2011 Northwest Iowa Community College Economic Impact Report

A study completed by Iowa Workforce Development and the Iowa Department of Education
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* An electronic appendix, which includes data tables for all of the figures included in this report, can be found on a separate CD.
Executive Summary

As Iowa’s largest postsecondary system, the community colleges play an important role in the state and its economic development. As Iowa seeks to skill-up its workforce, investment in its community colleges will play a key role.

In order to study outcomes related to Northwest Iowa Community College (NCC), Iowa Workforce Development and the Iowa Department of Education partnered to combine educational and workforce data. This report summarizes results in three areas: the impact of Northwest Iowa Community College on the region’s economy; student and public returns to their educational investment; and descriptive wage and employment summaries.

Economic Impact of Northwest Iowa Community College

Through community college and student expenditures, estimates of the total impact on employment and economic output are reported for the region.

Five counties (Cherokee, Lyon, O’Brien, Osceola and Sioux) were used to represent the community college’s region and to model economic benefits attributable to the community college’s and students’ spending.

- Every dollar spent by Northwest Iowa Community College creates an estimated $1.21 for the region’s economy.
- Every dollar of student spending creates $0.78 for the region’s economy.
- An estimated $9.6 million in total personal income across the region and 234 jobs are created from spending by the community college.
- An estimated $2.8 million in total personal income across the region and 138 jobs are created from spending by students.
- Sectors of the regional economy where community college operations have the greatest economic impact include retail trade; finance, insurance and real estate; and arts, entertainment and recreation.
- Overall, spending by Northwest Iowa Community College and its students adds an estimated $24.2 million in economic output to the region, 372 jobs and increased tax revenues of $1.4 million.

The analysis shows a positive impact on the region’s economy well in excess of the initial spending by the community college. These estimates are not necessarily the additional jobs or output that would be absent without the community college, but those benefits that can be attributable to institutional and student spending.

Student Return on Investment

To estimate the value of a degree, NCC students from the 2001-02 academic year and their careers throughout the following 10-year period are analyzed. The value is found by comparing the increased wages that graduates earned against their various incurred costs.

- Students completing their degree earn a 55 percent annualized return on their initial investment in time and expenses over the first 10 years of their career.
- Students completing a Northwest Iowa Community College program see their earnings grow faster and make, on average, 5.2 percent more per year than those not completing their degree program 10 years after degree completion.
- Students completing some college, but not their program, earned 14.0 percent more per year than those with only a high school degree. Those completing a community college program made 16.0 percent more per year than high school graduates.1
- A Northwest Iowa Community College degree is worth an average of $40,602 above and beyond the costs associated with tuition and fees over the first 10 years of a student’s career.

Students who choose to complete an NCC degree rather than leave early into the workforce should value the degree at no less than $40,602 above and beyond the costs associated with tuition and fees. This dollar amount represents the additional lump-sum amount that the degree holders earn compared to those that leave NCC early without completing their program.
Executive Summary

Public Return on Investment

- State and local governments receive a 13.4 percent return on the funding invested in Northwest Iowa Community College over the first 10 years of a student’s career.
- Every $1 of state and local tax money invested in Northwest Iowa Community College returns $1.60 over the first 10 years of a student’s career.

Extremely relevant to analysis is the rate of return attained on the public funding invested in NCC. Each year, both state and local government in Iowa contribute to NCC through state general aid and local support.

This funding is returned back to the state and local economies through higher revenues attributable to the higher wages of NCC graduates compared to those with only a high school diploma or a GED. State and local governments invested $4.2 million in unrestricted general funds for the 2010 fiscal year. Across 1,812 full-time equivalent students, this amounts to roughly $2,297 per student. After accounting for out-migration after degree completion, this funding returns an annualized 13.4 percent return on investment for the state and local governments through increased revenues over the first 10 years of a student’s career.

Completer Wage and Employment Outcomes

To analyze wage trends, NCC graduates from the 2000-01 academic year, and 2008-09 academic year are followed.

- Students completing their Northwest Iowa Community College programs see significant increases in median wages the first two years after degree completion.
- The largest proportion of Northwest Iowa Community College graduates work in the health care and social assistance industry sector, the only sector in Iowa to consistently add jobs throughout the recession and recovery.
- During the second quarter of 2011, the in-state retention rate was 78.2 percent for the 2008-09 Northwest Iowa Community College graduating class.
- Between the third quarter of 2009 and the second quarter of 2011, 2008-09 Northwest Iowa Community College graduates were leaving the state at a rate of 7.7 percent annually, on average.

As a measure of how NCC completers fair after settling into their careers, the 2011 median gross wage for 2000-01 NCC graduates was $39,460, 10 years after graduation. The largest industry sector by employment for this group is health care and social assistance (14.7%), followed by utilities (14.1%).

The quality of the education that students receive at NCC makes them marketable to employers outside the state of Iowa. However, the large majority of NCC degree completers remain in Iowa as part of the workforce. In the second quarter of 2011, the in-state retention rate was 78.2 percent for the 2008-09 NCC graduating class.
Introduction

Northwest Iowa Community College enrolled 2,486 credit students and 12,664 noncredit students in the 2009-10 academic year. It is part of the largest postsecondary system in Iowa and is an integral part of the state’s economy.

The role of education in national workforce development has been well-documented over the last 50 years. Students with more education typically earn higher wages and enjoy a higher quality of life. The difference in educational attainment has contributed to two-thirds of the increase in wage inequality since the 1970s. Typically, each year of education returns 10 percent to wages over a worker’s lifetime. Nationally, completing a community college degree versus leaving early returns between six and 14 percent.

Educated workers also enjoy lower unemployment rates nationally. For instance, in 2010 Bachelor’s degree holders had a 5.4 percent unemployment rate compared to a 7.0 percent unemployment rate for those with an Associate’s degree, and a 10.3 percent unemployment rate for those with a high school diploma.

Additional studies have shown educated workers tend to be healthier, thus paying less in health care and being less reliant on public health programs. They are less likely to be incarcerated and their children are also more likely to obtain higher education and higher earnings.

Northwest Iowa Community College, Iowa Workforce Development and the Iowa Department of Education have collaborated to join databases and track workforce outcomes of NCC students. This allows the study of how Northwest Iowa Community College contributes to Iowa’s workforce.

The role of education in workforce development is an expansive area of study. The scope of this report is limited to five questions:

1. How does Northwest Iowa Community College impact the region’s economy?
2. Does completing a Northwest Iowa Community College degree provide an economic benefit to the individual student?
3. What are the wage trends of recent Northwest Iowa Community College graduates, as well as those that completed degrees further in the past?
4. What sectors of the state’s economy are provided labor from Northwest Iowa Community College?
5. Do Northwest Iowa Community College graduates remain in the state’s labor force?

The answers to these questions can be found in the following section, Primary Findings. More detailed findings, as well as the methodology behind the analysis, can be found in the detailed sections in the remainder of the report.
Economic Impact of Northwest Iowa Community College

- Every dollar spent by Northwest Iowa Community College creates an estimated $1.21 for the region’s economy.
- Every dollar of student spending creates $0.78 for the region’s economy.
- An estimated $9.6 million in total personal income across the region and 234 jobs are created from spending by the community college.
- An estimated $2.8 million in total personal income across the region and 138 jobs are created from spending by students.
- Sectors of the regional economy where community college operations have the greatest economic impact include retail trade; finance, insurance and real estate; and arts, entertainment and recreation.
- Overall, spending by Northwest Iowa Community College and its students adds an estimated $24.2 million in economic output to the region, 372 jobs and increased tax revenues of $1.4 million.

Table 1: Top 10 sectors by increased employment due to community college expenditures

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food services and drinking places</td>
<td>0</td>
<td>0</td>
<td>4</td>
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<td>Private hospitals</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nursing and residential care facilities</td>
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<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Retail Stores - Food and beverage</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Wholesale trade businesses</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Offices of physicians, dentists, and other health practitioners</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Retail Nonstores - Direct and electronic sales</td>
<td>0</td>
<td>0</td>
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<td>Child day care services</td>
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<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Automotive repair and maintenance, except car washes</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Top 10 sectors by increased employment (Full-time Equivalent Jobs). These sectors represent those with the highest increase in employment attributable to community college expenditures.
As with employment, the majority of this ($8.5 million; 88.5%) goes to wages of direct staff and services. Table 2 shows the top 10 beneficiaries, outside of direct community college staffing. Healthcare is the greatest beneficiary with an estimated $237,560 in increased wages, but retail establishments also see $182,900 in increased wages due to community college expenditures. A total of 187 sectors of the economy are estimated to see an increase of approximately $9.6 million in labor income due to institutional spending.

Aggregating all the economic activity attributable to the Northwest Iowa Community College’s expenditures through employment, spending, and taxes can provide insight into the overall effect on the regional economy. The total spending of $10.9 million for the 2010 fiscal year results in total increased output of an estimated $13.2 million throughout the region’s economy. This means that each dollar spent by the community college creates roughly $1.21 for the region’s economy.

As with labor income, some sectors benefit disproportionately with increased community college expenditures. Table 3 shows the top 10 sectors by increased economic output due to community college expenditures. Real estate owners, establishments and rental activity sees an increase of an estimated $614,150 and is the top beneficiary. The overall health care system also benefits with $564,400 in increased activity and retail establishments see about $463,600 in increased output throughout the region’s economy. A total of 188 sectors of the economy are estimated to see an increase of approximately $13.2 million in output due to institutional spending.

Just as the community college’s spending flows through the region’s economy to create jobs and economic activity, it also benefits from the spending

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private hospitals</td>
<td>$0</td>
<td>$0</td>
<td>$98,194</td>
<td>$98,194</td>
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<tr>
<td>Wholesale trade businesses</td>
<td>$20,585</td>
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<td>Offices of physicians, dentists, and other health practitioners</td>
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<td>$0</td>
<td>$81,790</td>
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<tr>
<td>Nursing and residential care facilities</td>
<td>$0</td>
<td>$0</td>
<td>$48,114</td>
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<tr>
<td>Food services and drinking places</td>
<td>$0</td>
<td>$747</td>
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<td>Monetary authorities and depository credit intermediation activities</td>
<td>$0</td>
<td>$1,657</td>
<td>$36,653</td>
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<tr>
<td>Retail Stores - Food and beverage</td>
<td>$199</td>
<td>$110</td>
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<td>$36,780</td>
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<tr>
<td>Retail Stores - Motor vehicle and parts</td>
<td>$277</td>
<td>$157</td>
<td>$31,608</td>
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<tr>
<td>Architectural, engineering, and related services</td>
<td>$22,944</td>
<td>$1,666</td>
<td>$2,484</td>
<td>$27,094</td>
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<tr>
<td>Retail Stores - Building material and garden supply</td>
<td>$117</td>
<td>$77</td>
<td>$23,006</td>
<td>$23,200</td>
</tr>
</tbody>
</table>

Table 3: Top 10 sectors by increased economic output due to community college expenditures.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imputed rental activity for owner-occupied dwellings</td>
<td>$0</td>
<td>$0</td>
<td>$567,640</td>
<td>$567,640</td>
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<tr>
<td>Private hospitals</td>
<td>$0</td>
<td>$1</td>
<td>$256,933</td>
<td>$256,934</td>
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<tr>
<td>Wholesale trade businesses</td>
<td>$52,569</td>
<td>$5,491</td>
<td>$163,676</td>
<td>$221,736</td>
</tr>
<tr>
<td>Food services and drinking places</td>
<td>$0</td>
<td>$3,012</td>
<td>$166,553</td>
<td>$169,565</td>
</tr>
<tr>
<td>Monetary authorities and depository credit intermediation activities</td>
<td>$0</td>
<td>$6,294</td>
<td>$146,808</td>
<td>$153,102</td>
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<tr>
<td>Offices of physicians, dentists, and other health practitioners</td>
<td>$0</td>
<td>$0</td>
<td>$152,867</td>
<td>$152,867</td>
</tr>
<tr>
<td>Other state and local government enterprises</td>
<td>$28,349</td>
<td>$2,461</td>
<td>$68,453</td>
<td>$99,263</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>$46,962</td>
<td>$5,418</td>
<td>$45,395</td>
<td>$97,775</td>
</tr>
<tr>
<td>Retail Stores - Food and beverage</td>
<td>$510</td>
<td>$281</td>
<td>$93,392</td>
<td>$94,183</td>
</tr>
<tr>
<td>Nursing and residential care facilities</td>
<td>$0</td>
<td>$0</td>
<td>$77,556</td>
<td>$77,556</td>
</tr>
</tbody>
</table>

Table 3: Top 10 sectors by increased economic output. The table shows the sectors, excluding education, that experience the highest increase in economic output attributable to community college expenditures.
by students of the institution. While tuition and fees are included in the revenue and expenditures estimates for the community college impact analysis, the additional spending by students for entertainment, room and board, food and clothing creates jobs and tax revenues throughout the region. Student spending for the nine-month academic year is estimated to create 138 jobs from direct and indirect effects. Most of these jobs (119; 86.2%) are a direct result of the students’ spending and accrue largely to real estate and retail establishments. An estimated 19 jobs, 13.8 percent of the total created, accrue as an indirect effect of the money spent to establishments like wholesalers and employment services.

The increase in labor income from student spending to the region’s economy is not as dramatic as the increase attributable to community college expenditures. The total estimate for labor income attributable to student spending is $2.8 million, a respectable amount but only about a third the $9.6 million injection seen from institutional expenditures. While only about 3.6 percent of the jobs created from the community colleges’ expenditures are in the retail sector, more than a quarter (26.6%) of those created from student expenditures are within the sector.

The public sector receives an estimated $963,400 of increased revenues from state and local tax collections attributed to student spending. The largest proportion of this increased tax revenue comes from the real estate ($389,000) and retail ($370,000) sectors.

Though the region’s economy benefits from student expenditures as a result of community college enrollment, it is interesting to note that the total benefit to the state’s economy is less than total spending by students. In analyzing community college expenditures, it was seen that a dollar spent by the institution resulted in $1.21 accruing to the economy. A dollar spent by students only translates to an increase of $0.78 throughout the region’s economy. This is largely due to the position within the spending cycle and the general destinations for expenditures. Whereas the community college spends its money on business-to-business services and materials, the students spend their money at end-user or final consumer establishments. This means that the money is likely to cycle through to other establishments fewer times than with the community college expenditures. Additionally, whereas much of the community college’s expenditures go to local service providers, a bulk of the students’ expenditures go to retail which must buy merchandise from non-local wholesalers. This means that money leaves the state economic system much more quickly than it does with institutional expenditures.

### Student Return on Investment

- Students completing their degree earn a 55 percent annualized return on their initial investment in time and expenses over the first 10 years of their career.
- Students completing a Northwest Iowa Community College program see their earnings grow faster and make, on average, 5.2 percent more per year than those not completing their degree program 10 years after degree completion.
- Students completing some college, but not their program, earned 14.0 percent more per year than those with only a high school degree. Those completing a community college program made 16.0 percent more per year than high school graduates.1
- A Northwest Iowa Community College degree is worth an average of $40,602 above and beyond the costs associated with tuition and fees over the first 10 years of a student’s career.

<table>
<thead>
<tr>
<th>Median Annual Wages</th>
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<tbody>
<tr>
<td>$40,000</td>
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<tr>
<td>$35,000</td>
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<tr>
<td>$30,000</td>
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<tr>
<td>$15,000</td>
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<tr>
<td>$10,000</td>
</tr>
<tr>
<td>$5,000</td>
</tr>
<tr>
<td>$0</td>
</tr>
</tbody>
</table>

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

Figure 1: The median inflation-adjusted annual gross wages for both the completers and leavers in the 2002 fiscal year cohort. Wages are aggregated by fiscal year, not calendar year. For reference, the pink lines represent the corresponding statewide median wages for completers and leavers.
One draw for prospective students of NCC is the return on investment to a degree. Students invest money through tuition, forgo higher wages while at NCC and defer full-time work until later in life. In return, a community college degree holds the potential for a student to earn higher wages and work in better jobs. The cost of education is recouped throughout the student’s lifetime through higher earnings as the benefits from education far exceed the costs. This section explores the student’s return on investment. Students were followed from the 2001-02 academic year for 10 years to measure their return on investment. The costs of education are compared to the benefits students receive through their wages.

In 2002, leavers were spending their first year in the workforce after leaving Northwest Iowa Community College, while completers were finishing the last year of their program. Figure 1, on the previous page, shows both groups’ median wages over time. Once completers finished their degree, the wages of leavers and completers were $26,336 and $27,189, respectively. Afterward, the wages for those with a degree from NCC outpaced those who left. From 2004 through 2011, median wages for completers were between one to seven-thousand dollars more than leavers. By 2011, the median wage for completers was $33,065 and $31,425 for leavers.

An estimate of the internal rate of return for degree completion was made by comparing the initial expenses incurred for degree completion against the additional wages received over the 10-year period. Degree completers, on average, paid an additional $6,619 in tuition and forgone wages over the year to be in school rather than in the workforce. Over the course of 10 years, degree completers earn additional wages beyond those without a degree. This series of cash outflows and inflows results in an annualized return of 55 percent to students completing their degree. This return represents the rate at which the benefits equal the costs at present value. A 55 percent internal rate of return is way beyond that of almost any other investment opportunity and speaks to the fact that students should think carefully before deciding to leave NCC before degree completion.

The net present value for completing a degree at NCC was $40,602 during the first ten years of the students’ careers. That is, students who obtained a degree in 2002 earned $40,602 beyond what leavers earned after accounting for the all the additional costs of study. As completers would almost certainly continue to earn higher wages than leavers for the remainder of their careers, this is an underestimate of the value of an NCC degree. The difference in wages earned between 10 years after degree completion and retirement, even when discounted back to present value, would boost the estimate even more.

Public Return on Investment

- State and local governments receive a 13.4 percent return on the funding invested in Northwest Iowa Community College over the first 10 years of a student’s career.
- Every $1 of state and local tax money invested in Northwest Iowa Community College returns $1.60 over the first 10 years of a student’s career.

In the 2010 fiscal year, the Northwest Iowa Community College unrestricted general fund received $4.2 million in state general aid and local support. Since 1,812 full-time equivalent (FTE) students attended NCC during that period, that means state and local government invested $2,297 per FTE student. Since the education that NCC completers receive increases their earning potential for their entire career, state and local governments earn revenue from the state income tax on those additional earnings. While completers generated less state income revenue while they were still in community college, they generated much more, on average, than high school or GED educated workers with similar experience levels after degree completion.

After accounting for the initial investment of state and local funding and the lower state income revenue during the year of degree completion, the internal rate of return for state and local government is still 13.4 percent over the 10-year study period. This is due to the additional state income revenue in years one through nine, which is $6,034 after accounting for completer out-migration. Including all benefits and costs, every $1 of state and local tax money invested in Northwest Iowa Community College returns $1.60 over the ten year period starting in the year of the completers’ graduation.
Primary Findings

Completer Wage and Employment Outcomes

- Students completing their Northwest Iowa Community College programs see significant increases in median wages the first two years after degree completion.
- The largest proportion of Northwest Iowa Community College graduates work in the health care and social assistance industry sector, the only sector in Iowa to consistently add jobs throughout the recession and recovery.
- During the second quarter of 2011, the in-state retention rate was 78.2 percent for the 2008-09 Northwest Iowa Community College graduating class.
- Between the third quarter of 2009 and the second quarter of 2011, 2008-09 Northwest Iowa Community College graduates were leaving the state at a rate of 7.7 percent annually, on average.

This section looks at two groups of graduating NCC students; one from the 2000-01 academic year and another from the 2008-09 academic year. The study tracks student outcomes through their work history to present. The median wages for the completers from the 2000-01 academic year (herein the FY2001 cohort) show a steadily increasing pattern up until the 2009 fiscal year, with the largest year-to-year increases coming in the first few years after degree completion. After 2009, the initial period of the recent recession, the median wage leveled off and then decreased slightly. The cohort’s 2011 median gross wage is $39,460, a decade after completion of their degree.

The median wages for the completers from the 2008-09 academic year (herein the FY2009 cohort) show a very similar pattern to that of the FY2001 cohort’s, with sharp increases in the median wage in the two years following degree completion. The FY2009 cohort has slightly lower median wages than the FY2001 cohort in the year of degree completion and the first year after, although its median wage is higher in the second full year after completion. NCC median wages are higher than the statewide median completer wages.

The health care and social assistance industry sector employs the largest proportion (14.7%) of the FY2001 cohort. This is a much smaller proportion than the state as a whole, which has 31.2 percent of total employment in this sector. The next two industry sectors with the most employment from the FY2001 cohort are utilities (14.1%) and manufacturing (11.9%).

An important trend to consider when it comes to education outcomes data is “brain drain,” or the rate at which students educated at NCC leave the state for employment. On average, FY2001 cohort members were leaving the state at a rate of 1.70 percent per quarter (6.81% annually) during the period of analysis, while FY2009 cohort members were leaving the state at a rate of 1.94 percent per quarter (7.75% annually), on average. The longer period of time, 10 years, since completion of degree for the FY2001 cohort explains why the in-state retention rate is much lower for the FY2001 cohort, at 68.7 percent in the second quarter of 2011 (2011Q2), while the retention rate is 78.2 percent for the FY2009 cohort during the same quarter. Compared to the statewide data, NCC has lower in-state retention rates, most likely due to its location on the northwest border of Iowa, where out-of-state employment is in much closer proximity than on the interior of the state.

The remainder of the report will detail the methodology used for the data analysis, as well as additional findings not discussed in this section.
Introduction to Methodology

This section relates to the estimated effect on the region’s economy attributable to expenditures by Northwest Iowa Community College and its students. Results of the estimation are included in the primary findings section. Additional detail and methodology on the estimation follow below.

Many economic impact studies attempt to measure the amount of economic well-being that would be lost if the subject activity were discontinued or dramatically cut. This would be unreasonable given the importance of community colleges in the general economy and their role in the community. Additionally, studies attempting to show the economic difference in a complete absence of the subject business are full of assumptions and biases. Certainly, a portion of the community college’s students and staff would leave the area if not for the opportunity provided by the community college, but additional surveys would be needed to attempt an estimation of the true effect.

On a statewide basis, it becomes more probable that students and employees would still remain within Iowa while seeking other opportunities for employment or education. Several factors contribute to this including mobility and familial connections. On the regional or county-level, the impact of student or employee migration becomes more evident.

This study, instead, will attempt to show the effect of student and community college spending on the community through the multiplier process, or a study of how much a dollar of spending by one party affects the economy as a whole and which sectors or businesses benefit the most.

Community College Revenues

Revenues to NCC are found in the Annual Condition of Iowa’s Community Colleges 2010. Total unrestricted general fund revenues increased $513,198 from the prior year. State general aid (SGA) decreased by 17.6 percent to $3.6 million while other income decreased by 14.2 percent and federal funding more than tripled due to the American Recovery and Reinvestment Act (ARRA).

On a statewide basis, tuition and fees accounted for 54 percent of total unrestricted general fund revenue. State general aid composed 29 percent with 7 percent from federal sources, 5 percent from local support, and the remaining 6 percent from other income.²

Community College Expenditures

Expenditures by NCC within the region are an important part of the analysis on their impact on the economy. Funds spent for staff, services and materials all flow through the system to create demand for products and services which creates demand for jobs and raw materials.

Spending by NCC is found in the Annual Condition of Iowa’s Community Colleges 2010 report, disseminated on a yearly basis by the Iowa Department of Education. Section 15 of the report details the financial condition of the community college including revenue and spending, each by sources and destinations.

Spending by NCC generally falls into one of four categories:

- **Salaries** – All salaries and wages paid by the community college to personnel, both teaching and services. These salaries include administrative, instructional, professional and service staff. The total outlay includes fringe benefits and workers’ compensation.
- **Services** – These are outlays paid for professional fees, memberships, publications, material rental and insurance paid to providers not on regular payrolls.
- **Materials, Supplies and Travel** – Expenses including materials and supplies, periodicals, vehicles and travel expenses.
- **Capital Outlay** – These are generally longer-lasting materials such as: furniture, machinery and equipment, buildings and other structures.

Total expenditures to each outlay during the 2010 fiscal year from the unrestricted general fund were: salaries $7.5 million (68.8%); services $1.1 million (10.4%); current expenses $1.5 million (14.0%); and materials, supplies, and travel $732,050 (6.7%). Total expenditures for the 2010 fiscal year were $10.9 million.²
Impact Analysis and the Multiplier Effect

The preceding expenditures are analyzed and entered into a computer model to estimate the effect of spending throughout the region’s economy. Spending within each area must be analyzed by specific destinations, how much of the spending is to local entities and how those entities spend their revenues in turn. The entire process is called an Impact Analysis because it shows how each dollar spent 'impacts' the local economy.

For example, when NCC pays Northwest Glass $1,250 for window replacement, the company must then pay its employees and suppliers. With larger areas, like statewide analyses, the impact for each dollar spent is larger because each level of spending has the potential to remain within the state’s economy. With smaller areas, for example analyses of individual site expenditures on the county’s economy, the effect may be smaller because suppliers and employees may live outside of the studied region. Though the community college pays only limited state and federal taxes, businesses and individuals performing services for the community college pay taxes on income and property. This circuit of money through the economy allows a dollar spent by the community college to become more than a dollar worth of activity in the region’s economy.

Five counties (Cherokee, Lyon, O’Brien, Osceola and Sioux) were used to represent the community college’s region and to model economic benefits attributable to the community college’s and students' spending.

IMPLAN

IMPLAN® is input-output software, a model-based system estimating the economic relationships between businesses and consumers. Estimates of regional data for institutional demand and transfers, value-added, industry output and employment for each state and county in the U.S. follow the accounting conventions used in the “Input-Output Study of the U.S. Economy” by the Bureau of Economic Analysis (BEA) conducted in 1980.° The Minnesota IMPLAN Group (MIG) updates and refines this data with user-supplied data through surveys at different stages of the model building process.

The IMPLAN model uses the spending totals by the community colleges or students to estimate total spending throughout the area. It does this by constructing a model of how a dollar flows through different industries.

To construct a regional economic model from the five separate county models, each county’s model is analyzed for cross border purchasing and sales. This new trade flows model determines the total economic impact of expenditures through an iterative system.

One way to think of this is that one business’ spending is another’s sales. To produce a product, a business must buy from multiple suppliers, generating revenues for those suppliers to buy from their suppliers. According to estimates, 0.02 percent of the total expenditures for the community college is spent within the data processing sector, or about $1,979 of the $10.9 million dollars spent by NCC. Through indirect purchases and the flow of money through the economy, this creates almost $10,900 of business within the sector. The total expenditures from NCC reach about 188 sectors to create an additional $2.3 million in economic output beyond the initial direct expenditures.

IMPLAN produces estimates for employment, economic output and tax revenues for three levels of each scenario: initial or direct, indirect and induced. Initial effects include the total expenditures by the community college for salaries, services and other expenses. This is the immediate and direct effect of the community college’s impact on the economy through increased employment, economic activity and tax revenues.

Indirect spending includes the spending by businesses and individuals that provide goods or services to the community college system.

Induced spending includes all subsequent rounds of spending within the area after the indirect level. This spending is an effect of the increased income from the direct sources.
Economic Impact Analysis

Assumptions

Assumptions used within the model for community college expenditures are largely based on those assumptions built into the IMPLAN input-output model. The total unrestricted general fund expenditures are input into the model as spending within sector 12002, “State and Local Government–Education.” The multipliers used within the model and the basic assumptions of how money flows through the economy are checked against basic expenditure data from the community college.

Figure 2 shows the model assumptions for community college expenditures on economic activity within the industry groups. The industry seeing the most economic activity attributable to community college expenditures is most obviously that of educational services with a 73.5 percent share of total activity. Increased activity in other industries is more widespread with: finance, insurance and real estate (6.8%); wholesale and retail (5.2%); health care and social services (4.3%); other services (1.7%); information services (1.3%); and accommodation and food services (1.3%). The remaining 10 industries all account for less than one percent of economic activity each and a combined share of 5.9 percent of the total activity attributable to community college spending.

Impact on Employment

As noted in the primary findings section, spending by NCC contributes to a significant increase in jobs and economic development. Increased employment from spending is estimated at 234 additional jobs with 36 (15.4%) of these through subsequent and indirect effects of the community college’s spending.

Impact on Labor Income

Beyond the total number of jobs created by expenditures, the increase in labor income is also important to better understand overall impact on an area’s economy. Spending by some industries may create a disproportionate number of jobs throughout the economy, but the overall impact may be subdued if these jobs pay a relatively low wage. The high number of jobs created in health care due to community college expenditures means that the overall effect on the economy is higher than expenditures by other business entities or institutions. The total effect of spending by the community college is estimated to inject $9.6 million of increased labor income into the economy.

Impact on State and Local Taxes

The public receives a portion of the community college’s expenditures in the form of increased state and local taxes. Increased tax revenues are estimated at $439,290 or about 4.0 percent of the total initial expenditure amount. Because the community college itself pays only a limited amount of taxes, most of this revenue comes from the payment of taxes by businesses and individuals that benefit from the flow of spending through the region’s economy. Real estate and rental activity contributes the majority of the increase with an estimated $96,000 in taxes. Retail establishments also contribute greatly to the overall increase with about $88,000 in increased taxes.
Economic Impact Analysis

Student Expenditures

Student expenditures are estimated through the use of the Iowa College Aid web site and other online resources. The college’s site was used to estimate total student expenditures while web sites like stateuniversity.com and collegesearch.com were used to estimate the destination for these expenditures. An estimate of $7,765 was used for total annual student expenditures, distributed between room & board and other personal expenditures. Estimates are based on the assumption of off-campus living costs. Within this estimate, total spending is divided into two general sectors for room and board and eight general sectors for all other personal spending. Proportional estimates of student spending within the eight general sectors are established through web sites listed at the end of this report. After room and board, transportation costs accounted for the largest percentage of student expenditures to any one item. While retail establishments, 58.5 percent of non-room and board spending, account for the largest portion of spending to any one sector. Real estate establishments and apartment rentals are used to represent the estimated housing expenses of $2,700 per academic year while retail stores – food and beverage is used to represent the estimated dining expenses of $2,196 per academic year.

This per student estimate is then multiplied by the number of full-time equivalent students attending NCC in 2010. The Annual Condition of Iowa’s Community Colleges 2010 reports that 1,812 full-time equivalent students were in attendance for the subject academic year. From this, a total of $11.0 million of economic output is created for the region.

Table 4 shows the top 10 sectors benefiting from increased employment as a result of student expenditures. Real estate establishments are the

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate establishments</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Retail Stores - Food and beverage</td>
<td>22</td>
<td>0</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Transit and ground passenger transportation</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Food services and drinking places</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Insurance agencies, brokerages, and related activities</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Retail Stores - Clothing and clothing accessories</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Retail Stores - Electronics and appliances</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Other amusement and recreation industries</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Retail Stores - Gasoline stations</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Retail Stores - General merchandise</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4: Top 10 sectors by increased employment (Full-time Equivalent Jobs). These sectors represent those with the highest increase in employment attributable to community college student expenditures.

Table 5: Top Ten Sectors by Increased Labor Income due to Student Expenditures

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate establishments</td>
<td>$795,618</td>
<td>$8,405</td>
<td>$2,063</td>
<td>$806,086</td>
</tr>
<tr>
<td>Retail Stores - Food and beverage</td>
<td>$456,847</td>
<td>$2,069</td>
<td>$11,365</td>
<td>$470,281</td>
</tr>
<tr>
<td>Insurance agencies, brokerages, and related activities</td>
<td>$230,972</td>
<td>$51,410</td>
<td>$2,072</td>
<td>$284,454</td>
</tr>
<tr>
<td>Transit and ground passenger transportation</td>
<td>$194,554</td>
<td>$140</td>
<td>$83</td>
<td>$194,777</td>
</tr>
<tr>
<td>Food services and drinking places</td>
<td>$157,375</td>
<td>$6,678</td>
<td>$12,604</td>
<td>$176,657</td>
</tr>
<tr>
<td>Retail Stores - Electronics and appliances</td>
<td>$106,494</td>
<td>$362</td>
<td>$2,013</td>
<td>$108,869</td>
</tr>
<tr>
<td>Retail Stores - Clothing and clothing accessories</td>
<td>$96,760</td>
<td>$185</td>
<td>$1,646</td>
<td>$98,991</td>
</tr>
<tr>
<td>Retail Stores - Gasoline stations</td>
<td>$64,682</td>
<td>$551</td>
<td>$4,149</td>
<td>$69,382</td>
</tr>
<tr>
<td>Other amusement and recreation industries</td>
<td>$42,170</td>
<td>$109</td>
<td>$612</td>
<td>$42,891</td>
</tr>
<tr>
<td>Retail Stores - General merchandise</td>
<td>$35,703</td>
<td>$382</td>
<td>$5,711</td>
<td>$41,796</td>
</tr>
</tbody>
</table>

Table 5: Top 10 sectors by increased labor income due to community college student expenditures. While some sectors, i.e. food services and drinking establishments, see larger increases in employment, the increase in total labor income is largest in sectors with higher wages.
Economic Impact Analysis

Table 6: Top Ten Sectors by Increased Economic Output due to Student Expenditures

<table>
<thead>
<tr>
<th>Sector</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate establishments</td>
<td>$ 4,892,400</td>
<td>$ 51,683</td>
<td>$ 12,689</td>
<td>$ 4,956,772</td>
</tr>
<tr>
<td>Retail Stores - Food and beverage</td>
<td>$ 1,169,871</td>
<td>$ 5,297</td>
<td>$ 29,103</td>
<td>$ 1,204,271</td>
</tr>
<tr>
<td>Food services and drinking places</td>
<td>$ 634,834</td>
<td>$ 26,937</td>
<td>$ 50,841</td>
<td>$ 712,612</td>
</tr>
<tr>
<td>Insurance agencies, brokerages, and related activities</td>
<td>$ 570,780</td>
<td>$ 127,045</td>
<td>$ 5,119</td>
<td>$ 702,944</td>
</tr>
<tr>
<td>Transit and ground passenger transportation</td>
<td>$ 634,834</td>
<td>$ 456</td>
<td>$ 270</td>
<td>$ 635,560</td>
</tr>
<tr>
<td>Other amusement and recreation industries</td>
<td>$ 313,929</td>
<td>$ 809</td>
<td>$ 4,553</td>
<td>$ 319,291</td>
</tr>
<tr>
<td>Retail Stores - Clothing and clothing accessories</td>
<td>$ 304,086</td>
<td>$ 581</td>
<td>$ 5,173</td>
<td>$ 309,840</td>
</tr>
<tr>
<td>Retail Stores - Gasoline stations</td>
<td>$ 218,731</td>
<td>$ 1,864</td>
<td>$ 14,030</td>
<td>$ 234,625</td>
</tr>
<tr>
<td>Retail Stores - Electronics and appliances</td>
<td>$ 201,508</td>
<td>$ 665</td>
<td>$ 3,808</td>
<td>$ 206,001</td>
</tr>
<tr>
<td>Imputed rental activity for owner-occupied dwellings</td>
<td>$ 0</td>
<td>$ 0</td>
<td>$ 178,051</td>
<td>$ 178,051</td>
</tr>
</tbody>
</table>

Table 6: Top 10 sectors by increased economic output. The table shows the sectors that experienced the highest increase in economic output attributable to community college student expenditures.

The greatest beneficiaries, in terms of employment, are real estate establishments (46 jobs), food and beverage retail (24 jobs), food service and drinking establishments (19 jobs) and transit and ground passenger transportation (18 jobs).

Data Limitations

Local vs. Leakage

As businesses and consumers spend funds, some of this money leaves the local system through purchases of goods and materials coming from other counties or states. Though the IMPLAN model for the region is used to estimate economic effects and is believed to be an accurate representation, it is difficult to estimate the exact amount of money that ‘leaks’ out of the system at different parts of the process. Some regions may see that money flows out of the system much more quickly than others. Those regions without strong retail and business opportunities may see more leakage as consumers look for more options. This information, beyond the data provided by an economic benefit analysis, can be used to target sectors or industries not being met by the local economy.

Student Spending Surveys

Though differences between student bodies average out across the state with large numbers, surveys would be helpful to study the effects of student spending in smaller regions. Data is not available for student spending down to the more minute levels and spending in many areas is aggregated to the most generalized level. A survey
would not only help fine-tune the estimation process but would also provide each region’s businesses with valuable data on consumer spending patterns.

**Visitor Spending**

Estimates for the economic effects of spending by those visiting the community college or students are not incorporated into the analysis. Though these effects would certainly be much smaller than those from the community college or students, they would not be insignificant.

The fact that visitor spending is not included within the study means that economic impact of the community college is probably underestimated, especially for three specific sectors where visitors spend a disproportionate amount of their total expenditures: arts, entertainment and recreation; accommodation and food service; and retail trade.

**Counter-factual Estimates**

The greatest limitation of input-output models, like IMPLAN, is the estimation of the spending that would still occur if the subject studied were not present. Certainly some of the spending by students would still remain in the region if it were not spent through the community college system, just as some of the professors and employees would still work within the region if it were not for the community college.

The goal of this study has been to show the economic benefits for the community and those returns to students from participation in the community college system in the region. While many other studies attempt to measure the level of economic activity in the absence of the community college system, the myriad of assumptions and estimates involved make any end result little more than an educated guess. By only looking at known variables and information, the report can show the impact and returns attributable to the community college with a much higher degree of confidence.

**Accounting vs. Economic Impact**

One important distinction that must be made is the difference between accounting impact versus economic impact. Accounting impact is the benefits received that can be quantified and measured within an economy. Economic impact is the accounting impact plus those benefits that cannot easily be quantified or measured like improved chances of being hired, increased community productivity, reduced crime or quality of life.

This impact analysis has focused exclusively on the accounting impact of community college and student spending. This is not to say that the social benefits received from the presence of the community college system are not equally important to the region as those presented, but that accounting impacts are studied to set a minimum boundary on the effect of NCC on the region’s economy.

For example, studies have shown that levels of incarceration drop as the level of education increases. This means not only less public funds spent on police, rehabilitation programs and prisons but also higher quality of life for the entire public. While it is possible to estimate the number of fewer inmates within the correctional system due to higher education and the savings from this drop, it would be impossible to put a dollar figure on the improved quality of life felt by all. Additionally, as with many of the other social benefits, it is difficult to say that the level of education one receives is the reason for lower levels of incarceration or that those typically seeking higher education are less likely to commit crimes.

Health benefits accruing from higher education have been studied but face the same pitfalls as other social benefits. Generally, statistics support a link between level of education and better health habits which lead to fewer health-related expenditures for individuals and the state. Additionally, those with better health suffer less absenteeism and are more productive at work. While some of this benefit might be attributable to the level of education itself, it would not be appropriate to say that the education caused the health benefits or to put a dollar amount on the savings. It is not known if higher levels of education promote healthy habits or if those seeking higher levels of education are coincidentally more likely to have healthier habits.

Benefits also accrue to the region from lower incidences of unemployment and welfare correlated with higher levels of education. For example, a study of the impact of higher education in Virginia found that total lifetime savings on public assistance, Medicaid, unemployment insurance compensation, workers’ compensation and corrections costs amounted to $16,027 for an associate degree and $22,548 for a bachelor’s degree in present value terms.11
Regional effects of spending by NCC were slightly smaller than those seen in statewide analysis across all Iowa community colleges.

Much of the difference is due to the relative size of cities within the region and the amount of economic leakage to neighboring areas. The lack of a large and centralized metro means that some economic benefit is lost to cities like Spencer, Sioux Falls and Sioux City as the population purchases from outside the region. This is not a function of the economics of the community college itself but from the trade flows of the larger economic region.

The community college saw a statistically smaller impact on its expenditures at 1.21 times each dollar spent as was seen in the statewide analysis (1.47). The impact from student expenditures was lower at only 0.78 times each dollar spent versus 0.91 times in the statewide analysis. This is most likely due to a greater amount of imported products into the region for student demand than seen at the statewide level.
One draw for prospective students of Northwest Iowa Community College is the return on investment of a degree. Students invest money through tuition, forgo higher wages while at NCC and defer full-time work until later in life. In return, a Northwest Iowa Community College degree holds the potential for a student to earn higher wages and work in better jobs. In this section, students from the 2001-02 academic year are followed for 10 years to measure their return on investment.

Student Economic Benefit

As discussed in the primary findings section, and shown in Figure 1 on page 9, completers from the 2001-02 academic year had a higher median wage than leavers in every year after the initial year when completers were still in school. By 2011, the median annual wages for completers and leavers, respectively, were $33,065 and $31,425.

The wages earned in the past decade vary by the student’s major, as evidenced by Figure 3 on the next page. Architecture and construction majors are tremendously popular at NCC. Later analysis in this report shows many architecture and construction majors work in the utilities industry sector. It is also a valuable community college degree. By 2011, completers earned $57,273 compared to $25,120 for those who majored in architecture and construction, but left before completing a degree. The median wage for NCC architecture and construction completers in 2011 was $16,873 (41.8%) higher than the statewide median wage for architecture and construction completers in 2011.

Manufacturing is a very important sector in Iowa’s economy. Half of NCC manufacturing graduates earned over $35,787 in 2011, which is above the median earnings for all graduates. Manufacturing is one of the largest majors at NCC.

It is apparent that completers earn more money than those that left Northwest Iowa Community College without a degree, but the costs of the degree must also be accounted for. Completers invest additional time and money in three ways: students pay tuition to attend classes; forgo wages by attending classes instead of working; and students must wait for higher earnings until later in life. Even when accounting for these costs, though, the net present value for completing a NCC degree was $40,602 during the 10-year period of analysis. This is the worth when discounting the costs and increased wages to present value.

Thus, students who are choosing between completing a degree and leaving early into the workforce should value the degree at no less than $40,602. Even though students may think it wise to enter the workforce early, skipping the last year of college is not economically worthwhile.

The data allows for an estimate of internal rate of return to degree completers as well. The annualized return to degree completion is calculated using the additional tuition and fees paid to attend another year of NCC, the forgone wages from the year of graduation and the increase in wages versus those leaving before degree completion over the study period. Students, on average, pay or forgo an additional $6,619 to complete their degree. For this investment, they earn additional wages over the next 10 years beyond the wages earned by leavers, as measured by median annual wages. This schedule of cash flows amounts to a 55 percent annualized return on investment for staying at NCC just one more year, way beyond almost any other investment opportunity.

Methodology

This section of the report tracks completers and leavers from the 2001-02 academic year. Completers are students who graduated from NCC with an Associate’s degree, certificate or diploma. Leavers are students who left NCC before completing a degree.

The wages are obtained from the Training and Employment Outcomes System (TEOS), a shared education and workforce dataset created by the Iowa Department of Education and Iowa Workforce Development. Wages for this analysis are only those earned in Iowa.

The Iowa Department of Education ensures these students have not entered in postsecondary education elsewhere. Students are retained for analysis if they worked at least one quarter in Iowa for each fiscal year between 2002 and 2011. The final data set contains 177 former students.

Wages are inflation-adjusted to 2011 levels. Tuition and fees are based upon a 15 credit hour per term course-load. These estimates of tuition per student are also inflation adjusted to 2011 levels.
Figure 3: The median inflation-adjusted annual wages for both the NCC leavers (grey) and completers (dark red), by career cluster. For reference, the statewide median annual wages for leavers (light pink) and completers (dark pink) are included, as well. Wages are aggregated by fiscal year, not calendar year. The clusters without dark red and/or grey lines indicate that there were less than three completers that met the criterion in that cluster.
Public Return on Investment

Another perspective to consider when measuring return on investment to Northwest Iowa Community College education is that of state and local government funding. Every year, both state and local government in Iowa contribute to the community college system through state general aid and local support. This section estimates the public return on investment in NCC through increased state revenues.

Public Economic Benefit

In the 2010 fiscal year, the NCC unrestricted general fund received $3.6 million in state general aid. Beyond the state government support, the unrestricted general fund also received $0.6 million in local support. All together, state and local government invested $4.2 million in the NCC unrestricted general fund in the 2010 fiscal year. Since 1,812 full-time equivalent (FTE) students attended NCC during that period, that means state and local government invested $2,297 per FTE student.2

Since the education that NCC completers receive increases their earning potential for their entire career, state and local governments earn revenue from the state income tax on those additional earnings. Figure 4 shows the median state income tax owed by NCC completers and high school or GED educated workers at a similar point in their career over the ten year period starting with the year of the completers’ graduation.

One factor that needs to be considered is the rate of completer migration out of the state. Completers that work outside Iowa do not generate revenue for the state. In-state retention rates in line with the student migration section on page 26 of this report are built into the model to account for this leakage. It should be noted that retention rates are lower for NCC than Iowa as a whole, so less revenue is kept within the state.

After accounting for the initial investment of state and local funding and the lower state income revenue during the year of degree completion, the internal rate of return (IRR) for state and local government is still 13.4 percent over the study period. This is due to the additional state income revenue in years one through nine, which is $6,034 after accounting for completer out-migration. Including all benefits and costs, every $1 of state and local tax money invested in NCC returns $1.60 over the ten year period starting in the year of the completers’ graduation.

Methodology

To estimate the additional state income revenue generated by NCC completers, wages of FY2002 NCC completers are compared to the wages of high school or GED-level educated workers at a similar point in their career. Wage data for the latter group is collected from the Iowa Laborshed Study.1 The state income tax owed on each year of wages is calculated using the rates found in the 2011 Iowa Income Tax Information long-form booklet.12 Depending on income levels, the state income tax rate ranged from 3.43 percent to 5.23 percent.

The total state and local government funding per completer is found by multiplying the funding per FTE student ($2,297) times the number of years to degree completion, weighted by the distribution of award types issued by NCC. The total funding per completer is $2,999. This initial cost is combined with the state income revenue cash flows to arrive at the IRR estimate. The in-state retention rates used in the model are 91 percent retention in the first year after graduation and 75 percent in the ninth year, with equal decreases in between.
Short and Long-term Completer Analysis

In this section of the report, wage and employment outcomes are used to measure how Northwest Iowa Community College graduates are integrated in the state's economy. This is useful in analyzing the effectiveness of the educational institution. Short and long-term completers of NCC are analyzed to find differences in demographics, wage trends and migration patterns. Completers are students who graduated from NCC with an Associate's degree, certificate or diploma.

To get an accurate portrait of the students that have recently received some type of postsecondary degree from NCC, completers from the 2008-09 academic year (herein the FY2009 cohort) are analyzed in the following sections. This cohort of students is an interesting case study, as they were completing their educations during the heart of the recent recession.

It is also important to analyze students who went through NCC years earlier, to get a better picture of how completers fare once they settle into their careers. For this long-term analysis, completers from the 2000-01 academic year (herein the FY2001 cohort) are also examined. Studying the wages after degree completion, demographic profile and migration patterns for these two groups of former students can shed light on the workforce outcomes of NCC graduates.

Completer Wage and Employment Analysis

Perhaps the most enticing reward for obtaining a post-secondary education is the opportunity it provides completers to earn higher wages throughout their career. This section will compare and contrast wage trends between the FY2001 and FY2009 cohorts, as well as analyze the industry sectors into which the students entered into employment upon completion of their degrees. Comparisons and contrasts are also made with the statewide wage and employment data, in order to explore how NCC graduates fare in relation to the rest of the state's institutions' graduates.

In order to compare annual wages on the same scale, all wages are inflation-adjusted to August 2011 dollars, using the Consumer Price Index from the U.S. Department of Labor. Wages reported in this section are only those earned in Iowa.

The median annual gross wages for both the FY2001 and FY2009 cohorts over time are shown in Figure 5. The first year shown for both cohorts is the year in which the students completed their degrees, so it should be expected that wages would be lower that year, since members of the cohort were still in school for at least a portion of that time.

The FY2009 cohort's median wages show a very similar pattern to that of the FY2001 cohort's, with sharp increases in the median wage in the two years following degree completion. The FY2009 cohort has slightly lower median wages than the FY2001 cohort in the year of degree completion and the first year after, although its median wage is higher in the second full year after completion (Table 7). NCC median wages are higher than the statewide median completer wages.

Besides wages, another interesting characteristic to track for the two cohorts is the number of completers that are primarily employed in each industry sector. The primary industry sector is determined by using their highest wage quarter, between 2009Q3 and 2011Q2. This short period of analysis allows the use of both wages earned in

<table>
<thead>
<tr>
<th>Year</th>
<th>Cohort</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>FY2001</td>
<td>$9,173</td>
<td>$23,637</td>
<td>$27,951</td>
</tr>
<tr>
<td>2009</td>
<td>FY2009</td>
<td>$7,084</td>
<td>$21,772</td>
<td>$30,100</td>
</tr>
<tr>
<td>Diff.</td>
<td>$2,089</td>
<td>$1,865</td>
<td>$-2,149</td>
<td></td>
</tr>
</tbody>
</table>

Table 7: The median inflation-adjusted annual gross wages for both the FY2001 and FY2009 NCC cohorts. Wages are aggregated by fiscal year, not calendar year. The pink lines are the respective statewide median wages.
Figures 6 (top) and 7 (bottom): The number of NCC completers from the FY2001 and FY2009 cohorts, respectively, primarily employed in each industry sector. Primary industry sector is determined using their highest wage quarter, between 2009Q3 and 2011Q2.
Iowa and other states, using data from the Wage Record Interchange System. **Figure 6** on the previous page shows the number of completers from the FY2001 cohort primarily employed in each industry sector.

The members of the FY2009 cohort are generally at a different stage in their lives and careers, as they are only two years removed from completing their degrees. For instance, there is a much higher likelihood that members of the FY2009 cohort were continuing their educations at a four-year college during the period of analysis than FY2001 cohort members. For NCC graduates, though, the industry sector distribution for FY2009 cohort members is similar to the FY2001 cohort (Figure 7 on the previous page). Typically, recent graduates are more likely to be primarily employed in industry sectors with a higher proportion of part-time employees. For instance, 21.6 percent of statewide FY2009 cohort members are primarily employed in either the retail trade or accommodations and food services industry sectors. Only 7.1 percent of NCC FY2009 cohort members are primarily employed in one of those two industry sectors. One explanation for this is that a much higher proportion of NCC completers earn technical degrees rather than 4-year track degrees.

Another way to compare and contrast the FY2001 and FY2009 cohorts is to analyze the difference in wages by degree type. **Figure 8** illustrates the median gross inflation-adjusted annual wage from the second complete year after degree completion for both the FY2001 (2003 fiscal year wages) and FY2009 (2011 fiscal year wages) cohorts, by degree type. Median gross wages are higher in the FY2001 cohort for the AA, AS and AAS degree types. In both cohorts, though, completers that received an Associate in Applied Sciences have the highest median gross wage, with $37,094 for the FY2001 cohort and $33,825 for the FY2009 cohort.

Wages can also vary greatly by industry sector. **Figure 9** on the next page breaks down median wages over time by industry sector, for both the FY2001 and FY2009 cohorts. The scale on all of the graphs is the same for easy comparison between industry sectors. During any year in which there were less than three completers employed in a given sector, the data is suppressed for non-identifiability purposes. This is the case for many of the industry sectors, and many of the sectors that do have reported median wages also have low sample sizes which leads to year-to-year volatility.

Comparing the two cohorts, it can be seen that they show similar wage patterns during the year of completion and two years following in many of the industry sectors that have a large enough sample size. In the health care sector, the FY2009 cohort members have a higher median wage during that period. This could be an indication that entry-level wages in that sector grew faster than the rate of inflation from 2001 to 2009.

In addition to comparing wages between cohorts, **Figure 9** also lends itself to comparing wages that NCC completers are receiving to the statewide median wage. There are several industry sectors where NCC completers are earning higher wages than the statewide median, such as utilities and construction. In the 2011 fiscal year, the median wage for FY2001 NCC completers in the utilities industry was $70,522, while the statewide median was $60,633. Similarly, FY2001 NCC completers in the construction industry sector had a 2011 median wage of $43,591, while the statewide median was $36,117.

**Figure 8**: The median gross inflation-adjusted annual wage from the second complete year after degree completion for both the FY2001 and FY2009 NCC cohorts, by degree type. Wages are aggregated by fiscal year, not calendar year.

**Figure 9** (on p. 25): The median inflation-adjusted annual wage for both the FY2001 and FY2009 NCC cohorts, by industry sector. Wages are aggregated by fiscal year, not calendar year. Data points with low sample sizes (less than 3) are suppressed for non-identifiability purposes. The pink lines are the corresponding statewide median wages in each industry sector.
Median Wages by Industry Sector

Accommodation & Food Services
Administrative & Support Services
Agriculture, Forestry, Fishing & Hunting
Arts, Entertainment & Recreation
Agriculture, Forestry, Fishing & Hunting
Finance & Insurance
Health Care & Social Assistance
Construction
Educational Services
Manufacturing
Mining
Information
Management of Companies & Enterprises
Public Administration
Real Estate, Rental & Leasing
Other Services
Professional, Scientific & Technical Services
Retail Trade
Transportation & Warehousing
Utilities
Wholesale Trade
Short and Long-term Completer Analysis

Another trend to consider when it comes to educational outcomes data is “brain drain,” or the rate at which students educated in Iowa leave the state for employment. To do this, the primary place of employment is identified — the job that paid the highest wages — for each member of the FY2001 and FY2009 cohorts for the eight quarters between 2009Q3 and 2011Q2. Through this methodology, the state in which each cohort member was primarily employed during each quarter is obtained.

Figure 10 shows the in-state retention rate, defined as the percentage of employed completers whose primary employment is in Iowa, by quarter for both cohorts. The two cohorts show a similar decreasing trend, losing NCC-educated completers to out-of-state employment at a similar per-quarter rate. On average, FY2001 cohort members were leaving the state at a rate of 1.70 percent per quarter (6.81% annually) during the period of analysis, while FY2009 cohort members were leaving the state at a rate of 1.94 percent per quarter (7.75% annually), on average. NCC completers tend to stay in the state at a lower rate than Iowa community college completers as a whole. This is likely due to the institution’s location on the northwest border of the state, where out-of-state employment is in much closer proximity than on the interior of the state.

Taking a closer look at where the completers that are leaving the state are going, Figure 11 on the next page breaks down the percentage of employed completers not in Iowa by state for all industries. These numbers are compiled using the entire 2011 fiscal year, so seasonality does not play a factor. South Dakota is the largest importer of NCC educated students, with 7.7 percent for the FY2001 cohort. Following South Dakota, in order, is Minnesota, Missouri, Illinois and Nebraska. One obvious characteristic that these four states share in common is that they are all contiguous with Iowa. The FY2009 cohort shows similar trends to the FY2001 cohort, although there is a lower proportion of the cohort employed in Minnesota and Missouri.

Figures 12-14 on the next page illustrate the states to which Iowa is losing NCC completers for the top three industry sectors by employment for the FY2001 cohort, health care and social assistance, utilities and manufacturing, respectively. For the biggest industry sector, health care and social assistance, South Dakota is by far the biggest employment importer, with 15.9 percent of employed FY2001 cohort members and 16.4 percent of employed FY2009 cohort members. Overall, NCC’s in-state retention rate for the health care and social assistance industry sector was 77.6 percent for the FY2001 cohort and 76.3 percent for the FY2009 cohort during the 2011 fiscal year, better than the FY2001 aggregate rate and slightly worse than the FY2009 aggregate rate.
Figures 11 (top left), 12 (top right), 13 (bottom left) and 14 (bottom right): The proportion of employed FY2001 and FY2009 NCC cohort members whose primary employment was not in Iowa, by state, for the 2011 fiscal year. Figure 11 shows the breakdown by state for all industries combined, while Figures 12-14 show the breakdown by state for the top three employment industries for the FY2001 cohort: health care and social assistance, utilities and manufacturing, respectively.
This section analyzes the demographic characteristics of the 206 NCC completers in the FY2001 cohort. While some students earned multiple awards during this period, only the primary award is considered for the purposes of analysis.

The FY2001 cohort has a larger number of males than females, as seven out of every ten (71.2%) cohort members are male. A major contributor to the high male-to-female ratio is the large gender disparity in the two largest career clusters, architecture and construction and transportation. Just under 99 percent of completers in these two clusters, which account for 40 percent of all FY2001 completers, are male.

Illustrated in Figure 15 is the age profile of the cohort. The majority of completers, 77.0 percent, are below the age of 25. On the other side of the spectrum, 2.9 percent of completers are 45 and older. Since age is a relative statistic, the age of the cohort members is as measured on June 30, 2001 — the end of the 2001 fiscal year.

Each of the different degrees offered by NCC has a different intent for the student. Figure 16 shows the distribution of awards received by the FY2001 cohort members. The two most common awards held by completers are the Diploma (69.4%) and Associate in Applied Sciences (21.4%). Another type of degree that NCC offers, the Associate of Arts, is designed for students that plan on transferring to a four-year college, while the AAS is more often designed to transition students directly into the workforce. They both typically require two years of education, along with the rest of the Associate’s degrees. Proportionally, NCC issues a high number of diplomas; statewide, diplomas only accounted for 21.0 percent of awards in the FY2001 cohort.

Every program at NCC is classified into a career cluster, dependent on its intended career focus. By the state of Iowa’s classification during the 2001 fiscal year, there were 16 career clusters, as well as
the college parallel cluster. College parallel encapsulates students that take a liberal studies curriculum focused on preparation for transfer to a four-year college. **Figure 17** shows the distribution of awards given to the FY2001 cohort by career cluster. The largest career cluster is architecture and construction (21.5%), followed by transportation, distribution and logistics (18.5%). A relatively small percentage of completers (7.5%) were in the college parallel cluster compared to the state as a whole (35.0%).

**FY2009 Completers: Demographics**

As a contrast to the FY2001 cohort, the FY2009 cohort offers a snapshot of students that completed their degrees much more recently. It is larger than the 2001 fiscal year cohort, as it has a membership of 280 completers. To compare the demographic characteristics of these two groups of students is to analyze how the profile of the collective NCC student body has shifted over the span of eight years.

The ratio of males to females among completers of NCC became more balanced from 2001 to 2009, as 65.8 percent of FY2009 cohort members are male, down from 71.2 percent. The age profile of completers, shown in **Figure 18**, became slightly younger, as the average completer age shrank from 23.7 years of age in FY2001 to 23.0 years in FY2009 (median 21 in FY2001, 21 in FY2009). The percentage of completers in the FY2009 cohort less than 25 years of age is 79.4 percent, while 2.2 percent are 45 and older. The age of FY2009 completers was measured on the last day of the fiscal year, June 30, 2009.

Between 2001 and 2009, the government and public administration cluster was removed and all programs that were classified in this cluster were reclassified as human services. This was not a very significant change, though, as very few students completed programs in this cluster. **Figure 19**

![FY2009 Completers by Age](image)

**Figure 17**: The number of awards in the FY2001 NCC cohort by each respective career cluster. The majority of graduates were in the architecture and construction (21.5%) and transportation, distribution and logistics (18.5%) clusters.
Short and Long-term Completer Analysis

shows the distribution of awards given out for the FY2009 cohort by career cluster. In the FY2009 cohort, 35.7 percent of degrees are under the architecture and construction cluster, a higher proportion than the FY2001 cohort. The health science career cluster was relatively larger in the 2009 fiscal year than it was in 2001, accounting for 27.1 percent of degrees completed (up from 12.0%). An important thing to consider when comparing distribution of awards by career cluster between cohorts is that the definition of clusters shifted between 2001 and 2009, making direct comparisons somewhat difficult.

Figure 20 shows the distribution of awards received by the FY2009 cohort members. The two most common awards held by completers are the Associate in Applied Sciences (45.7%) and Diploma (44.6%). The former shows a 24.3 percent relative increase from FY2001.

Figure 19: The number of awards in the FY2009 NCC cohort in each respective career cluster. The majority of graduates were in the architecture and construction (35.7%) and health science (27.1%) clusters.

Figure 20: The number of each degree awarded for completers in the FY2009 community college cohort. The two most abundant award types are the Associate in Applied Sciences (45.7%) and Diploma (44.6%).

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Transition into Workforce

In the previous sections, academic career cluster and primary industry sector of employment were analyzed independently. A major point of interest is the cross-tabulation of these two variables, looking at which industry sectors completers are going into from each career cluster. Figure 21 on the next page plots these two variables against each other for the FY2009 cohort, utilizing Circos, which is software that uses polar coordinate mapping to visualize a table of data.13

To put it simply, each member of the cohort has a strand that starts in their academic career cluster on the left side of the graph and extends to their primary industry sector of employment on the right side. So, the bigger the wedge a career cluster or industry sector has, the more cohort members are associated with it. For instance, the health science career cluster takes up a large portion of the left side of the circle, which makes sense since Figure 19 identifies it as the second largest cluster for the FY2009 cohort.

While Figure 21 shows the overall picture, Figure 22 on page 33 shows the transition to workforce for each individual academic career cluster. These graphs show, along with many other things, that the large majority of employed health science completers (89.5%) are primarily employed in the health care and social assistance industry sector. This makes sense, as the completers of health science programs are specifically trained for the majority of the jobs that populate the health care and social assistance industry sector.

While the health science cluster sends the largest portion of its completers into one sector among career clusters, there are other clusters that send large portions into one sector as well. Of the employed FY2009 college parallel cluster completers, 41.2 percent are primarily employed in the health care and social assistance industry sector. Also, 35.0 percent of employed manufacturing cluster completers are primarily employed in the manufacturing industry sector.

On the other hand, there are clusters, such as business management and administration, whose completers become employed in a wide variety of industry sectors. There are NCC completers from this cluster primarily employed in nine different industry sectors. The largest proportion going to any one sector is the 25.0 percent that are primarily employed in wholesale trade.

An important thing to keep in mind is that this data is showing the industry sector in which completers are primarily employed, not their occupations. For instance, a person that received their degree in health science could be a Pharmaceutical Technician working in the pharmacy of a large retail store. While they are doing work related to the health care field, they are technically employed in the retail trade sector. The distinction between occupation and industry sector is important to consider when interpreting the trends seen in Figures 21 and 22.

Methodology

To analyze short and long term employment and wage trends, completers from the 2000-01 and 2008-09 academic years are followed.

Wages are obtained from TEOS, a shared education and workforce dataset created by the Iowa Department of Education and Iowa Workforce Development. TEOS is created through several steps. First, the Iowa Department of Education uses the Community College Management Information System (MIS) to select the cohort of graduates from the appropriate year.

The student information is then sent to Iowa Workforce Development to be matched with Unemployment Insurance (UI) records for Iowa as well as other states, through the Wage Record Interchange System (WRIS). Quarterly earnings are then aggregated for each year July 1st through June 30th to align with the state of Iowa fiscal year. The final dataset, TEOS, is then shared between both departments to conduct research.

Career Cluster

Industrial Sector
Figure 21: The FY2009 Northwest Iowa Community College cohort’s transition from career cluster into the workforce, as illustrated using the Circos data visualization software. Each individual strand corresponds to one completer, starting from their career cluster on the left side of the graph, extending to their primary industry sector of employment on the right side.
Figure 22: The FY2009 Northwest Iowa Community College cohort's transition from career cluster into the workforce, with an individual graph for each career cluster.
Regional Employment Profile

The majority of Northwest Iowa Community College’s service area is within Cherokee, Lyon, O’Brien, Osceola and Sioux counties. The following section illustrates the region’s employment profile by industry sector and occupation, as well as the labor needs of local employers. Information is pulled from various sources, including the regional Laborshed Study and Workforce Needs Assessment. For a more detailed analysis of the local job market, refer to the aforementioned regional reports.

Supply of Labor

One way to analyze the regional labor market is to consider the supply of labor to the local employers. NCC is a major source for trained labor within the region. This section illustrates the occupational make-up of the workers in the region, as well as the industry demand.

A worker’s occupation is defined by the actual tasks that they carry out on a day-to-day basis. There are often people with a wide variety of occupations within a given industry sector, or even a particular work site. Figure 24 shows the percent of employment by occupational category in 2009 for the Northwest Iowa region (Cherokee, Lyon, O’Brien, Osceola, Plymouth and Sioux counties), as well as for the state as a whole.14

In the region, the highest occupational category of employment is management with 16.7 percent of total employment, compared to 13.1 percent of total employment statewide. The largest difference between the region and the state in the distribution of occupations after management is office and administrative support (15.7% in the region compared to 14.3% in the state). Otherwise, the regional occupational profile is very similar to the state as a whole.

Figure 24: Employment by occupational category for the Northwest Iowa region (Cherokee, Lyon, O’Brien, Osceola, Plymouth and Sioux counties) and state of Iowa in 2009. The top three occupations in the area are management, office and administrative support and production.
The industry sector associated with a worker is determined by the type of business in which their employer is engaged. Therefore, consider a person working as a Pharmaceutical Technician in a large retail store. While they are doing work related to the health care field, they are technically employed in the retail trade sector. Figure 25 shows the employment by industry sector in 2010 for the region (Cherokee, Lyon, O’Brien, Osceola, Plymouth and Sioux counties). The manufacturing industry sector employed the most people in the region with 21.3 percent of total employment.

The top three industry sectors by employment in the region are manufacturing (21.3%), health services (13.9%) and retail trade (9.8%). The region has much higher employment in manufacturing than the state as a whole (14.0% of total employment in manufacturing). Conversely, the region has proportionally less employment in the administrative, support and waste management and finance and insurance industry sectors compared to the state as a whole.

Figure 25: Employment by industry sector for the Northwest Iowa region (Cherokee, Lyon, O’Brien, Osceola, Plymouth and Sioux counties) in 2010. The manufacturing industry sector employed the most people in the region with 21.3 percent of total employment.

Demand for Labor

Another way to analyze the regional labor market is to consider the demand that local employers have for labor. Some of the largest employers in the region are Staples Contract & Commercial, Inc.; Tyson Foods, Inc.; Pella Corporation; Advance Brands, LLC; Sioux Center Community Hospital & Health Center and Orange City Area Health System. These institutions, along with the many other employers in the NCC service area hire a wide variety of workers and it is important that NCC stays in touch with the labor needs of its region. This section illustrates the occupations that are in highest demand within the region, as well as occupations that are emerging in the region’s largest industry sector, manufacturing.

Table 8, on the next page, lists the occupations with the most vacancies in the region in 2011, as reported in the Workforce Needs Assessment survey. Also included is the average starting wage associated with those positions, the statewide median wage and statewide average entry level wage for those occupations. The occupation with the most reported vacancies in the region was heavy and tractor-trailer truck drivers. The positions had a relatively low average starting wage ($12.81 per hour), as it was lower than the statewide median wage for that occupation ($17.85 per hour).
Other occupations that were in high demand in the region in 2011 were production workers, nursing assistants, and stock clerks and order fillers. Overall, the average starting wages for the reported vacant positions were lower than the statewide median wage, although there were exceptions. The stock clerk vacancies had an average starting wage just under the statewide median wage for stock clerks and order fillers.

The largest industry sector in the region by employment, shown in Figure 25 on the previous page, is manufacturing. Table 9 identifies two emerging, higher wage occupations in the region related to the manufacturing industry sector, first-line supervisors of production and operating workers and computer-controlled machine tool operators (metal and plastic). Three lower-wage occupations that could potentially lead into each emerging occupation are listed as well, along with knowledge and skills that overlap and areas that could use improvement in order to be qualified.

For example, coating, painting and spraying machine setters, operators and tenders is a lower-paying occupation but could potentially lead to a computer-controlled machine tool operator position. Skills that both occupations share are knowledge of production and processing, as well as experience with operation monitoring and quality control analysis. However, in order to qualify for a computer-controlled machine tool operator position, these workers typically have to improve their computer, mechanical and mathematics knowledge. These are areas that NCC can assist with in up-skilling the existing workforce to meet future workforce demands. Apprenticeship programs are also helpful in learning the skills necessary for these types of specialized occupations.

### Table 8: Occupations with the most reported vacancies in the region in 2011, along with their average regional starting wage and corresponding statewide wages.

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Regional Starting Wage</th>
<th>Statewide Median Wage</th>
<th>Statewide Entry Level Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy and Tractor-Trailer Truck Drivers</td>
<td>$12.81</td>
<td>$17.85</td>
<td>$11.89</td>
</tr>
<tr>
<td>Production Workers, All Other</td>
<td>$10.52</td>
<td>$13.42</td>
<td>$9.37</td>
</tr>
<tr>
<td>Nursing Assistants</td>
<td>$9.67</td>
<td>*****</td>
<td>*****</td>
</tr>
<tr>
<td>Stock Clerks and Order Fillers</td>
<td>$10.00</td>
<td>$10.02</td>
<td>$8.28</td>
</tr>
<tr>
<td>Helpers--Production Workers</td>
<td>$9.75</td>
<td>$11.72</td>
<td>$9.25</td>
</tr>
<tr>
<td>Slaughterers and Meat Packers</td>
<td>$9.75</td>
<td>$12.23</td>
<td>$10.24</td>
</tr>
<tr>
<td>Construction Laborers</td>
<td>$10.28</td>
<td>$14.55</td>
<td>$10.65</td>
</tr>
<tr>
<td>Farm Equipment Mechanics and Service Technicians</td>
<td>$15.11</td>
<td>$16.78</td>
<td>$11.81</td>
</tr>
<tr>
<td>Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders</td>
<td>$11.19</td>
<td>$15.05</td>
<td>$12.05</td>
</tr>
</tbody>
</table>

### Table 9: Emerging occupations within the region related to the manufacturing industry sector, along with occupations that can lead into those higher paying opportunities.

<table>
<thead>
<tr>
<th>Related Occupations</th>
<th>Median Wages</th>
<th>Overlapping Skills and Education</th>
<th>Required Areas for Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging Occupation: First-Line Supervisors/Managers of Production and Operating Workers</td>
<td>$23.23</td>
<td>Critical thinking; Active listening; Production and Processing</td>
<td>Mechanical knowledge; Management of personnel resources; Engineering and technology knowledge</td>
</tr>
<tr>
<td>Inspectors, Testers, Sorters, Samplers, and Weighers</td>
<td>$16.42</td>
<td>Production and processing knowledge</td>
<td>Mechanical knowledge; Administration and management knowledge; Engineering and technology knowledge</td>
</tr>
<tr>
<td>Team Assemblers</td>
<td>$14.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welders, Cutters, Solderers, and Brazers</td>
<td>$15.32</td>
<td>Mechanical knowledge</td>
<td>Management of personnel resources; Production and processing knowledge; Speaking; Administration</td>
</tr>
<tr>
<td>Emerging Occupation: Computer-Controlled Machine Tool Operators, Metal and Plastic</td>
<td>$15.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coating, Painting, and Spraying Machine Setters, Operators, and Tenders</td>
<td>$14.09</td>
<td>Operation monitoring; Quality control analysis; Production and processing</td>
<td>Computer and electronics knowledge; Mechanical knowledge; Mathematics knowledge</td>
</tr>
<tr>
<td>Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic</td>
<td>$14.39</td>
<td>Production and processing knowledge; Operation monitoring</td>
<td>Computer and electronics knowledge; Mechanical knowledge</td>
</tr>
<tr>
<td>Production Workers, All Other</td>
<td>$13.03</td>
<td>Critical thinking</td>
<td>Mechanical knowledge; Production and processing knowledge; Computers and electronic knowledge</td>
</tr>
</tbody>
</table>

***** Insufficient Data
Limitations of Analysis

There are limitations on the coverage of the wage records used in the analysis of this report. Unemployment insurance (UI) wage records are derived from unemployment insurance quarterly contribution reports. The state UI program does not cover federal employees, members of the armed forces, the self-employed, proprietors, unpaid family workers, church employees and railroad workers covered by the railroad unemployment insurance system, as well as students employed in a college or university as part of a financial aid package. The UI program does provide partial information on agricultural industries and employees in private households.

A few more characteristics of UI wage records are listed below:

- Multiple job-holders have a separate wage record for each employer.
- Wage records include full and part-time workers, therefore, one may not assume a 40-hour work-week to calculate an average hourly wage.
- Occupations are not included in the wage records.
- Wages represent total wages paid during the calendar quarter, regardless of when services were performed. Included in wages are pay for vacation and other paid leave, bonuses, stock options, tips, the cash value of meals and lodging and in some cases deferred compensation may be included.

Besides Iowa UI records, wage matches from the Wage Record Interchange System (WRIS) are also used in sections of this report in order to identify employment and wages for those now living in other states. WRIS is an Employment and Training Administration program that facilitates the exchange of UI wage records between participating states. There are two primary limitations to the use of WRIS wage records: data matching is only for the most recent eight quarters, and a few states submit only aggregated quarterly wage records with no employer information included. The latter issue makes it impossible to identify a primary quarterly wage, as well as identify the industry of employment.
References
