

State of Oklahoma Incentive Evaluation Commission Aerospace Engineering Incentives Final Report



November 28, 2016

Prepared by



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At a Glance: Aerospace Engineering Incentives

Statute: §68-2357.301 through 304

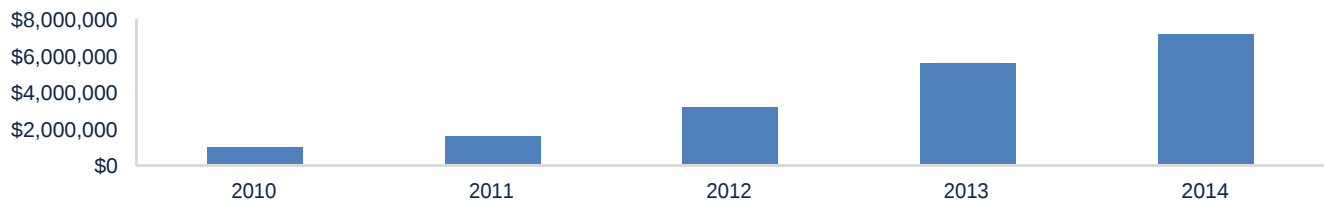
Program Goals

- Promote an increase in the supply of engineers to the aerospace industry in Oklahoma

Fiscal Impact

	2010	2011	2012	2013	2014
Total Dollar Amount	\$979,968	\$1,557,389	\$3,173,803	\$5,581,000	\$7,154,468
Employee Claimants	363	549	895	1,349	1,531
Employer Claimants	15	22	31	22	36

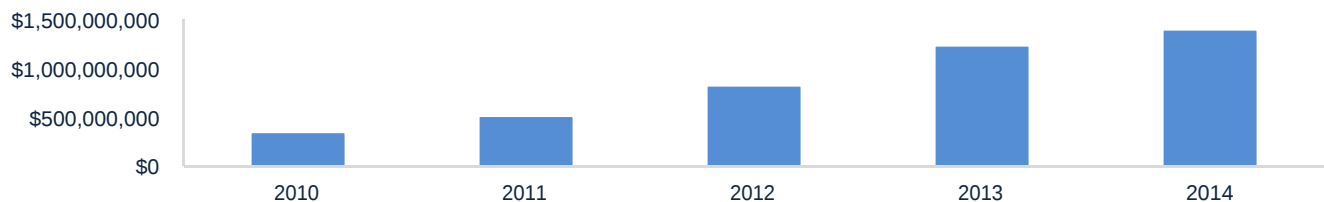
Total Tax Credits Claimed by Year



Economic Impact

	2010	2011	2012	2013	2014
Output	\$327,736,565	\$495,667,698	\$808,055,719	\$1,217,952,139	\$1,382,271,850
Labor Income	\$68,020,030	\$102,873,269	\$167,707,788	\$252,779,672	\$286,883,379
Employment	991	1,498	2,442	3,681	4,178
Total Tax Revenue	\$3,635,538	\$5,417,882	\$9,026,446	\$13,223,745	\$14,986,490

Economic Output by Year



Adequate Protections for Future Fiscal Impact?

- The various benefit limitations, coupled with the fact that these credits are neither transferable nor refundable and have a limited (5 year) carry-forward life provides adequate protection against significant, unanticipated fiscal impact.

Effective Administration?

- Additional reporting by employers that shows the overlap with the Quality Jobs programs Ad Valorem benefit are required.

Achieving its Goals?

- Overall, the aerospace industry in the state is growing and the number of aerospace engineers employed outperforms other type of engineering jobs.
- While the data on decreasing engineering job openings is inconclusive, perhaps for technical reasons, overall the employer and employee incentives seem to be an effective part of growing a key Oklahoma industry. The tuition reimbursement incentive is not widely subscribed, but could be critical in some specific recruiting scenarios.

Retain, Reconfigure, Repeal?

- Retain.

Changes to Improve Future Evaluation?

Enhance employer reporting to show the overlap with Quality Jobs incentives

Executive Summary

The aviation industry in Oklahoma dates back more than a century to a time when Clyde Cessna tested airplanes in the Enid area. While growing steadily in the first few decades of the 20th century, it was not until World War II and the period following that the aviation industry nationwide began to grow in earnest. From that time until the present, owing to a combination of military and commercial activities, the aviation/aerospace industry has become a strong, integral component of the Oklahoma economy. Today, according to the Oklahoma Aeronautics Commission, the aerospace industry is comprised of about 500 aerospace companies that constitute approximately 6% of the state's economy. These firms employ more than 120,000 individuals.

The Oklahoma aerospace industry generates over \$27 billion in sales annually, contributing over \$12.5 billion a year to the state's economy. These companies include marquee firms such as Boeing, American Airlines, NORDAM and Spirit AeroSystems. According to the Oklahoma Department of Commerce, Oklahoma's parts and component industry exports to more than 170 countries around the world, which generates \$4.4 billion in activity within the State.

While engineers may represent a small percentage of the aerospace workforce, they are a critical component in the production of technically-demanding products and services. In the mid-2000s, the aerospace industry increasingly encountered a lack of qualified applicants for engineering positions in the State, and it posed a significant barrier to entry and an impediment to growth.

Enacted by the legislature in 2008, the three aerospace engineering incentives evaluated in this report were designed to address this problem by assisting new and established companies. The incentives provide¹:

- A tax credit to the employer of up to 10 percent of an engineer's salary for up to five years;
- A tax credit to the employer for tuition reimbursements made to newly-graduated engineers of up to 50 percent of the average annual amount they paid for tuition in pursuit of their engineering degree; and
- A tax credit to the qualifying engineer for up to \$5,000 annually for a maximum of 5 years.

All three credits were primarily designed to stimulate the supply of engineers by allowing the employer to offer a higher starting wage and/or recover the cost of transferring the individual to Oklahoma as well as increasing the take-home value of the employee's wages during his or her early years of employment.

To evaluate the effectiveness of these programs the project team examined a variety of data, including the costs and benefits of the incentives, trends on engineering employment, the number of job openings in the field, and the levels of engineering degrees conferred by qualified Oklahoma colleges and universities. The analysis found that:

¹ §68-2357.301 through 304

- Credits were fiscally positive. The taxes generated by the engineering employees exceeded the amount of the credits paid out;
- Incentives were economically positive. The value of the economic activity generated by the engineers receiving credits was soundly positive compared to the cost of the benefits;
- Key jobs significantly increased. The growth of aerospace engineering employment increased 16.7 percent between 2009 (when the incentives took effect) and 2016 as opposed to 2.6 percent for comparable types of engineers during the same period; and
- The supply of graduating engineers increased. The number of engineering degrees conferred by accredited Oklahoma colleges increased by 57 percent.

Based on these results, the study team concluded that the engineering employee and employer tax incentives have been effective, but the tuition reimbursement has not been used to the extent that it would have a material impact. The project team found that the provision confining the required accreditation for the college granting the engineer's degree to American accreditation programs may be limiting the applicant pool from Canada and other countries. Finally, there is possible overlap between the aerospace engineering credits and the Quality Jobs incentive. However, the current data does not support an analysis of this overlap, particularly because the Quality Jobs incentive is not under evaluation until 2017.

Accordingly, the study team recommends:

- The aerospace engineering employee and employer tax credits be retained;
- The tuition reimbursement tax credit should be retained, if deemed critical by the industry;
- The data submitted by employers claiming the employer and tuition reimbursement credit be broadened to identify overlaps with the Quality Jobs programs; and
- The Tax Commission consult with the Oklahoma State Regents for Higher Education (OSRHE) to determine the appropriateness of expanding the acceptable accreditation of degree-granting institutions to certain bodies in Canada and other foreign countries.

Introduction

Note: There are three closely-related aerospace incentives that are included within this evaluation. They are largely inter-related, and the fiscal and economic data regarding them is largely monolithic. With this in mind, the three were combined to facilitate comparing and contrasting their use, impact and outcomes. As a result, this report contains the evaluation of the:

1. *Aerospace Engineering Employer Tax Credit;*
2. *Aerospace Engineering Employee Tax Credit;*
3. *Aerospace Engineering Employee Tuition Tax Credit.*

Overview

HB2182, which was enacted and became law in 2015, requires the Oklahoma Incentive Evaluation Commission (the Commission) to conduct an evaluation of all qualified state incentives. The law provides for the Commission to develop a four-year schedule for review of all qualified incentives and specific criteria to be used for the evaluation. The three aerospace engineering incentives are among those selected for review in 2016 by the Commission. This evaluation provides the Commission with information and analysis to assist in making recommendations to the Governor and the State Legislature.

Introduction

The aviation industry in Oklahoma dates back more than a century to a time when Clyde Cessna tested airplanes in the Enid area. While growing steadily in the first few decades of the 20th century, it was not until World War II and the period following that the aviation industry nationwide began to grow in earnest. From that time until the present (owing to a combination of military and commercial activities), the aviation/aerospace industry has become a strong, integral component of the Oklahoma economy. Today, according to the Oklahoma Aeronautics Commission, the aerospace industry comprises about 6% of the state's economy, made up of about 500 aerospace companies. These firms employ more than 120,000 individuals.

Aerospace generates over \$27 billion in sales annually, contributing over \$12.5 billion a year to the state's economy. These companies include marquee firms such as Boeing, American Airlines, NORDAM and Spirit AeroSystems. According to Oklahoma Department of Commerce, Oklahoma's parts and component industry exports to more than 170 countries around the world which brings \$4.4 billion to the state.

One of the mainstays of the state's aerospace industry is aircraft maintenance and its related supply chain. Oklahoma is home to the largest military aircraft Maintenance, Repair, and Overhaul (MRO) operations in the United States. Moreover, the American Airlines maintenance center in Tulsa is the largest commercial MRO in the world. The MRO industry also supports a robust supply chain of ancillary MRO facilities as well as parts, supplies, support and technical services and transportation.

Other elements of the state's aerospace industry include research and development, manufacturing, and civilian employment at military installations with aerospace missions. Major installations, such as Tinker Air Force Base near Oklahoma City, serve as major magnets for civilian employment, related research and development activities and supply chain companies.

Because there is a diverse base of employment types in Oklahoma’s aerospace industry, it is hard to pinpoint the various data elements necessary to capture the entire industry. For context, the project team researched the North American Industrial Classification System (NAICS) code 3364, Aerospace Products and Parts Manufacturing. The result of that NAICS code 3364 analysis of employment is shown in the following table:

Employment in Oklahoma ²	
Year	NAICS Code 3364
2005	3,677
2006	4,537
2007	5,226
2008	5,595
2009	4,901
2010	5,030
2011	5,600
2012	6,218
2013	6,687
2014	7,085
2015	7,013

There are a variety of other NAICS codes that are likely to include some aerospace incentive recipients. However, the engineering component of those occupations is likely to be even smaller than the data shown above. Accordingly, additional NAICS data is not displayed.

Oklahoma’s aerospace incentives feature three tax credits. Two are employer tax credits for tuition reimbursements and compensation paid to qualified employees. The third credit is an employee tax credit. Statutes authorizing each credit utilize similar language. The table below summarizes important definitions used in each program description.³

² Bureau of Labor Statistics, Quarterly Census of Employment and Wages

³ 68 O.S 2357.301 through 2357.304

Aerospace Sector	Private or public organization engaged in: ▪ Manufacture of aerospace defense hardware or software ▪ Aerospace maintenance, repair and overhaul ▪ Supply of parts to the aerospace industry ▪ Research and development for aerospace technology ▪ Education and training of aerospace personnel
Employers	Sole proprietor, general partnership, limited partnership, limited liability company, corporation, other legally recognized business entity, or public entity whose principal business activity involves the aerospace sector
Employees	Regardless of date of hire, employed or contracting in Oklahoma with a qualified employer on or after January 1, 2009 Must have been awarded an undergraduate or graduate degree from a qualified program Must not have been working in aerospace in the state prior to employment or contracting with qualified employer
Qualified Program	ABET accredited program

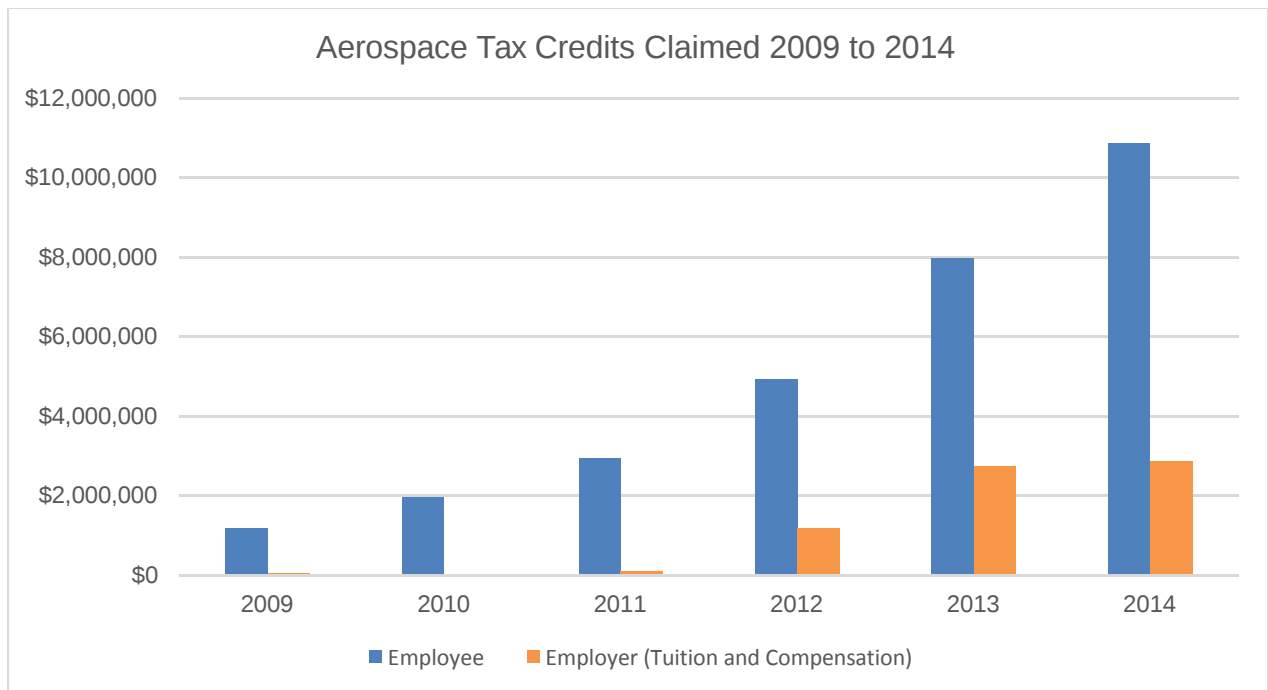
Tuition Reimbursement Credit: Employers in the aerospace sector are eligible for a credit against income tax in the amount of 50 percent of tuition reimbursed to a qualified employee. The employee must have earned an undergraduate or graduate degree within one year of employment with the qualified firm. The amount of the credit is not to exceed 50 percent of the average annual tuition paid at qualified programs at public institutions in Oklahoma. The credit may be taken in each of the first four years of employment.

Credit for Compensation Paid to Qualified Employees: Employers in the aerospace sector are eligible for a credit against income tax equal to a percentage of compensation paid to qualified employees during the first five years of employment. The amount of credit varies depends on where the employee's degree was earned. The amount is 10 percent for employees who graduated from a qualified Oklahoma institution, and 5 percent for employees who graduated from a qualified institution outside of the state. This credit is limited to \$12,500 per year for each employee.

Credit for Employees: Qualified employees may receive an income tax credit of up to \$5,000 per year for up to five years. Credits claimed but not used may be carried forward for up to five years.

Data provided by the Tax Commission claims for both the employee and employer credits increasing over the last five years. In each year, the amount of employee credits claimed far outweighs the amount claimed by employers. A review of tax documents by the Tax Commission revealed there has been no participation in the tuition reimbursement credit for employers. A total of 36 employers claimed the

credit for compensation paid to employees in 2014 compared to just 13 in 2009. Number of claims for the employee tax credit has grown from 257 in 2009 to 1,501 in 2014.



Source: Oklahoma Tax Commission

Criteria for Evaluation

A key factor in evaluating the effectiveness of incentive programs is to determine whether they are meeting the stated goals as established in state statute or legislation. Enacted as part of Chapter 417 of the Laws of 2008, the aerospace engineering credits were said to be intended to address the critical shortage of engineering talent in the industry. While the statute is silent on the intent or purpose, both Legislative commentary and information from industry representatives and groups confirm this intent.

“To address the critical shortage of engineering and technical talent facing the Oklahoma aerospace industry, which could potentially rise to 600 vacancies by 2014, the Legislature passed HB 3239. This measure allows tax credits for aerospace companies hiring new engineering graduates who agree to work for an Oklahoma aerospace company.”

2008 Session in Review, House Committee Research Staff
Oklahoma House of Representatives, May 2008

Industry officials also indicate that the lack of a qualified candidate pool of engineers in the 2000’s posed a significant barrier to entry into the Oklahoma aerospace market and growth of existing companies in that space. Anecdotal information suggests that there were a large number of engineering job openings in the 2000s, despite the fact that these jobs qualified for the Quality Jobs Program. Engineering talent was said to be a critical element of the business process of many types of Oklahoma aerospace companies. As a result, the inability to recruit and hire qualified engineers posed a barrier to entry for

new aerospace firms and an impediment to growth for existing companies.

From the discussion, it appears that a primary purpose of the three credit programs is to stimulate the supply of skilled aerospace labor to combat vacancies in the industry, which will help retain and grow the industry in the State.

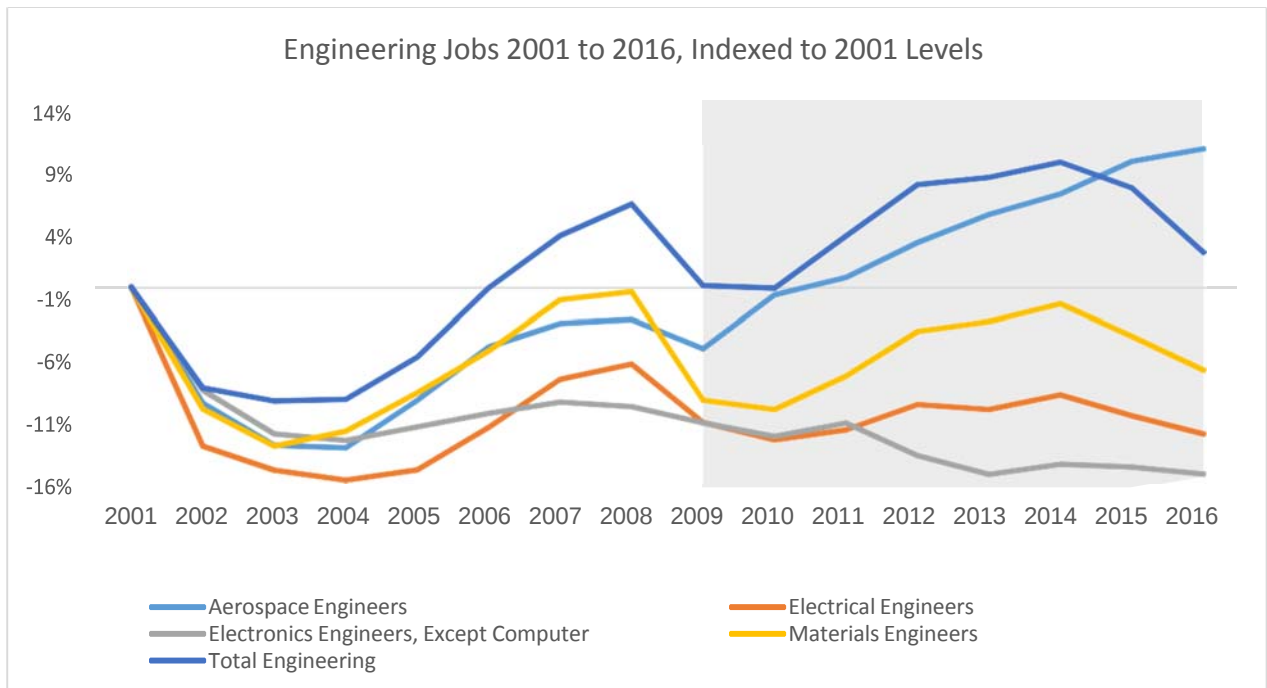
To assist in a determination of the effectiveness of the program, the Incentive Evaluation Commission has adopted the following criteria:

- Number and dollar value of approved credits by year of program
- Employment growth in state aerospace industry - comparison to period prior to the credit
- Payroll growth in state aerospace industry – comparison to period prior to the credit
- Change in measures of the 'skills gap' for engineering and technical skills in the aerospace industry
- Connection with other related business incentives
- Return on investment

Program Background and Benchmarking

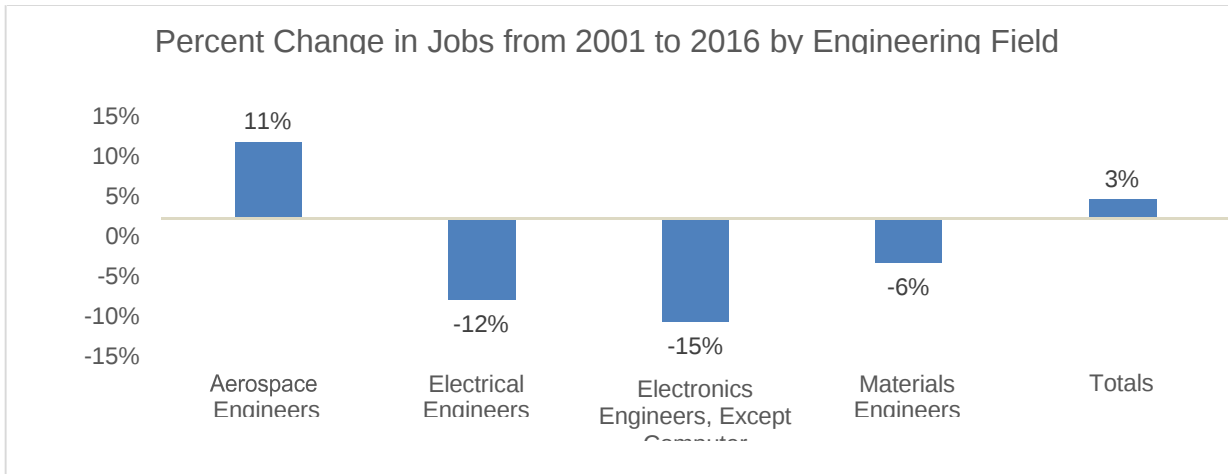
Program Background

As the following chart demonstrates, the Great Recession in 2008 had a significant negative impact on all engineering employment. However, while all other classes of engineers showed an anemic recovery, aerospace engineer employment recovery was notably stronger. That trend has continued to the present.



Source: BLS Quarterly Census of Employment and Wages

From 2009 (the first year in which the aerospace incentives were in effect) to 2016, aerospace engineering jobs increased by about 16.7 percent -- the strongest growth of any of the engineering categories in related occupations. In comparison, the growth of all of these categories over the same timeframe was 2.6 percent.



Source: BLS Quarterly Census of Employment and Wages

Over a longer period (from 2000 to 2016), which is designed to capture more of the economic cycle, aerospace engineers increased by 11 percent, while other engineering types showed slow growth or a decline.

Industry officials indicate that the five-year period of the employer incentive allows companies to offer a higher starting salary, which can then be conformed to the normal salary growth progression over time. Additionally, when larger companies transfer workers into Oklahoma, the five-year incentive payments provide a mechanism for the company to recover relocation costs.

The employee incentive effectively increases the engineer's take-home wages for the five year period, adding to the State's attractiveness for recruitment and retention purposes. Moreover, for individuals coming from states such as Washington (where there is no Personal Income Tax), the incentive serves as a form of personal income tax offset while wage levels grow over the first five years.

While the employer incentive and the tuition reimbursement claims data are combined for reporting purposes, research by the Tax Commission indicates that claims for the tuition incentive are rare, and expenditures for this purpose are not a significant element of the overall cost of the three engineering incentives. There is no available data that would answer the question as to why use of the tuition component is so low.

It should be noted that some component of the jobs that qualified for the aerospace incentives also qualified for Quality Jobs or 21st Century Quality Jobs incentive programs as well. However, the available Quality Jobs data does not support identification of such potential overlaps. Accordingly, the fiscal and economic analysis makes no adjustment for this potential overlap.

From a data perspective, there are two approaches to assessing occupational demand: job postings and job openings. What's the difference between job postings and job openings?

- Job postings can represent the ceiling of demand for a job in your region, but only if employers are actively advertising online

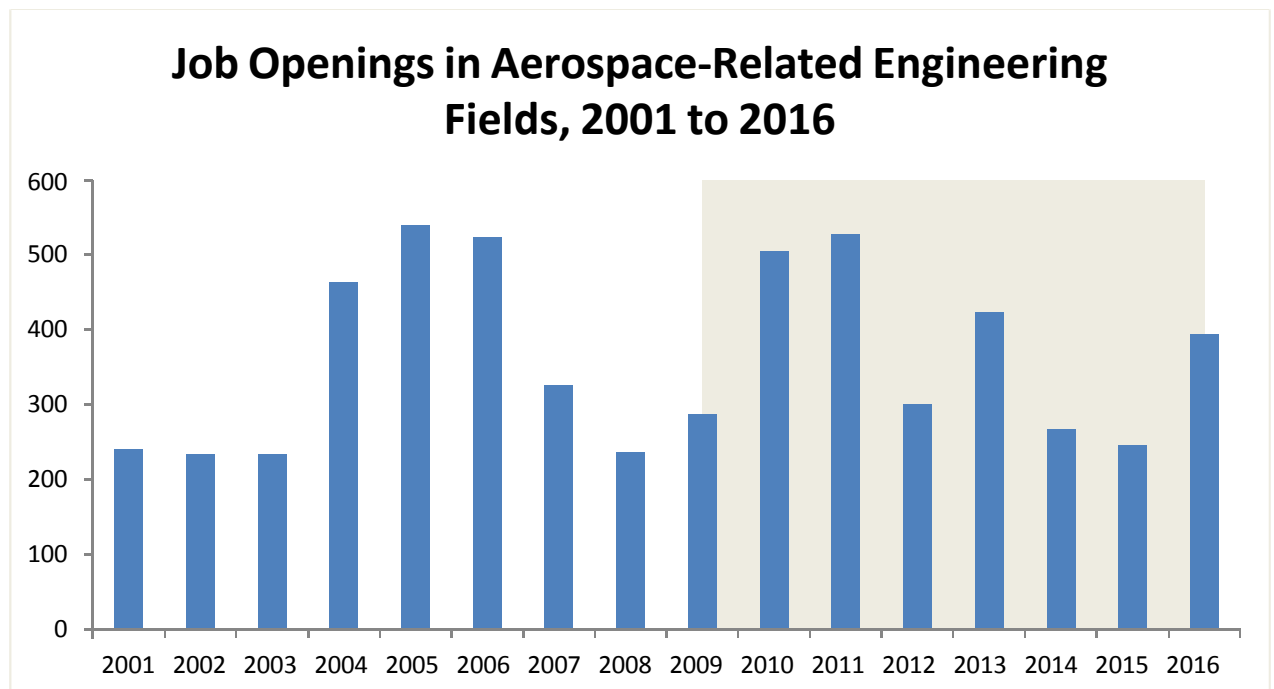
- Job openings take a fairly conservative approach to demand, accounting for job growth and estimating replacement needs for workers who change careers or retire
- It's likely that the true demand for a job is somewhere between job postings and openings

Job postings are placed by companies hoping to attract applicants. Job openings are a measure of demand using actual growth and estimated replacement needs. Both job postings and job openings are helpful for assessing the demand for an occupation, but it's important to understand the strengths and weaknesses of each.

Postings are voluntary, and therefore only represent the jobs that employers choose to advertise. This results in certain jobs being overrepresented by job postings in relation to the actual number of positions available, while other jobs are underrepresented. However, since a posting is designed to attract applicants, it frequently contains much more detailed information about that potential job - information like desired skills, detailed job titles, and the company interested in hiring.

For the purposes of this analysis, the study team selected job openings as a more conservative measure of demand.

In terms of job openings, data from the Department of Commerce is inconclusive. It shows that from 2001 to 2014, the average number of monthly openings showed supply and demand for aerospace engineering positions to generally follow trends in the broader state economy. However, in the most recent five years, openings have been less pronounced even though the aerospace industry employment figures have been trending upward.



The Data on job openings is not perfect. It is drawn from occupation employment data that are based on final industry data and staffing patterns. This data set also uses state data from the Oklahoma

Employment Security Commission. However, the data does not distinguish between new jobs and replacement recruiting, and the reporting can lead to some duplication. Nonetheless, it is the best data available for the time period we wanted to examine.

Benchmarking

A search for comparable state incentive programs yielded few results. There are two key characteristics that appear to set Oklahoma apart from other programs. First, Oklahoma's incentives are strictly focused on the aerospace industry. Second, within the aerospace industry, engineers are the employees receiving the benefit.

Among bordering states, Arkansas and Colorado have programs that are similar to components of Oklahoma's program, but each exhibit key differences that make comparison difficult. Arkansas has an incentive for tuition reimbursement that is targeted generally for employers. However, the Arkansas program it is not industry specific, and it is intended for employees returning to school after being employed, whereas the Oklahoma program has an emphasis on initial employment following graduation.

Colorado has a tax credit for employers for compensation paid to employees in aerospace manufacturing. However, it does not require the employees to be engineers or even employed in highly skilled positions.

While Oklahoma's three aerospace industry incentives appear to be unique, similar incentives have been used for different purposes in other states. Much like the risk of vacancies in the aerospace industry that inspired incentive legislation in Oklahoma, the state of Oregon was facing a potential shortage of medical professionals in rural areas in the late 1980s. To combat this, Oregon created a "three-pronged attack."⁴ First, an income tax credit of up to \$5,000 was created for medical providers. Second, the State created a loan repayment program for practitioners who agreed to operate in a rural area. Third, a financial assistance program was developed where rural hospitals would receive the same Medicaid reimbursement as non-rural hospitals.⁵ These three features are similar to Oklahoma's strategy of incenting both the demand and supply side of the labor market in the affected industry.

Finally, it should be noted that industry representatives indicate that the provision confining the required accreditation for the college granting the engineer's degree to American accreditation programs is limiting the applicant pool from Canada and other countries.

⁴ Oregon's program started in 1989 and expired January 1, 2016

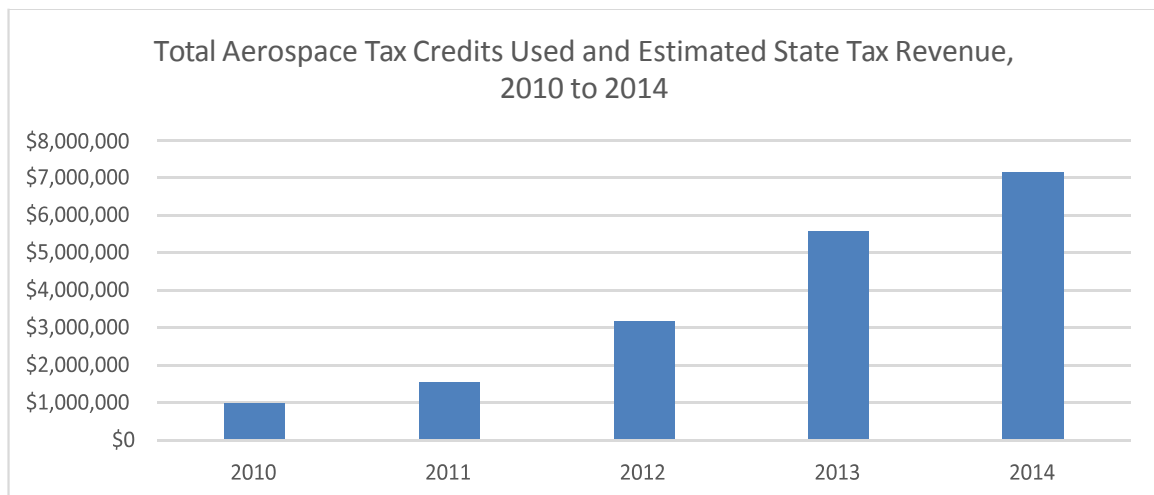
⁵ State of Oregon, 2016 Expiring Tax Credits Report, February 2015

Fiscal Impact

For this evaluation, fiscal impact is considered to be the directly attributable cost impact of the credits on State revenues and expenditures.

As shown in the table and chart below, the fiscal impact of the incentives is mainly attributable to the revenues forgone. Since these incentives are processes as part of overall corporate or personal income tax returns, the administrative cost of the incentives per se is considered not material.

Year	Employee Credits Used	Employer Credits Used	Total Credit Amount Used
2009	\$548,538	\$65,508	\$614,046
2010	\$949,825	\$30,143	\$979,968
2011	\$1,469,491	\$87,898	\$1,557,389
2012	\$2,497,020	\$676,783	\$3,173,803
2013	\$4,323,157	\$1,257,843	\$5,581,000
2014	\$5,153,323	\$2,001,145	\$7,154,468



Section 5C, subsection 2 HB2182 requires an assessment of whether adequate protections are in place to ensure the fiscal impact of the incentives does not increase substantially beyond the state's expectations in future years. While the aerospace incentives trend upward in the future, the five year limitation provides a stabilizing factor as old recipients age-out. Additionally, since the fiscal impact of these incentives is positive, they do not constitute an unplanned budget strain.

Economic Impact

Economic Impact

Methodology

Economists use a number of statistics to describe regional economic activity. Four common measures are “Output” which describes total economic activity and is generally equivalent to a firm’s gross sales; “Value Added” which equals gross output of an industry or a sector less its intermediate inputs; “Labor Income” which corresponds to wages and benefits; and “Employment” which refers to jobs that have been created in the local economy.

In an input-output analysis of new economic activity, it is useful to distinguish three types of expenditure effects: direct, indirect, and induced.

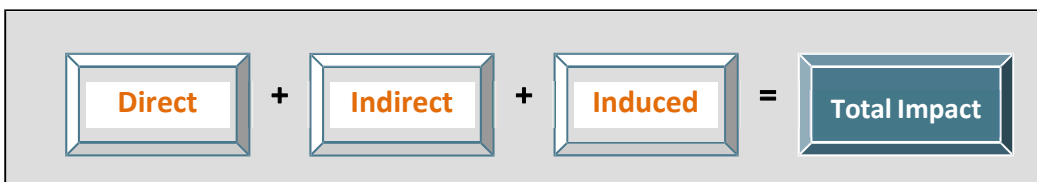
Direct effects are production changes associated with the immediate effects or final demand changes. The payment made by an out-of-town visitor to a hotel operator or the taxi fare paid for transportation while in town are examples of direct effects.

Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly affected industries – typically, additional purchases to produce additional output. Satisfying the demand for an overnight stay will require the hotel operator to purchase additional cleaning supplies and services. The taxi driver will have to replace the gasoline consumed during the trip from the airport. These downstream purchases affect the economic output of other local merchants.

Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects. Both the hotel operator and taxi driver experience increased income from the visitor’s stay, as do the cleaning supplies outlet and the gas station proprietor. Induced effects capture the way in which increased income is spent in the local economy.

A multiplier reflects the interaction between different sectors of the economy. An output multiplier of 1.4, for example, means that for every \$1,000 injected into the economy, all other sectors produce an additional \$400 in output. The larger the multiplier, the greater the impact will be in the regional economy.

The Flow of Economic Impacts



For this analysis, the project team used the IMPLAN online economic impact model with the dataset for the State of Oklahoma (2014 Model).

State of Oklahoma Tax Revenue Estimate Methodology

To provide an “order of magnitude” estimate for state tax revenue attributable to the incentive being evaluated, the project team focused on the ratio of state government tax collections to Oklahoma Gross Domestic Product (GDP). Two datasets were used to derive the ratio: 1) U.S. Department of Commerce Bureau of Economic Analysis GDP estimates by state;⁶ and 2) the Oklahoma Tax Commission’s *Annual Report of the Oklahoma Tax Commission* reports.⁷ Over the past ten years, the state tax revenue as a percent of state GDP was 5.5 percent.

State of Oklahoma Tax Revenue as a Percent of State GDP

Year	Oklahoma Tax Revenue*	Oklahoma GDP	Ratio
2005-06	\$8,435,214,025	\$136,804,000,000	6.2%
2006-07	\$8,685,842,682	\$144,171,000,000	6.0%
2007-08	\$9,008,981,280	\$155,015,000,000	5.8%
2008-09	\$8,783,165,581	\$143,380,000,000	6.1%
2009-10	\$7,774,910,000	\$151,318,000,000	5.1%
2010-11	\$8,367,871,162	\$165,278,000,000	5.1%
2011-12	\$8,998,362,975	\$173,911,000,000	5.2%
2012-13	\$9,175,334,979	\$182,447,000,000	5.0%
2013-14	\$9,550,183,790	\$190,171,000,000	5.0%
2014-15	\$9,778,654,182	\$180,425,000,000	5.4%
Average	\$8,855,852,065	\$162,292,000,000	5.5%

Source: U.S. Department of Commerce Bureau of Economic Analysis and Oklahoma Tax Commission

* Gross collections from state-levied taxes, licenses and fees, exclusive of city/county sales and use taxes and county lodging taxes

The value added of an industry, also referred to as gross domestic product (GDP)-by-industry, is the contribution of a private industry or government sector to overall GDP. The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Changes in value added components such as employee compensation have a direct impact on taxes such as income and sales tax. Other tax revenues such as alcoholic beverage and cigarette taxes are also positively correlated to changes in income.

Because of the highly correlated relationship between changes in the GDP by industry and most taxes collected by the state, the ratio of government tax collections to Oklahoma GDP forms the evaluation basis of the fiscal implications of different incentive programs offered by the State. The broader the basis of taxation (i.e., income and sales taxes) the stronger the correlation; with certain taxes on specific activity, such as the gross production (severance) tax, there may be some variation in the ratio year-to-year, although these fluctuations tend to smooth out over a period of several years. This ratio approach is somewhat standard practice, and is consistent with what IMPLAN and other economic modeling software programs use to estimate changes in tax revenue.

⁶ <http://www.bea.gov/regional/>

⁷ https://www.ok.gov/tax/Forms_&_Publications/Publications/Annual_Reports/index.html

To estimate State of Oklahoma tax revenue generated in a given year, TXP multiplied the total value added figure produced by the IMPLAN model by the corresponding annual ratio (about 5.5%). For example, if the total value added was \$1.0 million, then the estimated State of Oklahoma tax revenue was \$55,000 (\$1.0 million x 5.5%).

Impact of Aerospace Incentives

For the purpose of this analysis, we assumed that all the engineering jobs that received the incentives represented marginal employment that would not have occurred without the incentive. While this assumption may give credit to some individuals who would have been employed through organic growth, we found not available data or methodology to separate incented from organic growth. However, at the same time, we calculated marginal employment based solely on the number of employees claiming the income tax credit – assuming that all individuals claimed by the firms collecting the employer compensation and/or the tuition reimbursement credit were duplicates of the employee pool. This methodology may undercount some of the employment generated. Accordingly, based on these assumptions, we then calculated the economic impacts associated with increased employment in the aerospace industry. These impacts, shown below, indicate that the aerospace incentives are positive from an economic perspective.

Year		Output	Value Added	Labor Income	Employment	Estimated OK Tax Revenue
2010	Direct Effect	\$234,451,396	\$21,755,269	\$37,762,128	363	
	Indirect Effect	\$51,728,583	\$26,317,547	\$17,416,607	313	
	Induced Effect	\$41,556,585	\$22,683,290	\$12,841,295	314	
	Total Effect	\$327,736,565	\$70,756,106	\$68,020,030	991	\$3,635,538
2011	Direct Effect	\$354,583,517	\$32,902,597	\$57,111,318	549	
	Indirect Effect	\$78,234,138	\$39,802,571	\$26,340,819	474	
	Induced Effect	\$62,850,042	\$34,306,133	\$19,421,132	475	
	Total Effect	\$495,667,698	\$107,011,300	\$102,873,269	1,498	\$5,417,882
2012	Direct Effect	\$578,055,096	\$53,639,025	\$93,104,972	895	
	Indirect Effect	\$127,540,171	\$64,887,615	\$42,941,773	773	
	Induced Effect	\$102,460,452	\$55,927,120	\$31,661,043	775	
	Total Effect	\$808,055,719	\$174,453,759	\$167,707,788	2,442	\$9,026,446
2013	Direct Effect	\$871,280,809	\$80,848,094	\$140,333,639	1,349	
	Indirect Effect	\$192,236,526	\$97,802,674	\$64,724,527	1,165	
	Induced Effect	\$154,434,804	\$84,296,854	\$47,721,506	1,167	
	Total Effect	\$1,217,952,139	\$262,947,622	\$252,779,672	3,681	\$13,223,745
2014	Direct Effect	\$988,829,443	\$91,755,695	\$159,266,717	1,531	
	Indirect Effect	\$218,172,069	\$110,997,697	\$73,456,821	1,322	
	Induced Effect	\$175,270,337	\$95,669,743	\$54,159,841	1,325	
	Total Effect	\$1,382,271,850	\$298,423,135	\$286,883,379	4,178	\$14,986,490

Source: TXP, Inc. IMPLAN analysis output, October, 2016

Technical and Administrative Issues

Technical and Administrative Issues

The process for administering the AE incentives is fairly straight-forward. Individuals and companies submit forms 564 and 565, respectively, to the Oklahoma Tax Commission as part of their corporate or personal income tax returns, pursuant to 68 Oklahoma Statutes Sec. 2357.301 and 2357.304 and Rule 710:50-15-109 of the Tax Commission.

Employees enter the requisite information regarding their employer, position, tenure, and the name of their college or university. This will be a credit equal to their total state tax liability, or \$5,000 (\$10,000 on a joint return where both filers qualify) whichever is less.

Employers enter the name, social security number, date employed and compensation paid for each qualifying employee they are claiming the employer credit for. The credit is up to 10 percent of the employee's compensation, depending on their eligibility. Credits for tuition reimbursement are entered separately on the same form, using the same information, except the name of the college, the average annual tuition paid by the employee and date graduated are substituted for the compensation information. The tuition reimbursement is then calculated based on the amount the company paid during the year – not to exceed 50 percent of the tuition amount the employee paid to an Oklahoma higher education institution.

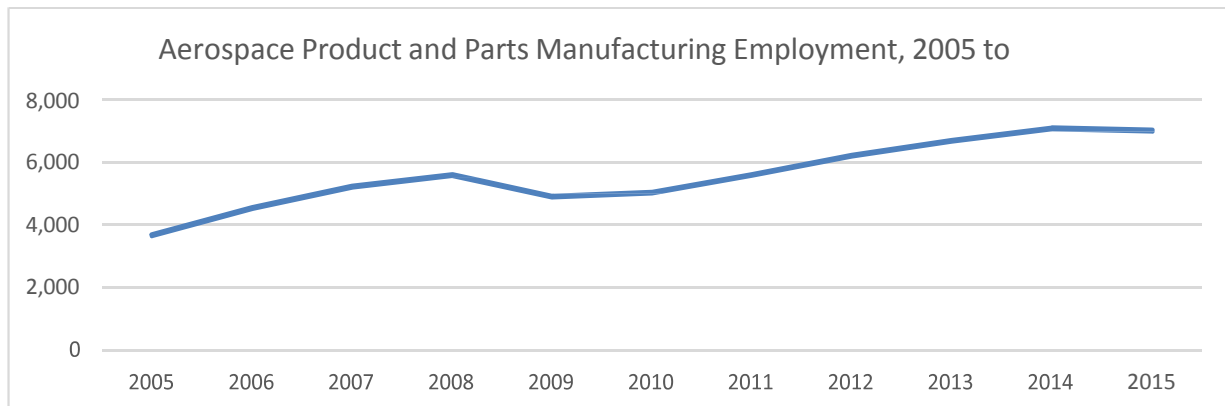
The forms are then received and processed by the Tax Commission, which reviews them for completeness, the proper information on starting dates, credit carry-forward, the appropriate accreditation of the degree-granting college or university, and other requirements found in the statute and Commission rules.

Outcomes

Outcomes

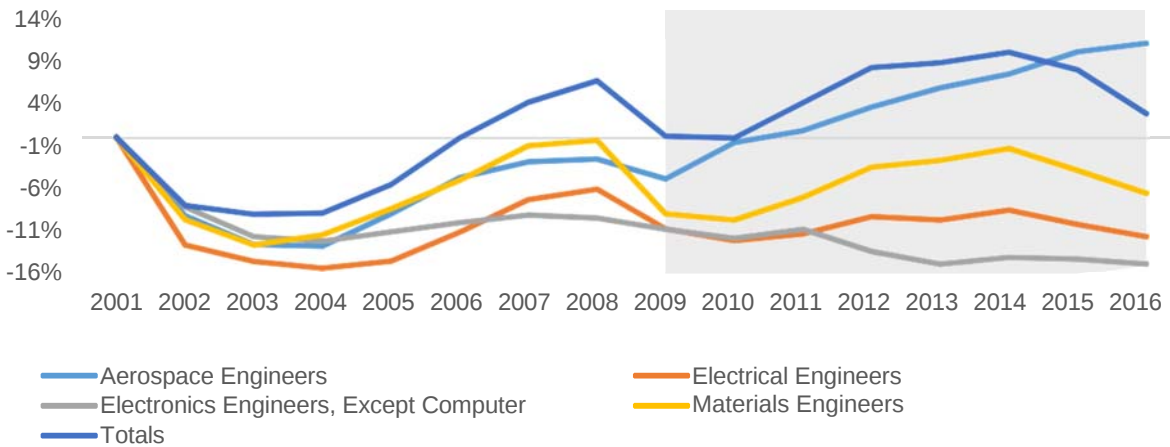
Based on the way that the incentives operate, it can be argued that the aerospace incentives should have helped augment the aerospace engineer labor supply (since the large number of job openings was indicative of already robust demand.) Aerospace industry officials argue that the three enacted incentives did just that. The “split” incentive was designed to encourage more engineers to seek employment in Oklahoma and provided employers with the capacity to offer higher starting wages and/or incur the cost of relocating current employees from other areas of the country. The tuition credit was intended to stimulate enrollment in the Oklahoma colleges and universities conferring engineering degrees. Hence, while the incentives package stimulated both the supply and the demand, it was principally designed to work on the supply side. Moreover, it was tightly confined to a specific employee type seen as the linchpin to the growth and success of this critical industry.

When looking at the data, the last decade has seen robust growth in the aerospace sector in Oklahoma, which remains a substantial and strategic component of the state’s economy. Over the past 10 years, employment in the aerospace product and parts manufacturing sector has grown by more than 90 percent, while total employment in Oklahoma grew by less than 9 percent. According to industry officials, continued growth in aerospace is likely.



From 2009 (the first year in which the aerospace incentives were in effect) to 2016, aerospace engineering jobs increased by about 16.7 percent -- the strongest growth of any of the engineering categories in related occupations. In comparison, the growth of all of these categories over the same timeframe was 2.6 percent.

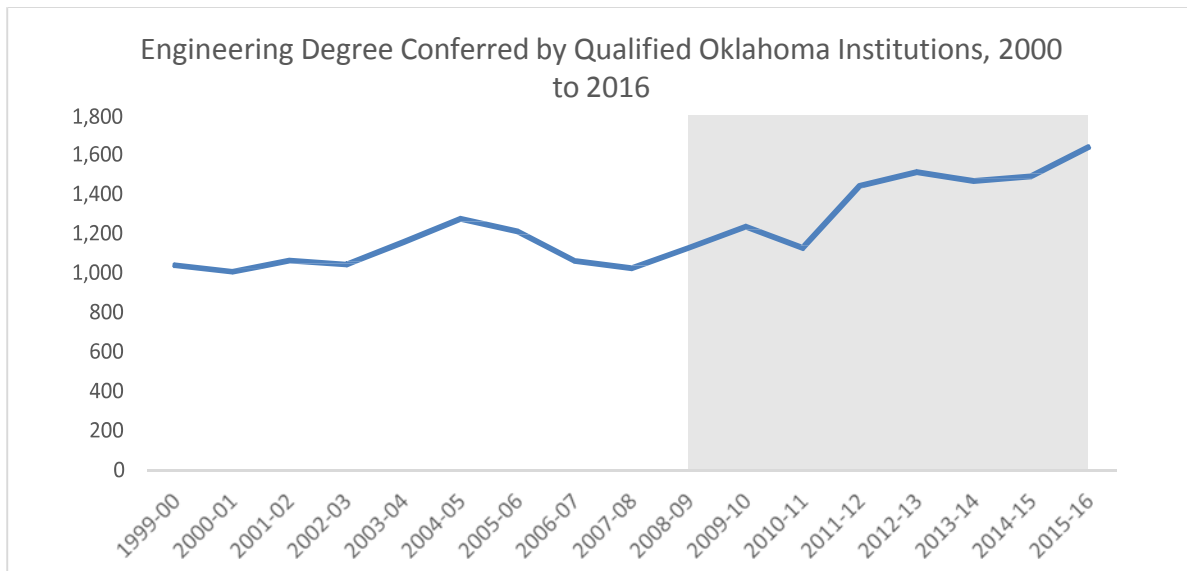
Engineering Jobs 2001 to 2016, Indexed to 2001



As a result of rising demand, the number of engineering degrees conferred in Oklahoma has risen considerably. The chart below indicates that the employer/employee incentives and the opportunity for tuition reimbursement have had a tertiary impact on the state's higher education sector as well.

Additionally, it could be argued that the tuition credit was also intended to provide enrollment support for Oklahoma higher education. To be eligible for the tuition support incentive, the engineer must have graduated from a nationally accredited Oklahoma college or university. The most well-known such accreditation body is the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The Sooner State is home to eight total ABET accredited engineering universities. In all, there are more than 30 different ABET accredited engineering programs at different universities throughout the state.

ABET Accredited Colleges and Universities in Oklahoma
Oklahoma Christian University
Oklahoma State University
Oklahoma State University Institute of Technology
Southwestern Oklahoma State University
Oral Roberts University
University of Central Oklahoma
University of Tulsa
University of Oklahoma



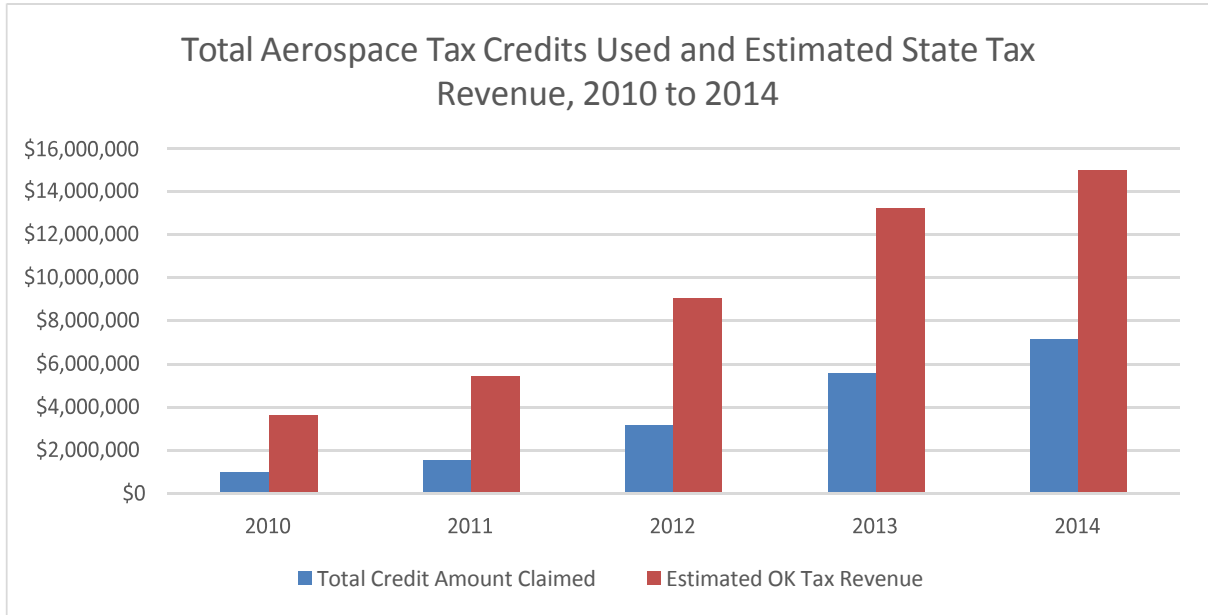
Source: Oklahoma State Regents for Higher Education, 2016

In fact, the number of undergraduate and graduate engineering degrees conferred annually by the 8 Oklahoma ABET schools has grown from 1,040 in 2011 to 1,693 in 2016 – a 57 percent increase.

Cost Benefit Analysis

As discussed in the sections above, the financial analysis suggest that the costs of providing the Aerospace Engineering Incentives are less than the revenue they produce, and that the level of incentive-qualified positions is likely to continue to grow slowly in the future. Moreover, the IMPLAN-generated economic calculation show a similar positive impact.

As shown in the chart below, the fiscal impact of the three engineering tax incentives is a net positive in each of the last five years for which data was available. A key assumption in the calculation of impact is that the engineers who are recipients of the personal income credit are the same individuals as those being claimed by the employer. Accordingly, while the data from the Oklahoma Tax Commission does not identify individuals claiming the credit, we assumed for this analysis that the estimated tax payments generated are based on one individual's income for all three of the incentives. All of the credits claimed in a given year cannot be realized due to lack of adequate tax liability – primarily by filers for the individual employee credit. However, the various benefit limitations, coupled with the fact that these credits are neither transferable nor refundable and have a limited (5 year) carry-forward life provides adequate protection against significant, unanticipated fiscal impact in any future fiscal year.



Source: Oklahoma Tax Commission and TXP, Inc.

It should be noted that some number of the engineering-related positions qualifying for the aerospace incentives would also qualify under the Quality Jobs (QJ) program or the 21st Century Quality Jobs (QJ21) program. However, due to the monolithic nature of the QJ and QJ21 data reported, the capacity does not currently exist to identify where and to what extent these two programs overlap. In general, QJ and QJ21 are broader incentives designed to promote well-paid increased employment in a variety of targeted areas, subject to certain compliance thresholds. Whereas the aerospace credits are more focused on a much narrower category of employment and are subject to more general continuity of employment requirement for the individual rather than specific payroll growth thresholds. Nonetheless, while we cannot calculate a specific value, we would note there would be some fiscal impact discount for the cost of QJ or QJ21 incentives where they do overlap.

Data provided by the Tax Commission indicates claims for both the employee and employer credits have been increasing over the last five years. In each year, the amount of employee credits claimed far outweighs the amount claimed by employers. A review of tax documents by the Tax Commission revealed there has been no participation in the tuition reimbursement credit for employers. A total of 36 employers claimed the credit for compensation paid to employees in 2014 compared to just 13 in 2009. Number of claims for the employee tax credit has grown from 257 in 2009 to 1,501 in 2014.

Comparison with Other States

The development of benchmarks with other state aerospace engineering programs proved difficult. Given the significant differences in the structure and makeup, other programs did not lend themselves to quantitative comparisons. However, several other similar approaches to occupational shortages in other program areas such as healthcare have effective.

Assessment of the Program

Based on the employment data available, the positive fiscal and economic impact analysis the increasing

trend in use of the employer and especially the employee credits and the general health of the aviation/aerospace industry in Oklahoma, the project team believes this program has been an effective catalyst for achieving its goal of stronger employment of engineers in the industry.

The potential overlap with the Quality Jobs (QJ) programs needs to be clarified by better data going forward. However, the fact that QJ was in place in the period leading up to the State's judgement that a specific incentive was needed, and the performance of the data thereafter, suggests that even if there is some overlap, it is not probative of the lack of need for the aerospace engineering program.

Due to data constraints, the analysis assumed that all employees receiving the income tax incentive would not have been employed but for that incentive. However, no additional employment credit was given for employees claimed under the employer compensation and/or tuition reimbursement programs as all those jobs were deemed to be duplicative of the employee recipient pool. While these two assumptions tend to offset each other, it is certainly possible that the methodology counts some jobs that would have been created through organic growth of the industry or the impact of the Quality Jobs or Ad Valorem incentive programs. While we were not define any rational basis for making adjustments to reflect these effects, we would observe that the margin by which these incentives are economically positive is significant – providing a comfortable margin for these factors.

The low subscription levels of the tuition credit are an area of interest and/or concern. It is not clear why this benefit is not more widely subscribed. Additional analysis of this element of the program would be advisable.

Recommendations

Recommendations for the Commission: Retain with Recommendations

Based on the employment data available, the positive fiscal and economic impact analysis, the increasing trend in use of the employer and especially the employee credits and the general health of the aviation/aerospace industry in Oklahoma, the project team believes this program has been an effective catalyst for achieving its goal of stronger employment of engineers in the industry. As a consequence, the credits should be retained.

The tuition reimbursement program is not widely used. It is recommended that the Tax Commission and the Department of Commerce work with the industry to gather data and information related to this outcome. In some of the other occupational demand incentive programs reviewed, tuition reimbursement is a critical factor. Certainly, a policy choice would be to eliminate the tuition reimbursement benefit, since it is under-utilized and the program has proven effective without it. However, since the savings achieved by dropping this element are minimal, the Commission may choose to leave it as an option that employers can use in certain circumstances.

As noted in the report, the same companies (and potentially the same individuals) that are beneficiaries of the aerospace engineering incentives may also be receiving support under the Quality Jobs programs. At the present time, there is not sufficient data to determine the extent of the overlap. However, going forward, the Tax Commission form 465 should be modified to include information regarding the company's use of other incentives in combination with the aerospace engineering credits. Further, it is recommended that the data included on the expanded form be entered into the Tax Commission data systems in a way that the specifics can be used to support analysis of overlaps.

Finally, the Commission may wish to consider recommending that the Legislature modify the definition of "Qualified program" in paragraph 6 of §68-2357.301 to expand the acceptable accreditation of degree-granting institutions to certain substantially equivalent bodies in Canada and other foreign countries.

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