

Virginia Registered Apprentice Program

Economic Impact and Return on Investment Analysis

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Abstract

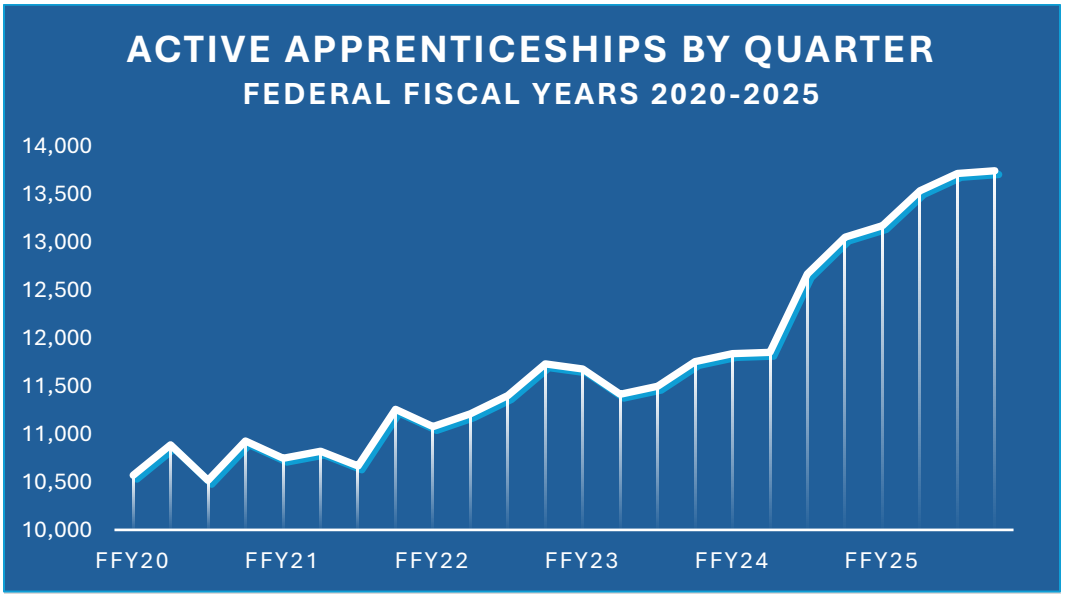
As Virginia Works reaches its first anniversary, its Registered Apprenticeship program is expanding while having positive impacts on the Commonwealth's economy and labor market, according to an analysis of apprenticeship participation and results, conducted by Timothy Aylor, Virginia Works Economist. Virginia Works' James Edmunds and Andrea Glaze provided invaluable assistance with the project. Over the last five years, program participation has steadily increased, from 10,569 active apprenticeships in 1Q20 to 13,742 in 4Q25[1]. Providing one possible driver of this growth, information on Virginia registered apprenticeships indicates that, while in the program, apprenticeship program completers often earn higher wages than they might otherwise. Resulting income and output impacts may generate an estimated $6.8 million in additional federal, state and local tax revenue. Comparing this fiscal impact to yearly estimated administrative costs resulted in a return on investment of three, meaning that every dollar in spending could be expected to return that dollar plus three additional dollars in tax revenue.

Results

In fiscal year 2023, 2,203 participants completed an approved Virginia Works Registered Apprenticeship program. During that time, active apprenticeships had a quarterly average of 11,585. From 2020 through the first fiscal quarter of 2025, nearly 10,000 participants had completed their Virginia apprenticeship programs. Over the last five years, program participation has steadily increased, from 10,569 active apprenticeships in 1Q20 to 13,742 in 1Q25 (federal fiscal year). Providing a possible driver of this growth, results from the research show that apprenticeship 'completers' often earned higher wages than they might have otherwise.

Registered Apprenticeships: Chart A below illustrates the number of 'active' apprenticeships have grown since the beginning of federal fiscal year 2020.

Chart A: Active Apprenticeships by Quarter, FFY20 – FFY25



[1] *Federal fiscal year begins on October 1 and ends on September 30 of the next calendar year. Figures represent those with active sponsors registered in VA.*

The results listed below validate that the Registered Apprenticeship program expanded the economy and raised tax revenues greater than the costs to administer the program. Economic activity in this segment of the analysis supported the equivalent of $17,141,991 in Labor Income and generated $34,735,335 in value-added (or Gross Domestic Product). In turn, this generated an estimated tax revenue of $6,807,462 at the federal, state, and county level. The following summarize the economic impact associated with the Virginia Registered Apprenticeship, FY2023.

- **Virginia Employment:** In addition to the labor income created by the apprenticeships, supply chain, or supporting, industry expenditures also were responsible for supporting 49 full-time equivalent jobs through second round effects with household spending resulting in 47 through third round effects
- **Virginia Labor Income:** In addition to the $9.7 million in labor income paid to individuals completing apprenticeships (the 'wages' part of the $12 million in total compensation), supply chain, or supporting, industry expenditures also were responsible for creating $4.5 million in additional regional labor income through second round effects with household spending resulting in $2.9 million from third round effects, for a total regional labor income impact of $17.1 million.
- **Value Added (Gross Domestic Product):** In addition to the value-added to production from individuals completing apprenticeships, it was also responsible for creating $7.8 million in additional value added through second round effects and $5.7 million from third round effects, for a total value-added impact of $34.7 million.
- **Virginia Economic Output:** Second round effects from the $13.4 million in labor income paid to completing apprentices were also responsible for generating over $22 million in additional output in the Commonwealth.
- **Fiscal Impact:** These income and output impacts were responsible for generating $2.5 million in additional state and local tax revenue, and $4.3 million in additional federal tax revenue, for a total fiscal impact of $6.8 million.
- **Return On Investment (ROI):** Administrative costs (state 'Program Expenditures') totaled $1.7 million in the most recent four quarters. Comparing the fiscal impacts to the administrative costs resulted in a ROI of three if federal tax revenues are included and .42 if they are excluded. In other words, the ROI of three means that every dollar in administrative spending returns that dollar plus three additional dollars and .42 means that every dollar will return that dollar plus forty-two cents.

Impact Summary: Table A below illustrates the overall impact of the added labor income generated by the Virginia Registered Apprenticeship program in FY 2023. A full glossary of terms is available at the end of this report.

Table A: Estimated Economic Impact of FY 2023 Registered Apprenticeship Program

	Employment	Labor Income	Output
Direct Economic Impacts	--	$9,758,290.50	$31,054,279.97
Indirect Economic Impacts	49	$4,533,373.04	$13,471,892.93
Induced Economic Impacts	47	$2,850,327.78	$8,888,825.61
	State and Local	Federal	Total
Fiscal Impact	$2,462,562.72	$4,344,898.83	$6,807,461.55
Estimated Return On Investment (ROI)	0.42	1.51	2.94

These positive results were primarily driven by two things: apprenticeship wages are often better than the likely alternative and industries that sponsor apprenticeships often have high value-added production and extensive supply chains. These things boost contribution to GDP and spur on indirect spending effects in a region. The results indicated that, often, the largest industry sponsors of apprenticeships were also better paying and contributed most to the direct labor income impact. Industry impact leaders included Specialty Trades Contractors (NAICS 238), Transportation

Equipment Manufacturing (NAICS 336), and Religious, Grantmaking, Civic, Professional, and Similar Organizations (NAICS 813). Trade unions often provide better paying apprenticeships and are a large source of apprenticeships. However, construction trade contractors, among others, are also large and important sources of apprenticeships in Virginia. The Personal Care Services industry underperformed in economic impact, influenced by apprenticeship wages that were often lower than the average and the relatively small secondary and tertiary effects on the state economy in those services industries. It must be noted that wage differences only capture one aspect of the economic and societal impacts of registered apprenticeship programs among industries.

Industry Apprenticeship Leaders: Table B below illustrates the largest sources of labor income impact by industry and age group.

Table B: Labor Income Impact Leaders in the FY 2023 Registered Apprenticeship Program by Age Group

'Student' Apprentices (Ages 24 and Under)	Program Completers	Average Exi Wage per Hour	'Student' Average Hourly Wage	Labor Income Impact
Religious, Grantmaking, Civic, Professional, and Similar Organizations (NAICS 813)	17	$43.0	$20.0	$7,674,508.8
Transportation Equipment Manufacturing (NAICS 336)	19	$26.0	$20.0	$2,228,620.8
Specialty Trade Contractors (NAICS 217)	21	$22.9	$20.0	$1,214,476.8

'Adult' Apprentices (Ages 25 and Over)	Program Completers	Average Exit Wage per Hour	'Adult' Average Hourly Wage	Labor Income Impact
Religious, Grantmaking, Civic, Professional, and Similar Organizations (NAICS 813)	163	$43.68	$23.97	$6,168,729.60
Chemical Manufacturing (NAICS 325)	26	$33.98	$23.97	$499,929.60
Professional, Scientific, and Technical Services (NAICS 541)	22	$33.27	$23.97	$392,812.80

Method

The broad question posed by this research is "But for Virginia Works' Registered Apprenticeship program, what would the citizen be earning and how does that impact the economy?" The research narrowed this down by asking, "During the program, do apprentices likely generate more labor income and grow the economy more than would otherwise be the case and might these differences result in a net positive fiscal impact?"

Model Design

The research design was structured in the following way. The model only described registered apprenticeship program completers. It is assumed that they were working full-time at their 'exit wage' at that position, which was compared to what they likely would be earning if not for the apprenticeship program. This difference would comprise the addition to state labor income that would be absent but for the apprenticeship. The model describes impacts in fiscal year 2023 and describes effects in Virginia.

These labor income impacts provided the 'event' needed for the economic impact software to calculate additional impacts that included tax revenues. The estimated tax revenue impacts were compared to the costs to administer the program. This relationship yielded the return-on-investment (ROI) estimate. Employer costs were not evaluated.

Model Data Sources

Representative apprenticeship information from the U.S. Department of Labor and the Registered Apprenticeship program were gathered that provided numbers of participants, program status, wages, and other information. Another important source was U.S. Census Bureau Quarterly Workforce Indicators (QWI) hiring wage data by detailed industry-by-age group.

Model Decisions

Several wage sources were considered for comparison to the RAPIDS exit wages.[2] On the low end, they ranged from 'no/negligible' wage income, the federal minimum wage, and the state minimum wage. These were considered too low to accurately represent what apprentices might otherwise earn. Conversely, overall average wages and median occupational wages were considered too high to accurately represent what apprentices might otherwise earn.

The selected approach is as follows. Apprentices were classified into 'student' and 'adult' groups because typical hiring wages differ between these groups. Over the last five years, there have been 8,200 that successfully completed the Registered Apprentice program in Virginia. The majority were in prime working years (55% ages 25-54), with 43% ages 24 and under. 150 were over the age of 55. To represent this, the chosen apprenticeship groups were ages 24 and under and ages 25 and over. Ages 24 and under average wages were compared to QWI average Virginia hiring wage estimates for ages 22-24. For ages 25 and over, exit wages were compared against the overall Virginia average hiring wage.

To illustrate this, there were 14 completers under the age of 25 working in the Utilities industry (NAICS 221), and they received an average exit wage of $30.30 an hour.[3] This was compared to the Virginia 'student' average hiring wage of $20.07 an hour.[4] The difference was summed to the estimated annual wage and applied to the 14 completers for a total direct 'student' labor income impact in that industry of $277,286.40. These tabulations were done for all 3-Digit NAICS industries that sponsored apprenticeships in 2023. The process was duplicated for the adult group and the two groups'

[2] . *RAPIDS is the U.S. Dept. of Labor's Registered Apprenticeship Partners Information Database System* https://www.apprenticeship.gov/help/what-rapids.
[3] *Virginia Works analysis of U.S. DOL RAPIDS apprenticeship data, fy2023.*
[4] *U.S. Census Bureau, Local Employment Dynamics (LED) program.*

figures were added together for a total labor income impact of $12.4 million. For the purposes of this analysis, these estimates were considered total compensation, not sole wages.

To estimate total economic impacts, the labor income differences by 3-Digit NAICS industry described above were used as the 'event' input into the economic impact software, with the study area being Virginia. With that information, the analysis examined the labor and economic impacts of the program for the year and was broken into categories that included the increase in employment and wage income of apprenticeship participants and economic impact of the increased wages on spending. These figures were compared to the cost to administer the apprenticeship program[5] to arrive at the final return-on-investment figures.

Wage Comparison Analysis: Table C below illustrates how 'student' and 'adult' apprentice wages were compared to equivalent average hiring wages.

Table C: Estimated Economic Impact of FY 2023 Registered Apprenticeship Program

Apprentice Age Group	Apprentices in Age Group	Average Exit Wage (per hr.)	Average Hiring Wage Age Range	Average QWI Hiring Wage (per hr.)
'Student' Completers (Apprentices 24 and Under)	956	$26.18	Ages 22-24 Average Hiring Wage	$20.07
'Adult' Completers (Apprentices 25 and Older)	1,143	$24.52	Overall Average Hiring Wage	$23.97

Conclusion

In examining the results of the research, the initial 'but for' assertion holds true that apprenticeship completers typically earn higher wages than they might have otherwise earned during the program. This difference contributes to the Virginia economy, potentially culminating in a positive return on investment for Virginia taxpayers. In this, the results are like those found in some other workforce services reports. But it differed by incorporating factors like the age group of apprentices that added to realism, while the selected methodology was conservative in several of its assumptions. The research may be useful in better understanding the program, but it is limited in scope. As such, it may be replicated and likely would produce similar results.

Much more is left to be explored. Expanding analysis to include apprenticeship data from other states or focusing the methodology on specific regions in Virginia are examples. Another promising focus may be to analyze 'high school' (ages 14 to 18) apprenticeships and whether they may indicate positive ROI results due to the low wages paid in typical 'student' jobs. Other studies have been more ambitious, with attempts to measure things like the lifetime impacts of an apprenticeship on career trajectories or quantifying effects on societal indicators like crime statistics, health measures, and poverty rates. Such things were outside the scope of the project but could be candidates for future research.

[5] *Virginia Works Registered Apprenticeship Program. Sum of quarterly state program costs, Q2 24 – Q1 25.*

Impact Analysis Glossary

- **Direct Effect:** The event being analyzed. For example, a layoff, a loss in wages, etc.
- **Indirect Effect:** The impact of local industries buying goods and services from other local industries. The impact on businesses of the event being analyzed (direct effect).
- **Induced Effect:** The response by an economy to an initial change (direct effect) that occurs through re-spending of income received by a component of value added.
- **Labor Income:** All forms of employment income, including employee compensation (wages and benefits) and proprietor income (payments received by self-employed individuals and unincorporated business owners, as well as the capital consumption allowance).
- **Output:** The value of industry production. These are annual production estimates for the year and are in producer prices. For manufacturers, this would be sales plus/minus change in inventory. For the service sectors, production equals sales. For retail and wholesale trade, output equals gross margin rather than gross sales.
- **Value Added:** The difference between an establishment's total output and the cost of its intermediate inputs. This is calculated as gross output (sales and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Consists of compensation of employees, taxes on production and imports minus subsidies.