R&D Credit Fails to Increase R&D

Thirteen states have no R&D tax credit, another eleven have small credits of 1.5% to 5%. So half of states have R&D tax credits for 5% or less or none at all. Only five states have credits of 20-30%, yet that is what legislators are being encouraged to adopt in Oregon.

Industry representatives contend that a research and development tax credit is critical to attract semiconductor expansion. They point to Arizona as the model Oregon should follow.

Our analysis shows no correlation between a research credit and research spending. States that have added or increased their tax credits have not demonstrated intended results. **Arizona's tax credit has had no discernable effect, and the state's R&D spending compared to other states has fallen over the past decade.**

Analysis

Using Commerce Department and National Science Foundation data, TFO measured R&D "intensity": the ratio of business-funded R&D to state GDP. (Spending excludes university and government funded R&D because R&D tax credits apply only to private spending.) We sought to understand the extent to which corporate R&D drives state economies and compare big states (California) with small ones (Oregon). In Table 2, which follows, we ranked states by intensity.

Most states' tax credits are more complex than the numbers in Table 1's last column, and their formulations affect how corporations calculate and benefit from them. We used 2022 data from KBKG, a tax services firm, to provide a consistent measure. (Analysts of any state program should use the state's data—and a CPA.)

Table 2 indicates little if any correlation between private R&D spending and a tax credit. Four of the top 20 have no credit (Washington, Oregon, Wyoming and North Carolina). The credit in the top 20 ranges from 1.9% of qualified research expenses (QRE) in Michigan to 10% to 15% in Indiana. **Arizona is out of the top 20, despite having the third most generous credit.**

Table 1, comparing Arizona and Oregon, shows R&D spending over the past decade. Arizona increased R&D benefits in 2011, to 24% (from 20%) of the first $2.5 million QRE and 15% (from 11%) beyond $2.5 million. Arizona's R&D spending increased from $3.8 billion in 2011 to $4.9 billion in 2022. But Oregon's more than doubled, from $4.4 billion in 2011 to $10.2 billion, though its R&D credit died after 2017. Its rank has climbed from seventh to fourth.

Arizona's *R&D intensity has fallen over the decade since it increased its credit*, from 1.69% to 1.46% of state GDP; its state rank is lower than it was in 2009. Oregon's R&D intensity rose from 2.75% to 4.75% and its rank from seventh to fourth. Correlation is not causation, but for a state that business advocates urge Oregon to copy, Arizona appears to be an ineffective model.

R&D in a state's context

History, business climate, government spending and other factors determine where companies pursue R&D. Washington is the headquarters of (Boeing and) Microsoft and other software businesses. California has Silicon Valley. Massachusetts' tech sector preceded Silicon Valley and is still a center for research of all kinds. Michigan has auto innovation, and New Jersey leads in pharmaceuticals. State R&D tax credits have had little effect.

Oregon became a semiconductor hub because Intel jointed Techtronix in Washington County and made it the center of its semiconductor process development, and the state's universe of semiconductor manufacturing equipment suppliers followed.

Research is not manufacturing

R&D tax credits are not an incentive for manufacturing. There is interplay between manufacturing and research, but **the legislature needs to resolve its priorities in the pursuit of CHIPS Act funds. Most of the dangled CHIPS Act funding is for manufacturing**. The Commerce Department has advised: "The CHIPS Program Office will accord less weight to incentives, such as direct tax abatements, with less potential for spillover benefits."

Intel may build wafer fabs in Phoenix, but the research—and the people who pursue it—remains in Hillsboro. The R&D credit is irrelevant.

Table 1 compares R&D intensity and state rank for Arizona and Oregon over the past decade. Table 1A (following Table 2) includes all states.
Table 2 ranks all states on 2022 R&D intensity.
R&D intensity: ratio of R&D spending to state GDP

Sources:
National Science Foundation, National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series) https://ncses.nsf.gov/pubs/nsf23321
State GDP data: U.S. Bureau of Economic Analysis https://bea.gov/data/gdp/gdp-state
KGKB: https://www.kbkg.com/research-tax-credits/research-development-tax-credit-state-benefits

Table 1: R&D intensity over time--Arizona/Oregon

	2009		2011		2017		2019		2020	
State	R&D intensity	Rank	R&D intensity	Rank	R&D intensity	Rank	R&D intensity	Rank	R&D intensity	Rank
Arizona	1.34%	19	1.69%	14	1.55%	16	1.40%	20	1.46%	21
Oregon	2.85%	7	3.02%	5	3.84%	5	3.54%	6	4.75%	4

Compiled from a report by Oregon Center for Public Policy

Table 2 on following page.

What is private R&D Intensity? It is the percentage of the state's GDP that is generated by research. We've removed government and university research, so this is a measure of private research as a percent of the states' GDP. To see how important farming is to a state one would look at the percentage of the state's GDP that is generated by agriculture.

Table 1A: R&D intensity over time--all states										
	2009		2011		2017		2019		2020	
State	Intensity	Rank	Intensity	Rank	Intensity	Rank	Intensity	Rank	Intensity	Rank
Alabama	0.44%	40	0.55%	37	0.54%	34	0.61%	36	0.69%	33
Alaska	0.11%	50	0.11%	50	2.13%	10	0.09%	51	0.11%	51
Arizona	1.34%	19	1.69%	14	1.55%	16	1.40%	20	1.46%	21
Arkansas	0.26%	47	0.34%	45	0.42%	42	0.35%	45	0.31%	48
California	3.27%	6	3.64%	2	4.99%	1	5.89%	2	6.59%	2
Colorado	1.54%	14	1.56%	17	1.25%	22	1.50%	17	1.77%	16
Connecticut	4.36%	2	3.00%	6	2.63%	6	2.36%	8	2.61%	9
Delaware	2.60%	9	2.64%	8	2.36%	9	2.07%	10	2.48%	10
D.C.	0.32%	46	0.23%	48	0.31%	44	0.28%	48	0.53%	40
Florida	0.46%	39	0.59%	35	0.50%	35	0.56%	37	0.58%	39
Georgia	0.87%	30	0.89%	29	1.00%	27	0.69%	32	0.80%	32
Hawaii	0.36%	43	0.34%	43	0.15%	50	0.12%	50	0.34%	46
Idaho	1.62%	13	1.78%	11	2.46%	8	3.61%	5	2.86%	8
Illinois	1.44%	15	1.74%	12	1.71%	12	1.66%	16	1.74%	17
Indiana	1.89%	10	2.08%	10	1.69%	13	2.00%	12	2.14%	12
Iowa	1.27%	22	1.33%	21	1.35%	19	1.32%	22	1.53%	20
Kansas	1.18%	24	0.89%	27	1.03%	26	1.21%	26	1.26%	25
Kentucky	0.67%	34	0.70%	31	0.43%	39	0.50%	41	0.45%	44
Louisiana	0.16%	49	0.19%	49	0.11%	51	0.24%	49	0.23%	50
Maine	1.13%	26	0.58%	36	0.48%	37	0.62%	35	0.62%	37
Maryland	1.05%	27	1.12%	24	0.97%	28	1.27%	23	1.23%	27
Massachusetts	3.53%	4	3.37%	4	3.96%	4	4.87%	3	5.25%	3
Michigan	3.31%	5	3.42%	3	4.25%	3	3.97%	4	4.00%	5
Minnesota	2.63%	8	2.17%	9	2.08%	11	2.18%	9	2.19%	11
Mississippi	0.24%	48	0.24%	47	0.25%	49	0.29%	47	0.26%	49
Missouri	1.42%	16	1.23%	22	1.27%	21	1.41%	19	1.57%	19
Montana	0.41%	42	0.34%	44	0.28%	47	0.40%	43	0.50%	41
Nebraska	0.65%	35	0.69%	32	0.44%	38	0.64%	34	0.65%	35
Nevada	0.47%	37	0.49%	39	0.31%	45	0.51%	39	0.46%	43
New Hampshir	1.41%	18	1.62%	15	1.05%	25	1.32%	21	1.38%	23
New Jersey	3.78%	3	2.73%	7	2.52%	7	2.91%	7	3.26%	7
New Mexico	0.41%	41	0.38%	40	0.43%	40	0.50%	40	1.16%	28
New York	0.79%	32	0.83%	30	0.93%	29	1.12%	28	1.35%	24
North Carolina	1.33%	20	1.40%	19	1.57%	15	1.77%	15	1.78%	15
North Dakota	0.78%	33	0.64%	34	0.56%	33	0.65%	33	0.69%	34
Ohio	1.23%	23	1.16%	23	1.16%	24	1.14%	27	1.23%	26
Oklahoma	0.35%	44	0.36%	42	0.48%	36	0.56%	38	0.60%	38
Oregon	2.85%	7	3.02%	5	3.84%	5	3.54%	6	4.75%	4
Pennsylvania	1.73%	12	1.61%	16	1.42%	18	1.85%	13	1.95%	13
Rhode Island	0.97%	28	1.05%	26	1.31%	20	1.25%	25	1.11%	29
South Carolina	0.80%	31	0.66%	33	0.64%	31	0.73%	31	0.65%	36
South Dakota	0.33%	45	0.30%	46	0.42%	41	0.36%	44	0.42%	45
Tennessee	0.58%	36	0.54%	38	0.38%	43	0.41%	42	0.46%	42
Texas	1.17%	25	1.08%	25	1.19%	23	1.25%	24	1.44%	22
Utah	1.28%	21	1.74%	13	1.47%	17	1.42%	18	1.67%	18
Vermont	1.76%	11	1.35%	20	0.87%	30	0.74%	30	1.02%	31
Virginia	0.93%	29	0.89%	28	0.64%	32	0.93%	29	1.11%	30
Washington	5.37%	1	4.22%	1	4.62%	2	6.88%	1	7.57%	1
West Virginia	0.47%	38	0.37%	41	0.29%	46	0.33%	46	0.32%	47
Wisconsin	1.42%	17	1.51%	18	1.68%	14	1.84%	14	1.82%	14
Wyoming	0.11%	51	0.10%	51	0.27%	48	2.03%	11	3.48%	6

Compiled from a report by Oregon Center for Public Policy

TAX FAIRNESS OREGON

Table 2: States ranked by R&D intensity, 2022

State	R&D ($M)	GDP ($M)	R&D intensity Rank	R&D intensity %	GDP Rank	R&D Credit?	TC as % of QRE
U.S. total ($ millions)	470,436	21,060,474		2.23			
All states (DC, PR)	465,455	20,925,236		2.22			
Washington	40,576	612,969	1	6.62	10	No	-
California	175,459	3,020,173	2	5.81	1	Yes	15
Massachusetts	27,704	585,150	3	4.73	12	Yes	10-15
Oregon	10,190	247,967	4	4.11	24	No	-
Michigan	18,507	520,105	5	3.56	14	Yes	1.9
New Jersey	18,054	620,086	6	2.91	9	Yes	10
Wyoming	1,035	36,330	7	2.85	50	No	-
Idaho	2,139	85,928	8	2.49	40	Yes	5
Connecticut	6,487	276,223	9	2.35	23	Yes	NA
Delaware	1,688	75,819	10	2.23	43	Yes	10
Minnesota	7,421	376,814	11	1.97	19	Yes	2.5-10
Indiana	7,202	373,782	12	1.93	20	Yes	10-15
Pennsylvania	13,544	771,613	13	1.76	6	Yes	10
Wisconsin	5,506	340,591	14	1.62	21	Yes	5.75-11.5
Illinois	13,415	856,943	15	1.57	5	Yes	6.5
Colorado	6,042	391,263	16	1.54	16	Yes	3
North Carolina	9,242	598,916	17	1.54	11	No	-
Utah	2,981	202,133	18	1.47	29	Yes	5
Missouri	4,581	330,250	19	1.39	22	Yes	15
Iowa	2,664	196,983	20	1.35	30	Yes	6.5
Arizona	4,899	382,072	21	1.28	17	Yes	15-24
Texas	22,834	1,789,933	22	1.28	2	Yes	5
New Hampshire	1,093	88,338	23	1.24	39	Yes	10
New York	21,062	1,740,805	24	1.21	3	Yes	6-8
Kansas	1,956	177,581	25	1.10	32	Yes	6.5-10
Ohio	7,511	684,383	26	1.10	7	Yes	7
Maryland	3,964	410,931	27	0.96	15	Yes	3-10
Rhode Island	581	60,771	28	0.96	45	Yes	16.9-22.5
Virginia	5,072	556,993	29	0.91	13	Yes	15
New Mexico	857	98,790	30	0.87	38	Yes	5-10
Vermont	295	34,019	31	0.87	51	Yes	2.7
Georgia	4,426	625,426	32	0.71	8	Yes	10
North Dakota	331	54,423	33	0.61	47	Yes	8-25
Alabama	1,329	230,892	34	0.58	27	No	-
Nebraska	769	134,581	35	0.57	35	Yes	1.5
South Carolina	1,337	245,360	36	0.54	25	Yes	5
Maine	385	70,740	37	0.54	44	Yes	5
Florida	5,762	1,116,727	38	0.52	4	Yes	10
Oklahoma	945	190,064	39	0.50	31	No	-
Puerto Rico	519	105,428	40	0.49	na	N/A	-
Montana	224	52,356	41	0.43	48	No	-
Tennessee	1,568	379,007	42	0.41	18	No	-
Nevada	707	172,563	43	0.41	33	No	-
Kentucky	852	216,866	44	0.39	28	No	5 for const.
South Dakota	209	55,681	45	0.38	46	No	-
District of Columbia	509	144,720	46	0.35	34	Yes	12-16
Arkansas	360	133,969	47	0.27	36	Yes	20-30
West Virginia	203	76,548	48	0.27	42	No	-
Hawaii	216	82,536	49	0.26	41	Yes	20
Mississippi	244	115,123	50	0.21	37	No	-
Louisiana	475	232,528	51	0.20	26	Yes	5-30
Alaska	43	50,475	52	0.09	49	Yes	1.8

Who is competing?

Potential Research Centers

Potential Manufacturing

0-3%

20-30%

A high tax credit doesn't seem critical

nor does it seem to work