

UNIVERSITY OF SCIENCE AND ARTS OF CHICKASHA

ECONOMIC IMPACT STUDY

THE ECONOMIC IMPACT OF USAO ON THE
CHICKASHA COMMUNITY

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EXECUTIVE SUMMARY

Institutions of higher education play a pivotal role in securing the vitality and success of local communities across the state of Oklahoma. In addition to preparing students for an increasingly competitive and uncertain economic future, our colleges and universities help infuse local communities with innovative activities, learning opportunities, and culture. Every year, they help attract thousands of visitors to local towns and cities through such varied activities as art exhibits, lectures, festivals, concerts, and sports events. And through their annual operating budgets they directly inject substantial expenditures into local communities, helping to create local jobs, increase local incomes, and raise local standards of living.

The University of Science and Arts of Oklahoma (USAO), the state's public liberal arts college, is no exception. This study describes the ways in which USAO impacts its host community of Chickasha, focusing specifically on the economic impact of the college's annual operations and activities. Data shows the economic impact of USAO on the Chickasha community is substantial, and, given proper support, will increase further in the future. With this in mind, the study presents a number of scenarios detailing the potential *additional* economic impact that might be realized given increasing student enrollment at the college, and suggests how community partners might assist USAO in realizing this growth in a mutually beneficial and cost-effective manner.

USAO and Chickasha: Macro-economic Effect

- USAO currently generates over **\$11.7 million** in local business volume per year
- USAO currently generates **\$8.1 million** in personal income for local individuals from college-related jobs and business activities every year.
- USAO currently supports **640** local jobs in the local economy—7.4% of all jobs in Chickasha.

- If **100 additional students** attend USAO, the college will generate an estimated **\$878,406** in additional local business volume. If **250 additional students** attend USAO, the college will generate an estimated **\$2,189,729** in additional local business volume.

PART I: THE MODEL

The impact of a college or university on its local community may be understood as the aggregate of three underlying effects:

1. **An immediate economic impact**—the institution injects money and jobs into the local economy through the economic activities of its faculty, staff and students;
2. **A structural economic impact**—the institution helps prepare its host community for future economic growth by providing an educated labor force that can attract more quality jobs to the area; and
3. **A quality of life impact**—through its various cultural offerings, including drama, music, art, festivals, athletic events, lectures and seminars, the institution enriches the cultural landscape of the local community.

This research project quantifies the first listed effect by using an established economic impact model initially devised by Caffrey and Isaacs for the American Council on Education.¹ The model separates economic impact into three main parts or sub-models: local business volume generated by college-related activities (Model 1); local jobs tied to the presence of the university (Model 2); and the amount of local personal income generated from college-related jobs and business activities (Model 3).

¹Caffrey, John and Herbert H. Isaacs. “Estimating the Impact of a College or University on the Local Economy.” The American Council on Education, 1971.

SUMMARY OF RESULTS

Utilizing the three models introduced above, this study provides the following estimates of USAO's impact on the Chickasha economy:

- Model 1: College-Related Local Business Volume

The model estimates that USAO generates \$11,748,928 in local business volume per year. This includes a direct effect of \$6,103,339, a second-round effect of \$1,373,251 and an indirect effect of \$4,272,337. Each effect is discussed in greater detail in Part II.

- Model 2: Number of Local Jobs Attributable to the Presence of the University

The total number of local jobs attributable to the presence of the university is estimated at 640. Deducting the 152 positions at the university, USAO creates 488 additional jobs in the community. The U.S. Census puts the total number of jobs in Chickasha at 8,679. Therefore, USAO is directly responsible for 1.8% of the jobs in the community and indirectly responsible for 5.6% of local jobs (7.4% in total).

- Model 3: Personal Income of Local Individuals from College-Related Jobs and Business Activities

USAO generates \$ 8,193,033 in personal income for local individuals from college-related jobs and business activities every year. Of this number, \$6,446,606 is wages paid to local faculty and staff. The remainder of \$1,746,427 is generated for individuals unrelated to the university. Total income in Chickasha is \$170,824,620, making USAO directly and indirectly responsible for 4.8% of the total.²

² Source: US Census. Mean household earnings in Chickasha (exclusive of transfer payments and retirement income) = \$37,610. Households of this earning type = 4,542. $(4,542 * 37,610) = \$170,824,620$ total income from earnings in Chickasha.

PART II: UNDERSTANDING THE MODEL

An economic model can be thought of as a machine that takes raw data and turns it into conclusions. In this case, the raw data are all of the pieces of information we think are important in understanding how USAO affects Chickasha. For example, the number of faculty, staff and students who live and work in the city will have an obvious impact on the local economy, as will the number of children of USAO personnel and students enrolled in local schools, how much money is spent by visitors to USAO art exhibits and basketball games, and whether or not Chickasha residents are likely to drive to Oklahoma City to do their shopping. Once the raw data is entered into the machine, it is filtered through a set of prescribed relationships—the model. This is nothing more than an expression of how the model builders think all the inputs fit together and affect each other. For example, the amount of local income attributable to the university is logically a function of how much money the university pays its employees, how many of those employees live locally, and how many times all money spent by the college is re-spent in Chickasha, creating additional income along the way.

Perhaps the most difficult part in building an economic model is collecting the data. We have been very careful to use only the most recent and relevant data available. In cases where data were not available in the needed form, or the data would have been too costly to discover, we have used reasonable assumptions to fill in for the missing data. These assumptions, along with a detailed description of all the variables, are presented here. In Part III, we explore the implications of growth or contraction of USAO on Chickasha’s local economy.

MODEL 1: COLLEGE-RELATED LOCAL BUSINESS VOLUME

Any economic activity will have ripple effects throughout the environment in which it operates and USAO is no exception. The amount of business volume generated by the presence of USAO in Chickasha—\$11,748,928—is the sum of a direct effect, a second-round effect and a multiplier effect.

Direct Effect

USAO has a direct impact on the local economy by injecting money into Chickasha. The model estimates that \$6,103,339 is spent in Chickasha annually by the university itself, faculty and staff, students, and visitors to the college.

- The university directly injects \$1,872,649 into the local economy, which includes all local spending exclusive of wages and taxes
- The local spending of faculty and staff, \$2,222,321, is the sum of:

1. rental expenditures by local faculty and staff (\$478,160)
 2. non-housing expenditures by local faculty and staff (\$1,718,205)
 3. local expenditures of non-local faculty and staff (\$25,920)
- Local spending by students, \$1,354,740, is the sum of:
 1. expenditures by students living locally in dorms or with parents (\$699,394)
 2. expenditures by students living in local rental housing (for rent and non-housing items) (\$179,664 + \$122,882)
 3. local expenditures by non-local students (\$352,800)
 - Local spending by visitors to the university, \$683,630, is the sum of the estimated spending by all visitors to the campus in a year³

The magnitude of all of these effects depends partly on the proportion of local people’s total non-housing expenditures that are spent in Chickasha. We calculate, using a gravity model, that this proportion is about \$0.68 per dollar. See Appendix B for a detailed explanation of this model.

Second-Round Effect

Once all of these dollars are injected into Chickasha’s economy, a “second-round” effect begins—purchases that local businesses make from local sources to support their USAO-related business. For example, when a USAO student purchases a meal from a local restaurant, the restaurant may replenish its stock from a local supplier, generating even more local business volume.

The magnitude of the second-round effect depends on the size of the local economy, its business diversity and access to other markets. The smaller the economy, the less specialized its businesses, and the easier access to other economies, the less likely businesses are to purchase from local suppliers. The second round effect will thus be weaker. The model suggests a range of \$0.15 - \$ 0.30 per dollar⁴ for “the proportion of receipts from college-related purchases used in turn to purchase goods and services from local sources.”⁵ Within our model, we use the midpoint of this range to reflect the relative small size of Chickasha and its access to larger markets. The calculated second-round effect is \$1,373,251.

³ A full list of visitors to the college in 2008 and their estimated spending is available upon request.

⁴ The coefficient m_p formally defined as “the additional value of local production generated by one dollar spent by local households in local business establishments” (Caffrey and Isaacs 45).

⁵ Caffrey and Isaacs 16.

Multiplier Effect

The ripple effect is not confined to a second-round, but continues as money is re-spent, creating even more income for Chickasha residents. Part of the money the student paid for the restaurant meal will be used by the restaurant owner to buy a haircut, for example, and the barber will in turn use some of that money to purchase something else in town. This is the “multiplier effect” of USAO-related spending: the money initially spent by one USAO person will be recycled many times, generating further income and spending for others.

The magnitude of this effect depends on the degree to which local business income is spent and re-spent locally. The model suggests a \$0.60-\$0.80 per dollar range, and we again use the midpoint of the range as a reflection of Chickasha’s relative small and open economy.⁶ The calculated multiplier effect is \$4,272,337.

MODEL 2: NUMBER OF LOCAL JOBS ATTRIBUTABLE TO THE PRESENCE OF THE UNIVERSITY

In addition to the injection of money for which the university is responsible, USAO also creates jobs for Chickasha—ones it hires directly, private sector jobs it creates from its spending activities (derived from Model 1), and public service jobs it creates through its presence and spending activities. Given the conservative nature of the model, we consider only the first two examples of job creation: USAO direct employment and private sector jobs directly attributable to USAO spending. Therefore, the number of local jobs related to USAO (640) is the sum of:

- Jobs hired directly by USAO (152)
- Jobs in the private sector created by the college-related expenditures as defined by Model 1 (488)

Private Sector Jobs from College-Related Expenditures

Every dollar spent locally by the university, its faculty, staff and students helps to support and create local jobs. The number of private sector jobs attached to USAO-induced business volume depends on how much local employment changes when an additional dollar is spent locally. The model supplies a range of .00007-.00009⁷: that is, for every \$100,000 of direct local expenditures by USAO, 7-9 jobs are created in Chickasha. We again use the midpoint of the range to calculate that 488 jobs in Chickasha are related to the presence of USAO—jobs beyond the college’s internal 152 staff and faculty positions.

⁶ The coefficient m_i is formally defined as “income-induced requirements per dollar of final demand, represent[ing] the additional value of local industrial and commercial output when household income and expenditures are recycled” (Caffrey and Isaacs 45).

⁷ The employment multiplier is used in the form of a coefficient with a range of 0.00007-0.00009. The coefficient j is formally defined as a “measure of the marginal change in local employment associated with the average household dollar spent locally when the direct and indirect production requirements and the induced income effects on local production are taken into account” (Caffrey and Isaacs 45).

Public Service Jobs

It should be noted that the college creates additional local public jobs as well, as the USAO staff, faculty, students, and their associated families who live locally consume public services. Such public sector jobs are directly attributable to the presence and operations of USAO; to restate this idea, if USAO were to cease operations, such public sector jobs would be placed in jeopardy. To more completely capture this dimension of USAO's impact on the Chickasha community, we can derive the number of public sector jobs attributable to USAO by:

1. Estimating the percentage of the municipal and public school budgets that serve the USAO community of staff, faculty, students, and their families—this is the portion of such budgets dependent upon the USAO community for its existence.
2. Determining the number of public sector jobs associated with USAO's presence, given the information introduced above.

We calculate that local USAO students, faculty, staff, and their associated families account for about 7% of the population of Chickasha, and the children of local USAO employees and students represent about 5% of local public school enrollees. USAO-related individuals are thus the consumers of about 7% and 5% of the municipal and public school budgets, respectively. The City of Chickasha employs 155 people, and the local school districts 392 people.⁸ Thus about 30 public sector jobs (11 municipal jobs and 19 public school jobs) are *directly* tied to the presence of the university. We should also note: when USAO-related activities stimulate the growth of the private sector, hence supporting *private sector* jobs (as described in the previous section), such added jobs also placed greater demand on public services, thereby creating additional economic impact on the Chickasha community. However, given the conservative nature of our model, we leave such additional considerations of the public sector out of our current analysis of USAO's local economic impact.

MODEL 3: PERSONAL INCOME OF LOCAL INDIVIDUALS FROM COLLEGE-RELATED JOBS AND BUSINESS ACTIVITIES

The effect of USAO's economic activities on Chickasha can also be expressed in terms of personal income. The personal income related to USAO (\$8,193,033) is the sum of:

- Personal income of USAO faculty and staff who live locally (\$6,446,606)
- Personal income of non-USAO persons, generated because of a connection to USAO-related business volume (\$1,746,427)

Income of Local Faculty and Staff

This income amount is calculated by multiplying the gross compensation of faculty and staff by the proportion of faculty and staff living locally.

Income of non-USAO persons in the community

USAO-related local expenditures (from Model 1) will create income for other people in the form of payrolls and profits in local businesses, in a magnitude that again depends on the size of the local economy and the likelihood of money leaking out to other economies. The model suggests a range of \$0.50-\$0.60 to represent that “on average, a dollar spent by local residents in the community will generate from 50 to 60 cents of local income.”⁹ We again use the midpoint of this range and calculate that \$1,746,427 is created from the \$6,103,339 of college-related local expenditures. Added to the personal income of local USAO employees, \$8,193,033 in personal income is generated locally.

⁸ Source: local government, and Chickasha, Friend and Pioneer school districts

⁹ p is formally defined as “the total amount of income accruing to local residents from the initial average dollar spent by local households in the community” (Caffrey and Isaacs 45).

PART III: EXTRAPOLATIONS

Three alternative growth scenarios were explored using the model: enrollment increases of 100, 250, and 500 students who mirror the current mix of the USAO student population. We assume in all scenarios that the current faculty and staff-to-student ratio will be maintained, and all relevant variables associated with faculty, staff and students will change in accordance with the initial enrollment increase. These changes are detailed in Appendix C.

In the first scenario, enrollment grows by 100 students. The increase in student enrollment raises all the economic impacts measured by the model. Local business volume increases to \$12,627,335 (7.5% increase), local jobs increase to 690 (7.8% increase), and generated income rises to \$8,857,628 (8.1% increase).¹⁰

In the second scenario, enrollment grows by 250 students; this change will logically have a greater impact on all model numbers. Local business volume increases to \$13,938,657 (18.6% increase), local jobs increase to 763 (19.2% increase), and generated income rises to \$9,836,817 (20.1% increase).¹¹

In the final scenario, enrollment grows by 500 students. In this case, the expanded student body necessitates the addition of 64 faculty and staff, with their associated spending being injected into the local economy as well. When we assume the 500 students live on campus, business volume generated by the university jumps to \$14,836,808 (26.3% increase), jobs to 833 (30.2% increase) and income generated to \$11,111,557 (35.6% increase).¹²

The results of our model indicate an important target area for economic growth in the Chickasha community. Identifying potential mechanisms through which various partners, including the city of Chickasha itself, might help USAO realize this growth in a mutually beneficial and cost-effective manner is therefore of no small significance—for both the college and the community in which it resides. Such mechanisms might include partial funding of college scholarships, contributions to state-wide recruiting

¹⁰ 165 faculty and staff jobs and 525 jobs from college-related local expenditures. See Model 2 for a discussion of direct and indirect job creation.

¹¹ 184 faculty and staff jobs and 579 jobs from college-related local expenditures. Again, see Model 2 for a discussion of direct and indirect job creation.

¹² 216 faculty and staff jobs and 617 jobs from college-related local expenditures. Again, see Model 2 for a discussion of direct and indirect job creation.

activities, and collaboration on projects that seek to enhance the distinction of both USAO and the Chickasha community within the state.

PART IV: CONCLUSIONS AND RECOMMENDATIONS

We conclude from this model that USAO has a quite significant economic impact on Chickasha. While USAO is not Chickasha's largest single employer or largest source of spending and income, the jobs, income and business volume generated because of its presence is anything but trivial. This is perhaps easiest to consider in the negative: if USAO disappeared, the loss of 640 jobs, almost \$12 million in business volume and \$8 million in income connected to the university would certainly be felt in the local economy. USAO provides a reliable population of student consumers year after year and a steady supply of relatively high-paying jobs to Chickasha. Additionally, USAO provides an opportunity for current residents to remain in town instead of leaving for a college education elsewhere. Moreover, if more jobs can be created locally for college graduates, Chickasha could retain some of USAO's students who might otherwise leave after graduation.

Limitations of the Model

As with any economic model, certain qualifications must be used in evaluating the results. The model is limited in a number of ways. First, as with any model, only the most important determining factors are considered. Other variables than the ones used here probably effect the economic connection between USAO and Chickasha. Secondly, the magnitudes of the variables the model does include are at times difficult to collect or estimate. The exact impact that USAO has on the Chickasha economy is thus unknowable; this report is a reasonable approximation, however. The economic impacts modeled here should also be taken as a very conservative approximation. We have consistently used conservative estimates for all variables, from the amount we assume students, faculty and staff spend to the multipliers responsible for magnifying that spending. Therefore, while the results are reasonable approximations, they should be considered to be erring on the low instead of high side.

Secondly, the model used here deals only with the effects that can be measured in dollars. As important as this is, the model is silent on the equally important cultural impact of USAO. That impact should be considered as part of a more comprehensive evaluation of the importance of USAO to Chickasha.

The results of this study must also be evaluated with the character of a university in mind. One factor in the model is the amount of spending that USAO does locally for its supplies. But USAO does not buy many raw materials locally or non-locally; its greatest input is labor. Thus USAO—or any service-providing institution—will not have as large of an economic impact using this model as would a manufacturing concern buying many different inputs from suppliers. With this perspective, the income and jobs that USAO does generate in the economy are even more impressive.

Recommendations

This study perhaps only serves to quantify what most people in Chickasha already know: USAO clearly has a strong impact on the local economy and if USAO were not in Chickasha or was smaller in size, a significant number of jobs and a significant amount of income would vanish from the economy. The real value of this model, however, may lie in suggesting not only the current impact of the university, but its potential structural impact as a key economic resource for the future growth of Chickasha. USAO provides an educated workforce and a quality of life that can be and should be used as a magnet for attracting more quality businesses to the area. The structural and cultural impact of USAO should be studied in depth as an extension of the current study.

APPENDIX A: THE VARIABLES

| Variable | Description | Defined by | Value |
|-----------------|--|--|-----------------------|
| BV_{CR} | College-Related Local Business Volume | $(E_L)_{CR} + (P_{LB})_{CR} + (BV_I)_{CR}$ | 11196980.20 |
| $(E_L)_{CR}$ | College-Related Local Expenditures | $(E_L)_C + (E_L)_F + (E_L)_S + (E_L)_V$ | 6398274.39 |
| $(P_{LB})_{CR}$ | purchases from local sources by local businesses in support of their college-related business volume | $(m_p) * (E_L)_{CR}$ | 959741.16 |
| $(BV_I)_{CR}$ | local business volume stimulated by the expenditure of C-R income by local persons other than faculty, staff or students | $(m_i) * (E_L)_{CR}$ | 3838964.63 |
| $(E_L)_C$ | local expenditures by the college | $[(e_L)_C] * [E_C - W_{FS} - X_{FC} - R_C]$ | 1450038.58 |
| $(E_L)_F$ | local expenditures by faculty and staff | $(E_H)_F + (E_{NH})_F + (E_L)_{NLF}$ | 1598764.85 |
| $(E_L)_S$ | local expenditures by students | $(E_M)_S + (E_H)_S + (E_{NH})_S + (E_L)_{NLS} + (E_L)_S$ | 2425076.96 |
| $(E_L)_V$ | local expenditures by visitors to the college | $(V_1) * (E_1)_V + \dots + (V_n) * (E_n)_V$ | 924394 |
| $(e_L)_C$ | proportion of total college expenditures that are local, excluding compensation, internal items and taxes | | 0.336 |
| E_C | total college expenditures | | 13095537 |
| W_{FS} | gross compensation to faculty, staff and students | | 8778991 ¹³ |
| X_{FC} | internal account transfers and payments | | 0 |
| R_C | taxes and other payments to government | | 955 ¹⁴ |
| $(E_L)_F$ | local expenditures by faculty and staff | $(E_H)_F + (E_{NH})_F + (E_L)_{NLF}$ | 1598764.85 |
| $(E_H)_F$ | expenditures by faculty and staff for local rental housing | $(f_L) * (f_H) * (DI_F) * (e_H)$ | 377489.71 |
| $(E_{NH})_F$ | expenditures by faculty and staff, local nonhousing | $(f_i) * (e_L) * (DI_F) * (e_{nh})_F$ | 1190915.13 |
| $(E_L)_{NLF}$ | local expenditures by nonlocal faculty and staff | $(1 - f_L) * (F) * (E_i)_F$ | 30360 |
| f_L | proportion of faculty and staff residing locally | | 0.77 ¹⁵ |
| f_H | proportion of local faculty and staff who rent housing | | 0.339 ¹⁶ |

¹³ Source: USAO Business Office. Number includes wages paid to TBC Bookstore and Sodexo Food Service employees as well.

¹⁴ Source: USAO Business Office

¹⁵ “Local” is defined as within the 73018 and 73023 zip codes. Only 38 faculty and staff live outside of these zip codes. However, many of these 38 live in what we consider to be the “Chickasha area” and thus the number of faculty and staff who spend a large part of their incomes in Chickasha is probably underestimated here.

¹⁶ Source: U.S. Census Department. Number is the proportion of Chickasha residents who rent as opposed to own their own home. It was assumed that USAO faculty and staff mirror the general population in housing choices.

| | | | |
|----------------------------------|--|--|--------------------------|
| DI _F | total disposable income of faculty and staff | | 4179637.34 ¹⁷ |
| e _H | proportion of a tenant's total expend. likely to be spent for rental housing | | 0.346 ¹⁸ |
| e _L | proportion of total nonhousing expend likely to be local | | 0.5474 ¹⁹ |
| (e _{NH}) _F | proportion of a consumer's total expenditures spent on nonhousing items | | 0.676 ²⁰ |
| F | number of faculty and staff | | 165 ²¹ |
| (E _i) _F | estimated average local expenditures by each nonlocal faculty and staff | | 800 ²² |
| (E _M) _S | local misc. expenditures (non-room and board) by local students (dorms, parents) | (S _L)*(E _m) _S *(e _L) | 255088.40 |
| (E _H) _S | local rental expenditures per student | (S _H)*(E _h) _S | 1082712 |
| (E _{NH}) _S | local nonhousing expend. By students who rent local housing | (S _H)*(E _{nh}) _S *(e _L) | 451276.56 |
| (E _L) _{NLS} | local expend. By nonlocal students | (S _{NL})*(E _i) _S | 636000 |
| (E _{LG}) _S | local expend. By students in living groups (frat houses, etc) | NA | 0 |
| S _L | number of students living locally (dorms, parents) | | 466 |
| (E _m) _S | avg. misc expenditure per local student (dorms, parents) | | 1000 ²³ |
| S _H | number of students renting local housing | | 229 ²⁴ |
| (E _h) _S | average rental housing exp. Per student | | 4728 ²⁵ |
| (E _{nh}) _S | average nonhousing exp. Per student who rents locally | | 3600 ²⁶ |

¹⁷ Source: USAO Business Office. Disposable Income = Gross Pay minus taxes and deductions

¹⁸ Source: U.S. Department of Labor, Bureau of Labor Statistics. "Issues" Summary 02-02, March 2002.

¹⁹ Derived from the gravity model described in Appendix B

²⁰ The Bureau of Labor Statistic's Consumer Expenditure Survey for 2000 lists the proportion of a consumer's spending on housing to be 32.4%. Therefore, 100% - 32.4% = 67.6% on non-housing items. Source: www.bls.gov/cex/csxann00.pdf

²¹ Number includes employees of Sodexo Food Service and TBC Bookstore as well as USAO employees.

²² The judgement of the committee was used in deriving this number. It was assumed that nonlocal faculty and staff spend \$20 per week locally. Assuming that faculty and staff are in town 200 days a year, non-local faculty and staff spend \$800 (\$4*200) locally a year. (The purchases of staff who are in town for the entire year will be underestimated by this number, while faculty who are not in town over longer periods during semester breaks will be overestimated. The number should therefore correct itself on average.)

²³ Judgement of committee was used to derive this number, with guidance from Financial Aid Office estimates of students' spending habits. We assumed local students spend \$100 per month on non-housing items if they live with their parents or in the dorm. If students are on campus for 10 months per year, they spend an average of \$2700 locally. This number probably underestimates the spending, as many students attend all three sessions and are thus in town longer than nine months. Additionally, many students maintain their primary residence in town year-round, regardless of their enrollment status.

²⁴ Source: USAO Information Services

²⁵ Source: Census, American Fact Finder. Average Rent in Chickasha = \$394 per month. For 12 months per year, \$4,728 per student. This number may be slightly high, as many students live with roommates in rental housing (a number that would be very difficult to estimate).

²⁶ Estimation of committee of \$300 per month, for 12 months

| | | |
|-----------|---|-------------------------------------|
| S_{NL} | number of nonlocal students | 795 |
| $(E_i)_s$ | estimated average local expenditures by each nonlocal student | 800 ²⁷ |
| (V_1) | estimated number of visits to the college by visitors in the first category | 3494 ²⁸ |
| $(E_1)_v$ | est. local expenditures by each visitor in the first category (\$0) | 0 |
| (V_2) | estimated number of visits to the college by visitors in the second category | 21654 |
| $(E_2)_v$ | est. local expenditures by each visitor in the second category (spending \$25) | 25 |
| (V_3) | estimated number of visits to the college by visitors in the third category | 2700 |
| $(E_3)_v$ | est. local expenditures by each visitor in the third category (\$50) | 50 |
| (V_4) | estimated number of visits to the college by visitors in the fourth category | 475 |
| $(E_4)_v$ | est. local expenditures by each visitor in the fourth category (\$75) | 75 |
| (V_5) | athletic event visitors | 8760 |
| $(E_5)_v$ | estimated spending by athletic event visitors | 10 |
| (V_6) | art gallery visitors | 2000 |
| $(E_6)_v$ | estimated spending by art gallery visitors | 10 |
| (V_7) | visitors to Sodexho catered events | 9529 |
| $(E_7)_v$ | spending on catered events | 11 |
| m_p | coefficient representing degree to which local businesses purchase from local sources | 0.15 ²⁹ |
| m_i | coefficient representing degree to which individual income received from local businesses is spent and re-spent locally | 0.6 ³⁰ |
| RS_L | total retail sales in the local economy | 142775103 |
| D_L | average distance or travel time for a local person to make a purchase in local economy | 5 |
| RS_{Nn} | total retail sales in nth competing neighboring economy | 889828045 57483498 4836647300 |

²⁷ Assumed by committee to be the same as spending by nonlocal faculty and staff. See footnote #18

²⁸ Dated collected on visitors to sporting events, music and drama productions, art exhibits, camps and clinics and catered events. A complete list is included in Appendix B.

²⁹ See explanation in Part III.

³⁰ See explanation in Part III.

| | | | |
|-------------------|--|---|-----------------------|
| D_{Nn} | average travel distance or time for a local person to make a purchase in the nth competing neighboring economy | | 35 |
| J_L | number of local jobs attributable to the presence of the college | $F + (j) * [(E_L)_{CR} + (OC_{MPS})_{CR}]$ | 705.446 |
| F | number of faculty and staff | | 165 |
| j | full-time jobs per dollar of direct expenditures locally | | 0.00007 ³¹ |
| $(E_L)_{CR}$ | college-related local expenditures | model B-1 | 6398274.39 |
| $(OC_{MPS})_{CR}$ | operating cost of gov't-provided municipal and public school services allocable to college-related influences | $(OC_M)_{CR} + (OC_{PS})_{CR}$ | 1322391.42 |
| $(OC_M)_{CR}$ | operating cost of local gov't-provided municipal services allocable to college-related influences | $[[[(F+S)/POP_{LD}] + [(FH_L+SH_L)/POP_{LR}]]/2] * B_M$ | 497196.384 |
| $(OC_{PS})_{CR}$ | operating cost of local public schools allocable to college-related persons | $[[[(CH_{PS})_F + (CH_{PS})_S]/CH_{PS}] * (B_{PS})$ | 825195.035 |
| F | number of faculty and staff | | 165 |
| S | number of students | | 1490 |
| POP_{LD} | total local daytime population | | |
| FH_L | total number of persons in local faculty and staff households | | 349.387 ³² |
| SH_L | total number of persons in local student households | | 890.573 ³³ |
| POP_{LR} | total local resident population | | 19529 ³⁴ |
| B_M | local gov't's operating budget for all municipal services except public schools | | 6708035 ³⁵ |

³¹ See explanation in Part III.

³² Number of people in local faculty and staff households = number of local faculty and staff * average faculty and staff household size. Average faculty and staff household size is 2.75 (from internal survey/estimate) * 127.05 local faculty and staff = 349.

³³ Number of people in local student households = number of local students (both those with and without assumed families) * 2.34 (average household size in Chickasha according to US Census). USAO has 695 local students. We assume that the local students reflect the general USAO student population, with 21% married. Therefore, 145.95 of the students are local and married, and 549.05 are local and unmarried. Assuming that only the married students have families, there are (145.95*2.34 =) 341.523 people in local married student families. Added to the assumed single-person families of the 549.05 single local students, there are 890.573 people in local student households.

³⁴ Source: U.S. Census Bureau

³⁵ Source: City of Chickasha, Budget Summary FY 2002-2003. Only the personnel expenditures of the budget are used here.

| | | | |
|----------------------------------|--|--------------------------------|------------------------|
| (CH _{PS}) _F | number of faculty and staff children in local public schools | | 88.1 ³⁶ |
| (CH _{PS}) _S | number of students' children in local public schools | | 101.216 ³⁷ |
| CH _{PS} | total number of students in local public schools | | 3400 ³⁸ |
| B _{PS} | local gov't's operating budget for public schools | | 14820000 ³⁹ |
| PI _{CR} | personal income of local individuals from college-related jobs and business activities | $(f_L)*(W_F) + (p)*(E_L)_{CR}$ | 9958960.26 |
| f _L | Proportion of faculty and staff residing locally | | 0.77 |
| W _F | gross compensation to faculty and staff | | 8778991 |
| p | payrolls and profits per dollar of local direct expenditures | | 0.5 ⁴⁰ |
| (E _L) _{CR} | College-Related Local Expenditures | Model B-1 | 6398274.39 |

³⁶ Number of children (under 18) in Chickasha = 4,462 (Census)

Number of households in Chickasha = 6,434 (Census)

Therefore, $4462/6434 = 0.6935$ children per household on average

0.6358×127.05 local faculty and staff = 88.1 children of local faculty and staff in local public schools

³⁷ 145.95 local married students (see note #29) * 0.6935 children per household (see note #32) = 101.216 children of local students in local public schools

³⁸ Local public schools include Chickasha, Friend and Pioneer districts. Source: respective school districts

³⁹ Source: Chickasha, Friend and Pioneer School Districts

⁴⁰ See explanation in Part III.

APPENDIX B: GRAVITY MODEL FOR ESTIMATING EXPENDITURES LIKELY TO BE LOCAL

Gravity models estimate the relative pull that an economy has on the dollars of consumers. The magnitude of the pull depends on the relative size of the economy (measured in retail sales), the distance that a consumer has to travel to shop in that economy, and the relative size and distance of competing economies. In general, the less diversified an economy is, the less pull it will have on people's money. Also, the more competing economies there are, the larger they are, and the closer they are, the more likely money will be to leak out into them. E_L measures the amount of every dollar spent by a consumer that is likely to be spent in their local environment.

$$E_L = \frac{RS_L/D_L^2}{(RS_L/D_L^2 + RS_{OKC}/D_L^2 + RS_{NORM}/D_L^2 + RS_{ANA}/D_L^2)}$$

Local economy: Chickasha

Average distance for a resident of Chickasha to make a purchase in Chickasha: 5 miles

Competing economies: Oklahoma City and Norman

Average distance for a resident of Chickasha to make a purchase in a competing economy : 45 miles (same for each competing economy)

$RS_L = \$203,687,492$ (total for 12 months of 2008)

$RS_{OKC} = \$6,208,110,009$ (total for 12 months of 2008)

$RS_{NORM} = \$1,343,709,545$ (total for 12 months of 2008)

Source for all: Oklahoma Retail Trade Series, Origins. (www.origins.ou.edu)

$$E_L = \frac{203687492/25}{[(203687492/25)+(6208110009/2025)+(1343709545/2025)]}$$

$$E_L = 0.6840$$

Thus for every \$1 that a Chickasha resident spends, 68 cents of it is likely to be spent in Chickasha. The relatively small size of this number is explained not only by the relatively small size of Chickasha, but also the easy access that Chickasha residents have to much larger shopping areas, especially in the Oklahoma City metro area.