Acknowledgments

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Dr. Fred H. Martin, Educational Consultant
Ms. Nancy Donahue, Director of Budget and Payroll
Mr. Richard Smelser, Director of Financial Aid
Ms. Elisa Simmons, Financial Analyst

Note: This report is also available on the College’s web site at http://www.pstcc.edu/departments/institutional_research/economic/eis_2008-2013.pdf
EXECUTIVE SUMMARY

Pellissippi State Community College (PSCC) has served the Knoxville metropolitan area since 1974, experiencing significant student enrollment growth as indicated in Figure 1. The enrollment for fall semester, 2013 for the College was a credit headcount of 10,704 students and a credit FTE of 6,826 students.

This twenty-sixth (26th) annual analysis of the direct economic impact of Pellissippi State Community College on Knox and Blount counties has recently been completed. It measures the College's five-year (2008-2013) economic impact on the community in terms of (1) business volume, (2) employment and (3) individual income. Not included in the study is the indirect economic impact that naturally results from having a trained and educated work force available to local business and industry.

The report is based on a standard model of economic impact modified for community colleges. The economic impact model is based on a circular cash flow model as illustrated in Figure 2. The model uses conservative income and employment multipliers, as illustrated in Figure 3, to determine economic impact.

The study reveals that more than $325 million in "new", non-local, and state/federal revenues flowed into the area during 2008-2013 as a result of the College's presence. These external revenues represented 65.5 percent of the total college revenues for the period. The College also received more than $171 million in local revenues during this period, for a grand total of more than $497 million in revenues.

The following economic impact resulted from college expenditures of these revenues:
1. Local **business volume** generated by College expenditures during 2008-2013 was $630 million, with $513 million being due to non-local revenues, as shown in Figure 4. Annual business volume generated ranged from $95.1 million to $142.4 million.

2. Local **full-time-equivalent jobs** created and sustained during 2008-2013 as a result of the College's presence totaled 42,947 jobs, including the College's own 2,472 jobs over that same period. Of this total, 32,565 jobs were the result of non-local revenues, as shown in Figure 5. Annual full-time jobs generated ranged from 6,569 to 9,660 jobs.

3. Local **individual income** generated by College expenditures during 2008-2013 totaled $676 million, using the more conservative Type I multiplier, with $561 million being due to non-local revenues, as shown in Figure 6. Annual individual income generated ranged from $100 million to $154.1 million.

In summary, the combined five-year direct economic impact on the community represents $1.3 billion, or an average of $261 million per year. Of this amount, $1.1 billion, or more than $214 million per year, is due to the infusion of "new" external/non-local revenues. This impact would likely not have occurred without the presence of Pellissippi State in the area.

**It is significant to note that for every $1.00 of local revenues coming to Pellissippi State, there was $3.67 of local business volume and from $3.94 to $4.18 of individual income generated, for a total return on investment (ROI) of $7.61 to $7.85 on the local dollar!**

In addition to the above local economic impacts, there are significant individual economic benefits that accrue to students earning two-year Associate degrees. National research estimates a differential of at least $350,000 in lifetime earnings for Associate degree graduates compared with high school diploma holders. Applying that figure to the Spring 2013 class of Pellissippi State
graduates results in an estimate of $441 million that this class alone could potentially earn over their high school diploma counterparts over their work lifetime, plus an increase of about $2.4 million in annual local, state and federal tax payments.

Research on unemployment rates shows lower unemployment rates for people with college degrees than for those with high school degrees or less. Finally, there are many demonstrated social benefits to increased levels of education that accrue to the broader society, in addition to the more personal economic benefits.

This study continues to document the significant force Pellissippi State has become in the economic and social vitality of the Knoxville metropolitan area.
INTRODUCTION

Pellissippi State Community College (PSCC) has served the Knoxville metropolitan area since 1974, experiencing significant enrollment growth as indicated in Figure 1. The enrollment for fall semester, 2013 for the College was a credit headcount of 10,704 students and a credit FTE of 6,826 students.

This report is the twenty-sixth (26th) annual analysis of the rolling five-year (2008-2013) economic impact of Pellissippi State on the Knoxville metropolitan area. The primary counties affected are Knox and Blount, with approximately 83 percent of the College's expenditures being made, on the average, in those two counties.

The analysis measures the direct, explicit economic impact of Pellissippi State on the community. It does not include the implicit, intangible economic impact that results from having a trained and educated work force available for local business/industry or from expansion and recruitment of business/industry as a result of the presence of the College. The analysis is based on the Caffrey model of economic impact, originally developed in 1968 through the American Council of Education. The model has been adapted for application to community colleges.¹

The model uses conservative income and employment multipliers to determine Pellissippi State's economic impact on the following:

1. **Business volume**--the total amount of local business volume generated as a result of the College's direct and indirect expenditures.

2. **Employment**--the total number of local full-time-equivalent jobs generated and sustained by the College's direct and indirect expenditures.

3. Individual income—the total amount of personal income earned by local households as a result of the College's direct and indirect expenditures.

Two additional components of the College’s impact on the community are included:

(1) an estimate of the projected increase in lifetime earning capacity of the most recent class of PSCC graduates compared to high school graduates, and (2) a description of the broader societal benefits of increased levels of higher education.

**METHODOLOGY**

The economic impact model is based on a circular cash flow model as illustrated in Figure 2. The community is treated as a semi-closed economic system, with money entering the system through Pellissippi State from both local and external or "new" sources.

The local sources of revenue include student tuition/fees, local grants/contracts, private scholarships, gifts and other miscellaneous local revenue. External or "new" revenues include state appropriations for both operating and capital purposes, federal/state student financial aid revenues, as well as state/federal grants and contracts.

Pellissippi State circulates its revenues through the local economy via expenditures for employee salaries and benefits, construction and maintenance of facilities, and local purchases of equipment and supplies. These expenditures are then re-circulated through the local economy, increasing in value and having a multiplier or secondary impact as local businesses and households make expenditures and generate jobs. Figure 3 illustrates the multiplier principle.

Economic impact on the community is measured on two levels: (1) in relationship to total expenditures from all revenue sources and (2) in relationship to expenditures from only those external or "new" revenues that would likely not have occurred without Pellissippi State's presence in
the economy. The following College revenues and expenditures for the five-year period 2008-2013 were incorporated into a MS Excel spreadsheet template containing the model.
For the five-year period, $325.5 million in non-local revenues was brought into the service area, along with $171.7 million in local revenues, for a combined total of $497.2 million in revenues.

The five-year average was 65.5 percent non-local and 34.5 percent local revenues.

RESULTS

Business Volume Impact

The local business volume impact generated by Pellissippi State expenditures is shown below:

<table>
<thead>
<tr>
<th>BUSINESS VOLUME IMPACT</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSINESS VOLUME</td>
<td>95,085,755</td>
<td>125,165,571</td>
<td>137,596,879</td>
<td>142,435,439</td>
<td>129,322,551</td>
<td>629,606,196</td>
</tr>
<tr>
<td>BUSINESS VOLUME (NEW)</td>
<td>73,937,354</td>
<td>102,766,895</td>
<td>115,588,903</td>
<td>115,228,698</td>
<td>105,039,684</td>
<td>512,561,535</td>
</tr>
</tbody>
</table>

The annual business volume impact of total college expenditures ranged from $95.1 million to $142.4 million, with a five-year total of $629.6 million. The impact of external or "new" college funds ranged from $73.9 million to $115.6 million, with a five-year total of $512.6 million. Figure 4 graphs the relationship between local revenues and both total and “new” business volume generated by the College’s presence.

Employment Impact

The local employment impact in terms of full-time-equivalent (FTE) jobs created and sustained by Pellissippi State expenditures is shown below:

<table>
<thead>
<tr>
<th>EMPLOYMENT IMPACT</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYMENT</td>
<td>6,568.66</td>
<td>8,525.36</td>
<td>9,345.51</td>
<td>9,659.56</td>
<td>8,847.59</td>
<td>42,947</td>
</tr>
<tr>
<td>EMPLOYMENT (NEW)</td>
<td>5,045.94</td>
<td>6,929.49</td>
<td>7,774.46</td>
<td>7,727.26</td>
<td>7,087.92</td>
<td>34,565</td>
</tr>
</tbody>
</table>
Pellissippi State's own annual FTE jobs ranged from 456 to 534 during this period, yet the total annual employment created and sustained by college expenditures ranged from 6,569 to 9,660 jobs, with a five year total of 42,947 jobs, including the College’s own 2,472 FTE jobs over that period. The number of FTE jobs created annually by external or "new" funds ranged from 5,046 to 7,774 jobs, with a five year total of 34,565 jobs. Figure 5 graphs the relationship between the College's full-time jobs and both total and "new" full-time-equivalent jobs generated and sustained by the College's presence.

Individual Income Impact

The local impact of Pellissippi State's expenditures on personal income is calculated using two different multipliers to produce a range of impact, shown below as Type I and Type II. The Type I multiplier is the more conservative measure.

<table>
<thead>
<tr>
<th>INDIVIDUAL INCOME IMPACT</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE I MULTIPLIER</td>
<td>100,225,200</td>
<td>135,139,001</td>
<td>149,044,638</td>
<td>154,058,682</td>
<td>137,939,952</td>
<td>676,407,473</td>
</tr>
<tr>
<td>TYPE II MULTIPLIER</td>
<td>107,661,425</td>
<td>142,905,905</td>
<td>157,278,073</td>
<td>162,724,742</td>
<td>147,028,098</td>
<td>717,598,244</td>
</tr>
<tr>
<td>TYPE I (NEW)</td>
<td>79,531,764</td>
<td>112,762,625</td>
<td>127,198,943</td>
<td>127,016,412</td>
<td>114,695,285</td>
<td>561,205,029</td>
</tr>
<tr>
<td>TYPE II (NEW)</td>
<td>84,307,003</td>
<td>118,000,837</td>
<td>132,859,335</td>
<td>132,524,397</td>
<td>120,403,001</td>
<td>588,094,574</td>
</tr>
</tbody>
</table>

The total Type I impact of college expenditures on personal income, using the more conservative multiplier, ranged from $100.2 million to $154.1 million, with a five-year total of $676.4 million. The impact of external or "new" funds ranged from $79.5 million to $127.2 million, with a five-year total of $561.2 million. Figure 6 graphs the relationship between local revenues and both total and “new” Type I personal income generated by the College’s presence.

In summary, the combined five-year direct economic impact on the community represents $1.3 billion, or an average of more than $261.2 million per year. Of this amount, $1.1 billion, or
$214.8 million per year, was due to the infusion of "new", external/non-local revenues. This impact would likely not have occurred without the presence of Pellissippi State in the area.

It is significant to note that for every $1.00 of local revenues coming to Pellissippi State, there was $3.67 of local business volume and from $3.94 to $4.18 of individual income generated, for a total return on investment (ROI) of $7.61 to $7.85 on the local dollar!

ECONOMIC BENEFITS OF HIGHER EDUCATION

Many national and state research studies have demonstrated the economic value of increased levels of education. There is a clear relationship established between increased levels of education and increased annual incomes and lifetime earnings.

As a 2007 study of the impact of Middle Tennessee higher education institutions states, “It appears that knowledge, either in the form of human capital or technological advancement, has become the common denominator in much economic growth and regional competitiveness literature.”¹

Several national research studies have been completed that specifically focus on the economic benefits of two-year Associate degree programs conferred by community colleges. As one such study says, “While community colleges serve many goals and missions, their occupational purposes are central, and virtually all their students enroll in order to enhance their employment, either directly or by later transferring to 4-year colleges.”²

This same compilation of a dozen national studies of the effect of Associate degrees on employment outcomes concluded that “completing Associate degrees generally enhances wages, employment, and earnings by significant amounts…”³ Another such study entitled “Education Pays: The Benefits of Higher Education for Individuals and Society” conducted by The College...
Board, further concludes that “there is a correlation between higher levels of education and higher earnings for all racial/ethnic groups and for both men and women.”

Most studies of this nature contrast the annual and lifetime earnings potential of Associate degree graduates compared with high school diploma holders. Lifetime earnings generally mean the cumulative earnings over a 40 year work life from about age 25-64.

The literature indicates a range of lifetime earnings ratios between Associate degree graduates and high school diploma holders, generally in the range of 20-30% higher, at a minimum, for Associate degree graduates. This income gap between high school and college graduates has also increased significantly over time.

In terms of average annual earnings by Associate degree and high school diploma holders, the literature also contains a range of findings. The College Board study referenced earlier cites an average annual earnings differential of $6,800, while a more recent U. S. Census Bureau study indicates an even greater difference of $11,033 ($32,602 vs. $21,569).

A 2007 study conducted by the University of Tennessee Center for Business and Economic Research found that, over the seven year period from 1997 to 2005, Associate degree graduates in Tennessee earned $33,326 on average one year after graduation, growing to $38,952 four years later, and to $42,921 after seven years, for an average annual growth rate of 4.3%.

A 2013 study revealed even higher first year earnings ($38,945) for Tennessee Associate degree completers. Also significant was the finding that Tennessee Associate degree completers had higher first year earnings than did Bachelor’s degree completers.

According to The College Board study, a person with an Associate degree can expect to earn about $1,769,000 over their work lifetime compared to about $1,419,000 for a high school
diploma holder, a difference of more than $350,000.\textsuperscript{11} It should be noted again that these
differences seem to apply to all genders, races, and ethnic groups.

**ECONOMIC BENEFITS APPLIED TO PELLISSIPPI STATE GRADUATES**

During 2008-2013, Pellissippi State graduated 4,569 students with two-year Associate
degrees, as seen below:

<table>
<thead>
<tr>
<th>Associate Degree Graduates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>658</td>
</tr>
<tr>
<td>2009-10</td>
<td>793</td>
</tr>
<tr>
<td>2010-11</td>
<td>755</td>
</tr>
<tr>
<td>2011-12</td>
<td>1,103</td>
</tr>
<tr>
<td>2012-13</td>
<td>1,260</td>
</tr>
<tr>
<td>Total</td>
<td>4,569</td>
</tr>
</tbody>
</table>

Graduates typically either transfer on to four year institutions to continue their education
or they seek immediate employment. The job placement rates for those career/technical graduates
who seek employment have been tracked as follows:

<table>
<thead>
<tr>
<th>Job Placement Rates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>95%</td>
</tr>
<tr>
<td>2009</td>
<td>89%</td>
</tr>
<tr>
<td>2010</td>
<td>92%</td>
</tr>
<tr>
<td>2011</td>
<td>94%</td>
</tr>
<tr>
<td>2012</td>
<td>96%</td>
</tr>
</tbody>
</table>
An estimate of projected lifetime earnings of a class of Pellissippi State Associate degree graduates can be gained using average national figures. The 2004 College Board study referenced earlier found a difference of about $350,000 in lifetime earnings between Associate degree and high school diploma holders. Taking the 1,260 graduates making up the class of 2012-13, for example, and applying the $350,000 excess lifetime earnings of Associate degree over high school diploma holders, one arrives at a figure of $441 million that this class alone could potentially earn over their high school diploma counterparts.

Pellissippi State typically draws the great majority of its students from its two-county primary service area. For example, in the fall semester of 2012, 78.5% of the headcount students came from Knox and Blount County.

The University of Tennessee study referenced earlier found that those earning Associate degrees were much more likely to stay and work in Tennessee than other degree-earners. In fact, after one year, 73.3% of Associate-degree earners were working in Tennessee, compared with 62.4% of bachelor’s degree earners and 40.0% of doctoral degree earners.\(^\text{12}\)

Assuming the majority of Pellissippi State’s graduates have remained in the area, the economic impact of each succeeding graduating class over their earnings lifetime has been and will continue to be an enormous contributor to local economic activity.

Along with the individual economic benefits associated with greater wages and earnings, there are also corresponding societal economic benefits that come from increased levels of local, state, and federal tax payments. The College Board study indicates, for example, average annual tax payments of $8,600 for Associate degree holders vs. $6,700 for high school degree holders, a difference of $1,900 per year.\(^\text{13}\) Applying that figure just to the 1,260 Pellissippi State Associate
degree graduates in 2012-13 would generate an estimate of $2,394,000 in increased annual tax payments to local, state, and federal governments, plus the “multiplier effect” of these taxes as they are circulated in the local, state and national economy.

Yet another indicator of the economic impact of education can be seen by comparing data on unemployment rates. A 2012 study of unemployment rates shows the following:

![Unemployment Rate by Education Level](image)

Source: BLS, FactSet, J. P. Morgan Asset Management, 2012

A consistent trend is seen since 1992, with highest unemployment rates for people with less than a high school degree, followed by people with a high school degree but no college, then those with some college, and lowest for those with a college degree.
SOCIAL BENEFITS

Many studies of the value of higher education identify broader benefits to society at large, in addition to the considerable economic benefits to the individual. Some of these societal benefits of increased levels of higher education include:

1. Increased likelihood of attending a 4-year college. Students who enroll in public two-year colleges increase their likelihood of attending a four-year institution by 5-10%;\(^{14}\)
2. Lower levels of unemployment as educational attainment increases;\(^ {15}\)
3. Reduced poverty rates, particularly for single mother and married couple families with children;\(^ {16}\)
4. Less dependence on social “safety-net” programs, resulting in less demand on public budgets;\(^ {17}\)
5. Improved perceptions of personal health, along with reduced smoking rates\(^ {18}\), lower rates of alcohol abuse and health-related absenteeism, and longer life spans;\(^ {19}\)
6. Reduced levels of crime and incarceration rates, along with reductions in victim costs (It costs about $26,000 per year to maintain a prisoner whereas it only costs the state about $3,300 per year to educate a student at Pellissippi State);\(^ {20}\)
7. Higher cognitive skill levels and greater ability to persist at tasks for young children of mothers with more education;\(^ {21}\)
8. Higher levels of participation in civic and volunteer activities, including voting and blood donation;\(^ {22}\) and
9. Increased levels of home ownership.\(^ {23}\)

These broader societal benefits tend to apply similarly across all gender, racial and ethnic student groups, as did the economic benefits.
CONCLUSIONS

The results of this economic and social impact study clearly demonstrate that Pellissippi State Community College continues to be a major contributor to the economic bases of Knox and Blount Counties. In addition to the more implicit impact of a community college on the improved productivity and quality of life achieved through increased education, the explicit economic impact noted here is significant. This economic impact is expressed here in terms of jobs created, business volume generated and personal income earned.

Additionally, it has been demonstrated that a two-year graduate can expect to earn significantly more over their work lifetime than a high school diploma holder, as well as to pay considerably more local, state and federal taxes as a result. Also, research indicates lower unemployment rates for people with college degrees than with high school degrees. Finally, there are demonstrated social benefits to increased levels of education that accrue to the broader society, in addition to the more personal economic benefits.

As Pellissippi State continues to grow in enrollment and/or budget, its economic and social impact on the Knoxville metropolitan area will increase similarly. The College continues to be a major partner and force in the economic vitality of the Knoxville metropolitan area.
REFERENCES

1. *Higher Education Institutions in Middle Tennessee: An In-Depth Analysis of Their Impact on the Region from a Comparative Perspective*. Middle Tennessee State University Business and Economic Research Center, study prepared by Murat Arik (March 30, 2007), p. 4.


Figure 1

Student Headcount
Figure 2

Circular Cash Flow Model

- Local Revenues
  - Fees
  - Scholarships
  - Gifts

- State
  - Federal

- Local Business

- Local Households

- Wages/Benefits
- Contracts, Gifts
- Purchases
- Purchases
Figure 3

How the Multiplier Works

Initial Spending: $1.00

1st Recycle:
- Savings: $0.70
- Taxes: $0.35
- Out Of Service Area: $0.20
- Spent In Service Area: $0.70

2nd Recycle:
- Savings: $0.35
- Taxes: $0.20
- Out Of Service Area: $0.15
- Spent In Service Area: $0.70

3rd Recycle:
- Savings: $0.20
- Taxes: $0.10
- Out Of Service Area: $0.05
- Spent In Service Area: $0.70

Final Spending: $1.00

Total Multiplier Effect: $2.25
Figure 4

Business Volume Impact

- Local Revenues
- Total Business Volume
- New Business Volume
Figure 5

Employment Impact
Figure 6

Individual Income Impact