



Beyond Productivity: How Employers Gain More from Apprenticeship

Findings from the American Apprenticeship Initiative Evaluation



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Overview and Key Findings

Beyond Productivity: Indirect Benefits of Apprenticeship Valued by Employers

In 2015, the U.S. Department of Labor (DOL) launched the American Apprenticeship Initiative (AAI) to expand registered apprenticeship in the United States. As part of the DOL-funded evaluation of AAI, a non-random 68 employers, representing a cross-section of industries, geographic areas, and apprenticeship program durations and occupations, responded to a survey on the costs and benefits of their AAI-affiliated registered apprenticeship programs. The survey inquired about two types of benefits: direct benefits (the value of apprentices' productivity) and indirect benefits (the value the employer experiences beyond that increased productivity, such as reduced turnover and improvements in company culture). Typically, calculations of apprenticeship benefits focus solely on direct benefits. This brief discusses the number and value of indirect benefits to employers. Supporters of apprenticeship, including state and local workforce agencies, can use these findings from the AAI evaluation to promote adoption of apprenticeship by employers. Direct benefits estimates were based on employers' reports of a reference apprentice's increased productivity. Indirect benefits were employers' reported values relative to the value of the reference apprentice's increased productivity. An employer could report that the indirect benefit was 50, 100, 150, or 200 percent as valuable as the increase in the value of the apprentice's productivity.

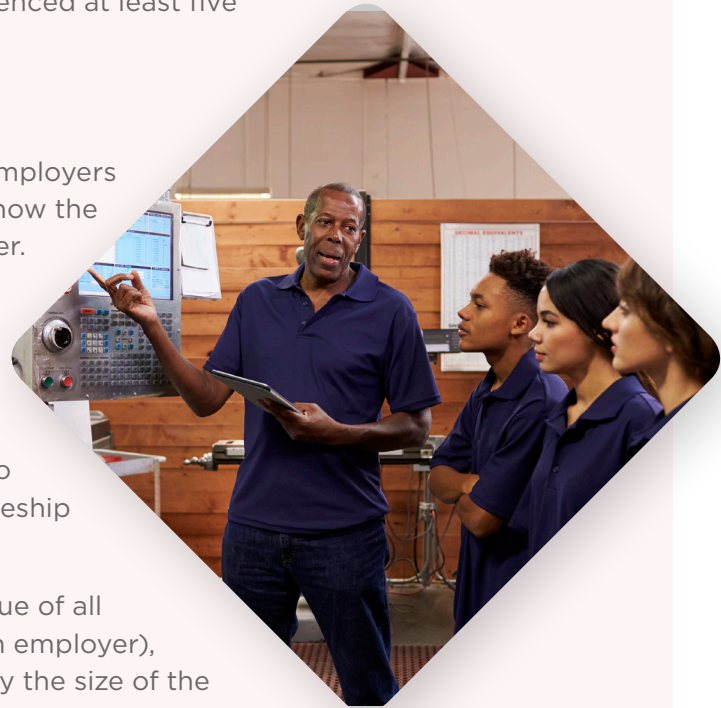
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Number of indirect benefits to 68 AAI employers

- Nearly all (99 percent) surveyed employers reported experiencing one or more indirect benefits.
- Most (84 percent) rated at least one of the indirect benefits as at least as valuable as the increases in apprentice's productivity.
- Nearly all employers (96 percent) cited improved company culture as a benefit. More than 90 percent of employers reported their apprenticeship programs led to improvements in their talent pipelines and increased employee loyalty.
- More than a quarter (28 percent) of employers reported experiencing all 10 indirect benefits the survey asked about. Almost all (94 percent) experienced at least five indirect benefits.

Value of indirect benefits to employers of apprentices

- There are two ways to report the indirect benefits to employers of apprentices. Unweighted median indirect benefits show the per-apprentice indirect benefits for the typical employer. The median employer had \$25,045 in indirect benefits per apprentice. Alternatively, when indirect benefits are weighted by the size of the apprenticeship program, they show the per-apprentice indirect benefit associated with the typical apprentice. The median apprentice provides \$958 in indirect benefits to their employer, after weighting by size of the apprenticeship program.
- Improved company culture had the highest median value of all indirect benefits (\$3,329 per apprentice for the median employer), or \$2,080 for the median apprentice, after weighting by the size of the apprenticeship program.



Variation by type of employer

- Employers participating in advanced manufacturing apprenticeship programs had the highest estimated indirect benefits.
- Employers with between 100 and 500 full-time-equivalent employees had higher indirect benefits per apprentice than did employers with fewer than 100 or more than 500 employees.
- Group joint apprenticeship programs (those that include multiple employers and are sponsored by a joint labor-management organization) had the highest median indirect benefits of any apprenticeship program type.

Introduction

Apprenticeship is a structured work-based training program that combines classroom instruction (related technical instruction, or RTI) with on-the-job learning (OJL) provided by a mentor at the employer's worksite (Gardiner et al. 2021). An apprenticeship provides training in a specific occupation and delivers occupational skills that are recognized and transferable across employers. Apprenticeships are a highly cost-effective way for workers to learn the skills required to be fully competent in an occupation (Hollenbeck and Huang 2016; Kuehn et al. 2022; Helper et al. 2016).

The research literature provides evidence based on rigorous quasi-experimental methods that apprenticeship training in the United States raises the earnings and employment of *apprentices* (Reed et al. 2012; Hollenbeck and Huang 2016; Jacoby and Haskins 2020),¹ but there is less evidence available on the benefits of apprenticeship for *employers*. The existing research on the returns to employers for apprenticeship is positive (Helper et al. 2016; Payne 2020; North Carolina Community College System and North Carolina Department of Commerce 2020), but these studies primarily consist of individual case studies or analyses of a small number of employers, which can be difficult to generalize to a broader range of employers. Helper et al. (2016) provide estimates on two employers and count different costs and benefits across employers. Payne (2020) provides estimates on three employers and does not attempt to monetize important indirect benefits that employers report. The North Carolina Community College System and North Carolina Department of Commerce (2020) report included 34 employers in its full return on investment estimates.

Because employers hire apprentices, pay their wages, and commit to developing their technical skills through OJL from mentors and RTI, their buy-in to apprenticeship is essential to expand apprenticeship in the United States. However, except for the building trades, American employers have not adopted apprenticeship in large numbers as a workforce development strategy. The 514,000 civilian apprentices reported by DOL's Office of Apprenticeship in 2020 constituted only 0.4 percent of the U.S. labor force.² Reasons include unawareness that apprenticeship is a viable workforce training model for sectors other than construction, belief that their existing training is sufficient for their business needs, or unfamiliarity with how to start an apprenticeship program (Lerman 2013).

1 Reed et al. (2012) match apprentices to a comparison group of individuals who are accepted into the apprenticeship program but do not participate. Hollenbeck and Huang (2016) match apprentices to a comparison group of individuals who receive services from employment offices in the state. Jacoby and Haskins (2020) match apprentices to a comparison group of community college students studying the same field.

2 Data on active apprentices come from the U.S. Department of Labor's Office of Apprenticeship (<https://www.dol.gov/agencies/eta/apprenticeship/about/statistics/2020>), and data on the U.S. labor force comes from the Bureau of Labor Statistics (<https://www.bls.gov/cps/cpsaat01.pdf>).

This brief describes “indirect” benefits of apprenticeship to a sample of 68 employers affiliated with AAI grantees; that is, employer experiences that are beyond the increased productive output, such as reduced turnover and increased morale. This analysis is part of the evaluation of the U.S. Department of Labor’s (DOL’s) American Apprenticeship Initiative (AAI). The brief examines the following questions:

1. Which indirect benefits are most frequently experienced by employers?
2. How large are the monetary values of indirect benefits for employers?
3. How does the experience of indirect benefits and their monetary value vary across employers and occupations?
4. How are indirect benefits associated with net benefits?

The findings described in this brief could help expand awareness of the specific types of indirect benefits employers can expect by investing in registered apprenticeships. Although these findings are not generalizable to all registered apprenticeships, they do provide helpful insights and considerations that can inform other expansion efforts.

After describing AAI and the evaluation, this brief reviews the existing literature on the importance of indirect benefits and the methodology for calculating them. It then addresses each of the research questions in turn.



The American Apprenticeship Initiative (AAI) Evaluation

AAI focused on expanding registered apprenticeship in the United States. Funded by the H-1B visa program,³ DOL awarded \$175 million in five-year AAI grants to 46 grantees in 2015 to expand apprenticeship into sectors with few apprenticeships and to populations traditionally underrepresented in apprenticeship.⁴

Apprenticeships provide training in a specific occupation and develop occupational skills that are recognized and transferable across employers. AAI supports efforts to expand apprenticeships that are “registered” either with DOL’s Office of Apprenticeship or with a federally recognized State Apprenticeship Agency (Box 1).

Box 1: Elements of Registered Apprenticeship

Registered apprenticeships must be at least one year in duration and include the following:

- **Approval** by DOL’s Office of Apprenticeship or a State Apprenticeship Agency, or sometimes both
- **Related technical instruction (RTI)** of at least 144 hours in a physical or virtual classroom
- **On-the-job learning (OJL)** of at least 2,000 hours overseen by a mentor at the employer site
- **Wage increases** over the course of the apprenticeship which can be tied to time in the program or to demonstration of skill competency
- An **industry-recognized credential** upon completion of the apprenticeship
- A **Standards of Apprenticeship** document that formally describes the work process schedule (skill standards) and specifies the RTI, OJL, and wage progression for the registered apprenticeship program
- A **sponsor** to oversee the program and maintain the *Standards of Apprenticeship* and basic data on apprentices; sponsors can be employers, consortia of employers, unions, community colleges, State or local workforce agencies, or nonprofit organizations
- A **written apprenticeship agreement** between an apprentice and either the program sponsor or an apprenticeship committee acting as an agent for the sponsor

Source: Gardiner et al (2021)

3 The H-1B visa program allows qualified nonimmigrant workers to temporarily work in the United States when employers cannot otherwise obtain needed business skills and abilities from the U.S. workforce (<https://www.dol.gov/whd/immigration/h1b.htm>). The Funding Opportunity Announcement (FOA) for AAI indicated that industries and occupations proposed by grantees should be those where H-1B visas were being used by employers or that were otherwise high-growth industries. See DOL/ETA 2014.

4 In 2020, DOL announced that grantees could apply for an extension of up to 12 months to their five-year grants, through September 30, 2021. Of the 36 grantees that requested an extension, 27 extended their grants through September 30, 2021. One extended to January 1, 2021; four extended to March 31, 2021; and four extended to June 30, 2021.

In 2016, DOL funded an evaluation of AAI, which included an employer return-on-investment (ROI) study of a sample of employers affiliated with AAI grantees (Kuehn et al. 2022). In addition to capturing employer costs of apprenticeships, the ROI study collected data on two types of benefits: *direct benefits* (the dollar value of apprentices' productivity) and *indirect benefits* (value that employers experienced beyond the apprentice's productivity, such as reduced turnover and increased morale) (Box 2).⁵ The ROI study found that over two-thirds of employers (68 percent) sampled experienced a positive return on their investments, especially when the study accounted for the indirect benefits to employers beyond the productivity of the apprentice.

The analysis for this brief expands on the AAI evaluation's ROI study to examine more closely the role of a range of *indirect benefits*

of apprenticeship experienced by AAI employers (Box 3). The data for this brief are from a survey of 68 employers that hired apprentices affiliated with an AAI grantee. The employers included those that started their apprenticeship programs during the five-year grant period and those that expanded existing apprenticeship programs with support from the AAI grant.⁶

Grantees nominated one or more employers to take the survey. To be eligible to participate, the employer needed to have at least one apprentice who completed its apprenticeship program. This requirement ensured that the employer could report costs and benefits of all apprenticeship program steps. The evaluation team guided each employer to select a "reference apprentice"—one who had completed the program and whose individual experience the employer would use in answering the survey items.⁷

The evaluation team fielded the Employer Survey between March and October 2020 as part of the ROI study (Kuehn et al. 2022). The team first emailed the survey to employers, then scheduled calls to administer the survey via telephone. This approach let the survey administrator supplement and clarify the employer's survey responses as the two talked about the details of the apprenticeship program. This brief includes specific examples of indirect benefits from these conversations.

Box 2: AAI Employer Survey Topics



- **Employer characteristics**, including industry and size
- **Apprenticeship program characteristics**, including duration, type, and occupation
- **Apprenticeship costs**, including apprentice wages and non-wage benefits, mentoring costs, tuition and fees, and program registration costs
- **Direct benefits of apprenticeship**, including employers' reports of apprentice's productivity over time relative to other employees
- **Indirect benefits**, including employers' reports of the value of the 10 indirect benefits of apprenticeship asked about in the Employer Survey

Source: Kuehn et al. (2022)

5 An apprentice's productivity is the value of the output produced by the apprentice. This is usually not directly measurable, but the AAI Employer Survey asks employers to estimate the apprentice's productivity relative to that of a fully qualified worker. The apprentice's productivity gain is the rise in the value of the apprentice's productivity from the beginning until the end of the apprenticeship. See Kuehn et al. (2022) for details.

6 Only 45 of the 46 original grantees referred employers for the survey because one grant ended before data collection began.

7 To prevent employers from reporting on their most successful apprentice instead of a typical one, the evaluation team had each employer select from its first cohort of AAI apprentices that apprentice whose name was first alphabetically and who had completed the employer's apprenticeship program. If the employer did not hire apprentices in cohorts, the employer was to select from its earliest AAI apprentice hire.

Box 3: Employer Survey Questions on Indirect Benefits



Question #1. Has your company or organization experienced any of the following benefits from hiring apprentices that likely improves your company or organization's performance in the short-run or long-run?

- Reduced turnover
- Improved pipeline of skilled employees
- Development of future managers
- Improved productivity of co-workers
- Improved firm culture
- Product or process innovation
- Employee engagement and loyalty
- Reduced use of overtime
- Reduced downtime
- More on-time delivery

Question #2. On a scale from 1 to 5, where 1 is not important and 5 is very important, how important were these additional benefits of the apprenticeship program, compared to the benefit of increasing the productivity of [your reference apprentice] when they started to their completion?

- Not important compared to the benefit of increasing the productivity of apprentices
- Somewhat valuable (50%)
- Equally valuable (100%)
- More valuable (150%)
- Very valuable compared to the benefit of increasing the productivity of apprentices (200%)

Source: Kuehn et al. (2022)

Two caveats are in order regarding the findings. First, the study included only employers associated with an AAI grant. Thus, the AAI survey sample is not statistically representative of all employers using apprenticeships or even all AAI-affiliated employers. Nevertheless, the 68 employers surveyed in the AAI evaluation come from a cross-section of industries, geographic areas, and apprenticeship program durations and occupations. Employers associated with an AAI grantee operate programs in healthcare, information technology, advanced manufacturing, and construction. They operate in all DOL regions of the country, with apprenticeship program lengths ranging from one year to five years.⁸

Second, determining the monetary value of an indirect benefit is inherently difficult. There could be measurement error in the analysis' estimated values of these benefits (particularly for larger apprenticeship programs). The estimates are therefore informative but should be interpreted cautiously.

⁸ See Kuehn et al. (2022) for additional details on the 68 surveyed employers that hired apprentices supported by an AAI grant.

Previous Literature on Indirect Benefits of Apprenticeship

The AAI Employer Survey builds on previous research on the costs and benefits of registered apprenticeship by estimating and elaborating on the indirect benefits of apprenticeship beyond the improvements of apprentices' skills and productivity. Several studies indicate indirect benefits have an important role in overall ROI. For example, the North Carolina Apprenticeship Program Survey, which collected data on 280 apprenticeship programs across the state, found that the most frequently cited benefit of apprenticeship programs was increasing employees' flexibility in undertaking tasks requiring specialized skills, followed by improving productivity, and an employer's ability to find qualified candidates (North Carolina Community College System and North Carolina Department of Commerce 2020). Another study (Payne 2020) calculated the ROI of apprenticeship programs using only survey measures of productivity for three apprenticeship program sponsors. It reported that benefits not measured in dollars—such as the value of upskilling, retention, comprehensive training, and recruitment—“were at least equally, if not more, important to employers than the measured ROI” (Payne 2020, 35–36).

Helper et al.'s (2016) apprenticeship ROI study for the U.S. Department of Commerce asked 13 employers and workforce intermediaries (e.g., industry associations) to describe the benefits they experienced from investing in apprenticeship. By asking employers to describe rather than value their indirect benefits, the study could not compare how different employers might have valued the same benefit. By soliciting descriptions, however, the study could identify benefits that might have been ignored if the research focused exclusively on productivity and skills.

Among the most mentioned indirect benefits were building loyalty among workers (reported by all 13 organizations) and reduced turnover (reported by eight). Fewer reported creation of a pipeline of skilled workers (four) or reduced overtime costs, improved quality control, or reduced downtime (two each).

Box 4: Employers Describe Importance of Indirect Benefits

A sponsor of a bus operator apprenticeship program reported that apprenticeship gives “more tools and resources to frontline bus operators,” which they can use to avoid downtime that often results in a reduction of service. A large manufacturer reported another way apprentices reduce downtime: “Apprentices get rotated so they help other departments, which [also] gives them a bigger picture of the operations, processes, products, and the plants.”

Some employers described a benefit not included in the Employer Survey, namely the beneficial effects of apprenticeship on mentors: “It was also a great retention strategy for [the mentors] – we approached them, they were flattered to be asked, they learned more skills themselves.”

The bus operator found mentoring was so attractive that (after a required three or more years of experience) “operators who started in the apprenticeship are now signing up to be mentors.”

One employer reported a dock worker apprenticeship improved its pipeline of skilled truck drivers; another stated that it was common for the apprenticeship program to enhance co-worker productivity because the apprenticeship program stimulated journeyworkers' interest in further training.

Source: Employer interviews from AAI Return on Investment study (Kuehn et al. 2022)

Another study used data from a survey of nearly 1,000 registered apprenticeship program sponsors to compare indirect benefits of apprenticeship (Lerman, Eyster, and Chambers 2009). Offered a list, nearly all program sponsors cited their apprenticeship programs as helping meet their need for skilled workers, with 83 percent ranking that benefit as “very important.” The second most cited benefit (72 percent) was apprenticeship’s role in reliably demonstrating which workers have the skills needed for the job. The next most cited benefits (68 percent) were strengthening worker morale and pride, raising apprentice productivity, and improving worker safety. The sponsors identified nearly all the listed benefits as “very important” or “somewhat important,” which suggests that sponsors believe they are capturing a wide array of benefits from apprenticeship programs.

The AAI evaluation adds an innovative approach to measuring the monetary value of indirect benefits of apprenticeship for employers. Valuing indirect benefits in dollars is difficult, and employers rarely collect such data.



Findings

Q1. Which indirect benefits are most frequently experienced by employers?

- All employers reported experiencing at least one indirect benefit, most commonly improving company culture.

In interviews conducted for the AAI implementation study, employers described the importance of indirect benefits (Box 4). Exhibit 1 compares the experiences of employers with each of the 10 indirect benefits listed in the Employer Survey. The most cited benefit was improvement to company culture. Other common indirect benefits were an improved pipeline of talent, increased employee loyalty, and co-worker productivity. More than 80 percent of employers cited reduced worker turnover, which seems closely related to employee loyalty (Kuehn et al. 2022). More than two-thirds of employers (68 percent) cited reduced downtime; that is, reduction in lost production time from factors including mistakes by employees or machinery breakdowns. The least common indirect benefit was reduced overtime, a finding consistent with findings of Helper et al. (2016).

Exhibit 1: Number and share of employers reporting indirect benefits from apprenticeship

Indirect Benefit Category	Number of Employers that Reported Experiencing the Indirect Benefit	Percentage of Employers that Reported Experiencing the Indirect Benefit
Company culture	65	96%
Improved pipeline	62	91%
Employee loyalty	62	91%
Co-worker productivity	59	87%
Reduced turnover	55	81%
Innovation	53	78%
Future managers	52	76%
On-time delivery	50	74%
Reduced downtime	46	68%
Reduced overtime	33	49%

Source: AAI Employer Survey. N=68

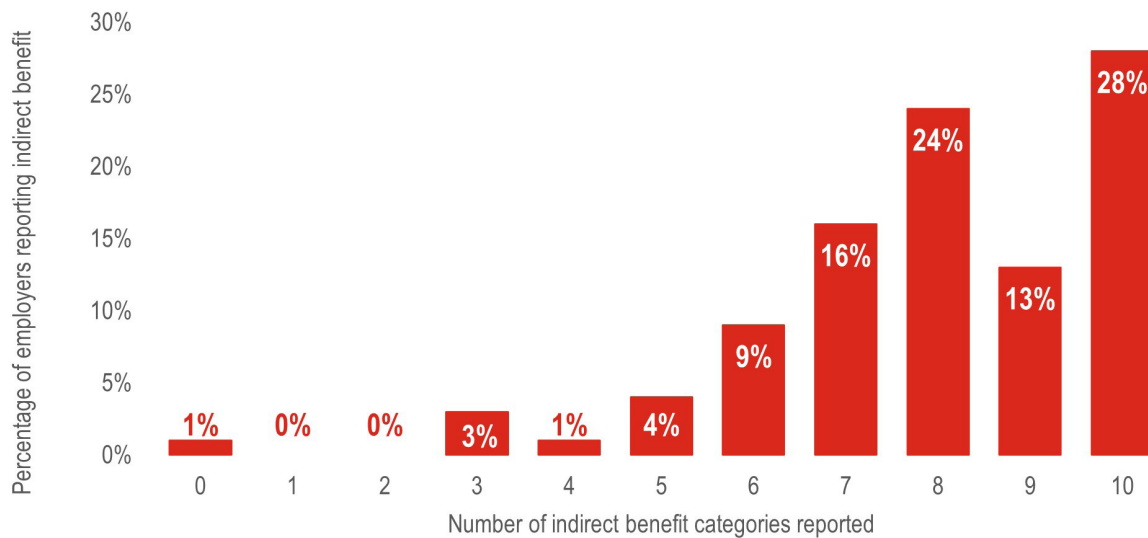
- **Some indirect benefits tended to be reported together; most commonly, loyalty and reduced turnover.**

Almost all employers reporting that their apprenticeship programs reduced turnover (96 percent) also reported that apprenticeship improved employee loyalty. As noted earlier, reduced turnover and employer loyalty seem related (Kuehn et al. 2022). In this sample, of the employers that did not report that the program reduced turnover, about two-thirds (69 percent) still stated that their apprenticeship program improved employee loyalty.⁹

- **Typically, employers reported experiencing multiple indirect benefits from their apprenticeship programs.**

Almost 30 percent of employers reported experiencing all 10 indirect benefits (Exhibit 2) listed on the Employer Survey. Almost all employers reported experiencing at least half of the 10 indirect benefits. Of four employers reporting fewer than half of the 10 benefits, only one employer reported experiencing none.

Exhibit 2. Number of indirect benefits reported by employers



Source: AAI Employer Survey. N=68.

Notes: The AAI Employer Survey offered respondents a list of 10 indirect benefits, so the most indirect benefits an employer could report was 10. It is possible that employers experienced other indirect benefits from their apprenticeship programs. Percentages do not add to 100% due to rounding.

⁹ The 27 percentage point difference is statistically significant at the .01 level using a two sided t-test.

Q2. How large are the monetary values of the indirect benefits for employers?

The evaluation team estimated the dollar value of each indirect benefit by asking employers the value of each benefit relative to the value of the reference apprentice’s increased productivity. The estimated measure of increased productivity was the change in the value of productive contributions of apprentices as reported by the employer, multiplied by the earnings of a fully qualified worker. For example, if an apprentice started at 10 percent as productive and improved to 100 percent by one year after the apprenticeship ended, then the value of the gain would be 90 percent of the compensation paid to a fully qualified worker (see Kuehn et al. 2022 for additional details). An employer could report that the indirect benefit was 50, 100, 150, or 200 percent as valuable as the increase in the value of the apprentice’s productivity. Exhibit 3 presents a summary of employers’ responses.

Exhibit 3: Value of the indirect benefits compared with the direct benefit of increased productivity

Indirect benefit category	Average value employers attributed to the indirect benefit relative to the value of increased productivity	Share of employers that valued the indirect benefit as equal to or higher than the value of increased productivity
Improved pipeline	132%	88%
Employee loyalty	132%	88%
Co-worker productivity	105%	84%
Company culture	123%	81%
Reduced turnover	114%	76%
On-time delivery	89%	65%
Innovation	90%	60%
Reduced downtime	84%	59%
Future managers	88%	56%
Reduced overtime	51%	38%

Source: AAI Employer Survey. N=68.
Notes: Increased productivity of the representative apprentice was a direct benefit that employers reported in dollars elsewhere on the Employer Survey. An employer could report that the indirect benefit was 50, 100, 150, or 200 percent as valuable as that direct benefit

- **Employers rated as especially valuable an improved pipeline of skilled workers, employee loyalty, co-worker productivity, company culture, and reduced turnover.**

For these five indirect benefits listed on the Employer Survey, at least three-quarters of employers reported the benefit was at least or more valuable than the increase in apprentice productivity they had reported. Surveyed employers were most likely to report an improved pipeline of skilled workers and employee loyalty as indirect benefits of apprenticeship, with 88 percent of employers reporting both benefits. Employers rated both benefits as being 132 percent as valuable as increased productivity, on average. Although the Employer Survey did not directly ask about whether apprenticeship improved the diversity and inclusivity of a company’s workplace, access for underrepresented populations may have been a

consideration for employers reporting an improved pipeline. Kuehn et al. (2021) interviewed employers about their experiences with apprenticeship programs inclusive of people with disabilities. Some interviewed employers reported that inclusive apprenticeships were perceived by coworkers as high-quality jobs, which improved retention even for apprentices who did not identify as having a disability.

Reduced overtime was the indirect benefit valued least (on average, it was rated as 51 percent as valuable as increased productivity). Little more than a third of employers (38 percent) valued reduced overtime as at least as or more valuable than increased productivity.

To estimate the dollar value of the indirect benefits listed on the Employer Survey, the AAI evaluation team multiplied the percentage value the employer attributed to each benefit relative to the reference apprentice's increase in productivity by the dollar value of the apprentice's productivity gain estimated by the employer. For example, if an employer valued employee loyalty at 150 percent of the value of the increased productivity, and the employer had estimated the value of production increase as \$1,000, then the value of employee loyalty to that employer was \$1,500. This means that different employers may value the same benefit differently, which appropriately reflects the variation in how different apprenticeship programs generate indirect benefits across employers operating in different contexts.

Surveying respondents to collect information on the value of benefits that do not have a market price is called "contingent valuation," and is common in the cost-benefit analysis literature. Contingent valuation methods can produce estimates that are close to actual values, particularly when the benefit being measured is private or quasi-public rather than a public good and when survey respondents are given detailed descriptions of the benefits measured (Carson 2012).

- **Surveyed employers enjoyed a median total of \$25,045 in estimated indirect benefits per apprentice.**

To estimate the dollar value of the indirect benefits per apprentice, the evaluation team first estimated the total value of each indirect benefit for the employer's entire apprenticeship program. Then the team divided the total value of each indirect benefit for the entire program by the total number of AAI apprentices in the program.¹⁰ Exhibit 4 shows the median values of the 10 indirect benefits per apprentice across the study's 68 employers.

The median estimated total value of all 10 indirect benefits per apprentice was \$25,045. Improvements to company culture had the highest median value of all 10 indirect benefits, \$3,329 per apprentice (Exhibit 4). Improvements in employee loyalty, improved pipelines, and improved co-worker productivity also had high median value estimates. The median employer reported almost \$3,000 in benefits per apprentice from increased employee loyalty. In the case of improved pipelines and co-worker productivity, the median employer reported just over \$2,000 in benefits.

Some employers, however, reported experiencing little or no value from several of the indirect benefits listed. At least a quarter of employers experienced no indirect benefits associated with the development of future managers, reduced overtime, reduced downtime, and on-time delivery.¹¹

¹⁰ For details on the calculation of employer costs and benefits by the evaluation team see Kuehn et al. (2022).

¹¹ An employer might have reported experiencing a benefit (Exhibit 1) but still estimated a zero-dollar value for that benefit if the value of the apprentice's increased productivity was zero.

Exhibit 4: Median estimates of the value per apprentice of each indirect benefit

Indirect benefit category	Median estimated value per apprentice
Company culture	\$3,329
Employee loyalty	\$2,945
Improved pipeline	\$2,057
Co-worker productivity	\$2,050
Reduced turnover	\$1,322
Innovation	\$1,216
Future managers	\$1,063
On-time delivery	\$754
Reduced downtime	\$405
Reduced overtime	\$0
Total estimated value of indirect benefits	\$25,045

Source: AAI Employer Survey. N=68.

Note: The total median value of the indirect benefits is not necessarily equal to the sum of the medians of the individual indirect benefits.

Q3. How does the experience of indirect benefits and their monetary value vary across employers and occupations?

- **Much like the estimated value of individual indirect benefits, the estimated total value of the indirect benefits of apprenticeship varied substantially across employers.**

The differences in the total value of indirect benefits across employers depended on both the number of indirect benefits that the employer experienced and the estimated dollar value of those benefits. As noted in Exhibit 4, the total value of the indirect benefits of operating an apprenticeship program for the median employer was \$25,045 per apprentice. The average value of all indirect benefits was far higher (\$91,712 per apprentice), reflecting that a few employers made high estimates (Exhibit 5).¹²

The value of employers' indirect benefits can also be weighted by the size of their apprenticeship program. Both values are correct, but weighting employer cost and benefit data in this way changes their interpretation from being the costs and benefits experienced with the employer as the unit of analysis to the costs and benefits associated with the apprentice as the unit of analysis. When the apprentices of the surveyed employer rather than the surveyed employer become the unit of analysis, the values of indirect benefits will

¹² As discussed in more detail in Kuehn et al., 2022, extreme values of reported indirect benefit values are top-coded at the 90th percentile (i.e., the data points whose values are above this upper bound are excluded). Even after top-coding, some values are much higher than others (Exhibit 5). Without prior documentation of standard ranges for these benefit values, the study team decided to rely on medians of reported benefits and costs (which are not influenced by extreme values) rather than determining that a particular value was unreliably high.

be weighted towards larger programs with more apprentices, since each large program is weighted not as one program but as reflecting many apprentices. When the estimated value of employers' indirect benefits is weighted by the size of the apprenticeship program in this way to reflect apprentices as the unit of analysis, the median value of the indirect benefit per apprentice falls from \$25,045 to \$958 (Exhibit 5). The decline results mostly from the higher weight placed on the largest three surveyed employers, who had lower estimated indirect benefit values. The method for estimating indirect benefits may have produced more conservative estimates by understating benefits for the largest programs. The maximum value that could be assigned to an indirect benefit was 200 percent of the value of increased productivity of a reference apprentice, even though that fixed amount was divided by a larger number of apprentices for larger employers. Discussions with employers of the largest programs showed that employers perceived the total and indirect benefits per apprentice as higher than the estimates. For this reason, tabulations based on the median employer or tabulations that exclude the largest three programs may more accurately capture the indirect benefits per apprentice (Exhibit 5).

- **The value of indirect benefits for surveyed employers ranges widely, from \$5,000 to over \$150,000 per apprentice.**

Employers at the 25th percentile (meaning 25 percent of employers surveyed had lower estimated values) reported receiving less than \$5,000 per apprentice in total indirect benefits when the employer is the unit of analysis (e.g., unweighted), or less than a fifth of the indirect benefits of the median employer (Exhibit 5). Employers in the 75th percentile reported receiving more than \$150,000 per apprentice in indirect benefits, or more than six times the indirect benefits of the median employer.

Exhibit 5: Distribution of estimates of the total value of indirect benefits per apprentice

	Estimated dollar value of indirect benefit, unweighted	Estimated dollar value of indirect benefit, weighted by apprenticeship program size	Estimated dollar value of indirect benefit, weighted by apprenticeship program size, excluding largest three programs
Average value of total indirect benefits	\$91,712	\$17,293	\$27,347
25th percentile value of total indirect benefits	\$4,995	\$640	\$756
Median value of total indirect benefits	\$25,045	\$958	\$4,894
75th percentile value of total indirect benefits	\$150,354	\$9,384	\$24,130

Source: AAI Employer Survey. N=68.

Note: Weighted averages are weighted by the number of apprentices in the employer's apprenticeship program, so larger programs are given higher weights and smaller programs are given lower weights.

- **Surveyed employers' estimates of the value of the indirect benefits varied with the characteristics of the employers and their apprenticeship programs.**

Advanced manufacturing. Surveyed employers operating advanced manufacturing apprenticeship programs had the highest average and median estimates of indirect benefits (\$164,365 and \$140,400, respectively) (Exhibit 6).¹³ Median values of indirect benefits for advanced manufacturing programs were more than 10 times the median values for healthcare or information technology apprenticeship programs, and almost six times those for other occupations.

Mid-sized employers. Surveyed employers with between 100 and 500 full-time-equivalent (FTE) employees had higher median estimated indirect benefits (\$74,200) than did employers with either fewer than 100 or more than 500 full-time-equivalent employees (Exhibit 6).¹⁴ However, these estimates may understate the value of indirect benefits to surveyed employers with large apprenticeship programs because the survey asked employers to estimate values relative to the productivity of a single, representative apprentice. In the study's methodology, the highest relative value that any employer could attribute to an indirect benefit was 200 percent the value of the growth in the reference apprentice's productivity. If the value of an indirect benefit increased with the size of an apprenticeship program, a larger program could be constrained in reporting these larger benefits.

Exhibit 6. Estimated indirect benefit values per apprentice and employer characteristics

	Average estimated dollar value of indirect benefit	Median estimated dollar value of indirect benefit
Occupational category		
Healthcare (n=12)	\$17,414	\$8,028
Information technology (n=12)	\$52,221	\$10,351
Advanced manufacturing (n=23)	\$164,365	\$140,400
Other occupations (n=21)	\$77,161	\$24,130
Employer size		
Fewer than 100 FTEs (n=18)	\$93,069	\$35,792
100 to 500 FTEs (n=29)	\$130,819	\$74,200
More than 500 FTEs (n=21)	\$36,543	\$11,642
Apprenticeship program type		
Group joint (n=7)	\$119,222	\$62,598
Group non-joint (n=18)	\$84,031	\$28,082
Independent joint (n=14)	\$102,362	\$12,327
Independent non-joint (n=29)	\$84,697	\$24,130

Source: AAI Employer Survey. N=68.

¹³ The difference in means between indirect benefits for advanced manufacturing employers is statistically significant at the 0.01 level using a two-sample t-test. The difference in medians is tested using a quantile regression and is not statistically significant. Like all apprenticeship return on investment studies, the sample size for this study is not large and the goal is not to derive statistically representative estimates; rather, it is to identify patterns in the data collected from a broad cross-section of employers.

¹⁴ The difference in medians is tested using a quantile regression and is not statistically significant. Like all apprenticeship return on investment studies, the sample size for this study is not large and the goal is not to derive statistically representative estimates, it is to identify patterns in the data collected from a broad cross-section of employers.

Group joint apprenticeship programs. There are four types of registered apprenticeship programs (Box 5). Group joint apprenticeship programs (comprising multiple employers sponsored by a joint labor-management organization) had the highest median indirect benefit values (\$62,598) (Exhibit 6). This is notable because Kuehn et al. (2022) found that group non-joint apprenticeship programs (comprising multiple employers but not sponsored by a joint labor-management organization) had the highest total net benefit values (meaning direct productivity benefit values plus all indirect benefit values minus the costs of operating the apprenticeship program). One reason for this may be that joint apprenticeship programs produce large indirect benefits for employers, but also are higher cost than non-joint programs. Surveyed employers sponsoring joint programs had statistically significant higher average supply and wastage costs, mentoring costs, and total wage costs than non-joint employers. Differences between the two groups' average registration costs and tuition costs were higher but not statistically significant.¹⁵

Box 5: Types of Apprenticeship Programs



- **Joint program:** sponsored by a joint labor-management organization, consisting of a labor organization (e.g., a union) and a management committee
- **Non-joint program:** sponsored without a labor organization
- **Independent program:** involving only one employer
- **Group program:** involving multiple employers

Source: 29 CFR § 29.2

Q4. How are indirect benefits associated with net benefits?

- **The indirect benefits associated with employers' apprenticeship programs was closely related to the employer's total net benefits.**

An apprenticeship program's total net benefits include the direct productivity benefit value of the apprenticeship program, all indirect benefit values, and the costs of operating the apprenticeship program. More than two-thirds of the study's 68 employers (68 percent) had positive total net benefits (Exhibit 7). Even the third of employers that had negative total net benefits had positive indirect benefit values.

Exhibit 7. Estimated indirect benefits and total net benefits per apprentice

Total net benefits outcome	Average estimated dollar value of indirect benefit	Median estimated dollar value of indirect benefit
Positive (n=46)	\$113,348	\$35,160
Negative (n=22)	\$46,472	\$13,320

Source: AAI Employer Survey. N=68.

Notes: Kuehn et al. (2022) calculated total net benefits using multiple assumptions to estimate the value of the apprentice's productivity. Total net benefits reported here use their "medium" productivity assumption and a 3 percent discount rate.

Employers with positive total net benefits reported greater average indirect benefit values than did employers with negative total net benefits (\$113,348 compared to \$46,472). They also reported higher median indirect benefit values than did those with negative total net benefits (\$35,160 compared to \$13,320). The AAI ROI study report describes total net benefits for the 68 surveyed employers in more detail (see Kuehn et al. 2022).

¹⁵ Authors' calculations from AAI Employer Survey data.

Analysis of Implications for Marketing Registered Apprenticeship to Employers

This brief provides a new detailed understanding of the value of indirect benefits of apprenticeship that have been touched upon in previous studies but are often difficult to measure. Although the estimates of indirect benefits come from a specific group of 68 employers associated with the AAI grants, the results have implications for how grantees and similar actors might use the estimates to recruit employers to registered apprenticeship.

- **Most surveyed employers associated with the AAI grantees experience multiple indirect benefits, with the most common and valuable including improvements in company culture, employee loyalty, and a pipeline of talent.**

Employers' responses suggest that for them, apprenticeship is more than a way to build workers' skills and increase productivity. Apprenticeship can affect how employers hire and maintain their workforce as well as many facets of operations and employee relations. Along with direct benefits of apprenticeship, the value of indirect benefits could be an important employer recruitment message.

- **AAI grantees reported that they used the topic of indirect benefits to engage employers in discussions about apprenticeship.**

Exhibit 8 presents results from a 2019 survey fielded to 45 grantees as part of the AAI implementation study, at a time when grantees were actively recruiting employers to registered apprenticeship. Grantees reported that their most common selling points to employers related to customized skill sets, improvements in productivity, and reduced

Exhibit 8. Grantees' selling points to engage employers in apprenticeship

Selling point	Number of grantees reported using selling point	Percentage of grantees reported using selling point
Customized skill set that is specific to an employer's needs	45	100%
Improvements in worker productivity	41	91%
Reduces turnover	41	91%
Steady source of skilled workers that are difficult to hire directly	38	84%
Broader social benefit such as reducing inequality or closing the skills gap	33	73%
Develops workers' skill set without them leaving the workforce	31	69%
Local RTI providers have valuable training opportunities that can be accessed through apprenticeship	21	47%
Helps make workers self-sufficient	21	47%

Source: AAI Evaluation Grantee Survey. Reported at the grantee level. N=45.

turnover. Each of these was used by more than 90 percent of AAI grantees. In addition to these selling points, grantees reported mentioning indirect benefits including improvements in the talent pipeline, worker turnover, and productivity of co-workers (Gardiner et al. 2021).

- **Findings on indirect benefits have implications for crafting outreach messaging.**

The insights gleaned from this analysis can aid business services staff working within educational institutions, workforce boards, nonprofit organizations, state and local governments, and industry intermediaries such as industry associations to communicate to employers more effectively about the value of indirect benefits of apprenticeship. As such entities seek to expand apprenticeship opportunities in their service areas, staff responsible for marketing apprenticeship to employers could stress the importance of indirect benefits to employers' total net benefits. They could stress that employers typically experience many indirect benefits. Nearly all employers surveyed for the AAI evaluation (64 out of 68) reported experiencing at least half of the indirect benefits, while only one employer reported no indirect benefits. Most surveyed employers rated the benefits as being at least as valuable as productivity benefits. Although the AAI Employer Survey is not representative of all employers, it provides data on a broad cross-section of employers partnering with the AAI grantees.

The estimated dollar values of indirect benefits in this study should be interpreted cautiously; employers accrue positive tangible returns from investing in apprenticeship: the value of the estimated indirect benefits from operating an apprenticeship program for the median surveyed employer is \$25,045 per apprentice. Though such amounts should not be expressed as guaranteed for all employers (and were not even achieved by all surveyed employers), recruitment staff could use these estimates to illustrate the potential monetized value of apprenticeship to an employer's organization. Carefully designed surveys to monetize intangible benefits can be quite accurate (Carson 2012), and certainly represent an improvement over return on investment studies that implicitly assume indirect benefits have no value to employers. Future research can improve these estimates by surveying statistically representative samples of employers and testing the validity of survey instruments against objective benefit measures.



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About This Brief

The U.S. Department of Labor (DOL) American Apprenticeship Initiative (AAI) focused on expanding registered apprenticeship in the United States. Funded by the H-1B visa program, AAI awarded \$175 million in five-year grants to 46 grantees in 2015 to expand apprenticeship into sectors with few apprenticeships and to populations traditionally underrepresented in apprenticeship. DOL commissioned an evaluation of the AAI grants to build evidence about the effectiveness of registered apprenticeship for apprentices and employers. This brief examines in detail a range of benefits that are estimated using information reported by employers that accrue from their investments in apprenticeship beyond the dollar value of the apprentices' productivity. The key data source is the AAI Employer Survey.

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