THE ROLE OF CAREER COLLEGES IN TENNESSEE: THEIR SIZE, CONTRIBUTION TO WORKFORCE EARNINGS, AND IMPACT ON TENNESSEE'S ECONOMY

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Prepared for
The Tennessee Association of Independent Colleges and Schools (TAICS)
and Tennessee Department of Labor and Workforce Development

February 1, 2007

Acknowledgements. The authors would like to acknowledge the contributions of several individuals to this project. Harika Erdemir and John Seaton, undergraduate research assistants, provided full-time research support to this project. Dr. Jennifer Kates diligently reviewed the study materials and compiled them. Kitty Kulp handled survey materials and provided logistic support, and Sally Govan helped design and edit study materials whenever needed. We also would like to thank Sandra Robert, Executive Director of Tennessee Association of Independent Colleges and Schools (TAICS), and Paul M. Starnes, president of Tennessee Proprietary Business School Association (TPBSA), for their valuable input and effort throughout the study period.

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EXECUTIVE SUMMARY

Demand for skilled workforce has been on the rise in industrial countries across industries and occupations because of changes in economic structure. The resulting change in the skill composition of the workforce is then structural rather than cyclical, which has important implications for the long-term competitiveness of an economy as well as the unemployed and dislocated workforce. At the heart of these structural changes is career-level college training[1] and career colleges,[2] which represent the dividing line between traditional and nontraditional, high-technology and low-technology, skilled and unskilled, and employable and unemployable.

As of 2005, nearly 35 percent of 152 postsecondary educational institutions in Tennessee were "private for-profit" institutions.[3] Given the increasing demand for skilled workforce and structural changes in Tennessee's economy, career colleges are likely to play a critical role in supplying the needed skilled labor force and providing opportunities for nontraditional students, thereby contributing to a competitive business environment.

The reason for this prospect is clear: in Tennessee, more than 50 percent of the labor force age 25 and over has high school or less than high school educational attainment as opposed to 45 percent in the U.S. in 2005. The labor force with career-level college education is 25 percent in Tennessee versus 28 percent in the U.S. Overall, Tennessee is less competitive than the U.S. in terms of career-level college educational attainment.

This study, sponsored by the Tennessee Department of Labor and Workforce Development and the Tennessee Association of Independent Colleges and Schools,

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[1] "Career-level college education" in this study is defined as educational attainment that is associated with any of the following educational level/categories beyond high school: (1) less than one-year training/program, (2) more than one year but less than two-year training/program, (3) associate's degree, or (4) more than two years but less than bachelor's degree.

[2] "Career colleges" in this study refer to all private, for-profit postsecondary educational institutions that operated in Tennessee during the 2004-2005 academic year and were profiled in the Integrated Postsecondary Education Data System (IPEDS).

[3] According to Tennessee Higher Education Commission (THEC) website, there are more than 200 private, for profit, post-secondary institutions in Tennessee (www.state.tn.us/thec/). However, this study profiles only those institutions profiled in the IPEDS. Therefore, the actual number of career college enrollees may be substantially higher than the figures presented in this study.

critically answers the following research question: what role do career colleges play in the Tennessee economy? To this end, the Business and Economic Research Center (BERC) of the Jennings A. Jones College of Business at Middle Tennessee State University analyzes

- trends in the skill composition of Tennessee's workforce,
- labor supply and demand with regard to career-level college training,
- the value of an additional year of schooling in career-level college training, and
- the economic impact of career colleges on the Tennessee economy.

Conceptually, this study only deals with career colleges profiled in IPEDS. In terms of workforce dynamics, the universe of this study is the Tennessee workforce ages 24 to 65 who are employed at least one (1) hour a week and who have earned income from the work. The BERC utilized various data sources and theoretical approaches to address the role of career-level college training in the Tennessee economy.

FINDINGS

According to American Community Survey (2005) data, on average, 28 percent of the workforce ages 25-65 has career-level college education as defined in this study, earning about $35,000.

Detailed Characteristics of Tennessee's Workforce

- The findings indicate the presence of gender and racial gaps as well as intergenerational difference in terms of percent of workforce with career-level college education.
    - The female workforce (31.18 percent), the African American workforce (32.43 percent), and the younger generation (30.54 percent) are more likely to get career-level college education.
- In terms of earnings, there are clear gaps between the male-female workforce on one hand and the Asian-other racial groups with career-level college education on the other.

Trend in Employment

- As of 2005, nearly one-third of the workforce in major sectors has career-level college education.

- A detailed analysis of the workforce by educational attainment indicates the presence of strong intergenerational, sectoral, and occupational difference in terms of the percent of workforce with career-level college education.

- Demand for career-level college skill increased more than 23 percentage points in certain industries.

Skilled Labor Force Supply and Demand

Demand for workforce in Tennessee is expected to be more than one (1) million between 2004 and 2014. This includes both new jobs and replacements. Average annual demand (new additions and replacements) is estimated at around 91,000. Analysis of workforce supply and demand indicates that

- the annual demand for workforce with career-level college training is 28,082 (31 percent of the total demand for workforce),
- the annual supply of workforce with career-level college training is 21,754, and
- annually, demand exceeds supply by 6,328 in terms of workforce with career-level college training.

Value of Postsecondary Education

- What is the value of additional years of schooling[4] for the workforce? On average, in 2005, average years of schooling that Tennessee's workforce has attained is estimated at around 13.45, representing career-level college schooling. Average corresponding earned income is $24,984. Other things being equal, an additional year of schooling in Tennessee at the career college level (on average) generates

  an 11.40 percent increase ($2,848) in average earned income for all workers.
- The value of an additional year of schooling dramatically differs by age cohort, race, and major sector in the economy. Controlled by experience, an additional year of schooling leads to a higher increase in average earned income for the younger cohort and African Americans.

[4] This return on investment may be called private return on an additional year of schooling, as this study does not attempt to measure social return on an additional year of schooling. The previous studies indicate that social return on an additional year of schooling would be substantially higher than private return because education contributes to economic growth, social cohesion (capital), and tax revenues.

- The impact of an additional year of schooling on earnings changes by major industry. In certain industries, there appears to be a substantially higher premium for an additional year of schooling. The percent contribution of an additional year of schooling to earned income is the highest in
    - professional services at 17.00 percent, manufacturing (chemical) at 15.40 percent, utilities at 15.20 percent, healthcare at 14.90 percent, and financial services at 14.80 percent.

Role of Career Colleges in the Tennessee Economy: General Characteristics[5]

- Career colleges represent nearly 35 percent of postsecondary higher education institutions, more than 70 percent of which provide occupational training.
- A total of 366,644 people are enrolled in higher education institutions in Tennessee.
    - **A total of 25,022 (6.8 percent) are enrolled in career colleges.**
- Nearly 61 percent of career-college enrollees are women, compared to 58 percent in other educational institutions.

Racial Diversity and Nontraditional Students

- Career colleges are more racially diverse than other types of educational institutions.
- Career colleges provide more educational opportunities to nontraditional students than the other institutions.

Finance and Income

- Career-college students are more likely to receive educational loan aid than students enrolled at other types of institutions.
- Compared to private not-for-profit (27 percent) and public (21 percent) institutions, career colleges derive a substantial portion (85 percent) of their revenues from tuition and fees.

[5] Information in this section reflects the data for career colleges profiled in the IPEDS (52 institutions).

Labor Supply and Demand[6]

- Career colleges account for nearly 34 percent (7,280) of career-level college training (21,754) in Tennessee.
- Annual demand for career-level college training in Tennessee is estimated at around 28,082, of which 26 percent is met by career colleges, 52 percent is met by other educational institutions, and 22 percent is unmet.

Economic Impact of Career Colleges

- Career colleges spend nearly $68 million on goods and services in Tennessee.
- Career colleges' payroll in 2005 was $59.72 million. After-tax disposable income of employees is estimated at around $49.98 million.
- Career-college graduates command substantially higher wages than those workers with less than a high school education.
- Incremental earnings of career-college graduates are estimated at around $65 million, of which $57 million is disposable income.

Total Economic Impact

The total economic impact of career colleges is

- $329.64 million in business revenue,
- $130.24 million in labor income,
- 4,288 jobs, and
- $10.22 million in state and local taxes.

CONCLUSION

The workforce with career-level college education constitutes a little over 28 percent of the workforce ages 25-65. As the educational attainment level of the workforce by age cohort indicates, while the percent of the workforce with high school and less than

[6] Number of people completing a career-level college education may be substantially higher, taking into account the fact that only major private for-profit institutions are profiled in this study. However, a review of the literature suggests that a substantial portion of career-level college enrollees hold a job while continuing their education. In this part of the analysis, we assume all career-level college graduates are new entrants to the labor market. Given this assumption, the demand-supply analysis can be considered an accurate depiction of the current conditions.

high school education has been shrinking, the percent of the workforce with career-level college training has been on the rise.

While this trend toward career-level college skill is likely to continue, the current supply of workforce at this level is not enough to meet the annual demand. Every year, an estimated 6,000 career-level college skill jobs are filled by either in-migration or workforce with less than the desired skill.

Considering the benefits of an additional year of schooling (11.4 percent increase in earned income on average), a strategy that helps reduce the high school dropout rate and encourages additional schooling beyond high school is likely to generate substantial benefits to individuals and to a competitive business environment.

Career colleges themselves play an important role in Tennessee by providing educational opportunities for nontraditional students, women, and diverse racial groups. In addition to having a $330 million impact on Tennessee's economy, these colleges supply 26 percent of the skilled workforce demand at career-level college training. Since many of these career colleges provide occupational training, they are well positioned to monitor labor market demand and supply conditions and respond quickly to emerging skill needs in the Tennessee economy.

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I. INTRODUCTION

I.A. Background

Interest in the relationship between human capital and economic growth is growing, in part, because of structural changes in industries' demand for a skilled workforce. Global competition has changed the economic structure of countries significantly over the past decade. In many developed countries, the employment structure is changing in favor of a more skilled workforce. Consequently, it is critically important that both the existing workforce and the incoming workforce respond to the quickening pace of economic change.

Theoretically, the endogenous economic growth theory transformed the way human capital--economic growth relationship is treated in economic literature. On the one hand, increasing return to education opened up endless possibilities for developing regions or countries to catch up with developed regions or countries. On the other hand, "knowledge-based" economic development has transformed the economic landscape as the structure of the economy has changed, creating the competitive pressure of the workforce of developing and developed countries alike.

More than ever, the quality of the workforce in a region has been associated with competitiveness in the global economy. Among others, three critical elements are necessary to be competitive in the 21st century: (1) a skilled and flexible workforce, (2) a knowledge infrastructure (the presence of educational institutions that monitor labor market conditions and respond quickly to emerging needs), and (3) institutions hospitable to knowledge and innovation. This report critically examines the role of the first two

elements in Tennessee's economy from the perspective of private for- profit educational institutions defined here as career colleges.

I.B. Tennessee's Current Situation

How does Tennessee stack up when faced with competitive global challenges? In the area of educational attainment, Tennessee is substantially behind the U.S. average. According to 2005 Census data, 18.9 percent of Tennessee's labor force lacks even a high school diploma, as opposed to 15.9 percent in the United States. In other educational categories, Tennessee is substantially behind the U.S. average. More than a third of Tennessee workers (34.5 percent) have only a high school education, a full five percentage points higher than the national average of 29.6 percent. At the career college level, only 24.8 percent of Tennessee's workforce has either some college education or an associate's degree, whereas the national average is 27.5 percent. The educational gap grows wider at the college level and above. Just 21.8 percent of Tennessee workers hold bachelor's or graduate degrees. This is a gerater than five point variance from the national average of 27.2 percent. Clearly, Tennessee is not currently meeting the critical requirement of educational attainment among its workforce.

However, Tennessee provides institutional support for its workforce in the form of more than 150 postsecondary educational institutions. Of these, one-third are private, for-profit career colleges. Although many of them have small operating budgets compared to public and not-for-profit institutions, in terms of their programs, student characteristics, and awards, for-profit colleges and schools fill critical transitional needs of Tennessee's workforce. These career colleges bridge the gap between high and low

technology, between a skilled and an unskilled workforce, and between traditional and nontraditional students.

What role do these postsecondary institutions play in Tennessee? This study critically evaluates the role of private, for-profit educational institutions in the Tennessee economy. Each of the following sections highlights a different aspect of private for-profit educational institutions in Tennessee. We describe Tennessee employment trends and explore the issue of why career colleges are so important on both the supply and demand sides of Tennessee's economy. We delineate the value of postsecondary education and show the direct and indirect economic impact of career colleges in Tennessee.

I.C. Study Goals

The goal of this study is twofold. First, this study describes the role of a career-level college education in Tennessee by analyzing the current workforce makeup, trends in employment, issues of supply and demand, and the value of a postsecondary education. Second, this study identifies the role of career colleges in Tennessee's economy by comparing them to other educational institutions and analyzing the economic impact of their operations.

I.D. General Methodology

I.D.1. Definitions

Throughout this study, certain conceptual issues and terms are defined as follows

- "Career colleges" will refer to all private, for-profit postsecondary educational institutions that operated in Tennessee during the 2004-2005 academic year and were profiled in the Integrate Postsecondary Education Data System (IPEDS).

- "Career-Level College Education," "Career College Level Training," "Career College Graduates," or "Career College Level Educational Attainment" will refer to training, graduates, or an educational level that are associated with any one of the following educational levels/categories:

  (1) training/programs of less than one year,

  (2) training/programs of more than one year but less than two years,

  (3) associate's degree, or

  (4) more than two years but less than bachelor's degree.

I.D.2. Data Sources

Data for this study come from four main sources. Data for education institutions and their characteristics come from the Integrated Postsecondary Education Data System (IPEDS). Data for population characteristics come from the 2005 American Community Survey. Data for workforce projections come from the Tennessee Department of Labor and Workforce Development. Finally, the BERC initiated a comprehensive survey of for-profit postsecondary institutions. However, due to a low response rate (less than 10 percent), we extensively utilize secondary data sources in this report.

II. THE ROLE OF A CAREER COLLEGE LEVEL EDUCATION IN TENNESSEE

II.A. Introduction

Demand for a skilled workforce has been on the rise in industrial countries across industries and occupations because of changes in economic structure. The resulting change in the skill composition of the workforce is then structural rather than cyclical, which has important implications for the long-term competitiveness of an economy as well as for the unemployed and dislocated workforce. At the heart of these structural changes is career-level college training and career colleges, which represent the dividing line between traditional and nontraditional, high-technology and low-technology, skilled and unskilled, and employable and unemployable.

Given the importance of career-level college education, how well is Tennessee doing? In Tennessee, more than 50 percent of the labor force age 25 and over has high school educational attainment or less as opposed to a 45 percent national average in 2005. The labor force with a career-level college education is 25 percent in Tennessee, versus 28 percent in the U.S. Furthermore, compared to the peer states, Tennessee's performance is substantially lower in terms of percent of working adults enrolled part-time in any type of postsecondary institutions.[7] Overall, Tennessee is less competitive than the rest of the nation in terms of career college level educational attainment.

[7] Alan Wagner, 2006, *Measuring Up Internationally: Developing Skills and Knowledge for the Global Knowledge Economy* (Washington, D.C.: National Center for Public Policy and Higher Education). According to this study, only 2.6 percent of working adults enrolled part-time in postsecondary institutions, compared to 3.5 percent in Alabama, 4.6 percent in Colorado, 3.7 percent in Florida, 2.9 percent in Georgia, 3.2 percent in Indiana, 3.6 percent in Kentucky, 2.4 percent in Mississippi, 3.7 percent in North Carolina, and 3.2 percent in Ohio.

This section of the study critically answers the following research question: what role does a career-level college education play in the Tennessee economy? To this end, the Business and Economic Research Center (BERC) analyzes the following areas:

- trends in the skill composition of Tennessee's workforce,
- labor supply and demand with regard to career-level college training, and
- the value of an additional year of schooling in career-level college training.

Conceptually, this study defines career-level college training as training or education beyond high school but less than a bachelor's degree. The universe of this study is the Tennessee workforce ages 24 to 65 who are employed at least one (1) hour a week and who have earned income from the work. The BERC utilized various data sources and theoretical approaches to address the role of career-level college training in the Tennessee economy.

II.B. Background

Evidence from the literature suggests that demand for skilled workers is increasing across the sectors. Competitiveness of an economy then critically depends on the ability of the workforce to adapt to a quickly changing economic environment. In a knowledge-driven economy, acquiring and using knowledge and application of new technologies require both a higher level of educational attainment and lifelong learning through part-time enrollment while holding a job.

A vast amount of literature has analyzed the contribution of an additional year of schooling to earnings or economic growth. The literature suggests that the return on each

additional year of schooling is between five (5) and 15 percent in general and upwards of 20 percent in developing countries.[8] The general conclusion we draw from these studies is that human capital contributes significantly to economic growth.[9]

In calculating the return on an additional year of schooling, many studies, however, calculate private return on the additional year of schooling. It is most likely that social return on an additional year of schooling is much larger due to spillovers, social capital, reduced crime, and fiscal impact (increased tax revenues).[10] Because of the inherent difficulties in calculating the social impact of an additional year of schooling, studies often deal with private return on an additional year of schooling.

In the sections that follow, this study first highlights characteristics of Tennessee's workforce with regard to career-level college education. After critically looking at supply and demand conditions for the workforce with career-level college education, a conceptual framework is then developed to estimate return on an additional year of schooling by workforce characteristics in Tennessee.

II.C. Tennessee's Workforce Makeup

II.C.1. Workforce Demand-Side Issues

One reason a career-level college education is important is that the demand for an educated workforce is rising. Computer applications are ubiquitous, so only a

[8] For a review of critical studies and issues regarding the measurement of human capital or a year of schooling, see Alan B. Krueger and Mikael Lindahl, 2001, "Education for Growth: Why and for Whom," *Journal of Economic Literature*, vol. xxxix, pp. 1101-1136.

[9] We acknowledge that in addition to education, human capital also includes health and social capital. However, these two aspects of human capital are also closely linked to the education component.

[10] For a comprehensive review of these issues, see OECD, Center for Educational Research and Innovation. (1999). *Human Capital Investment: An International Comparison*, Organization for Economic Co-operation and Development.

knowledgeable workforce will be able to serve the market's growing technological needs. Also, an increasing number of people are losing low-skilled jobs due to plant closings, and many of them are unable to reenter the workforce without additional training. Furthermore, workforce demographics are changing. Many baby boomers are approaching retirement age, creating labor shortages in many areas of the economy. Educational requirements for future jobs are increasing because the competitive business environment requires a skilled labor force that can adapt to rapid changes.

II.C.2. Workforce Supply-Side Issues

In response to changes in the demand for an educated workforce from employers, there is a growing demand from workers themselves for postsecondary education, particularly career-level college education. Why is this? Many people find it convenient to advance their careers while working with the flexible educational opportunities offered in career colleges. Employees know that high-tech skills give them a competitive edge, and businesses know that high-tech skills increase their productivity. Additionally, postsecondary education provides opportunities for disadvantaged learners such as immigrants, displaced workers, and welfare recipients to enter or reenter the workforce. This level of education also provides opportunities to people who do not have access to traditional educational venues due to age, work schedules, or childcare issues. A career-level college education plays an important role in meeting the needs of these nontraditional students.

II.C.3. Tennessee Workforce Demographics

The demographics of Tennessee's workforce make a career-level college education particularly important. This part of the analysis deals strictly with segments of

Tennessee's labor force between the ages of 25 and 65 who are employed in a sector, work for at least one hour a week, and earn income from the work. Because of these restrictions, some figures presented here may differ from figures for the general population 25 and over.

What is the education level of Tennessee's workforce?

A little more than 28 percent of Tennessee's working population (age 25-65) has a career-level college education (Table 1). Nearly 44 percent of the working population has a high school education or less. Overall, working women are better educated than working men in Tennessee.

Table 1: Educational Attainment by Sex	Male	Female	All Workers
Less Than High School	12.35%	8.05%	10.27%
High School	34.00%	32.55%	33.30%
Some College (Career College Level)	**25.87%**	**31.18%**	**28.44%**
Bachelor's and Above	27.77%	28.22%	27.99%

BERC and American Community Survey (2005) at www.census.gov

Table 2 presents the racial gap in educational attainment. According to Table 2, Tennessee's African Americans have the highest percentage of career-level college education at 32.43 percent. However, the proportion of African Americans with bachelor's and advanced degrees is substantially lower than that of Whites (a difference of nearly 10 percentage points). Asians have the highest advanced-level education, and American Indians have the lowest level of educational attainment.

Table 2: Educational Attainment by Race	American Indian	Asian	Black or African American	Other Races	White
Less Than High School	16.47%	11.95%	11.04%	29.27%	9.75%
High School	42.35%	19.18%	36.97%	27.80%	33.06%
Some College (Career College Level)	**25.88%**	**14.47%**	**32.43%**	**24.88%**	**28.17%**
Bachelor's and Above	15.29%	54.40%	19.56%	18.05%	29.02%

BERC and American Community Survey (2005) at www.census.gov

Table 3 presents intergenerational differences in the educational attainment of Tennessee's workforce. Tennessee's workforce is changing as it ages. New workers (age 25-34) have the highest rate of career-level college education at 30.54 percent, and the numbers fall as the workforce ages. Only 24.70 percent of employees approaching retirement (age 55-64) have a career-level college education. The difference between new recruits and those approaching retirement age in terms of educational attainment is quite revealing, suggesting a trend toward hiring people with more formal education.

Table 3: Educational Attainment by Age Group

	Age 25-34	Age 35-44	Age 45-54	Age 55-64
Less Than High School	8.44%	9.52%	10.56%	13.15%
High School	30.10%	33.82%	34.82%	34.12%
Some College (Career College Level)	**30.54%**	**29.72%**	**28.00%**	**24.70%**
Bachelor's and Above	30.92%	26.94%	26.61%	28.03%

BERC and American Community Survey (2005) at www.census.gov

How does income differ according to educational attainment, sex, race, and age?

On average, members of Tennessee's workforce with a career-level college education command a substantially higher income than employees with only a high school education or less, a difference of at least $6,000 per year. In terms of gender gap, women earn substantially less than men across the board. However, at the advanced-degree level, the earnings gap between men and women is much greater than at the career college level. Women with advanced degrees earn nearly $40,000 less than their male counterparts, while women with career-level college education earn just $16,432 less than men with the same level of education.

Although Table 4 indicates a substantial gender gap in terms of earnings by educational attainment, a certain portion of this may be due to the number of hours worked and the career choices of women.

Table 4: Average Earnings by Educational Attainment and Gender

Educational Attainment	Male	Female	Average
Bachelor's Degree	$67,457	$37,727	$53,121
Graduate Degree Plus	$88,203	$48,229	$68,177
High School	$34,935	$21,068	$28,360
Less Than High School	$28,832	$16,063	$23,965
Some College (Career)	**$43,490**	**$27,058**	**$34,754**
Average	$47,474	$28,356	$38,201

BERC and American Community Survey (2005) at www.census.gov

When looking at differences according to race (Table 5), we find that Asians with career-level college education earn as much as Asians with bachelor's degrees. At nearly every level of education, African Americans earn less than other racial groups with similar training while Whites out-earn other races at every educational level. Across all racial groups, people with career-level college training earn more than those with a high school education or less, on average a difference of about six to ten thousand dollars. As Table 5 shows, the career college level of education makes the most consistent difference in earnings potential, regardless of race.

Table 5: Average Earnings by Educational Attainment and Race

Educational Attainment	American Indian	Asian	Black or African American	Other Races	White	Average
Bachelor's Degree	$34,033	$42,694	$41,816	$43,010	$54,543	$53,121
Graduate Degree Plus	$78,725	$70,381	$52,217	$51,767	$69,757	$68,177
High School	$23,161	$39,122	$24,363	$25,480	$28,965	$28,360
Less Than High School	$26,736	$20,358	$19,302	$18,515	$25,034	$23,965
Some College (Career)	**$30,264**	**$42,215**	**$29,230**	**$31,007**	**$35,666**	**$34,754**
Average	$29,354	$48,284	$29,510	$28,784	$39,482	$38,201

BERC and American Community Survey (2005) at www.census.gov

Similarly, when comparing intergenerational difference in earnings we see that the career-level college education accounts for the most consistent difference (Table 6). In every age group, those with career-level college training command higher earnings than those with a high school education or less. The difference in earnings potential

widens with age. On average, new recruits age 25-34 with career-level college training earn nearly $9,000 more than new recruits with less than high school training. But those workers nearing retirement (age 55-64) earn more than $12,000 more than their cohorts with high school level training or less.

Table 6: Average Earnings by Educational Attainment and Age Group

Educational Attainment	Age 25-34	Age 35-44	Age 45-54	Age 55-64	Average
Bachelor's Degree	$36,284	$57,101	$63,524	$58,814	$53,121
Graduate Degree Plus	$50,052	$70,208	$76,739	$71,506	$68,177
High School	$23,316	$27,982	$31,073	$30,122	$28,360
Less Than High School	$18,450	$22,931	$26,217	$26,616	$23,965
Some College (Career)	**$27,354**	**$35,825**	**$37,801**	**$38,833**	**$34,754**
Average	$29,423	$38,874	$42,442	$41,507	$38,201

BERC and American Community Survey (2005) at www.census.gov

How does a career college education affect earnings by industry?

As mentioned above, some of the large gender and racial gaps in earnings by educational attainment may be due to the career choice of individuals. Table 7 clearly demonstrates the effect of sectoral choice on earnings by educational attainment. The earnings difference attributable to a career-level college education is consistent across a wide variety of career fields. Nearly every industry surveyed pays substantially higher wages to workers with career-level college training than to those with high school level training or less. The largest difference is in the field of mining, oil, and gas, in which a career-level college education accounts for an average earnings difference of nearly $70,000. Eleven of the 18 industries surveyed report a pay difference of more than $10,000 for workers with career-level college training versus high school education or less. Only the field of agriculture showed a negative difference of $1,877 for higher educational attainment. The substantial impact of career college education on earnings potential spans a broad spectrum of industries.

Table 7: Average Industry Pay by Educational Attainment

Industry	Less Than High School	Some College (Career)	Difference
Government	$29,023	$35,799	$6,777
Agriculture	$29,643	$27,766	-$1,877
Construction	$28,478	$37,962	$9,484
Education	$14,240	$19,562	$5,323
Leisure and Hospitality	$14,536	$25,217	$10,681
Mining, Oil, and Gas	$28,889	$98,667	$69,778
Financial Services	$29,984	$40,419	$10,435
Information	$35,227	$44,748	$9,520
Healthcare	$21,034	$31,954	$10,920
Manufacturing-Apparel	$24,321	$40,767	$16,446
Manufacturing-Chemical	$29,677	$43,509	$13,832
Manufacturing-Machine	$25,617	$40,287	$14,670
Professional Services	$20,046	$34,379	$14,334
Retail	$19,826	$29,552	$9,726
Social Services	$12,448	$18,788	$6,340
Personal Services	$17,265	$27,985	$10,720
Transportation	$39,365	$42,532	$3,167
Utilities	$26,794	$48,999	$22,205
Wholesale	$25,170	$40,601	$15,431
Average	$23,965	$34,754	$10,789

BERC and American Community Survey (2005) at www.census.gov

II.D. Trends in Employment by Industry and Occupation

As we have seen, industries are increasingly hiring workers with more formal training. The difference between the level of educational attainment in new recruits and that of workers approaching retirement is clear evidence of this trend. As Table 8 demonstrates, out of 17 industries surveyed, 13 show an increase in the number of employees with career-level college education when comparing the youngest and oldest age groups. The largest intergenerational differences, more than 15 percent, occur in the areas of information and personal services. Only four industries report a decreasing trend in educational attainment.

Table 8: Educational Difference between New Recruits and Workers Approaching Retirement Age by Major Sectors

	High School and Below			Some College (Career)			Bachelor's Degree and Above		
	Age 25-34	Age 55-64	Difference	Age 25-34	Age 55-64	Difference	Age 25-34	Age 55-64	Difference
Information	19.15%	42.86%	-23.71%	39.72%	24.18%	15.54%	41.13%	32.97%	8.17%
Personal Services	43.64%	53.21%	-9.58%	36.73%	21.43%	15.30%	19.64%	25.36%	-5.72%
Social Services	29.92%	54.41%	-24.49%	31.50%	17.65%	13.85%	38.58%	27.94%	10.64%
Manufacturing-Chemical	43.89%	55.67%	-11.78%	31.67%	21.18%	10.48%	24.44%	23.15%	1.29%
Leisure and Hospitality	50.74%	58.92%	-8.18%	32.14%	22.70%	9.43%	17.12%	18.38%	-1.25%
Healthcare	20.30%	37.68%	-17.39%	37.91%	28.63%	9.28%	41.79%	33.68%	8.11%
Retail	45.66%	57.34%	-11.68%	34.44%	26.64%	7.80%	19.91%	16.02%	3.88%
Manufacturing-Machine	57.35%	65.27%	-7.92%	28.68%	22.20%	6.48%	13.97%	12.53%	1.45%
Transportation	46.94%	58.71%	-11.77%	35.92%	29.92%	5.99%	17.14%	11.36%	5.78%
Professional Services	26.87%	31.00%	-4.13%	30.52%	25.07%	5.45%	42.61%	43.94%	-1.32%
Administration-Government	20.19%	33.09%	-12.90%	38.97%	33.82%	5.15%	40.85%	33.09%	7.75%
Manufacturing-Apparels	61.71%	71.82%	-10.11%	25.23%	20.99%	4.23%	13.06%	7.18%	5.88%
Education	9.48%	23.09%	-13.62%	12.70%	10.18%	2.53%	77.82%	66.73%	11.09%
Construction	71.58%	65.51%	6.07%	20.30%	22.15%	-1.85%	8.12%	12.34%	-4.22%
Wholesale	41.67%	44.92%	-3.25%	29.17%	31.55%	-2.38%	29.17%	23.53%	5.64%
Financial Services	24.43%	28.92%	-4.49%	32.49%	38.15%	-5.66%	43.07%	32.92%	10.15%
Utilities	40.74%	34.78%	5.96%	29.63%	40.58%	-10.95%	29.63%	24.64%	4.99%

BERC and American Community Survey (2005) at www.census.gov

Furthermore, when we examine occupations and trends in educational attainment, we see even more dramatic intergenerational differences as the number of new workers with career-level college education increases compared to the number of outgoing employees. As reflected in Table 9, in the area of healthcare support occupations, 23.39 percent more new recruits have attained career college level training than their soon-to-retire cohorts. Likewise, occupations related to installation, maintenance, and repair; food preparation and service; and protective service all show increases in the number of career college educated personnel of more than 10 percent. Of the 22 occupational areas surveyed, 16 showed increases in the level of educational attainment at the career college level. Thus, the structure of occupations by educational attainment is changing dramatically as the educational attainment level of new entrants and those approaching retirement age demonstrates.

Table 9: Educational Difference between New Recruits and Workers Approaching Retirement Age by Occupational Categories

	High School and Below			Some College (Career)			Bachelor's Degree and Above		
	Age 25-34	Age 55-64	Difference	Age 25-34	Age 55-64	Difference	Age 25-34	Age 55-64	Difference
Healthcare Support Occupations	46.53%	71.05%	-24.52%	44.44%	21.05%	23.39%	9.03%	7.89%	1.13%
Installation, Maintenance, and Repair Occupations	50.92%	67.53%	-16.61%	43.22%	25.77%	17.45%	5.86%	6.70%	-0.84%
Food Preparation and Serving Related Occupations	64.31%	82.79%	-18.47%	25.88%	13.11%	12.77%	9.80%	4.10%	5.71%
Protective Service Occupations	26.92%	45.68%	-18.76%	50.96%	40.74%	10.22%	22.12%	13.58%	8.54%
Building and Grounds Cleaning and Maintenance Occupations	65.31%	77.78%	-12.47%	26.53%	16.37%	10.16%	8.16%	5.85%	2.32%
Healthcare Practitioners and Technical Occupations	6.23%	16.16%	-9.92%	37.41%	27.51%	9.90%	56.36%	56.33%	0.03%
Production Occupations	68.07%	76.97%	-8.90%	27.73%	17.98%	9.75%	4.20%	5.05%	-0.85%
Arts, Design, Entertainment, Sports, and Media Occupations	16.96%	27.69%	-10.73%	36.61%	27.69%	8.91%	46.43%	44.62%	1.81%
Community and Social Services Occupations	5.05%	14.44%	-9.39%	17.17%	8.89%	8.28%	77.78%	76.67%	1.11%
Personal Care and Service Occupations	50.57%	62.07%	-11.50%	37.50%	29.31%	8.19%	11.93%	8.62%	3.31%
Transportation and Material Moving Occupations	66.33%	73.90%	-7.57%	27.81%	19.65%	8.16%	5.87%	6.45%	-0.58%
Management Occupations	19.91%	28.05%	-8.15%	31.62%	25.19%	6.43%	48.48%	46.76%	1.72%
Office and Administrative Support Occupations	34.48%	48.85%	-14.38%	43.13%	37.53%	5.60%	22.39%	13.61%	8.78%
Computer and Mathematical Occupations	4.46%	17.95%	-13.48%	32.14%	28.21%	3.94%	63.39%	53.85%	9.55%
Education, Training, and Library Occupations	7.82%	9.91%	-2.09%	12.22%	8.45%	3.77%	79.95%	81.63%	-1.68%
Sales and Related Occupations	35.68%	42.58%	-6.91%	30.53%	30.02%	0.51%	33.79%	27.40%	6.39%
Life, Physical, and Social Science Occupations	4.65%	21.88%	-17.22%	9.30%	9.38%	-0.07%	86.05%	68.75%	17.30%
Construction and Extraction Occupations	77.48%	71.49%	5.99%	18.56%	20.85%	-2.29%	3.96%	7.66%	-3.70%
Legal Occupations	10.91%	6.82%	4.09%	14.55%	18.18%	-3.64%	74.55%	75.00%	-0.45%
Farming, Fishing, and Forestry Occupations	95.24%	80.95%	14.29%	0.00%	4.76%	-4.76%	4.76%	14.29%	-9.52%
Engineers and Architects	10.71%	12.94%	-2.23%	19.64%	25.88%	-6.24%	69.64%	61.18%	8.47%
Business and Financial Operations Occupations	11.59%	23.71%	-12.12%	20.60%	27.84%	-7.23%	67.81%	48.45%	19.36%

BERC and American Community Survey (2005) at www.census.gov

As Tables 8 and 9 indicate, employment trends as examined by major sectors and occupations have changed considerably over the past three decades. If we assume that the educational attainment level of workers age 55-64 is the same today as it was when they were first hired nearly three decades ago, the change in skill composition by industry and occupation is significant. Tables 8 and 9 suggest that the demand for labor force with career-level college education is likely to increase in Tennessee. For example, the demand for career-level college skills increased as much as 23 percentage points in certain industries between 1975 and 2005, as the difference between skill sets of age cohorts age 25-34 and 55-64 indicates. In this context, career colleges play a considerable role in meeting the demand for an increasingly skilled labor force.

II.E. Skilled Labor Force Supply and Demand

As of 2005, nearly one-third of jobs in major occupational categories required a career-level college education. In fact, this may be an understatement of the role career college level education will play in the next decade because of the massive number of baby boomers that will reach retirement age around 2015. The data utilized in this section comes from different sources: employment projections by occupation are from the Tennessee Department of Labor and Workforce Development, replacement rates are calculated from the American Community Survey (2005) using employment by occupation by age cohort, and educational attainment level by occupations is also calculated using the American Community Survey (2005).

Table 10: Demand for Workforce (New Jobs and Replacement) (2004-2014)

Occupational Title	Current (2004)	Projected (2014)	Change (2004-2014)	Replacement Rate	Total Replacement	Total Demand for Workforce
Total, All Occupations	2,901,010	3,362,460	461,450		544,529	1,005,979
Office and Administrative Support Occupations	467,720	518,300	50,580	20.8%	97,333	147,913
Sales and Related Occupations	280,450	317,560	37,120	22.2%	62,344	99,464
Transportation and Material Moving Occupations	277,230	316,470	39,250	18.8%	51,981	91,231
Management Occupations	176,480	210,920	34,450	23.0%	40,590	75,040
Production Occupations	328,500	342,750	14,250	18.0%	59,229	73,479
Food Preparation and Serving Related	218,180	258,190	40,010	15.0%	32,662	72,672
Education, Training, and Library Occupations	153,790	187,110	33,320	21.1%	32,434	65,754
Healthcare Practitioners and Technical	150,780	185,950	35,160	15.2%	22,888	58,048
Installation, Maintenance, and Repair	124,640	146,610	21,970	17.9%	22,323	44,293
Building and Grounds Cleaning and Maintenance	105,440	125,570	20,130	20.8%	21,953	42,083
Construction and Extraction Occupations	123,630	145,230	21,600	15.4%	19,076	40,676
Business and Financial Operations	84,100	105,010	20,910	19.7%	16,526	37,436
Healthcare Support Occupations	63,990	83,600	19,610	16.6%	10,642	30,252
Personal Care and Service Occupations	76,230	86,700	10,480	19.5%	14,857	25,337
Protective Service Occupations	57,480	70,990	13,510	17.1%	9,841	23,351
Community and Social Services Occupations	43,990	55,700	11,710	21.1%	9,295	21,005
Computer and Mathematical Occupations	39,840	52,430	12,590	10.0%	3,964	16,554
Arts, Design, Entertainment, Sports, and Media	39,550	47,910	8,370	15.6%	6,150	14,520
Legal Occupations	15,870	20,170	4,300	21.3%	3,374	7,674
Farming, Fishing, and Forestry Occupations	21,020	23,050	2,030	20.0%	4,204	6,234
Life, Physical, and Social Science	15,220	18,110	2,890	18.8%	2,864	5,754

BERC, Tennessee Department of Labor and Workforce Development, and American Community Survey (2005) at www.census.gov

According to Table 10, total demand for workforce is expected to be more than one (1) million between 2004 and 2014. This includes new additions and replacements

but excludes turnovers. The top five major occupational categories (office and administrative support, sales and related, transportation and material moving, management, and production occupations) account for nearly half of the workforce need in the next decade. Furthermore, demand for an educated workforce for replacement employees in these occupational areas is projected to grow at rates ranging from 18 to 23 percent with a total demand for more than 500,000 replacement workers by 2014.

Table 11: Average Annual Workforce Demand and Share of Workforce with Career College Level Training

Occupational Title	Average Annual Demand	Percent of Workforce with Career College Degree	Estimated Number of Career College Level Training
Total, All Occupations	90,797		28,082
Office and Administrative Support Occupations*	13,447	43.13%	5,800
Sales and Related Occupations	9,042	30.53%	2,761
Transportation and Material Moving Occupations*	8,294	27.80%	2,306
Management Occupations*	6,822	32.00%	2,183
Healthcare Practitioners and Technical*	5,277	37.40%	1,974
Production Occupations*	6,680	27.73%	1,852
Installation, Maintenance, and Repair*	4,027	43.22%	1,740
Food Preparation and Serving Related	6,607	25.88%	1,710
Healthcare Support Occupations*	2,750	44.44%	1,222
Protective Service Occupations*	2,123	50.96%	1,082
Building and Grounds Cleaning and Maintenance	3,826	26.53%	1,015
Personal Care and Service Occupations*	2,303	37.50%	864
Education, Training, and Library Occupations	5,978	12.22%	730
Business and Financial Operations*	3,403	21.00%	715
Construction and Extraction Occupations	3,698	18.56%	686
Arts, Design, Entertainment, Sports, and Media*	1,320	36.61%	483
Computer and Mathematical Occupations*	1,505	32.00%	482
Community and Social Services Occupations	1,910	17.17%	328
Legal Occupations	698	14.55%	102
Life, Physical, and Social Science	523	9.30%	49
Farming, Fishing, and Forestry Occupations	567	0.00%	0

BERC, IPEDS, Tennessee Department of Labor and Workforce Development, and American Community Survey at www.census.gov.

*Star next to the occupational categories indicates the concentration of many private career collges based on the primary field of completion data.

As Table 11 clearly demonstrates, nearly one-third of the annual workforce needs in major occupational categories requires increasing numbers of career-level college

educated employees. Based on the data presented in Table 11, annually, Tennessee needs 28,082 people with career-level college training across the major occupational categories. A particularly important observation of Table 11 is that several occupational categories (office and administrative support occupations; healthcare practitioners and technical occupations; installation, maintenance, and repair occupations; healthcare support occupations; and protective service occupations) require more than 40 percent of new recruits to have a career-level college education.

Given the increasing demand for workforce with career-level college education, what is the supply of workforce at this level of education in Tennessee? Table 12 below summarizes the demand and supply conditions of the workforce with a career-level college education. According to the BERC's estimates, nearly 22,000 people obtain career-level college training each year. If we assume that all of these individuals enter the job market upon graduation, which is not the case for many trainees who go to school while they continue to work, Tennessee will need more than 6,000 more career-level college trained workers than are available each year.

Table 12: Workforce Supply and Demand With Regard to Career College Level Training

Annual Demand for Workforce with Some Training Beyond High School, but Less Than Bachelor's	28,082
Annual Supply for Workforce with Some Training Beyond High School, but Less Than Bachelor's	21,754
By Career Colleges	***7,282***
By Private not-for-profit	*614*
By Public	*13,868*
Supply-Demand Gap (Excess Demand)	**-6,328**
Share of Career Colleges in Total Supply	**33.47%**

BERC, IPEDS, Tennessee Department of Labor and Workforce Development, and American Community Survey at www.census.gov.

As we will revisit in the next chapter, private for-profit institutions defined as career colleges in this report supply more than 33 percent of workers with a career-level college education. While it is difficult to assign career college graduates to broader

occupational categories based on their primary field of concentration, however, it would be useful to examine the rate of career college degree completion by primary field of concentration in order to show how closely many of these fields align with major high growth occupational categories. As depicted in Table 13, the largest number of completed degrees occurs in the fields of the health professions and related clinical sciences, personal and culinary services, and mechanic and repair technology. All of these areas are experiencing significant growth in demand for an educated workforce.

Table 13: Primary Areas of Concentration of Career College Graduates	Number of Degree Completions
Business, management, marketing, and related support services	324
Communications technologies/technicians and support services	3
Computer and information sciences and support services	443
Construction trades	13
Engineering technologies/technicians	393
Health professions and related clinical sciences	2,680
Legal professions and studies	170
Mechanic and repair technologies/technicians	1,412
Personal and culinary services	1,741
Security and protective services	27
Visual and performing arts	76
Grand total	7,282

BERC and IPEDS

II.F. Value of a Postsecondary Education

Workforce demand and supply analysis indicates that Tennessee is likely to experience a substantial deficit in the number of skilled workforce with career-level college education. An obvious question then is whether it is worth pursuing an additional year of schooling for those in Tennessee with a high school education or less. A vast number of the literature that appeared in the past decade suggests that it is worth pursuing an additional year of schooling for such individuals.

In this paper, we would like to briefly mention the general conclusions of a substantial number of studies, especially in North America, and specify our model to

address the value of an additional year of schooling in Tennessee. A reference section at the end of this study will include the papers reviewed for this part of the study. The ultimate question in much economic development and growth literature has been what role human capital, measured as years of schooling, plays in economic prosperity. Micro-level studies often look at the variations in the earnings of individuals and account for those variations by an individual's years of schooling and experience. Mincer's (1974) seminal study shows the relationship between earnings and education at the micro level. Using Mincer (1974) as an equation model, subsequent micro-level analyses find that additional years of schooling result in statistically significant monetary returns. A significant number of studies emerged utilizing a variant of Mincer's original formulation.

While Mincerian-type modeling has suggested a significant return on education, a different type of inquiry has been developed that aims to explain significant variations in economic growth across nations. Some of these macro-level studies focus on the convergence hypothesis, which analyzes how schooling affects output growth per capita over five-, 10-, or 20-year periods, given the initial income level. Examples of macro-level analyses include Romer (1990), Mankiw et al. (1992), Barro and Lee (1993), and Benhabib and Spiegel (1994). Krueger and Lindahl (2001) provide useful discussions of these studies, their data, and measurement issues. A critical review of some theoretical and empirical studies indicates that competitiveness of countries, regions, governments, businesses, and individuals vitally depends on investment in education.

II.F.1. Empirical Model

The conceptual framework used in this study follows Mincer's (1974) seminal work, which shows the relationship between earnings and educational attainment at the micro level. The standard form of this Mincerian equation can be specified as

$$\ln Y = \alpha + \beta_1 S + \beta_2 MAGE + \beta_3 MAGE^2 + \varepsilon ,$$

where *lnY* = natural log of individual's earning, *S* = years of schooling for given individuals, and *MAGE* and *MAGE2* = experience of person and square of experience, respectively. For simplicity, subscripts are eliminated. In order to account for variations in earnings due to number of work hours, we also added number of hours worked as an additional indicator:

$$\ln Y = \alpha + \beta_1 S + \beta_2 MAGE + \beta_3 MAGE^2 + \beta_4 HW + \varepsilon ,$$

where *HW* = number of hours worked per week. We expect that earned income is significantly positively related to number of hours worked per week. Excluding this indicator produces biased estimates of the relationship between earnings and schooling. In this model, then, the natural logarithm of earned income is expressed as a function of years of schooling, experience, the quadratic function of experience, and the number of weekly hours worked.

II.F.2. Data

Tennessee data come from the American Community Survey (2005). Before running the analysis we filtered the data based on the following criteria:

- employment (only people who are employed are included in the analysis),

- age (only people ages 25-64 are selected),
- work (only people who work at least one (1) hour a week are selected), and
- earned income (only people who have earned income from the work are selected).

II.F.3. Indicators

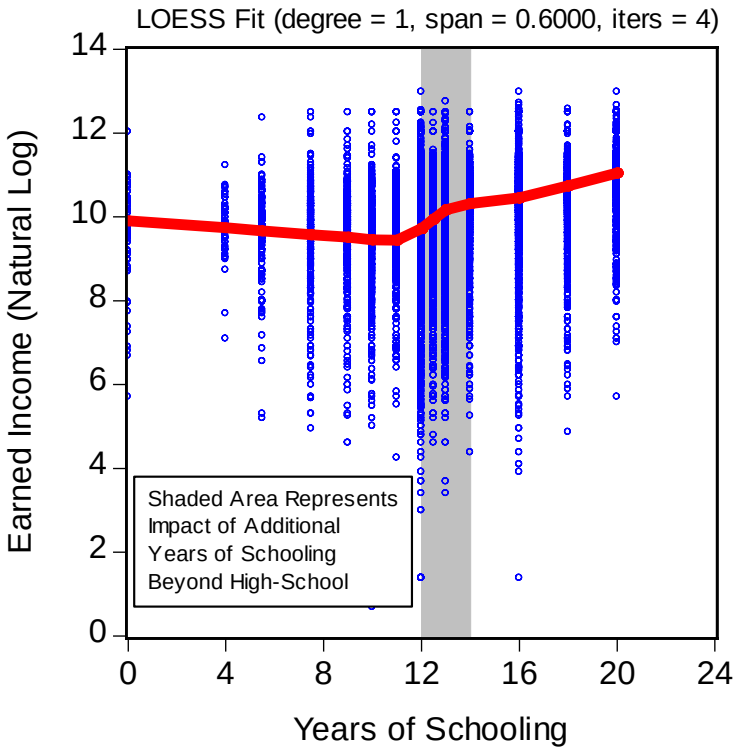
Indicators utilized in this study are calculated as follows:

- Earnings (ln*Y*) = natural log of earnings,
- Experience (*MAGE*) = (*AGE*-6) - *S*(*YEARS OF SCHOOLING)*,
- Years of schooling (*S)* = is calculated from detailed educational attainment data, and
- Hours worked (*HW*) = actual number of hours worked weekly.

II.F.4. Results

As reflected in Figure 1, a nonparametric data smoothing method (loess fit) is utilized to show the relationship between income and years of schooling. According to Figure 1, earned income takes a significant upturn at the year of schooling that corresponds with career-level college training. This preliminary observation suggests that additional schooling beyond high school, especially about 18 months of postsecondary schooling, creates significant benefits for individuals through increases in their earnings.

Figure 1: Income versus Years of Schooling in Tennessee (N=25,386)



Controlled by experience and work hours, how much does an additional year of education contribute to an individual's earning? On average, regression results indicate that each additional year of schooling increases earned income by 11.4 percent in Tennessee.

Table 14: Value of Additional Year of Schooling: General Regression Results

Dependent Variable: Natural Logarithm of Earned Income (lnincome)			
Independent Variables	Parameter Values	t-Value	Standard Error
Intercept	6.459	147.50	0.043
Year of Schooling	**0.114**	**52.07**	**0.002**
Experience	0.029	13.20	0.002
Experience Squared	-0.0004	-9.12	0.000
Work Hours	0.042	84.34	0.000
N	25,386		
Adj. R^2	0.301		
Average Income	$24,984		
Average Year of Schooling	13.45		

Note: All parameters are statistically significant and have expected signs.

How does this relationship vary according to gender? Other things being equal, results by gender (Table 15) indicate that each additional year of schooling increases the earned income of males and females by 11.9 percent. So both men and women benefit equally from the value of a career college education, although the model for females is more robust (R^2 is larger then the model for males).

Table 15: Value of Additional Year of Schooling: Results by Gender

Dependent Variable: Natural Logarithm of Earned Income (lnincome)		
	Male	Female
Independent Variables	Parameter Values	Parameter Values
Intercept	6.987	6.124
	(122.04)	(93.74)
Year of Schooling	**0.119**	**0.119**
	(42.47)	**(35.92)**
Experience	0.040	0.021
	(13.23)	(6.75)
ExperienceSquare	-0.001	0.000
	(-10.03)	(-4.17)
Work Hours	0.029	0.047
	(41.31)	(65.48)
N	13,073	12,313
Adj. R^2	0.248	0.325
Average Income	$32,500	$18,883
Average Year of Schooling	13.34	13.55

Note 1: All parameters are statistically significant and have expected signs.
Note 2: Values in parentheses are t-values.

When examining the value of a career college education for different age groups, we see that all age groups experience earnings increases for each additional post-secondary year of schooling. However, there is a clear intergenerational difference, as the largest income impact for the 35-44 age bracket, which enjoys a 13.3 percent increase in income for each additional year of schooling, clearly indicates. The youngest age group, 25-34, with a 13 percent income impact, closely follows this age group (Table 16).

Table 16: Value of Additional Year of Schooling: Regression Results by Age Cohort

Dependent Variable: Natural Logarithm of Earned Income (lnincome)				
	Age 25-34	Age 35-44	Age 45-54	Age 55-64
Independent Variables	Parameter Values	Parameter Values	Parameter Values	Parameter Values
Intercept	6.096	6.796	8.839	10.742
	(50.09)	(29.92)	(20.32)	(11.13)
Year of Schooling	**0.130**	**0.133**	**0.113**	**0.071**
	(22.73)	**(24.28)**	**(21.67)**	**(10.12)**
Experience	0.035	-0.041	-0.118	-0.146
	(2.99)	(-2.14)	(-4.37)	(-3.16)
ExperienceSquare	0.000	0.001	0.002	0.001
	(-0.43)	(3.05)	(4.51)	(2.81)
Work Hours	0.042	0.043	0.038	0.042
	(41.39)	(48.22)	(41.19)	(10.12)
N	5,986	7,060	7,481	4,859
Adj. R^2	0.294	0.323	0.273	0.295
Average Income	$20,537	$25,540	$27,945	$25,848
Average Year of Schooling	13.610	13.428	13.371	13.381

Note 1: All parameter values are statistically significant and have expected signs, except experience indicators across the age cohorts, where they are either insignificant, have wrong signs, or both.
Note 2: Values in parentheses are t-values.

When we break down the earning impact by race, Table 17 shows that each additional year of schooling benefits African Americans the most, an income increase of 12.2 percent per year of postsecondary education.

Table 17: Value of Additional Year of Schooling: Regression Results by Major Population Segments

Dependent Variable: Natural Logarithm of Earned Income (lnincome)				
	White	Black	Asian	Other Races
Independent Variables	Parameter Values	Parameter Values	Parameter Values	Parameter Values
Intercept	6.432	6.344	7.857	7.016
	(135.09)	(47.16)	(21.73)	(21.41)
Year of Schooling	**0.115**	**0.122**	**0.086**	**0.061**
	(48.13)	**(16.90)**	**(5.67)**	**(4.91)**
Experience	0.029	0.026	0.031	0.008
	(12.41)	(4.14)	(1.47)	(0.41)
ExperienceSquare	-0.0004	-0.0003	-0.0004	0.0000
	(-8.78)	(-2.54)	(-0.79)	(0.09)
Work Hours	0.042	0.039	0.017	0.047
	(79.29)	(26.85)	(4.54)	(10.39)
N	21,557	3,016	318	410
Adj. R^2	0.307	0.269	0.151	0.249
Average Income	$25,719	$20,599	$30,761	$18,921
Average Year of Schooling	13.507	13.109	14.759	11.858

Note 1: All parameter values are statistically significant and have expected signs, except experience indicators for Asian and "other races" segments.
Note 2: Values in parentheses are t-values.

The impact of postsecondary education on income varies according to industry. The largest impact of additional years of schooling occurs, as presented in Table 18, in the fields of education (13.7 percent), financial services (14.8 percent), healthcare (14.9 percent), manufacturing-chemical (15.4 percent), professional services (17 percent), and utilities (15.2 percent).

Table 18: Value of Additional Year of Schooling: Regression Results by Major Sectors

Dependent Variable: Natural Logarithm of Earned Income (lnincome)

	Government	Construction	Education	Leisure and Hospitality	Financial Services	Information	Healthcare	Manufacturing-Apparel	Manufacturing-Chemical
Independents	Values	Values	Values	Values	Values	Values	Values	Values	Values
Intercept	7.234	7.461	5.811	6.678	6.501	7.177	6.542	6.293	6.764
	(39.83)	(42.02)	(51.37)	(37.28)	(35.33)	(21.29)	(58.30)	(27.34)	(28.66)
Schooling	**0.096**	**0.065**	**0.137**	**0.062**	**0.148**	**0.079**	**0.149**	**0.101**	**0.154**
	(11.61)	**(6.62)**	**(22.86)**	**(6.15)**	**(14.94)**	**(4.42)**	**(26.79)**	**(7.97)**	**(13.75)**
Experience	0.033	0.028	0.012	0.018	0.044	0.039	0.046	0.026	0.017
	(4.07)	(3.00)	(2.07)	(1.87)	(5.32)	(2.76)	(8.55)	(2.27)	(1.52)
ExperienceSq.	-0.0005	-0.0004	0.0000	-0.0003	-0.0007	-0.0007	-0.0008	-0.0003	-0.00002
	(-3.29)	(-2.33)	(-0.05)	(-1.73)	(-4.04)	(-2.48)	(-7.54)	(-1.48)	(-0.10)
Work Hours	0.033	0.035	0.046	0.048	0.031	0.041	0.027	0.052	0.028
	(14.43)	(17.06)	(32.99)	(25.67)	(15.87)	(11.72)	(21.05)	(16.97)	(8.94)
N	1,206	1,873	2,223	11,413	1,567	501	2,776	998	968
Adj. R^2	0.236	0.166	0.498	0.347	0.262	0.254	0.352	0.293	0.242
Average Income	$32,332	$23,766	$22,560	$13,609	$33,467	$33,107	$29,194	$26,686	$34,431
Average Schooling	13.960	11.931	15.686	12.589	13.936	14.014	14.457	12.341	12.997

	Manufacturing-Machine	Professional Services	Retail	Social Services	Personal Services	Transportation	Utilities	Wholesale
Independents	Values	Values	Values	Values	Values	Values	Values	Values
Intercept	7.010	5.538	6.363	6.291	6.699	7.163	5.886	6.077
	(48.31)	(33.58)	(42.28)	(20.77)	(31.65)	(37.94)	(16.65)	(25.70)
Schooling	**0.134**	**0.170**	**0.099**	**0.086**	**0.0676**	**0.124**	**0.152**	**0.139**
	(17.26)	**(20.42)**	**(11.80)**	**(5.27)**	**(6.03)**	**(11.92)**	**(9.06)**	**(11.40)**
Experience	0.021	0.029	0.014	-0.015	0.029	0.041	0.042	0.042
	(3.05	(3.39)	(1.94)	(-0.96)	(2.41)	(4.27)	(2.92)	(3.79)
ExperienceSq.	-0.0002	-0.0004	-0.0002	0.0006	-0.0005	-0.0005	-0.0005	-0.0005
	(-1.46)	(-2.10)	(-1.28)	(1.86)	(-2.07)	(-2.81)	(-1.71)	(-2.71)
Work Hours	0.028	0.044	0.049	0.051	0.045	0.022	0.048	0.042
	(14.52)	(22.27)	(33.06)	(15.51)	(22.23)	(13.29)	(8.02)	(15.95)
N	2,626	2,025	2,571	451	1,229	1,331	305	908
Adj. R^2	0.186	0.361	0.331	0.404	0.328	0.213	0.379	0.325
Average Income	$29,296	$26,334	$18,314	$11,452	$15,309	$32,975	$40,921	$30,983
Average Schooling	12.552	14.178	12.947	13.375	13.141	12.936	13.457	13.183

Note 1: All parameter values of the variable of interest (schooling) are statistically significant and have expected signs.

Note 2: Values in parentheses are t-values.

What does this mean in terms of dollars? As Table 19 demonstrates, each additional year of postsecondary education adds thousands of dollars to earned income.

Table 19: Effect of Additional Year of Schooling on Income

	Average Income	Contribution of Additional Year of Schooling (Percent)	Contribution of Additional Year of Schooling to Income ($)
All Population	$24,984	11.40%	$2,848
By Gender			
Male	$32,500	11.90%	$3,868
Female	$18,883	11.90%	$2,247
By Age Cohort			
Age 25-34	$20,537	13.00%	$2,670
Age 35-44	$25,540	13.30%	$3,397
Age 45-54	$27,945	11.30%	$3,158
Age 55-64	$25,848	7.10%	$1,835
By Race			
White	$25,719	11.50%	$2,958
Black	$20,599	12.20%	$2,513
Asian	$30,761	8.60%	$2,645
Other Races	$18,921	6.10%	$1,154

Findings are based on the regression results.

The calculations in Table 19 are based on the average income of each population segment. According to Table 19, on average, each additional year of schooling contributes $2,848 to annual income.

In some industries, the contribution of each additional year of schooling can mean more than $4,000 of added income. In the utilities sector, each year of postsecondary education adds more than $6,000 to earned income. This is a significant impact on both the individual and the economy. According to Table 20, the lowest contribution of an additional year of schooling to earned income is in the leisure and hospitality and social services sectors, $844 and $985, respectively. As these results indicate, concentrations of individuals by gender and race in certain sectors may significantly affect their earnings potential due to an additional year of schooling. Because of data limitations, this study did not further stratify the data by race, gender, educational attainment and sector.

Table 20: Effect of Additional Year of Schooling on Income

	Average Income	Contribution of Additional Year of Schooling (Percent)	Contribution of Additional Year of Schooling to Income ($)
By Major Sectors			
Government	$32,332	**9.60%**	$3,104
Construction	$23,766	**6.50%**	$1,545
Education	$22,560	**13.70%**	$3,091
Leisure and Hospitality	$13,609	**6.20%**	$844
Financial Services	$33,467	**14.80%**	$4,953
Information	$33,107	**7.90%**	$2,615
Healthcare	$29,194	**14.90%**	$4,350
Manufacturing-Apparel	$26,686	**10.10%**	$2,695
Manufacturing-Chemical	$34,431	**15.40%**	$5,302
Manufacturing-Machine	$29,296	**13.40%**	$3,926
Professional Services	$26,334	**17.00%**	$4,477
Retail	$18,314	**9.90%**	$1,813
Social Services	$11,452	**8.60%**	$985
Personal Services	$15,309	**6.76%**	$1,035
Transportation	$32,975	**12.40%**	$4,089
Utilities	$40,921	**15.20%**	$6,220
Wholesale	$30,983	**13.90%**	$4,307

Findings are based on the regression results.

To conclude, this analysis shows that investment in an additional year of schooling beyond high school generates substantial returns to the individuals. Furthermore, certain population segments are more likely to benefit from an additional year of schooling, as the results by gender, race, and age cohort demonstrate. With the average number of years of schooling between 12 years and 13.5 years, career colleges are uniquely positioned to play an important role in realization of these benefits to individuals and ultimately to society. Given the important role career colleges have played in this process, the next section solely deals with Tennessee's career colleges and their operating impact on Tennessee's economy.

III. THE ROLE OF CAREER COLLEGES IN TENNESSEE'S ECONOMY

III.A. Introduction

As of 2005, nearly 35 percent of 152 postsecondary educational institutions in Tennessee were "private for-profit" institutions. For the purpose of this study, private for-profit institutions are defined as "career colleges." Given the increasing demand for a skilled workforce and structural changes in Tennessee's economy, career colleges are likely to play a critical role in supplying the needed skilled labor force and providing opportunities for nontraditional students, thereby contributing to a competitive business environment.

This part of the study evaluates the role of career colleges in Tennessee's economy by highlighting

- the characteristics of students
- the supply of skilled workforce
- the economic impact of operating expenditures and payroll, and
- the economic impact of the incremental earnings of their graduates.

Conceptually, public, private not-for-profit, and private for-profit institutions provide career-level college training in Tennessee. However, for the purpose of this study, all private for-profit institutions are labeled as "career colleges." The actual number of career colleges as defined here may be more than this study reflects.[11] However, in order

[11] In fact, according to Tennessee Higher Education Commission, there are more than 200 private for-profit institutions authorized to operate in Tennessee.

to compare career colleges with other types of institutions, the BERC relied on the Integrated Postsecondary Education Data System (IPEDS).

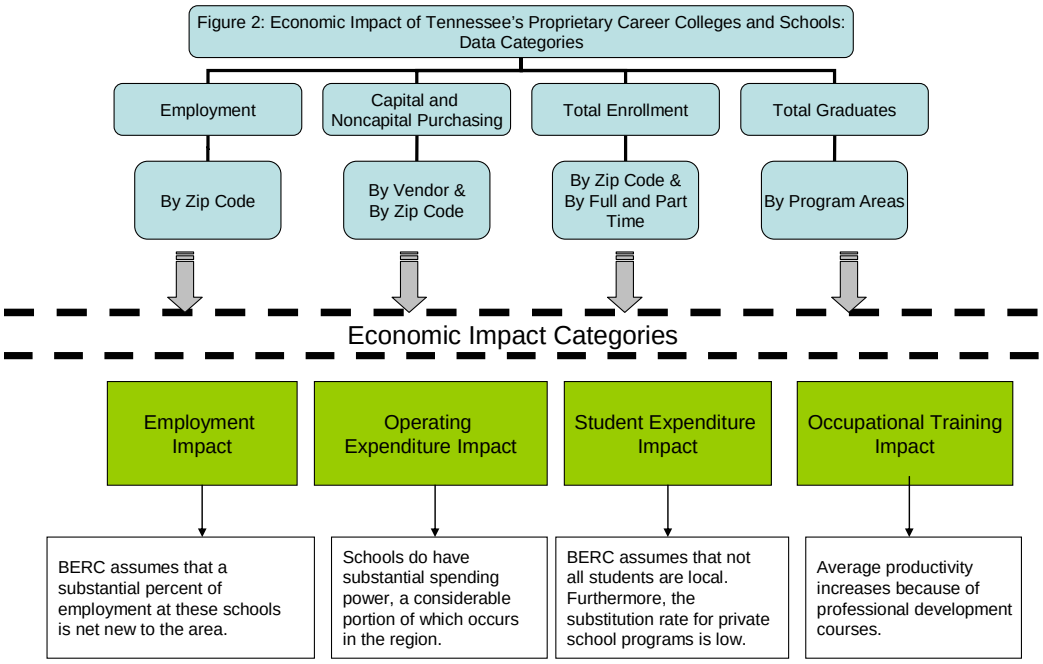
III.B. Background and Conceptual Framework

Modern higher education institutions embody a diverse set of missions and organizational goals that differently affect their surrounding regions, ranging from the traditional functions of teaching and public service to the recent activities of licensing inventions and engaging collaboratively in research with private sector industries (Glasson, 2003; Thanki, 1999). Goldstein, Maier, and Luger (1995) indicate eight functions of university's that lead to economic development impacts: (a) creation of knowledge, (b) human capital creation, (c) transfer of existing know-how, (d) technological innovation, (e) capital investment, (f) regional leadership, (g) influence on regional milieu, and (h) knowledge infrastructure production.

Goldstein and Drucker (2006) examine the influence of four-year colleges and universities in the United States at the metropolitan level, focusing on the internal and external factors that impact regional economies. They found that knowledge-based university activities, such as teaching and basic research, have a substantially positive impact on regional earnings. Furthermore, the impacts are higher in small and medium-sized regions than in large-sized regions. Although career colleges are not as big as many public and private not-for-profit universities in terms of their enrollments and missions, they nevertheless have similar economic impacts in many areas cited by Goldstein, Maier, and Lugar (1995). Furthermore, career colleges may be even more effective in certain economic areas as they are able to respond to the changing labor market conditions faster than many public and private for not-for-profit institutions.

The concept of economic impact deals with the impacts of new economic activities on a clearly defined region's economy. However, many economic impact studies for higher education institutions seek to quantify the economic impact of already operating institutions. In this case, it is important to carefully identify, using survey data from the institutions, the net new economic activities by counterfactually removing these institutions.

As illustrated in Figure 2, the conceptual framework for economic impact used in this study quantifies employment by zip code, capital and non-capital purchasing by vendor and zip code, total enrollment in career colleges by zip code and by full or part time, and total career college graduates by program areas. Economic impact categories include the employment impact, operating expenditure impact, student expenditure impact, and occupational training impact.



As clearly demonstrated in Figure 2, economic impact assumptions take into account only those activities that are net new to Tennessee due to the operation of career colleges. Although this study planned to include net new student expenditures into the economic impact assessment, a limited number of survey responses did not allow us to develop reasonable assumptions regarding the net new student expenditures. In terms of occupational training impact, this study utilizes earned income differentials between less than high school graduates and career-level college graduates as proxy to the occupational training impact assumption. This study's findings regarding economic impact of career colleges should be construed as short-term economic impact as we did not attempt to calculate lifetime earnings of individuals.

In the sections that follow, we first look at the profile of career colleges from a variety of perspectives to answer some common questions about these colleges and their graduates. Second, the study quantifies economic impacts of various activities of career colleges on Tennessee's economy. However, it is also important to note that economic impact of career colleges should be considered along with the findings of the previous chapter.

III.C. Career Colleges Compared to Other Educational Institutions

Career colleges as defined in this study represent more than a third, 34.8 percent, of all postsecondary institutions in Tennessee. More than 70 percent of these institutions provide occupational training. According to Table 21, there were 44 private for-profit

educational institutions offering 2-year and less-than 2-year training programs and nine (9) institutions offering 4-year and above degree programs as profiled in IPEDS.[12]

Table 21: General Characteristics of Post-Secondary Educational Institutions

Sector and Type	Number	Percent
Private for-Profit, 2-year and less-than 2-year (Career)	44	28.9%
Private for-Profit, 4-year or above (Career)	9	5.9%
Private not-for-profit, 2-year and less-than 2-year	5	3.3%
Private not-for-profit, 4-year or above	46	30.3%
Public, 2-year and less-than 2-year	39	25.7%
Public, 4-year or above	9	5.9%
Total	152	100.0%

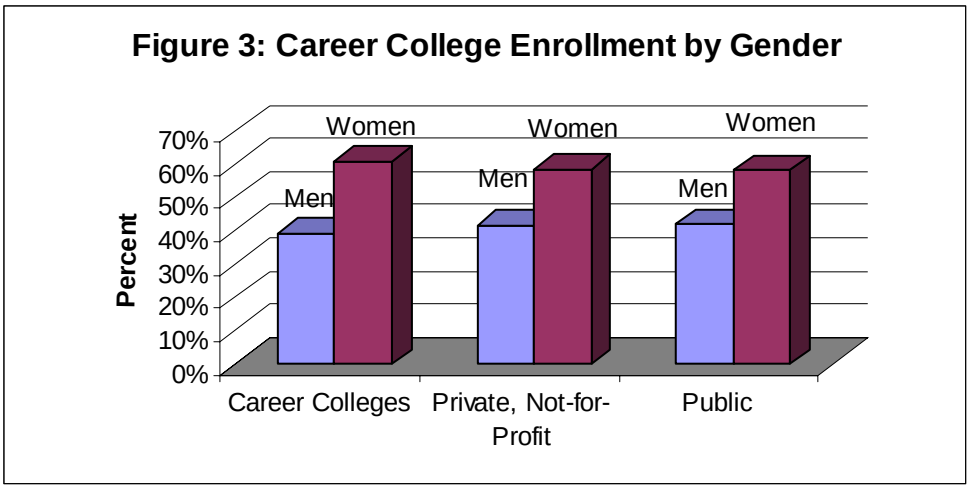
III.C.1. Enrollment

In Tennessee, a total of 366,644 people are enrolled in institutions of higher education. Of those, 72,247 (19.7 percent) are enrolled in private, not-for-profit institutions, 269,375 (73.5 percent) are enrolled in public institutions, and 25,022 (6.8 percent) are enrolled in career colleges.

What opportunities do career colleges provide for women?

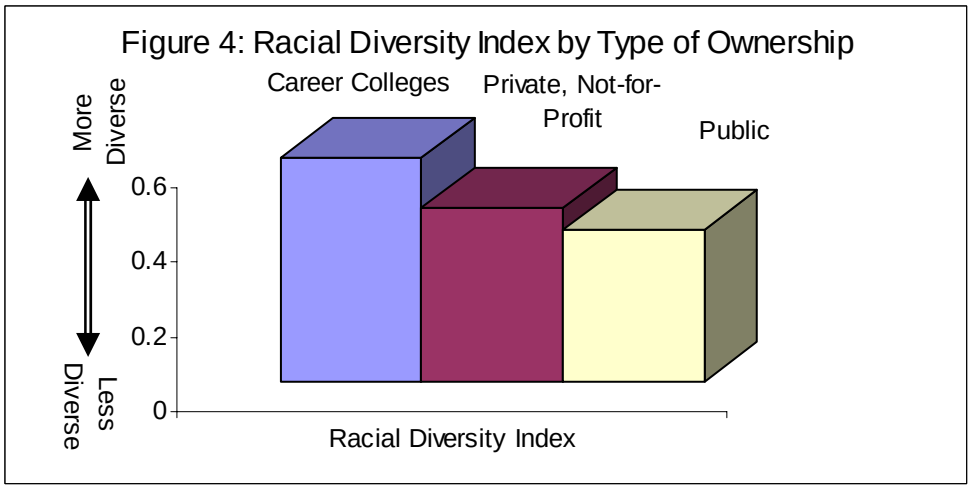
Compared to other educational institutions, career colleges serve more female students, providing educational opportunity to more Tennessee women. More than half of career college enrollees, nearly 61 percent, are women, as opposed to 58 percent in both private and for-profit institutions. As Figure 3 indicates, career colleges play an important role in closing the gender gap by providing flexible opportunities so women can have access to educational opportunities.

[12] Number of private for-profit postsecondary institutions is more than 200, according to Tennessee Higher Education commission website. For consistency, we take into account only those institutions profiled in the IPEDS.



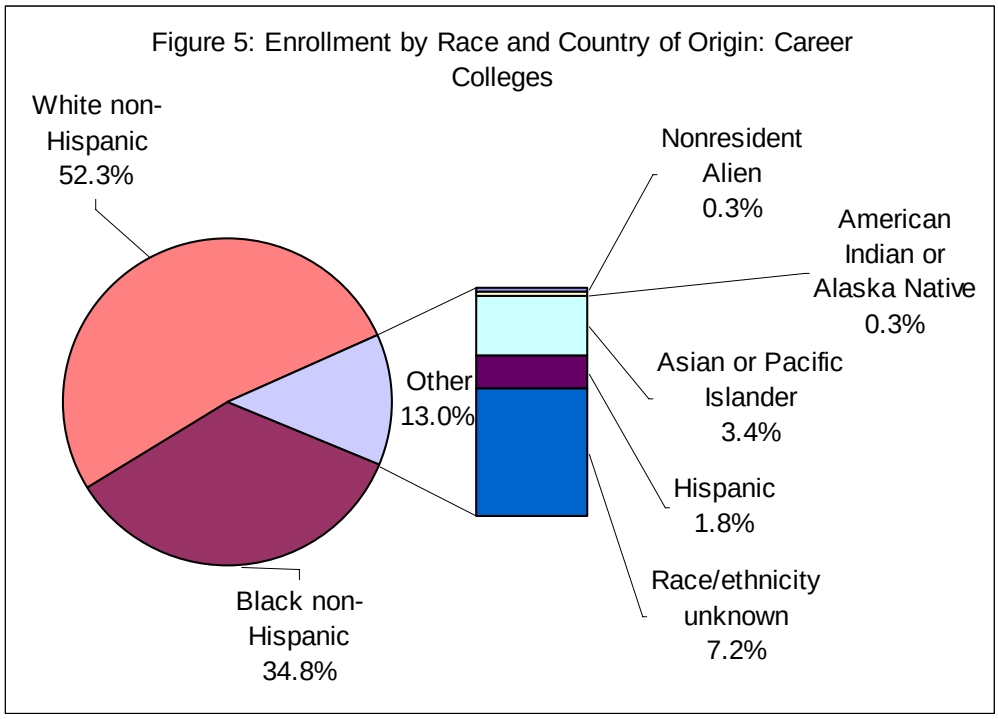
What opportunities do career colleges provide for diverse racial groups?

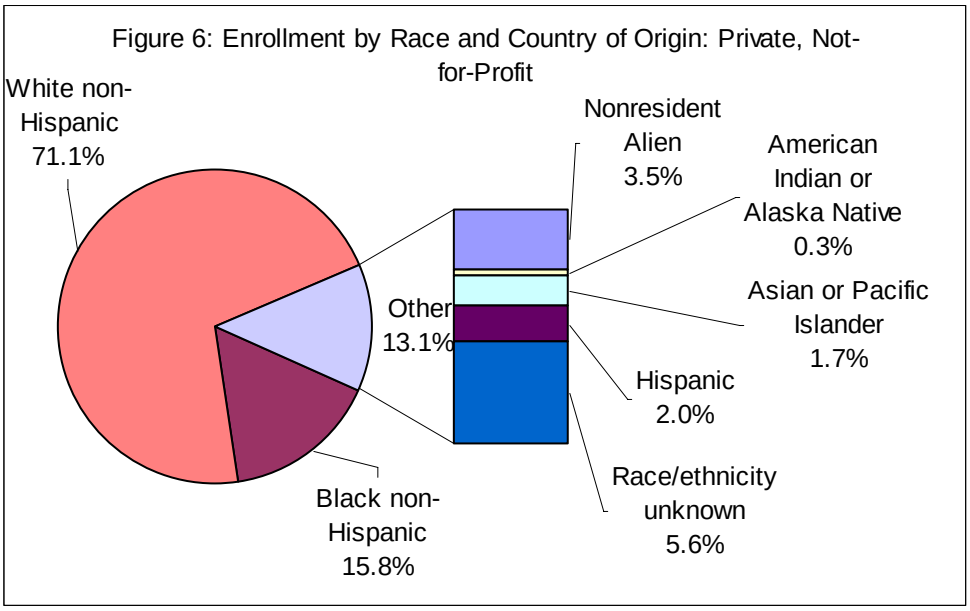
Another reason career colleges are important to Tennessee's education system is that they are more racially diverse than other institutions. According to Figure 4, the racial diversity index is substantially higher for career colleges than both private, not-for-profit and public institutions.[13]

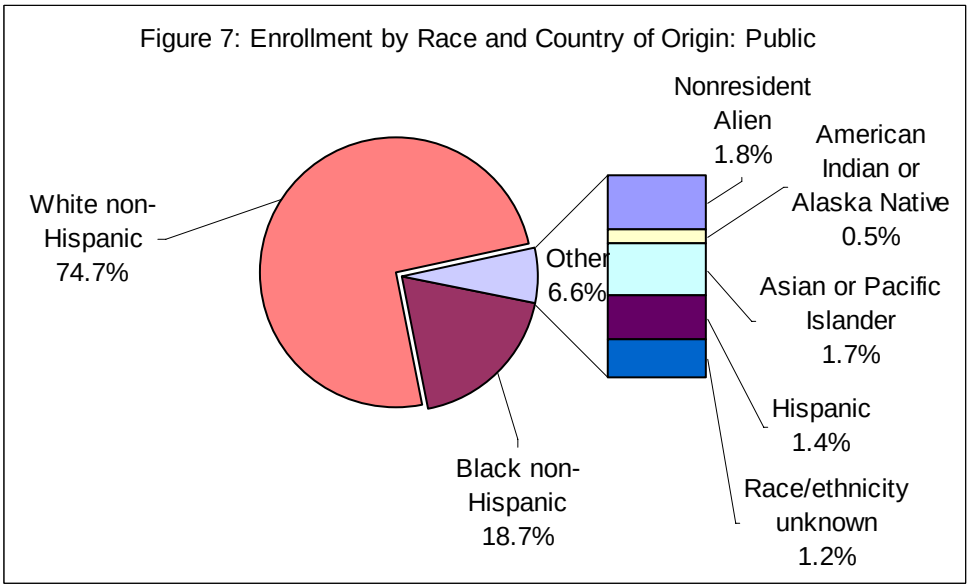


[13] Racial diversity index is created using the following formula: $d_r = 1 - \sum_{i=1}^{n} r_i^2$, where d_r=racial diversity index, r_i=percent of (ith) racial group in total enrollment. Racial diversity index is close to one (1) when all racial groups are represented equally and zero (0) when one racial group represents nearly 100 percent of the enrollment. This index is also known as Rae Index, widely used in party fragmentation analysis.

Figures 5-7 present a more detailed breakdown of enrollment by race by institution. According to Figure 5, more than one third of career college students are African Americans, and another 13 percent represent other non-white racial groups; nearly half of career college students are non-white. In contrast, 71.1 percent of private not-for-profit enrollees and nearly three-fourths of public school enrollees are non-Hispanic white students.





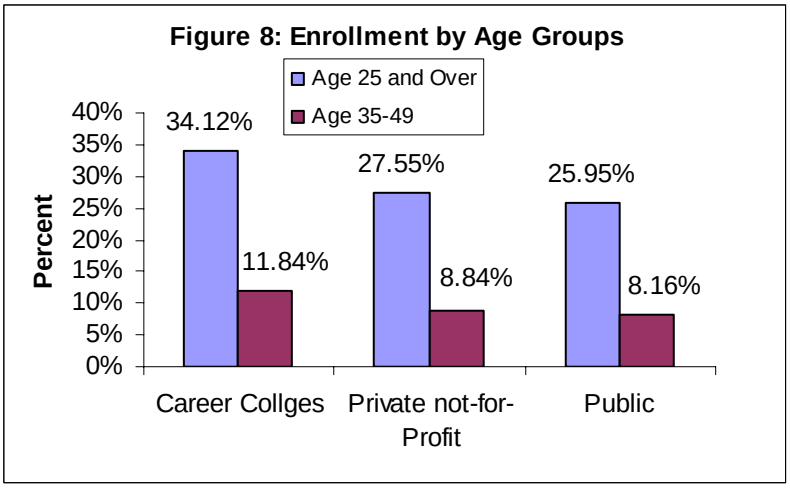


To summarize, compared to other educational institutions in Tennessee, career colleges serve the needs of a more racially diverse student population. Additionally, the more

diverse career college student population creates a beneficial learning environment for all students.

What opportunities do career colleges provide for non-traditional students?

Because of the increasing demand for higher educational attainment, more and more of Tennessee's workforce are returning to school later in life, making for an older student population. The largest number of these non-traditional students are flocking to career colleges to pursue higher education. As Figure 8 indicates, more than 34 percent of career college enrollees are age 25 and older, compared to 27.55 percent of private, not-for-profit enrollees and 26 percent of students enrolled in public institutions. Similarly, nearly 12 percent of career college students are aged 35-49 as opposed to just 9 percent and 8 percent for private, not-for-profit and public institutions, respectively.

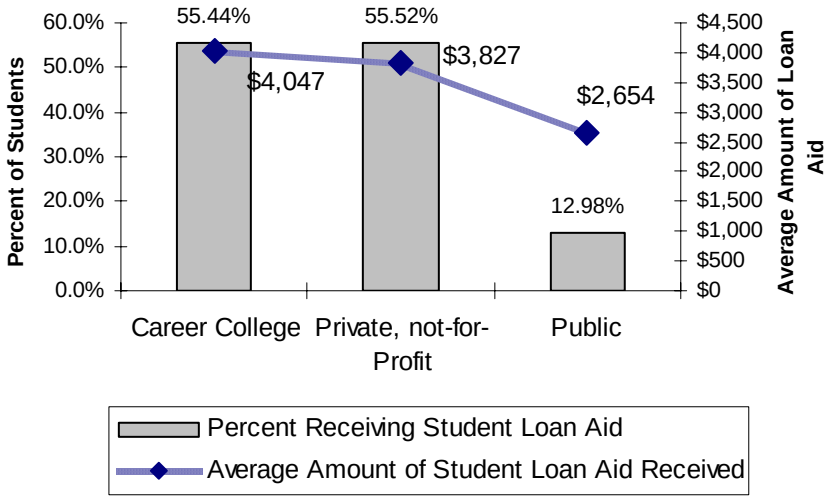


Clearly, career colleges play an increasingly significant role in educating Tennessee's growing nontraditional student population.

III.C.2. Finance and Income

When it comes to paying for school, students in both career colleges and private, not-for-profit institutions rely heavily on loans. According to Figure 9, more than 55 percent of career college students receive student loans with an average loan amount of $4,047. Similarly, more than 55 percent of private not-for-profit enrollees receive student loans with an average loan amount of $3,827. In contrast, only 13 percent of public college students rely on student loan aid, with an average loan amount of just $2,654, more than one third less than the average amount granted to career college students.

Figure 9: Percent of Students Receiving Student Loan Aid and Average Loan Aid Reeceived



So, while much larger numbers of Tennessee students, particularly women, racial minorities, and non-traditional students, rely on career colleges to further their

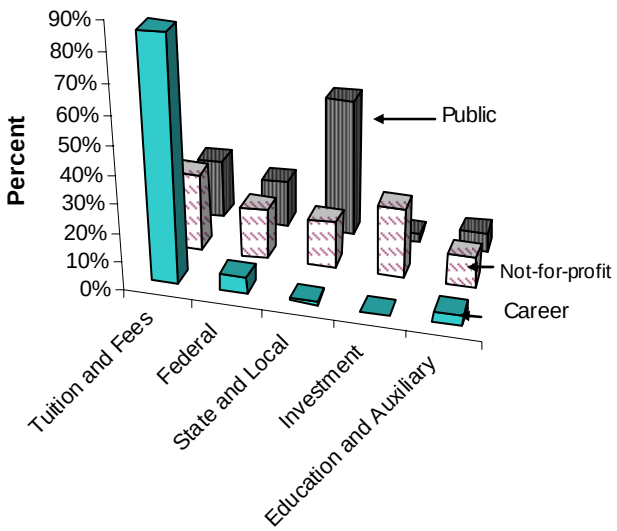
educations, they are much more likely to depend on loan aid to pay for school than their counterparts at other educational institutions.

III.C.3. Revenue Sources

Revenue sources for career colleges are less diverse than for other educational institutions. Total revenue for higher education institutions in Tennessee is $5.3 billion. Of that, public institutions take in the largest amount (55.1 percent) at $2.9 billion, private not-for-profit institutions take in $2.2 billion, and career colleges take in just $162 million, only 3.1 percent of the total revenue for higher education. Thus, there exists a significant gap between the number of Tennesseans served by career colleges and the amount of revenue they garner.

Furthermore, revenue sources for career colleges are far less diverse than those of other educational institutions. Compared with private not-for-profit and public institutions, career colleges rely heavily on a single source of revenue: tuition and fees. Public institutions receive a large amount of their revenue from state and local governments. Figure 10 presents source of revenue by institution from a comparative perspective.

Figure 10: Source of Revenue by Type of Institutions



While career colleges receive 85 percent of their revenue from tuition and fees, their share of state and local resources is less than one percent of their revenue. Conversely, private not-for-profit institutions enjoy well-diversified revenue sources, with state and local sources accounting for 17 percent of their total revenue. Public institutions receive the largest portion of revenue, nearly half, from state and local sources and rely on tuition and fees for just 21 percent of their total revenue. Figures 11-13 provide a detailed view of sources of revenue by type of educational institutions.

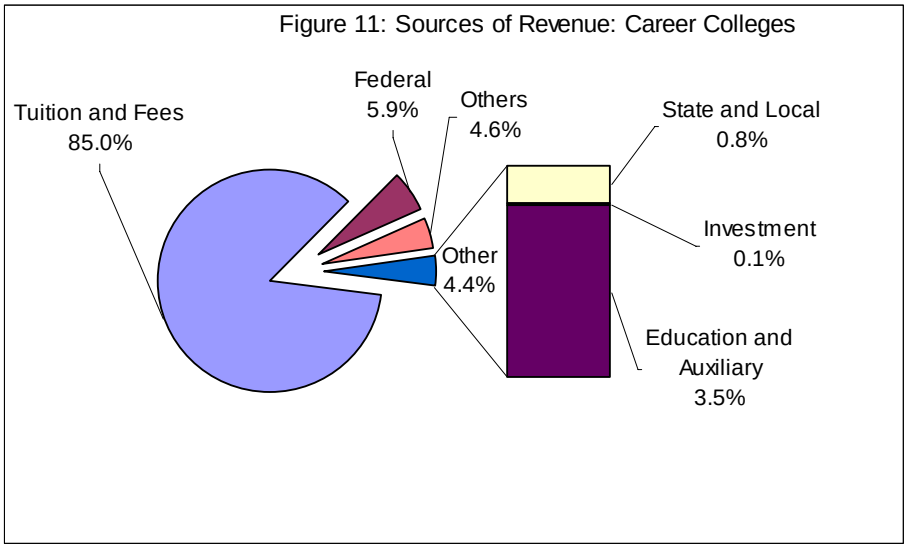


Figure 11: Sources of Revenue: Career Colleges
Federal
5.9%
Others
4.6%
Tuition and Fees
85.0%
State and Local
0.8%
Investment
0.1%
Other
4.4%
Education and
Auxiliary
3.5%

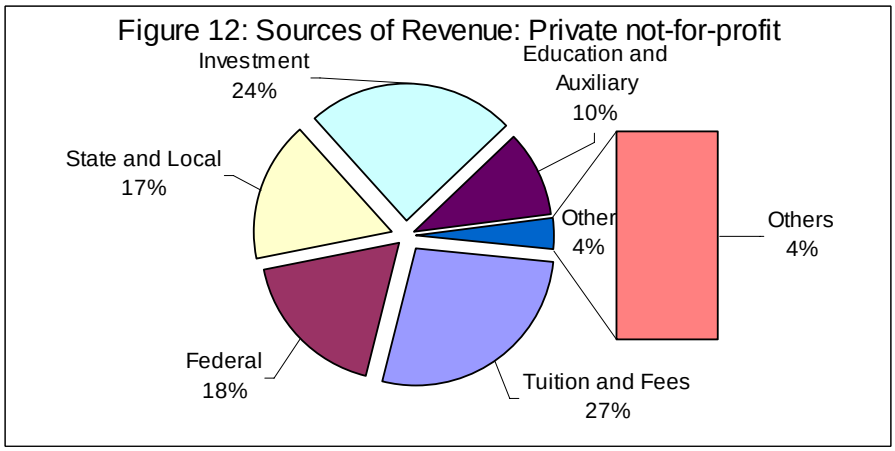


Figure 12: Sources of Revenue: Private not-for-profit
Investment
24%
Education and
Auxiliary
10%
State and Local
17%
Other
4%
Others
4%
Federal
18%
Tuition and Fees
27%

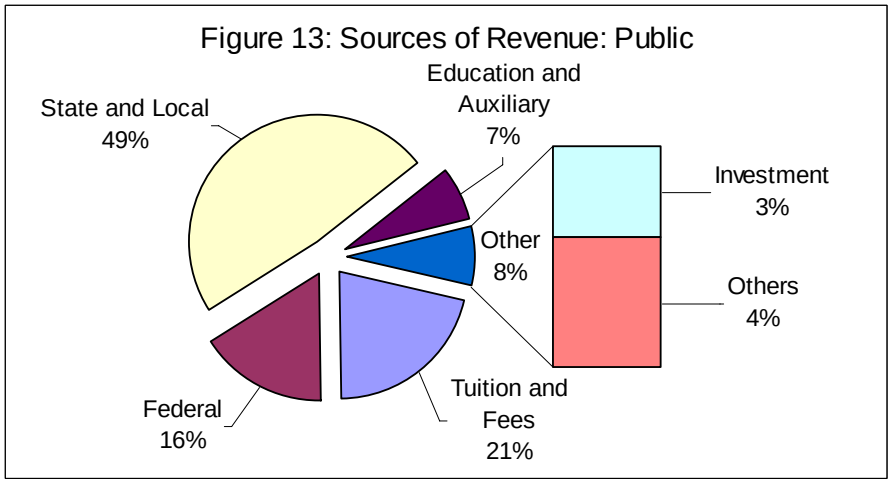


Figure 13: Sources of Revenue: Public
Education and
Auxiliary
7%
State and Local
49%
Investment
3%
Other
8%
Others
4%
Federal
16%
Tuition and
Fees
21%

In addition to the inequity in the *amount* of revenue career colleges receive, the *types* of revenue they depend on are also much less diverse, and thus much less economically stable, than those of their counterparts in higher education.

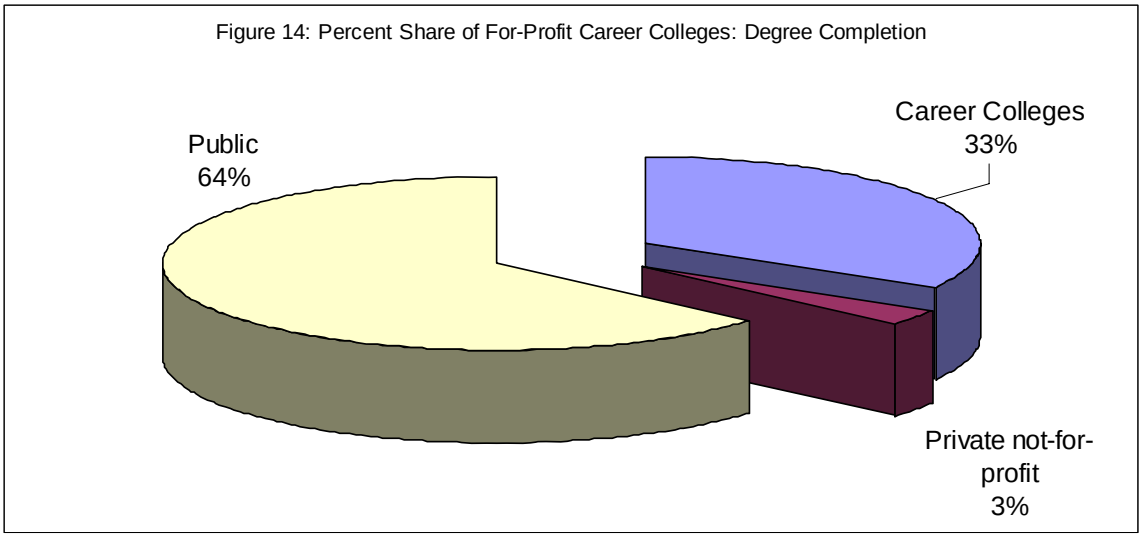
III.C.4. Degree Completion

As we have seen, the career college level of education serves the needs of a diverse population and has a significant impact on their earnings potential. But where do most of these students complete their degree programs? Nearly 22,000 students successfully completed training at the career college level in 2005 (Table 22). Of these, 7,280 (33.45 percent) were career college graduates. Only three percent of graduates came from private not-for-profit programs, and the largest share (63.72 percent) graduated from public institutions (Figure 14).

Table 22: Number of Students Completing A Program Below Bachelor's Degre

	Total	Percent
Career Colleges	7,280	33.45%
Private not-for-profit	615	2.83%
Public	13,868	63.72%
Total	21,763	

BERC and IPEDS



When we analyze degree completion by gender and race, an interesting trend emerges. Nearly 65 percent of those who earned degrees from career colleges are women, as opposed to 57 percent in public institutions. Additionally, non-whites represent nearly half (47.38 percent) of career college graduates as opposed to just 18.15 percent in public institutions and 15.77 percent in private not-for-profit institutions (Table 23). So, while the rate of degree completion may favor public institutions, it is clear that career colleges are meeting the needs of women and racial minorities at a much higher rate.

Table 23: Students Completing A Degree/Certificate Below Bachelor's Degree by Institution, Gender, and Race

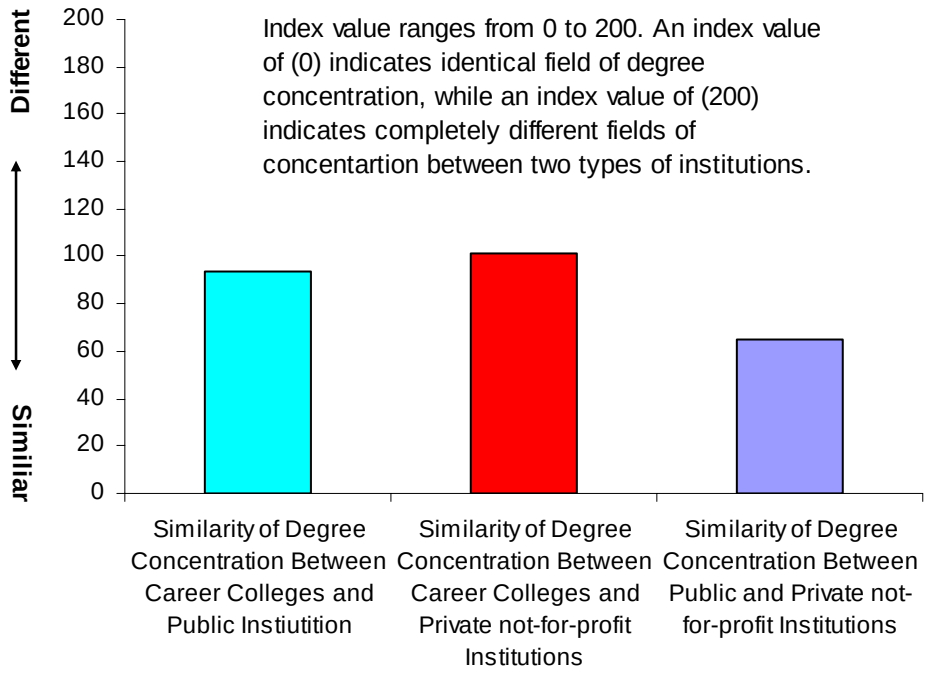
By Gender						
Type of Institution	Men		Women		Total	
	Number	Percent	Number	Percent	Number	Percent
Career College	**2,577**	**35.40%**	**4,703**	**64.60%**	**7,280**	**33.45%**
Private not-for-profit	171	27.80%	444	72.20%	615	2.83%
Public	5,924	42.72%	7,944	57.28%	13,868	63.72%
Total	8,672	39.85%	13,091	60.15%	21,763	100.00%

By Race	White	Black	Hispanic	Asian	American Indian	Race/ Ethnicity Unknown	Non-resident
Career College	**52.62%**	**36.74%**	**1.63%**	**1.46%**	**0.19%**	**7.28%**	**0.07%**
Private not-for-profit	84.23%	8.94%	1.79%	2.44%	0.33%	0.81%	1.46%
Public	81.85%	14.94%	0.92%	0.94%	0.36%	0.59%	0.40%
Total (All Institutions)	72.14%	22.06%	1.18%	1.16%	0.30%	2.84%	0.32%

BERC and IPEDS

One question that arises in analyzing trends in degree completion is just what are these graduates studying? One might assume that the choices for concentration of study in career colleges would be very narrow or very different from those offered in public or not-for-profit institutions. However, when we compare the similarity of degree concentration in all three types of post-secondary institutions, we find that the greatest difference is between career colleges and private not-for-profit institutions and the greatest similarity is between public and private not-for-profit institutions.

Figure 15: Similarity of Degree Concentration of Three Types of Post-Secondary Institutions



III.D. Economic Impact of Career Colleges

Clearly, career colleges command an important presence in Tennessee's educational system. But what exactly is their impact? In addition to the impact career colleges have on employment and income for Tennesseans, they also impact the economy directly through operating expenditures, employee spending and the incremental earnings of career college graduates.

III.D.1. Operating Expenditures

Career colleges spend nearly $68 million on goods and services in Tennessee. The total business revenue impact of career college operating expenditures is estimated at about $99.88 million. The total employment impact of operating expenditures is 822 jobs, and career college operating expenditures generate $29.7 million in personal income and $1.92 million in state and local taxes (Table 24).

Table 24: Economic Impact of Career Colleges (2005): Operating Expenditures
(Dollar Figures in Million $, and Employment in Thousands)

	Direct	Indirect	Induced	Total
Business Revenue (Output)	$68.14	$12.11	$19.63	$99.88
Total Value Added (GDP Equivalent)	$18.77	$7.59	$12.10	$38.45
Labor Income	$19.36	$3.60	$6.73	$29.70
Employment	0.524	0.103	0.194	0.822
State and Local Taxes	N/A	N/A	N/A	$1.92

Note: Operating Expenditures are adjusted by out-of-state spending. Appropriate household margins applied to the commodity purchases made by these institutions.

III.D.2. Employee Household Spending

Furthermore, career colleges employ 2,011 full-time people, with total wages paid to these employees estimated at about $60 million. An estimated $49.98 million of disposable income for these employees is household spending (Table 25). Thus, the total impact of employee household spending is $141.26 million in business revenue, $74.23 million in personal income, 2,078 jobs (including 2,011 career college jobs) and $3.98 million in state and local taxes.

Table 25: Economic Impact of Career Colleges (2005): Household (Employee) Spending (Dollar Figures in Million $, and Employment in Thousands)

	Direct	Indirect	Induced	Total
Business Revenue (Output)	$59.72	$39.31	$42.23	$141.26
Total Value Added (GDP Equivalent)	$49.98	$20.59	$22.79	$93.36
Labor Income	$49.98	$11.57	$12.67	$74.23
Employment	2.011	0.327	0.37	2.708
State and Local Taxes	N/A	N/A	N/A	$3.98

Note: Employees of these institutions are modeled as households. Only disposable incomes of these households are used in the model. Total disposable income of employees are modeled as direct business revenue. Direct employment figure reflects total employment of career colleges (2,011).

III.D.3. Incremental Earnings of Career College Graduates

The largest economic impact generator is the graduates themselves. The incremental earnings of career college graduates are estimated at about $64.82 million, with an estimated $56.79 million in disposable income. Because many career college programs offer GED and remedial courses, incremental earnings are calculated as the difference in earnings between those members of the workforce with career college training and those with less than high school education, using the age bracket 25-34 to eliminate the effect of experience on earnings.

In all, the economic impact of incremental earnings of career college graduates is $88.5 million in business revenue, $26.32 million in labor income, 758 jobs, and $4.32 million in state and local taxes (Table 26).

Table 26: Economic Impact of Career Colleges (2005): Incremental Earnings of Graduates (Dollar Figures in Million $, and Employment in Thousands)

	Direct	Indirect	Induced	Total
Business Revenue (Output)	$56.79	$14.27	$17.44	$88.50
Total Value Added (GDP Equivalent)	$27.98	$8.36	$10.75	$47.09
Labor Income	$15.55	$4.79	$5.98	$26.32
Employment	0.459	0.126	0.173	0.758
State and Local Taxes	N/A	N/A	N/A	$4.32

Note: Incremental earnings of career college graduates are calculated as a difference between average earnings of less than high school graduates and some college graduates, and then this income difference is multiplied by the number of career college graduates. Average income of less than high school graduates and some college graduates reflect earnings of new hires as proxied by age cohort of 25-34 to eliminate the effect of experience on earnings calculations.
Note 1: Average earnings of age cohort 25-34 by educational attainment is obtained from American Community Survey (2005) at www.census.gov.
Note 2: The calculated incremental earnings then are modeled as household income with appropriate household margins.

III.D.4. Total Economic Impact

When we add all these areas of economic impact, the results are significant. The total economic impact of career colleges in Tennessee is as follows (Table 27):

- $329.64 million in business revenue
- $178.90 million in value added (GDP equivalent)
- $130.24 million in labor income
- 4,288 jobs
- $10.22 million in state and local taxes

Table 27: Economic Impact of Career Colleges (2005): Total Economic Impact
(Dollar Figures in Million $, and Employment in Thousands)

	Direct	Indirect	Induced	Total
Business Revenue (Output)	$184.65	$65.69	$79.30	$329.64
Total Value Added (GDP Equivalent)	$96.73	$36.54	$45.64	$178.90
Labor Income	$84.89	$19.97	$25.39	$130.24
Employment	2.994	0.556	0.737	4.288
State and Local Taxes	N/A	N/A	N/A	$10.22

Note: In calculating economic impact, economic activities are divided into three groups as presented above. Each group's initial (direct) spending on commodities in the economy is modeled as business revenue for businesses.

IV. CONCLUSION

The findings of this study indicate that career colleges in Tennessee have a widespread impact on economic and business activities. In terms of the role of a career-level college education, Tennessee's career colleges are in a unique position to fill a quickly growing need for a more educated workforce. The current workforce with career-level college education constitutes a little over 28 percent of the workforce ages 25-65. As the educational attainment level of the workforce by age cohort indicates, the percent of the workforce with high school and less than high school education has been shrinking, and the percent of the workforce with career-level college training has been on the rise. While this trend toward career-level college skill is likely to continue, the current supply of career college level educated employees is not enough to meet the annual demand. Every year, an estimated 6,000 career-level college skill jobs are filled by either in-migration or workforce with less than the desired skill.

We have seen that the value of a postsecondary education is significant. A career-level college education raises earned income by an average of 11.4 percent. Furthermore,

the economic impact of career colleges is critical. They generate nearly $330 million in business revenue, create at least 4,288 jobs and contribute to state and local government by generating more than $10 million in state and local taxes. In addition, many of these institutions train individuals from their local communities, thereby increasing the welfare of their communities.

Career colleges play an important role in Tennessee by providing educational opportunities for nontraditional students, women, and diverse racial groups. In addition to having a $330 million impact on Tennessee's economy, these colleges supply 26 percent of the skilled workforce demand at career-level college training. Since many of these career colleges provide occupational training, they are well positioned to monitor labor market demand and supply conditions and respond quickly to emerging skill needs in the Tennessee economy.

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VI. APPENDIX A: ROLE OF CAREER-LEVEL COLLEGE EDUCATION IN TENNESSEE: EXECUTIVE SUMMARY

The demand for a skilled workforce has been on the rise in industrial countries across industries and occupations because of changes in economic structure. The resulting change in the skill composition of the workforce has important implications for the long-term competitiveness of an economy as well as the unemployed and dislocated workforce. At the heart of these structural changes is career-level college training and career colleges, which represent the dividing line between traditional and nontraditional, high-technology and low-technology, skilled and unskilled, and employable and unemployable.

In Tennessee, more than 50 percent of the labor force age 25 and over has no more than high school educational attainment as opposed to 45 percent in the U.S. in 2005. The labor force with a career-level college education is 25 percent in Tennessee versus 28 percent in the U.S. Overall, Tennessee is less competitive than the U.S. in terms of career-level college educational attainment.

This study, sponsored by Tennessee Department of Labor and Workforce Development and Tennessee Association of Independent Colleges and Schools, critically answers the following research question: what role does career-level college education play in the Tennessee economy? To this end, the Business and Economic Research Center (BERC) of the Jennings A. Jones College of Business at Middle Tennessee State University analyzes

- trends in the skill composition of Tennessee's workforce,
- labor supply and demand with regard to career-level college training, and
- the value of an additional year of schooling at career-level college training.

Conceptually, this study defines career-level college training as training or education beyond high school but less than a bachelor's degree. The universe of this study is the Tennessee workforce ages 24 to 65 who are employed at least one (1) hour a week and who have earned income from the work. The BERC utilized various data sources and theoretical approaches to address the role of career-level college training in the Tennessee economy.

FINDINGS:

According to American Community Survey (2005) data, on average, 28 percent of the workforce ages 25-65 has career-level college education as defined in this study. On average, Tennessee's workforce with career-level college education earns about $35,000.

Detailed Characteristics of Tennessee's Workforce:

- the percent of the female workforce with career-level college education (31.18 percent) is substantially higher than that of the male workforce with career-level college education (25.87 percent),
- the percent of the African American workforce with career-level college education (32.43 percent) is larger than the workforce with other ethnic/racial backgrounds,
- the percent of the age cohort 25-34 with career-level college education (30.54 percent) is larger than other age cohorts,
- the male workforce with career-level college education earns ($43,490) more than the female workforce with similar training ($27,058),
- by racial groups, the Asian workforce with career-level college training earns ($42,215) substantially more than the workforce from other ethnic/racial groups.
- by major sectors, the workforce with career-level college education earns substantially more in utilities, wholesale, professional services, and manufacturing than the workforce with less than a high school education in the same sectors.

Trend in Employment by Educational Attainment:

Analysis of data from American Community Survey (2005) indicates that the share of the workforce with career-level college education has increased considerably over the years. As of 2005, nearly one-third of the workforce in major sectors has career-level college education. A detailed analysis of the workforce by educational attainment and age cohort shows that

- new recruits (age cohort 25-34) are more likely to have career-level college education than the old (55-64) workforce,

- the information, personal services, social services, manufacturing (chemical), leisure and hospitality, and healthcare sectors are more likely to recruit workers with career-level college education than 20-25 years ago,
- the healthcare support occupations, installation, maintenance and repair occupations, food preparation and serving related occupations, protective service occupations, building and ground clearing and maintenance occupations, and healthcare practitioners and technical occupations are more likely to require career-level college education from the new recruits than 20-25 years ago.
- To conclude, the skill mix of the workforce in major sectors and occupations has changed considerably in the past three decades, and
- the demand for career-level college skill increased more than 23 percentage points in certain industries.

Skilled Labor Force Supply and Demand:

The demand for workforce in Tennessee is expected to be more than one (1) million between 2004 and 2014. This includes both new jobs and replacements. Average annual demand (new additions and replacements) is estimated at around 91,000. Analysis of workforce supply and demand indicates that

- the annual demand for workforce with career-level college training is 28,082 (31 percent of the total demand for workforce),
- the annual supply of workforce with career-level college training is 21,754,
- annually, demand exceeds supply by 6,328 in terms of workforce with career-level college training.

Value of Postsecondary Education:

What is the value of additional years of schooling for the workforce? On average, in 2005, the average Tennessee worker has attained 13.45 years of schooling, representing career-level college schooling. The average corresponding earned income is $24,984. According to the econometric analysis, other things being equal, an additional year of schooling in Tennessee at the career college level (on average) generates

- an 11.40 percent increase ($2,848) in earned income, and

- an 11.90 percent increase ($3,868 for males and $2,247 for females) in average earned income for male and female workers.

The value of an additional year of schooling differs dramatically by age cohort, race, and major sector in the economy. By age cohort, an additional year of schooling leads to an increase in average earned income of

- 13.00 percent for ages 25-34,
- 13.30 percent for ages 35-44,
- 11.30 percent for ages 45-54, and
- 7.10 percent for ages 55-64.

By major race/ethnic groups, the largest impact of an additional year of schooling is on the earnings of African Americans (12.20 percent), followed by Whites (11.50 percent), Asians (8.60 percent) and other groups combined (6.10 percent).

The impact of an additional year of schooling on earnings differs by major industry. In certain industries, there appears to be a substantially higher premium for an additional year of schooling. The percent contribution of an additional year of schooling to earned income is the highest in

- professional services at 17.00 percent,
- manufacturing (chemical) at 15.40 percent,
- utilities at 15.20 percent,
- healthcare at 14.90 percent, and
- financial services at 14.80 percent.

CONCLUSION:

The workforce with career-level college education constitutes a little over 28 percent of the workforce ages 25-65. As the educational attainment level of the workforce by age cohort indicates, while the percent of the workforce with high school education or less has been shrinking, the percent of the workforce with career-level college training has been on the rise.

While this trend toward career-level skills will continue, the current supply of workforce is not enough to meet the annual demand. Every year, an estimated 6,000

career-level college skill jobs are filled by either in-migration or workforce with less than the desired skills.

Considering the benefits of an additional year of schooling (11.4 percent on average), a strategy that will reduce the high school dropout rate and encourage additional schooling beyond high school is likely to generate substantial benefits to individuals and to a competitive business environment.

VII. APPENDIX B: ROLE OF CAREER COLLEGES IN TENNESSEE: EXECUTIVE SUMMARY

As of 2005, nearly 35 percent of 152 postsecondary educational institutions in Tennessee were "private for-profit" institutions. For the purpose of this study, private for-profit institutions are defined as "career colleges." Given the increasing demand for a skilled workforce and structural changes in Tennessee's economy, career colleges are likely to play a critical role in supplying the needed skilled labor force and providing opportunities for nontraditional students, thereby contributing to a competitive business environment.

This study, sponsored by the Tennessee Department of Labor and Workforce Development and the Tennessee Association of Independent Colleges and Schools, evaluates the role of career colleges in Tennessee's economy. The Business and Economic Research Center (BERC) of the Jennings A. Jones College of Business at Middle Tennessee State University critically analyzes the impact of career colleges by highlighting

- the characteristics of their students,
- the supply of the skilled workforce,
- the economic impact of their operating expenditures and payroll, and
- the economic impact of incremental earnings of their graduates.

Conceptually, public, private not-for-profit, and private for-profit institutions provide career-level college training in Tennessee. However, for the purpose of this study, all private for-profit institutions are labeled as "career colleges." The actual number of career colleges as defined here may be more than this study reflects. In order to compare career colleges with other types of institutions, the BERC relied on the Integrated Postsecondary Education Data System (IPEDS).

FINDINGS:

Role of Career Colleges in the Tennessee Economy: General Characteristics

Institutions

- Career colleges represent nearly 35 percent of postsecondary higher education institutions.
- More than 70 percent of these career colleges provide occupational training.

Enrollment by Gender

- A total of 366,644 people are enrolled in higher education institutions in Tennessee.
    - **A total of 25,022 (6.8 percent) are enrolled in career colleges.**
- Nearly 61 percent of career-college enrollees are women, compared to 58 percent in other educational institutions.

Racial Diversity and Nontraditional Students

- Career colleges are more racially diverse than other types of educational institutions.
    - Nearly 35 percent of career-college enrollees are African Americans, compared to 19 percent in public and 16 percent in private not-for-profit institutions.
- Career colleges provide more educational opportunities to nontraditional students than the other institutions.
    - More than 34 percent of enrollees are age 25 and older, compared to 27.6 percent at private not-for-profit and 26 percent at public institutions.
    - Similarly, nearly 12 percent of enrollees are ages 35-49, compared to nine (9) percent at private not-for profit and eight (8) percent at public institutions.

Finance and Income

- Career-college students are more likely to receive educational loan aid than students enrolled at other types of institutions.
    - The average loan amount ($4,047) for career-college students is higher than the average loan amount at private not-for-profit ($3,827) and public ($2,654) institutions.
- Compared to private not-for-profit (27 percent) and public (21 percent) institutions, career colleges derive a substantial portion (85 percent) of their revenues from tuition and fees.
    - State and local sources of revenue represent less than one (1) percent of their revenue, compared to 17 percent of private not-for-profit revenues and 49 percent of public institutions' revenues.

Labor Supply and Demand

- Career colleges account for nearly 34 percent (7,280) of career-level college training (21,754) in Tennessee.
  - Nearly 65 percent are women,
  - 53 percent are Whites, and
  - 37 percent are African Americans.
- Annual demand for career-level college training in Tennessee is estimated at around 28,082, of which
  - 26 percent is met by career colleges,
  - 52 percent by other educational institutions, and
  - 22 percent is unmet.

Economic Impact of Career Colleges

Operating Expenditures

- Career colleges spend nearly $68 million on goods and services in Tennessee, generating
  - $99.98 million in business revenue,
  - $29.70 million in labor income,
  - 822 jobs, and
  - $1.92 million in state and local taxes.

Employee (Household) Expenditures

- Career colleges' payroll in 2005 is $59.72 million. After-tax disposable income of employees is estimated at around $49.98 million, generating
  - $141.26 million in business revenue,
  - $74.23 million in labor income,
  - 2,708 jobs, and
  - $3.98 million in state and local taxes.

Incremental Earnings of Career-College Graduates

- Career-college graduates command substantially higher wages than those workers with less than a high school education.

- For the 25-34 age cohort, the earning difference between workers with career-level college training and those with less than a high school education is estimated at around $8,900.
- Because many career colleges offer remedial classes and GED programs, the BERC used the income differential between career-level college training and less than a high school education.
- Incremental earnings of career-college graduates are estimated at around $65 million, of which $57 million is disposable income, generating
    - $88.50 million in business revenue,
    - $26.32 million in labor income,
    - 758 jobs, and
    - $4.32 million in state and local taxes.

Total Economic Impact

The total economic impact of career colleges is

- $329.64 million in business revenue,
- $130.24 million in labor income,
- 4,288 jobs, and
- $10.22 million in state and local taxes.

CONCLUSION

Career colleges play an important role in Tennessee by providing educational opportunities for nontraditional students, women, and diverse racial groups. In addition to having a $330 million impact on Tennessee's economy, these colleges supply 26 percent of the skilled workforce demand at career-level college training. Since many of these career colleges provide occupational training, they are well positioned to monitor labor market demand and supply conditions and respond quickly to emerging skill needs in the Tennessee economy.