent WA
Advanced Computing	22	73.0%	22	82.2%	44	85.5%	124	79.7%	117	84.2%
Advanced Materials	7	56.0%	5	89.0%	4	95.0%	15	90.9%	29	71.5%
Biotechnology	15	68.6%	14	69.3%	17	79.8%	59	89.8%	64	82.2%
Electronic Device Technology	14	54.4%	16	77.6%	32	81.5%	83	80.9%	81	84.5%
Environmental Technology	3	33.3%	4	64.8%	5	96.0%	22	70.0%	27	75.8%

Table 4.6 illustrates the level of temporary employees hired from staffing firms and used by program participants; temporary employment data was not included in the 2004 survey. While there is an overall trend increase in the use of temporary employees, temporary employment has actually declined in manufacturing whereas dramatic increases in the use of temps in Information and Scientific Services have driven the overall increase. The decrease in temporary employees in the manufacturing sector supports the analysis and results found that overall manufacturing employment in Washington has decreased.

Table 4.6
Employment from Temporary Staffing: as Reported in Annual Survey Responses

Participants	2005	2006	2007	2008
Manufacturing (32)	156	103	101	66
Manufacturing (33)	1,465	1,605	1,938	921
Information (51)	3,904	4,888	7,076	7,221
Scientific Services (54)	1,142	2,254	2,186	3,175
Waste Management (56)	57	88	150	301
Health Care Services (62)	124	278	316	559
Yearly Total	6,848	9,216	11,767	12,243

Program participants answer annual survey questions regarding employee benefits, including medical and retirement benefits. The Employment Security Department also does surveys of employer-provided benefits, although their survey coverage is different. The department combined the data for both of these surveys in a way that allows comparisons between program participants and non-participants; the following tables provide comparisons of employee medical benefits and retirement benefits. From the tables it can be seen that for years in which data can be compared, program participants provide benefits to a higher percent of employees than non-participants in similar industries.

The Employment Security Department's annual Employee Benefits Survey did not include data for Tables 4.7 through 4.10 in years 2004 and 2007. In addition, there were no participants in either the deferral program or credit program for years 2004, 2005, 2007, and 2008 in NAICS 56, Waste Management.

Table 4.7
High Tech Deferral Program Medical Coverage: Participants vs. Non-Participants

Participants	2004*	2005	2006	2007*	2008
Manufacturing (32)	98.5%	97.9%	99.9%	96.1%	D
Manufacturing (33)	93.2%	90.2%	89.7%	90.0%	89.3%
Information (51)	D	D	D	D	D
Scientific Services(54)	92.9%	84.7%	93.5%	85.3%	86.4%
Waste Management (56)	NA	NA	D	NA	NA
Health Care Services (62)	82.4%	D	81.2%	79.9%	81.9%
Non-Participants					
Manufacturing (32)	NA	83.1%	83.8%	NA	D
Manufacturing (33)	NA	80.6%	83.9%	NA	81.8%
Information (51)	NA	D	D	NA	D
Scientific Services(54)	NA	80.3%	82.0%	NA	79.2%
Waste Management (56)	NA	NA	D	NA	NA
Health Care Services (62)	NA	D	70.3%	NA	65.6%

D = Data have been withheld to avoid disclosure where less than three firms participated.

Table 4.8
High Tech Deferral Program Retirement Plans: Participants vs. Non-Participants

Participants	2004*	2005	2006	2007*	2008
Manufacturing (32)	84.8%	92.4%	94.2%	95.7%	D
Manufacturing (33)	89.2%	77.3%	81.9%	84.9%	89.4%
Information (51)	D	D	D	D	D
Scientific Services(54)	77.8%	75.4%	74.7%	72.6%	77.7%
Waste Management (56)	NA	NA	D	NA	NA
Health Care Services (62)	71.8%	D	88.3%	70.6%	80.3%
Non-Participants					
Manufacturing (32)	NA	62.3%	54.8%	NA	D
Manufacturing (33)	NA	49.2%	51.1%	NA	51.9%
Information (51)	NA	D	D	NA	D
Scientific Services(54)	NA	62.7%	54.9%	NA	59.7%
Waste Management (56)	NA	30.7%	D	NA	22.6%
Health Care Services (62)	NA	D	59.3%	NA	55.2%

D = Data have been withheld to avoid disclosure where less than three firms participated.

Table 4.9
High Tech Credit Program Medical Coverage: Participants vs. Non-Participants

Participants	2004*	2005	2006	2007*	2008
Manufacturing (32)	87.9%	87.1%	87.8%	81.8%	84.6%
Manufacturing (33)	83.7%	90.8%	90.6%	88.3%	87.4%
Information (51)	D	D	D	D	D
Scientific Services(54)	89.1%	87.0%	87.8%	86.1%	87.5%
Waste Management (56)	93.5%	93.6%	92.7%	90.1%	90.5%
Health Care Services (62)	89.5%	90.4%	91.3%	89.0%	87.0%
Non-Participants					
Manufacturing (32)	NA	83.2%	83.9%	NA	79.7%
Manufacturing (33)	NA	80.0%	83.5%	NA	81.5%
Information (51)	NA	D	D	NA	D
Scientific Services(54)	NA	80.0%	81.7%	NA	78.8%
Waste Management (56)	NA	50.9%	55.5%	NA	37.6%
Health Care Services (62)	NA	73.2%	70.5%	NA	65.8%

D = Data have been withheld to avoid disclosure where less than three firms participated.

Table 4.10
High Tech Credit Program Retirement Plans: Participants vs. Non-Participants

Participants	2004*	2005	2006	2007*	2008
Manufacturing (32)	75.0%	66.6%	65.9%	60.6%	65.4%
Manufacturing (33)	73.4%	78.3%	79.8%	81.2%	78.7%
Information (51)	D	D	D	D	D
Scientific Services(54)	78.0%	75.1%	77.4%	74.9%	78.5%
Waste Management (56)	96.8%	96.9%	96.5%	94.2%	90.4%
Health Care Services (62)	69.9%	77.4%	66.3%	66.4%	53.3%
Non-Participants					
Manufacturing (32)	NA	62.5%	55.0%	NA	54.5%
Manufacturing (33)	NA	47.6%	49.7%	NA	50.3%
Information (51)	NA	D	D	NA	D
Scientific Services(54)	NA	62.3%	52.8%	NA	58.8%
Waste Management (56)	NA	28.0%	33.2%	NA	20.7%
Health Care Services (62)	NA	61.3%	59.7%	NA	55.6%

D = Data have been withheld to avoid disclosure where less than three firms participated.

Company Growth

Based on survey data reported, taxable revenue for all high technology participants as a whole grew about 1.5 percent per year from 2004 to 2008. This growth was less than the growth in research spending as well as inflation but, on a per company average basis, the growth increased to 4.7 percent. While the count of participants declined slowly the total taxable revenue per year grew slightly. These trends are key indicators that the participants that used the incentive programs saw modest company growth overall. See Table 3.10 of the previous chapter and Table 4.11 below.

Though company revenue, as seen in Table 4.11, did not see a significant increase, participants reported moderate growth in the annual survey. The decline in the number of participants and the slight increase in taxable revenue confirms moderate company growth of participants. There are two possible explanations for the overall increase in average taxable. One, firms within the industry that used the incentives consolidated, explaining the decrease in the number of participants. Or firms, for multiple reasons, stopped using the incentives, closed or left the state. Analysis to identify the reason for decreased participation was not conducted but it is safe to say that those firms that used the incentive programs experienced moderate gains in company growth over time.

Table 4.11
Taxable Revenue Reported by Participants in High Tech Credit and Deferral Programs

Year	Participants	Taxable	Average Taxable
2004	621	$9,847,261,539	$15,857,104
2005	554	8,915,620,360	16,093,178
2006	522	9,274,518,674	17,767,277
2007	542	9,268,759,267	17,101,032
2008	519	10,462,407,399	20,158,781
Yearly Growth		1.5%	4.7%

Introduction of New Products

This study requires that new product trends be evaluated. To that end, the annual survey asks several questions about new products, services, processes, and research projects. The responses are reported in the annual Descriptive Statistics Report. It is clear that these concepts may have differing values for each firm, as a product in one industry may have a vastly different value from a product in another industry. However, it was believed that changes in counts might provide insights about trends over time if answers to the questions by each firm were consistent over time. Table 4.12 shows the product information reported on the survey for high tech participants by technology group, with research spending for the firms that answered these questions.

It should be noted that since firms may be involved in multiple technologies, the amount of research spending may be double counted across technologies and therefore totals would not add to the total spending for these firms in the state. From the data it appears there are very few clear trends, but the following observations are offered:

- Advanced computing – Apparent increases in activity on a by business basis, increases in research spending per product, and a possible consolidation of the industry.

- Advanced materials – No clear trends in activity with volatility during the five-year period and an apparent decrease in research spending per product.

- Biotechnology – No clear trends in product counts during the five-year period, although aggregate research spending increased and spending per product also increased.

- Electronic devices – Research spending was generally higher at the end of the period in aggregate and on a per product basis and a possible consolidation of the industry.

- Environmental technology – While research spending on a per product basis declined over the period, the number of products was generally higher.

Based on survey responses the total of all five technology group's product counts appear lower in 2008 than in 2004. However, research spending in aggregate has increased for this same time period. See Table 4.12 on the next page.

Table 4.12
Product Trends by Technology Group

	2004	2005	2006	2007	2008
Advanced Computing					
All new products, services, processes & projects	8156	7946	8077	7953	7916
Existing projects	1300	2127	2731	2844	2004
Count of firms reporting	262	256	225	222	207
Research spending for reporters	$ 4,725,687,882	$ 3,335,427,391	$ 3,924,163,749	$ 4,690,819,893	$ 5,155,544,124
Average new and existing items per reporter	36	39	48	49	48
Average spending per item reported	$ 499,755	$ 331,126	$ 363,080	$ 434,456	$ 519,712
Advanced materials					
All new products, services, processes & projects	882	150	362	1056	732
Existing projects	74	160	351	381	102
Count of firms reporting	32	24	27	29	35
Research spending for reporters	$ 194,257,422	$ 276,826,514	$ 99,016,142	$ 127,340,878	$ 133,387,290
Average new and existing items per reporter	30	13	26	50	24
Average spending per item reported	$ 203,198	$ 892,989	$ 138,873	$ 88,616	$ 159,937

Table 4.12 (Continued)
Product Trends by Technology Group

	2004	2005	2006	2007	2008
Biotechnology					
All new products, services, processes & projects	4821	2683	1056	2105	1832
Existing projects	2289	7642	8869	1576	2109
Count of firms reporting	86	72	74	76	77
Research spending for reporters	$ 474,169,129	$ 496,473,160	$ 474,330,532	$ 535,208,656	$ 746,931,795
Average new and existing items per reporter	83	143	134	48	51
Average spending per item reported	$ 66,690	$ 48,085	$ 47,791	$ 145,398	$ 189,528
Electronic devices					
All new products, services, processes & projects	2322	2131	1991	2078	2085
Existing projects	1004	1112	845	1326	1324
Count of firms reporting	154	152	143	139	130
Research spending for reporters	$ 695,874,638	$ 860,058,872	$ 923,166,391	$ 777,147,336	$ 887,386,723
Average new and existing items per reporter	22	21	20	24	26
Average spending per item reported	$ 209,223	$ 265,205	$ 325,517	$ 228,304	$ 260,307
Environmental technology					
All new products, services, processes & projects	188	115	119	174	323
Existing projects	119	221	165	439	199
Count of firms reporting	43	33	26	33	34
Research spending for reporters	$ 427,631,363	$ 418,374,109	$ 351,716,440	$ 388,223,123	$ 344,540,988
Average new and existing items per reporter	7	10	11	19	15
Average spending per item reported	$ 1,392,936	$ 1,245,161	$ 1,238,438	$ 633,317	$ 660,040

Diversification of the State's Economy

Analysis of patent information indicates that Washington's technological expertise has continued to expand after the early 1990s (prior to existence of programs) both relative to the U.S. and selected states. See Chapter 5. There are indications that both technological breadth and depth has increased relative to the U.S. and the selected competitive states; this improvement is largely due to firms that are participants in these programs. While these trends indicate potential economic diversification due to inventions, they do not speak to diversification in actual production of products.

While these programs are targeted to selected higher growth technologies, the research to invent products is only the first step to producing and distributing products. A high growth in research that is translated into products manufactured and distributed by Washington firms would yield the optimum outcome for both highly educated research employees as well as blue-collar employees in Washington.

However, a review of participant tax reporting indicates a declining trend in manufacturing activity by participants. This information coupled with survey responses indicate that the majority of new products or services are probably not manufactured or distributed by Washington firms. See Tables 4.13 through 4.15.

Patent information is helpful for evaluating trends in technological innovation. The U.S. Patent and Trademark Office (PTO) keeps statistics on patents granted in about 450 classification codes by state and by owner. The classifications define a general area of knowledge, which is similar to but more refined than an industry code.

One method of measuring technological diversity and trends in diversity for a state is to measure the breadth of patent classifications over time. The breadth of patents over time is represented by the number of classifications with granted patents during the period analyzed.

To evaluate Washington's breadth, patent data for the state was compared to the nation and other selected competitive states. The selected states included: California, Missouri, Nevada, North Carolina, Oregon and Texas. (These states were also used in chapter five of this study).

To analyze patent data, population ratios were applied to ensure data was comparable for analysis with the assumption that a state's population impacts the number of granted patents for any state. The ratio worked as follows:

During the time periods analyzed,

- Washington averaged one patent in a class per year to count the class,
- Selected States averaged 13.5 patents in a class per year to count the class,
- The U.S. averaged 50 patents in a class per year to count the class.

Hence, for any class to count in Table 4.13a, the U.S. would need at least 50 patents in that class, while Washington would only need one to count the class. Table 4.13a also includes the populations used to determine the ratio needed for comparable patent analysis.

The numbers in Table 4.13a represent the averages for each group after the ratio was applied. Therefore, the numbers are not actual totals but represent averages based on the population factor for each group which allowed for much more meaningful analysis. During the period from 1999-1994, the U.S. had 234 classifications with granted patents. The 234 was determined by using the population ratio meaning that 234 classifications had at least 50 patents during that period; while Washington needed only one and during the same time period had 206 classifications with granted patents.

Based upon the results of Table 4.13a, it appears that Washington's technological breadth increased relative to the U.S. as well as the selected competitive states by about 5 percent from the early 1990s to 2008. The percents calculated in the middle sections of Table 4.13a show Washington compared with both groups and were calculated using the number of classifications with granted patents in the first part of the table. While the dot-com bust of the early decade had an impact, the state's recovery caused technological breadth to improve by the later part of the decade. Participant's technological breadth realized an increase relative to the U.S. for the specified time period, more so than non-participants. The results can be seen in the last section of the table. The analysis shows that much of Washington's increase in technological breadth can be attributed to the growth in the participant group.

Table 4.13a
Patent Class Diversification: Breadth

Breadth

Number of Classifications with Granted Patents						WA Comparison of U.S. & Selected States		Participants	Non-Participants
Time Period	U.S.	Selected States	WA Total	Non-Participants	All High Tech Participants	Total WA/U.S.	Total WA/Selected States	High-Tech Participants/U.S.	Non-Participants / U.S.
1990-1994	234	217	206	139	39	88%	95%	17%	59%
1995-1999	244	226	232	146	85	95%	103%	35%	60%
2000-2004	249	235	225	156	94	90%	96%	38%	63%
2005-2008	227	210	210	160	81	93%	100%	36%	70%

U.S. - Those classes with 50 or more patents averaged per year for the spedified time period
Selected States - Those classes with 13.5 or more patents averaged per year for the specified time period
Washington - Those classes with 1 or more patents averaged per year for the specified time period
Number of patents per class determined by Ratio of 50:13.5:1. Estimated 2008 population for each group selected
U.S. = 304,060,000
Selected States = 82,607,000
Washington = 6,550,000

As the number of patents granted within patent classifications increases, it indicates that competence and expertise in technologies are improving. This helps to measure technological knowledge development or depth, a goal of these programs. Depth refers to the number of patents within a classification; the more patents in a class the more depth or expertise is assumed. To measure this trend over time, the same types of calculations used for the breadth indicator were made. For Washington to have a classification with depth it was determined that 5 granted patents in the class would be required. Therefore, a multiple of 5 was applied to determine depth denoting that the U.S. would be required to have 250 granted patents in a class to include the class in the analysis for depth.

Based upon the results of Table 4.13b below, it appears that Washington's technological expertise has continued to expand after the early 1990s relative to the U.S. and selected states. Participants compared to the U.S. experienced larger gains in depth compared to the non-participants. This indicates that both technological breadth and depth increased relative to the U.S. and selected competitive states over this period.

Table 4.13b
Patent Class Diversification: Depth

Debth

Number of Classifications with Granted Patents						WA Comparison of U.S. & Selected States		Participants	Non-Participants
Time Period	U.S.	Selected States	WA Total	Non-Participants	All High Tech Participants	Total WA/U.S.	Total WA/Selected States	High-Tech Participants/U.S.	Non-Participants / U.S.
1990-1994	41	51	45	19	4	110%	88%	10%	46%
1995-1999	69	74	65	28	22	94%	88%	32%	41%
2000-2004	89	100	85	43	34	96%	85%	38%	48%
2005-2008	77	88	89	52	40	116%	101%	52%	68%

U.S. - Those classes with 250 or more patents averaged per year for the spedified time period
Selected States - Those classes with 67.5 or more patents averaged per year for the specified time period
Washington - Those classes with 5 or more patents averaged per year for the specified time period
Number of patents per class determined by Ratio of 50:13.5:1 with a multiple of 5.

One of the goals of the high technology tax incentive programs was to provide targeted incentives for specific activities which were believed to grow more rapidly than average. To evaluate these goals requires analysis of the results related to targeted groups versus non-targeted, non-participant groups. For the analysis, participants are classified as participants if they ever participated between 1995 and 2008 and non-participants were firms that never participated in the same period.

Table 4.14 illustrates that the high technology participant group grew faster than other categories and therefore increased the share of total state patents to 53 percent, up from 20 percent during 1990 through 1994. For that reason, it appears likely that improvement in breadth and depth of technological activities for the state mentioned above was significantly impacted due to the participation of firms in the high technology incentive programs, in spite of their targeted emphasis. Non-participant firms also added significantly to the potential product diversification of the state (using patents as a measure), but this group grew at a slower pace than those in the high technology programs. It should be noted that a portion of the non-participant group is eligible for the aerospace incentive programs.

Table 4.14
Washington Patents

	Percent of Washington patents*	
	1990-1994	2005-2008
All Hi Tech Participants	20%	53%
No Program Participation**	74%	45%
Rural deferral only	6%	2%
	100%	100%

* Excludes patents issued to individuals

** About half is aerospace

Patents granted to firms were reported on the survey by technology group. Table 4.15 shows the reported patent counts for 2004-2008. There were significant differences between reported patents on the survey and patent counts indicated by the U.S. Patent and Trademark Office. In many cases firms did not report patents only for Washington, reported patents when they were not the primary owner, or reported patents for the wrong year. Therefore, for purposes of analysis, the PTO counts were used.

Some firms in the program reported copyrights instead of or in addition to patents. The totals for copyrights were small and averaged only 0.06 percent of the national average during 2004 through 2007.

Table 4.15
Patents and Trademarks by Technology Group: as Reported by Survey Participants

Patents	2004	2005	2006	2007	2008
Advanced Computing	916	979	1,644	1,836	2,392
Advanced Materials	14	61	29	7	26
Biotechnology	133	188	116	182	151
Electronic Device Technology	433	336	437	1,134	270
Environmental Technology	73	65	28	16	9
Other areas	63	33	35	101	24
Totals	1,632	1,662	2,289	3,276	2,872
Patents per PTO (companies)	1,016	1,087	1,817	1,924	2,174
Trademarks					
Advanced Computing	732	267	113	158	233
Advanced Materials	11	10	40	3	8
Biotechnology	32	22	26	106	67
Electronic Device Technology	64	55	84	57	38
Environmental Technology	9	3	5	18	7
Other areas	25	18	18	34	48
Totals	873	375	286	376	401
Washington total trademarks per PTO	1,750	1,686	2,185	2,095	3,219
U.S. total trademarks per PTO	97,571	92,527	119,526	122,266	171,104
Participants as share of Washington total	50%	22%	13%	18%	12%
Participants as share of U.S. total	0.9%	0.4%	0.2%	0.3%	0.2%

Firms that receive patents are identified by the U.S. Patent and Trademark Office by state location where the patent was received. This patent location data was evaluated to determine

whether firms changed their research locations (consolidation into Washington) after the high tech programs were created. From this data it was determined that during 1990 to 2008, 201 firms that participated in these programs received patents and of these firms, 56 received patents in multiple states. A review of this data over time indicates a mixed result when looking for firms that completely changed their research location to Washington. Another way of looking at this was by comparing year to year changes in the share of Washington patents received to see if a preference toward research in Washington was detectable. In Table 4.16, it was found that there does appear to be a net preference toward doing research in Washington at about a 5 percent greater level than for non-participant firms.

Table 4.16
Research Location Preference

	High Tech Program Participants	Non-Participant Firms
Count of firms with patents 1990-2008	201	427
Firms with multistate patent locations	56	201
Share with multistate patents	27.9%	47.1%
Instances of WA patent share increases over two year periods	230	718
Instances of WA patent share decreases over two year periods	210	685
Relative WA bias	9.5%	4.8%

Growth in Research and Development Investment

While capital spending on research facilities has grown dramatically as shown in Table 3.3 of Chapter 3, there is significant volatility caused by business cycles as well. The trends in non-capital spending are not as clear. For example, average spending per patent in Washington was 60 percent above the national average in 2004 but was only 56 percent of the national average in 2008. Total research spending in the state probably peaked in 2001 at $10.3 billion and was $7.3 billion in 2008. Since this spending is dominated by the software industry, stock options and bonus payments have a significant impact on the volatility of this amount. In recent years, low growth in non-software spending has offset higher growth in software spending and caused an average five-year growth of 3.3 percent compared to a national average of 6 percent. See Tables 4.16 through 4.18.

National research spending using data provided by Global Insight grew about 6 percent per year between 2004 and 2008. In Washington, research spending for participants of the two high tech research programs grew at about 3.3 percent per year for the same period. The lower growth rate in Washington was caused by a near flat spending level for non-software firms in the programs while software firms (NAICS 511) grew at a rate of about 5.9 percent. The lower growth rate caused Washington's relative share of national research spending to decline from 2.2 percent in 2004 to 1.9 percent in 2008. A portion of the decline in research spending for non-software

firms was caused by mergers where a firm's activity left the state; while some spending changes may be due to reduced levels of stock option or bonus payments. A lack of specific data in these areas did not allow for analysis of those patterns.

In a contrary trend, patents granted to firms participating in the high tech programs increased substantially between 2004 and 2008 and Washington share of U.S. patents grew from 1.4 percent to 3.4 percent. Much of this growth was attributable to the software industry. While the number of patents increased, the average research spending per year per patent declined substantially during recent years in Washington. One potential cause for the contrary trend is the notion that the software industry started to split ideas into desecrate components which increased the number of patents but mostly would not require an increasing in research spending. The average research cost per patent in 2004 for firms in the software industry was $7.6 million but declined to $2.6 million in 2008. In contrast, the average research cost per year per patent for non-software firms was $5.7 million in 2004 and $5.9 million in 2008.

Table 4.17 illustrates the differing trends between Washington research spending and the U.S. average. Notably, the software industry had different results in the time period analyzed compared with the U.S. and other participating industries.

Table 4.17
Research Trends: Washington – U.S. Comparisons

	2004	2005	2006	2007	2008
U.S. Research spending ($ billion)	299.9	323.0	347.9	368.1	381.6
WA high tech program participants spending ($ billion)	6.8	5.4	5.9	6.7	7.3
WA participant share of U.S.	2.27%	1.68%	1.70%	1.81%	1.91%
U.S. Patents (companies)	71,901	63,582	74,192	65,577	63,837
WA high tech participant patents	1,016	1,087	1,817	1,924	2,174
WA participant share of U.S.	1.41%	1.71%	2.45%	2.93%	3.41%
U.S. research spending per patent	$ 4,171,082	$ 5,080,133	$ 4,688,794	$ 5,613,218	$ 5,977,725
WA high tech program participants spending per patent	$ 6,692,868	$ 5,004,749	$ 3,263,653	$ 3,471,891	$ 3,344,663
WA relative spending per patent	1.6	1.0	0.7	0.6	0.6
U.S. Copyrights	661,469	531,720	520,906	526,378	NA
WA high tech participant copyrights	353	254	287	426	236
WA participant share of U.S.	0.05%	0.05%	0.06%	0.08%	NA
Software (NAICS 511)					
WA high tech program participants spending ($ billion)	4.1	2.6	3.2	4.1	4.5
WA high tech participant patents	543	619	1,212	1,389	1,703
WA high tech program participants spending per patent	$ 7,581,013	$ 4,203,382	$ 2,671,798	$ 2,928,701	$ 2,625,173
Patents per participating firm	9.5	11.1	24.2	28.9	34.8
All other participating industries					
WA high tech program participants spending ($ billion)	2.7	2.8	2.7	2.6	2.8
WA high tech participant patents	473	468	605	535	471
WA high tech program participants spending per patent	$ 5,673,284	$ 6,064,676	$ 4,449,320	$ 4,882,153	$ 5,946,131
Patents per participating firm	0.8	0.9	1.3	1.1	1.0

Table 4.18
Growth in Research and Development Spending

Data Source: Affidavits

Year	Washington R&D Spending	Share of National R&D Spending	M&E Exemption	M&E Source
1995	1,478,941	0.8	2,697,360	2003 estimate
1996	2,387,157,500	1.2	10,961,272	2003 estimate
1997	3,048,773,100	1.4	18,234,241	2003 estimate
1998	3,724,318,700	1.7	13,262,786	2003 estimate
1999	5,563,025,300	2.3	15,769,458	2003 estimate
2000	7,994,269,400	3.0	20,202,683	2003 estimate
2001	10,300,619,900	3.7	15,454,150	2003 estimate
2002	6,811,048,800	2.3	12,596,433	2003 estimate

Data Source: Survey

	Washington R&D Spending	Firm Count	Share of National R&D Spending	M&E Exemption	
2004	6,799,953,526	621	2.3	2,374,660	voluntary answer
2005	5,440,161,788	554	1.2	21,620,930	required answer
2006	5,930,058,133	522	1.7	20,544,731	required answer
2007	6,677,917,782	542	1.8	27,477,817	required answer
2008	7,271,298,036	519	1.9	34,582,587	required answer

The Movement of Firms or Consolidation of Firms' Operations into the State

Based on survey responses by participants from 2004 to 2008, favorable growth trends are evident as many firms indicated they moved operations into the state or expanded within the state. Few firms reported that operations were moved out of state. See Tables 4.19 and 4.20.

However, a review of patenting trends for participating firms doing research in multiple states showed mixed results of movement of all research activity to Washington. Further analysis of changes in the ratio of Washington patents to patents in all locations for all multistate firms did indicate a preference to a Washington location as compared to non-participants.

One goal of these programs was to provide expansion of manufacturing and distribution of products developed as a result of discoveries by the high technology industries. Ideally, additional employment in manufacturing and distribution of products developed through research in Washington would occur in the same business doing the research or by other firms in Washington. To evaluate the impact of the incentives on manufacturing and employment, there

are several survey questions related to movement of activities and the share of activities performed in the state.

For the questions in the annual survey related to the movement or expansion of activities into Washington, Table 4.19 shows the count of firms in the high tech programs answering these questions. Based on the counts, favorable trends are evident as many firms indicated they moved operations into the state or expanded within the state. These participant firms also added about 9 percent of new employment positions in manufacturing or distribution functions. This gives an indication that some additional activities occurred outside of research. It should be noted that survey responses also indicated that firms have a tendency to over-estimate the positive numbers and underestimate the negative. For example, responses to questions regarding employment positions in Washington would generally be larger than actual Employment Security data if the respondent answered incorrectly. Whereas, if the respondents answered questions regarding positions leaving Washington, the tendency was for those responses to follow the opposite trend. Due to some of the anomalies in the survey data, analysis required that employment data from Employment Security be used verses survey responses in some cases.

Table 4.19
Movement or Consolidation of Activities Reported by High Tech Participants

Number of high tech participants answering questions about movement of activities

	2004	2005	2006	2007	2008
Moved activites into Washington	12	6	24	51	51
Expanded existing operations in Washington	35	38	70	227	231
Created a new activity in Washington	6	6	17	51	43
Moved activites out of Washington	9	14	12	10	25

For firms indicating a movement out of the state (a relatively small number), a higher share of lost employment was in manufacturing and distribution jobs -- about 49 percent of the total over the five-year period.

As mentioned previously, one goal of these programs was to provide expansion of manufacturing and distribution of products developed as a result of discoveries by the high technology industries. For another view to evaluate this goal, the trends over time of reported manufacturing activity for program participants and non-participants was done. Table 4.20 shows the percent of reported manufacturing activity to total activity in Washington for the major groups of firms participating in the high tech programs versus non-participants in similar industries.

During the 1990-1994 period (before creation of these programs), firms that ultimately became participants had a higher level of manufacturing activity than similarly situated non-participants, averaging 31 percent higher. With this backdrop it would seem reasonable that Washington inventions would have a high chance of being produced by the business doing research. However, in looking at subsequent years it appears that the differential has declined from 31.2

percent to 5.7 percent, while both groups have reduced their manufacturing presence. It appears, therefore, that manufacturing of new products by in-state participants has substantially decreased, and this decline is at a faster rate than what is occurring for firms in similar industries that do not participate in these programs.

In the annual survey, questions were asked about the share of activities performed within the state versus outside the state. On an industry or trend basis, the answers to these questions were not very useful because responses were not very consistent over time or by industry. However, for firms in these high tech programs taken as a whole, on a weighted average basis about 98 percent of business activities appear to be supported by in-state employment of these respondents. This result does not support the notion that participants use other in-state firms to manufacture or distribute their products but, in combination with the relative decline in manufacturing activity reported, instead indicates that the state is missing out on a major portion of the benefits of inventions in the state.

Table 4.20
Percent of Manufacturing Activity to Total Activity

Participants	Yearly Average: 1990 - 1994	Yearly Average: 1995 - 1999	Yearly Average: 2000 - 2004	Yearly Average: 2005 - 2008
Select Manufacturing (32)*	67.80%	29.81%	26.20%	26.66%
Select Manufacturing (33)**	79.74%	67.09%	50.99%	33.20%
Select Information (51)***	89.50%	51.30%	14.44%	6.23%
Scientific Services (541)	9.54%	14.50%	12.32%	8.71%
Waste Management (562)	0.00%	0.00%	0.00%	0.00%
Health Care Services (621)	0.44%	0.28%	0.29%	0.08%
Non-Participants				
Select Manufacturing (32)*	33.07%	35.20%	33.04%	25.61%
Select Manufacturing (33)**	21.19%	24.15%	18.12%	13.23%
Select Information (51)***	2.20%	0.50%	0.63%	0.28%
Scientific Services (541)	3.40%	2.75%	1.48%	0.96%
Waste Management (562)	0.14%	0.40%	0.53%	0.45%
Health Care Services (621)	0.04%	0.03%	0.02%	0.03%
Total Participant Average	41.17%	27.16%	17.37%	12.48%
Total Non-Participant Average	10.00%	10.51%	8.97%	6.76%
Difference	31.17%	16.65%	8.40%	5.72%

*Chemical, Plastics and Nonmetallic Mineral Manufacturing

**Metal, Machinery, Computer, Electrical, Transportation and Miscellaneous Manufacturing

***Software Publishing, Motion Picture Recording, Telecommunications & Data Processing

CHAPTER FIVE

SIMILAR INCENTIVES IN OTHER STATES

RCWs 82.04.4452(8) and 82.63.020 require the Department to study the effect of the high tech B&O tax credit and sales and use tax deferral on diversification of the state's economy, growth in R&D investment, and the movement of firms or consolidation of firms' operations into the state. The incentives will have an effect on diversification and growth if they serve to make Washington more competitive.

The analysis shows that:

- Washington compares well to six other competitor states, ranging from the middle to upper half (more competitive) in terms of total state and local taxes paid by high tech firms.
- The high tech B&O tax credit has a modest effect on Washington's competitive position when all major business taxes are considered.
- The sales and use tax deferral for new R&D facilities consistently improves the competitive position of Washington firms engaged in high tech research and development, when all major business taxes are considered.
- Washington's high tech credit and deferral programs provide more tax relief on average than the other states' incentives considered here.
- Washington's B&O tax credit is easy to use, which may be a reason for its higher participation compared with other states' credits.
- The sales and use tax deferral provides greater tax relief than the R&D credit does, as a percentage of sales, but the R&D credit provides greater dollar savings.

METHODOLOGY

A hypothetical firm analysis is used to measure the relative impact of the high tech R&D incentives on the competitive position of Washington firms. The R&D incentive programs are modeled as components of the major state and local business taxes in the selected states in order to address the incremental impact of the R&D programs on Washington's overall tax competitiveness.

Competitor States and Their Tax Systems

Along with Washington, the states included in the analyses are:

- California
- Missouri
- Nevada
- North Carolina
- Oregon
- Texas

These six states have been identified by industry sources as potential sites for future facilities or the home of competitor firms, or by public officials as states that are soliciting industries and jobs that Washington would like to retain and attract.

The following major state and local business taxes are included:

- Washington B&O tax, and corporate income and franchise taxes in other states
- Sales and use taxes paid by business
- Property taxes paid on real and personal business property

Hypothetical Firm Profiles

The study employs detailed firm profiles containing characteristics such as sales receipts, corporate income and profits, taxable purchases, and property holdings. Profiles were constructed with data from financial filings, the IRS, state tax return information, industry experts, and other sources.

There are five business types analyzed in the study:

- A small aircraft and parts manufacturer
- A manufacturer of instruments for navigation, measuring, and related uses
- A semiconductor or other electronic component manufacturer
- A biotechnology/pharmaceutical integrated manufacturer and wholesaler
- A small software originator

Data on sales, R&D spending, and investment in new R&D facilities is presented in Table 5.1 below. This data was used for the analysis of both the B&O tax credit for R&D expenses and for the new facility sales and use tax deferral/exemption. More detailed firm data is found in Appendix 5A.

Table 5.1
Hypothetical Firm Characteristics
Pertaining to the R&D Credit and R&D Facilities Sales Tax Deferral

	Annual Sales (Millions)	10 Yr. NPV Sales* (Millions)	R&D Spending (Percent of Sales)	Investment in R&D Facility (Millions)
Small aircraft and parts	$54	$433	6.0%	$2.7
Instruments and related	$29	$212	7.5%	$1.8
Semiconductor and related	$414	$3,134	11.2%	$41.4
Biotechnology/pharmaceutical	$243	$1,891	14.8%	$31.0
Software originator	$12	$91	15.0%	$1.3

*The interest rate used in the net present value calculation is 5 percent, the rate on ten-year AA corporate bonds as of October 28, 2009.

The firms in the analyses are typical Washington firms, not the giants of their respective industries. The software originator is the smallest firm with annual sales of $12 million. With $54 million in annual sales, the small aircraft manufacturer is a supplier rather than a seller of aircraft. The largest firm is the manufacturer of semiconductor and related electronic devices whose annual sales of $414 million classify it as a modest-sized facility in this industry.

R&D spending by the hypothetical firm roughly reflects the levels of R&D spending by participants in Washington's high tech programs. R&D expenditures for the small aircraft and the instruments firms are approximately 6 to 7 percent of sales revenues while the integrated biotech/pharmaceutical and software firms are both approximately 15 percent. The semiconductor manufacturer occupies the middle ground with R&D expenses equal to 11 percent of sales revenues.

The assumed investment in new R&D facilities ranges from $1.8 million for the instruments and related firm to $41.4 million for the semiconductor and related firm.

Total tax burden is estimated for each of the firms in each of the seven different states. Taxes are ranked by the total ten-year net present value of the estimated tax payments. Tax savings due to the incentives can be determined by taking the difference between total tax burden with and without the incentives. To study the effect of taxes alone, labor and other business costs, federal taxes, regulatory structure, and similar factors are assumed to be the same for all of the states.

Any particular firm's actual tax payments will in reality vary considerably due to factors such as ownership form, corporate structure, and apportionment methods used. To hold these constant,

the firms are modeled as independent entities or as parts of larger corporations that are considered on a stand-alone basis.

Firms are assumed to sell all products in-state. It is also assumed that firms take full advantage of the available credits and exemptions, such as Washington's sales and use tax exemption for manufacturers' machinery and equipment. All firms are assumed to be located in areas where high tech firms typically locate; therefore, firms are not modeled as taking advantage of programs designed for specific distressed areas, enterprise zones, or rural areas. All firms are assumed to be profitable. Not modeled are incentive programs in which participation is at the discretion of local authorities. The details for the states' programs, the location of the firms, taxes, and assumptions are found in Appendix 5B.

SEVEN STATE COMPARISONS

Part 1: Relative Tax Burdens

The hypothetical firm analysis has two parts which answer two separate questions. The first part of the analysis examines the effectiveness of Washington State's B&O tax credit and sales and use tax deferral in improving the competitive position of Washington high tech firms. In this part of the analysis the hypothetical firms are taxed under current law for each of the six comparative states and Washington State. The ten-year net present value tax burden is compared and the states are ranked according to their total tax burdens. Washington's ranking is compared both with and without its tax incentives.

Part 2: Relative Tax Relief

The second part of the hypothetical firm analysis compares the high tech incentive programs in each of the seven states to determine which type of high tech incentive program offers the greatest amount of tax relief.

Both parts 1 and 2 are further split into two separate analyses; this allows the B&O tax credit and the sales and use tax deferral program to each be evaluated on their own. Washington's B&O tax credit for R&D spending is compared with R&D credits granted by other states against their corporate income and franchise taxes. However, the sales and use tax deferral for R&D facilities is found only in Washington. Washington's sales and use tax deferral more closely compares to other states' incentives targeting investment in new facilities in general.

Part 1: Change in Washington's Relative Tax Burden Caused by the High Tech Incentives

Effects of the B&O Tax Credit for R&D Expenses on Tax Rankings

The first two columns in Table 5.2 below show Washington's total tax burden in the absence of Washington's B&O tax credit compared to the current-law tax burden in the other six states (e.g. with other states' 2010 R&D credit programs). The total tax burden is the ten-year net present value of sales and use taxes, property taxes, and corporate income, franchise, and/or B&O taxes paid by the firms. The second two columns show Washington's relative tax burden when its B&O tax credit for R&D is included in the analysis.

Washington ranks third or better out of the seven states both with and without the R&D program, where 1st is the lowest tax burden and 7th is the highest. When the R&D high tech credit is included in the analysis, the Washington rank of the small aircraft and software firms both improve from 3rd to 2nd. For the other firm types, Washington's rank is the same both with and without the R&D credit: 1st for instrument and related, 2nd for integrated biotech, and 3rd for semiconductor and related.

Table 5.2
Washington With and Without the B&O Credit; Other States are Current Law
Net Present Value: 10 Years of Expected Taxes in $Millions/Rank: 1=lowest tax burden, 7=highest tax burden

		No WA B&O Credit for R&D		With WA B&O R&D Credit	
		$Millions	Rank	$Millions	Rank
Small Aircraft and Parts	Oregon	$3.433	1	$3.433	1
	Nevada	4.546	2	4.546	3
	Washington	**4.689**	**3**	**4.355**	**2**
	North Carolina	5.304	4	5.304	4
	California	6.029	5	6.029	5
	Missouri	7.103	6	7.103	6
	Texas	7.976	7	7.976	7
Instruments and Equipment	**Washington**	**$3.539**	**1**	**$3.331**	**1**
	Oregon	3.558	2	3.558	2
	Nevada	4.159	3	4.159	3
	North Carolina	5.391	4	5.391	4
	California	8.020	5	8.020	5
	Missouri	8.816	6	8.816	6
	Texas	8.927	7	8.927	7
Semiconductor and Related	Nevada	$27.199	1	$27.199	1
	Oregon	38.045	2	38.045	2
	Washington	**44.911**	**3**	**40.036**	**3**
	North Carolina	52.989	4	52.989	4
	California	57.052	5	57.052	5
	Texas	67.988	6	67.988	6
	Missouri	71.136	7	71.136	7
Integrated Biotech Pharmaceutical	Oregon	$29.939	1	$29.939	1
	Washington	**41.707**	**2**	**37.779**	**2**
	Nevada	49.198	3	49.198	3
	North Carolina	51.394	4	51.394	4
	Missouri	69.811	5	69.811	5
	Texas	70.544	6	70.544	6
	California	72.753	7	72.753	7
Small Software Originator	Oregon	$0.828	1	$0.828	1
	North Carolina	1.243	2	1.243	3
	Washington	**1.385**	**3**	**1.192**	**2**
	Nevada	1.387	4	1.387	4
	California	1.682	5	1.682	5
	Texas	1.932	6	1.932	6
	Missouri	1.956	7	1.956	7

Table 5.3 summarizes Washington's ranking for the hypothetical firms in the five industries.

Table 5.3
Washington's Total Tax Rank
WA With and Without the R&D Credit

Washington Firms	WA Without Credit	WA With Credit
Small aircraft and parts	3	2
Instruments and equipment	1	1
Semiconductor and related	3	3
Biotech/pharmaceutical	2	2
Small software originators	3	2

Effect of the New Facilities Sales and Use Tax Deferral on Tax Rankings

The other states have no tax incentive programs directly comparable to Washington's sales and use tax deferral/exemption for new, expanded, or renovated R&D facilities. The Washington deferral was instead compared to any statewide incentive program in the other states that would apply to new or expanded facilities in the five industries modeled. The tax regimes of Washington and the other states were applied to the initial investment in a new R&D facility and ten years of subsequent operations. A portion of the firms' sales, property, and business taxes were allocated to the R&D facility based on costs.

The first two columns of Table 5.4 below show Washington's ten-year net present value total tax burden when the sales and use tax deferral is excluded from the analysis. The second two columns show Washington's relative tax burden when its sales and use tax deferral is modeled. The other states are modeled with their current law programs effective for calendar year 2010.

The tax rankings for Washington's sales and use tax deferral are not as high as the rankings for the B&O tax credit for R&D expenses. The sales and use tax deferral never ranks lower than 4th, but never higher than 2nd. However, use of the deferral program does improve the rankings for four of the five firm types. In fact, with the use of the deferral small aircraft and semiconductors both jump two ranks, from 4th to 2nd. Instruments and integrated biotech both improve from 3rd to 2nd when the deferral is employed. Though the small software originator remains in 4th, the deferral moves it into a virtual tie with Nevada for 3rd.

Table 5.4
Washington With and Without the Sales Tax Deferral for New Facilities

Net Present Value: 10 Years of Expected Taxes in $Millions/Rank: 1=lowest tax burden, 7=highest tax burden

		No WA Sales Tax Deferral		WA Sales Tax Deferral	
		$Millions	Rank	$Millions	Rank
Small Aircraft and Parts	Oregon	$0.298	1	$.298	1
	Nevada	0.506	2	0.506	3
	North Carolina	0.529	3	0.529	4
	Washington	**0.553**	**4**	**0.395**	**2**
	Missouri	0.740	5	0.740	5
	California	0.778	6	0.778	6
	Texas	0.836	7	0.836	7
Instruments and Equipment	Nevada	$0.143	1	$.143	1
	Oregon	0.151	2	0.151	3
	Washington	**0.202**	**3**	**0.150**	**2**
	North Carolina	0.256	4	0.256	4
	Missouri	0.397	5	0.397	5
	Texas	0.409	6	0.409	6
	California	0.479	7	0.479	7
Semiconductor and Related Devices	Oregon	$3.459	1	$3.459	1
	North Carolina	4.386	2	4.386	3
	Nevada	4.513	3	4.513	4
	Washington	**5.662**	**4**	**4.342**	**2**
	Missouri	7.543	5	7.543	5
	Texas	7.636	6	7.636	6
	California	9.161	7	9.161	7
Integrated Biotech Pharmaceutical	Oregon	$3.882	1	$3.882	1
	North Carolina	6.714	2	6.714	3
	Washington	**6.749**	**3**	**5.493**	**2**
	Nevada	6.859	4	6.859	4
	Missouri	9.747	5	9.747	5
	Texas	10.146	6	10.146	6
	California	12.522	7	12.522	7
Small Software Originator	Oregon	$0.211	1	$0.211	1
	North Carolina	0.250	2	0.250	2
	Nevada	0.280	3	0.280	3
	Washington	**0.353**	**4**	**0.284**	**4**
	Missouri	0.389	5	0.389	5
	Texas	0.464	6	0.464	6
	California	0.480	7	0.480	7

Table 5.5 below summarizes Washington's ranking for the hypothetical firms investing in new, expanded, or renovated R&D facilities in the five industries modeled.

Table 5.5
Washington Total Tax Rank
WA With and Without the Sales Tax Deferral for New R&D Facilities
(Other states have general incentives for new facilities.)

	WA Without Sales Tax Deferral	WA With Sales Tax Deferral
Small aircraft and parts	4	2
Instruments and equipment	3	2
Semiconductor and related	4	2
Biotech/pharmaceutical	3	2
Small software originators	4	4

Part 2: Comparison of High Tech R&D Programs in Seven States

This section compares the high tech incentives available in the seven comparison states. Detailed information about each state's incentive programs is found in Appendix 5B.

Washington B&O Tax Credit for R&D Expenses and Similar Programs in Other States

R&D credit programs in some of the selected states are similar in that a percentage of qualified R&D spending can be taken as a credit against the B&O tax, corporate income tax, or franchise taxes levied on firms. The programs differ in the type of activity qualifying, the ability to carry credits forward, the allowable credit limit, and the amount of the credit. One major difference is that other states typically grant credits on incremental R&D spending over an initial base year's R&D spending, often following the complex federal procedure; Oregon and California use these types of programs. North Carolina, however, has just implemented a new R&D credit that is similar to Washington's in that credits are calculated as a percentage of qualified spending, though both states' credit rates are lower than the rates found in a federal style program. The Washington and North Carolina style of R&D credit makes it easier for firms to apply. Note that the R&D credits in Texas and Missouri have both expired and there are no plans to revive them, and that Nevada does not have an R&D credit program.

Washington Sales and Use Tax Deferral for New R&D Facilities and General Incentives for New Facilities in Other States

The sales and use tax deferral/exemption is not taken on a continuing basis like the R&D credits, but only when a firm invests in a new or expanded R&D facility or acquires eligible equipment. Washington's sales and use tax deferral/exemption is unique among the states in the study, but the modeling effort had to assume that firms governed by other states' laws would take advantage of all incentives for new investment in general. New investment incentives in other

states are included if they are generally available when new facilities are brought on line or when facilities are expanded.

Other exemptions and tax treatments are applied in Washington and all states whether the facility is new or existing; these include machinery and equipment exemptions, inventory exemptions, special property tax treatment, and others.

High tech R&D firms are assumed to locate in areas that attract similar investment; they are not placed in distressed areas, enterprise zones, or in other areas targeted for special relief. It is also assumed that all firm types will meet the criteria necessary to convert Washington's and other states' deferrals into exemptions.

Comparison of Tax Savings from High Tech Incentives

Tax Savings from Programs Similar to the B&O Credit

Table 5.6 below presents the tax savings in all seven states for tax incentives similar to the B&O credit. The savings are presented both in dollar terms (ten-year net present value) and as a percentage of the total taxes (ten-year net present value) allocated to the R&D facility.

In terms of the incremental impact, Washington's R&D credit program generally provides a greater dollar savings than do the other credit programs modeled. Only California, and software in Oregon, rank higher than Washington in terms of dollar savings. Washington, however, ranks first in terms of percentage saved for small aircraft, instruments, and integrated biotech.

The primary reason for these results is that Washington's credit is taken for the full amount of R&D expenditures over the threshold, rather than just the addition over an initial base; this tends to outweigh the higher credit rates allowed in the other states. Washington’s savings are a greater percent of taxes for the above three firms because California’s taxes are so high that the greater tax savings represent a smaller percent of taxes.

Another advantage to the Washington R&D credit is its relative simplicity, since there is no need to determine a base level of research spending. R&D credit programs in other states are known for their difficulty of use, particularly those piggybacking on the federal program. There is anecdotal evidence that it is extremely difficult for small firms to qualify for most state R&D credit programs.

Table 5.6
Washington's B&O Tax Credit Compared with R&D Credits in Other States
Net Present Value: 10 Years of Expected Taxes in $Millions/Rank: 1=highest tax relief, 7=lowest tax relief

		Tax Savings $Millions	Savings as a Percent of Total Tax Burden	Savings Rank
Small Aircraft and Parts	California	$0.443	7.35%	1
	Washington	**0.334**	**7.66%**	**2**
	Oregon	0.027	0.79%	3
	North Carolina	0.027	0.51%	4
	Missouri	-	-	5
	Texas	-	-	5
	Nevada	-	-	5
Instruments and Equipment	California	$.329	4.10%	1
	Washington	**0.208**	**6.24%**	**2**
	North Carolina	0.026	0.48%	3
	Oregon	0.020	0.56%	4
	Texas	-	-	5
	Missouri	-	-	5
	Nevada	-	-	5
Semiconductor and Related Devices	California	$7.393	12.96%	1
	Washington	**4.875**	**12.18%**	**2**
	Oregon	0.965	2.54%	3
	North Carolina	0.528	1.00%	4
	Texas	-	-	5
	Missouri	-	-	5
	Nevada	-	-	5
Integrated Biotech Pharmaceutical	California	$5.412	7.44%	1
	Washington	**3.929**	**10.40%**	**2**
	Oregon	1.298	4.34%	3
	North Carolina	0.705	1.37%	4
	Missouri	-	-	5
	Texas	-	-	5
	Nevada	-	-	5
Small Software Originator	California	$0.320	19.01%	1
	Oregon	0.314	37.85%	2
	Washington	**0.193**	**16.15%**	**3**
	North Carolina	0.105	8.41%	4
	Missouri	-	-	5
	Nevada	-	-	5
	Texas	-	-	5

Note in Tables 5.6 above and 5.7 below that "-" denotes no change in tax payments.

Tax Savings from Programs Similar to the Sales and Use Tax Deferral

Table 5.7 below presents the tax savings for Washington's sales and use tax deferral and similar tax incentives in the other six states. Tax savings are presented both in terms of (ten-year net present value) total taxes and as a percentage of (ten-year net present value) total taxes on the new, renovated, or expanded R&D facility.

The Washington sales and use tax deferral/exemption for new facilities also tends to provide greater tax savings than found in most of the other states modeled. For small aircraft and integrated biotech firms Washington ranked 1st in both tax dollars saved and in savings as a percent of taxes. Washington software firms ranked 1st in the percentage saved. Otherwise, Washington ranked 2nd to either Nevada or North Carolina.

One of the primary reasons for these rankings is that Missouri, California, Oregon, and Texas do not have statewide incentives that are not at the discretion of local authorities;[1] their current investment incentives are narrowly targeted to enterprise zones or other special areas, or they require applications that may be rejected at the discretion of local authorities, or the programs result in negotiated taxes. This analysis places high tech firms in broadly defined, major high tech centers where new high tech firms tend to locate, typically not distressed areas.

[1] None of these analyses include Oregon's strategic investment program because its use is at the discretion of local authorities. Use of this program only affects the semiconductor and biotech/pharmaceutical firms which both surpass the valuation cap of $100 million in property values. Their ten-year net present value taxes in Table 5.2 would be reduced by $3.40 and $4.50 respectively, but this has no impact on Washington's rankings since Oregon already ranks higher. In Table 5.6, however, Oregon would move ahead of Washington in biotech/pharmaceutical total (dollar) tax savings; the additional savings would not affect the semiconductor ranking. There is no impact on Table 5.7 from Oregon's SIP.

Table 5.7
WA Sales Tax Deferral Compared to Other States' Incentives for New Facilities
Net Present Value: 10 Years of Expected Taxes in $Millions/Rank: 1=highest tax relief, 7=lowest tax relief

		Tax Savings $Millions	Savings as a Percent Of Taxes on Facility	Savings Rank
Small Aircraft and Parts	**Washington**	**$0.158**	**40.00%**	**1**
	Nevada	0.061	12.09%	2
	North Carolina	0.046	8.77%	3
	Missouri	0.010	1.34%	4
	California	-	-	5
	Oregon	-	-	5
	Texas	-	-	5
Instruments and Equipment	Nevada	$0.065	45.32%	1
	Washington	**0.052**	**34.69%**	**2**
	North Carolina	0.013	4.98%	3
	Missouri	0.003	0.63%	4
	California	-	-	5
	Oregon	-	-	5
	Texas	-	-	5
Semiconductor and Related Devices	North Carolina	$1.584	36.11%	1
	Washington	**1.321**	**30.42%**	**2**
	Nevada	0.291	6.45%	3
	Missouri	0.033	0.44%	4
	California	-	-	5
	Oregon	-	-	6
	Texas	-	-	6
Integrated Biotech Pharmaceutical	**Washington**	**$1.256**	**22.88%**	**1**
	Nevada	1.225	17.86%	2
	North Carolina	0.859	12.79%	3
	California	-	-	4
	Missouri	-	-	4
	Oregon	-	-	4
	Texas	-	-	4
Small Software Originator	Nevada	$0.074	26.40%	1
	Washington	**0.069**	**27.27%**	**2**
	North Carolina	0.015	5.89%	3
	Missouri	-	-	4
	Oregon	-	-	4
	California	-	-	4
	Texas	-	-	4

Table 5.8 below compares Washington's results for the R&D credit and for the sales tax deferral for new R&D facilities. Tax savings for the two programs are shown as a percentage of sales. The analysis implies that savings from the deferral for R&D facilities represents a larger percentage of sales.* Tables 5.6 and 5.7 above, however, indicate that the R&D credit provides greater tax savings in dollar terms.

Table 5.8
Tax Savings as a Percent of Firm Sales
Net Present Value: 10 Years of Expected Taxes Divided by Sales

Washington Firm	Tax Savings R&D Credit	Tax Savings R&D Facility*
Small Aircraft and Parts Firm	0.08%	0.42%
Instruments and Equipment	0.10%	0.56%
Semiconductor & Related	0.16%	0.42%
Biotech/Pharmaceutical	0.21%	0.45%
Small Software Originators	0.21%	0.35%

*The tax savings for the sales tax deferral/exemption for R&D facilities is divided by the sales that were allocated to that R&D facility based on costs.

A Note on Washington's ranking in the 2009 Study

Washington's ranking improved since the Department's similar 2003 analysis. The primary factors for this improvement were changes to other states' tax laws rather than changes to Washington's tax laws.

The biggest change in Washington's tax law, relevant to these rankings, was the reduced B&O rate for certain aerospace firms. It is assumed that the small aircraft supplier qualified for the reduced B&O rate, 0.2904 percent, rather than 0.484 percent rate. However, the aircraft supplier was not assumed to take advantage of the more broadly defined aerospace B&O credit for preproduction development expenditures since this would conflict with the modeling of the High Tech R&D credit. Also not modeled was the B&O rate reduction for producers of certain semiconductor materials and the related sales tax exemption because these programs are very narrowly targeted and apply to only a few firms in the industry group (NAICS 3344).

There were major changes in other states' tax laws that, on net, improved Washington's rankings. The biggest changes were that R&D credits in both Missouri and Texas expired and there are no plans to revive them; the same is true for California's machinery and equipment exemption from sales and use taxes. North Carolina's new R&D credit, when combined with other credits, cannot save a taxpayer more than 50 percent of the tax that would otherwise be owed in a given year. Nevada implemented a new "modified business tax" which greatly raised business taxes on the firms analyzed, though Nevada's taxes are still low. Other changes had smaller effects on relative tax ranks, such as Oregon's new minimum business tax and other changes in various states' incentive programs. Please see Appendix 5B for more details on the state tax rates and programs.