EAST CENTRAL COLLEGE

BOARD OF TRUSTEES MEETING

January 27, 2024

Board of Trustees Meeting

East Central College
Monday, January 27, 2025, at 5:30 PM
BH238 Board Room

Agenda

I. Call to Order

II. Recognition of Guests

III. Public Comment

IV. Approval of Agenda (4 votes)

Approval items of a routine nature will be marked with an asterisk (*) located immediately before the item. Unless a Board member requests an item be removed for discussion, the agenda will be approved upon a motion and a second of the Board and unanimously adopted and shall have the same validity as if each action were separately moved, seconded, and adopted. Any item removed upon request of a Board member will be taken up in its regular place on the agenda.

V. *Approval of Minutes (4 votes)

VI. Treasurer's Report and Financial Report (simple majority)

VII. Economic Impact Study

VIII. Respiratory Care Program Update

IX. Tax Levy (4 votes)

X. Emergency Expenditure

XI. Bids (4 votes)

XII. Grant Application Resolution (simple majority)

XIII. *Personnel (4 votes)

- **A. Position Reclassifications**
- **B. Resignations**
- **C. Adjunct Faculty Addendum - SP25**
- **D. Classified Staff Appointments (information only)**

XIV. Board President's Report

XV. Reports

- **A. Faculty Association**
- **B. ECC-NEA**
- **C. Professional Staff Association**
- **D. Classified Staff Association**
- **E. Student Government Association**

XVI. President's Report

XVII. Adjournment of Public Session / Executive Session - RSMo2004, Section 610.021 (2) Real Estate (simple majority)

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM I: CALL TO ORDER

The regular meeting of the Board of Trustees will be called to order by Board President Ann Hartley.

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM II: RECOGNITION OF GUESTS

Guests will be recognized by Mr. Gregg Jones.

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JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM III: PUBLIC COMMENT

The Board will hear comments from members of the public in attendance at the meeting who wish to speak.

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JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM IV: APPROVAL OF AGENDA

Recommendation: To **approve** the agenda for the January 27, 2025, Board of Trustees meeting.

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Agenda Item IV: Approval of Agenda

Consent Agenda Items for January 27, 2025:

Approval of Minutes
Personnel

Matters to be brought before the Board of Trustees at such meeting of which the President has been notified in accordance with the bylaws and upon which consideration and action may be taken by the Board are included in the agenda for the meeting. Any matters not on the agenda of a regular meeting may be considered unless objected to by any Board member present.

Such items of a routine nature placed on the agenda will be marked with an asterisk (*) located immediately before the item on the agenda. When Item 3, Consent Agenda, is reached at a meeting, the President of the Board will read all items so marked, and all items not requested to be removed shall, upon a single motion of any Board member, seconded by any other Board member, and unanimously adopted, be deemed to have been duly adopted with the same validity as if each action were separately moved, seconded, and duly adopted.

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM V: *APPROVAL OF MINUTES

Recommendation: To **approve** the minutes of the December 2, 2024 regular meeting of the Board of Trustees.

Attachment

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
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EAST CENRAL COLLEGE
BOARD OF TRUSTEES MEETING
Monday, December 2, 2024

CALL TO ORDER: The regular meeting of the Board of Trustees was called to order at 5:31 p.m. by Board President Ann Hartley. Other Board members present for all, or parts of the meeting were Joseph Stroetker, Eric Park, Cookie Hays, Audrey Freitag, and J.T. Hardy. Also present were President of the College Jon Bauer; Administrators – Vice President of Academic Affairs Robyn Walter, Vice President of External Relations Joel Doepker, and Vice President of Student Development Sarah Leassner; Faculty – Faculty Association President Tracy Mowery and ECC-NEA President Reg Brigham, Other Staff – ECC Foundation Director Bridgette Kelch, Human Resources Director Carrie Myers, Director of Communications & Marketing Gregg Jones, Professional Staff Association President Todd Tracy, Classified Staff Association Vice President Amanda Studdard, Campus Life and Leadership Coordinator Andy Klingensmith, and Executive Assistant to the President Stacy Langan.

RECOGNITION OF GUESTS: Chris Parker from the *Missourian,* Matt Wallace from KPM, and Officer Tommie Lowe from the Union Police Department, ECC students Oliva Reed, Audrey Schroeder, and Toni Sells, and community members Ray Krame, Paul Grosse, and Dean Grosse were also in attendance.

PUBLIC COMMENT: There was no public comment.

APPROVAL OF AGENDA: Each item on the consent agenda shall be deemed to have been duly approved with the same validity as if each action were separately moved, seconded, and adopted.

Motion: To **approve** the agenda for December 2, 2024, meeting of the Board of Trustees.

Motion by Cookie Hays; Seconded by Joseph Stroetker; Carried Unanimously

APPROVAL OF MINUTES: The Board approved the minutes of the November 4, 2024, regular meeting and the November 9, 2024, special meeting of the Board of Trustees.

SPECIAL RECOGNITION: The Board recognized Olivia Reed, Audrey Schroeder, and Toni Sells, students in ECC's Nursing program, for their heroic, life-saving actions following a traffic accident near campus. The students recounted the events and expressed gratitude to their instructors, Trista Elias and Jessica Van Leer, for preparing them not only with the necessary skills but also with the communication, teamwork, and relationship-building tools embedded in the curriculum. The Board commended ECC and its students, emphasizing that this is the best nursing program in the state. While they are aware of what the college offers on a larger scale, this moment reinforced ECC's mission to make a meaningful difference in the community.

TREASURER'S REPORT AND FINANCIAL REPORT: College President Jon Bauer stated that Mr. Wallace from KPM will present the audit report later during this meeting. President Bauer reviewed the current financial statements since October 31, 2024. Total expenses through October 2024 are $7.1 million, compared to $7.2 million at the same time last year. State aid is received in equal monthly installments, while tuition revenue is received each semester.

Motion: To **approve** the treasurer's report, the financial report, and the payment of bills subject to the annual audit.

Motion by Dr. Eric Park; Seconded by Dr. Joseph Stroetker; Carried Unanimously

EMERGENCY EXPENDITURES: President Bauer informed the Board of an emergency purchase made to repair water lines on campus. The water main, part of the original infrastructure installed in 1971, experienced a break early in the fall and another break a few weeks ago. The six-inch iron line is being replaced with PVC, with SCE in Villa Ridge hired for the installation. The parking lot was closed today and will be repaved once temperatures rise. The city will reimburse 50% of the repair costs. No action is required from the Board, and the project is approximately 95% complete. The total cost includes paving. Outside of COVID-related expenditures, the emergency purchase policy has only been used one other time, underscoring the challenges of aging infrastructure.

INTRAFI: The College's depository bank has proposed using the IntraFi program. United Bank has been utilizing this program for some time. Instead of providing a list of securities, the bank places deposits with other banks in increments of $250,000, ensuring all funds are FDIC-insured. This change will not negatively affect the College and serves as a way to collateralize deposits. Board policy requires collateral for amounts exceeding insured limits, but with IntraFi, all funds are insured. While no policy change is needed, legal counsel confirmed this approach complies with existing policy. The Board will need to approve this change, as it represents a significant shift in how deposits are managed.

Motion: To **authorize** the participation in the IntraFi program for the purpose of securing the colleges investment funds.

Motion by Eric Park; Seconded by J.T. Hardy; Carried Unanimously

AUDIT REPORT: Matt Wallace from KMP reviewed the audit report, noting that ECC and the ECC Foundation received an unmodified opinion; the financial statements are free from material misstatements. A federal compliance audit was also conducted, and there were no findings associated with the administration of the major federal programs.

Motion: To **accept** the audit report for the fiscal year ending June 30, 2024.

Motion by Eric Park; Seconded by Joseph Stroetker; Carried Unanimously

TAX LEVY: The College considered three options for the tax levy, which were discussed during a special Board meeting with a presentation by Piper Sandler. President Bauer outlined the pros and cons of each option, emphasizing critical needs in deferred maintenance, including HVAC repairs, roofs, asbestos abatement, roads, parking lots, elevators, storage, and the fitness trail. Renovation of underutilized spaces like the Shook Student Center, Hansen Hall, ECTC, and the Business and Industry Center was also highlighted, along with operational needs such as competitive salaries, rising utility and insurance costs, technology, and professional development. Opportunities for new construction, such as STEM facilities, skilled trades spaces, a professional development center, childcare, student housing, and access to Highway 47 South, were discussed as ways to enhance enrollment but would also require additional investment. President Bauer noted that state funding has decreased since 2001, the operating levy has not increased since 1985, and tuition is the only revenue source the College directly controls, which has risen significantly. Maintaining the current levy beyond its 2026 expiration could provide an estimated $10 million for capital improvements, address maintenance needs, renovate spaces, fund new construction like a modern welding facility, and support critical faculty and staff positions.

The Board reviewed potential ballot language, with adjustments to maintain the levy at 44.72 cents by reallocating the debt service levy. The bond counsel approved revised language, though minor

changes may still be made before the January 27 deadline. If approved, the resolution will be finalized and counties notified. Maintaining the levy would not solve every need but would be transformative for ECC, addressing capital improvements and ongoing maintenance while positioning the College for future growth.

Motion: To **approve** placing on the April 8, 2025, ballot a proposition to increase the East Central College tax levy ceiling by 9.9 cents, offset by a reduction in the debt service levy of 9.9 cents, resulting in no increase to the overall levy.

Motion by Joseph Stroetker; Seconded by Audrey Freitag; Carried Unanimously

COMPENSATION AND CLASSIFICATION STUDY: Four firms were interviewed to conduct a compensation and classification study, a one-time expense funded through reserves. Human Resources Director Carrie Myers informed the Board that Gallagher, a firm with extensive experience in public sector studies, was selected. The study, to be completed by April 2025, will provide a comprehensive review of staff positions (excluding faculty, who follow a separate ranking process). It will ensure positions are correctly classified, assess compensation, and establish an objective framework to promote equity within the College and competitiveness in the market, considering both educational institutions and corporate benchmarks.

Motion: To **authorize** Gallagher Benefit Services, Inc. to complete a compensation and classification study for East Central College at a cost of $42,450.

Motion by Audrey Freitag; Seconded by Cookie Hays; Carried Unanimously

BIDS: Computers for the Adult Education and Literacy program to be purchased for class sites and instructors.

Motion: To **approve** the purchase of 33 Dell Latitude 3550 laptops for $28,380 from Dell per the Midwestern Higher Education Compact (MHEC) contract (*#04152022*) for the Adult Education and Literacy program class sites and instructors.

Motion by Joseph Stroetker; Seconded by J.T. Hardy; Carried Unanimously

***PERSONNEL:** The Board **approved** the appointment of Frank Miller as the full-time Director of Enrollment Services effective December 9, 2024, with an annual salary of $70,251.99. The Board **accepted** the resignation of Joe Benninger, Head Coach for Men's and Women's soccer effective December 2, 2024. The Board also **approved** the rosters of adjunct faculty for the Winter 2025 and Spring 2025 semesters as listed in the attached memorandum.

BOARD PRESIDENT'S REPORT: Board President had no report.

REPORTS:

A. FACULTY ASSOCIATION REPORT: No report

B. ECC-NEA: The ECC-NEA hosted a Fall Feast on Friday, November 22. That evening, the ECC-NEA and Administration bargaining teams participated in training on Interest-Based Bargaining. The teams held their first bargaining session on November 12, during which they established the full meeting schedule and began addressing the issue statements.

C. PROFESSIONAL STAFF ASSOCIATION REPORT: Student Development Strategy Director, Stephanie Hebert earned a Community College Data and Analytics Micro-credential from the

University of Maryland Global Campus, which aligns with their Doctor of Management in Community College Policy and Administration program. This opportunity was offered in coordination with Achieving The Dream as part of their Data and Analytics Summit. Stephanie expressed gratitude to ECC and the Title III grant for funding this professional development. Several Professional Staff Association employees presented at the annual MCCA Convention in November 2024.

D. CLASSIFIED STAFF ASSOCIATION REPORT: The Christmas Outreach Committee, a subcommittee within CSA organized an annual gift giving drive. They accepted nominations for the 2025 Denim Day charities in November for which voting will soon be open to determine the 2025 lineup. They are currently accepting nominations for a new treasurer as the current treasurer left ECC. The CSA Spotlight recipient for the fall was Cynthia Cubas, Executive Administrative Assistant, External Relations.

E. **STUDENT GOVERNMENT ASSOCIATION**: Andy Klingensmith, Campus Life and Leadership Coordinator, provided an update on behalf of SGA leadership. He shared that SGA now has a full cabinet for the first time since the pandemic. This semester, they have successfully hosted three events: karaoke night, a costume contest, and a trivia night. Additionally, SGA hosted a table at two recent campus events and volunteered as ushers and concession workers for all four performances of The Night of the Living Dead. They are also collaborating with other campus clubs to decorate a newly designated student space, further enhancing the campus community.

PRESIDENT'S REPORT: Enrollment is underway for spring, wintersession, and summer, with slight fluctuations in headcount and credit hours as of this morning. Progress continues on both the Rolla project and the respiratory care lab. The Rolla building, funded by state resources, is in the design phase with construction expected to begin next summer and completion projected for spring 2027. For the federally funded respiratory care lab, renovations to an existing space are proceeding as planned. Construction is scheduled to be completed by mid-summer 2025, with the lab ready for use that fall.

ADJOURNMENT:

Motion: To **adjourn** the December 2, 2024, public meeting of the Board of Trustees and enter executive session per RSMo2004, Section 610.021 (2) Real Estate at 7:24 p.m.

Motion by J.T. Hardy; Seconded by Joseph Stroetker; Carried Unanimously

The following roll call vote was taken, and the motion carried.

Yes A. Hartley	Yes E. Park	Yes A. Freitag
Yes J. Stroetker	Yes C. Hays	Yes J.T. Hardy

_____ _____

President, Board of Trustees Secretary, Board of Trustees

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM VI: TREASURER'S REPORT AND FINANCIAL REPORT

Recommendation: To **approve** the treasurer's report, the financial report, and the payment of bills subject to the annual audit.

Attachments

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
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East Central College
Statement of Net Assets for all Funds
As of December 31, 2024 and December 31, 2023

	12/31/24	12/31/23
ASSETS		
Current		
Cash	2,645,604	5,368,187
Investments	2,990,464	2,800,661
Receivables, net		
Student	4,054,608	3,412,253
Federal & State agencies	1,571,189	1,300,254
Other	64,976	254,429
Inventories	281,466	227,885
Prepaid expenses	299,386	224,077
Total Current Assets	**11,907,693**	**13,587,746**
Non-Current Assets		
Lease Assets	348,550	289,548
Capital Assets (net)	45,738,116	41,783,636
Total Non-Current Assets	**46,086,666**	**42,073,184**
Total Assets	**57,994,359**	**55,660,930**
DEFERRED OUTFLOW OF RESOURCES		
Deferred pension outflows	15,097,621	16,074,458
Deferred OPEB outflows	430,351	509,559
	15,527,972	**16,584,017**
Total Assets and Deferred Outflow of Resources	**73,522,331**	**72,244,947**
LIABILITIES		
Current Liabilities		
Accounts Payable	36,129	3,449
Accrued Wages & Benefits	74,515	44,068
Unearned Revenue	185,754	146,496
Due to Agency Groups	(227)	255
Accrued Interest	-	-
Total Current Liabilities	**296,171**	**194,268**
Non-Current Liabilities		
Lease Liability	357,213	289,572
USDA Loan	191,667	291,667
Bonds Payable	3,625,000	5,225,000
Premium on Sale of Bonds	132,184	234,581
Net Pension Liability	18,267,888	15,685,923
Compensated Absences	772,216	872,724
Post Employment Benefit Plan Payable	1,686,592	1,599,488
Johnson Control Performance Contract	807,951	880,174
United Bank of Union	1,360,000	1,480,000
Total Non-Current Liabilities	**27,200,711**	**26,559,129**
Total Liabilities	**27,496,882**	**26,753,397**
DEFERRED INFLOW OF RESOURCES		
Deferred pension inflows	7,461,740	10,695,010
Deferred OPEB Inflows	556,345	626,536
	8,018,085	11,321,546
NET ASSETS		
Investment in Capital Assets, net	47,244,532	42,170,988
Restricted for Debt Service	(134,769)	(134,769)
Board Restricted	1,760,000	1,760,000
Unrestricted:		
General Fund	7,440,542	9,350,418
All other Funds	(18,302,941)	(18,976,633)
Total Net Assets	**38,007,364**	**34,170,004**
Total Liabilities, Deferred Inflow of Resources and Net Assets	**73,522,331**	**72,244,947**

East Central College
Statement of Activities
General Fund
As of December 31, 2024 and December 31, 2023

	For the Fiscal Year Ending June 30, 2025			For the Fiscal Year Ended June 30, 2024			
	Current FY Budget	Dec 31, 2024 Month end	Current FY Year-To-Date	Prior FY Budget	Dec 31, 2023 Month end	Prior FY Year-To-Date	Prior Year FYE
Revenues:							
Local Revenue	8,166,388	1,118,120	1,302,750	8,428,974	2,088,907	2,256,666	8,028,646
State Revenue	5,532,654	461,054	2,766,328	5,360,734	456,727	2,680,366	5,360,734
Federal Revenue	-	-	-	-	-	-	-
Tuition and Fees	8,114,429	547,472	7,644,403	7,808,233	183,577	7,033,156	7,559,223
Interest Income	150,000	17,768	80,198	124,076	5,910	50,421	245,193
Gifts and Grants	100,000	7,726	46,364	100,000	3,002	38,317	95,337
Miscellaneous Revenue	45,500	1,943	61,741	45,500	1,848	18,436	48,764
Transfers-Interfund & Indire	1,149,832	901	(34,891)	749,967	849	5,953	(415,312)
Transfer Federal Programs	-	-	-	-	-	-	9,749
Total Revenues	**23,258,803**	**2,154,984**	**11,866,893**	**22,617,484**	**2,740,820**	**12,083,315**	**20,932,334**
Expenses:							
Salaries	13,813,772	1,108,170	6,317,611	13,229,459	1,598,904	6,214,204	13,457,724
Benefits	4,869,124	404,081	2,266,254	4,713,956	476,132	2,246,561	4,991,915
Contractual Services	1,047,078	18,372	726,713	1,084,300	23,571	702,097	911,776
Current Expenses	920,026	29,351	503,715	1,016,160	39,076	448,194	881,808
Travel	295,455	5,638	144,903	269,417	17,115	112,326	220,199
Property & Casualty Insuran	301,178	185,564	334,432	235,000	136,425	259,420	259,420
Vehicle Expense	19,930	-	10,119	17,750	135	5,413	13,774
Utilities	689,350	34,883	346,915	645,840	50,291	377,910	689,672
Tele/Communications	232,900	7,988	91,967	229,460	14,070	104,658	198,770
Miscellaneous	511,409	20,507	157,929	596,224	40,734	134,849	339,726
Foundation Paid Expense	-	4,608	25,578	27,505	2,464	17,986	37,605
Clearing Account	-	(38)	188	-	-	732	-
Scholarship Expense	107,600	(1,410)	98,062	145,600	(2,355)	94,940	188,910
Faculty Development	35,000	200	2,000	-	1,650	2,800	6,532
Instit. Match for Grants	78,718	-	-	35,000	-	-	139,578
Commitment to AEL	65,000	-	943	70,000	-	-	51,005
Instit. Commit.to Fine Arts	-	-	-	-	-	-	-
Instit. Commit.to Word & M	-	-	-	-	-	-	-
Capital	700	-	92,860	25,750	13,390	593,086	636,424
Interfund Transfers	-	-	-	-	-	-	-
Debt Princ & Interest	271,562	8,333	129,687	276,063	8,333	131,375	275,500
Total Expenses	**23,258,803**	**1,826,247**	**11,249,876**	**22,617,484**	**2,419,935**	**11,446,551**	**23,300,338**
Revenues over Expenses	**-**	**328,737**	**617,017**	**-**	**320,885**	**636,764**	**(2,368,004)**

Statement of Revenue, Expenses & Changes in Net Assets
(All Funds)
As of December 31, 2024 and December 31, 2023

	For the Fiscal Year Ending June 30, 2025		For the Fiscal Year Ended June 30, 2024	
	Dec 31, 2024	FY 2025 Year-To-Date	Dec 31, 2023	FY 2024 Year-To-Date
Operating Revenues:				
Student Tuition & Fees	688,407	9,542,798	232,220	8,675,663
Federal Grants & Contracts	166,421	3,724,394	57,247	2,900,065
State Grants & Contracts	501,723	653,399	263,397	504,358
Auxiliary Services Revenue	128,493	1,284,687	21,755	844,629
Other Operating Revenue	16,616	164,830	12,265	129,852
Total Operating Revenues	**1,501,660**	**15,370,108**	**586,884**	**13,054,567**
Operating Expenses:				
Salaries	1,262,745	7,244,564	1,773,015	6,951,456
Benefits	452,055	2,532,739	517,344	2,456,593
Purchased Services	308,380	1,796,960	282,541	1,559,217
Supplies & Current Expenses	190,859	2,079,034	263,057	1,852,348
Travel	585	99,472	26,646	130,712
Insurance	185,564	367,665	136,425	280,795
Utilities	46,267	559,285	67,795	595,173
Other	54,744	188,025	20,857	72,289
Depreciation/Amortization	194,370	1,170,129	195,909	1,156,108
Financial Aid & Scholarship	6,499	3,230,138	3,145	2,992,248
Foundation Paid Expense	6,523	34,829	4,981	29,808
Total Operating Expenses	**2,708,591**	**19,302,840**	**3,291,715**	**18,076,747**
Operating (Loss)/Gain	**(1,206,931)**	**(3,932,732)**	**(2,704,831)**	**(5,022,180)**
Non-Operating Revenues/(Expenses):				
State Appropriations	461,054	2,766,328	456,727	2,680,366
Tax Revenue	1,433,487	1,670,193	2,678,086	2,893,264
Interest Income	19,384	89,720	6,979	59,625
Gain/Loss on asset disposal	-	-	-	17,838
Principal & Interest on Debt	(1,835)	(46,806)	(2,014)	(56,143)
Total Non-Operating Revenus/(Expe	**1,912,090**	**4,479,435**	**3,139,778**	**5,594,950**
Increase/(Decrease) in Net Assets	**705,159**	**546,703**	**434,947**	**572,770**

East Central College
Investments
As of December 31, 2024

CD Number United Bank of Union	Date	Maturity	Term	Rate		Total
1024028589	12/5/2024	12/2/2025	12 Months	4.43%	$	886,131.72
1024025404	1/24/2024	1/24/2025	12 Months	5.25%	$	1,058,391.45
1024026085	3/15/2024	3/15/2025	12 Months	5.05%	$	525,078.25
1024026886	7/15/2024	1/15/2025	6 Months	5.34%	$	520,862.86
			ECC Total Investments		**$**	**2,990,464.28**

2024		
Total Cash Accounts	$	2,645,604.00
Certificates of Deposit	$	2,990,464.28
	$	**5,636,068.28**

2023 (December)		
Total Cash Accounts	$	5,436,643.00
Certificates of Deposit	$	2,841,438.43
	$	**8,278,081.43**

East Central College
Pledged Securities
As of December 31, 2024

United Bank of Union

SECURITY DESCRIPTION	MATURITY DATE	CUSIP NO.	PAR AMOUNT
FDIC Insurance			$ 250,000.00
FHLMC POOL #RB5108	4/1/2041	3133KYU98	$ 1,416,523.82
US TREASURY NOTE	9/30/2025	9128285C0	$ 1,000,000.00
WEBB CITY MO #R-7 SCH DIST	3/1/2033	947398CC5	$ 315,000.00
FRESB 2021-SB84 A 10H	1/25/2041	30320WAQ2	$ 1,394,519.79
TOTAL			**$ 4,376,043.61**

Phelps County Bank

SECURITY DESCRIPTION	MATURITY DATE	CUSIP NO.	PAR AMOUNT
FDIC Insurance			$ 250,000.00
TOTAL			**$ 250,000.00**

* ALL SECURITIES ARE HELD WITH OUR SAFEKEEPING AGENT - COMMERCE BANK N.A., 1000 WALNUT STREET, KANSAS CITY, MO 64106

** ALL PLEDGED SECURITIES ARE IN COMPLIANCE WITH SECTION 1823 (E) OF THE FDIC REGULATIONS AND HAVE BEEN APPROVED BY THE BANK'S LOAN COMMITTEE. THE APPROVAL IS REFLECTED WITHIN THE MINUTES OF THE COMMITTEE.

East Central College
Warrant Check Register
As of December 31, 2024

The Board of Trustees, including the Treasurer, has access to records necessary to confirm check payments have been issued in accordance with the policies and procedures of the Junior College District of East Central Missouri (East Central College), in compliance with the appropriation granted by the Board of Trustees as defined in the FY25 budgets.

Total amount of checks disbursed from November 1, 2024 through December 31, 2024 is reported at $2,020,689.23

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM VII: ECONOMIC IMPACT REPORT

A recently completed economic impact report will be presented to the Board.

Attachments

01/27/2025
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EAST CENTRAL COLLEGE

Executive Summary

PUBLISHED DECEMBER 2024

The Economic Value of East Central College to the East Central College Taxing District

Reflects FY 2022-23

Lightcast

EAST CENTRAL COLLEGE (ECC) creates value in many ways. The college plays a key role in helping students increase their employability and achieve their individual potential. The college draws students to the region, generating new dollars and opportunities for the ECC Taxing District.* ECC provides students with the education, training, and skills they need to have fulfilling and prosperous careers. Furthermore, ECC is a place for students to meet new people, increase their self-confidence, and promote their overall health and well-being.

ECC influences both the lives of its students and the regional economy. The college supports a variety of industries in the ECC Taxing District, serves regional businesses, and benefits society as a whole in Missouri from an expanded economy and improved quality of life. Additionally, the benefits created by ECC extend to the state and local government through increased tax revenues and public sector savings.

The ECC Taxing District, Missouri

This study measures the economic impacts created by ECC on the business community and the benefits the college generates in return for the investments made by its key stakeholder groups—students, taxpayers, and society. The following two analyses are presented:

ECC influences both the **lives of its students** and the **regional economy**.

Economic impact analysis

Investment analysis

All results reflect employee, student, and financial data, provided by the college, for fiscal year (FY) 2022-23. Impacts on the ECC Taxing District economy are reported under the economic impact analysis and are measured in terms of added income. The returns on investment to students, taxpayers, and society in Missouri are reported under the investment analysis.

* For the purposes of this analysis, the ECC Taxing District is comprised of 16 zip codes spanning across Crawford, Franklin, St. Charles, and Warren Counties in Missouri.

Economic impact analysis

ECC promotes economic growth in the ECC Taxing District through its direct expenditures and the resulting expenditures of students and regional businesses. The college serves as an employer and buyer of goods and services for its day-to-day operations. The college's activities attract students from outside the ECC Taxing District, whose expenditures benefit regional vendors. In addition, ECC is one of the primary sources of higher education to the ECC Taxing District residents and a supplier of trained workers to regional industries, enhancing overall productivity in the regional workforce.

Operations spending impact

ECC adds economic value to the ECC Taxing District as an employer of regional residents and a large-scale buyer of goods and services. In FY 2022-23, the college employed 453 full-time and part-time faculty and staff, 65% of whom lived in the ECC Taxing District. Total payroll at ECC was $18.2 million, much of which was spent in the region for groceries, mortgage and rent payments, dining out, and other household expenses. In addition, the college spent $8.7 million on expenses related to facilities, supplies, and professional services.

ECC's operations spending added $10.9 million in income to the region during the analysis year. This figure represents the college's payroll, the multiplier effects generated by the in-region spending of the college and its employees, and a downward adjustment to account for funding that the college received from regional sources. The $10.9 million in added income is equivalent to supporting 346 jobs in the region.

Student spending impact

Around 34% of students attending ECC originated from outside the region in FY 2022-23, and most of them relocated to the ECC Taxing District to attend ECC. These students may not have come to the region if the college did not exist. In addition, some in-region students, referred to as retained students, would have left the ECC Taxing District if not for the existence of ECC. While attending the college, these relocated and retained students spent money on groceries, accommodation, transportation, and other household expenses. This spending generated $9.5 million in added income for the regional economy in FY 2022-23, which supported 167 jobs in the ECC Taxing District.

Impacts created by ECC in FY 2022-23

Operations spending impact
$10.9 million

+

Student spending impact
$9.5 million

+

Alumni impact
$90.5 million

Total economic impact
$110.9 million

OR

Jobs supported
1,891

Alumni impact

The education and training ECC provides for regional residents has the greatest impact. Since the establishment of the college, students have studied at ECC and entered the regional workforce with greater knowledge and new skills. Today, thousands of former ECC students are employed in the ECC Taxing District. As a result of their education from ECC, the students receive higher earnings and increase the productivity of the businesses that employ them. In FY 2022-23, ECC alumni generated $90.5 million in added income for the regional economy, which is equivalent to supporting 1,378 jobs.

Total impact

ECC added $110.9 million in income to the ECC Taxing District economy during the analysis year, equal to the sum of the operations spending impact, the student spending impact, and the alumni impact. For context, the $110.9 million impact was equal to approximately 2.7% of the total gross regional product (GRP) of the ECC Taxing District. This contribution that the college provided on its own is nearly as large as the entire Accommodation & Food Service industry in the region.

ECC's total impact can also be expressed in terms of jobs supported. The $110.9 million impact supported 1,891 regional jobs, using the jobs-to-sales ratios specific to each industry in the region. This means that one out of every 26 jobs in the ECC Taxing District is supported by the activities of ECC and its students. In addition, the $110.9 million, or 1,891 supported jobs, stemmed from different industry sectors. For instance, among non-education industry sectors, the spending of ECC and its students and the activities of its alumni in the Health Care & Social Assistance industry supported 155 jobs in FY 2022-23. If the college did not exist, these impacts would not have been generated in the ECC Taxing District.

ECC impacts by industry (jobs supported)

One out of every 26 jobs in the ECC Taxing District are supported by the activities of ECC and its students.

Investment analysis

An investment analysis evaluates the costs associated with a proposed venture against its expected benefits. The analysis presented here evaluates ECC as an investment from the perspectives of students, taxpayers, and society in Missouri. As with the economic impact analysis, this analysis considers only FY 2022-23 activities.

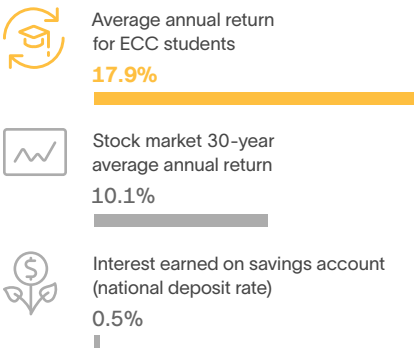
Student perspective

In FY 2022-23, ECC served 3,192 credit and 1,095 non-credit students. In order to attend the college, the students paid for tuition, fees, books, and supplies. They also took out loans and will incur interest on those loans. Additionally, students gave up money they would have otherwise earned had they been working instead of attending college. The total investment made by ECC's students in FY 2022-23 amounted to a present value of $13.3 million, equal to $7.7 million in out-of-pocket expenses (including future principal and interest on student loans) and $5.7 million in forgone time and money.

In return for their investment, ECC's students will receive a stream of higher future earnings that will continue to grow throughout their working lives. For example, the average ECC associate degree graduate from FY 2022-23 will see annual earnings that are $7,500 higher than a person with a high school diploma or equivalent working in Missouri. Over a working lifetime, the benefits of an associate degree over a high school diploma will amount to an undiscounted value of $330,000 in higher earnings per graduate. The present value of the cumulative higher future earnings that ECC's FY 2022-23 students will receive over their working careers is $74.3 million.

The students' benefit-cost ratio is 5.6. In other words, for every dollar students invest in ECC in the form of out-of-pocket expenses and forgone time and money, they will receive a cumulative value of $5.60 in higher future earnings. Annually, the students'

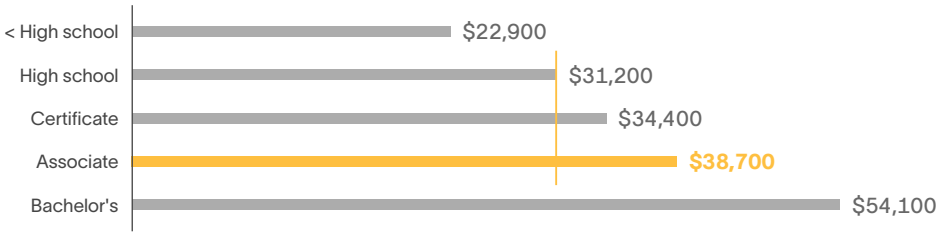
Students see a high rate of return for their investment in ECC



Source: Forbes' S&P 500, 1992-2022; FDIC.gov, 2-2022

Average earnings by education level at career midpoint

The average associate degree graduate from ECC will see an increase in earnings of **$7,500** each year compared to a person with a high school diploma or equivalent working in Missouri.



Source: Lightcast employment data

investment in ECC has an average annual internal rate of return of 17.9%, which is impressive compared to the U.S. stock market's 30-year average rate of return of 10.1%.

Taxpayer perspective

ECC generates more in tax revenue than it receives. These benefits to taxpayers consist primarily of taxes that the state and local government will collect from the added revenue created in the state. As ECC students will earn more, they will make higher tax payments throughout their working lives. Students' employers will also make higher tax payments as they increase their output and purchases of goods and services. By the end of the FY 2022-23 students' working lives, the state and local government will have collected a present value of $22.5 million in added taxes.

For every dollar of public money invested in ECC, taxpayers will receive a cumulative value of **$1.40** over the course of the students' working lives.

Benefits to taxpayers will also consist of savings generated by the improved lifestyles of ECC students and the corresponding reduced government services. Education is statistically correlated with a variety of lifestyle changes. The education that ECC students receive will generate savings in three main categories: 1) health care, 2) justice system, and 3) income assistance. Improved health will lower students' demand for national health care services. In addition, costs related to the justice system will decrease. ECC students will be more employable, so their reduced demand for income assistance such as welfare and unemployment benefits will benefit taxpayers. For a list of study references, contact the college for a copy of the main report. Altogether, the present value of the benefits associated with an education from ECC will generate $3.1 million in savings to state and local taxpayers.

Total taxpayer benefits amount to $25.6 million, the present value sum of the added tax revenue and public sector savings. Taxpayer costs are $18.6 million, equal to the amount of state and local government funding ECC received in FY 2022-23. These benefits and costs yield a benefit-cost ratio of 1.4. This means that for every dollar of public money invested in ECC in FY 2022-23, taxpayers will receive a cumulative present value of $1.40 over the course of the students' working lives. The average annual internal rate of return for taxpayers is 2.2%, which compares favorably to other long-term investments in the public sector.

Social perspective

Society as a whole in Missouri benefits from the presence of ECC in two major ways. Primarily, society benefits from an increased economic base in the state. This is attributed to the added income from students' increased lifetime earnings (added student income) and increased business output (added business income), which raise economic prosperity in Missouri.

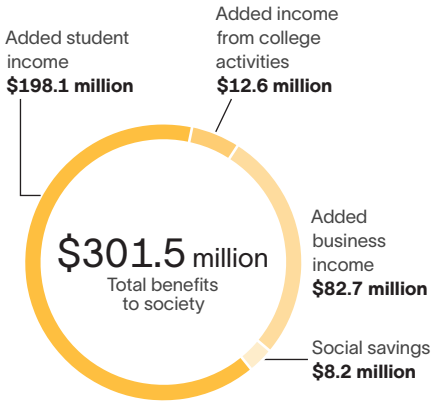
Benefits to society also consist of the savings generated by the improved lifestyles of ECC students. As discussed in the previous section, education is statistically correlated with a variety of lifestyle changes that generate social savings. Note that these costs are avoided by the consumers but are distinct from the costs avoided by the taxpayers

outlined above. Health care savings include avoided medical costs associated with smoking, obesity, substance abuse, and depression. Justice system savings include avoided costs to the government and society due to less judicial activity. Income assistance savings include reduced welfare and unemployment claims. For a list of study references, contact the college for a copy of the main report.

Altogether, the social benefits of ECC equal a present value of $301.5 million. These benefits include $198.1 million in added student income, $82.7 million in added business income, $8.2 million in added income from college activities, as well as $12.6 million in social savings related to health, the justice system, and income assistance in Missouri. People in Missouri invested a present value total of $35.4 million in ECC in FY 2022-23. The cost includes all the college and student costs.

The benefit-cost ratio for society is 8.5, equal to the $301.5 million in benefits divided by the $35.4 million in costs. In other words, for every dollar invested in ECC, people in Missouri will receive a cumulative value of $8.50 in benefits. The benefits of this investment will occur for as long as ECC's FY 2022-23 students remain employed in the state workforce.

Social benefits in Missouri from ECC



Source: Lightcast impact model

Summary of investment analysis results

The results of the analysis demonstrate that ECC is a strong investment for all three major stakeholder groups—students, taxpayers, and society. As shown, students receive a great return for their investments in an education from ECC. At the same time, taxpayers' investment in ECC returns more to government budgets than it costs and creates a wide range of social benefits throughout Missouri.

Summary of investment analysis results

Student perspective		Taxpayer perspective		Social perspective	
Present value benefits	$74.3 million	Present value benefits	$25.6 million	Present value benefits	$301.5 million
Present value costs	$13.3 million	Present value costs	$18.6 million	Present value costs	$25.4 million
Net present value	$60.9 million	Net present value	$6.9 million	Net present value	$266.1 million
Benefit-cost ratio	5.6	Rate of return	17.9%	Benefit-cost ratio	1.4	Rate of return	2.2%	Benefit-cost ratio	8.5	Rate of return	n/a*

* The rate of return is not reported for the social perspective because the beneficiaries are not necessarily the same as the original investors.

Conclusion

*The results of this study demonstrate that ECC creates value from **multiple perspectives**.*

The college benefits regional businesses by increasing consumer spending in the region and supplying a steady flow of qualified, trained workers to the workforce. ECC enriches the lives of students by raising their lifetime earnings and helping them achieve their individual potential. The college benefits state and local taxpayers through increased tax receipts and a reduced demand for government-supported social services. Finally, ECC benefits society as a whole in Missouri by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students.

About the study

Data and assumptions used in the study are based on several sources, including the FY 2022-23 academic and financial reports from ECC, industry and employment data from the U.S. Bureau of Labor Statistics and U.S. Census Bureau, outputs of Lightcast's Multi-Regional Social Accounting Matrix model, and a variety of studies and surveys relating education to social behavior. The study applies a conservative methodology and follows standard practice using only the most recognized indicators of economic impact and investment effectiveness. For a full description of the data and approach used in the study, please contact the college for a copy of the main report.

Lightcast

Lightcast provides colleges and universities with labor market data that help create better outcomes for students, businesses, and communities. Our data, which cover more than 99% of the U.S. workforce, are compiled from a wide variety of government sources, job postings, and online profiles and résumés. Hundreds of institutions use Lightcast to align programs with regional needs, drive enrollment, connect students with in-demand careers, track their alumni's employment outcomes, and demonstrate their institution's economic impact on their region. Visit lightcast.io/solutions/education to learn more or connect with us.

EAST CENTRAL COLLEGE

Fact Sheet

PUBLISHED DECEMBER 2024

The Economic Value of East Central College to the East Central College Taxing District

East Central College (ECC) creates a significant positive impact on the business community and generates a return on investment to its major stakeholder groups—students, taxpayers, and society. Using a two-pronged approach that involves an economic impact analysis and an investment analysis, this study calculates the benefits received by each of these groups. Results of the analysis reflect fiscal year (FY) 2022-23.

The ECC Taxing District, Missouri

Economic impact analysis

In FY 2022-23, ECC added **$110.9 million** in income to the ECC Taxing District* economy, a value approximately equal to **2.7%** of the region's total gross regional product (GRP). Expressed in terms of jobs, ECC's impact supported **1,891 jobs**. For perspective, the activities of ECC and its students support **one out of every 26 jobs** in the ECC Taxing District.

Operations spending impact

- ECC employed 453 full-time and part-time faculty and staff. Payroll amounted to $18.2 million, much of which was spent in the region for groceries, mortgage and rent payments, dining out, and other household expenses. The college spent another $8.7 million on its expenses related to facilities, supplies, and professional services (excluding construction).
- The net impact of the college's operations spending added **$10.9 million** in income to the regional economy in FY 2022-23.

Student spending impact

- Around 34% of students attending ECC originated from outside the region. Most of them relocated to the ECC Taxing District. In addition, some in-region students, referred to as retained students, would have left the ECC Taxing District for other educational opportunities if not for ECC. These relocated and retained students spent money on groceries, mortgage and rent payments, and other living expenses at regional businesses.
- The expenditures of relocated and retained students in FY 2022-23 added **$9.5 million** in income to the ECC Taxing District economy.

Alumni impact

- Over the years, students have studied at ECC and entered or re-entered the workforce with newly acquired knowledge and skills. Today, thousands of these former students are employed in the ECC Taxing District.
- The net impact of ECC's former students currently employed in the regional workforce amounted to **$90.5 million** in added income in FY 2022-23.

Impacts created by ECC in FY 2022-23

Operations spending impact
$10.9 million

+

Student spending impact
$9.5 million

+

Alumni impact
$90.5 million

Total economic impact
$110.9 million

OR

Jobs supported
1,891

* For the purposes of this analysis, the ECC Taxing District is comprised of 16 zip codes spanning across Crawford, Franklin, St. Charles, and Warren Counties in Missouri.

Investment analysis

Student perspective

- ECC's FY 2022-23 students paid a present value of **$7.7 million** to cover the cost of tuition, fees, supplies, and interest on student loans. They also forwent a value of **$5.7 million** in time and money had they been working instead of attending college.
- In return for their investment, students will receive a cumulative present value of **$74.3 million** in increased earnings over their working lives. This translates to a return of **$5.60** in higher future earnings for every dollar students invest in their education. Students' average annual rate of return is **17.9%**.

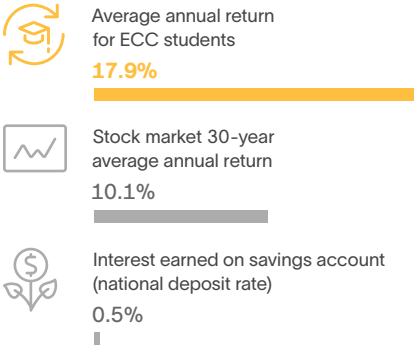
Taxpayer perspective

- Taxpayers provided ECC with **$18.6 million** of funding in FY 2022-23. In return, they will benefit from added tax revenue, stemming from students' higher lifetime earnings and increased business output, amounting to **$22.5 million**. A reduced demand for government-funded services in Missouri will add another **$3.1 million** in benefits to taxpayers.
- Total taxpayer benefits amount to **$25.6 million**, the present value sum of the added tax revenue and public sector savings. For every dollar of public money invested in ECC, taxpayers will receive **$1.40** in return over the course of students' working lives. The average annual rate of return for taxpayers is **2.2%**.

Social perspective

- In FY 2022-23, Missouri invested **$35.4 million** to support ECC. In turn, the Missouri economy will grow by **$289.0 million**, over the course of students' working lives. Society will also benefit from **$12.6 million** of public and private sector savings.
- For every dollar invested in ECC in FY 2022-23, people in Missouri will receive **$8.50** in return, for as long as ECC's FY 2022-23 students remain active in the state workforce.

Students see a high rate of return for their investment in ECC



Source: Forbes' S&P 500, 1992-2022; FDIC.gov, 2-2022

For every $1...

Students gain in lifetime earnings
$5.60

Taxpayers gain in added tax revenue and public sector savings
$1.40

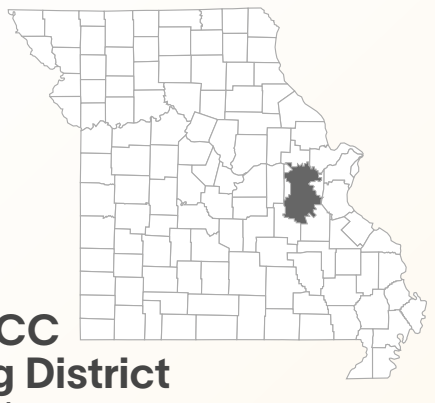
Society gains in added income and social savings
$8.50

EAST CENTRAL COLLEGE

Reflects **FY 2022-23**

PUBLISHED DECEMBER 2024

The Economic Value of East Central College to the East Central College Taxing District



About ECC

3,192 Credit students

1,095 Non-credit students

453 Employees

Economic impact analysis

$90.5 million Added income

Alumni impact

Impact of the increased earnings of ECC alumni and the businesses they work for

An economic boost similar to hosting the World Series **14x**

OR **1,378** Jobs supported

1 out of every 26

jobs in the ECC Taxing District is supported by the activities of ECC and its students.

$10.9 million Added income

Operations spending impact

Impact of annual payroll and other spending

Enough to buy **231** new cars

OR **346** Jobs supported

$9.5 million Added income

Student spending impact

Impact of the daily spending of ECC students attracted to or retained in the region

Enough to buy **647** families* a year's worth of groceries

OR **167** Jobs supported

ECC total annual impact

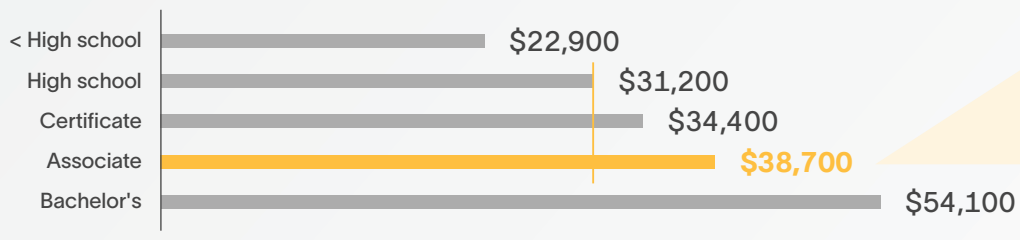
$110.9 million
Added income

OR **1,891**
Jobs supported

● = 100 jobs * = family of four

Investment analysis

Average earnings by education level at career midpoint



The average associate degree graduate from ECC will see an increase in earnings of **$7,500** each year compared to someone with a high school diploma working in Missouri.

For every $1...

Students gain **$5.60** in lifetime earnings

Taxpayers gain **$1.40** in added tax revenue and public sector savings

Society gains **$8.50** in added income and social savings

Sources: Lightcast Economic Impact Study; https://www.bizjournals.com/washington/news/2019/10/16/nats-could-face-yankees-or-astros-in-world-series.html; https://www.coxautoinc.com/market-insights/kbb-atp-february-2024/; https://fns-prod.azureedge.us/sites/default/files/resource-files/Cost_Of_Food_Low_Moderate_Liberal_Food_Plans_February_2024.pdf

EAST CENTRAL COLLEGE

Main Report

DECEMBER 2024

The Economic Value of East Central College to the East Central College Taxing District

Reflects FY 2022-23

Lightcast

Contents

Preface

Lightcast is a leading provider of economic impact studies and labor market data to educational institutions, workforce planners, and regional developers in the U.S. and internationally. Since 2000, Lightcast has completed over 3,000 economic impact studies for educational institutions in three countries. Along the way, we have worked to continuously update and improve our methodologies to ensure that they conform to the best practices. The present study reflects the latest version of our model, representing the most up-to-date theory for conducting human capital economic impact analyses.

Among the most vital departures from Lightcast's previous economic model is the conversion from traditional Leontief input-output multipliers to those generated by Lightcast's Multi-Regional Social Accounting Matrix (MR-SAM). Though Leontief multipliers are based on sound theory, they are less comprehensive and adaptable than MR-SAM multipliers. Moving to the more robust MR-SAM framework allows us to increase the level of sectoral detail in the model and remove any aggregation error that may have occurred under the previous framework. This change in methodology primarily affects the regional economic impact analysis provided in Chapter 3; however, the multi-regional capacity of the MR-SAM also increases the accuracy with which we calculate the statewide labor and non-labor multipliers used in the investment analysis in Chapter 4.

Another major change in the model is the replacement of John Parr's development index with a proprietary mapping of instructional programs to regional industries. The Parr index was a significant move forward when we first applied it in 2000 to approximate the industries where students were most likely to find employment after leaving their institution. Now, by mapping the institution's program completers to detailed regional industries, we can move from an approach based on assumptions to one based on the actual occupations for which students are trained.

The new model also reflects changes to the calculation of the alternative education variable. This variable addresses the counterfactual scenario of what would have occurred if the institution did not exist. Those students that would have obtained a similar education elsewhere and worked in the region, regardless of the institution under analysis, are excluded from the impact. The previous model measured the distance between institutions and the associated differences in tuition prices to determine the change in the students' demand for education. In the current model, we assume 15% of the institution's students would find alternative education opportunities and remain in or return to the region. A sensitivity analysis of this adjustment is presented in Appendix 1.

This model also reflects several changes related to how the investment analysis results are calculated for students, taxpayers, and society. The primary change was extending the estimated amount of time it takes workforce/professional development students to find employment after leaving college. Previously, it was assumed that 100% of these students would find employment immediately after leaving the institution. In order to reflect the job market more accurately, that number has been reduced to 25%, so we now estimate that only 75% of students find employment within two years of leaving their institution.

Some changes are due to our efforts to conform to best practices for economic impact analyses. For example, the economic impact guidelines set by the Association for Public Land-Grant Universities discourage the inclusion of depreciation expenses in operations spending impacts. Previous iterations of our model have used this measure as a proxy for capital maintenance. However, in an effort to provide more conservative and defensible results, we now exclude those expenditures from the operations spending impact.

Further, the source of migration data has been updated to the Internal Revenue Service, which provides more granular and reliable data on migration, making the regional and state outmigration rates used in the study reflective of actual historical migration patterns.

The model is consistently being updated as more data become available. For example, in prior studies the alumni impact only included the alumni served over the past 30 years. Historical headcount data beyond 30 years oftentimes did not exist and estimates were unreliable. However, historical headcount data reliability has increased over the years, making the historical headcount estimates by Lightcast more accurate. Therefore, the impact from alumni has been expanded to include all alumni active in the regional workforce who have not reached the average retirement age of 67.

Due to increased data availability, we have also improved the accuracy of the Mincer function, a function used to project former students' earnings trajectory as they gain more experience throughout their working lives. We have switched data sources and now use a more accurate and complete data set from IPUMS[1] to calculate our Mincer functions. In addition, the Mincer function is now demographic profile specific, which we are able to apply to the institution's student demographic composition. Further, we have also made the Mincer specific to students' education levels. As part of updating the Mincer, the age at which students reach their career midpoint in earnings was updated.

This model, as with previous versions, has various external data inputs which reflect the most current economic activity and data. These data include (but are not limited to): the taxpayer discount rate; the student discount rate; the consumer savings rate; the consumer price index; national health expenditures; state and local industry earnings as a percent of total industry earnings; income tax brackets and sales tax by state; and unemployment, migration, and life tables. All data sets are maintained quarterly, although most updates occur only once a year.

[1] IPUMS provides census and survey data from around the world integrated across time and space. This data can be accessed through their site: https://www.ipums.org/.

These and other changes mark a considerable upgrade to the Lightcast economic impact model. Our hope is that these improvements will provide a better product for our clients – reports that are more transparent and streamlined, methodology that is more comprehensive and robust, and findings that are more relevant and meaningful to today's audiences.

While this report is useful in demonstrating the current value of East Central College (ECC), it is not intended for comparison with ECC's previous study conducted by Lightcast in 2010. In addition to changes in Lightcast's model and methodology, a key difference between the present study and the previous study is the region considered for the economic impact analysis. Previously, a wider range of zip codes was considered to be part of the college's service region, while this study uses a refined group of code. Due to the significant change in the region and the extent of the external data changes and improvements to Lightcast's model since 2010, differences between results from the 2010 study and the present study do not necessarily indicate changes in the value of the college.

Lightcast encourages our readers to approach us directly with any questions or comments they may have about the study so that we can continue to improve our model and keep the public dialogue open about the positive impacts of education.

A note on comparing studies

It is important to note that the changes outlined above represent important improvements to our methodology, ultimately providing more accurate and robust results. However, these changes make it difficult to directly compare past studies to the current study, with the effectiveness of the comparison decreasing as the age of the previous study increases.

Additionally, in general Lightcast discourages comparisons between individual institutions and between educational systems since many factors, such as regional economic and political conditions, institutional differences, and student demographics are outside of the institution's control. In addition, every institution is unique, meaning the results and types of impact or investment measures are tailored to the specific institution or educational system.

Finally, if the college's service region was changed between the studies, the results cannot be compared as the economic impact analysis is strictly dependent on the region for which it is conducted, as well as on its economic, demographic, and political specifics.

Acknowledgments

Lightcast gratefully acknowledges the excellent support of the staff at East Central College in making this study possible. Special thanks go to Dr. Jon Bauer, President, who approved the study, and to Bethany Lohden, Director of Institutional Research; Dana Riegel, Research Analyst; Joel Doepker, Vice President of External Relations; and Ashley Straatmann, Director of Financial Service/Comptroller, who collected much of the data and information requested. Any errors in the report are the responsibility of Lightcast and not any of the above-mentioned individuals.

Lightcast provides colleges and universities with labor market data that help create better outcomes for students, businesses, and communities. Our data, which cover more than 99% of the U.S. workforce, are compiled from a wide variety of government sources, job postings, and online profiles and résumés. Hundreds of institutions use Lightcast to align programs with regional needs, drive enrollment, connect students with in-demand careers, track their alumni's employment outcomes, and demonstrate their institution's economic impact on their region. Visit lightcast.io/solutions/education to learn more or connect with us.

Executive summary

This report assesses the impact of East Central College (ECC) on the regional economy and the benefits generated by the college for students, taxpayers, and society. The results of this study show that ECC creates a positive net impact on the regional economy and generates a positive return on investment for students, taxpayers, and society.

Economic impact analysis

During the analysis year, ECC spent in total $18.2 million on payroll and benefits for 453 full-time and part-time employees and spent another $8.7 million on goods and services to carry out its day-to-day operations. This initial round of spending creates more spending across other businesses throughout the regional economy, resulting in the commonly referred to multiplier effects. This analysis estimates the net economic impact of ECC that directly accounts for the fact that state and local dollars spent on ECC could have been spent elsewhere in the region if not directed toward ECC and would have created impacts regardless. We account for this by estimating the impacts that would have been created from the alternative spending and subtracting the alternative impacts from the spending impacts of ECC.

The additional income of **$110.9 million** created by ECC is equal to approximately **2.7%** of the total gross regional product of the ECC Taxing District.

This analysis shows that in fiscal year (FY) 2022-23, operations and student spending of ECC, together with the enhanced productivity of its alumni, generated **$110.9 million** in added income for the ECC Taxing District[2] economy. The additional income of **$110.9 million** created by ECC is equal to approximately **2.7%** of the total gross regional product (GRP) of the ECC Taxing District. For perspective, this impact from the college is nearly as large as the entire Accommodation & Food Service industry in the region. The impact of **$110.9 million** is equivalent to supporting **1,891 jobs**. For further perspective, this means that **one out of every 26 jobs** in the

[2] For the purposes of this analysis, the ECC Taxing District is comprised of the following zip codes in Missouri: 63013, 63041, 63055, 63056, 63060, 63061, 63068, 63077, 63080, 63084, 63090, 63332, 63342, 63357, 65441, and 65535, spanning across Crawford, Franklin, St. Charles, and Warren

ECC Taxing District is supported by the activities of ECC and its students. These economic impacts break down as follows:

Operations spending impact

Payroll and benefits to support ECC's day-to-day operations amounted to $13.7 million, and the college's non-pay expenditures amounted to $6.6 million in the ECC Taxing District. The net impact of operations spending by the college in the ECC Taxing District during the analysis year was approximately **$10.9 million** in added income, which is equivalent to supporting **346 jobs**.

Student spending impact

Around 34% of students attending ECC originated from outside the region. Most of them relocated to the ECC Taxing District to attend the college. In addition, some students are residents of the ECC Taxing District who would have left the region if not for the existence of ECC. The money that these students, referred to as retained students, spent toward living expenses in the ECC Taxing District is attributable to ECC.

The expenditures of relocated and retained students in the region during the analysis year added approximately **$9.5 million** in income for the ECC Taxing District economy, which is equivalent to supporting **167 jobs**.

Alumni impact

Over the years, students gained new skills, making them more productive workers, by studying at ECC. Today, thousands of these former students are employed in the ECC Taxing District.

The accumulated impact of former students currently employed in the ECC Taxing District workforce amounted to **$90.5 million** in added income for the ECC Taxing District economy, which is equivalent to supporting **1,378 jobs**.

Important note

When reviewing the impacts estimated in this study, it is important to note that the study reports impacts in the form of added income rather than sales. Sales includes all of the intermediary costs associated with producing goods and services, as well as money that leaks out of the region as it is spent at out-of-region businesses. Income, on the other hand, is a net measure that excludes these intermediary costs and leakages and is synonymous with gross regional product (GRP) and value added. For this reason, it is a more meaningful measure of new economic activity than sales.

Investment analysis

Investment analysis is the practice of comparing the costs and benefits of an investment to determine whether it is profitable. This study evaluates ECC as an investment from the perspectives of students, taxpayers, and society.

Student perspective

Students invest their own money and time in their education to pay for tuition, books, and supplies. Some take out student loans to attend the college, which they will pay back over time. While some students were employed while attending the college, students overall forewent earnings that they would have generated had they been in full employment instead of learning. Summing these direct outlays, opportunity costs, and future student loan costs yields a total of **$13.3 million** in present value student costs.

In return, students will receive a present value of **$74.3 million** in increased earnings over their working lives. This translates to a return of **$5.60** in higher future earnings for every dollar that students invest in their education at ECC. The corresponding annual rate of return is **17.9%**.

Taxpayer perspective

Taxpayers provided **$18.6 million** of state and local funding to ECC in FY 2022-23. In return, taxpayers will receive an estimated present value of **$22.5 million** in added tax revenue stemming from the students' higher lifetime earnings and the increased output of businesses. Savings to the public sector add another estimated **$3.1 million** in benefits due to a reduced demand for government-funded social services in Missouri. Total taxpayer benefits amount to **$25.6 million**, the present value sum of the added tax revenue and public sector savings. For every tax dollar spent educating students attending ECC, taxpayers will receive an average of **$1.40** in return over the course of the students' working lives. In other words, taxpayers receive an annual rate of return of **2.2%**.

For every tax dollar spent educating students attending ECC, taxpayers will receive an average of **$1.40** in return over the course of the students' working lives.

Social perspective

People in Missouri invested **$35.4 million** in ECC in FY 2022-23. This includes the college's expenditures, student expenses, and student opportunity costs. In return, the state of Missouri will receive an estimated present value of **$289.0 million** in added state revenue over the course of the students' working lives. Missouri will also benefit from an estimated **$12.6 million** in present value social savings related to reduced crime, lower welfare and unemployment assistance, and increased health and well-being across the state. For every dollar society invests in ECC, an average of **$8.5** in benefits will accrue to Missouri over the course of the students' careers.

Chapter 1:

Introduction

East Central College (ECC), established in 1968, has today grown to serve 3,192 credit and 1,095 non-credit students. The college is led by Dr. Jon Bauer, President. The region of analysis, for the purpose of this report, is referred to as the ECC Taxing District and consists of the following 16 zip codes: 63013, 63041, 63055, 63056, 63060, 63061, 63068, 63077, 63080, 63084, 63090, 63332, 63342, 63357, 65441, and 65535 in Crawford, Franklin, St. Charles, and Warren Counties in Missouri.

While this study only considers the economic benefits generated by ECC, it is worth noting the region receives a variety of benefits from the college, including social and cultural benefits that are difficult to quantify. The college naturally helps students achieve their individual potential and develop the knowledge, skills, and abilities they need to have fulfilling and prosperous careers. However, ECC impacts the ECC Taxing District beyond influencing the lives of students. The college's program offerings supply employers with workers to make their businesses more productive. The college, its day-to-day operations, and the expenditures of its students support the regional economy through the output and employment generated by regional vendors. The benefits created by the college extend as far as the state treasury in terms of the increased tax receipts and decreased public sector costs generated by students across the state.

ECC impacts the ECC Taxing District beyond influencing the lives of students.

This report assesses the impact of ECC as a whole on the regional economy and the benefits generated by the college for students, taxpayers, and society. The approach is twofold. We begin with an economic impact analysis of the college on the ECC Taxing District economy. To derive results, we rely on a specialized Multi-Regional Social Accounting Matrix (MR-SAM) model to calculate the added income created in the ECC Taxing District economy as a result of increased consumer spending and the added knowledge, skills, and abilities of students. Results of the economic impact analysis are broken out according to the following impacts: 1) impact of the college's operations spending, 2) impact of student spending, and 3) impact of alumni who are still employed in the ECC Taxing District workforce.

The second component of the study measures the benefits generated by ECC for the following stakeholder groups: students, taxpayers, and society. For students, we perform an investment analysis to determine how the money spent by students on their education performs as an investment over time. The students' investment in this case consists of their out-of-pocket expenses, the cost of interest incurred on student loans, and the opportunity cost of attending the college as opposed to working. In return for these investments, students receive a lifetime of higher earnings. For taxpayers, the study measures the benefits to state taxpayers in the form of increased tax revenues and public sector savings stemming from a reduced demand for social services. Finally, for society, the study assesses how the students' higher earnings and improved quality of life create benefits throughout Missouri as a whole.

The study uses a wide array of data that are based on several sources, including the FY 2022-23 academic and financial reports from ECC; industry and employment data from the Bureau of Labor Statistics and Census Bureau; outputs of Lightcast's impact model and MR-SAM model; and a variety of published materials relating education to social behavior.

Chapter 2:

Profile of East Central College and the economy

East Central College (ECC) is a comprehensive two-year college located in Union, Missouri. Established in 1968, ECC has a rich history of serving students and community members through flexible course offerings in relevant, in-demand fields. In FY 2022-23, ECC served 3,192 credit and 1,095 non-credit students.

ECC provides exceptional educational opportunities in a variety of formats, including online and in-person options. With more than 70 degree and certificate program offerings, ECC's flexible learning models make it easy for students to explore interests and gain skills. The college's diverse program offerings include Accounting, Computer Information Systems, Emergency Medical Services, Nursing, Music, Teaching, and more. In addition, ECC offers a robust assortment of workforce development and adult education classes designed to meet the needs of students and the community.

With more than 70 degree and certificate program offerings, ECC's flexible learning models make it easy for students to explore interests and gain skills.

Along with offering a diverse range of academic activities, the college also offers a range of community services. Specifically, the college enables students to engage with their community via a variety of service learning opportunities. The college supports the ECC Civic & Community Engagement Coalition, which is a collaborative effort to develop and sustain social and environmental responsibility and cultural literacy through education, support, and outreach.

In addition to providing excellent academic opportunities for students, ECC is a vital asset to regional employers. Specifically, the college adds highly-trained human capital to the regional workforce and provides training for local businesses at the Center for Workforce Development. The Center's mission is to provide local business with the resources they need to compete in a global economy.

ECC employee and finance data

The study uses two general types of information: 1) data collected from the college and 2) regional economic data obtained from various public sources and Lightcast's proprietary data modeling tools.[3] This chapter presents the basic underlying information from ECC used in this analysis and provides an overview of the ECC Taxing District economy.

Employee data

Data provided by ECC include information on faculty and staff by place of work and by place of residence. These data appear in Table 2.1. As shown, ECC employed 173 full-time and 280 part-time faculty and staff in FY 2022-23 (including student workers). Of these, 75% worked in the region and 65% lived in the region. These data are used to isolate the portion of the employees' payroll and household expenses that remains in the regional economy.

Table 2.1: Employee data, FY 2022-23

Full-time faculty and staff	173
Part-time faculty and staff	280
Total faculty and staff	453
% of employees who work in the region	75%
% of employees who live in the region	65%

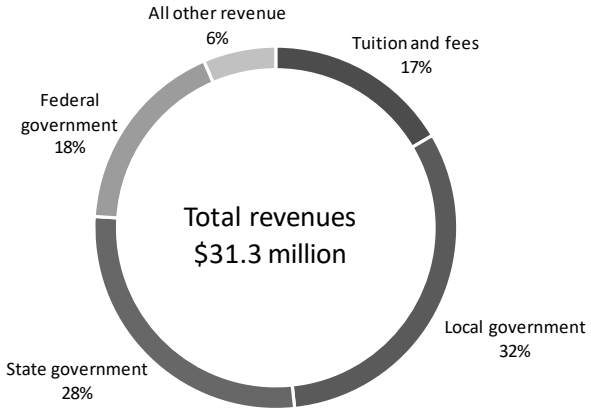
Source: Data provided by ECC

Revenues

Figure 2.1 shows the college's annual revenues by funding source – a total of $31.3 million in FY 2022-23. As indicated, tuition and fees comprised 17% of total revenue, and revenues from local, state, and federal government sources comprised another 77%. All other revenue (i.e., auxiliary revenue, sales and services, interest, and donations) comprised the remaining 6%. These data are critical in identifying the annual costs of educating the student body from the perspectives of students, taxpayers, and society.

[3] See Appendix 5 for a detailed description of the data sources used in the Lightcast modeling tools.

Figure 2.1: ECC revenues by source, FY 2022-23

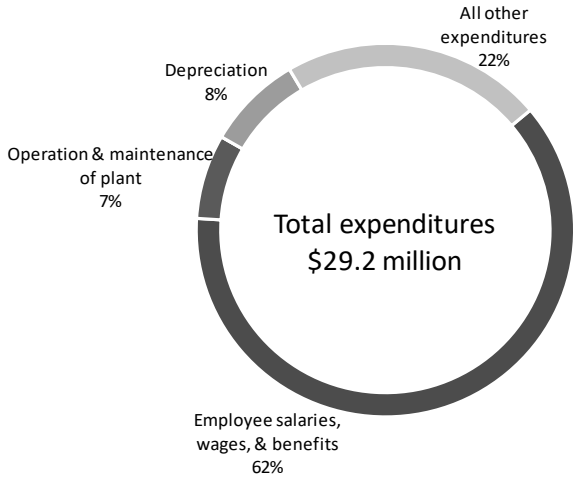


Percentages do not sum to 100% due to rounding.
Source: Data provided by ECC

Expenditures

Figure 2.2 displays ECC's expense data. The combined total payroll at ECC, including student salaries and wages, amounted to $18.2 million. This was equal to 62% of the college's total expenses for FY 2022-23. Other expenditures, including operation and maintenance of plant, depreciation, and purchases of supplies and services, made up $11.1 million. When we calculate the impact of these expenditures in Chapter 3, we exclude depreciation expenses, as they represent a devaluing of the college's assets rather than an outflow of expenditures.

Figure 2.2: ECC expenses by function, FY 2022-23



Percentages do not sum to 100% due to rounding.
Source: Data provided by ECC

Students

ECC served 3,192 students taking courses for credit and 1,095 non-credit students in FY 2022-23. These numbers represent unduplicated student headcounts. The breakdown of the student body by gender was 61% female and 39% male. The breakdown by ethnicity was 89% white, 10% students of color, and 1% unknown. The students' overall average age was 23 years old.4 An estimated 66% of students remain in the ECC Taxing District after finishing their time at ECC, another 33% settle outside the region but in the state, and the remaining 1% settle outside the state.5

Table 2.2 summarizes the breakdown of the student population and their corresponding awards and credits by education level. In FY 2022-23, ECC served 473 associate degree graduates and 91 certificate completers. Another 1,695 students enrolled in courses for credit but did not complete a degree during the reporting year. The college offered dual credit courses to high schools, serving a total of 933 students over the course of the year. The college also served 146 basic education students, and 598 personal enrichment students enrolled in non-credit courses. Non-degree seeking students enrolled in workforce or professional development programs accounted for 351 students.

We use credit hour equivalents (CHEs) to track the educational workload of the students. One CHE is equal to 15 contact hours of classroom instruction per semester. In the analysis, we exclude the CHE production of personal enrichment students under the assumption that they do not attain knowledge, skills, and abilities that will increase their earnings. The average number of CHEs per student (excluding personal enrichment students) was 14.1.

Table 2.2: Breakdown of student headcount and CHE production by education level, FY 2022-23

Category	Headcount	Total CHEs	Average CHEs
Associate degree graduates	473	10,428	22.0
Certificate completers	91	2,280	25.0
Continuing students	1,695	29,578	17.5
Dual credit students	933	8,469	9.1
Basic education students	146	848	5.8
Personal enrichment students	598	639	1.1
Workforce/professional development students	351	244	0.7
Total, all students	**4,287**	**52,485**	**12.2**
Total, less personal enrichment students	**3,689**	**51,846**	**14.1**

Source: Data provided by ECC

[4] Unduplicated headcount, gender, ethnicity, and age data provided by ECC.

[5] Because ECC was unable to provide settlement data, Lightcast used estimates based on student origin.

The ECC Taxing District economy

ECC serves a region referred to as the ECC Taxing District in Missouri.[6] Since the college was first established, it has been serving the ECC Taxing District by enhancing the workforce, providing local residents with easy access to higher education opportunities, and preparing students for highly skilled, technical professions. Table 2.3 summarizes the breakdown of the regional economy by major industrial sector ordered by total income, with details on labor and non-labor income. Labor income refers to wages, salaries, and proprietors' income. Non-labor income refers to profits, rents, and other forms of investment income. Together, labor and non-labor income comprise the region's total income, which can also be considered the region's gross regional product (GRP).

As shown in Table 2.3, the total income, or GRP, of the ECC Taxing District is approximately $4.1 billion, equal to the sum of labor income ($2.6 billion) and non-labor income ($1.5 billion). In Chapter 3, we use the total added income as the measure of the relative impacts of the college on the regional economy.

[6] For the purposes of this analysis, the ECC Taxing District is comprised of the following zip codes in Missouri: 63013, 63041, 63055, 63056, 63060, 63061, 63068, 63077, 63080, 63084, 63090, 63332, 63342, 63357, 65441, and 65535, spanning across Crawford, Franklin, St. Charles, and Warren Counties.

Table 2.3: Income by major industry sector in the ECC Taxing District, 2023*

Industry sector	Labor income (millions)	Non-labor income (millions)	Total income (millions)+	% of total income	Sales (millions)
Manufacturing	$596	$496	$1,092	27%	$2,708
Retail Trade	$219	$183	$402	10%	$677
Health Care & Social Assistance	$337	$32	$370	9%	$574
Utilities	$67	$241	$309	8%	$494
Finance & Insurance	$179	$98	$277	7%	$431
Construction	$203	$46	$249	6%	$483
Wholesale Trade	$89	$76	$166	4%	$279
Real Estate & Rental & Leasing	$104	$59	$163	4%	$345
Transportation & Warehousing	$96	$35	$132	3%	$260
Government, Non-Education	$94	$30	$124	3%	$501
Professional & Technical Services	$98	$24	$122	3%	$183
Government, Education	$121	$0	$121	3%	$141
Accommodation & Food Services	$81	$39	$120	3%	$240
Other Services (except Public Administration)	$88	$10	$98	2%	$173
Agriculture, Forestry, Fishing & Hunting	$45	$42	$87	2%	$213
Administrative & Waste Services	$65	$10	$75	2%	$142
Information	$28	$45	$73	2%	$127
Management of Companies & Enterprises	$39	$3	$42	1%	$66
Mining, Quarrying, & Oil and Gas Extraction	$7	$15	$22	1%	$36
Arts, Entertainment, & Recreation	$10	$3	$14	<1%	$25
Educational Services	$8	<$1	$9	<1%	$12
Total	**$2,576**	**$1,489**	**$4,064**	**100%**	**$8,109**

* Data reflect the most recent year for which data are available. Lightcast data are updated quarterly.

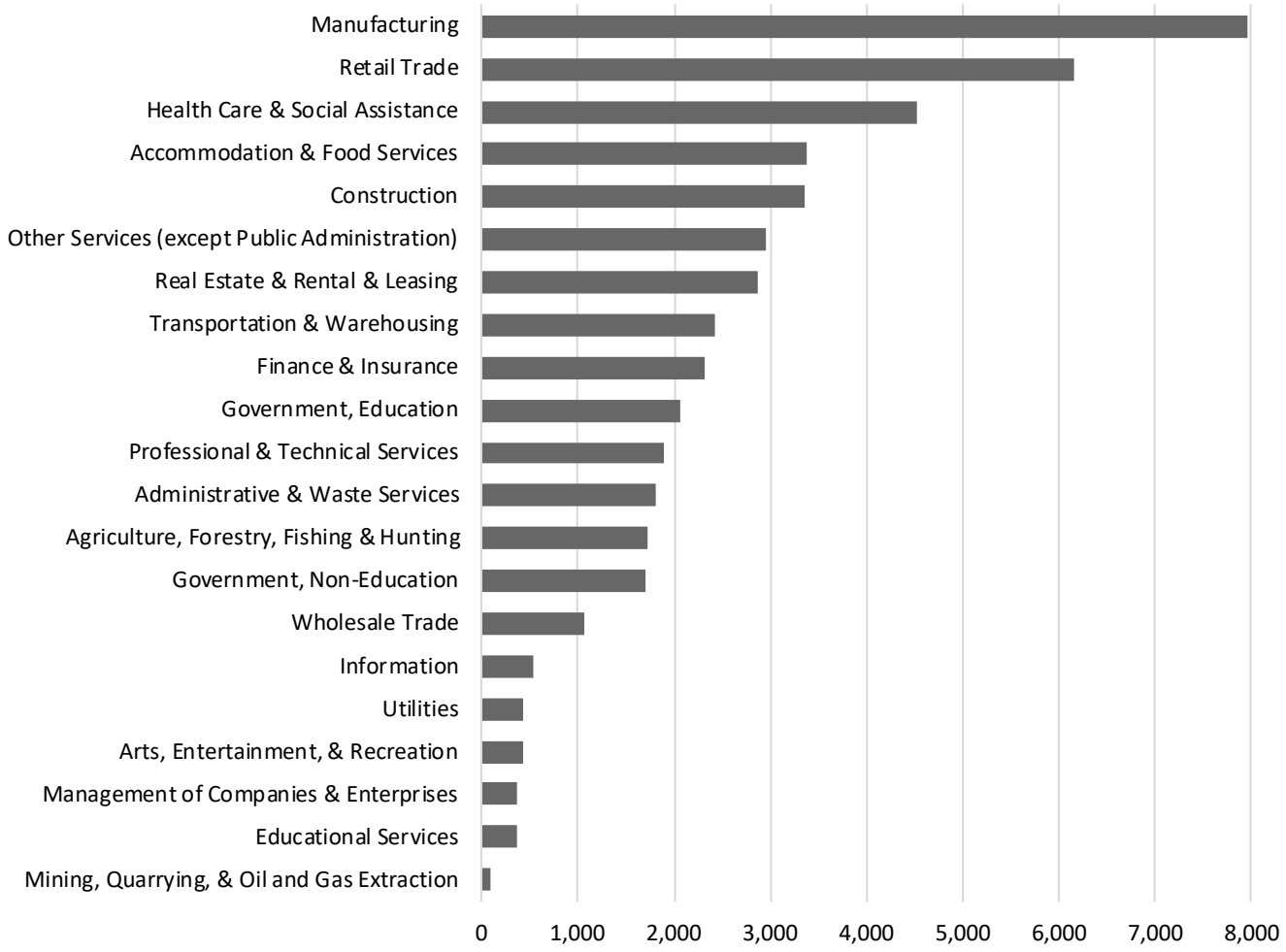
+ Numbers may not sum to totals due to rounding.

Source: Lightcast industry data

Figure 2.3 provides the breakdown of jobs by industry in the ECC Taxing District. The Manufacturing sector is the largest employer, supporting 7,966 jobs or 16.4% of total employment in the region. The second largest employer is the Retail Trade sector, supporting 6,160 jobs or 12.7% of the region's total employment. Altogether, the region supports 48,449 jobs.[7]

[7] Job numbers reflect Lightcast's complete employment data, which includes the following four job classes: 1) employees who are counted in the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW), 2) employees who are not covered by the federal or state unemployment insurance (UI) system and are thus excluded from QCEW, 3) self-employed workers, and 4) extended proprietors.

Figure 2.3: Jobs by major industry sector in the ECC Taxing District, 2023*



* Data reflect the most recent year for which data are available. Lightcast data are updated quarterly.

Source: Lightcast employment data

Table 2.4 and Figure 2.4 present the mean earnings by education level in the ECC Taxing District and the state of Missouri at the midpoint of the average-aged worker's career. These numbers are derived from Lightcast complete employment data on average earnings per worker in the region and the state.[8] The numbers are then weighted by the college's demographic profile, and state earnings are weighted by students' settlement patterns. As shown, students have the potential to earn more as they achieve higher levels of education compared to maintaining a high school diploma. Students who earn an associate degree from ECC can expect approximate wages of $35,700 per year within the ECC Taxing District, approximately $6,900 more than someone with a high school diploma.

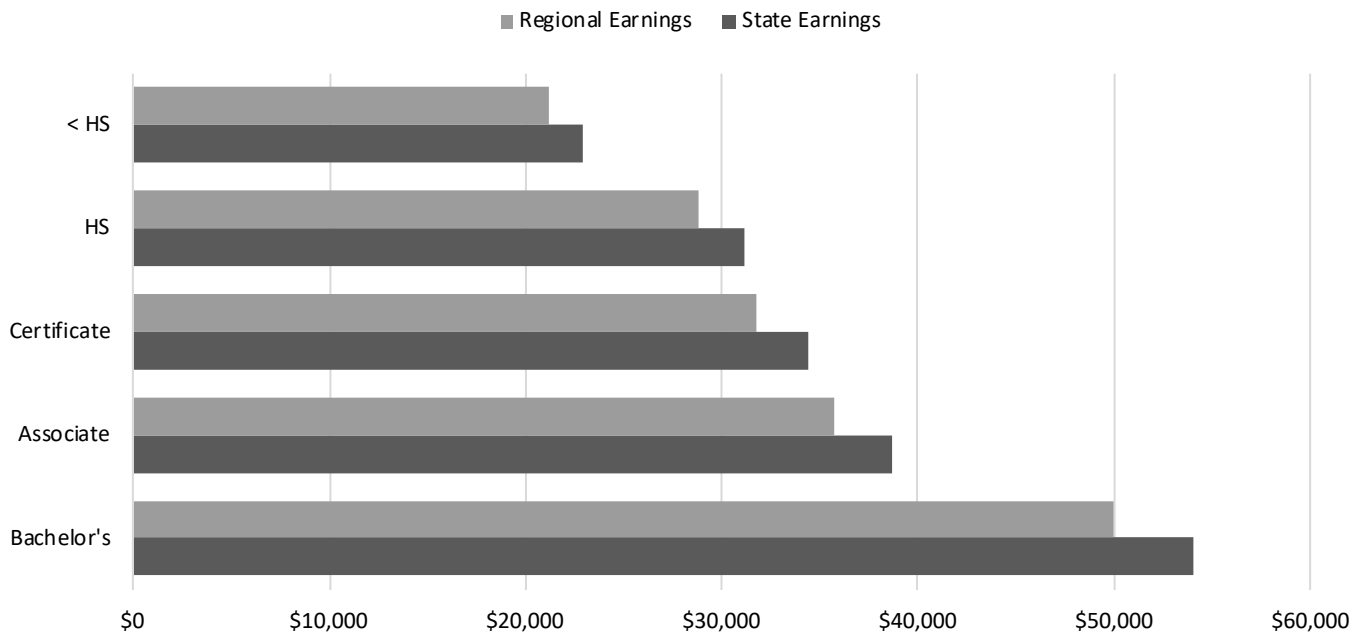
[8] Wage rates in the Lightcast MR-SAM model combine state and federal sources to provide earnings that reflect complete employment in the state, including proprietors, self-employed workers, and others not typically included in regional or state data, as well as benefits and all forms of employer contributions. As such, Lightcast industry earnings-per-worker numbers are generally higher than those reported by other sources.

Table 2.4: Average earnings by education level at an ECC student's career midpoint

Education level	Regional earnings	Difference from next lowest degree	State earnings	Difference from next lowest degree
Less than high school	$21,200	n/a	$22,900	n/a
High school or equivalent	$28,800	$7,600	$31,200	$8,300
Certificate	$31,800	$3,000	$34,400	$3,200
Associate degree	$35,700	$3,900	$38,700	$4,300
Bachelor's degree	$50,000	$14,300	$54,100	$15,400

Source: Lightcast employment data

Figure 2.4: Average earnings by education level at an ECC student's career midpoint



Source: Lightcast employment data

Chapter 3:

Economic impacts on the ECC Taxing District economy

ECC impacts the ECC Taxing District economy in a variety of ways. The college is an employer and buyer of goods and services. It attracts monies that otherwise would not have entered the regional economy through its day-to-day operations, and the expenditures of its students. Further, it provides students with the knowledge, skills, and abilities they need to become productive citizens and add to the overall output of the region.

In this chapter, we estimate the following economic impacts of ECC: 1) the operations spending impact, 2) the student spending impact, and 3) the alumni impact, measuring the income added in the region as former students expand the regional economy's stock of human capital.

When exploring each of these economic impacts, we consider the following hypothetical question:

How would economic activity change in the ECC Taxing District if ECC and all its alumni did not exist in FY 2022-23?

Each of the economic impacts should be interpreted according to this hypothetical question. Another way to think about the question is to realize that we measure net impacts, not gross impacts. Gross impacts represent an upper-bound estimate in terms of capturing all activity stemming from the college; however, net impacts reflect a truer measure of economic impact since they demonstrate what would not have existed in the regional economy if not for the college.

Economic impact analyses use different types of impacts to estimate the results. The impact focused on in this study assesses the change in income. This measure is similar to the commonly used gross regional product (GRP). Income may be further broken out into the **labor income impact**, also known as earnings, which assesses the change in employee compensation; and the **non-labor income impact**, which assesses the change in business profits. Together, labor income and non-labor income sum to total income.

Net impacts reflect a truer measure of economic impact since they demonstrate what would not have existed in the regional economy if not for the college.

Another way to state the impact is in terms of **jobs**, a measure of the number of full- and part-time jobs that would be required to support the change in income. Finally, a frequently used measure is the **sales impact**, which comprises the change in business sales revenue in the economy as a result of increased economic activity. It is important to bear in mind, however, that much of this

sales revenue leaves the regional economy through intermediary transactions and costs.[9] All of these measures – added labor and non-labor income, total income, jobs, and sales – are used to estimate the economic impact results presented in this chapter. The analysis breaks out the impact measures into different components, each based on the economic effect that caused the impact. The following is a list of each type of effect presented in this analysis:

- The **initial effect** is the exogenous shock to the economy caused by the initial spending of money, whether to pay for salaries and wages, purchase goods or services, or cover operating expenses. This effect is only represented by labor income and sales and has zero non-labor income, as the initial effect of the college spending stems exclusively from its employees' salaries, wages, and benefits, while any other direct expenditures of the college are reflected in the sales amount.
- The initial round of spending creates more spending in the economy, resulting in what is commonly known as the **multiplier effect**. The multiplier effect comprises the additional activity that occurs across all industries in the economy and may be further decomposed into the following three types of effects:
  - The **direct effect** refers to the additional economic activity that occurs as the industries affected by the initial effect spend money to purchase goods and services from their supply chain industries.
  - The **indirect effect** occurs as the supply chain of the initial industries creates even more activity in the economy through inter-industry spending.
  - The **induced effect** refers to the economic activity created by the household sector as the businesses affected by the initial, direct, and indirect effects raise salaries or hire more people.

The terminology used to describe the economic effects listed above differs slightly from that of other commonly used input-output models, such as IMPLAN. For example, the initial effect in this study is called the "direct effect" by IMPLAN, as shown below. Further, the term "indirect effect" as used by IMPLAN refers to the combined direct and indirect effects defined in this study. To avoid confusion, readers are encouraged to interpret the results presented in this chapter in the context of the terms and definitions listed above. Note that, regardless of the effects used to decompose the results, the total impact measures are analogous.

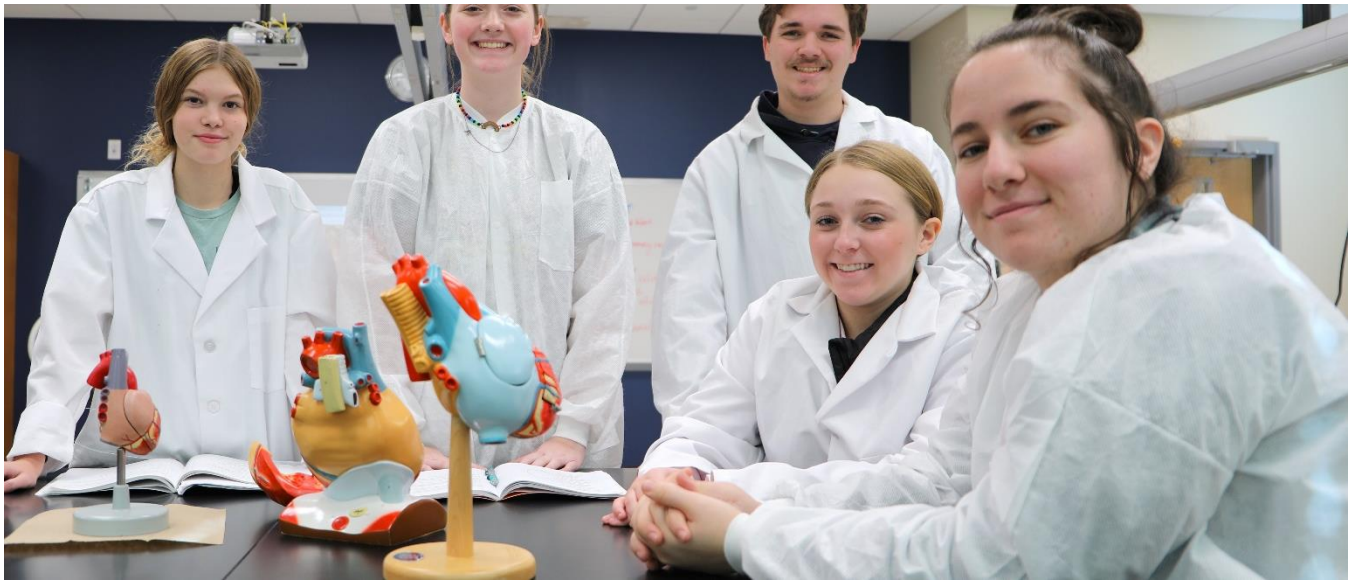
Lightcast	Initial	Direct	Indirect	Induced
IMPLAN	Direct	Indirect		Induced

Multiplier effects in this analysis are derived using Lightcast Multi-Regional Social Accounting Matrix (MR-SAM) input-output model that captures the interconnection of industries, government, and households in the region. The Lightcast MR-SAM contains approximately 1,000 industry sectors at the highest level of detail available in the North American Industry Classification System (NAICS) and supplies the industry-specific

[9] See Appendix 4 for an example of the intermediary costs included in the sales impact but not in the income impact.

multipliers required to determine the impacts associated with increased activity within a given economy. The multi-regional capacity of the MR-SAM allows impacts to be measured in the region and state simultaneously, accounting for ECC's activity in each area, as well as each area's economic characteristics. In this analysis, impacts on the region include impacts from the college's regional activity, as well as the indirect and induced multiplier effects that reach the region from the college's activity in the rest of the state. For more information on the Lightcast MR-SAM model and its data sources, see Appendix 5.

Operations spending impact



Faculty and staff payroll is part of the region's total earnings, and the spending of employees for groceries, apparel, and other household expenditures helps support regional businesses. The college itself purchases supplies and services, and many of its vendors are located in the ECC Taxing District. These expenditures create a ripple effect that generates still more jobs and higher wages throughout the economy.

Table 3.1 presents college expenditures for the following three categories: 1) salaries, wages, and benefits, 2) operation and maintenance of plant, and 3) all other expenditures, including purchases for supplies and services. Also included in all other expenditures are expenses associated with grants and scholarships. Many students receive grants and scholarships that exceed the cost of tuition and fees. The college then dispenses this residual financial aid to students, who spend it on living expenses. Some of this spending takes place in the region, and is therefore an injection of new money into the regional economy that would not have happened if ECC did not exist. In this analysis, we exclude depreciation expenses due to the way this measure is calculated in the national input-output accounts, and because depreciation represents the devaluing of the college's assets rather than an outflow of expenditures.[10]

The first step in estimating the multiplier effects of the college's operational expenditures is to map these categories of expenditures to the approximately 1,000 industries of the Lightcast MR-SAM model. Assuming that the spending patterns of college personnel approximately match those of the average U.S. consumer, we map salaries, wages, and benefits to spending on industry outputs using national household expenditure coefficients provided by Lightcast national SAM. Approximately 75% of ECC employees work in the ECC Taxing

[10] This aligns with the economic impact guidelines set by the Association of Public and Land-Grant Universities. Ultimately, excluding these measures results in more conservative and defensible estimates.

District (see Table 2.1), and therefore we consider 75% of their salaries, wages, and benefits. For the other two expenditure categories (i.e., operation and maintenance of plant and all other expenditures), we assume the college's spending patterns approximately match national averages and apply the national spending coefficients for NAICS 903612 (Colleges, Universities, and Professional Schools (Local Government)).[11] Operation and maintenance of plant expenditures are mapped to the industries that relate to capital construction, maintenance, and support, while the college's remaining expenditures are mapped to the remaining industries.

Table 3.1: ECC expenses in the ECC Taxing District by function (excluding depreciation), FY 2022-23

Expense category	In-region expenditures (thousands)	Out-of-region expenditures (thousands)	Total expenditures (thousands)
Employee salaries, wages, and benefits	$10,292	$3,431	$13,722
Operation and maintenance of plant	$803	$813	$1,616
All other expenditures	$480	$4,460	$4,940
Total	**$11,574**	**$8,704**	**$20,278**

Source: Data provided by ECC and the Lightcast impact model

We now have three vectors of expenditures for ECC: one for salaries, wages, and benefits; another for operation and maintenance of plant; and a third for the college's purchases of supplies and services. The next step is to estimate the portion of these expenditures that occurs inside the region. The expenditures occurring outside the region are known as leakages. We estimate in-region expenditures using regional purchase coefficients (RPCs), a measure of the overall demand for the commodities produced by each sector that is satisfied by regional suppliers, for each of the approximately 1,000 industries in the MR-SAM model.[12] For example, if 40% of the demand for NAICS 541211 (Offices of Certified Public Accountants) is satisfied by regional suppliers, the RPC for that industry is 40%. The remaining 60% of the demand for NAICS 541211 is provided by suppliers located outside the region. The three vectors of expenditures are multiplied, industry by industry, by the corresponding RPC to arrive at the in-region expenditures associated with the college. See Table 3.1 for a break-out of the expenditures that occur in-region. Finally, in-region spending is entered, industry by industry, into the MR-SAM model's multiplier matrix, which in turn provides an estimate of the associated multiplier effects on regional labor income, non-labor income, total income, sales, and jobs.

Table 3.2 presents the economic impact of college operations spending. The people employed by ECC and their salaries, wages, and benefits comprise the initial effect, shown in the top row of the table in terms of labor income, non-labor income, total added income, sales, and jobs. The additional impacts created by the initial effect appear in the next four rows under the section labeled *multiplier effect*. Summing the initial and multiplier effects, the gross impacts are $11.6 million in labor income and $1.1 million in non-labor income.

[11] See Appendix 2 for a definition of NAICS.

[12] See Appendix 5 for a description of Lightcast's MR-SAM model.

This sums to a total impact of $12.8 million in total added income associated with the spending of the college and its employees in the region. This is equivalent to supporting 367 jobs.

Table 3.2: Operations spending impact, FY 2022-23

	Labor income (thousands)	Non-labor income (thousands)	Total income (thousands)	Sales (thousands)	Jobs supported
Initial effect	**$10,292**	**$0**	**$10,292**	**$20,278**	**340**
Multiplier effect					
Direct effect	$456	$250	$706	$1,283	8
Indirect effect	$39	$17	$56	$107	1
Induced effect	$863	$845	$1,708	$2,637	18
Total multiplier effect	**$1,358**	**$1,112**	**$2,470**	**$4,026**	**27**
Gross impact (initial + multiplier)	**$11,650**	**$1,112**	**$12,762**	**$24,304**	**367**
Less alternative uses of funds	-$937	-$896	-$1,833	-$8,613	-20
Net impact	**$10,713**	**$216**	**$10,929**	**$15,691**	**346**

Source: Lightcast impact model

The $12.8 million in gross impact is often reported by researchers as the total impact. We go a step further to arrive at a net impact by applying a counterfactual scenario, i.e., what would have happened if a given event – in this case, the expenditure of in-region funds on ECC – had not occurred. ECC received an estimated 46% of its funding from sources within the ECC Taxing District. This portion of the college's funding came from the tuition and fees paid by resident students, from the auxiliary revenue and donations from private sources located within the region, from state and local taxes, and from the financial aid issued to students by state and local government. We must account for the opportunity cost of this in-region funding. Had other industries received these monies rather than ECC, income impacts would have still been created in the economy. In economic analysis, impacts that occur under counterfactual conditions are used to offset the impacts that actually occur in order to derive the true impact of the event under analysis.

We estimate this counterfactual by simulating a scenario where in-region monies spent on the college are instead spent on consumer goods and savings. This simulates the in-region monies being returned to the taxpayers and being spent by the household sector. Our approach is to establish the total amount spent by in-region students and taxpayers on ECC, map this to the detailed industries of the MR-SAM model using national household expenditure coefficients, use the industry RPCs to estimate in-region spending, and run the in-region spending through the MR-SAM model's multiplier matrix to derive multiplier effects. The results of this exercise are shown as negative values in the row labeled *less alternative uses of funds* in Table 3.2.

The total net impact of the college's operations is **$10.9 million** in total added income, which is equivalent to supporting **346 jobs**.

The total net impact of the college's operations is equal to the gross impact less the impact of the alternative use of funds – the opportunity cost of the regional money. As shown in the last row of Table 3.2, the total net impact is approximately $10.7 million in labor income and $216.4 thousand in non-labor income. This sums together to $10.9 million in total added income and is equivalent to supporting 346 jobs. These impacts represent new economic activity created in the regional economy solely attributable to the operations of ECC.

Student spending impact

Both in-region and out-of-region students contribute to the student spending impact of ECC; however, not all of these students can be counted toward the impact. Of the in-region students, only the impact from those students who were retained, or who would have left the region to seek education elsewhere had they not attended ECC, is measured. Students who would have stayed in the region anyway are not counted toward the impact since their monies would have been added to the ECC Taxing District economy regardless of ECC. In addition, only the out-of-region students who relocated to the ECC Taxing District to attend the college are considered. Students who commute from outside the region or take courses online are not counted towards the student spending impact because they are not adding money from living expenses to the region.

While there were 1,315 students attending ECC who originated from the ECC Taxing District (excluding personal enrichment students and dual credit high school students),[13] not all of them would have remained in the region if not for the existence of ECC. We apply a conservative assumption that 10% of these students would have left the ECC Taxing District for other education opportunities if ECC did not exist.[14] Therefore, we recognize that the in-region spending of 132 students retained in the region is attributable to ECC. These students, called retained students, spent money at businesses in the region for everyday needs such as groceries, accommodation, and transportation.

Relocated students are also accounted for in ECC's student spending impact. An estimated 1,427 students came from outside the region and lived off campus while attending ECC in FY 2022-23. The off-campus expenditures of out-of-region students supported jobs and created new income in the regional economy.[15]

The average costs for students appear in the first section of Table 3.3, equal to $22,919 per student. Note that this table excludes expenses for books and supplies, since many of these costs are already reflected in the operations impact discussed in the previous section. We multiply the $22,919 in annual costs by the 1,558 students who either were retained or relocated to the region because of ECC and lived in-region but off campus. This provides us with an estimate of their total spending. Altogether, off-campus spending of relocated and retained students, once net of monies paid to student workers, generated sales of $35.7 million, as shown in the bottom row of Table 3.3.

[13] Note that because the college was unable to provide origin data for their non-credit students, we assume that all non-credit students originated from within the region.

[14] See Appendix 1 for a sensitivity analysis of the retained student variable.

[15] Online students and students who commuted to the ECC Taxing District from outside the region are not considered in this calculation because it is assumed their living expenses predominantly occurred in the region where they resided during the analysis year. We recognize that not all online students live outside the region, but keep the assumption given data limitations.

Table 3.3: Average student costs and total sales generated by relocated and retained students in the ECC Taxing District, FY 2022-23

Room and board	$12,147
Personal expenses	$6,079
Transportation	$4,693
Total expenses per student	**$22,919**
Number of students retained	132
Number of students relocated	1,427
Gross retained student sales	$3,013,849
Gross relocated student sales	$32,696,016
Total gross off-campus sales	$35,709,865
Wages and salaries paid to student workers*	$32,767
Net off-campus sales	**$35,677,098**

* This figure reflects only the portion of payroll that was used to cover the living expenses of relocated and retained student workers who lived in the region.

Source: Student costs and wages provided by ECC. The number of relocated and retained students who lived in the region off campus while attending is derived by Lightcast from the student origin data and in-term residence data provided by ECC.

Estimating the impacts generated by the $35.7 million in student spending follows a procedure similar to that of the operations impact described above. We distribute the $35.7 million in sales to the industry sectors of the MR-SAM model, apply RPCs to reflect in-region spending, and run the net sales figures through the MR-SAM model to derive multiplier effects.

Table 3.4 presents the results. The initial effect is purely sales-oriented and there is no change in labor or non-labor income. The impact of relocated and retained student spending thus falls entirely under the multiplier effect. The total impact of student spending is $5.9 million in labor income and $3.6 million in non-labor income. This sums together to $9.5 million in total added income and is equivalent to supporting 167 jobs. These values represent the direct effects created at the businesses patronized by the students, the indirect effects created by the supply chain of those businesses, and the effects of the increased spending of the household sector throughout the regional economy as a result of the direct and indirect effects.

The total impact of student spending is **$9.5 million** in total added income and is equivalent to supporting **167 jobs**.

Table 3.4: Student spending impact, FY 2022-23

	Labor income (thousands)	Non-labor income (thousands)	Total income (thousands)	Sales (thousands)	Jobs supported
Initial effect	**$0**	**$0**	**$0**	**$35,677**	**0**
Multiplier effect					
Direct effect	$5,110	$2,970	$8,079	$14,582	142
Indirect effect	$548	$335	$883	$1,652	17
Induced effect	$246	$277	$523	$930	8
Total multiplier effect	**$5,903**	**$3,582**	**$9,486**	**$17,165**	**167**
Total impact (initial + multiplier)	**$5,903**	**$3,582**	**$9,486**	**$52,842**	**167**

Source: Lightcast impact model

Alumni impact

In this section, we estimate the economic impacts stemming from the added labor income of alumni in combination with their employers' added non-labor income. This impact is based on the number of students who have attended ECC *throughout its history.* We then use this total number to consider the impact of those students in the single FY 2022-23. Former students who earned a degree as well as those who may not have finished their degree or did not take courses for credit are considered alumni.

While ECC creates an economic impact through its operations and student spending, the greatest economic impact of ECC stems from the added human capital – the knowledge, creativity, imagination, and entrepreneurship – found in its alumni. While attending ECC, students gain experience, education, and the knowledge, skills, and abilities that increase their productivity and allow them to command a higher wage once they enter the workforce. But the reward of increased productivity does not stop there. Talented professionals make capital more productive too (e.g., buildings, production facilities, equipment). The employers of ECC alumni enjoy the fruits of this increased productivity in the form of additional non-labor income (i.e., higher profits).

The greatest economic impact of ECC stems from the added human capital – the knowledge, creativity, imagination, and entrepreneurship – found in its alumni.

The methodology here differs from the previous impacts in one fundamental way. Whereas the previous spending impacts depend on an annually renewed injection of new sales into the regional economy, the alumni impact is the result of years of past instruction and the associated accumulation of human capital. The initial effect of alumni is made up of two main components. The first and largest of these is the added labor income

of ECC's former students. The second component of the initial effect is the added non-labor income of the businesses that employ former students of ECC.

We begin by estimating the portion of alumni who are employed in the workforce. To estimate the historical employment patterns of alumni in the region, we use the following sets of data or assumptions: 1) settling-in factors to determine how long it takes the average student to settle into a career;[16] 2) death, retirement, and unemployment rates from the National Center for Health Statistics, the Social Security Administration, and the Bureau of Labor Statistics; and 3) state migration data from the Internal Revenue Service.[17] The result is the estimated portion of alumni from each previous year who were still actively employed in the region as of FY 2022-23.

The next step is to quantify the skills and human capital that alumni acquired from the college. We use the students' production of CHEs as a proxy for accumulated human capital. The average number of CHEs completed per student in FY 2022-23 was 14.1. To estimate the number of CHEs present in the workforce during the analysis year, we use the college's historical student headcount over the past 44 years, from FY 1979-80 to FY 2022-23. We apply a 44-year time horizon to include all alumni active in the regional workforce who have not reached the average retirement age of 67. The time horizon, or number of years in the workforce, is calculated by subtracting the average age of ECC students from the retirement age of 67. However, because the alumni impact is based on credits achieved and not headcount, we calculate and use an average age per credit rather than per student.

We multiply the 14.1 average CHEs per student by the headcounts that we estimate are still actively employed from each of the previous years.[18] Students who enroll at the college more than one year are counted at least twice in the historical enrollment data. However, CHEs remain distinct regardless of when and by whom they were earned, so there is no duplication in the CHE counts. We estimate there are approximately 1.2 million CHEs from alumni active in the workforce.

Next, we estimate the value of the CHEs, or the skills and human capital acquired by ECC alumni. This is done using the *incremental* added labor income stemming from the students' higher wages. The incremental added labor income is the difference between the wage earned by ECC alumni and the alternative wage they would have earned had they not attended ECC. Using the regional incremental earnings, credits required, and distribution of credits at each level of study, we estimate the average value per CHE to equal $97. This value represents the regional average incremental increase in wages that alumni of ECC received during the analysis year for every CHE they completed.

[16] Settling-in factors are used to delay the onset of the benefits to students in order to allow time for them to find employment and settle into their careers. In the absence of hard data, we assume a range between one and three years for students who graduate with a certificate or a degree, and between one and five years for returning students.

[17] According to a study performed by Pew Research Center, people who have already moved are more likely to move again than people who do not move. Therefore, migration rates are dampened to account for the idea that if they do not move in the first two years after leaving the college, then they are less likely to migrate out compared to the average person.

[18] This assumes the average credit load and level of study from past years is equal to the credit load and level of study of students today.

Because workforce experience leads to increased productivity and higher wages, the value per CHE varies depending on the students' workforce experience, with the highest value applied to the CHEs of students who had been employed the longest by FY 2022-23, and the lowest value per CHE applied to students who were just entering the workforce. More information on the theory and calculations behind the value per CHE appears in Appendix 6. In determining the amount of added labor income attributable to alumni, we multiply the CHEs of former students in each year of the historical time horizon by the corresponding average value per CHE for that year, and then sum the products together. This calculation yields approximately $113.2 million in gross labor income from increased wages received by former students in FY 2022-23 (as shown in Table 3.5).

Table 3.5: Number of CHEs in workforce and initial labor income created in the ECC Taxing District, FY 2022-23

Number of CHEs in workforce	1,169,325
Average value per CHE	$97
Initial labor income, gross	**$113,244,178**
Adjustments for counterfactual scenarios	
Percent reduction for alternative education opportunities	15%
Percent reduction for adjustment for labor import effects	50%
Initial labor income, net	**$48,128,776**

Source: Lightcast impact model

The next two rows in Table 3.5 show two adjustments used to account for counterfactual outcomes. As discussed above, counterfactual outcomes in economic analysis represent what would have happened if a given event had not occurred. The event in question is the education and training provided by ECC and subsequent influx of skilled labor into the regional economy. The first counterfactual scenario that we address is the adjustment for alternative education opportunities. In the counterfactual scenario where ECC does not exist, we assume a portion of ECC alumni would have received a comparable education elsewhere in the region or would have left the region and received a comparable education and then returned to the region. The incremental added labor income that accrues to those students cannot be counted toward the added labor income from ECC alumni. The adjustment for alternative education opportunities amounts to a 15% reduction of the $113.2 million in added labor income. This means that 15% of the added labor income from ECC alumni would have been generated in the region anyway, even if the college did not exist. For more information on the alternative education adjustment, see Appendix 7.

The other adjustment in Table 3.5 accounts for the importation of labor. Suppose ECC did not exist and in consequence there were fewer skilled workers in the region. Businesses could still satisfy some of their need for skilled labor by recruiting from outside the ECC Taxing District. We refer to this as the labor import effect. Lacking information on its possible magnitude, we assume 50% of the jobs that students fill at regional

businesses could have been filled by workers recruited from outside the region if the college did not exist.[19] Consequently, the gross labor income must be adjusted to account for the importation of this labor, since it would have happened regardless of the presence of the college. We conduct a sensitivity analysis for this assumption in appendix 1. With the 50% adjustment, the net added labor income added to the economy comes to $48.1 million, as shown in Table 3.5.

The $48.1 million in added labor income appears under the initial effect in the labor income column of Table 3.6. To this we add an estimate for initial non-labor income. As discussed earlier in this section, businesses that employ former students of ECC see higher profits as a result of the increased productivity of their capital assets. To estimate this additional income, we allocate the initial increase in labor income ($48.1 million) to the six-digit NAICS industry sectors where students are most likely to be employed. This allocation entails a process that maps completers in the region to the detailed occupations for which those completers have been trained, and then maps the detailed occupations to the six-digit industry sectors in the MR-SAM model.[20] Using a crosswalk created by National Center for Education Statistics (NCES) and the Bureau of Labor Statistics, we map the breakdown of the college's completers to the approximately 700 detailed occupations in the Standard Occupational Classification (SOC) system. Finally, we apply a matrix of wages by industry and by occupation from the MR-SAM model to map the occupational distribution of the $48.1 million in initial labor income effects to the detailed industry sectors in the MR-SAM model.[21]

Once these allocations are complete, we apply the ratio of non-labor to labor income provided by the MR-SAM model for each sector to our estimate of initial labor income. This computation yields an estimated $22.7 million in added non-labor income attributable to the college's alumni. Summing initial labor and non-labor income together provides the total initial effect of alumni productivity in the ECC Taxing District economy, equal to approximately $70.8 million. To estimate multiplier effects, we convert the industry-specific income figures generated through the initial effect to sales using sales-to-income ratios from the MR-SAM model. We then run the values through the MR-SAM's multiplier matrix.

[19] A similar assumption is used by Walden (2014) in his analysis of the Cooperating Raleigh Colleges.

[20] Completer data comes from the Integrated Postsecondary Education Data System (IPEDS), which organizes program completions according to the Classification of Instructional Programs (CIP) developed by the National Center for Education Statistics (NCES).

[21] For example, if the MR-SAM model indicates that 20% of jobs in SOC 51-4121 (Welders) occur in NAICS 332313 (Plate Work Manufacturing) in the given region, then we allocate 20% of the initial labor income effect under SOC 51-4121 to NAICS 332313.

Table 3.6: Alumni impact, FY 2022-23

	Labor income (thousands)	Non-labor income (thousands)	Total income (thousands)	Sales (thousands)	Jobs supported
Initial effect	**$48,129**	**$22,698**	**$70,826**	**$139,352**	**1,081**
Multiplier effect					
Direct effect	$4,842	$2,218	$7,060	$13,965	124
Indirect effect	$850	$368	$1,217	$2,391	22
Induced effect	$7,418	$3,998	$11,416	$21,932	151
Total multiplier effect	**$13,110**	**$6,584**	**$19,694**	**$38,287**	**297**
Total impact (initial + multiplier)	**$61,239**	**$29,282**	**$90,520**	**$177,639**	**1,378**

Source: Lightcast impact model

Table 3.6 shows the multiplier effects of alumni. Multiplier effects occur as alumni generate an increased demand for consumer goods and services through the expenditure of their higher wages. Further, as the industries where alumni are employed increase their output, there is a corresponding increase in the demand for input from the industries in the employers' supply chain. Together, the incomes generated by the expansions in business input purchases and household spending constitute the multiplier effect of the increased productivity of the college's alumni. The final results are $13.1 million in added labor income and $6.6 million in added non-labor income, for an overall total of $19.7 million in multiplier effects. The grand total of the alumni impact is $90.5 million in total added income, the sum of all initial and multiplier labor and non-labor income effects. This is equivalent to supporting 1,378 jobs.

Total ECC impact

The total economic impact of ECC on the ECC Taxing District can be generalized into two broad types of impacts. First, on an annual basis, ECC generates a flow of spending that has a significant impact on the regional economy. The impacts of this spending are captured by the operations and student spending impacts. While not insignificant, these impacts do not capture the true purpose of ECC. The fundamental mission of ECC is to foster human capital. Every year, a new cohort of former ECC students adds to the stock of human capital in the region, and a portion of alumni continues to add to the regional economy.

Table 3.7 displays the grand total impacts of ECC on the ECC Taxing District economy in FY 2022-23. For context, the percentages of ECC compared to the total labor income, total non-labor income, combined total income, sales, and jobs in the ECC Taxing District, as presented in Table 2.3 and Figure 2.3, are included. The total added value of ECC is **$110.9 million**, equivalent to **2.7%** of the GRP of the ECC Taxing District. By comparison, this contribution that the college provides on its own is nearly as large as the entire Accommodation & Food Service industry in the region. ECC's total impact supported **1,891 jobs** in FY 2022-23. For perspective, this means that **one out of every 26 jobs** in the ECC Taxing District is supported by the activities of ECC and its students.

Table 3.7: Total ECC impact, FY 2022-23

	Labor income (thousands)	Non-labor income (thousands)	Total income (thousands)	Sales (thousands)	Jobs supported
Operations spending	$10,713	$216	$10,929	$15,691	346
Student spending	$5,903	$3,582	$9,486	$52,842	167
Alumni	$61,239	$29,282	$90,520	$177,639	1,378
Total impact	**$77,855**	**$33,080**	**$110,936**	**$246,172**	**1,891**
% of the ECC Taxing District economy	3.0%	2.2%	2.7%	2.8%	3.9%

Source: Lightcast impact model

These impacts from the college and its students stem from different industry sectors and spread throughout the regional economy. Table 3.8 displays the total impact of ECC by each industry sector based on their two-digit NAICS code. The table shows the total impact of operations, students, and alumni, as shown in Table 3.7, broken down by each industry sector's individual impact on the regional economy using processes outlined earlier in this chapter. By showing the impact from individual industry sectors, it is possible to see in finer detail the industries that drive the greatest impact on the regional economy from the spending of the college and its students and from where ECC alumni are employed. For example, the spending of ECC and its students

as well as the activities of its alumni in the Manufacturing industry sector generated an impact of $17.8 million in FY 2022-23.

Table 3.7: Total ECC impact by industry, FY 2022-23

Industry sector	Total income (thousands)	Jobs supported
Manufacturing	$17,824	137
Retail Trade	$16,192	267
Government, Education	$14,281	411
Health Care & Social Assistance	$11,905	155
Real Estate & Rental & Leasing	$7,482	187
Accommodation & Food Services	$6,995	196
Construction	$5,985	82
Finance & Insurance	$4,168	30
Other Services (except Public Administration)	$4,026	148
Utilities	$4,023	7
Government, Non-Education	$3,920	55
Wholesale Trade	$3,197	20
Professional & Technical Services	$3,115	54
Information	$2,390	17
Administrative & Waste Services	$1,663	37
Management of Companies & Enterprises	$1,050	9
Transportation & Warehousing	$891	15
Educational Services	$781	34
Arts, Entertainment, & Recreation	$718	27
Agriculture, Forestry, Fishing, & Hunting	$173	4
Mining, Quarrying, & Oil and Gas Extraction	$157	1
Total impact	**$110,936**	**1,891**

Source: Lightcast impact model

Chapter 4:

Investment analysis

The benefits generated by ECC affect the lives of many people. The most obvious beneficiaries are the college's students; they give up time and money to go to the college in return for a lifetime of higher wages and improved quality of life. But the benefits do not stop there. As students earn more, communities and citizens throughout Missouri benefit from an enlarged economy and a reduced demand for social services. In the form of increased tax revenues and public sector savings, the benefits of education extend as far as the state and local government.

Investment analysis is the process of evaluating total costs and measuring these against total benefits to determine whether a proposed venture will be profitable. If benefits outweigh costs, the investment is worthwhile. If costs outweigh benefits, the investment will lose money and could be considered infeasible. In this chapter, we evaluate ECC as an investment from the perspectives of students, taxpayers, and society.

Student perspective

To enroll in postsecondary education, students pay for tuition and forgo monies that otherwise they would have earned had they chosen to work instead of attend college. From the perspective of students, education is the same as an investment. Students incur a cost, or put up a certain amount of money, with the expectation of receiving benefits in return. The total costs consist of the tuition and fees as well as student loan interest that students pay and the opportunity cost of forgone time and money. The benefits are the higher earnings that students receive as a result of their education.

Calculating student costs

Student costs consist of three main items: direct outlays, opportunity costs, and future principal and interest costs incurred from student loans. Direct outlays include tuition and fees, equal to $5.2 million from Figure 2.1. Direct outlays also include the cost of books and supplies. On average, full-time students spent $1,500 each on books and supplies during the reporting year.[22] Multiplying this figure by the number of full-time equivalents (FTEs) produced by ECC in FY 2022-23[23] generates a total cost of $2.6 million for books and supplies.

In order to pay the cost of tuition, some students had to take out loans. These students not only incur the cost of tuition from the college but also incur the interest cost of taking out loans. In FY 2022-23, students received a total of $1.2 million in federal loans to attend ECC.[24] Students pay back these loans along with interest over the span of several years in the future. Since students pay off these loans over time, they accrue no initial cost during the analysis year. Hence, to avoid double counting, the $1.2 million in federal loans is subtracted from the costs incurred by students in FY 2022-23.

In addition to the cost of tuition, books, and supplies, students also experienced an opportunity cost of attending college during the analysis year. Opportunity cost is the most difficult component of student costs to estimate. It measures the value of time and earnings forgone by students who go to college rather than work. To calculate it, we need to know the difference between the students' full earning potential and what they actually earn while attending the college.

We derive the students' full earning potential by weighting the average annual earnings levels in Table 2.4 according to the education level breakdown of the student population at the start of the analysis year.[25]

[22] Based on the data provided by ECC.

[23] A single FTE is equal to 30 CHEs, so there were 1,728 FTEs produced by students in FY 2022-23, equal to 51,846 CHEs divided by the weighted average number of CHEs per student (excluding personal enrichment students).

[24] Due to data limitations, only federal loans are considered in this analysis.

[25] This is based on students who reported their prior level of education to ECC. The prior level of education data was then adjusted to exclude dual credit high school students.

However, the earnings levels in Table 2.4 reflect what average workers earn at the midpoint of their careers, not while attending the college. Because of this, we adjust the earnings levels to the average age of the student population (23) to better reflect their wages at their current age.[26] This calculation yields an average full earning potential of $14,068 per student.

In determining how much students earn while enrolled in postsecondary education, an important factor to consider is the time that they actually spend on postsecondary education, since this is the only time that they are required to give up a portion of their earnings. We use the students' CHE production as a proxy for time, under the assumption that the more CHEs students earn, the less time they have to work, and, consequently, the greater their forgone earnings. Overall, students attending ECC in FY 2022-23 earned an average of 15.7 CHEs per student (excluding personal enrichment students and dual credit high school students), which is approximately equal to 52% of a full academic year.[27] We thus include no more than $7,381 (or 52%) of the students' full earning potential in the opportunity cost calculations.

Another factor to consider is the students' employment status while enrolled in postsecondary education. It is estimated that 79% of students are employed.[28] For the remainder of students, we assume that they are either seeking work or planning to seek work once they complete their educational goals (with the exception of personal enrichment students, who are not included in this calculation). By choosing to enroll, therefore, non-working students give up everything that they can potentially earn during the academic year (i.e., the $7,381). The total value of their forgone earnings thus comes to $4.3 million.

Working students are able to maintain all or part of their earnings while enrolled. However, many of them hold jobs that pay less than statistical averages, usually because those are the only jobs they can find that accommodate their course schedule. These jobs tend to be at entry level, such as restaurant servers or cashiers. To account for this, we assume that working students hold jobs that pay 81% of what they would have earned had they chosen to work full-time rather than go to college.[29] The remaining 19% comprises the percentage of their full earning potential that they forgo. Obviously, this assumption varies by person; some students forgo more and others less. Since we do not know the actual jobs that students hold while attending, the 19% in forgone earnings serves as a reasonable average.

Thus far we have discussed student costs during the analysis year. However, recall that students take out student loans to attend college during the year, which they will have to pay back over time. The amount they will be paying in the future must be a part of their decision to attend the college today. Students who take out loans are not only required to pay back the principal of the loan but to also pay back a certain amount in interest. The first step in calculating students' loan interest cost is to determine the payback time for the loans.

[26] Further discussion on this adjustment appears in Appendix 6.

[27] Equal to 15.7 CHEs divided by 30, the assumed number of CHEs in a full-time academic year.

[28] Based on data provided by ECC. This figure excludes dual credit high school students, who are not included in the opportunity cost calculations.

[29] The 81% assumption is based on the average hourly wage of jobs commonly held by working students divided by the regional average hourly wage. Occupational wage estimates are published by the Bureau of Labor Statistics (see http://www.bls.gov/oes/current/oes_nat.htm).

The $1.2 million in loans was awarded to 218 students, averaging $5,663 per student in the analysis year. However, this figure represents only one year of loans. Because loan payback time is determined by total indebtedness, we assume that since ECC is a two-year college, students will be indebted twice that amount, or $11,326 on average. According to the U.S. Department of Education, this level of indebtedness will take 15 years to pay back under the standard repayment plan.[30]

This indebtedness calculation is used solely to estimate the loan payback period. Students will be paying back the principal amount of $1.2 million over time. After taking into consideration the time value of money, this means that students will pay off a discounted present value of $825.1 thousand in principal over the 15 years. In order to calculate interest, we only consider interest on the federal loans awarded to students in FY 2022-23. Using the student discount rate of 4.9%[31] as our interest rate, we calculate that students will pay a total discounted present value of $391.1 thousand in interest on student loans throughout the first 15 years of their working lifetime. The stream of these future interest costs together with the stream of loan payments is included in the costs of Column 5 of Table 4.2.

The steps leading up to the calculation of student costs appear in Table 4.1. Direct outlays amount to $6.5 million, the sum of tuition and fees ($5.2 million) and books and supplies ($2.6 million), less federal loans received ($1.2 million) and $63 thousand in direct outlays of personal enrichment students (those students are excluded from the cost calculations). Opportunity costs for working and non-working students amount to $5.7 million, excluding $1.6 million in offsetting residual aid that is paid directly to students.[32] Finally, we have the present value of future student loan costs, amounting to $1.2 million between principal and interest. Summing direct outlays, opportunity costs, and future student loan costs together yields a total of $13.3 million in present value student costs.

[30] Repayment period based on total education loan indebtedness, U.S. Department of Education, 2022. https://studentaid.ed.gov/sa/repay-loans/understand/plans/standard.

[31] The student discount rate is derived from the three-year average of the baseline forecasts for the 10-year discount rate published by the Congressional Budget Office. See the Congressional Budget Office, Student Loan and Pell Grant Programs – May 2023 Baseline. https://www.cbo.gov/data/baseline-projections-selected-programs.

[32] Residual aid is the remaining portion of scholarship or grant aid distributed directly to a student after the college applies tuition and fees.

Table 4.1: Present value of student costs, FY 2022-23 (thousands)

Direct outlays in FY 2022-23	
Tuition and fees	$5,174
Less federal loans received	-$1,235
Books and supplies	$2,592
Less direct outlays of personal enrichment students	-$63
Total direct outlays	**$6,469**
Opportunity costs in FY 2022-23	
Earnings forgone by non-working students	$4,272
Earnings forgone by working students	$2,987
Less residual aid	-$1,599
Total opportunity costs	**$5,660**
Future student loan costs (present value)	
Student loan principal	$825
Student loan interest	$391
Total present value student loan costs	**$1,216**
Total present value student costs	**$13,345**

Source: Based on data provided by ECC and outputs of the Lightcast impact model

Linking education to earnings

Having estimated the costs of education to students, we weigh these costs against the benefits that students receive in return. The relationship between education and earnings is well documented and forms the basis for determining student benefits. As shown in Table 2.4, state mean earnings levels at the midpoint of the average-aged worker's career increase as people achieve higher levels of education. The differences between state earnings levels define the incremental benefits of moving from one education level to the next.

A key component in determining the students' return on investment is the value of their future benefits stream; i.e., what they can expect to earn in return for the investment they make in education. We calculate the future benefits stream to the college's FY 2022-23 students first by determining their average annual increase in earnings, equal to $5.8 million. This value represents the higher wages that accrue to students at the midpoint of their careers and is calculated based on the marginal wage increases of the CHEs that students complete while attending the college. Using the state of Missouri earnings, the marginal wage increase per CHE is $112. For a full description of the methodology used to derive the $5.8 million, see Appendix 6.

The second step is to project the $5.8 million annual increase in earnings into the future, for as long as students remain in the workforce. We do this by using the extended Mincer function to predict the change in earnings at each point in an individual's working career.[33] The Mincer function originated from Mincer's seminal work on human capital (1958). The function estimates earnings using an individual's years of education and post-

[33] Appendix 6 provides more information on the Mincer function and how it is used to predict future earnings growth.

schooling experience. While some have criticized Mincer's earnings function, it is still upheld in recent data and has served as the foundation for a variety of research pertaining to labor economics. Card (1999 and 2001) addresses a number of these criticisms using U.S. based research over the last three decades and concludes that any upward bias in the Mincer parameters is on the order of 10% or less. Thus, to account for any upward bias, we conservatively incorporate a 10% reduction in our projected earnings, otherwise known as the ability bias.

Further, due to inconsistencies in the original quadratic Mincer specification,[34] as noted above, we use an enhanced version of the Mincer function—a quartic specification—that, besides the education level and work experience variables, factors in demographic characteristics such as sex and race/ethnicity to project, as precisely as possible, the former students' wage trajectories.[35] With the $5.8 million representing the students' higher earnings at the midpoint of their careers, we apply scalars from the Mincer function to yield a stream of projected future benefits that gradually increase from the time students enter the workforce, peak shortly after the career midpoint, and then dampen slightly as students approach retirement at age 67. This earnings stream appears in Column 2 of Table 4.2.

Table 4.2: Projected benefits and costs, student perspective

1	2	3	4	5	6
Years out of school	**Gross higher earnings to students (millions)**	**% active in workforce***	**Net higher earnings to students (millions)**	**Student costs (millions)**	**Net cash flow (millions)**
0	$1.2	14%	$0.2	$12.1	-$12.0
1	$1.5	23%	$0.3	$0.1	$0.2
2	$1.7	31%	$0.5	$0.1	$0.4
3	$1.9	42%	$0.8	$0.1	$0.7
4	$2.2	56%	$1.2	$0.1	$1.1
5	$2.4	97%	$2.4	$0.1	$2.2
6	$2.7	97%	$2.6	$0.1	$2.5
7	$3.0	97%	$2.9	$0.1	$2.8
8	$3.3	96%	$3.2	$0.1	$3.0
9	$3.6	96%	$3.4	$0.1	$3.3
10	$3.9	96%	$3.7	$0.1	$3.6
11	$4.2	96%	$4.0	$0.1	$3.9
12	$4.4	96%	$4.3	$0.1	$4.1

[34] Hamlen, S. S., & Hamlen, W. A. (2012). The inconsistency of the quadratic Mincer equation: A proof. Theoretical Economics Letters, 2(2), 115-120. https://doi.org/10.4236/tel.2012.22021.

[35] Murphy, K. M., & Welch, F. (1990). Empirical age-earnings-profiles. Journal of Labor Economics, 8(2), 202-229.

Table 4.2: Projected benefits and costs, student perspective

1	2	3	4	5	6
Years out of school	Gross higher earnings to students (millions)	% active in workforce*	Net higher earnings to students (millions)	Student costs (millions)	Net cash flow (millions)
13	$4.7	95%	$4.5	$0.1	$4.4
14	$5.0	95%	$4.8	$0.1	$4.7
15	$5.3	95%	$5.0	$0.1	$4.9
16	$5.6	95%	$5.3	$0.0	$5.3
17	$5.8	95%	$5.5	$0.0	$5.5
18	$6.1	94%	$5.7	$0.0	$5.7
19	$6.3	94%	$5.9	$0.0	$5.9
20	$6.5	94%	$6.1	$0.0	$6.1
21	$6.7	93%	$6.3	$0.0	$6.3
22	$6.9	93%	$6.4	$0.0	$6.4
23	$7.1	93%	$6.6	$0.0	$6.6
24	$7.2	92%	$6.7	$0.0	$6.7
25	$7.4	92%	$6.8	$0.0	$6.8
26	$7.5	91%	$6.9	$0.0	$6.9
27	$7.6	91%	$6.9	$0.0	$6.9
28	$7.7	91%	$7.0	$0.0	$7.0
29	$7.7	90%	$7.0	$0.0	$7.0
30	$7.8	89%	$7.0	$0.0	$7.0
31	$7.8	89%	$7.0	$0.0	$7.0
32	$7.9	88%	$6.9	$0.0	$6.9
33	$7.9	87%	$6.9	$0.0	$6.9
34	$7.8	87%	$6.8	$0.0	$6.8
35	$7.8	86%	$6.7	$0.0	$6.7
36	$7.8	85%	$6.6	$0.0	$6.6
37	$7.7	84%	$6.5	$0.0	$6.5
38	$7.7	83%	$6.4	$0.0	$6.4
39	$7.6	82%	$6.2	$0.0	$6.2
40	$7.5	81%	$6.1	$0.0	$6.1
41	$7.4	80%	$5.9	$0.0	$5.9
42	$7.3	78%	$5.7	$0.0	$5.7
43	$7.2	77%	$5.6	$0.0	$5.6
Present value			**$74.3**	**$13.3**	**$60.9**
Internal rate of return					**17.9%**
Benefit-cost ratio					**5.6**
Payback period (no. of years)					**7.7**

* Includes the “settling-in” factors and attrition.

Table 4.2: Projected benefits and costs, student perspective

1	2	3	4	5	6
Years out of school	Gross higher earnings to students (millions)	% active in workforce*	Net higher earnings to students (millions)	Student costs (millions)	Net cash flow (millions)

Source: Lightcast impact model

As shown in Table 4.2, the $5.8 million in gross higher earnings occurs around Year 17, which is the approximate midpoint of the students' future working careers given the average age of the student population and an assumed retirement age of 67. In accordance with the Mincer function, the gross higher earnings that accrue to students in the years leading up to the midpoint are less than $5.8 million and the gross higher earnings in the years after the midpoint are greater than $5.8 million.

The final step in calculating the students' future benefits stream is to net out the potential benefits generated by students who are either not yet active in the workforce or who leave the workforce over time. This adjustment appears in Column 3 of Table 4.2 and represents the percentage of the FY 2022-23 student population that will be employed in the workforce in a given year. Note that the percentages in the first five years of the time horizon are relatively lower than those in subsequent years. This is because many students delay their entry into the workforce, either because they are still enrolled at the college or because they are unable to find a job immediately upon graduation. Accordingly, we apply a set of "settling-in" factors to account for the time needed by students to find employment and settle into their careers. As discussed in Chapter 3, settling-in factors delay the onset of the benefits by one to three years for students who graduate with a certificate or a degree and by one to five years for degree-seeking students who do not complete during the analysis year.

Beyond the first five years of the time horizon, students will leave the workforce for any number of reasons, whether death, retirement, or unemployment. We estimate the rate of attrition using the same data and assumptions applied in the calculation of the attrition rate in the economic impact analysis of Chapter 3.[36] The likelihood of leaving the workforce increases as students age, so the attrition rate is more aggressive near the end of the time horizon than in the beginning. Column 4 of Table 4.2 shows the net higher earnings to students after accounting for both the settling-in patterns and attrition.

[36] See the discussion of the alumni impact in Chapter 3. The main sources for deriving the attrition rate are the National Center for Health Statistics, the Social Security Administration, and the Bureau of Labor Statistics. Note that we do not account for migration patterns in the student investment analysis because the higher earnings that students receive as a result of their education will accrue to them regardless of where they find employment.

Return on investment for students

Having estimated the students' costs and their future benefits stream, the next step is to discount the results to the present to reflect the time value of money. For the student perspective we assume a discount rate of 4.9% (see below). Because students tend to rely upon debt to pay for education – i.e. they are negative savers – their discount rate is based upon student loan interest rates.[37] In Appendix 1, we conduct a sensitivity analysis of this discount rate. The present value of the benefits is then compared to student costs to derive the investment analysis results, expressed in terms of a benefit-cost ratio, rate of return, and payback period. The investment is feasible if returns match or exceed the minimum threshold values; i.e., a benefit-cost ratio greater than 1.0, a rate of return that exceeds the discount rate, and a reasonably short payback period.

Discount rate

The discount rate is a rate of interest that converts future costs and benefits to present values. For example, $1,000 in higher earnings realized 30 years in the future is worth much less than $1,000 in the present. All future values must therefore be expressed in present value terms in order to compare them with investments (i.e., costs) made today. The selection of an appropriate discount rate, however, can become an arbitrary and controversial undertaking. As suggested in economic theory, the discount rate should reflect the investor's opportunity cost of capital, i.e., the rate of return one could reasonably expect to obtain from alternative investment schemes. In this study we assume a 4.9% discount rate from the student perspective and a 0.7% discount rate from the perspectives of taxpayers and society.

In Table 4.2, the net higher earnings of students yield a cumulative discounted sum of approximately $74.3 million, the present value of all of the future earnings increments (see the bottom section of Column 4). This may also be interpreted as the gross capital asset value of the students' higher earnings stream. In effect, the aggregate FY 2022-23 student body is rewarded for its investment in ECC with a capital asset valued at $74.3 million.

The students' cost of attending the college is shown in Column 5 of Table 4.2, equal to a present value of $13.3 million. Comparing the cost with the present value of benefits yields a student benefit-cost ratio of 5.6 (equal to $74.3 million in benefits divided by $13.3 million in costs).

[37] The student discount rate is derived from the most recent three-year average baseline forecasts for the 10-year Treasury rate published by the Congressional Budget Office. See the Congressional Budget Office, Student Loan and Pell Grant Programs – May 2023 Baseline. https://www.cbo.gov/data/baseline-projections-selected-programs.

Another way to compare the same benefits stream and associated cost is to compute the rate of return. The rate of return indicates the interest rate that a bank would have to pay a depositor to yield an equally attractive stream of future payments.[38] Table 4.2 shows students of ECC earning average returns of 17.9% on their investment of time and money. This is a favorable return compared, for example, to approximately 1% on a standard bank savings account, or 10.1% on stocks and bonds (30-year average return).

ECC students see an average rate of return of **17.9%** for their investment of time and money.

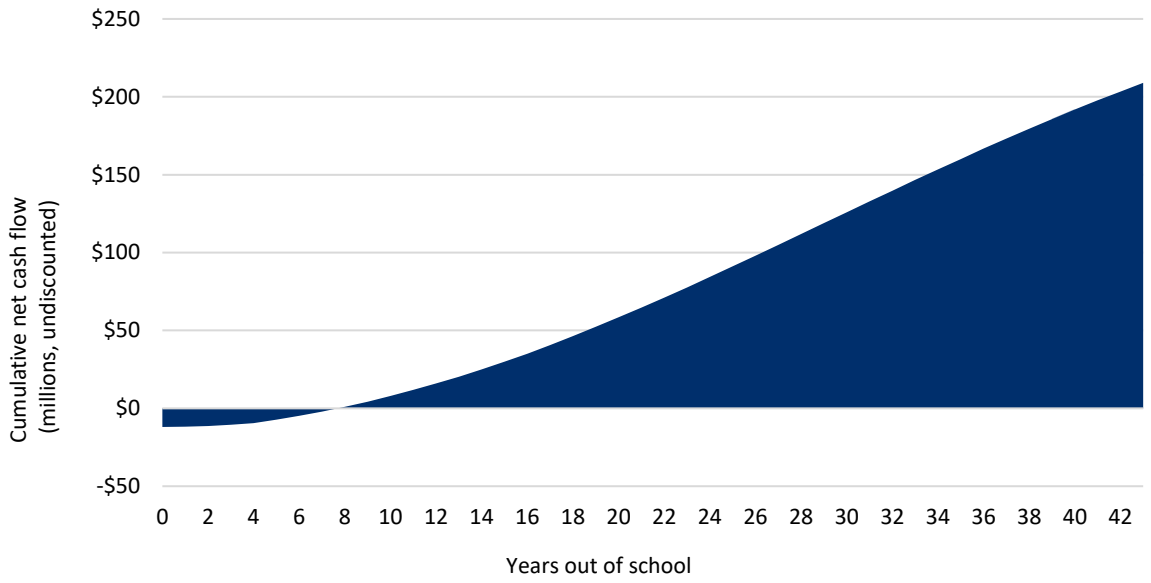
Note that returns reported in this study are real returns, not nominal. When a bank promises to pay a certain rate of interest on a savings account, it employs an implicitly nominal rate. Bonds operate in a similar manner. If it turns out that the inflation rate is higher than the stated rate of return, then money is lost in real terms. In contrast, a real rate of return is on top of inflation. For example, if inflation is running at 3% and a nominal percentage of 5% is paid, then the real rate of return on the investment is only 2%. In Table 4.2, the 17.9% student rate of return is a real rate. With an inflation rate of 2.6% (the average rate reported over the past 20 years as per the U.S. Department of Commerce, Consumer Price Index), the corresponding nominal rate of return is 20.5%, higher than what is reported in Table 4.2.

The payback period is defined as the length of time it takes to entirely recoup the initial investment.[39] Beyond that point, returns are what economists would call pure costless rent. As indicated in Table 4.2, students at ECC see, on average, a payback period of 7.7 years, meaning 7.7 years after their initial investment of forgone earnings and out-of-pocket costs, they will have received enough higher future earnings to fully recover those costs (Figure 4.1).

[38] Rates of return are computed using the familiar internal rate-of-return calculation. Note that, with a bank deposit or stock market investment, the depositor puts up a principal, receives in return a stream of periodic payments, and then recovers the principal at the end. Someone who invests in education, on the other hand, receives a stream of periodic payments that include the recovery of the principal as part of the periodic payments, but there is no principal recovery at the end. These differences notwithstanding comparable cash flows for both bank and education investors yield the same internal rate of return.

[39] Payback analysis is generally used by the business community to rank alternative investments when safety of investments is an issue. Its greatest drawback is it does not account for the time value of money. The payback period is calculated by dividing the cost of the investment by the net return per period. In this study, the cost of the investment includes tuition and fees plus the opportunity cost of time; it does not account for student living expenses.

Figure 4.1: Student payback period



Source: Lightcast impact model

Taxpayer perspective

From the taxpayer perspective, the pivotal step is to determine the public benefits that specifically accrue to state and local government. For example, benefits resulting from earnings growth are limited to increased state and local tax payments. Similarly, savings related to improved health, reduced crime, and fewer welfare and unemployment claims, discussed below, are limited to those received strictly by state and local government. In all instances, benefits to private residents, local businesses, or the federal government are excluded.

Growth in state tax revenues

As a result of their time at ECC, students earn more because of the skills they learned while attending the college, and businesses earn more because student skills make capital more productive (buildings, machinery, and everything else). This in turn raises profits and other business property income. Together, increases in labor and non-labor (i.e., capital) income are considered the effect of a skilled workforce. These in turn increase tax revenues since state and local government is able to apply tax rates to higher earnings.

Estimating the effect of ECC on increased tax revenues begins with the present value of the students' future earnings stream, which is displayed in Column 4 of Table 4.2. To these net higher earnings, we apply a multiplier derived from Lightcast's MR-SAM model to estimate the added labor income created in the state as students and businesses spend their higher earnings.[40] As labor income increases, so does non-labor income, which consists of monies gained through investments. To calculate the growth in non-labor income, we multiply the increase in labor income by a ratio of the Missouri gross state product to total labor income in the state. We also include the spending impacts discussed in Chapter 3 that were created in FY 2022-23 from operations and student spending, measured at the state level. To each of these, we apply the prevailing tax rates so we capture only the tax revenues attributable to state and local government from this additional revenue.

Not all of these tax revenues may be counted as benefits to the state, however. Some students leave the state during the course of their careers, and the higher earnings they receive as a result of their education leave the state with them. To account for this dynamic, we combine student settlement data from the college with data on migration patterns from the Internal Revenue Service to estimate the number of students who will leave the state workforce over time.

We apply another reduction factor to account for the students' alternative education opportunities. This is the same adjustment that we use in the calculation of the alumni impact in Chapter 3 and is designed to account for the counterfactual scenario where ECC does not exist. The assumption in this case is that any benefits

[40] For a full description of the Lightcast MR-SAM model, see Appendix 5.

generated by students who could have received an education even without the college cannot be counted as new benefits to society. For this analysis, we assume an alternative education variable of 15%, meaning that 15% of the student population at the college would have generated benefits anyway even without the college. For more information on the alternative education variable, see Appendix 7.

We apply a final adjustment factor to account for the "shutdown point" that nets out benefits that are not directly linked to the state and local government costs of supporting the college. As with the alternative education variable discussed under the alumni impact, the purpose of this adjustment is to account for counterfactual scenarios. In this case, the counterfactual scenario is where state and local government funding for ECC did not exist and ECC had to derive the revenue elsewhere. To estimate this shutdown point, we apply a sub-model that simulates the students' demand curve for education by reducing state and local support to zero and progressively increasing student tuition and fees. As student tuition and fees increase, enrollment declines. For ECC, the shutdown point adjustment is 0%, meaning that the college could not operate without taxpayer support. As such, no reduction applies. For more information on the theory and methodology behind the estimation of the shutdown point, see Appendix 9.

After adjusting for attrition, alternative education opportunities, and the shutdown point, we calculate the present value of the future added tax revenues that occur in the state, equal to $22.5 million. Recall from the discussion of the student return on investment that the present value represents the sum of the future benefits that accrue each year over the course of the time horizon, discounted to current year dollars to account for the time value of money. Given that the stakeholder in this case is the public sector, we use the discount rate of 0.7%. This is the three-year average of the real Treasury interest rate reported by the Office of Management and Budget (OMB) for 30-year investments, and in Appendix 1, we conduct a sensitivity analysis of this discount rate.[41]

Government savings

In addition to the creation of higher tax revenues to the state and local government, education is statistically associated with a variety of lifestyle changes that generate social savings, also known as external or incidental benefits of education. These represent the avoided costs to the government that otherwise would have been drawn from public resources absent the education provided by ECC. Government savings appear in Figure 4.2 and Table 4.3 and break down into three main categories: 1) health savings, 2) crime savings, and 3) income

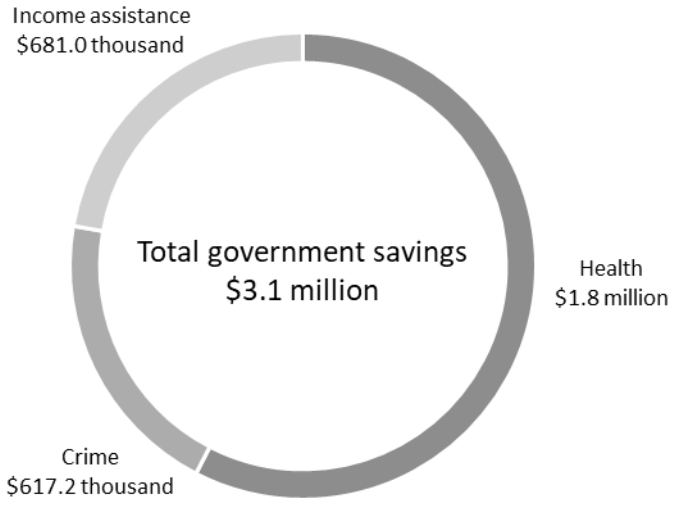
In addition to the creation of **higher tax revenues** to the state and local government, education is statistically associated with a variety of lifestyle changes that generate **social savings**.

[41] Office of Management and Budget. "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses." Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in Percent). https://www.whitehouse.gov/wp-content/uploads/2023/02/M-23-12-Appendix-C-Update_Discount-Rates.pdf. Last revised February 17, 2023.

assistance savings. Health savings include avoided medical costs that would have otherwise been covered by state and local government. Crime savings consist of avoided costs to the justice system (i.e., police protection, judicial and legal, and corrections). Income assistance benefits comprise avoided costs due to the reduced number of welfare and unemployment insurance claims.

The model quantifies government savings by calculating the probability at each education level that individuals will have poor health, commit crimes, or claim welfare and unemployment benefits. Deriving the probabilities involves assembling data from a variety of studies and surveys analyzing the correlation between education and health, crime, and income assistance at the national and state level. We spread the probabilities across the education ladder and multiply the marginal differences by the number of students who achieved CHEs at each step. The sum of these marginal differences counts as the upper bound measure of the number of students who, due to the education they received at the college, will not have poor health, commit crimes, or demand income assistance. We dampen these results by the ability bias adjustment discussed earlier in the student perspective section and in Appendix 6 to account for factors (besides education) that influence individual behavior. We then multiply the marginal effects of education by the associated costs of health, crime, and income assistance.[42] Finally, we apply the same adjustments for attrition, alternative education, and the shutdown point to derive the net savings to the government. Total government savings appear in Figure 4.2 and sum to $3.1 million.

Figure 4.2: Present value of government savings



Source: Lightcast impact model

[42] For a full list of the data sources used to calculate the social externalities, see the Resources and References section. See also Appendix 10 for a more in-depth description of the methodology.

Table 4.3 displays all benefits to taxpayers. The first row shows the added tax revenues created in the state, equal to $22.5 million, from students' higher earnings, increases in non-labor income, and spending impacts. The sum of the government savings and the added income in the state is $25.6 million, as shown in the bottom row of Table 4.3. These savings continue to accrue in the future as long as the FY 2022-23 student population of ECC remains in the workforce.

Table 4.3: Present value of added tax revenue and government savings (thousands)

Added tax revenue	**$22,501**
Government savings	
Health-related savings	$1,763
Crime-related savings	$617
Income assistance savings	$681
Total government savings	$3,061
Total taxpayer benefits	**$25,562**

Source: Lightcast impact model

Return on investment for taxpayers

Taxpayer costs are reported in Table 4.4 and come to $18.6 million, equal to the contribution of state and local government to ECC. In return for their public support, taxpayers will receive an investment benefit-cost ratio of 1.4 (= $25.6 million ÷ $18.6 million), indicating a profitable investment.

Table 4.4: Projected benefits and costs, taxpayer perspective

1	2	3	4
Years out of school	**Benefits to taxpayers (millions)**	**State and local gov't costs (millions)**	**Net cash flow (millions)**
0	$0.6	$18.6	-$18.1
1	<$0.1	$0.0	<$0.1
2	$0.1	$0.0	$0.1
3	$0.2	$0.0	$0.2
4	$0.3	$0.0	$0.3
5	$0.5	$0.0	$0.5
6	$0.5	$0.0	$0.5
7	$0.5	$0.0	$0.5
8	$0.6	$0.0	$0.6
9	$0.6	$0.0	$0.6
10	$0.6	$0.0	$0.6
11	$0.7	$0.0	$0.7
12	$0.7	$0.0	$0.7

Table 4.4: Projected benefits and costs, taxpayer perspective

1 Years out of school	2 Benefits to taxpayers (millions)	3 State and local gov't costs (millions)	4 Net cash flow (millions)
13	$0.7	$0.0	$0.7
14	$0.7	$0.0	$0.7
15	$0.8	$0.0	$0.8
16	$0.8	$0.0	$0.8
17	$0.8	$0.0	$0.8
18	$0.8	$0.0	$0.8
19	$0.8	$0.0	$0.8
20	$0.8	$0.0	$0.8
21	$0.9	$0.0	$0.9
22	$0.9	$0.0	$0.9
23	$0.9	$0.0	$0.9
24	$0.9	$0.0	$0.9
25	$0.9	$0.0	$0.9
26	$0.9	$0.0	$0.9
27	$0.9	$0.0	$0.9
28	$0.9	$0.0	$0.9
29	$0.9	$0.0	$0.9
30	$0.9	$0.0	$0.9
31	$0.8	$0.0	$0.8
32	$0.8	$0.0	$0.8
33	$0.8	$0.0	$0.8
34	$0.8	$0.0	$0.8
35	$0.8	$0.0	$0.8
36	$0.8	$0.0	$0.8
37	$0.7	$0.0	$0.7
38	$0.7	$0.0	$0.7
39	$0.7	$0.0	$0.7
40	$0.7	$0.0	$0.7
41	$0.7	$0.0	$0.7
42	$0.6	$0.0	$0.6
43	$0.6	$0.0	$0.6
Present value	**$25.6**	**$18.6**	**$6.9**
Internal rate of return			**2.2%**
Benefit-cost ratio			**1.4**
Payback period (no. of years)			**27.6**

Source: Lightcast impact model

At 2.2%, the rate of return to state and local taxpayers is favorable. Given that the stakeholder in this case is the public sector, we use the mentioned earlier discount rate of 0.7%, the three-year average of the real Treasury interest rate reported by the Office of Management and Budget for 30-year investments. This is the return governments are assumed to be able to earn on generally safe investments of unused funds, or alternatively, the interest rate for which governments, as relatively safe borrowers, can obtain funds. A rate of return of 0.7% would mean that the college just pays its own way. In principle, governments could borrow monies used to support ECC and repay the loans out of the resulting added taxes and reduced government expenditures. A rate of return of 2.2%, on the other hand, means that ECC not only pays its own way, but also generates a surplus that the state and local government can use to fund other programs.

A benefit-cost ratio of **1.4** means ECC is a good public investment since the taxes from ECC student higher earnings and reduced government expenditures not only recover taxpayer costs but grow the Missouri tax base.

Additionally, a benefit-cost ratio greater than 1.0 indicates a good public investment since the taxes from ECC student higher earnings and reduced government expenditures not only recover taxpayer costs but grow the Missouri tax base.

Social perspective

Missouri benefits from the education that ECC provides through the earnings that students create in the state and through the savings that they generate through their improved lifestyles. To receive these benefits, however, members of society must pay money and forgo services that they otherwise would have enjoyed if ECC did not exist. Society's investment in ECC stretches across a number of investor groups, from students to employers to taxpayers. We weigh the benefits generated by ECC to these investor groups against the total social costs of generating those benefits. The total social costs include all ECC expenditures, all student expenditures (including interest on student loans) less tuition and fees, and all student opportunity costs, totaling a present value of $35.4 million.

On the benefits side, any benefits that accrue to Missouri as a whole – including students, employers, taxpayers, and anyone else who stands to benefit from the activities of ECC – are counted as benefits under the social perspective. We group these benefits under the following broad headings: 1) increased earnings in the state, and 2) social externalities stemming from improved health, reduced crime, and reduced unemployment in the state (see the Beekeeper Analogy box for a discussion of externalities). Both of these benefits components are described more fully in the following sections.

Beekeeper analogy

Beekeepers provide a classic example of positive externalities (sometimes called "neighborhood effects"). The beekeeper's intention is to make money selling honey. Like any other business, receipts must at least cover operating costs. If they don't, the business shuts down.

But from society's standpoint, there is more. Flowers provide the nectar that bees need for honey production, and smart beekeepers locate near flowering sources such as orchards. Nearby orchard owners, in turn, benefit as the bees spread the pollen necessary for orchard growth and fruit production. This is an uncompensated external benefit of beekeeping, and economists have long recognized that society might actually do well to subsidize activities that produce positive externalities, such as beekeeping.

Educational institutions are like beekeepers. While their principal aim is to provide education and raise people's earnings, in the process they create an array of external benefits. Students' health and lifestyles are improved, and society indirectly benefits just as orchard owners indirectly benefit from beekeepers. In an effort to provide a more comprehensive report of the benefits generated by education, the model accounts for many of these external social benefits.

Growth in state economic base

In the process of absorbing the newly acquired skills of students who attend ECC, not only does the productivity of the Missouri workforce increase, but so does the productivity of its physical capital and assorted infrastructure. Students earn more because of the skills they learned while attending the college, and businesses earn more because student skills make capital more productive (buildings, machinery, and everything else). This in turn raises profits and other business property income. Together, increases in labor and non-labor (i.e., capital) income are considered the effect of a skilled workforce.

Estimating the effect of ECC on the state's economic base follows a similar process used when calculating increased tax revenues in the taxpayer perspective. However, instead of looking at just the tax revenue portion, we include all of the added earnings and business output. First, we calculate the students' future higher earnings stream. We factor in student attrition and alternative education opportunities to arrive at net higher earnings. We again apply multipliers derived from Lightcast's MR-SAM model to estimate the added labor and non-labor income created in the state as students and businesses spend their higher earnings and as businesses generate additional profits from this increased output (added student and business income in Figure 4.3). We also include the operations and student spending impacts discussed in Chapter 3 that were created in FY 2022-23, measured at the state level (added income from college activities in Figure 4.3). The shutdown point does not apply to the growth of the economic base because the social perspective captures not only the state and local taxpayer support to the college, but also the support from the students and other non-government sources.

Using this process, we calculate the present value of the future added income that occurs in the state, equal to $289.0 million. Recall from the discussion of the student and taxpayer return on investment that the present value represents the sum of the future benefits that accrue each year over the course of the time horizon, discounted to current year dollars to account for the time value of money. As stated in the taxpayer perspective, given that the stakeholder in this case is the public sector, we use the discount rate of 0.7%.

Social savings

Similar to the government savings discussed above, society as a whole sees savings due to external or incidental benefits of education. These represent the avoided costs that otherwise would have been drawn from private and public resources absent the education provided by ECC. Social benefits appear in Table 4.5 and break down into three main categories: 1) health savings, 2) crime savings, and 3) income assistance savings. These are similar to the categories from the taxpayer perspective above, although health savings now also include lost productivity and other effects associated with smoking, obesity, depression, and substance abuse. In addition to avoided costs to the justice system, crime savings also consist of avoided victim costs and benefits stemming from the added productivity of individuals who otherwise would have been incarcerated. Income assistance savings comprise the avoided government costs due to the reduced number of welfare and unemployment insurance claims.

Table 4.5 displays the results of the analysis. The first row shows the increased economic base in the state, equal to $289.0 million, from students' higher earnings and their multiplier effects, increases in non-labor income, and spending impacts. Social savings appear next, beginning with a breakdown of savings related to health. These include savings due to a reduced demand for medical treatment and social services, improved worker productivity and reduced absenteeism, and a reduced number of vehicle crashes and fires induced by alcohol or smoking-related incidents. Although the prevalence of these health conditions generally declines as individuals attain higher levels of education, prevalence rates are sometimes higher for individuals with certain levels of education. For example, adults with college degrees may be more likely to spend more on illicit substances and alcohol and become dependent on them. Thus, in some cases the social savings associated with a health factor can be negative. Nevertheless, the overall health savings for society are positive, amounting to $11.2 million. Crime savings amount to $683.7 thousand, including savings associated with a reduced number of crime victims, added worker productivity, and reduced expenditures for police and law enforcement, courts and administration of justice, and corrective services. Finally, the present value of the savings related to income assistance amounts to $681.0 thousand, stemming from a reduced number of persons in need of welfare or unemployment benefits. All told, social savings amounted to $12.6 million in benefits to communities and citizens in Missouri.

Table 4.5: Present value of the future increased economic base and social savings in the state (thousands)

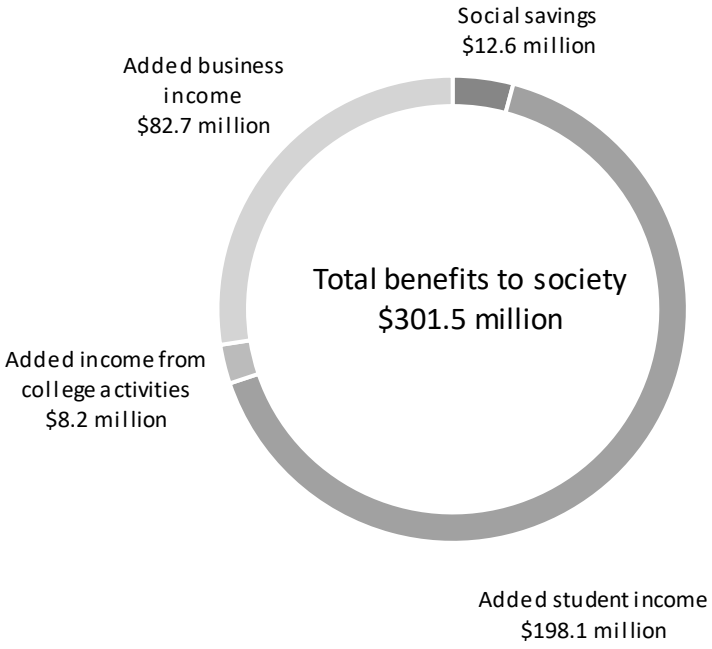
Increased economic base	**$288,972**
Social savings	
Health	
Smoking	$14,294
Obesity	$2,451
Depression	-$3,390
Substance abuse	-$2,165
Total health savings*	**$11,191**
Crime	
Criminal justice system savings	$612
Crime victim savings	$18
Added productivity	$53
Total crime savings	**$684**
Income assistance	
Welfare savings	$535
Unemployment savings	$146
Total income assistance savings	**$681**
Total social savings	**$12,555**
Total, increased economic base + social savings	**$301,527**

* In some cases, health savings may be negative. This is due to increased prevalence rates at certain education levels.

Source: Lightcast impact model

The sum of the social savings and the increased state economic base is $301.5 million, as shown in the bottom row of Table 4.5 and in Figure 4.3. These savings accrue in the future as long as the FY 2022-23 student population of ECC remains in the workforce.

Figure 4.3: Present value of benefits to society



Source: Lightcast impact model

Return on investment for society

Table 4.6 presents the stream of benefits accruing to Missouri society and the total social costs of generating those benefits. Comparing the present value of the benefits and the social costs, we have a benefit-cost ratio of 8.5. This means that for every dollar invested in an education from ECC, whether it is the money spent on operations of the college or money spent by students on tuition and fees, an average of $8.50 in benefits will accrue to society in Missouri.[43]

[43] The rate of return is not reported for the social perspective because the beneficiaries of the investment are not necessarily the same as the original investors.

Table 4.6: Projected benefits and costs, social perspective

1 Years out of school	2 Benefits to society (millions)	3 Social costs (millions)	4 Net cash flow (millions)
0	$8.6	$33.8	-$25.2
1	$0.9	$0.1	$0.8
2	$1.3	$0.1	$1.1
3	$1.9	$0.1	$1.8
4	$2.8	$0.1	$2.7
5	$5.3	$0.1	$5.1
6	$5.6	$0.1	$5.5
7	$6.0	$0.1	$5.9
8	$6.4	$0.1	$6.3
9	$6.8	$0.1	$6.7
10	$7.2	$0.1	$7.1
11	$7.5	$0.1	$7.4
12	$7.9	$0.1	$7.8
13	$8.2	$0.1	$8.1
14	$8.5	$0.1	$8.4
15	$8.8	$0.1	$8.7
16	$9.1	$0.0	$9.1
17	$9.3	$0.0	$9.3
18	$9.5	$0.0	$9.5
19	$9.7	$0.0	$9.7
20	$9.9	$0.0	$9.9
21	$10.0	$0.0	$10.0
22	$10.2	$0.0	$10.2
23	$10.2	$0.0	$10.2
24	$10.3	$0.0	$10.3
25	$10.3	$0.0	$10.3
26	$10.3	$0.0	$10.3
27	$10.3	$0.0	$10.3
28	$10.3	$0.0	$10.3
29	$10.2	$0.0	$10.2
30	$10.1	$0.0	$10.1
31	$10.0	$0.0	$10.0
32	$9.8	$0.0	$9.8
33	$9.7	$0.0	$9.7
34	$9.5	$0.0	$9.5
35	$9.3	$0.0	$9.3
36	$9.1	$0.0	$9.1
37	$8.8	$0.0	$8.8

Table 4.6: Projected benefits and costs, social perspective

1 Years out of school	2 Benefits to society (millions)	3 Social costs (millions)	4 Net cash flow (millions)
38	$8.6	$0.0	$8.6
39	$8.4	$0.0	$8.4
40	$8.1	$0.0	$8.1
41	$7.8	$0.0	$7.8
42	$7.6	$0.0	$7.6
43	$7.3	$0.0	$7.3
Present value	**$301.5**	**$35.4**	**$266.1**
Benefit-cost ratio			**8.5**
Payback period (no. of years)			**7.4**

Source: Lightcast impact model

With and without social savings

Earlier in this chapter, social benefits attributable to education (improved health, reduced crime, and reduced demand for income assistance) were defined as externalities that are incidental to the operations of ECC. Some would question the legitimacy of including these benefits in the calculation of rates of return to education, arguing that only the tangible benefits (higher earnings) should be counted. Table 4.4 and Table 4.6 are inclusive of social benefits reported as attributable to ECC. Recognizing the other point of view, Table 4.7 shows rates of return for both the taxpayer and social perspectives exclusive of social benefits. As indicated, returns are still above threshold levels (a net present value greater than zero and a benefit-cost ratio greater than 1.0), confirming that taxpayers and society as a whole receive value from investing in ECC.

Table 4.7: Taxpayer and social perspectives with and without social savings

	Including social savings	Excluding social savings
Taxpayer perspective		
Net present value (millions)	$6.9	$3.9
Benefit-cost ratio	1.4	1.2
Internal rate of return	2.2%	1.6%
Payback period (no. of years)	27.6	31.8
Social perspective		
Net present value (millions)	$266.1	$253.5
Benefit-cost ratio	8.5	8.2

Source: Lightcast impact model

Chapter 5:

Conclusion

While ECC adds value to the ECC Taxing District beyond the economic impact outlined in this study, the value of ECC's impact in terms of dollars and cents is an important component of the college's value as a whole. In order to fully assess ECC's value to the regional economy, this report has evaluated the college from the perspectives of economic impact analysis and investment analysis.

From an economic impact perspective, we calculated that ECC generates a total economic impact of **$110.9 million** in total added income for the regional economy. This represents the sum of several different impacts, including the college's:

- Operations spending impact (**$10.9 million**);
- Student spending impact (**$9.5 million**); and
- Alumni impact (**$90.5 million**).

The total impact of $110.9 million is equivalent to approximately **2.7%** of the total GRP of the ECC Taxing District and is equivalent to supporting **1,891 jobs**. For perspective, this means that **one out of every 26 jobs** in the ECC Taxing District is supported by the activities of ECC and its students.

Since ECC's activity represents an investment by various parties, including students, taxpayers, and society as a whole, we also evaluated the college as an investment to see the value it provides to these investors. For each dollar invested by students, taxpayers, and society, ECC offers a benefit of **$5.60**, **$1.40**, and **$8.50**, respectively. These results indicate that ECC is an attractive investment to students with rates of return that exceed alternative investment opportunities. At the same time, the presence of the college expands the state economy and creates a wide range of positive social benefits that accrue to taxpayers and society in general within Missouri.

One out of every 26 jobs in the ECC Taxing District is supported by the activities of ECC and its students.

Modeling the impact of the college is subject to many factors, the variability of which we considered in our sensitivity analysis (Appendix 1). With this variability accounted for, we present the findings of this study as a robust picture of the economic value of ECC.

Resources and appendices

Resources and references

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Appendix 1: Sensitivity analysis

Sensitivity analysis measures the extent to which a model's outputs are affected by hypothetical changes in the background data and assumptions. This is especially important when those variables are inherently uncertain. This analysis allows us to identify a plausible range of potential results that would occur if the value of any of the variables is in fact different from what was expected. In this chapter we test the sensitivity of the model to the following input factors: 1) the alternative education variable, 2) the labor import effect variable, 3) the student employment variables, 4) the discount rate, and 5) the retained student variable.

Alternative education variable

The alternative education variable (15%) accounts for the counterfactual scenario where students would have to seek a similar education elsewhere absent the publicly-funded college in the region. Given the difficulty in accurately specifying the alternative education variable, we test the sensitivity of the taxpayer and social investment analysis results to its magnitude. Variations in the alternative education assumption are calculated around base case results listed in the middle column of Table A1.1. Next, the model brackets the base case assumption on either side with a plus or minus 10%, 25%, and 50% variation in assumptions. Analyses are then repeated introducing one change at a time, holding all other variables constant. For example, an increase of 10% in the alternative education assumption (from 15% to 17%) reduces the taxpayer perspective rate of return from 2.2% to 2.1%. Likewise, a decrease of 10% (from 15% to 14%) in the assumption increases the rate of return from 2.2% to 2.3%.

Table A1.1 Sensitivity analysis of alternative education variable, taxpayer and social perspectives

% variation in assumption	-50%	-25%	-10%	Base case	10%	25%	50%
Alternative education variable	8%	11%	14%	15%	17%	19%	23%
Taxpayer perspective							
Net present value (millions)	$9.2	$8.0	$7.4	$6.9	$6.5	$5.8	$4.7
Rate of return*	2.6%	2.4%	2.3%	2.2%	2.1%	2.0%	1.8%
Benefit-cost ratio	1.49	1.43	1.40	1.37	1.35	1.31	1.25
Social perspective							
Net present value (millions)	$293	$279	$271	$266	$261	$253	$240
Benefit-cost ratio	9.26	8.88	8.66	8.51	8.36	8.13	7.76

Based on this sensitivity analysis, the conclusion can be drawn that ECC investment analysis results from the taxpayer and social perspectives are not very sensitive to relatively large variations in the alternative education variable. As indicated, results are still above threshold levels (a net present value greater than zero and a benefit-cost ratio greater than 1.0), even when the alternative education assumption is increased by as much

as 50% (from 15% to 23%). The conclusion is that although the assumption is difficult to specify, its impact on overall investment analysis results for the taxpayer and social perspectives is not very sensitive.

Labor import effect variable

The labor import effect variable only affects the alumni impact calculation in Table 3.6. In the model we assume a labor import effect variable of 50%, which means that 50% of the region's labor demands would have been satisfied without the presence of ECC. In other words, businesses that hired ECC students could have substituted some of these workers with equally-qualified people from outside the region had there been no ECC students to hire. Therefore, we attribute only the remaining 50% of the initial labor income generated by increased alumni productivity to the college.

Table A1.2 presents the results of the sensitivity analysis for the labor import effect variable. As explained earlier, the assumption increases and decreases relative to the base case of 50% by the increments indicated in the table. Alumni productivity impacts attributable to ECC, for example, range from a high of $135.8 million at a -50% variation to a low of $45.3 million at a +50% variation from the base case assumption. This means that if the labor import effect variable increases, the impact that we claim as attributable to alumni decreases. Even under the most conservative assumptions, the alumni impact on the ECC Taxing District economy still remains sizable.

Table A1.2: Sensitivity analysis of labor import effect variable

% variation in assumption	-50%	-25%	-10%	Base case	10%	25%	50%
Labor import effect variable	25%	38%	45%	50%	55%	63%	75%
Alumni impact (millions)	$135.8	$113.2	$99.6	$90.5	$81.5	$67.9	$45.3

Student employment variables

Student employment variables are difficult to estimate because many students do not report their employment status or because colleges generally do not collect this kind of information. Employment variables include the following: 1) the percentage of students who are employed while attending the college and 2) the percentage of earnings that working students receive relative to the earnings they would have received had they not chosen to attend the college. Both employment variables affect the investment analysis results from the student perspective.

Students incur substantial expense by attending ECC because of the time they spend not gainfully employed. Some of that cost is recaptured if students remain partially (or fully) employed while attending. It is estimated

that 79% of students are employed.[44] This variable is tested in the sensitivity analysis by changing it first to 100% and then to 0%.

The second student employment variable is more difficult to estimate. In this study we estimate that students who are working while attending the college earn only 81%, on average, of the earnings that they statistically would have received if not attending ECC. This suggests that many students hold part-time jobs that accommodate their ECC attendance, though it is at an additional cost in terms of receiving a wage that is less than what they otherwise might make. The 81% variable is an estimation based on the average hourly wages of the most common jobs held by students while attending college relative to the average hourly wages of all occupations in the ECC Taxing District. The model captures this difference in wages and counts it as part of the opportunity cost of time. As above, the 81% estimate is tested in the sensitivity analysis by changing it to 100% and then to 0%.

The changes generate results summarized in Table A1.3, with *A* defined as the percent of students employed and *B* defined as the percent that students earn relative to their full earning potential. Base case results appear in the shaded row; here the assumptions remain unchanged, with A equal to 79% and B equal to 81%. Sensitivity analysis results are shown in non-shaded rows. Scenario 1 increases A to 100% while holding B constant, Scenario 2 increases B to 100% while holding A constant, Scenario 3 increases both A and B to 100%, and Scenario 4 decreases both A and B to 0%.

Table A1.3: Sensitivity analysis of student employment variables

Variations in assumptions	Net present value (millions)	Internal rate of return	Benefit-cost ratio
Base case: A = 79%, B = 81%	$60.9	17.9%	5.6
Scenario 1: A = 100%, B = 81%	$64.4	21.8%	7.5
Scenario 2: A = 79%, B = 100%	$63.9	21.1%	7.2
Scenario 3: A = 100%, B = 100%	$68.2	30.2%	12.2
Scenario 4: A = 0%, B = 0%	$47.8	11.4%	2.8

Note: A = percent of students employed; B = percent earned relative to statistical averages.

- **Scenario 1:** Increasing the percentage of students employed (A) from 79% to 100%, the net present value, internal rate of return, and benefit-cost ratio improve to $64.4 million, 21.8%, and 7.5, respectively, relative to base case results. Improved results are attributable to a lower opportunity cost of time; all students are employed in this case.
- **Scenario 2:** Increasing earnings relative to statistical averages (B) from 81% to 100%, the net present value, internal rate of return, and benefit-cost ratio results improve to $63.9 million, 21.1%, and 7.2, respectively, relative to base case results; this strong improvement, again, is attributable to a lower opportunity cost of time.

[44] Based on data provided by ECC. This figure excludes dual credit high school students, who are not included in the opportunity cost calculations.

- **Scenario 3:** Increasing both assumptions A and B to 100% simultaneously, the net present value, internal rate of return, and benefit-cost ratio improve yet further to $68.2 million, 30.2%, and 12.2, respectively, relative to base case results. This scenario assumes that all students are fully employed and earning full salaries (equal to statistical averages) while attending classes.
- **Scenario 4:** Finally, decreasing both A and B to 0% reduces the net present value, internal rate of return, and benefit-cost ratio to $47.8 million, 11.4%, and 2.8, respectively, relative to base case results. These results are reflective of an increased opportunity cost; none of the students are employed in this case. [45]

It is strongly emphasized in this section that base case results are very attractive in that results are all above their threshold levels. As is clearly demonstrated here, results of the first three alternative scenarios appear much more attractive, although they overstate benefits. Results presented in Chapter 4 are realistic, indicating that investments in ECC generate excellent returns, well above the long-term average percent rates of return in stock and bond markets.

Discount rate

The discount rate is a rate of interest that converts future monies to their present value. In investment analysis, the discount rate accounts for two fundamental principles: 1) the time value of money, and 2) the level of risk that an investor is willing to accept. Time value of money refers to the value of money after interest or inflation has accrued over a given length of time. An investor must be willing to forgo the use of money in the present to receive compensation for it in the future. The discount rate also addresses the investors' risk preferences by serving as a proxy for the minimum rate of return that the proposed risky asset must be expected to yield before the investors will be persuaded to invest in it. Typically, this minimum rate of return is determined by the known returns of less risky assets where the investors might alternatively consider placing their money.

In this study, we assume a 4.9% discount rate for students and a 0.7% discount rate for taxpayers and society.[46] Similar to the sensitivity analysis of the alternative education variable, we vary the base case discount rates for students, taxpayers, and society on either side by increasing the discount rate by 10%, 25%, and 50%, and then reducing it by 10%, 25%, and 50%.

[45] Note that reducing the percent of students employed to 0% automatically negates the percent they earn relative to full earning potential, since none of the students receive any earnings in this case.

[46] These values are based on the three-year average of the baseline forecasts for the 10-year Treasury rate published by the Congressional Budget Office and the real Treasury interest rates reported by the Office of Management and Budget for 30-year investments. See the Congressional Budget Office "Table 5. Federal Student Loan Programs: Projected Interest Rates: CBO's May 2023 Baseline" and the Office of Management and Budget "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses."

Table A1.4: Sensitivity analysis of discount rate

% variation in assumption	-50%	-25%	-10%	Base case	10%	25%	50%
Student perspective							
Discount rate	2.4%	3.7%	4.4%	4.9%	5.4%	6.1%	7.3%
Net present value (millions)	$110.2	$81.5	$68.4	$60.9	$54.3	$45.8	$34.6
Benefit-cost ratio	9.26	7.11	6.12	5.56	5.07	4.43	3.59
Taxpayer perspective							
Discount rate	0.37%	0.55%	0.66%	0.73%	0.81%	0.92%	1.10%
Net present value (millions)	$9.2	$8.0	$7.3	$6.9	$6.5	$5.9	$4.9
Benefit-cost ratio	1.49	1.43	1.39	1.37	1.35	1.32	1.26
Social perspective							
Discount rate	0.37%	0.55%	0.66%	0.73%	0.81%	0.92%	1.10%
Net present value (millions)	$293	$279	$271	$266	$261	$254	$242
Benefit-cost ratio	9.3	8.9	8.7	8.5	8.4	8.2	7.8

As demonstrated in Table A1.4, an increase in the discount rate leads to a corresponding decrease in the expected returns, and vice versa. For example, increasing the student discount rate by 50% (from 4.9% to 7.3%) reduces the students' benefit-cost ratio from 5.6 to 3.6. Conversely, reducing the discount rate for students by 50% (from 4.9% to 2.4%) increases the benefit-cost ratio from 5.6 to 9.3. The sensitivity analysis results for taxpayers and society show the same inverse relationship.

Retained student variable

The retained student variable only affects the student spending impact calculation in Table 3.4. For this analysis, we assume a retained student variable of 10%, which means that 10% of ECC's students who originated from the ECC Taxing District would have left the region for other opportunities, whether that be education or employment, if ECC did not exist. The money these retained students spent in the region for accommodation and other personal and household expenses is attributable to ECC.

Table A1.5 presents the results of the sensitivity analysis for the retained student variable. The assumption increases and decreases relative to the base case of 10% by the increments indicated in the table. The student spending impact is recalculated at each value of the assumption, holding all else constant. Student spending impacts attributable to ECC range from a high of $9.9 million when the retained student variable is 15% to a low of $9.0 million when the retained student variable is 5%. This means as the retained student variable decreases, the student spending attributable to ECC decreases. Even under the most conservative assumptions, the student spending impact on the ECC Taxing District economy remains substantial.

Table A1.5: Sensitivity analysis of retained student variable

% variation in assumption	-50%	-25%	-10%	Base case	10%	25%	50%
Retained student variable	5%	8%	9%	10%	11%	13%	15%
Student spending impact (thousands)	$9,036	$9,259	$9,394	$9,483	$9,572	$9,707	$9,930

Appendix 2: Glossary of terms

Alternative education	A "with" and "without" measure of the percent of students who would still be able to avail themselves of education if the college under analysis did not exist. An estimate of 10%, for example, means that 10% of students do not depend directly on the existence of the college in order to obtain their education.
Alternative use of funds	A measure of how monies that are currently used to fund the college might otherwise have been used if the college did not exist.
Asset value	Capitalized value of a stream of future returns. Asset value measures what someone would have to pay today for an instrument that provides the same stream of future revenues.
Attrition rate	Rate at which students leave the workforce due to out-migration, unemployment, retirement, or death.
Benefit-cost ratio	Present value of benefits divided by present value of costs. If the benefit-cost ratio is greater than 1.0, then benefits exceed costs, and the investment is feasible.
Counterfactual scenario	What would have happened if a given event had not occurred. In the case of this economic impact study, the counterfactual scenario is a scenario where the college did not exist.
Credit hour equivalent	Credit hour equivalent, or CHE, is defined as 15 contact hours of education if on a semester system, and 10 contact hours if on a quarter system. In general, it requires 450 contact hours to complete one full-time equivalent, or FTE.
Demand	Relationship between the market price of education and the volume of education demanded (expressed in terms of enrollment). The law of the downward-sloping demand curve is related to the fact that enrollment increases only if the price (tuition and fees) is lowered, or conversely, enrollment decreases if price increases.
Discounting	Expressing future revenues and costs in present value terms.
Earnings (labor income)	Income that is received as a result of labor; i.e., wages.
Economics	Study of the allocation of scarce resources among alternative and competing ends. Economics is not normative (what ought to be done), but positive (describes what is, or how people are likely to behave in response to economic changes).

Elasticity of demand	Degree of responsiveness of the quantity of education demanded (enrollment) to changes in market prices (tuition and fees). If a decrease in fees increases or decreases total enrollment by a significant amount, demand is elastic. If enrollment remains the same or changes only slightly, demand is inelastic.
Externalities	Impacts (positive and negative) for which there is no compensation. Positive externalities of education include improved social behaviors such as improved health, lower crime, and reduced demand for income assistance. Educational institutions do not receive compensation for these benefits but benefits still occur because education is statistically proven to lead to improved social behaviors.
Gross regional product	Measure of the final value of all goods and services produced in a region after netting out the cost of goods used in production. Alternatively, gross regional product (GRP) equals the combined incomes of all factors of production; i.e., labor, land, and capital. These include wages, salaries, proprietors' incomes, profits, rents, and other. Gross regional product is also sometimes called value added or added income.
Initial effect	Income generated by the initial injection of monies into the economy through the payroll of the college and the higher earnings of its students.
Input-output analysis	Relationship between a given set of demands for final goods and services and the implied amounts of manufactured inputs, raw materials, and labor that this requires. When educational institutions pay wages and salaries and spend money for supplies in the region, they also generate earnings in all sectors of the economy, thereby increasing the demand for goods and services and jobs. Moreover, as students enter or rejoin the workforce with higher skills, they earn higher salaries and wages. In turn, this generates more consumption and spending in other sectors of the economy.
Internal rate of return	Rate of interest that, when used to discount cash flows associated with investing in education, reduces its net present value to zero (i.e., where the present value of revenues accruing from the investment are just equal to the present value of costs incurred). This, in effect, is the breakeven rate of return on investment since it shows the highest rate of interest at which the investment makes neither a profit nor a loss.
Multiplier effect	Additional income created in the economy as the college and its students spend money in the region. It consists of the income created by the supply chain of the industries initially affected by the spending of the college and its students (i.e., the direct effect), income created by the supply chain of the

	initial supply chain (i.e., the indirect effect), and the income created by the increased spending of the household sector (i.e., the induced effect).
NAICS	The North American Industry Classification System (NAICS) classifies North American business establishments in order to better collect, analyze, and publish statistical data related to the business economy.
Net cash flow	Benefits minus costs, i.e., the sum of revenues accruing from an investment minus costs incurred.
Net present value	Net cash flow discounted to the present. All future cash flows are collapsed into one number, which, if positive, indicates feasibility. The result is expressed as a monetary measure.
Non-labor income	Income received from investments, such as rent, interest, and dividends.
Opportunity cost	Benefits forgone from alternative B once a decision is made to allocate resources to alternative A. Or, if individuals choose to attend college, they forgo earnings that they would have received had they chosen instead to work full-time. Forgone earnings, therefore, are the "price tag" of choosing to attend college.
Payback period	Length of time required to recover an investment. The shorter the period, the more attractive the investment. The formula for computing payback period is: Payback period = cost of investment/net return per period

Appendix 3: Frequently asked questions (FAQs)

This appendix provides answers to some frequently asked questions about the results.

What is economic impact analysis?

Economic impact analysis quantifies the impact from a given economic event – in this case, the presence of a college – on the economy of a specified region.

What is investment analysis?

Investment analysis is a standard method for determining whether an existing or proposed investment is economically viable. This methodology is appropriate in situations where a stakeholder puts up a certain amount of money with the expectation of receiving benefits in return, where the benefits that the stakeholder receives are distributed over time, and where a discount rate must be applied in order to account for the time value of money.

Do the results differ by region, and if so, why?

Yes. Regional economic data are drawn from Lightcast's proprietary MR-SAM model, the Census Bureau, and other sources to reflect the specific earnings levels, jobs numbers, unemployment rates, population demographics, and other key characteristics of the region served by the college. Therefore, model results for the college are specific to the given region.

Are the funds transferred to the college increasing in value, or simply being re-directed?

Lightcast's approach is not a simple "rearranging of the furniture" where the impact of operations spending is essentially a restatement of the level of funding received by the college. Rather, it is an impact assessment of the additional income created in the region as a result of the college spending on payroll and other non-pay expenditures, net of any impacts that would have occurred anyway if the college did not exist.

How do my college's rates of return compare to that of other institutions?

In general, Lightcast discourages comparisons between institutions since many factors, such as regional economic conditions, institutional differences, and student demographics are outside of the college's control. It is best to compare the rate of return to the discount rates of 4.9% (for students) and 0.7% (for society and taxpayers), which can also be seen as the opportunity cost of the investment (since these stakeholder groups could be spending their time and money in other investment schemes besides education). If the rate of return

is higher than the discount rate, the stakeholder groups can expect to receive a positive return on their educational investment.

Lightcast recognizes that some institutions may want to make comparisons. As a word of caution, if comparing to an institution that had a study commissioned by a firm other than Lightcast, then differences in methodology will create an "apples to oranges" comparison and will therefore be difficult. The study results should be seen as unique to each institution.

Lightcast conducted an economic impact study for my college a few years ago. Why have results changed?

Lightcast is a leading provider of economic impact studies and labor market data to educational institutions, workforce planners, and regional developers in the U.S. and internationally. Since 2000, Lightcast has completed over 3,000 economic impact studies for educational institutions in three countries. Along the way we have worked to continuously update and improve our methodologies to ensure that they conform to the best practices and stay relevant in today's economy. The present study reflects the latest version of our model, representing the most up-to-date theory, practices, and data for conducting economic impact and investment analyses. Many of our former assumptions have been replaced with observed data, and we have researched the latest sources in order to update the background data used in our model. Additionally, changes in the data the college provides to Lightcast can influence the results of the study.

Net present value (NPV): How do I communicate this in laymen's terms?

Which would you rather have: a dollar right now or a dollar 30 years from now? That most people will choose a dollar now is the crux of net present value. The preference for a dollar today means today's dollar is therefore worth more than it would be in the future (in most people's opinion). Because the dollar today is worth more than a dollar in 30 years, the dollar 30 years from now needs to be adjusted to express its worth today. Adjusting the values for this "time value of money" is called discounting and the result of adding them all up after discounting each value is called net present value.

Internal rate of return (IRR): How do I communicate this in laymen's terms?

Using the bank as an example, an individual needs to decide between spending all of their paycheck today and putting it into savings. If they spend it today, they know what it is worth: $1 = $1. If they put it into savings, they need to know that there will be some sort of return to them for spending those dollars in the future rather than now. This is why banks offer interest rates and deposit interest earnings. This makes it so an individual can expect, for example, a 3% return in the future for money that they put into savings now.

Total economic impact: How do I communicate this in laymen's terms?

Big numbers are great but putting them into perspective can be a challenge. To add perspective, find an industry with roughly the same "% of GRP" as your college (Table 2.3). This percentage represents its portion of the total gross regional product in the region (similar to the nationally recognized gross domestic product but at a regional level). This allows the college to say that their single brick and mortar campus does just as much for the region as the entire Utilities *industry*, for example. This powerful statement can help put the large total impact number into perspective.

Appendix 4: Example of sales versus income

Lightcast's economic impact study differs from many other studies because we prefer to report the impacts in terms of income rather than sales (or output). Income is synonymous with value added or gross regional product (GRP). Sales include all the intermediary costs associated with producing goods and services. Income is a net measure that excludes these intermediary costs:

Income = Sales – Intermediary Costs

For this reason, income is a more meaningful measure of new economic activity than reporting sales. This is evidenced by the use of gross domestic product (GDP) – a measure of income – by economists when considering the economic growth or size of a country. The difference is GRP reflects a region and GDP a country.

To demonstrate the difference between income and sales, let us consider an example of a baker's production of a loaf of bread. The baker buys the ingredients such as eggs, flour, and yeast for $2.00. He uses capital such as a mixer to combine the ingredients and an oven to bake the bread and convert it into a final product. Overhead costs for these steps are $1.00. Total intermediary costs are $3.00. The baker then sells the loaf of bread for $5.00.

The sales amount of the loaf of bread is $5.00. The income from the loaf of bread is equal to the sales amount less the intermediary costs:

Income = $5.00 − $3.00 = $2.00

In our analysis, we provide context behind the income figures by also reporting the associated number of jobs. The impacts are also reported in sales and earnings terms for reference.

Appendix 5: Lightcast MR-SAM

Lightcast's MR-SAM represents the flow of all economic transactions in a given region. It replaces Lightcast's previous input-output (IO) model, which operated with some 1,000 industries, four layers of government, a single household consumption sector, and an investment sector. The old IO model was used to simulate the ripple effects (*i.e.*, multipliers) in the regional economy as a result of industries entering or exiting the region. The MR-SAM model performs the same tasks as the old IO model, but it also does much more. Along with the same 1,000 industries, government, household, and investment sectors embedded in the old IO tool, the MR-SAM exhibits much more functionality, a greater amount of data, and a higher level of detail on the demographic and occupational components of jobs (16 demographic cohorts and about 750 occupations are characterized).

This appendix presents a high-level overview of the MR-SAM. Additional documentation on the technical aspects of the model is available upon request.

Data sources for the model

The Lightcast MR-SAM model relies on a number of internal and external data sources, mostly compiled by the federal government. What follows is a listing and short explanation of our sources. The use of these data will be covered in more detail later in this appendix.

Lightcast Data are produced from many data sources to produce detailed industry, occupation, and demographic jobs and earnings data at the local level. This information (especially sales-to-jobs ratios derived from jobs and earnings-to-sales ratios) is used to help regionalize the national matrices as well as to disaggregate them into more detailed industries than are normally available.

BEA Make and Use Tables (MUT) are the basis for input-output models in the U.S. The *make* table is a matrix that describes the amount of each commodity made by each industry in a given year. Industries are placed in the rows and commodities in the columns. The *use* table is a matrix that describes the amount of each commodity used by each industry in a given year. In the use table, commodities are placed in the rows and industries in the columns. The BEA produces two different sets of MUTs, the benchmark and the summary. The benchmark set contains about 500 sectors and is released every five years, with a five-year lag time (e.g., 2002 benchmark MUTs were released in 2007). The summary set contains about 80 sectors and is released every year, with a two-year lag (e.g., 2010 summary MUTs were released in late 2011/early 2012). The MUTs are used in the Lightcast MR-SAM model to produce an industry-by-industry matrix describing all industry purchases from all industries.

BEA Gross Domestic Product by State (GSP) describes gross domestic product from the value added (also known as added income) perspective. Value added is equal to employee compensation, gross operating surplus, and taxes on production and imports, less subsidies. Each of these components is reported for each

state and an aggregate group of industries. This dataset is updated once per year, with a one-year lag. The Lightcast MR-SAM model makes use of this data as a control and pegs certain pieces of the model to values from this dataset.

BEA National Income and Product Accounts (NIPA) cover a wide variety of economic measures for the nation, including gross domestic product (GDP), sources of output, and distribution of income. This dataset is updated periodically throughout the year and can be between a month and several years old depending on the specific account. NIPA data are used in many of the Lightcast MR-SAM processes as both controls and seeds.

BEA Local Area Income (LPI) encapsulates multiple tables with geographies down to the county level. The following two tables are specifically used: CA05 (Personal income and earnings by industry) and CA91 (Gross flow of earnings). CA91 is used when creating the commuting submodel and CA05 is used in several processes to help with place-of-work and place-of-residence differences, as well as to calculate personal income, transfers, dividends, interest, and rent.

Bureau of Labor Statistics Consumer Expenditure Survey (CEX) reports on the buying habits of consumers along with some information as to their income, consumer unit, and demographics. Lightcast utilizes this data heavily in the creation of the national demographic by income type consumption on industries.

Census of Government's (CoG) state and local government finance dataset is used specifically to aid breaking out state and local data that is reported in the MUTs. This allows Lightcast to have unique production functions for each of its state and local government sectors.

Census' OnTheMap (OTM) is a collection of three datasets for the census block level for multiple years. **Origin-Destination (OD)** offers job totals associated with both home census blocks and a work census block. **Residence Area Characteristics (RAC)** offers jobs totaled by home census block. **Workplace Area Characteristics (WAC)** offers jobs totaled by work census block. All three of these are used in the commuting submodel to gain better estimates of earnings by industry that may be counted as commuting. This dataset has holes for specific years and regions. These holes are filled with Census' Journey-to-Work described later.

Census' Current Population Survey (CPS) is used as the basis for the demographic breakout data of the MR-SAM model. This set is used to estimate the ratios of demographic cohorts and their income for the three different income categories (i.e., wages, property income, and transfers).

Census' Journey-to-Work (JtW) is part of the 2000 Census and describes the amount of commuting jobs between counties. This set is used to fill in the areas where OTM does not have data.

Census' American Community Survey (ACS) Public Use Microdata Sample (PUMS) is the replacement for Census' long form and is used by Lightcast to fill the holes in the CPS data.

Oak Ridge National Lab (ORNL) County-to-County Distance Matrix (Skim Tree) contains a matrix of distances and network impedances between each county via various modes of transportation such as highway, railroad, water, and combined highway-rail. Also included in this set are minimum impedances utilizing the best

combination of paths. The ORNL distance matrix is used in Lightcast's gravitational flows model that estimates the amount of trade between counties in the country.

Overview of the MR-SAM model

Lightcast's MR-SAM modeling system is a comparative static model in the same general class as RIMS II (Bureau of Economic Analysis) and IMPLAN (Minnesota Implan Group). The MR-SAM model is thus not an econometric model, the primary example of which is PolicyInsight by REMI. It relies on a matrix representation of industry-to-industry purchasing patterns originally based on national data which are regionalized with the use of local data and mathematical manipulation (i.e., non-survey methods). Models of this type estimate the ripple effects of changes in jobs, earnings, or sales in one or more industries upon other industries in a region.

The Lightcast MR-SAM model shows final equilibrium impacts – that is, the user enters a change that perturbs the economy and the model shows the changes required to establish a new equilibrium. As such, it is not a dynamic model that shows year-by-year changes over time (as REMI's does).

National SAM

Following standard practice, the SAM model appears as a square matrix, with each row sum exactly equaling the corresponding column sum. Reflecting its kinship with the standard Leontief input-output framework, individual SAM elements show accounting flows between row and column sectors during a chosen base year. Read across rows, SAM entries show the flow of funds into column accounts (also known as receipts or the appropriation of funds by those column accounts). Read down columns, SAM entries show the flow of funds into row accounts (also known as expenditures or the dispersal of funds to those row accounts).

The SAM may be broken into three different aggregation layers: broad accounts, sub-accounts, and detailed accounts. The broad layer is the most aggregate and will be covered first. Broad accounts cover between one and four sub-accounts, which in turn cover many detailed accounts. This appendix will not discuss detailed accounts directly because of their number. For example, in the industry broad account, there are two sub-accounts and over 1,000 detailed accounts.

Multi-regional aspect of the MR-SAM

Multi-regional (MR) describes a non-survey model that has the ability to analyze the transactions and ripple effects (i.e., multipliers) of not just a single region, but multiple regions interacting with each other. Regions in this case are made up of a collection of counties.

Lightcast's multi-regional model is built off of gravitational flows, assuming that the larger a county's economy, the more influence it will have on the surrounding counties' purchases and sales. The equation behind this model is essentially the same that Isaac Newton used to calculate the gravitational pull between planets and stars. In Newton's equation, the masses of both objects are multiplied, then divided by the distance separating them and multiplied by a constant. In Lightcast's model, the masses are replaced with the supply of a sector for one county and the demand for that same sector from another county. The distance is replaced with an

impedance value that considers the distance, type of roads, rail lines, and other modes of transportation. Once this is calculated for every county-to-county pair, a set of mathematical operations is performed to make sure all counties absorb the correct amount of supply from every county and the correct amount of demand from every county. These operations produce more than 200 million data points.

Components of the Lightcast MR-SAM model

The Lightcast MR-SAM is built from a number of different components that are gathered together to display information whenever a user selects a region. What follows is a description of each of these components and how each is created. Lightcast's internally created data are used to a great extent throughout the processes described below, but its creation is not described in this appendix.

County earnings distribution matrix

The county earnings distribution matrices describe the earnings spent by every industry on every occupation for a year – i.e., earnings by occupation. The matrices are built utilizing Lightcast's industry earnings, occupational average earnings, and staffing patterns.

Each matrix starts with a region's staffing pattern matrix which is multiplied by the industry jobs vector. This produces the number of occupational jobs in each industry for the region. Next, the occupational average hourly earnings per job are multiplied by 2,080 hours, which converts the average hourly earnings into a yearly estimate. Then the matrix of occupational jobs is multiplied by the occupational annual earnings per job, converting it into earnings values. Last, all earnings are adjusted to match the known industry totals. This is a fairly simple process, but one that is very important. These matrices describe the place-of-work earnings used by the MR-SAM.

Commuting model

The commuting sub-model is an integral part of Lightcast's MR-SAM model. It allows the regional and multi-regional models to know what amount of the earnings can be attributed to place-of-residence vs. place-of-work. The commuting data describe the flow of earnings from any county to any other county (including within the counties themselves). For this situation, the commuted earnings are not just a single value describing total earnings flows over a complete year but are broken out by occupation and demographic. Breaking out the earnings allows for analysis of place-of-residence and place-of-work earnings. These data are created using Bureau of Labor Statistics' OnTheMap dataset, Census' Journey-to-Work, BEA's LPI CA91 and CA05 tables, and some of Lightcast's data. The process incorporates the cleanup and disaggregation of the OnTheMap data, the estimation of a closed system of county inflows and outflows of earnings, and the creation of finalized commuting data.

National SAM

The national SAM as described above is made up of several different components. Many of the elements discussed are filled in with values from the national Z matrix – or industry-to-industry transaction matrix. This matrix is built from BEA data that describe which industries make and use what commodities at the national level. These data are manipulated with some industry standard equations to produce the national Z matrix. The data in the Z matrix act as the basis for the majority of the data in the national SAM. The rest of the values are filled in with data from the county earnings distribution matrices, the commuting data, and the BEA's National Income and Product Accounts.

One of the major issues that affect any SAM project is the combination of data from multiple sources that may not be consistent with one another. Matrix balancing is the broad name for the techniques used to correct this problem. Lightcast uses a modification of the "diagonal similarity scaling" algorithm to balance the national SAM.

Gravitational flows model

The most important piece of the Lightcast MR-SAM model is the gravitational flows model that produces county-by-county regional purchasing coefficients (RPCs). RPCs estimate how much an industry purchases from other industries inside and outside of the defined region. This information is critical for calculating all IO models.

Gravity modeling starts with the creation of an impedance matrix that values the difficulty of moving a product from county to county. For each sector, an impedance matrix is created based on a set of distance impedance methods for that sector. A distance impedance method is one of the measurements reported in the Oak Ridge National Laboratory's County-to-County Distance Matrix. In this matrix, every county-to-county relationship is accounted for in six measures: great-circle distance, highway impedance, rail miles, rail impedance, water impedance, and highway-rail-highway impedance. Next, using the impedance information, the trade flows for each industry in every county are solved for. The result is an estimate of multi-regional flows from every county to every county. These flows are divided by each respective county's demand to produce multi-regional RPCs.

Appendix 6: Value per credit hour equivalent and the Mincer function

Two key components in the analysis are 1) the value of the students' educational achievements, and 2) the change in that value over the students' working careers. Both of these components are described in detail in this appendix.

Value per CHE

Typically, the educational achievements of students are marked by the credentials they earn. However, not all students who attended ECC in the 2022-23 analysis year obtained a degree or certificate. Some returned the following year to complete their education goals, while others took a few courses and entered the workforce without graduating. As such, the only way to measure the value of the students' achievement is through their credit hour equivalents, or CHEs. This approach allows us to see the benefits to all students who attended the college, not just those who earned a credential.

To calculate the value per CHE, we first determine how many CHEs are required to complete each education level. For example, assuming that there are 30 CHEs in an academic year, a student generally completes 120 CHEs in order to move from a high school diploma to a bachelor's degree, another 60 CHEs to move from a bachelor's degree to a master's degree, and so on. This progression of CHEs generates an education ladder beginning at the less than high school level and ending with the completion of a doctoral degree, with each level of education representing a separate stage in the progression.

The second step is to assign a unique value to the CHEs in the education ladder based on the wage differentials presented in Table 2.4.[47] For example, the difference in regional earnings between a high school diploma and an associate degree is $6,900. We spread this $6,900 wage differential across the 60 CHEs that occur between a high school diploma and an associate degree, applying a ceremonial "boost" to the last CHE in the stage to mark the achievement of the degree.[48] We repeat this process for each education level in the ladder.

Next, we map the CHE production of the FY 2022-23 student population to the education ladder. Table 2.2 provides information on the CHE production of students attending ECC, broken out by educational achievement. In total, students completed 51,846 CHEs during the analysis year, excluding personal enrichment students. We map each of these CHEs to the education ladder depending on the students' education level and the average number of CHEs they completed during the year. For example, bachelor's

[47] The value per CHE is calculated differently between the economic impact analysis and the investment analysis. The economic impact analysis uses the region as its background and, therefore, uses regional earnings to calculate value per CHE, while the investment analysis uses the state as its backdrop and, therefore, uses state earnings. The methodology outlined in this appendix will use regional earnings; however, the same methodology is followed for the investment analysis when state earnings are used.

[48] Economic theory holds that workers that acquire education credentials send a signal to employers about their ability level. This phenomenon is commonly known as the sheepskin effect or signaling effect. The ceremonial boosts applied to the achievement of degrees in the Lightcast impact model are derived from Jaeger and Page (1996).

degree graduates are allocated to the stage between the associate degree and the bachelor's degree, and the average number of CHEs they completed informs the shape of the distribution curve used to spread out their total CHE production within that stage of the progression.

The sum product of the CHEs earned at each step within the education ladder and their corresponding value yields the students' aggregate annual increase in income (*ΔE)*, as shown in the following equation:

$$\Delta E = \sum_{i=1}^{n} e_i h_i \quad \text{where } i \in 1, 2, \ldots, n$$

and *n* is the number of steps in the education ladder, e_i is the marginal earnings gain at step *i,* and h_i is the number of CHEs completed at step *i*.

Table A6.1 displays the result for the students' aggregate annual increase in income (*ΔE)*, a total of $5.4 million. By dividing this value by the students' total production of 51,846 CHEs during the analysis year, we derive an overall value of $104 per CHE.

Table A6.1: Aggregate annual increase in income of students and value per CHE

Aggregate annual increase in income	$5,403,977
Total credit hour equivalents (CHEs) in FY 2022-23*	51,846
Value per CHE	$104

*Excludes the CHE production of personal enrichment students.

Source: Lightcast impact model

Mincer Function

The $104 value per CHE in Table A6.1 only tells part of the story, however. Human capital theory holds that earnings levels do not remain constant; rather, they start relatively low and gradually increase as the worker gains more experience. Research also shows that the earnings increment between educated and non-educated workers grows through time. These basic patterns in earnings over time were originally identified by Jacob Mincer, who viewed the lifecycle earnings distribution as a function with the key elements being earnings, years of education, and work experience, with age serving as a proxy for experience.[49] While some have criticized Mincer's earnings function, it is still upheld in recent data and has served as the foundation for a variety of research pertaining to labor economics. Those critical of the Mincer function point to several unobserved factors such as ability, socioeconomic status, and family background that also help explain higher earnings. Failure to account for these factors results in what is known as an "ability bias." Research by Card (1999 and 2001) suggests that the benefits estimated using Mincer's function are biased upwards by 10% or less. As such, we reduce the estimated benefits by 10%.

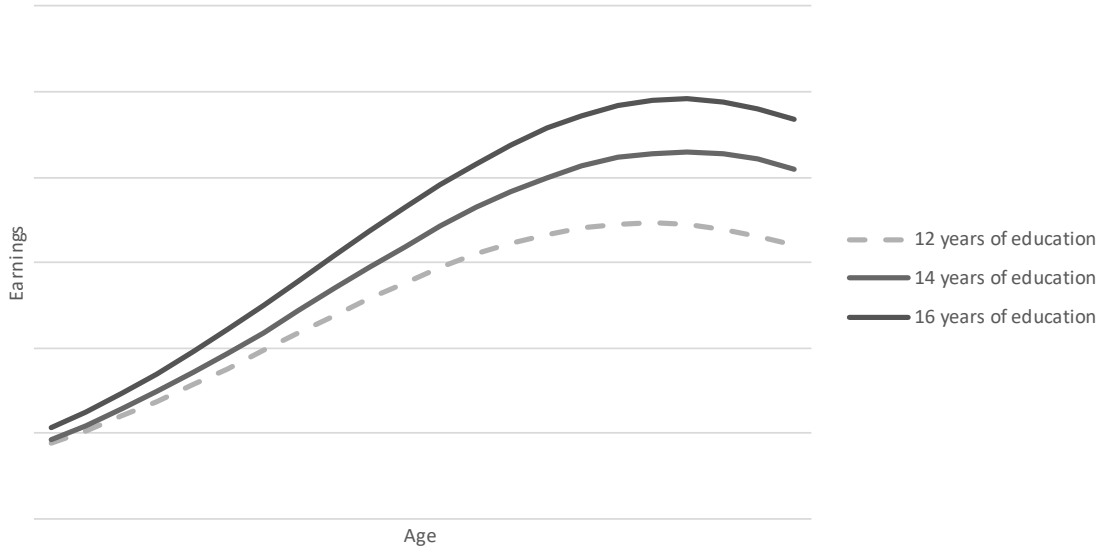
We use IPUMS (originally the "Integrated Public Use Microdata Series") data to calculate Mincer coefficients. The database contains over 60 integrated, high precision samples of the American population drawn from 16 federal census, from the American Community Surveys of 2000-present, and from the Puerto Rican Community Surveys of 2005-present. By using this data, we are able to create demographic and education level-specific Mincer coefficients. These coefficients are used in a quartic equation, which explains earnings with the years

[49] See Mincer (1958 and 1974).

of education and work experience variables accounting for demographic characteristics through interaction terms with sex and race and ethnicity.

Figure A6.1 illustrates several important points about the Mincer function. First, as demonstrated by the shape of the curves, an individual's earnings initially grow at an increasing rate, then grow at a decreasing rate, reach a maximum somewhere well after the midpoint of the working career, and then decline in later years. Second, individuals with higher levels of education reach their maximum earnings at an older age compared to individuals with lower levels of education (recall that age serves as a proxy for years of experience). And third, the benefits of education, as measured by the difference in earnings between education levels, increase with age.

Figure A6.1: Lifecycle change in earnings



In calculating the alumni impact in Chapter 3, we use the slope of the curve in Mincer's earnings function to condition the $104 value per CHE to the students' age and work experience. To the students just starting their career during the analysis year, we apply a lower value per CHE; to the students in the latter half or approaching the end of their careers we apply a higher value per CHE. The original $104 value per CHE applies only to the CHE production of students precisely at the midpoint of their careers during the analysis year.

In Chapter 4 we again apply the Mincer function, this time to project the benefits stream of the FY 2022-23 student population into the future. Here too the value per CHE is lower for students at the start of their career and higher near the end of it, in accordance with the scalars derived from the slope of the Mincer curve illustrated in Figure A6.1.

Appendix 7: Alternative education variable

In a scenario where the college did not exist, some of its students would still be able to avail themselves of an alternative comparable education. These students create benefits in the region even in the absence of the college. The alternative education variable accounts for these students and is used to discount the benefits we attribute to the college.

Recall this analysis considers only relevant economic information regarding the college. Considering the existence of various other academic institutions surrounding the college, we have to assume that a portion of the students could find alternative education and either remain in or return to the region. For example, some students may participate in online programs while remaining in the region. Others may attend an out-of-region institution and return to the region upon completing their studies. For these students – who would have found an alternative education and produced benefits in the region regardless of the presence of the college – we discount the benefits attributed to the college. An important distinction must be made here: the benefits from students who would find alternative education outside the region and not return to the region are *not* discounted. Because these benefits would not occur in the region without the presence of the college, they must be included.

In the absence of the college, we assume 15% of the college's students would find alternative education opportunities and remain in or return to the region. We account for this by discounting the alumni impact, the benefits to taxpayers, and the benefits to society in the region in Chapters 3 and 4 by 15%. In other words, we assume 15% of the benefits created by the college's students would have occurred anyway in the counterfactual scenario where the college did not exist. A sensitivity analysis of this adjustment is presented in Appendix 1.

Appendix 8: Overview of investment analysis measures

The appendix provides context to the investment analysis results using the simple hypothetical example summarized in Table A8.1 below. The table shows the projected benefits and costs for a single student over time and associated investment analysis results.[50]

Table A8.1: Example of the benefits and costs of education for a single student

Year	Tuition	Opportunity cost	Total cost	Higher earnings	Net cash flow
1	**2**	**3**	**4**	**5**	**6**
1	$1,500	$20,000	$21,500	$0	-$21,500
2	$0	$0	$0	$5,000	$5,000
3	$0	$0	$0	$5,000	$5,000
4	$0	$0	$0	$5,000	$5,000
5	$0	$0	$0	$5,000	$5,000
6	$0	$0	$0	$5,000	$5,000
7	$0	$0	$0	$5,000	$5,000
8	$0	$0	$0	$5,000	$5,000
9	$0	$0	$0	$5,000	$5,000
10	$0	$0	$0	$5,000	$5,000
Net present value			**$21,500**	**$35,753**	**$14,253**
Internal rate of return					**18.0%**
Benefit-cost ratio					**1.7**
Payback period					**4.2 years**

Assumptions are as follows:

- Benefits and costs are projected out 10 years into the future (Column 1).
- The student attends the college for one year, and the cost of tuition is $1,500 (Column 2).
- Earnings forgone while attending the college for one year (opportunity cost) come to $20,000 (Column 3).
- Together, tuition and earnings forgone cost sum to $21,500. This represents the out-of-pocket investment made by the student (Column 4).
- In return, the student earns $5,000 more per year than he otherwise would have earned without the education (Column 5).
- The net cash flow (NCF) in Column 6 shows higher earnings (Column 5) less the total cost (Column 4).
- The assumed going rate of interest is 4%, the rate of return from alternative investment schemes for the use of the $21,500.

[50] Note that this is a hypothetical example. The numbers used are not based on data collected from an existing college.

Results are expressed in standard investment analysis terms, which are as follows: the net present value, the internal rate of return, the benefit-cost ratio, and the payback period. Each of these is briefly explained below in the context of the cash flow numbers presented in Table A8.1.

Net present value

The student in Table A8.1 can choose either to attend college or to forgo post-secondary education and maintain his present employment. If he decides to enroll, certain economic implications unfold. Tuition and fees must be paid, and earnings will cease for one year. In exchange, the student calculates that with post-secondary education, his earnings will increase by at least the $5,000 per year, as indicated in the table.

The question is simple: Will the prospective student be economically better off by choosing to enroll? If he adds up higher earnings of $5,000 per year for the remaining nine years in Table A8.1, the total will be $45,000. Compared to a total investment of $21,500, this appears to be a very solid investment. The reality, however, is different. Benefits are far lower than $45,000 because future money is worth less than present money. Costs (tuition plus earnings forgone) are felt immediately because they are incurred today, in the present. Benefits, on the other hand, occur in the future. They are not yet available. All future benefits must be discounted by the going rate of interest (referred to as the discount rate) to be able to express them in present value terms.[51]

Let us take a brief example. At 4%, the present value of $5,000 to be received one year from today is $4,807. If the $5,000 were to be received in year 10, the present value would reduce to $3,377. Put another way, $4,807 deposited in the bank today earning 4% interest will grow to $5,000 in one year; and $3,377 deposited today would grow to $5,000 in 10 years. An "economically rational" person would, therefore, be equally satisfied receiving $3,377 today or $5,000 10 years from today given the going rate of interest of 4%. The process of discounting – finding the present value of future higher earnings – allows the model to express values on an equal basis in future or present value terms.

The goal is to express all future higher earnings in present value terms so that they can be compared to investments incurred today (in this example, tuition plus earnings forgone). As indicated in Table A8.1 the cumulative present value of $5,000 worth of higher earnings between years 2 and 10 is $35,753 given the 4% interest rate, far lower than the undiscounted $45,000 discussed above.

The net present value of the investment is $14,253. This is simply the present value of the benefits less the present value of the costs, or $35,753 - $21,500 = $14,253. In other words, the present value of benefits exceeds the present value of costs by as much as $14,253. The criterion for an economically worthwhile investment is that the net present value is equal to or greater than zero. Given this result, it can be concluded that, in this case, and given these assumptions, this particular investment in education is very strong.

[51] Technically, the interest rate is applied to compounding – the process of looking at deposits today and determining how much they will be worth in the future. The same interest rate is called a discount rate when the process is reversed – determining the present value of future earnings.

Internal rate of return

The internal rate of return is another way of measuring the worth of investing in education using the same cash flows shown in Table A8.1. In technical terms, the internal rate of return is a measure of the average earning power of money used over the life of the investment. It is simply the interest rate that makes the net present value equal to zero. In the discussion of the net present value above, the model applies the going rate of interest of 4% and computes a positive net present value of $14,253. The question now is what the interest rate would have to be in order to reduce the net present value to zero. Obviously, it would have to be higher – 18.0% in fact, as indicated in Table A8.1. Or, if a discount rate of 18.0% were applied to the net present value calculations instead of the 4%, then the net present value would reduce to zero.

What does this mean? The internal rate of return of 18.0% defines a breakeven solution – the point where the present value of benefits just equals the present value of costs, or where the net present value equals zero. Or, at 18.0%, higher earnings of $5,000 per year for the next nine years will earn back all investments of $21,500 made plus pay 18.0% for the use of that money ($21,500) in the meantime. Is this a good return? Indeed, it is. If it is compared to the 4% going rate of interest applied to the net present value calculations, 18.0% is far higher than 4%. It may be concluded, therefore, that the investment in this case is solid. Alternatively, comparing the 18.0% rate of return to the long-term 10.1% rate or so obtained from investments in stocks and bonds also indicates that the investment in education is strong relative to the stock market returns (on average).

Benefit-cost ratio

The benefit-cost ratio is simply the present value of benefits divided by present value of costs, or $35,753 ÷ $21,500 = 1.7 (based on the 4% discount rate). Of course, any change in the discount rate would also change the benefit-cost ratio. Applying the 18.0% internal rate of return discussed above would reduce the benefit-cost ratio to 1.0, the breakeven solution where benefits just equal costs. Applying a discount rate higher than the 18.0% would reduce the ratio to lower than 1.0, and the investment would not be feasible. The 1.7 ratio means that a dollar invested today will return a cumulative $1.70 over the ten-year time period.

Payback period

This is the length of time from the beginning of the investment (consisting of tuition and earnings forgone) until higher future earnings give a return on the investment made. For the student in Table A8.1, it will take roughly 4.2 years of $5,000 worth of higher earnings to recapture his investment of $1,500 in tuition and the $20,000 in earnings forgone while attending the college. Higher earnings that occur beyond 4.2 years are the returns that make the investment in education in this example economically worthwhile. The payback period is a fairly rough, albeit common, means of choosing between investments. The shorter the payback period, the stronger the investment.

Appendix 9: Shutdown point

The investment analysis in Chapter 4 weighs the benefits generated by the college against the state and local taxpayer funding that the college receives to support its operations. An important part of this analysis is factoring out the benefits that the college would have been able to generate anyway, even without state and local taxpayer support. This adjustment is used to establish a direct link between what taxpayers pay and what they receive in return. If the college is able to generate benefits without taxpayer support, then it would not be a true investment.[52]

The overall approach includes a sub-model that simulates the effect on student enrollment if the college loses its state and local funding and has to raise student tuition and fees in order to stay open. If the college can still operate without state and local support, then any benefits it generates at that level are discounted from total benefit estimates. If the simulation indicates that the college cannot stay open, however, then benefits are directly linked to costs, and no discounting applies. This appendix documents the underlying theory behind these adjustments.

State and local government support versus student demand for education

Figure A9.1 presents a simple model of student demand and state and local government support. The right side of the graph is a standard demand curve (*D*) showing student enrollment as a function of student tuition and fees. Enrollment is measured in terms of total credit hour equivalents (CHEs) and expressed as a percentage of the college's current CHE production. Current student tuition and fees are represented by *p'*, and state and local government support covers *C%* of all costs. At this point in the analysis, it is assumed that the college has only two sources of revenues: 1) student tuition and fees and 2) state and local government support.

[52] Of course, as a public training provider, the college would not be permitted to continue without public funding, so the situation in which it would lose all state support is entirely hypothetical. The purpose of the adjustment factor is to examine the college in standard investment analysis terms by netting out any benefits it may be able to generate that are not directly linked to the costs of supporting it.

Figure A9.1: Student demand and government funding by tuition and fees

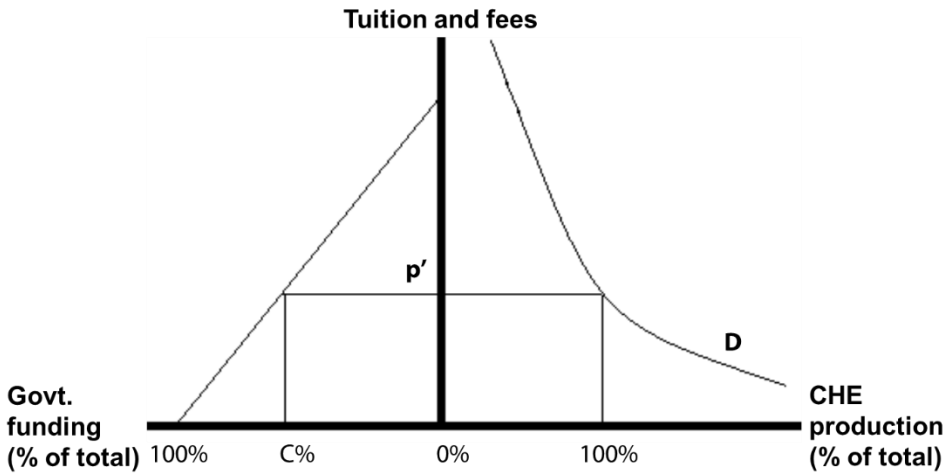
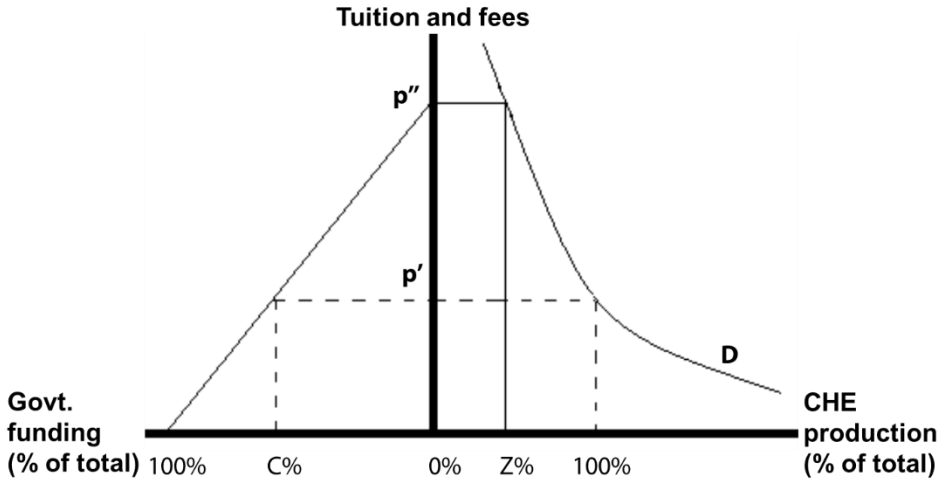


Figure A9.2 shows another important reference point in the model – where state and local government support is 0%, student tuition and fees are increased to *p*′′, and CHE production is at *Z%* (less than 100%). The reduction in CHEs reflects the price elasticity of the students' demand for education, *i.e.*, the extent to which the students' decision to attend the college is affected by the change in tuition and fees. Ignoring for the moment those issues concerning the college's minimum operating scale (considered below in the section called "Calculating benefits at the shutdown point"), the implication for the investment analysis is that benefits to state and local government must be adjusted to net out the benefits that the college can provide absent state and local government support, represented as *Z%* of the college's current CHE production in Figure A9.2.

Figure A9.2: CHE production and government funding by tuition and fees



To clarify the argument, it is useful to consider the role of enrollment in the larger benefit-cost model. Let *B* equal the benefits attributable to state and local government support. The analysis derives all benefits as a function of student enrollment, measured in terms of CHEs produced. For consistency with the graphs in this

appendix, *B* is expressed as a function of the percent of the college's current CHE production. Equation 1 is thus as follows:

$$1) \qquad B = B\,(100\%)$$

This reflects the total benefits generated by enrollments at their current levels.

Consider benefits now with reference to *Z*. The point at which state and local government support is zero nonetheless provides for *Z%* (less than 100%) of the current enrollment, and benefits are symbolically indicated by the following equation:

$$2) \qquad B = B\,(Z\%)$$

Inasmuch as the benefits in equation 2 occur with or without state and local government support, the benefits appropriately attributed to state and local government support are given by equation 3 as follows:

$$3) \qquad B = B\,(100\%) - B\,(Z\%)$$

Calculating benefits at the shutdown point

Colleges and universities cease to operate when the revenue they receive from the quantity of education demanded is insufficient to justify their continued operations. This is commonly known in economics as the shutdown point.[53] The shutdown point is introduced graphically in Figure A9.1 as S%. The location of point S% indicates that the college can operate at an even lower enrollment level than Z% (the point at which the college receives zero state and local government funding). State and local government support at point S% is still zero, and student tuition and fees have been raised to p'''. State and local government support is thus credited with the benefits given by equation 3, or B = B (100%) − B (Z%). With student tuition and fees still higher than p''', the college would no longer be able to attract enough students to keep the doors open, and it would shut down.

[53] In the traditional sense, the shutdown point applies to firms seeking to maximize profits and minimize losses. Although profit maximization is not the primary aim of colleges and universities, the principle remains the same, *i.e.*, that there is a minimum scale of operation required in order for colleges and universities to stay open.

Figure A9.1: Shutdown Point after Zero Government Funding

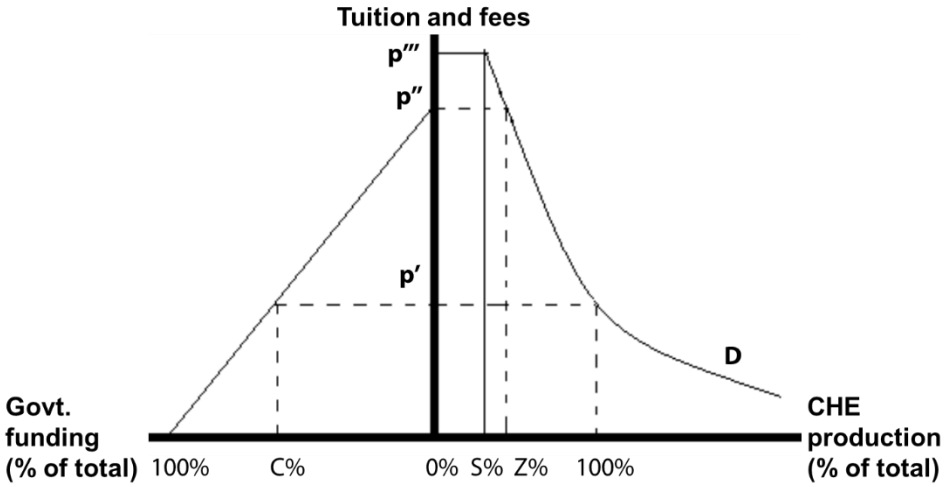
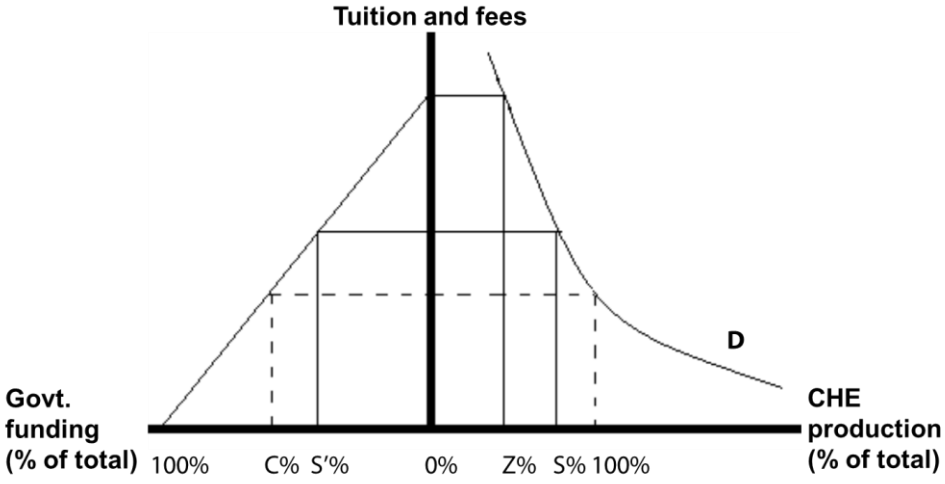


Figure A9.2 illustrates yet another scenario. Here, the shutdown point occurs at a level of CHE production greater than Z% (the level of zero state and local government support), meaning some minimum level of state and local government support is needed for the college to operate at all. This minimum portion of overall funding is indicated by S'% on the left side of the chart, and as before, the shutdown point is indicated by S% on the right side of chart. In this case, state and local government support is appropriately credited with all the benefits generated by the college's CHE production, or B = B (100%).

Figure A9.2: Shutdown Point before Zero Government Funding



Appendix 10: Social externalities

Education has a predictable and positive effect on a diverse array of social benefits. These, when quantified in dollar terms, represent significant social savings that directly benefit society communities and citizens throughout the region, including taxpayers. In this appendix we discuss the following three main benefit categories: 1) improved health, 2) reductions in crime, and 3) reduced demand for government-funded income assistance.

It is important to note that the data and estimates presented here should not be viewed as exact, but rather as indicative of the positive impacts of education on an individual's quality of life. The process of quantifying these impacts requires a number of assumptions to be made, creating a level of uncertainty that should be borne in mind when reviewing the results.

Health

Statistics show a correlation between increased education and improved health. The manifestations of this are found in five health-related variables: smoking, obesity, depression, and substance abuse. There are other health-related areas that link to educational attainment, but these are omitted from the analysis until we can invoke adequate (and mutually exclusive) databases and are able to fully develop the functional relationships between them.

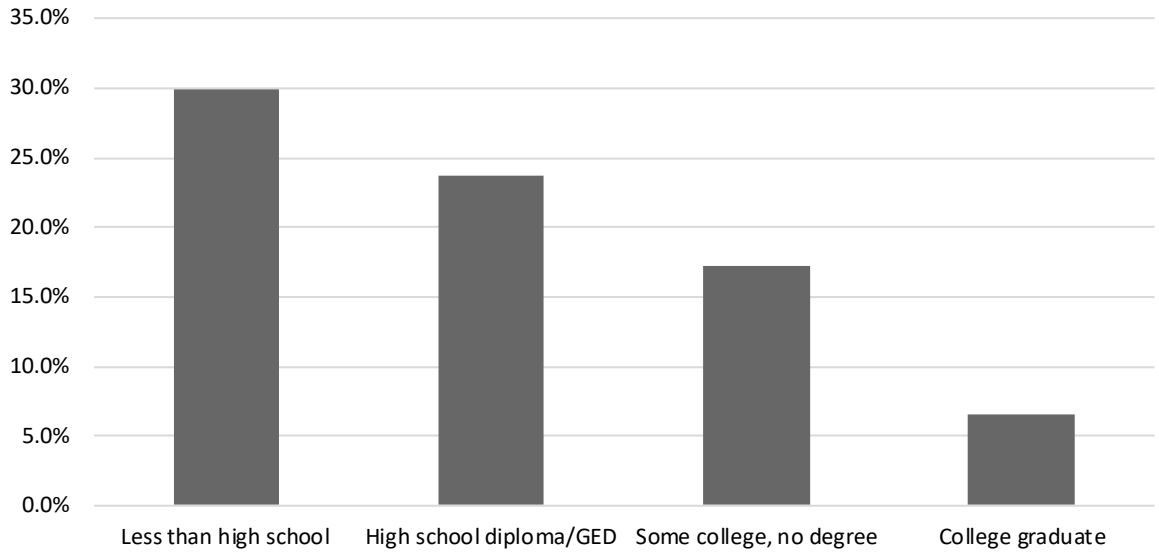
Smoking

Despite a marked decline over the last several decades in the percentage of U.S. residents who smoke, a sizable percentage of the U.S. population still smokes. The negative health effects of smoking are well documented in the literature, which identifies smoking as one of the most serious health issues in the U.S.

Figure A10.1 shows the prevalence of cigarette smoking among adults, 21 years and over, based on data provided by the National Survey on Drug use and Health.[54] The data include adults who reported smoking in the last month. As indicated, prevalence of cigarette smoking declines after high school diploma or high school equivalency level of education.

[54] National Survey on Drug Use and Health. "Table 2.18B– Cigarette Use in Past Month: Among People Aged 12 or Older; by Age Group and Demographic Characteristics, Percentages, 2021 and 2022."

Figure A10.1: Prevalence of smoking among U.S. adults by education level



Source: National Survey on Drug Use and Health

The National Survey on Drug Use and Health also reports the percentage of adults who are current smokers by state.[55] We use this information to create an index value by which we adjust the national prevalence data on smoking to each state. For example, 23.5% of Missouri adults were smokers in 2022, relative to 16.7% for the nation. We thus apply a scalar 1.41 to the national probabilities of smoking in order to adjust them to the state of Missouri.

Obesity

The rise in obesity and diet-related chronic diseases has led to increased attention on how expenditures relating to obesity have increased in recent years. The average cost of obesity-related medical conditions is calculated using information from the *Journal of Occupational and Environmental Medicine*, which reports incremental medical expenditures and productivity losses due to excess weight.[56]

Data for Figure A10.2 is derived from the National Center for Health Statistics which shows the prevalence of obesity among adults aged 20 years and over by education, gender, and ethnicity.[57] As indicated, college graduates are less likely to be obese than individuals with a high school diploma. However, the prevalence of

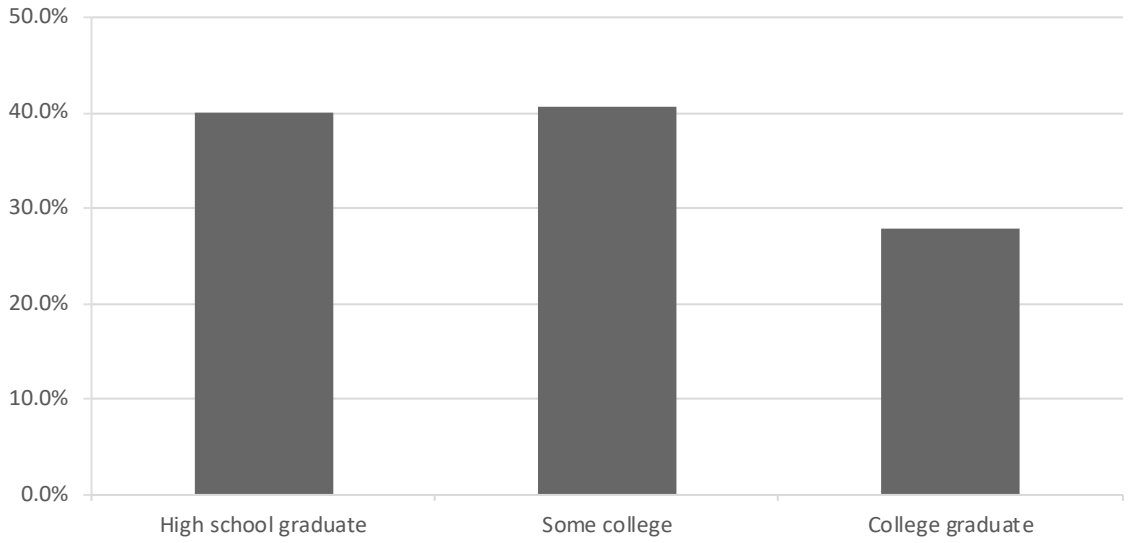
[55] National Survey on Drug Use and Health. "Table 20. Cigarette Use in the Past Month: Among People Aged 12 or Older, by Age Group and State, Annual Average Percentages, 2021 and 2022."

[56] Eric A. Finkelstein, Marco da Costa DiBonaventura, Somali M. Burgess, and Brent C. Hale, "The Costs of Obesity in the Workplace," *Journal of Occupational and Environmental Medicine* 52, no. 10 (October 2010): 971-976.

[57] Ogden Cynthia L., Tala H. Fakhouri, Margaret D. Carroll, Craig M. Hales, Cheryl D. Fryar, Xianfen Li, David S. Freedman. "Prevalence of Obesity Among Adults, by Household Income and Education — United States, 2011–2014" National Center for Health Statistics, Morbidity and Mortality Weekly Report, 66:1369–1373 (2017).

obesity among adults with some college is actually greater than those with just a high school diploma. In general, though, obesity tends to decline with increasing levels of education.

Figure A10.2: Prevalence of obesity by education level



Source: Derived from data provided by the National Center for Health Statistics

Depression

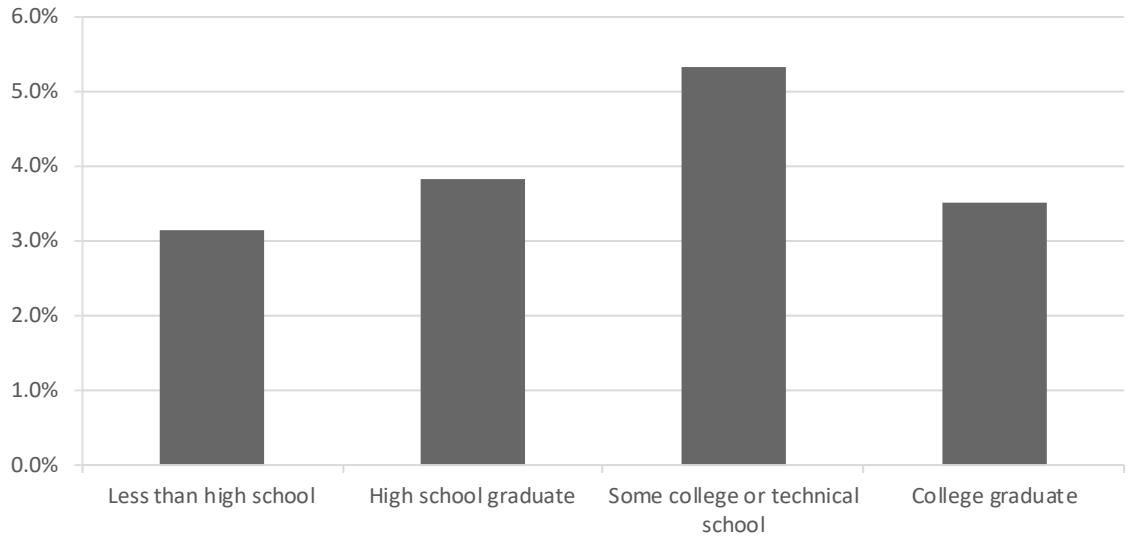
Capturing the full economic cost of mental illness is difficult because not all mental disorders have a correlation with education. For this reason, we only examine the economic costs associated with major depressive disorder (MDD), which comprise medical and pharmaceutical costs, workplace costs such as absenteeism, and suicide-related costs.[58]

Figure A10.3 summarizes the prevalence of major depressive episodes (MDE) with severe impairment and treatment for depression among adults by education level, based on data provided by the National Survey on Drug Use and Health.[59] As shown, people with some college education are most likely to have an MDE with severe impairment and seek treatment for depression compared to those with other levels of educational attainment. People with a high school diploma or less, along with college graduates, are all fairly similar in the prevalence rates.

[58] Greenberg, Paul, Andree-Anne Fournier, Tammy Sisitsky, Crystal Pike, and Ronald Kesslaer. "The Economic Burden of Adults with Major Depressive Disorder in the United States (2019)." Adv Ther 40, 4460-4479 (2023).

[59] National Survey on Drug Use and Health. "Table 6.43A – Receipt of Treatment for Depression in Past Year: Among People Aged 18 or Older with Major Depressive Episode (MDE) and among People Aged 18 or Older with MDE with Severe Impairment in Past Year; by Geographic, Socioeconomic, and Health Characteristics, Numbers in Thousands, 2021 and 2022."

Figure A10.3: Prevalence of major depressive episode with severe impairment and treatment for depression by education level



Source: National Survey on Drug Use and Health

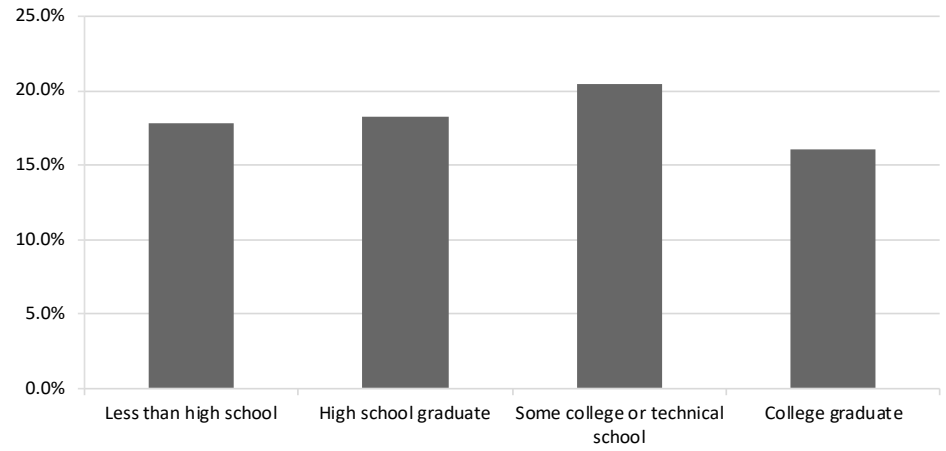
Substance abuse

The burden and cost of substance abuse is enormous in the U.S., but little is known about the magnitude of costs and effects at a national level. What is known is that the rate of people abusing substances is inversely proportional to their education level. The higher the education level, the less likely a person is to abuse or depend on illicit drugs. The probability that a person with less than a high school diploma will abuse drugs or alcohol is 17.8%, slightly larger than the probability of substance abuse for college graduates (16.1%). This relationship is presented in Figure A10.4 based on data supplied by the National Survey on Drug Use and Health.[60] Prevalence does not strictly decline at every education level. Health Costs associated with substance abuse include health, productivity, traffic collisions, fire, and research and prevention.[61]

[60] National Survey on Drug Use and Health. "Table 5.10B – Substance Use Disorder in Past Year: Among People Aged 12 or Older; by Age Group and Demographic Characteristics, Percentages, 2021 and 2022."

[61] Marwood Group. "Economic Cost of Substance Abuse Disorder in the United States, 2019." Recovery Centers of America.

Figure A10.4: Prevalence of substance dependence or abuse by education level



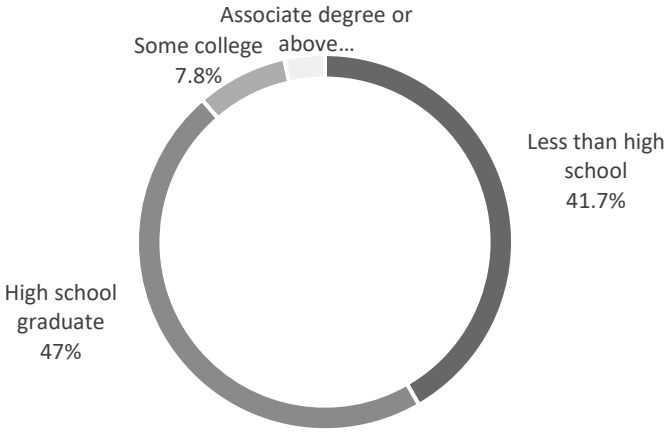
Source: Substance Abuse and Mental Health Services Administration

Crime

As people achieve higher education levels, they are statistically less likely to commit crimes. The analysis identifies the following three types of crime-related expenses: 1) criminal justice expenditures, including police protection, judicial and legal, and corrections, 2) victim costs, and 3) productivity lost as a result of time spent in jail or prison rather than working.

Figure A10.5 displays the educational attainment of the incarcerated population in the U.S. Data are derived from the breakdown of the inmate population by education level in federal, state, and local prisons as provided by the U.S. Bureau of Justice Statistics.[62]

Figure A10.5: Educational attainment of the incarcerated population



Source: Derived from data provided by the U.S. Bureau of Justice Statistics

[62] Nowotny, Kathryn, Ryan Masters, and Jason Boardman, 2016. "The relationship between education and health among incarcerated man and women in the United States" BMC Public Health. September 2016.

Victim costs comprise material, medical, physical, and emotional losses suffered by crime victims. Some of these costs are hidden, while others are available in various databases. Estimates of victim costs vary widely, attributable to differences in how the costs are measured. The lower end of the scale includes only tangible out-of-pocket costs, while the higher end includes intangible costs related to pain and suffering.[63]

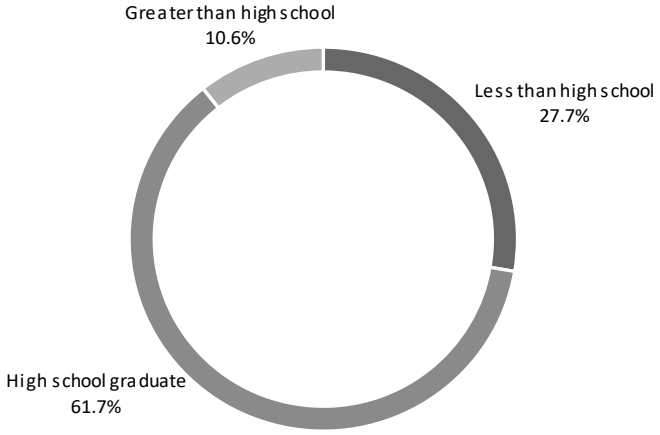
Yet another measurable cost is the economic productivity of people who are incarcerated and are thus not employed. The measurable productivity cost is simply the number of additional incarcerated people, who could have been in the labor force, multiplied by the average income of their corresponding education levels.

Income assistance

Statistics show that as education levels increase, the number of applicants for government-funded income assistance such as welfare and unemployment benefits declines. Welfare and unemployment claimants can receive assistance from a variety of different sources, including Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Medicaid, Supplemental Security Income (SSI), and unemployment insurance.[64]

Figure A10.6 relates the breakdown of TANF recipients by education level, derived from data provided by the U.S. Department of Health and Human Services.[65] As shown, the demographic characteristics of TANF recipients are weighted heavily toward the less than high school and high school categories, with a much smaller representation of individuals with greater than a high school education.

Figure A10.6: Breakdown of TANF recipients by education level



Source: US. Department of Health and Human Services, Office of Family Assistance

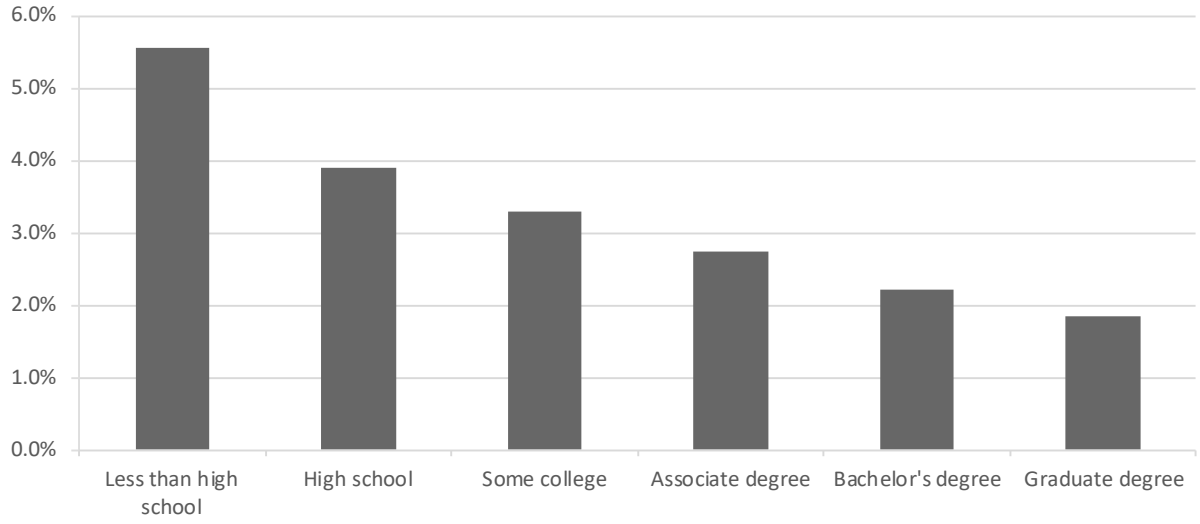
[63] McCollister, Kathryn E., Michael T. French, and Hai Fang. "The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation." Drug and Alcohol Dependence 108, no. 1-2 (April 2010): 98-109.

[64] Medicaid is not considered in this analysis because it overlaps with the medical expenses in the analyses for smoking, obesity, depression, and substance abuse. We also exclude any welfare benefits associated with disability and age.

[65] U.S. Department of Health and Human Services, Office of Family Assistance. "Characteristics and Financial Circumstances of TANF Recipients, Fiscal Year 2022."

Unemployment rates also decline with increasing levels of education, as illustrated in Figure A10.7. These data are provided by the Bureau of Labor Statistics.[66] As shown, unemployment rates range from 5.6% for those with less than a high school diploma to 1.8% for those at the graduate degree level or higher.

Figure A10.7: Unemployment by education level



Source: Bureau of Labor Statistics

[66] Bureau of Labor Statistics. "Table 7. Employment status of the civilian noninstitutional population 25 years and over by educational attainment, sex, race, and Hispanic or Latino ethnicity." Current Population Survey, Labor Force Statistics, Household Data Annual Averages, 2023.

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM VIII: RESPIRATORY CARE PROGRAM UPDATE

An update of the Respiratory Care program, project timeline, and construction update will be presented to the Board.

Attachments

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM IX: TAX LEVY

Recommendation: To **adopt** a resolution calling for an election on April 8, 2025 in the Junior College District of East Central Missouri, for the purpose of seeking voter approval of a transfer of the debt service levy to the operating levy, with no increase in the overall tax rate.

Attachments

01/27/2025

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

BOARD MEMORANDUM

TO: BOARD OF TRUSTEES

FROM: JON BAUER, PH.D.

SUBJECT: TAX LEVY ELECTION

DATE: JANUARY 22, 2025

CC:

The enclosed resolution is presented to the Board of Trustees, formally calling for an election on April 8, 2025, for the purpose of seeking voter approval of a change in the college's operating levy. The board in December voted to proceed with the election. The resolution contains the ballot language that will be presented to voters, and formally notifies each of our county clerks that an election will be held.

As you are aware, we are seeking voter approval to transfer 9.9 cents per $100 of assessed valuation from the debt service fund to the operating fund. The overall levy will remain the same, but the change would provide general revenue for capital projects such as construction, maintenance and repair of existing facilities, renovations, and new construction. It would also provide funds for ongoing operational expenses.

This issue has been discussed at length for the past two years. Last April, a nearly identical proposal was narrowly defeated at the polls. However, our needs have not changed. This issue presents a generational opportunity to secure revenue for the effective operation of the college and care of its physical plant.

The resolution includes ballot language that has been modified since last April. The changes have been approved by our bond counsel and are intended to clarify what voters are asked to approve.

A full presentation will be made at the board meeting Monday evening. Upon the board's approval of the resolution, we will formally notify the six county clerks serving our district that the levy election will be placed on the April 8 ballot.

Please contact me should you need additional information prior to the board meeting.

A RESOLUTION CALLING AN ELECTION ON THE QUESTION WHETHER TO INCREASE THE OPERATING TAX LEVY CEILING FOR THE JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI.

BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI, AS FOLLOWS:

Section 1. An election is hereby ordered to be held in the Junior College District of East Central Missouri (the **"District"**) concurrently with the general municipal election on Tuesday, April 8, 2025, on the following question:

PROPOSITION ECC

Shall the Board of Trustees of The Junior College District of East Central Missouri (aka East Central College) be authorized to maintain the current total property tax levy by increasing the operating property tax levy ceiling to $0.4472 per one hundred dollars of assessed valuation, the increase of $0.0990 from the current operating property tax levy of $0.3482 is to be offset by a $0.0990 decrease in the debt service property tax levy, for the purpose of funding construction, maintenance and repairs, operating expenses, personnel and safety/security measures within the College District.

Approval of this question will result in zero increase of the College District's current total property tax levy, which is estimated to remain unchanged at $0.4472 per one hundred dollars of assessed valuation.

Section 2. The form of Notice of Election attached hereto as **Exhibit A** showing said question is hereby approved.

Section 3. That the Board of Trustees of the District is hereby authorized and directed to notify the County Clerks of Crawford, Franklin, Gasconade, St. Charles, Warren and Washington Counties, all in the State of Missouri, of the passage of this Resolution no later than 5:00 P.M. on January 28, 2025, and to include in said notification all of the terms and provisions required by Chapter 115, RSMo, as amended.

Section 4. This Resolution shall be in full force from and after its passage.

PASSED by the Board of Trustees of the Junior College District of East Central Missouri this 27th day of January, 2025.

(SEAL)

_____
President of the Board of Trustees

ATTEST:

_____
Secretary of the Board of Trustees

EXHIBIT A

FORM OF NOTICE OF ELECTION

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI

Notice is hereby given to the qualified voters of the Junior College District of East Central Missouri (the "District") that the Board of Trustees of the District has called an election to be held in the District concurrently with the general municipal election on Tuesday, April 8, 2025, commencing at 6:00 A.M. and closing at 7:00 P.M., on the question contained in the following sample ballot:

OFFICIAL BALLOT
JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI

TUESDAY, APRIL 8, 2025

PROPOSITION ECC

Shall the Board of Trustees of The Junior College District of East Central Missouri (aka East Central College) be authorized to maintain the current total property tax levy by increasing the operating property tax levy ceiling to $0.4472 per one hundred dollars of assessed valuation, the increase of $0.0990 from the current operating property tax levy of $0.3482 is to be offset by a $0.0990 decrease in the debt service property tax levy, for the purpose of funding construction, maintenance and repairs, operating expenses, personnel and safety/security measures within the College District.

Approval of this question will result in zero increase of the College District's current total property tax levy, which is estimated to remain unchanged at $0.4472 per one hundred dollars of assessed valuation.

YES ☐
NO ☐

INSTRUCTIONS TO VOTERS: If you are in favor of the question, place an X in the box opposite "YES." If you are opposed to the question, place an X in the box opposite "NO."

The election will be held at the following polling places in the District:

CRAWFORD COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

FRANKLIN COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

GASCONADE COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

ST. CHARLES COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

WARREN COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

WASHINGTON COUNTY, MISSOURI

PRECINCT	**POLLING PLACE**
_____	_____
_____	_____

DATED: _____, 202_.

_____
County Clerk

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM X: EMERGENCY EXPENDITURES

President Jon Bauer will report to the Board an emergency purchase made to repair HVAC units on campus.

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
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JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XI: BIDS

Recommendation: To **approve** the purchase of a ventilator and all-in-one multiple therapy equipment packages from Hamilton Medical, a sole source provider, for $81,104.56, funded by the U.S. Department of Labor training grant for the new Respiratory Care program.

Recommendation: To **approve** the purchase of a HAAS 5-Axis CNC Vertical Machine for the Precising Machining program in the amount of $99,734.90 from the HAAS Factory Outlet, a sole source provider, funded by the U.S. Department of Labor's award to the MoSEPWork apprenticeship consortium.

Recommendation: To **approve** the purchase of Phase II Instructional Technology equipment from Midwest Computer Products, Inc. for $150,581.65 based on the Omnia cooperative bid contract funded by allocated federal money earmarked for this project.

Attachments

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

EAST CENTRAL COLLEGE

OFFICE OF THE VICE-PRESIDENT OF ACADEMIC AFFAIRS

TO: Dr. Jon Bauer, College President

DATE: January 17, 2025

FROM: Robyn Walter, Vice President of Academic Affairs

RE: Academic Affairs Respiratory Care Program Equipment

Description	Unit Cost	Total Cost
Hamilton-C3 Ventilator Package (2)	$24,552.28	$49,104.56
Hamilton-C1 All-in-One Multiple Therapy Pkg (2)	$16,000.00	$32,000.00
Total		**$81,104.56**

Rationale:

It is my recommendation the Board of Trustees approve the equipment listed above from Hamilton Medical, sole source provider, totaling $81,104.56. The equipment will be used in the new Respiratory Care Program implementation.

These ventilators will provide students hands on experiential learning within the lab setting prior to entering the clinical sites. This equipment is seen frequently within our MHPC community affiliate hospitals. Additionally, the “add on’s,” included in the price, provides students multiple modes of operation of the ventilators as well as the opportunity to care for multiple populations of patients such as neonatal, pediatrics, and adults. The C3 and C1 also allow for noninvasive and high flow ventilation at the bedside and for transport.

The equipment purchase will be funded by the Strengthening Community College Grant.

EAST CENTRAL COLLEGE

Interoffice Memorandum

To: Dr. Jon Bauer
From: Joel Doepker
Subject: Precision Machining Equipment Purchase
Date: January 22, 2025

It is my recommendation that the Board of Trustees approves an equipment purchase from the HAAS Factory Outlet in the amount of $99,734.90 for a HAAS 5-Axis CNC Vertical Machine (*UMC-350HD-EDU)* to be used by the students and faculty in the Precision Machining program.

The equipment cost will be provided by the U.S. Department of Labor's award to the MoSEPWork apprenticeship consortium. The consortium includes East Central College, Jefferson College, Mineral Area College,Three Rivers College and Central Methodist University, and is intended to use pre-apprenticeship and apprenticeships in teacher education, nursing and advanced manufacturing.

The new equipment is a sole source item and modernizes the current Precision Machining equipment.

Item	Equipment	Expense
HAAS Factory Outlet, St. Louis	5-Axis CNC Vertical Machine	$99,734.90
Total		$99,734.90

Haas Factory Outlet

A Division of NYMAT Machine Tool Corp.

01/15/2025

East Central College
42 Prairie Dell Plaza Drive
Union, MO 63084

Attn. Mr. Todd Tracy
RE; Sole Source Request

Dear Mr. Tracy

In response to your request for information regarding the Haas UMC-350-EDU Please review the following information.

1) Haas is the only manufacturer that has the same proprietary control on both their lathes and mills. Students can move from one control to the other without any additional training or instruction. The proprietary control panel is the same on both machines and the software is the same, with an additional axis of movement on the mill.

2) Haas Automation assigns sales territories throughout the country. NYMAT Machine Tool Corp's Territory encompasses the state of Missouri. We are the sole source for Haas Machines, parts, and certified service in Missouri.

.

Should you require any additional information, please feel free to contact me. I will respond immediately.

Sincerely,

Dean Koskolos
Sales Engineer
Haas Factory Outlet-Stl.
PH 314-267-1133
dkoskolos@nymat.com
http:/www.haascncoutlet.com

Haas Factory Outlet
A Division of NYMAT Machine Tool Corp.

January 15, 2025

East Central College
42 Prairie Dell Plaza Drive
Union, MO 63084

Attn: Blake Poertner

Subject: Quote # 133.124.54

Dear Blake:

Per your request, Haas Factory Outlet, A Division of NYMAT Machine Tool Corp. is pleased to propose a Haas UMC-350HD-EDU for East Central College. The Haas UMC-350HD-EDU will enable East Central College to increase its profitability and productivity, now and for years to come.

Haas Automation employs stringent quality control standards and procedures throughout the manufacturing process to ensure you get the finest machine tool available. This in turn will enable East Central College to increase the quality of its product with the Haas UMC-350HD-EDU.

NYMAT Machine Tool Corp. has installed more than 7,500 Haas machine tools, and is fully prepared to assist you in optimizing your production through an investment in a Haas UMC-350HD-EDU. Our factory-trained installation engineer will have you up and running in the shortest possible time, so you can begin reaping the benefits of the industry's most user-friendly machine tool.

Sincerely,

Dean Koskolos
Haas Factory Outlet
A Division of NYMAT Machine Tool Corp.

Presented By: _____ Accepted By: _____

Kansas City
15661 South Mahaffie St.
Olathe, KS 66062
phone: (913) 768-HAAS (4227)
fax: (585) 248-3463

Rochester
2650 Baird Road
Fairport, NY 14450
phone: (585) 641-HAAS (4227)
fax: (585) 248-3463

St. Louis
11744 Westline Industrial Dr.
St. Louis, MO 63146
phone: (314) 567-HAAS (4227)
fax: (585) 248-3463

email: hfo@nymat.com • web: www.haascncoutlet.com

TOP 10 REASONS to buy Haas

1

On-Site Service

You're covered by 170 Haas Factory Outlets, with 1000 stocked vans, on-site parts inventories, and a proprietary online diagnostics and procedure service guide.

2

Customer Support

Local HFO service, applications support, parts and training help - all part of the incredible support that comes when buying just a single machine.

3

Spare Sense

Reasonable spare-parts pricing that treats you like a valued customer. We don't believe in taking advantage of a situation. Having you as a long-term customer is more important.

4

Honest Pricing

We're the only machine tool builder that honors true upfront, transparent, machine pricing - published online, in every market we serve.

5

Real Backing

Our warranty is a full year: 365 days, no hour limit, 100% coverage. And we cover it all, the machine, the control, and the software.

6

Great Control

Known as the industry's most user-friendly control, the ease-of-use of the Haas CNC extends to every machine we build. The same Haas control is on all our mills and lathes.

7

Resale Value

Highest resale value in the industry. A 5-year-old Haas is often worth 50% or more of the original purchase price.

8

Online Resources

HaasCNC.com offers useful information on maintenance, cutting tips, fault diagnostics, service parts, problem solving, and high-end, how-to videos - available nowhere else.

9

Machines in Schools

With Haas machines in 4500 schools worldwide, and 40,000 students trained each year, producing qualified Haas operators is all part of our customer support philosophy.

10

Easy Automation

There’s no need for a third-party integrator with our automation systems. Everything can be set up by the HFO/customer, and is controlled directly through the Haas Control.

Investment

Part #	Description	
UMC-350HD-EDU	5-Axis CNC Vertical Machining Center for Education, with 15" x 14" x 12" (381 x 356 x 305 mm) travels, 40 taper.	$89,995.00

Spindle

10K-40T-IN-15	10,000-rpm Spindle, 40 taper, 15 hp (11.2 kW) vector drive, inline direct-drive	$0.00

Probe System

WIPS-R	Set up your Haas mill up to 5 times faster using the Haas Wireless Intuitive Probing System (WIPS). WIPS is a complete probing package that includes the spindle probe, tool setting probe, and optical machine interface, along with powerful software that guides the operator through the job set-up process with intuitive, easy-to-use templates. WIPS allows you to quickly and easily define work offset coordinates, set tool length offsets, and perform in-process inspection, for both part inspection and tool breakage detection. The system includes the Haas Visual Programming System, macros, spindle orientation, and coordinate rotation and scaling. WIPS is the single best productivity improvement you can add to your Haas mill.	$0.00

Options

230 MM PLATTER	230 mm Platter w/multiple bolt-hole patterns	$0.00
AUGER	This auger-style chip conveyor automatically removes chips from the machine, while compressing them and wringing out the coolant. It is ideal for both short runs and high-production environments, eliminating the downtime required for manual chip removal. The auger can be activated via M-code or directly from the control pendant, and there are settings to control the interval and duration of the auger cycle for automatic operation. Smart-sensing technology automatically reverses the auger if a jam occurs.	$3,695.00

Control Options

1GB	Standard Program Memory; 1 GB of onboard memory for program storage and backup.	$0.00
DWO/TCPC	G254 Dynamic Work Offsets (DWO) and G234 Tool Center Point Control (TCPC) are software features in the Haas control that make setting up 4- and 5-axis jobs as easy as setting up a 3-axis machine. These software features allow an operator to place the part and fixture anywhere on the table, regardless of the location that was programmed in the CAM system. This simplifies set-up operations, and eliminates the need for costly workholding, like self-centering fixtures. DWO and TCPC determine the difference between the centers-of-rotation programmed in the CAM system and the centers-of-rotation within the machine and apply the appropriate offsets. This increases productivity and reduces part handling, because the operator no longer needs to repost the program every time the part location on the table changes. DWO applies to all 3+1 and 3+2 machining, while TCPC applies to all simultaneous 4- and 5-axis machine movements. Easy-to-use calibration templates are included. Includes the Rotary Axis Calibration Tool.	$0.00
EPFDM	The Haas power-failure detection module senses a power failure or severe drop in incoming line voltage and quickly brings all axis motion to a safe and controlled stop. The module maintains power to the electronics long enough to activate brake motors and prevent uncommanded motion that could damage parts and tooling. Vertical axes are brought to a stop with the absolute minimum motion possible.	$0.00

HAAS CONNECT	HaasConnect is a web-based application that lets you monitor the operating status of your Haas machine remotely - anywhere, any time, on any device. HaasConnect provides instant alerts - via SMS, email, and iOS/Android push notifications - for specific machine events, like cycle start, program end, alarms, and overrides to feeds, spindle speed, or rapids. You choose which events you care about, and set up alerts to go to specific personnel for specific machine events. Simply log in to www.My.HaasCNC.com to manage your users and alerts. HaasConnect requires a Haas machine with the Next Generation Control (NGC), and an active Internet connection. Free apps are available for all of your iOS and Android devices.	$0.00
HAASDROP	HaasDrop Wireless File Transfer is a fast and convenient method for sending images, videos, and even program files from a mobile device directly to the Next-Generation Control on a Haas CNC machine. Available for Android and iOS devices.	$0.00
MEDIA DISPLAY	The Haas M-130 Media Display M-Code is a powerful tool for communicating with machine operators and programmers directly from the Haas control as an NC program runs. Use M-130 to call up setup instructions, tool lists, CAD images, manufacturing information, and more. When the program reaches an M-130, the specified media (image, video, or PDF) will be displayed in the upper right corner of the control screen. The function is turned off using an M-131 in the program. NextGen Control only.	$0.00
RTAP-3	Don't waste time and money tapping holes the old-fashioned way. Rigid tapping synchronizes the Z-axis motion of the machine with the spindle's rotation, eliminating the need for expensive floating tap holders. This prevents lead-thread distortion and start-thread pullout, while increasing productivity and allowing the use of standard collet toolholders. Rigid tapping is fully integrated with the Haas control, with built-in cycles for tapping, peck tapping, and repeat tapping, as well as an automatic tap recovery procedure, and up to 8X retract speeds.	$0.00
SAFE RUN	Our Safe Run features can detect a machine crash within a few milliseconds, and stop machine motion before significant damage occurs. When in Safe Run, the machine's rapids and accelerations are reduced, and an algorithm in the Haas control monitors the servos for abnormal signals. If the control detects a servo abnormality caused by unexpected contact, the machine will stop, back off in the reverse direction of the approach, and alarm out - before significant damage can occur.	$0.00
SURGE PROTECTION	Surge Protection; provides protection from power surges to the machine control, preventing damage to critical components. If the machine experiences a power surge, the single-use surge-protection module is consumed, preventing the electrical spike from affecting the rest of the control components. Replacement surge-protection modules are available from Haas. Standard on 3-phase machines only.	$0.00
TOUCH SCREEN	Touch Screen interface for the Haas control; allows screen navigation, data entry, and other control functions on-screen, without using the keypad.	$0.00
WIFI	The WiFi option provides wireless connectivity between the Haas control and a local area network. Use WiFi to easily share and transfer files wirelessly, and monitor your machine remotely via HaasConnect mobile machine monitoring. It is easily set up through the Haas control, and supports Netshare capabilities. It operates on the 2.4 GHz frequency.	$0.00
ETHERNET	Connect your Haas machine to your local area network (LAN) with the Haas Ethernet Interface. This simple interface provides a reliable network connection to easily transfer program files to and from the machine, at speeds much faster than RS-232. High-speed data transfer rates let you DNC large files over the network at up to 1000 blocks per second, and you can eliminate redundant copies of your NC programs by hosting them all in a single network location. The Ethernet Interface also provides connectivity for HaasConnect mobile machine monitoring, and supports Netshare capabilities.	$0.00

Accessories

CHIP STRAINER	Save time cleaning out your machine with our Chip Tray Filter Kit. This supplemental chip strainer kit keeps chips from entering the coolant system, preventing rust and component malfunctions. The kit includes a 200-micron filter and metal chip tray basket.	$95.00

Coolant Tank

55GAL	The Haas 55-gallon (208 liter) coolant tank is equipped with a powerful 3/4 hp (0.6 kW) pump that flows 5.25 gpm @ 30 psi (19.9 L/min @ 2 bar), and it features a multi-section labyrinth design that prevents chips from reaching the coolant pump and being recirculated. The tank is equipped with casters and a handle to simplify maintenance. The tank easily accommodates an additional pump for machines with the Through-Spindle Coolant option.	$0.00

Tooling

08-1757A	3" (75mm) Self-Centering Vise and Adapter Kit for 160/210 Rotaries	$849.95
08-0002A	10-Piece, CT40 Toolholder Kit, TSC	$1,099.95

Warranty

SW-6-MONTH	The Mini Mill-EDU is backed by a standard 6-month limited warranty covering defects in material and workmanship. An additional 6-month extended warranty may be purchased at any time before the original warranty expires.	$0.00

Total UMC-350HD-EDU	**$95,734.90**
TOTAL QUOTE	**$95,734.90**
FREIGHT FROM CA TO MO	**$2,000.00**
RIGGING UNION MACHINERY	**$2,000.00**
TOTAL INVESTMENT	**$99,734.90**

NOTE: INSTALLATION IS FREE ONCE POWER AND AIR ARE RUN TO THE MACHINE.
NOTE: THIS QUOTE IS GOOD FOR THIRTY DAYS.
NOTE: HAAS IS HAVING A PRICE INCREASE AT THE END OF JANUARY

Customer is responsible for freight and rigging. Order subject to credit due diligence.

TRAINING, AUTOMATION, AND MORE

Get the most out of your investment by adding some of the following options to your quote above:

Training

LIFETIME	May be used for life of machine for any HFO scheduled training classes in Fairport, NY, St. Louis, MO, or Olathe, KS as long as the customer owns their machine.	$1,995.00
ONETIME	Two day training class. Good for one seat in a scheduled training class in Fairport, NY, St. Louis, MO, Olathe, KS, or Wichita ,KS.	$895.00
ONSITE	One day training at your facility. Good for 8 hours of training at your facility (must be in HFO NYMAT territory).	$1,795.00

Automation

ROBOT-PKG-7KG	7 kg Capacity Robot System	$44,995.00
ROBOT-PKG-25KG	25 kg Capacity Robot System	$69,995.00
ROBOT-PKG-50KG	50 kg Capacity Robot System	$79,995.00
APL	Automate Your Part Production on Small VMCs, Small UMCs, or Lathes	$29,995.00
COMPACT APL	Automate Your Small Part Production	$21,995.00

Other

PREVENTIVE MAINT	Protect your Haas investment and maximize your productivity by utilizing locally available Haas factory-certified professionals to keep your machine in the best possible condition. Travel to and from your facility is included (must be in HFO NYMAT territory).	#N/A

Popular Options Not Included In This Quote

P-COOL	Boost your productivity. Reduce cycle times. Eliminate all that opening and closing of the mill doors to adjust coolant lines. Our Programmable Coolant Nozzle is a multi-position nozzle that automatically directs coolant precisely at the cutting tool. The position of the nozzle is controlled via the program, and set specifically for each tool length - saving operator time by eliminating constant adjustments. The nozzle position may also be adjusted manually from the control pendant while a program is running.	$2,095.00
HSM	The Haas High-Speed Machining option allows faster feedrates and more complex toolpaths, without hesitation or starving the machine. By combining a proprietary motion algorithm with block look-ahead, HSM delivers contouring feedrates up to 1200 ipm (30.5 m/min), without risk of distortion to the programmed path. This yields shorter cycle times, higher accuracy, and smoother motion. The Haas HSM option accepts ISO standard G-code from all major CAM systems, and can be combined with settings and G-codes to produce exceptional results. HSM is mandatory for 3D and simultaneous 4- or 5-axis programs, and produces the desired results when short strokes are combined with high feedrates.	$3,495.00
TSC	This Haas Through-Spindle Coolant system provides up to 300 psi (21 bar) of coolant to the cutting tool, allowing for heavier cuts, higher feedrates, deep-hole drilling, and better surface finishes. With Through-Spindle Coolant, you can really reduce your cycle times to increase throughput, and you'll produce higher-quality parts. To minimize clogging, the Haas TSC pump includes an innovative self-cleaning feature. Maximum rpm with TSC enabled is 15,000 rpm.	$6,295.00
TSC READY	Through-Spindle Coolant Ready machines are pre-configured to accept an optional Haas Through-Spindle Coolant system. The TSC drawbar, plumbing, and wiring are preinstalled at the factory, making field installation of TSC faster, easier, and less invasive.	$1,195.00

New Options Not Included In This Quote

VARIABLE FLOW CLNT	Variable Flow Coolant Pump, allows control of the flood coolant flow and pressure via M-code P values.	$995.00
AUTO DOOR-MILL	The Auto Door opens the machine doors automatically via the part program. This reduces operator fatigue during repetitive machining operations, or allows for unattended operation when used with a robotic loader.	$2,095.00

Options above may or may not be appropriate for your application. Ask your Sales Engineer for assistance selecting options.

All prices and specifications subject to change without notice. Additional charges may apply for field installation of options and accessories. All prices are F.O.B. Shipping Point. Other dealer charges may apply. All prices are in U.S. dollars. Customers will be charged a $5,000.00 restocking fee for all orders cancelled after the machine has been built.

FOB:	Shipping Point	
Shipment:	Call for delivery.	
Terms:	Standard terms are 20% down, 70% prior to shipment, and 10% net thirty days after shipment. Terms are subject to credit approval. The 20% down payment is required to process the order. This sale is subject to the NYMAT Machine Tool Corp. Sale Terms and Conditions Agreement which are incorporated in full by this reference. The Sale Terms and Conditions Agreement is available at http://www.nymat.com/terms-conditions/, and also will be sent by mail or email to the purchaser upon request.	
Taxes:	Any applicable taxes are not included in this quote and will be extra if required	
Warranty:	Machine:	Manufacturer's Warranty
	Control:	Manufacturer's Warranty
	Accessories:	Manufacturer's Warranty

Training: A two-day programming class is available, held on a regularly scheduled basis at our facilities at a cost of $895 per student.

Note: Lifetime Training can only be purchased at the time of a new machine order and is machine specific by s/n

Life of Machine Training Certificate: $1,995.00

May be used for life of machine for any HFO scheduled training classes in Fairport, NY, St. Louis, MO, or Olathe, KS as long as the customer owns their machine. Classes are scheduled on a monthly basis in all three offices.

HFO reserves the right to limit the number of students per class. If the desired class is full, a life of machine training certificate customer will be given space in the next scheduled class. For multiple machine customers, trainees should be operating or programming the specific serial number machine for which the training certificate was purchased.

Preventive Maintenance: Can be purchased at the time of a new machine order or as needed at a later date. Pricing reflects cost per visit per machine and does not include any optional special services which can be quoted separately. See the Preventive Maintenance Program flyer for all details, terms, and conditions.

All features, benefits and specifications are subject to change. Haas Automation, Inc. and NYMAT Machine Tool Corporation are not responsible for any typographical errors, omissions or misprints.

EAST CENTRAL COLLEGE

Interoffice Memorandum

To: **Dr. Jon Bauer**

From: **Chad Baldwin**

Subject: **Phase II Classroom Technology Equipment Purchase**

Date: **January 21, 2025**

It is my recommendation that the Board of Trustees approve the phase II equipment proposal by Midwest Computer Products, Inc. for $150,581.65. Pricing is based off the Omnia cooperative bid contract.

This equipment will comprise most of the classroom equipment to be installed in phase II of the classroom technology/streaming project.

The installation of the equipment in the classrooms will be contracted out and is planned to begin in Summer 2025. The equipment will be used to convert existing ECC classrooms into streaming capable rooms, allowing for hyflex/livestream instruction and virtual meetings. Mobile classroom streaming equipment is also included in the bid.

This project is being funding out of the allocated federal earmark for the phase II technology/streaming project.

Equipment List

Item	Number of Items	Unit Cost	Total Item Cost
Samsung 75" Displays	25	$654.25	$16,356.25
Epson Projectors	20	$1,899.00	$37,980.00
DaLite Projector Screens	20	$1,041.49	$20,829.80
PTZ Optics Instructor Facing PTZ Cameras	20	$1,414.89	$28,297.80
OSBOT Classroom Facing PTZ Cameras	25	$299.00	$ 7,475.00
Jabra Microphone/Speaker Pods	10	$258.78	$ 2,587.80
ClearTouch Boards	10	$2,899.00	$28,990.00
ClearTouch Mobile Carts	10	$806.50	$ 8,065.00
		Overall Total Cost:	**$150,581.65**

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XII: GRANT APPLICATION RESOLUTION

Recommendation: To **approve** a resolution authorizing East Central College to apply for federal assistance from the Recreational Trails program for the purpose of East Central College Fitness Trail.

Attachments

01/27/2025

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

Resolution - Recreational Trails Program Grant

WHEREAS, East Central College is applying for federal assistance from the Recreational Trails Program for the purpose of East Central College Fitness Trail,

NOW, THEREFORE, BE IT RESOLVED BY THE EAST CENTRAL COLLEGE BOARD OF TRUSTEES, that

1. Dr. Jon Bauer, President of East Central College is authorized to sign the application for federal assistance and any other official project documents that are necessary to obtain such assistance, including any agreements, contracts or other documents that are required by the State of Missouri or the Federal Highway Administration.

2. East Central College currently has the written commitment for the minimum 40% matching share for the project elements that are identified in the application and will allocate the necessary funds to complete the project.

3. In the event a grant is awarded, East Central College will commit the necessary financial resources to operate and maintain the completed project in a safe and attractive manner for public access for 25 years.

4. In the event a grant is awarded, East Central College is prepared to complete the project within the time period identified on the signed project agreement.

5. In the event a grant is awarded, East Central College will comply with all rules and regulations of the Recreational Trails Program, applicable Executive Orders and all state laws that govern the grant applicant during the performance of the project.

PASSED AND RESOLVED BY THE East Central College BOARD OF TRUSTEES THIS 27th DAY OF JANUARY, 2025.

ATTEST:_____
Stacy Langan, Recording Secretary

BY:_____ _____
Ann Hartley, Board President Ina Hays, Board Secretary

(SEAL)

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
December 2, 2024

AGENDA ITEM XIII: *PERSONNEL

A. POSITION RECLASSIFICATION

Recommendation: To **reclassify** the Head Baseball Coach position, from part-time to full-time professional staff level 204 effective February 1, 2025 with Luke Miller as the Head Baseball Coach with an annual salary of $49,920.

B. RESIGNATIONS

Recommendation: To **accept** the resignation of Dana Riegel, Research Analyst, effective February 14, 2025.

Recommendation: To **accept** the resignation of Kami Hancock, English Instructor, effective January 10, 2025.

C. ADJUNCT FACULTY – SP25

Recommendation: To **approve** the roster of adjunct faculty for the SP25 Session as listed in the attached memorandum.

D. CLASSIFIED STAFF APPOINTMENTS (*information only*)

A list of classified staff hired since the December 2, 2024, meeting is attached for information.

Attachments

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

EAST CENTRAL COLLEGE

Interoffice Memo
HUMAN RESOURCES

TO: Dr. Jon Bauer, College President

DATE: January 16, 2025

FROM: Carrie Myers, Human Resources Director

RE: Recommendation to Reclassify: Baseball Coach - Luke Miller

Please accept the recommendation to reclassify Luke Miller from part-time Head Baseball coach to full-time Head Baseball coach. This reclassification would move Luke to a professional staff level 204 with an annual salary of $49,920 effective February 1, 2025.

Sarah Leassner, Vice President of Student Development, has approved this recommendation. The purpose of the position restructuring is to fully support the Baseball/Athletic department at East Central College.

Recommendation signatures:

Carrie A. Myers
Director of Human Resources

Sarah Leassner
Vice President, Student Development

/kja

EAST CENTRAL COLLEGE

Interoffice Memo
HUMAN RESOURCES

TO: Dr. Jon Bauer

DATE: January 16, 2025

FROM: Carrie A Myers, Director of Human Resources

RE: Requesting Release from Contract – Dana Riegel

Dana Riegel, Research Analyst, has requested to be released from the remainder of her FY25 employment contract effective February 14, 2025. The official resignation letter is on file in the Human Resources Office.

Signatures:

Carrie A. Myers
Director, Human Resources

Michelle Smith
Executive Director, Institutional Effectiveness

EAST CENTRAL COLLEGE

Interoffice Memo
HUMAN RESOURCES

TO: Dr. Jon Bauer

DATE: January 10, 2025

FROM: Carrie A Myers, Director of Human Resources

RE: Requesting Release from Contract –Kami Hancock

Kami Hancock, English Instructor, has requested to be released from the remainder of her FY25 employment contract effective January 10, 2025. The official resignation letter is on file in the Human Resources Office.

Signatures:

Carrie A. Myers
Director, Human Resources

Dr. Robyn Walter
Vice President, Academic Affairs

EAST CENTRAL COLLEGE

Interoffice Memo

TO: Dr. Bauer

DATE: January 20, 2025

FROM: Office of Academic Affairs

RE: Adjunct Addendum for Spring Semester 2025

Please approve the following adjunct addendum for the spring 2025 semester.

ADDITIONS

English & Humanities
Molly Bene, Communications
Madison Emerick, English
Shawna Flanigan, Communications
Natasha Green, English
Shana Harris, Communications
Cassidy Litle, English
Julie Munro, English
Katen Niedbalski, English
Lindsay Riegel, English
Elizabeth Rosebrough, English
Timothy Stagner, Religion

Dual Credit
Emily Brasher, English, SFBHS
Bradley Dicus, Building Construction, RTI
Melisa Mauchenheimer, Mathematics, WHS
Jenny Meers, Education, FRCC
Andrew Rosenburg, Collision Repair, FRCC
Kenneth Willardson, Mathematics, VHS

Health Sciences
Kim Dziejma, EMS
Heather Starnes, Nursing
Susan Wurdack, Nursing

Social Sciences & College Success
Arti Dautenhahn, Psychology
James Huitt, Sociology
Steffani McCrary, College Success
Jessica Robart, College Success
Windy Souders, College Success
Teresa Stratman, Psychology
Tracie Welsh, College Success

Science & Engineering
Tiffanie Atherton, Environmental Science
Nancy Hayes, Biology
John Tubbesing, Chemistry

Mathematics, Business, & Education
Easton Brawley, Mathematics
Philip Giacomelli, Education
Susan Giesing, Education
Denise Vogeler, Business

DELETIONS

Science & Engineering
Clarissa Wisner, Physics

Mathematics, Business & Education
Steffani McCrary, Business

Social Science
Kristi Garner, Sociology
Sarah Wildt, Sociology

Health Sciences
Clay Bandermann, EMS

Signatures:

Robyn C. Walter
Dr. Robyn Walter, Vice President of Academic Affairs Date

Carrie Myers, Director of Human Resources Date

EAST CENTRAL COLLEGE

HUMAN RESOURCES

TO: Dr. Jon Bauer, College President

DATE: January 16, 2025

FROM: Carrie Myers, Human Resources Director

RE: Support Staff Hires –December/January

The following support staff employees have been hired since the last meeting:

• Keshia Hinkle	Testing Center Clerk	Part-time	12/2/24
• Joan Firebaugh	Library Technician	Part-time	1/13/25

Carrie A. Myers
Director of Human Resources

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XIV: BOARD PRESIDENT'S REPORT

Board President Ann Hartley will share information with the Board**.**

East Central College
1964 Prairie Dell Road, Union, Missouri 63084
(636) 584-6500
FAX (636) 584-0513

JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XV: REPORTS

Reports may be presented by:

A. Faculty Association President, Tracy Mowery

B. ECC-NEA President, Reg Brigham

C. Professional Staff President, Todd Tracy

D. Classified Staff Association President, Denise Walker

E. Student Government Association Officers
   a. Tessa Schweich, President
   b. Addi Klophaus, Vice President
   c. Jovie Garner, Chief Recording Officer
   d. Violet Melchoir, Public Relations Officer

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JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XVI: PRESIDENT'S REPORT

Projected meeting dates for 2025 are listed below for planning purposes. Meetings will normally begin at 5:30 p.m. Please let me know as soon as possible if you will not be able to attend any of the projected meetings.

2025 Projected Meeting Dates	**Alternate Meeting Dates**
No February Meeting	
March 3	March 10
April 14	April 21
May 5	May 12
June 16	June 23
July 17 (Thursday noon business meeting)	TBD
August 25	TBD
No September Meeting	
October 6	October 13
November 3	November 10
December 1	December 8

01/27/2025

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JUNIOR COLLEGE DISTRICT OF EAST CENTRAL MISSOURI
BOARD OF TRUSTEES MEETING
January 27, 2025

AGENDA ITEM XVII: ADJOURNMENT OF PUBLIC SESSION/ENTER EXECUTIVE SESSION – RSMO2004, SECTION 610.021(2) REAL ESTATE

Recommendation: To **adjourn** the January 27 2025, public meeting of the Board of Trustees and enter executive session per RSMo2004, Section 610.021(2) Real Estate.

01/27/2025

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