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The economic impact of the H. Lee Moffitt Cancer Center & Research Institute at the University of South Florida : an analysis performed by Center for Economic Development Research, College of Business Administration, University of South Florida

University of South Florida. Center for Economic Development Research

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An Analysis Performed by

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Preface

The H. Lee Moffitt Cancer Center & Research Institute is organized as a not-for-profit corporation located on the campus of the University of South Florida (USF) and was statutorily created in Chapter 240.512 by the Florida Legislature. Operating funds for Moffitt Cancer Center come from patient revenues, state-appropriated general revenue funds, and private donations. This study was commissioned by Moffitt Cancer Center and performed by the Center for Economic Development Research, College of Business Administration, University of South Florida. The purpose of the study is to quantify Moffitt's economic contribution to the Tampa Bay Region. The Center for Economic Development Research provides information and conducts research on issues related to economic growth and development in the Nation, in the State of Florida, and particularly in the Central Florida region. The Center serves the faculty, staff, and students of the College of Business Administration, the University, and individuals and organizations in the University's service area. Activities of the Center for Economic Development Research are designed to further the objectives of the University and specifically the objectives of the College of Business Administration.

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Executive Summary

The purpose of this study is to quantify H. Lee Moffitt Cancer Center & Research Institute's economic contribution to the Tampa Bay Region. Specifically, we quantify the economic contribution of operational expenditures, payroll, spending by visitors attracted to Moffitt, and the use of research grants. Due to the circulation of funds within the Region, the impact of Moffitt's spending activities is a multiple of the initial, or first, round of spending. The impact is measured by employment, personal income, and output. The data used to estimate Moffitt's economic contribution are from fiscal year 1998. The quantifiable impact is interpreted as Moffitt's expected *annual* economic contribution to the Region, even if there were no further growth in activities.

The quantifiable economic contributions of the H. Lee Moffitt Cancer Center & Research Institute to the Tampa Bay Region are ---

Jobs. There are 1,214 (full-time equivalent) employees, 256 medical staff (physicians), and 263 researchers and support staff, totaling 1,733 positions at Moffitt; plus 1,558 more jobs are created in the Region as a result of Moffitt's existence. Thus, **Moffitt contributes 3,291 jobs to the Tampa Bay Region**.

Personal Income. Moffitt's annual payroll is $45,948,000 for employees, $9,935,000 for reimbursement to USF for medical staff, and $10,806,068 allocated from grants to salaries and wages for the researchers and their support staff, totaling $66,689,068 for workers at Moffitt; plus $41,550,887 is earned annually by workers in the 1,558 jobs created in the Region. Thus, **Moffitt contributes $108,239,955 of personal income for workers in the Tampa Bay Region**.

Cancer Treatment and Research. The Cancer Center offers a concentration of specialists and facilities that provide a central marketplace for the diagnosis and treatment of cancer, thereby increasing operational efficiency and reducing costs. Last year, Moffitt accommodated 5,055 patient-admissions and 95,937 outpatient-visits. Also, as of February 1998 there were 123 active cancer research projects with grants totaling in excess of $15.9 million.. The diagnosis and treatment of cancer, along with active research, is Moffitt's productive output for which we are unable to place a dollar value, but we expect that the combination of increased efficiency and active research leads to shorter hospital stays, more effective treatments, less patient suffering, and more productive patients in spite of their disease.

Local Output. The workers in the 1,558 jobs created in the Region as a result of Moffitt's existence, produced goods and services valued at $112,123,186. Of these **$112,123,186 worth of goods and services produced in the Tampa Bay Region**, Moffitt was directly responsible for purchases totaling $22,237,294 for operations and other purchases valued at approximately $4,631,172 for research activity.

In addition to the annually recurring contributions above, Moffitt's capital budgets contribute to the Region's economy --

- $12,185,444 cash expenditures in fiscal year 1998, and

- $100 million construction budget, to be spent between 1998 and 2005, for a 329,000-square-foot, 5-story research facility.

The nexus between the Cancer Center with its Research Institute and the University of South Florida (USF) fosters a unique structure ---

- H. Lee Moffitt Cancer Center & Research Institute and USF create an environment in which Moffitt researchers independently conduct basic research and clinical investigations, while benefiting from the considerable resources available from the University.

- All Moffitt researchers are members of the USF faculty and, thus, contribute to the education of undergraduate medical students, residents, clinical fellows, graduate students, research fellows and the medical community at large.

- Moffitt's activities may also attract medical technology firms and medical supply firms to the Region, resulting in private capital investments and added high-wage employment opportunities.

I. Introduction.

The purpose of this study is to quantify Moffitt's economic contribution to the Tampa Bay Region. If the H. Lee Moffitt Cancer Center & Research Institute were closed, or even if its spending activities were decreased, the result would be loss of jobs, personal income and production within the Region. This study estimates the loss if Moffitt were closed and all of its employees left the Region. In the parlance of economic impact analysis, the quantifiable estimate of loss is *Moffitt's economic contribution to the Region*.[1]

We define the Region as the seven contiguous counties surrounding the Center. These counties are Hernando, Hillsborough, Manatee, Pasco, Pinellas, Polk, and Sarasota. The Region is considered the immediate service area of the Center and the place of residence for the employees and other medical practitioners at Moffitt.

Specifically, we examine the quantifiable economic effects of operational expenditures, payroll, spending by visitors attracted to Moffitt, and the use of research "grant funds" received through the University of South Florida (USF). We refer to the aforementioned as Moffitt's spending activities.

Due to the circulation of funds within the Region, the impact of Moffitt's spending activities is a multiple of the initial, or first round, of spending. That is, there are links among the various commercial elements of the Regional economy. Through these links, second and subsequent rounds of spending occur following the initial expenditures by Moffitt. For example, when Moffitt purchases locally produced medical instruments, the manufacturer of the instruments, in turn, must spend a portion of the funds received from Moffitt to hire workers, buy machinery, and pay for accounting services. The first-round or initial spending produces a direct effect on the Region. The economic effects of subsequent spending by businesses, such as the purchase of the manufacturing machinery and accounting services, are called indirect effects. In addition, workers' spending, which becomes possible due their incomes motivated by first round expenditures, leads to induced effects. This cycle continues, round by round, until the initial expenditure by Moffitt has a multiple effect on employment, personal income, and production within the Region.

Subsequent rounds of spending continue within the Region until Moffitt's initial expenditures "leak" out of the Regional economy. Leaks occur due to taxes, savings, and spending to import goods and services from outside the Region.

In this study, we estimate the impact of annual spending by Moffitt Cancer Center. The impact

[1] See Appendix E, "Primer on Regional Economic Development Analysis," for an explanation of the technique of economic impact analysis used for this study.

is measured by employment, personal income, and production. The data used in the estimation process are from fiscal year 1998, which began July 1, 1997 and ended June 30, 1998. The impact on employment is measured in terms of jobs. Personal income, which is aggregated from all sources, including employment income and proprietors' income, is denominated in 1997 dollars. Production, also called output, is measured at 1997 producer prices.

Although the focus of this study is the quantifiable economic effects of the Moffitt Cancer Center on the Region, we recognize that expenditures and the "multiplier" effects are only the monetary impact of Moffitt. While we cannot put a dollar value on the medical benefits to patients treated at the Cancer Center, we do note that Moffitt Cancer Center offers a concentration of specialists and facilities that provide a central marketplace for the diagnosis and treatment of cancer. Economists have long recognized that a central marketplace increases operational efficiency and reduces costs. We expect that increased operational efficiency produces shorter hospital stays, more effective treatments, less patient suffering, and more productive patients in spite of their disease.

In 1998, Moffitt Cancer Center accommodated 5,055 inpatient(IP) admissions and 95,937 outpatient(OP) visits. The average length of stay for an inpatient was 5.76 days, resulting in production of 29,127 patient-days by the Center. A total of 2,328 inpatients and 15,002 outpatients were people living within the 7-county Region. An additional 5,133 (793 inpatients and 4,340 outpatients) people from outside the Region came to Moffitt for treatment. The distribution of patients by county follows.[2]

Patient's County	IP	OP
Hernando	124	886
Hillsborough	847	6,670
Manatee	172	1,018
Pasco	335	1,910
Pinellas	324	2,113
Polk	348	1,511
Sarasota	178	894
Regional Total	2,328	15,002
Other	793	4,340
Grand Total	3,121	19,342

As a university-based teaching facility, Moffitt is a classroom for physicians, health care professionals, patients, families, students and community members seeking knowledge of cancer. In partnership with USF, Moffitt physicians share their expertise and time to train medical professionals in all aspects of cancer treatment, research, and prevention. Economists use the

[2]Some patients were admitted more than once or made more than one outpatient visit during 1998. For example, there were 95,937 outpatient visits by 19,342 outpatients, or an average of 4.96 visits per outpatient.

term "human" capital to describe attributes, such as knowledge that allows a person to be a productive member of society. Human capital is an intangible asset that is not readily quantifiable. Nevertheless, we do acknowledge the benefit to the individual and the community from Moffitt's educational mission.

Research at Moffitt has effects that extend beyond the amount of federal, state, and private grant money that is spent in the Region. Discoveries can lead to new technology that, in turn, gives rise to new industries. Moffitt's research activities may also attract medical technology firms to the Region, resulting in private capital investments and added high-wage employment opportunities.

We purposefully include operating expenses, payroll, visitors' spending, and use of research funds - and exclude capital expenditures - so that our quantifiable estimate of Moffitt's economic contribution may be measured and understood as an annual occurrence.[3] That is, as long as Moffitt's doors remain open, we expect that the quantifiable contribution will continue from year to year. On the other hand, capital expenditures are expected to provide only a temporary boost to the economy because, by definition, a capital expense is the cost of acquiring a *long-lasting* asset. However, we note that Moffitt has a consistent, although fluctuating, 5-year record of cash expenditures for the acquisition of property, plant, and equipment. These expenditures have been in the amounts indicated below.

FY94	FY95	FY96	FY97	FY98
$13,907,380	$5,564,631	$5,227,530	$4,422,103	$12,185,444

These capital expenditures add to Moffitt's economic impact on jobs, income, and production in the Region. Because of the variability in the amount spent from year to year, the spending may also induce a cyclical effect in some sectors of the Regional economy. For example, if the major portion of capital spending in a year were for construction, the local construction industry may have a boom year. When the project is finished, however, the construction industry, as well as the Region's economy, could slow down as construction workers are laid off. We also note, as explained further in Section II of this study, that it is expected that $100 million will be spent between 1998 and 2005 on the construction of a research facility. If the spending were spread evenly through the years, approximately $14.3 million will be spent each year. Thus, Moffitt's future capital spending can be expected to have a greater economic impact on the Region than capital expenditures of the recent past.

[3] Over the span of fiscal years 1994 to 1998, year-to-year operating expenses increased two times and decreased two times. However, the average increase in operating expenses was +8.3% per annum. See Appendix A, "Financial Statements: H. Lee Moffitt Cancer Center & Research Institute."

II. History, Organization and Function.

H. Lee Moffitt Cancer Center & Research Institute opened its doors on October 27, 1986 on the main campus of the University of South Florida (USF) in Tampa, Florida. Its principal mission is to contribute to the prevention and cure of cancer through patient care, education and research. The $70 million for the original construction of the Center was primarily funded by Florida's cigarette tax.

Supported by the State of Florida and leased from the Florida Board of Regents, H. Lee Moffitt Cancer Center & Research Institute is organized as a nonprofit corporation under Chapter 617 of the Florida Statues. Moffitt Cancer Center is statutorily created in Chapter 240.512 of the Florida Legislature and serves as an instrumentality of the State.

Facilities.

At present, the Center occupies three buildings on the USF campus. The six-story hospital is licensed for 162 inpatient beds, which include three 8-bed special care units and a 37-bed bone marrow transplant program. Additions soon to be underway at the main hospital include expansion of operating room space (18,000 sq. ft.) and third floor office space (20,000 sq. ft.). A Breast Cancer Center construction project is also currently underway, which will house all services related to breast cancer in one central area within the main hospital.

The Moffitt Research Center, located across the street from the main hospital, was acquired by Moffitt in 1991. The Florida Legislature allocated $12 million for renovation and equipment for this 100,000-square-foot structure and the building became fully operational in 1994. The Moffitt Research Center houses basic research labs, cancer control research space, educational areas including an auditorium and library, and some outpatient services. Currently, 49,000 square feet of basic research lab space is being added to the Moffitt Research Center at a cost of $11 million.

The third building, the Child Development Center, is a 5,506 square-foot day-care facility operated primarily for the children of Moffitt staff. Also, five modular structures provide 11,370 square feet of space to house human resources, business office, appointment call center, clinical research and other administrative functions.

In addition, the Center has leased space at the University Tech Center (19,000 sq. ft.), adjacent to the USF main campus, and University Park (21,000 sq. ft.). Moffitt's Lifetime Cancer Screening service and Cancer Answers outreach programs are located in University Park for easy access to consumers seeking prevention services. Three Lifetime mobile units also traverse the Region conducting screening and educational workshops.

Screening and Outreach.

Lifetime Cancer Screening is a program that provides routine clinical services and functions as a clinical laboratory for cancer control research. At the program's University Park facility there is space for clinical, educational, research and administrative staff, as well as housing for diagnostic medical equipment. Activities at the facility include cancer screening and patient counseling, nutritional assessments, and smoking cessation studies. The three mobile units go off-site to reach underserved and minority populations in the west central Florida area. A group of 45 Moffitt employees, plus other Moffitt-based physicians and clinical research specialists, carry out the program's activities.

In fiscal year 1998, Lifetime Cancer Screening served 6,219 patients at the clinic and 4,649 patients at the mobile units. Based on the first quarter case load, the screening program is projected to serve 11,640 patients at the clinic and 5,464 patients at the mobile units during fiscal year 1999. About 10% of the population served is Hispanic and about 7% is African-American or other minority group.[4]

The community education specialists at Lifetime Cancer Screening provide access to information about cancer for audiences of all ages. Topics include cancer prevention, early detection, and screening. Many educational programs target minorities, senior citizens, and underserved groups. Bilingual educators regularly reach Spanish-speaking audiences. Also, Moffitt's education specialists develop educational materials for the public, as well as agencies such as the American Cancer Society.

Furthermore, in an important part of Moffitt's nexus with USF, students work with Moffitt's community education specialists during internships and gain valuable experience in such fields as public health, education, and nursing.

During fiscal years 1997-1998, there were 141 educational visits to schools in Hillsborough (32 visits), Pasco (45), and Polk (64) counties. In addition, there were 48 visits to local businesses and community organizations, as shown in the following table by county.[5]

County	Number of Businesses & Community Organizations Visited
Hernando	6
Hillsborough	20
Manatee	9
Pasco	1

[4]This distribution is comparable to the composition of the population of the west central Florida counties that are served by Lifetime Cancer Screening.

[5]Additionally, there were 2 visits to Hardee County, making the grand total of educational visits equal to 50.

Pinellas	5
Polk	2
Sarasota	5
Total visits	48

During their visits to local schools, businesses, and community organizations, Moffitt's education specialists contacted approximately 6,302 client-citizens or an average of almost 33 contacts per visit.

NCI Designation and Future Growth.

In September 1997, H. Lee Moffitt Cancer Center & Research Institute became the only institution in Florida - and one of 58 in the Nation - to achieve cancer center designation by the National Cancer Institute (NCI). The designation is in recognition of Moffitt's scientific and clinical excellence, resulting in superior patient care. Of economic significance, the designation came with a three-year research grant of up to $2.5 million. Additionally, Moffitt became eligible for further research funding that is available only to NCI-designated centers.[6]

On June 10, 1998, in a ceremonial signing at Moffitt, Florida Governor Lawton Chiles approved a legislative initiative to fund construction of a 329,000-square-foot, five-story Moffitt Research Tower. The tower building will connect the existing hospital and research building on the USF campus. Construction of the research tower is expected to cost $100 million. These funds will be allocated from the revenues of Florida's cigarette tax to be annually replaced by the Tobacco Settlement lawsuit. The planned opening of the building is in the year 2004. When fully completed, the building will accommodate a scientific staff of 540, including 81 principal investigator scientists. In addition to the research space, the facilities in the tower building will include outpatient services, a diagnostic laboratory, conference and education rooms, and administrative offices.

The $100 million construction budget, as well as the annual operating expenditures for the Research Tower, when it is "open for business," can only increase Moffitt's economic impact on the Region. Thus, the effects quantified in this study, based on fiscal year 1998 expenditures, will grow in magnitude and importance.

Cancer Center Operations.

Operating funds for the Moffitt Cancer Center come from patient revenues, state-appropriated general revenue funds, and private donations. For fiscal year 1998, the Florida Legislature passed and the Governor signed an appropriation for Moffitt of $9,650,169. This state

[6]See, for example, *The Tampa Tribune*, Business Finance section, September 27, 1997.

appropriation represents 7.5% of Moffitt's total revenues of $129,344,483.[7] Also in fiscal year 1998, Moffitt provided $5,269,267 in charity cancer care services. The charity care represents 4.6% of net patient services revenues and 4.1% of total revenues.[8]

The Center's operating expenses for fiscal year 1998 were $110,339,686. The economic impact of the expenditures is explained in Section III of this study.

All physicians of the Center are faculty members of USF's College of Medicine. Moffitt's faculty includes 256 physicians representing more than 45 medical disciplines. The Center participates in the education of undergraduate medical students, residents, clinical fellows, graduate students, research fellows and the medical community at large. About 50 residents and fellows are serving at Moffitt at any time during the year. Moffitt also participates in the training of nurses, technicians and other allied health personnel. Additionally, Moffitt researchers and support staff total 263. These faculty members, primarily located in the Moffitt Research Center, represent work being accomplished at many levels. In their labs, basic scientists probe the whys and hows of healthy cells that change to cancer. Cancer control scientists design studies to reduce unpleasant side effects of chemotherapy and radiation; they focus on the human side of how patients can best cope with the treatment of cancer.

In fiscal year 1998, the Center's payroll totaled $45.948 million, which was paid to the equivalent of 1,214 full-time employees.[9] The economic impact of this payroll is explained in Section IV of this study.

The Center offers educational programs, seminars, conferences, and symposia each year. During fiscal year 1998, there were 34 such events attended by more than 1,800 people.[10] Approximately 933 of the attendees were visitors to the Region. Additionally, many patients, along with their families and friends, travel from outside the Region to visit Moffitt Cancer Center. The economic impact of spending by visitors to Moffitt is examined in Section V of this study.

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[7]H. Lee Moffitt Cancer Center & Research Institute organizes its financial accounting on the same fiscal year basis as the State of Florida. Fiscal year 1998 extends from July 1, 1997 to June 30, 1998.

[8]See Appendix A, "Financial Statements: H. Lee Moffitt Cancer Center & Research Institute." In addition to unfunded charity care, $3,349,726 was expensed in fiscal year 1998 as Provisions for Bad Debt. The bad debt provision represents 3.0% of the year's $113,124,085 Net Patient Service Revenues and 2.6% of Total Revenues.

[9]The Center uses the following categories of employees: full-time, part-time, and PRN. The PRN category is a pool of medical professionals who are available to work on an "as needed" basis. Full-time employment is defined as 2,080 hours annually. Hours worked by part-time and PRN employees were aggregated to derive the number of full-time employee equivalents during the fiscal year.

[10]Four of the events were held outside the Region.

Basic and clinical research are an integral part of the activities at Moffitt. Moffitt physicians and scientists are part of the Moffitt Cancer Center membership, and have research interests that are incorporated into a multitude of programs. Researchers obtain funding from a variety of sources, such as the National Institutes of Health, National Cancer Institute, American Cancer Society, and the National Aeronautics and Space Administration. Research grants are administered by USF's Division of Sponsored Research. During fiscal year 1998, approximately $15.4 million was spent on research that was funded by sources outside Moffitt and USF. The economic impact of this research activity is explained in Section VI of this study.

The conclusions of the study are presented in Section VII.

III. Economic Impact of the Operating Expenditures by Moffitt.

H. Lee Moffitt Cancer Center & Research Institute's total operating expenses for fiscal year 1998 were $110,339,686. Of the total operating expenses, an estimated $22,237,294 was spent to purchase locally produced goods and services, $9,935,000 was spent to reimburse USF for the salaries of the medical faculty, and $45,948,000 was paid to employees for wages and salaries.[11] (The economic impact of employees' spending of their wages and salaries is discussed in the Section IV, next.) The remainder, or $32,219,392, was spent to purchase goods and service, which were produced outside the Region.[12]

Moffitt's purchase of locally produced goods and services has an economic impact on the Region. The total impact is the sum of direct, indirect, and induced spending. This impact is measurable in terms of increased employment, personal income and output.

About 512 jobs within the Region depend on Moffitt's spending for locally produced goods and services. Annually, the workers in these 512 jobs earn more than $14.7 million of income, while producing an output valued at approximately $40.1 million.

About 267 of the 512 jobs, and approximately $8 million of personal income, are directly attributable to Moffitt's operating expenditures. These 267 workers produced the $22,237,294 of goods and services purchased by Moffitt in the Region. Firms providing business services within the Region enjoy the largest gain in employment, with almost 50 jobs and about $1.6 million in personal income. However, the largest gain in output, over $5.8 million, goes to local companies for scientific instruments, mainly surgical appliances and supplies.

Second and subsequent rounds of spending by businesses, spurred by the direct effects of Moffitt's operating expenditures, sustain 92 more jobs and provide those workers with $2.7 million in personal income. These rounds of spending increase the output of goods and services in the Region by another $7.2 million. The primary beneficiaries of this indirect economic activity are again local firms providing business services. The business services sector of the economy adds another 20 jobs with personal income slightly more than $500,000 and produces an output valued at more than $960,000.

The increase in personal incomes, stemming from the direct and indirect effects of Moffitt's

[11] We used the vendor's postal ZIP code to infer whether the good or service was produced locally or not. If a vendor's ZIP was located within the 7-county Tampa Bay Region, we considered the good or service locally produced.

[12] Identification of the items produced outside the Region and purchased by Moffitt was not undertaken during this study. However, anecdotal evidence suggests that the items include goods important for hospital operations, such as pharmaceuticals, medical equipment, and blood supplies, which are not available locally.

operating expenditures, induces further spending in the Region. Induced spending supports 153 more jobs, which provide another $3.7 million in income, and adds over $10 million to the total impact on output. The retail trades within the Region benefit most from the induced effects. Increased output from induced effects in the retail sector is over $1.8 million, which generates 50 jobs with personal income in excess of $850,000.

In summary, the total contribution of Moffitt's operating expenditures to the Regional economy, excluding payroll and reimbursement to USF for medical faculty, is approximately 512 jobs, which provide the workers with $14.7 million of income while producing $40.1 million in output each year. The following table summarizes the distribution of the *Contribution of Local Purchases to the Tampa Bay Region* among business sectors by aggregating the effects at the 1-digit Standard Industrial Classification (SIC) code level.

Contribution of Local Purchases to the Tampa Bay Region

Sector	Employment	Personal Income	Output
Agriculture	10 jobs	$149,102	$247,491
Mining	*	11,823	55,860
Construction	14	444,460	935,385
Manufacturing	67	2,689,560	11,320,803
Transportation & Public Utilities	16	652,508	2,885,655
Trade	97	1,990,989	4,399,688
Finance (FIRE)	33	1,016,908	5,029,559
Services	263	7,272,315	13,426,891
Government	9	461,625	1,820,721
Other	3	28,689	28,689
Total Local Purchasing Impact	512 jobs	$14,717,829	$40,150,742

* = less than 1 full-time job

Additionally, we estimate the economic impact of the $9,935,000 spent to reimburse USF for the salaries of the medical faculty. To make the estimate, we assume that the entire sum is paid to medical faculty as employment income and that the medical faculty are in high income (over $50,000 per annum) households. After a reduction for estimated tax payments, the aggregate annual personal disposable income is $8,731,872.[13]

About 143 jobs within the Region depend on the spending of the dollars that Moffitt pays to USF for reimbursement of salaries of the medical faculty. Annually, the workers in these 140 jobs earn more than $3.5 million of income, while producing an output valued at approximately $9.7 million.

[13]The 1997 Florida Statistical Abstract is the basis for a disposable income factor of 0.8789 of personal income. The Abstract is published by the Bureau of Economic and Business Research, College of Business Administration, University of Florida, Gainesville, FL 32611.

About 83 of the 143 jobs, and approximately $2 million of personal income, are directly attributable to Moffitt's spending for medical faculty. These 83 workers produced $5,585,352 of goods and services in the Region. Retail establishments within the Region experience the largest gain in employment with an increase of 35 jobs with $596,182 in personal income. This spending also adds over $1.2 million to the annual output for the retail sector of the Regional economy.

Second and subsequent rounds of spending by businesses, motivated by the direct effects, sustain about 21 more jobs and provide those workers with $599,830 of personal income. These rounds of spending increase the output of goods and services in the Region by approximately another $1.6 million. The greatest employment impact is on the business services sector, which gains 4 jobs with personal income estimated at $101,647. In terms of output, the personal services sector increases production by about $221,000 in response to the indirect spending.

The increase in personal incomes, due to the direct and indirect effects, induces further spending in the Region. Induced spending generates about 39 more jobs, which provide the workers with $944,322 in personal income, and adds just over $2.5 million to the total impact on Regional output. Retail businesses add another 12 jobs with personal income equal to $207,252 and increase output by $444,768.

In summary, the total contribution of the dollars spent by Moffitt to reimburse USF for the salaries of medical faculty is approximately 143 jobs, which provide the workers with more than $3.5 million of income, while producing $9.7 million of output each year. The following table summarizes the distribution of the *Contribution of Reimbursement for Medical Faculty to the Tampa Bay Region* among business sectors by aggregating the effects at the 1-digit Standard Industrial Classification (SIC) code level.

Contribution of Reimbursement for Medical Faculty to the Tampa Bay Region

Sector	Employment	Personal Income	Output
Agriculture	2 jobs	$ 28,058	$ 62,704
Mining	*	1,410	7,082
Construction	3	85,441	199,413
Manufacturing	4	120,115	502,338
Transportation & Public Utilities	5	189,436	756,564
Trade	54	1,065,622	2,403,274
Finance (FIRE)	12	374,391	2,420,540
Services	58	1,599,111	3,139,021
Government	2	78,640	226,057
Other	3	27,461	27,461
Total Reimbursement Impact	143 jobs	$3,569,685	$9,744,494

* = less than 1 full-time job

IV. Economic Impact of Spending by Moffitt Employees.

During fiscal year 1998, employees of H. Lee Moffitt Cancer Center & Research Institute were paid employment income totaling $45,948,000. We estimate that this employment income generated $5,564,313 in tax liabilities for Moffitt's employees.[14] After paying taxes out of their total employment income, the employees have $40,383,686 in spending power.

How that money is spent depends on the level of household income. To model the spending patterns of Moffitt's employees, we divide the after-tax payroll among low, medium, and high wage earners.[15] The breakout is:

Category	Interval	Percent	Disposable Income
Low	$0 to $20,000	14.5%	$ 5,855,635
Medium	$20,001 to $50,000	62.0%	25,037,855
High	over $50,000	23.5%	9,490,166
Total		100%	$40,383,686

The employees have an economic impact on the Region when they spend their disposable income to buy goods and services in the Region. The total impact is the sum of direct, indirect, and induced spending. This impact is measurable in terms of increased employment, personal income and output.

About 684 jobs within the Region, in addition to the jobs at Moffitt, depend on Moffitt's employment payroll. Annually, the workers in these 684 jobs earn more than $17.6 million of income, while producing an output valued at approximately $47.2 million.

About 403 of the 684 jobs, and approximately $9.7 million of personal income, are directly attributable to Moffitt's payroll. These 403 workers produce about $26.9 million of goods and services in the Region. Retail businesses in the Region benefit most with an addition of over 163 jobs, almost $2.9 million in personal income, and $6.1 million in output.

Second and subsequent rounds of spending by businesses, due to the direct economic activity of Moffitt's employees, sustain 99 more jobs and provide those workers with over $2.7 million in personal income. These rounds of spending increase the output of goods and services in the Region by another $7.4 million. Benefits from indirect spending spawned by Moffitt's payroll

[14] See footnote 13.

[15] We do not have data about the household incomes of Moffitt employees. We approximate household income levels by assuming that a Moffitt employee is the only household member who has income. Payroll information, including the breakout among low, medium, and high earners, was supplied by the Director of Business Analysis at Moffitt. Low earnings are $20,000 or less per year. High earnings are over $50,000 per year.

are widely distributed throughout the Region. In terms of output, the real estate sector benefits most with added productivity of more than $1 million annually. The business services sector of the Regional economy adds 21 jobs and personal income slightly under $500,000.

The increase in personal incomes due to direct and indirect effects induces further spending in the Region. Induced spending supports 182 more jobs, which provide another $4.5 million in income, and adds $12 million to the total impact on output. Again, the retail trades within the Region benefit most from the induced effects. Increased output from induced effects in the retail sector is over $2.2 million, which generates 60 jobs with personal income in excess of $1 million.

In summary, the total contribution of Moffitt's payroll to the Regional economy is approximately 684 jobs, which provide the workers $17.6 million of income while creating $47.2 million in output each year. The following table summarizes the distribution of the *Contribution of Moffitt Payroll to the Tampa Bay Region* among business sectors by aggregating the effects at the 1-digit Standard Industrial Classification (SIC) code level.

Contribution of Moffitt Payroll to the Tampa Bay Region

Sector	Employment	Personal Income	Output
Agriculture	8 jobs	$ 145,531	$ 330,787
Mining	*	7,678	38,596
Construction	13	405,315	937,058
Manufacturing	17	589,697	2,498,614
Transportation & Public Utilities	22	932,955	3,796,332
Trade	254	5,076,871	11,426,003
Finance (FIRE)	59	1,821,801	11,387,067
Services	289	8,127,965	15,524,870
Government	9	385,232	1,134,690
Other	13	131,062	131,062
Total Payroll Impact	684 jobs	$17,624,106	$47,205,079

* = less than 1 full-time job

V. Economic Impact of Spending by Visitors to Moffitt.

During fiscal year 1998, educational programs, seminars, conferences, and symposia that were sponsored by Moffitt Cancer Center & Research Institute, attracted 933 visitors into the Tampa Bay Region. These 933 visitors amassed 1,423 visitor-days and an estimated $227,368 of direct spending in the Region.[16]

Visitors attracted into the Region by Moffitt's events add about eight jobs to the economy with aggregate earnings of $150,741, while producing $414,994 of output. The specific effects are:

Effect	Employment	Personal Income	Output
Direct	5 jobs	$ 82,601	$227,368
Indirect	1	28,675	81,474
Induced	2	39,465	106,152
Total	8 jobs	$150,741	$414,994

Patients also travel to the Moffitt Cancer Center for treatment and they are often accompanied by families and friends. As reported in Section I of this analysis, the hospital accommodated 5,055 inpatient admissions and 95,937 outpatient visits in 1998. Here, our purpose is to quantify the economic impact on the Region, because some of these patients come from outside the Region and spend when they arrive in the Region.[17]

During fiscal year 1998, there were 793 inpatient admissions involving patients who reside outside the Region. Based on a telephone survey, the average size of the group accompanying an inpatient is 2.13 persons and their average daily spending per person is $69.55.[18] Further, lodging data indicate 4,462 room-nights attributable to visitors from outside the Region.[19] Thus,

[16]We define a visitor-day as a period including at least parts of two consecutive calendar days and an overnight stay in the Region. According to the Tampa/Hillsborough Convention and Visitors Association, the average daily expenditure per typical visitor during 1997 was $159.78 per person. We use this amount to estimate visitors' direct spending in the Region during fiscal year 1998.

[17]We do not include spending by patients who reside in the 7-county Region, because we believe that their spending related to patient-activity substitutes for an equal amount of spending that would otherwise occur in the Region. Thus, the economic impact of their spending can constitute only a minor change in the Regional spending pattern.

[18]The Office of Patient Relations, Public Relations & Marketing, H. Lee Moffitt Cancer Center & Research Institute, surveyed 30 patients during January 1999. Daily spending per person ranges from $245.00 to $20.71.

[19]Moffitt's Magnolia Lodging Program's Annual Report for fiscal year 1998 indicates that patients, their families and friends utilized a total of 6,375 room-nights. Occupying a hotel room or an apartment over night is one room-night. Seventy percent of the 6,375 room-nights, or 4,462 room-nights, are attributable visitors from outside the Region.

estimated aggregate spending by relatives and friends accompanying inpatients who live outside the Region, is $661,007.

Relatives and friends of inpatients who visit the Region for treatment at Moffitt Cancer Center add about 22 jobs to the economy with aggregate earnings of $438,282, while producing $1,206,536 of output. The specific effects are:

Effect	Employment	Personal Income	Output
Direct	14 jobs	$240,164	$ 661,007
Indirect	3	83,372	236,890
Induced	5	114,746	308,639
Total	22 jobs	$438,282	$1,206,536

In summary, the total contribution to the Regional economy by visitors attracted to Moffitt's events and by relatives and friends of inpatients is approximately 30 jobs, which provide the workers in those positions with $589,123 of income while creating $1,621,530 in output each year.

VI. Economic Impact of Research Activity at Moffitt.

All Moffitt researchers are faculty of USF. Working together, the Moffitt Cancer Center and USF create an environment in which Moffitt researchers independently conduct basic research and clinical investigations, while benefiting from the considerable resources available from the University. Also, USF and its Health Sciences Center benefit from the opportunities to attract outstanding faculty, who in turn enhance the University's standing as an excellent educational center for medical professionals.

Grant funds for the conduct of research are awarded through USF's Division of Sponsored Research and managed by USF's Division of Finance and Accounting. As of February 1998, active research grants totaled in excess of $15.9 million, involving 123 research projects. In the following table, the "In Residence" column refers to active research grants obtained by members "in residence" and the "All Others" column refers to research grants obtained by others participating in the Membership Program. The column labeled "Direct Costs" is the sum of the "In Residence" and "All Others" columns, and represents the total amount that can be spent under active research grants.

Active Research Grants

Funding Agency	Projects	Direct Costs	In Residence	All Others
National Cancer Institute	42	$4,361,802	$3,889,874	$ 471,928
Other National Institutes of Health	23	2,684,511	751,314	1,933,197
American Cancer Society	7	396,100	225,700	170,400
National Science Foundation	6	313,515	61,295	252,220
Other Peer Reviewed	14	1,582,862	701,670	881,192
Peer Reviewed Subtotal	92	$9,338,790	$5,629,853	$3,708,937
Non-peer Reviewed	31	6,573,117	5,554,186	1,018,931
Non-peer Reviewed Subtotal	31	$6,573,117	$5,554,186	$1,018,931
Grand Total	**123**	**$15,911,906**	**$11,184,038**	**$4,727,868**

Source: Office of the Vice President, Research Administration, H. Lee Moffitt Cancer Center & Research Institute.

The table above reflects the active research grants of Moffitt "members." The Membership Program, established in 1992, creates a formal relationship that draws in USF faculty with interest in cancer-related research and provides an effective framework for the integration of basic research and clinical studies. Membership applications are evaluated by the Moffitt Cancer

Center's Scientific Leadership Council. The Council assigns new members to research programs. Membership is independent of USF faculty appointment status, medical staff membership, or hospital admitting privileges. Membership benefits include access to shared resources, participation in scientific programs, eligibility for research facilities, and support by developmental funds.

Members "in residence" are physicians and scientists who have been recruited by Moffitt Cancer Center & Research Institute, accepted into the Membership Program, and hired by USF. USF is reimbursed by Moffitt for the salaries of members "in residence," and they are allocated work space within the Moffitt complex of facilities. "All others" are also participants in the Membership Program; however, their salaries are not reimbursed to USF, and they are not necessarily assigned work space within the Moffitt complex.

We estimate the economic impact on the Region by assuming that, if Moffitt were to close its doors, all currently funded research activity stops or moves out of the Region. Based on the active grants, as shown above, the annual loss in research spending would be approximately $15,437,240.[20] About 70 percent of research spending generally is allocated to salaries and wages of researchers and support staff; the remainder is used to purchase supplies and equipment.[21] From the 70/30 split, we allocate $10,806,068 to salaries and wages for the researchers and support staff, resulting in an approximate annual disposable personal income of $9,497,453.[22] The remaining $4,631,172 is our estimate of annual spending for supplies and equipment.

About 189 jobs within the Region, in addition to the jobs of researchers and staff, depend on Moffitt's research activities. Annually, the workers in these 189 jobs earn more than $5 million of income while producing an output valued at approximately $13.4 million.

Almost $2.3 million of the $13.4 million in added annual output within the Region is due to the

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[20]Although most grants provide funds for a one-year period and may be annually renewed for additional funds, some grants - particularly non-peer-reviewed, pay-for-performance grants for clinical investigations - are constructed in anticipation of spending beyond a one-year period. For this study, we estimate that $474,667 may be spent beyond a one-year period and reduce the grand total of active grant funding accordingly.

[21]The expenditures for salary and wages from the research grants usually provides income for between 100 and 300 researchers and support staff, depending upon the projects underway. During fiscal year 1998 there were, on average, 263 researchers and support staff. In some instances, a "member in residence" may be partly compensated from grant funds, with the remainder of compensation being paid by USF and reimbursed to USF from Moffitt's operating funds.

[22]See footnote 13.

purchase of supplies and equipment that are used to conduct cancer research. The remainder, or about $11.1 million, is due to spending of personal disposable income earned by the researchers and their staff.[23]

About 111 of 189 jobs, and approximately $2.9 million of personal income, is directly attributable to Moffitt's research activities. These 111 workers produce about $7.6 million of goods and services in the Region. Retail businesses in the Region benefit most with the addition of over $1.4 million in output, 39 jobs, and almost $670,000 in personal income.

Second and subsequent rounds of spending by businesses, arising from the direct economic impact of Moffitt's research activities, support 28 more jobs and provide those workers with more than $816,000 in personal income. These rounds of spending increase the output of goods and services within the Region by another $2.2 million. Local firms that sell business services experience the largest increase in output - $286,000 - resulting from the indirect impact of the research activities. The local business services industry also adds about 6 jobs with aggregate personal income of slightly over $150,000.

The increase in personal incomes, due to the direct and indirect effects, induces further economic activity within the Region. Induced spending supports 50 more jobs, which provide more than $1.3 million in personal income and adds $3.6 million to the total impact on output. Retail businesses in the Region also benefit most from the induced economic activity with over $2 million in increased output, 17 jobs, and more than $985,000 in personal income.

In summary, the contribution of Moffitt's research activities to the Regional economy is approximately 189 jobs, which provide the workers just over $5 million of income while creating $13.4 million in output.[24] The following table summarizes the distribution of the *Contribution of Research Grants to the Tampa Bay Region* among business sectors by aggregating the effects

[23]We do not have data about individual incomes or the household incomes of the researchers and support staff. Hence, we assume a medium household income - $20,001 to $50,000 - and model household spending patterns accordingly.

[24]If we use the alternative assumption that, if Moffitt were to close, only members "in residence" research activity would be lost from the Region, then the economic impact is diminished by about 30.6%. That is, under the alternative assumption, about 132 jobs within the Region, in addition to the researchers' jobs, depend on Moffitt's "in residence" research activities. Annually, the workers in these 132 jobs earn just under $3.5 million of income, while producing an output valued at approximately $9.3 million.

at the 1-digit Standard Industrial Classification (SIC) code level.

Contribution of Research Grants to the Tampa Bay Region

Sector	Employment	Personal Income	Output
Agriculture	2 jobs	$ 39,648	$ 88,064
Mining	*	2,314	11,696
Construction	8	258,566	556,353
Manufacturing	5	179,012	740,678
Transportation & Public Utilities	6	257,917	1,038,401
Trade	65	1,319,281	2,980,813
Finance (FIRE)	17	514,612	3,185,609
Services	81	2,334,957	4,454,708
Government	2	110,172	311,254
Other	3	33,765	33,765
Total Research Impact	189 jobs	$ 5,050,244	$13,401,341

* = less than 1 full-time job

VII. Conclusions.

The H. Lee Moffitt Cancer Center & Research Institute has 1,214 full-time equivalent jobs and an annual payroll of $45.948 million. Moffitt also reimbursed USF $9,935,000 in fiscal year 1998 for 256 medical staff, who are faculty members of USF. Additionally, 263 researchers and support staff were serving at Moffitt during fiscal year 1998. As of February 1998, active research grants totaled $15.9 million. And, in fiscal year 1998, Moffitt spent $22,237,294 to purchase locally produced goods and services for operations.

The following table summarizes the quantifiable economic impacts of spending of their wages and salaries by Moffitt's employees, medical staff, researchers and support staff, as well as operating expenditures, spending for cancer research, and spending by visitors attracted to Moffitt. The impacts shown in the table reflect the *additional* jobs, income, and production created within the surrounding 7-county Region, that are a result of Moffitt's existence.[25]

Activity	Impact on:	Employment	Personal Income	Output
Operating expenditures[26]		512 jobs	$14,717,829	$40,150,742
Medical faculty spending		143	3,569,685	9,744,494
Employee spending		684	17,624,106	47,205,079
Visitor spending		30	589,023	1,621,530
Research activity		189	5,050,244	13,401,341
Total impacts		1,558 jobs	$41,550,887	$112,123,186

Furthermore, Moffitt Cancer Center's 256 medical staff (physicians) treated 5,055 inpatient-admissions and 95,937 outpatient visits during the past year. In economic terms, the treatment of patients, for which we do not attempt to assign a dollar value, is an output of Moffitt Cancer Center. As with the treatment of patients, we also cannot assign a dollar value to research results.

Hence, the **quantifiable economic contributions** of the H. Lee Moffitt Cancer Center & Research Institute to the Tampa Bay Region are:

(1) **Jobs.** There are 1,214 employee jobs, 256 medical staff (physicians), and 263 researchers and support staff, totaling 1,773 positions at Moffitt, plus the 1,558 jobs created in the Region as a result of Moffitt's existence. Thus, Moffitt contributes 3,291 jobs to the Tampa Bay Region.

[25]See Appendix B, "Impacts on the Florida Economy," for a comparison of the 7-county impacts with the entire state, when the economic impact area is alternatively defined as the state of Florida.

[26]Operating expenditures listed here are principally for the purchase of goods and services. Moffitt employees' spending out of their wages and salaries and reimbursement to USF for medical faculty are treated separately in this report.

The employment multiplier is 1.90 (3,291 jobs in the Tampa Bay Region divided by 1,773 jobs at Moffitt) indicating that for every 100 jobs at Moffitt another 90 jobs are created in the 7-county Tampa Bay Region.[27]

(2) **Personal Income.** Moffitt's annual payroll is $45,948,000 for employees, $9,935,000 for reimbursement to USF for medical staff, and $10,806,068 allocated from grants to salaries and wages for the researchers and their support staff, totaling $66,689,068 for workers at Moffitt, plus the $41,550,887 earned by workers in the 1,558 jobs created in the Region. Thus, Moffitt contributes $108,239,955 of personal income for workers in the Tampa Bay Region. The personal income multiplier is 1.62 ($108,239,955 of personal income in Tampa Bay Region divided by $66,689,068 for workers at Moffitt) indicating that for every dollar of personal income received by Moffitt workers another 62 cents of income is created for other workers in the Tampa Bay Region.[28]

(3) **Cancer Treatment and Research.** Last year, Moffitt accommodated 5,055 patient-admissions and 95,937 outpatient-visits. Also, there were 123 active cancer research projects during the past year. This is Moffitt's economic output for which we are unable to place a dollar value.

(4) **Local Output**. The workers in the 1,558 jobs created in the Region as a result of Moffitt's existence, produced goods and services valued at $112,123,186. Of these $112,123,186 worth of goods and services produced in the Tampa Bay Region, Moffitt was directly responsible for purchases totaling $22,237,294 for operations and other purchases valued at approximately $4,631,172 for research activity.

The above quantities measure the activities of Moffitt during FY 1998 and reflect recurring activities. Thus, we interpret these quantities as Moffitt's expected *annual* economic contribution to the Region, even if there were no further growth in operating activities.

Besides spending on recurring activities, Moffitt's cash capital budget for FY 1998 was $12,185,444. The annual capital budget is expected to increase in the immediate future due to a plan to spend $100 million between 1998 and 2005 to construct a new research facility. Thus, planned capital expenditures may be expected to provide an incremental increase in economic activity in the Tampa Bay Region to the extent that local resources, including labor, are employed.

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[27] Appendix C, "Employment Multiplier Chart," shows the distribution of jobs created in the Region according to the Moffitt activity, e.g. research, employee spending, etc., responsible for the job creation.

[28] Appendix D, "Personal Income Multiplier Chart," shows the distribution of personal income created in the Region according to the Moffitt activity, e.g. research, employee spending, etc., responsible for the income creation.

Moffitt Cancer Center also contributes to the Tampa Bay Region through its community outreach programs. Lifetime Cancer Screening is a program that provides routine clinical services and functions as a clinical laboratory for cancer control research. Also, Moffitt's education specialists develop educational materials for the public, as well as agencies such as the American Cancer Society.

H. Lee Moffitt Cancer Center & Research Institute was created by the Legislature of the State of Florida to contribute to the prevention and cure of cancer and opened in 1986. Since then Moffitt has experienced growth and progress in carrying out its cancer prevention and cure mission through the efforts of its employees, medical staff and researchers. And, Florida's legislators have continued to recognize and support Moffitt's mission through the appropriation of funds for expanding the efforts and sustaining superb operations from year to year.

Appendix A. Financial Statements: H. Lee Moffitt Cancer Center & Research Institute.

Financial Report/ H. Lee Moffitt Cancer Center & Research Institute

BALANCE SHEET (1994-1998)

	30-Jun-94	30-Jun-95	30-Jun-96	30-Jun-97	30-Jun-98
Assets					
Current Assets					
Cash and Short-Term investments	$6,018,727	$7,024,487	$12,580,148	$26,194,949	$18,040,706
Accounts Receivables	$20,024,409	$18,982,394	$16,301,839	$17,369,090	$20,811,223
Other	$4,538,175	$5,859,443	$5,571,576	$5,985,772	$7,394,423
Total Current Assets	$30,581,311	$31,866,324	$34,453,563	$49,549,811	$46,246,352
Assets With Limited Use	$9,900,685	$19,365,734	$20,683,331	$21,881,450	$37,389,667
Pledges Receivable	$0	$205,719	$206,559	$294,834	$261,746
Property, Plant and Equipment	$72,263,264	$66,485,723	$68,916,643	$60,093,976	$57,208,780
Construction in Progress	$0	$2,284,461	$428,511	$441,022	$5,873,162
	$82,163,949	$88,341,637	$90,235,044	$82,711,282	$100,733,355
Total Assets	$112,745,260	$120,207,961	$124,688,607	$132,261,093	$146,979,707
Percentage Change of Total Assets		6.62%	3.73%	6.07%	11.13%
Liabilities and Fund Balance					
Current Liabilities	$14,903,599	$14,186,286	$17,902,224	$18,826,685	$23,425,281
Other Liabilities	$697,530	$1,370,020	$943,109	$1,005,011	$704,824
Long-Term Debt	$1,458,705	$4,343,080	$4,229,985	$2,927,990	$2,146,244
Fund Balance	$95,685,426	$100,308,575	$101,613,289	$109,501,407	$120,703,358
Total Liabilities and Fund Balance	$112,745,260	$120,207,961	$124,688,607	$132,261,093	$146,979,707

Financial Report/ H. Lee Moffitt Cancer Center & Research Institute

INCOME STATEMENT (1994-1998)

	30-Jun-94	30-Jun-95	30-Jun-96	30-Jun-97	30-Jun-98
Revenues					
Net Patient Service Revenues	$95,411,998	$104,129,343	$94,593,353	$100,507,219	$113,124,085
Other Revenues	$2,575,343	$11,428,322	$12,645,813	$14,452,997	$16,220,398
Total Revenues	$97,984,341	$115,557,665	$107,239,166	$114,960,216	$129,344,483
Percentage Change of Total Revenue		17.93%	-7.20%	7.20%	12.51%
Expenses					
Operating Expenses	$95,446,616	$101,939,224	$100,510,127	$99,549,162	$110,339,686
Depreciation and Amortization	$7,956,726	$9,131,760	$10,133,692	$9,969,634	$8,437,203
Interest	$60,140	$569,084	$43,901	$284,233	$92,330
Provisions for Bad Debt	$4,460,482	$1,396,792	$3,167,166	$2,863,815	$3,649,726
Total Expenses	$107,923,964	$113,036,860	$113,854,886	$112,666,844	$122,518,945
Percentage Change of Operating Expenses		6.80%	-1.40%	-0.96%	10.84%
Percentage Change of Total Expenses		4.74%	0.72%	-1.04%	8.74%
Excess Of Operating Expenses Over Operating Revenues	-$9,939,623	$2,520,805	-$6,615,720	$2,293,372	$6,825,538
Nonoperating Gains, Net	$10,615,241	$1,183,767	$1,484,974	$4,653,113	$2,749,787
Revenues and Gains in Excess of Expenses and Losses	$675,618	$3,704,572	-$5,130,746	$6,946,485	$9,575,325

Appendix B. Impacts on the Florida Economy.

We also examine the impacts of the activities of H. Lee Moffitt Cancer Center & Research Institute on the state of Florida. By enlarging the size of the defined economic impact region from a 7-county area to the entire state, we reduce the "leakage" from the region due to imports. Thus, the statewide economic impact becomes larger than the impact for the 7-county area.

The major increase in impact comes from operating expenditures for the purchase of goods and services. As explained in Section III of this analysis, about $32.2 million was spent during fiscal year 1998 to purchase goods and services from outside of the previously defined 7-county Region. Using Regional Purchase Coefficients (RPCs) we estimate that an additional $6.6 million out of the $32.2 million would be spent to buy goods and services in Florida. The additional spending of $6.6 million in Florida adds 152 jobs, $4.4 million of personal income, and $11.9 million of output to the state's economy.[29] Enlargement of the economic impact region also has small incremental impacts on spending activities other than operating expenditures for the purchase of goods and services.

By enlarging the size of the defined economic impact region from a 7-county area to the entire state, the increase in impact is from 1,558 jobs in the 7-county Region to 1,746 jobs statewide with concomitant increases in personal income from $41.5 million in the 7-county Region to $47.5 million statewide and in output from $112.1 million in the 7-county Region to $126.6 million statewide.

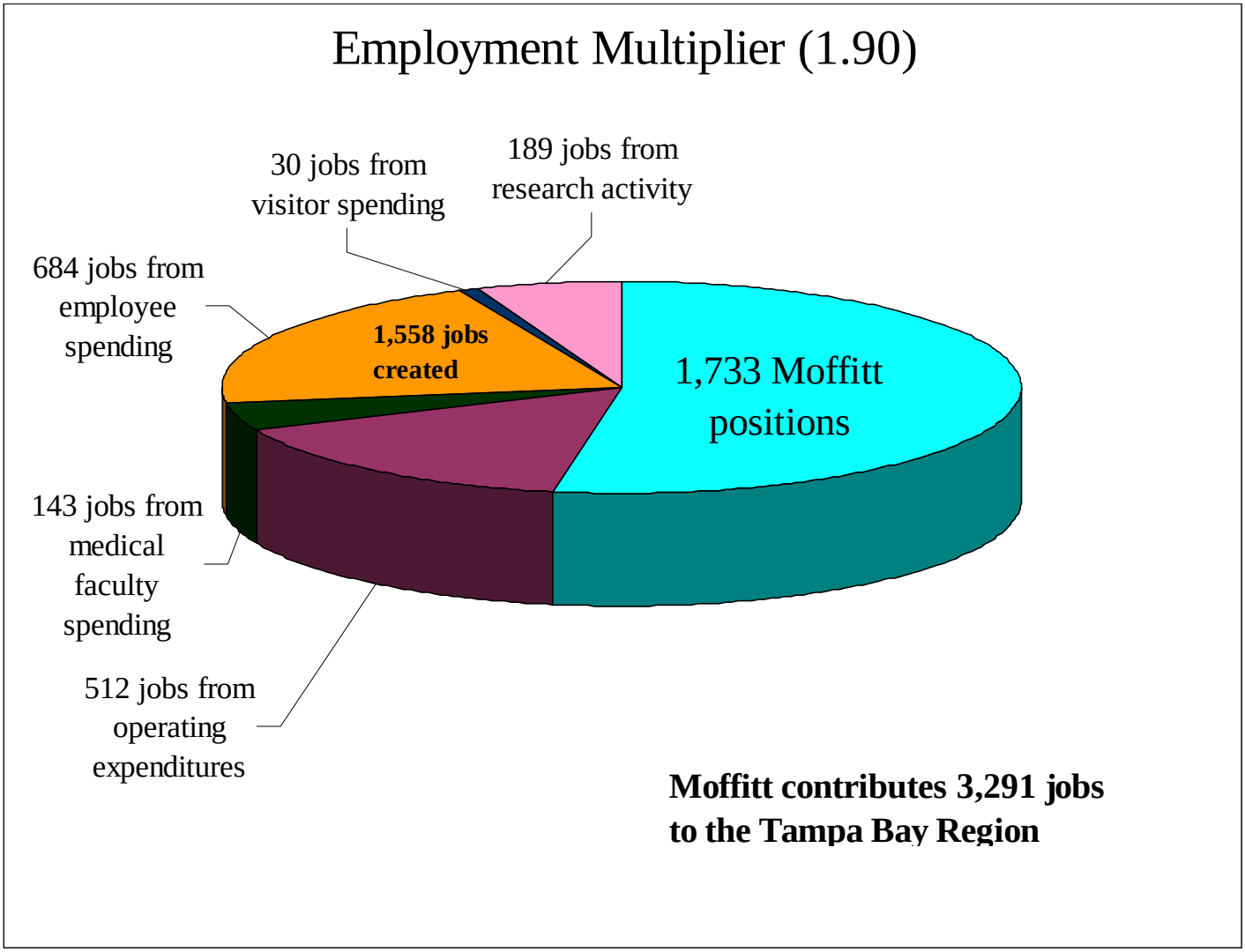
The following table compares local, or 7-county Region, impacts with the impacts on the state of Florida.

[29]Estimating local spending using the RPCs results in a decrease of about $100,000 in output within the 7-county Region. There is no change in jobs and personal income increases about $140,000.

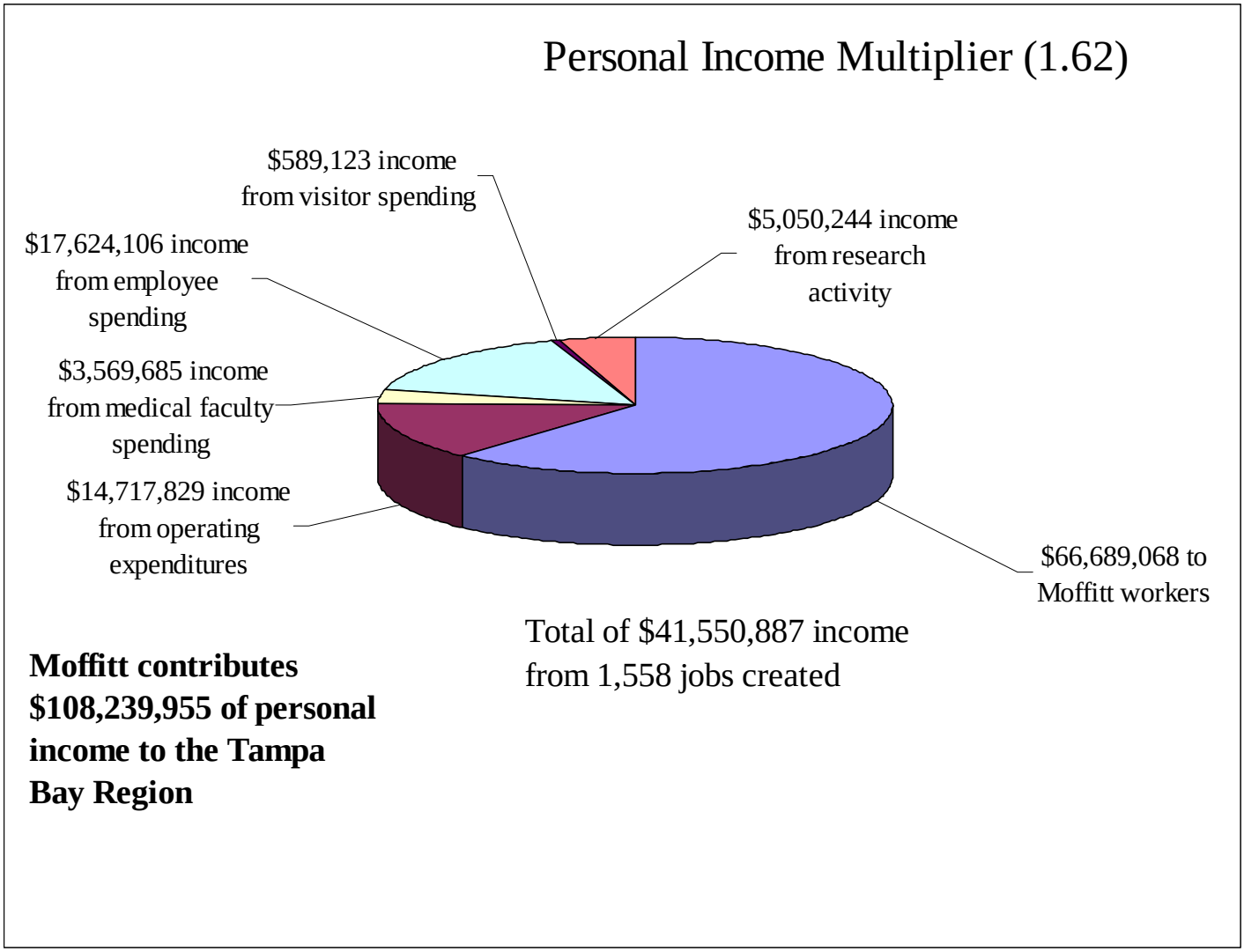
Comparison of Local and Florida Impacts

		Local Impacts			Florida Impacts		
		Employment	Personal Income	Output	Employment	Personal Income	Output
Total operating expenses	$110,339,686						
less: USF reimbursement	9,935,000						
less: Employee wages	45,948,000						
Spending for goods & services	$54,456,686						
less:							
Local spending	22,237,294	512	$14,717,829	$40,150,742	512	$14,856,948	$40,050,192
Non-local spending (imports)	$32,219,392				152	4,403,697	11,871,140
Florida impact of spending for goods & services					664	$19,260,645	$51,921,332
Personal disposable income (reibursement for med faculty)	$8,731,872	143	$3,569,685	$9,744,494	139	$3,648,332	$9,888,296
Personal disposable income (employees) by household income:							
low 14.5%	$5,855,635						
medium 62.0%	25,037,885						
high 23.5%	9,490,166						
Total household spending	$40,383,686	684	$17,624,106	$47,205,079	710	$18,545,817	$48,777,158
Event visitors' spending	$227,368	8	$150,741	$414,994	8	$153,901	$416,324
Hospital visitors' spending	$661,007	22	$438,282	$1,206,536	22	$447,424	$1,210,343
Research activity							
Personal disposable income	$9,497,453						
Supplies & equipment	4,631,172						
Total	$14,128,625	189	$5,050,244	$13,401,341	203	$5,410,034	$14,410,034
Total Impacts		1,558	$41,550,887	$112,123,186	1,746	$47,466,153	$126,623,487

Appendix C. Employment Multiplier Chart.



Appendix D. Personal Income Multiplier Chart.



Appendix E. Primer on Regional Economic Development Analysis.

The Center for Economic Development Research (CEDR), College of Business Administration, University of South Florida (USF), uses the ***IMPLAN Professional***^{TM} *Social Accounting and Impact Analysis Software for economic impact analyses. Data (1995) for each county in the state of Florida are available. County-wide data may be aggregated to focus on a region, such as the 7-county region - Hernando, Hillsborough, Manatee, Pasco, Pinellas, Polk and Sarasota - of special importance to the USF community. The following paragraphs briefly explain the economic impact analysis and the assumptions upon which the analysis is based.*

The Impact Analysis.

Economic impact analysis is based on conditional, predictive models of the form: If ...then... An input-output model is one type of model used in impact analysis. Other generally accepted models are the economic base model and the income-expenditure model. Compared with the input-output model, both the economic base and income-expenditure models are limited in application to small economic regions in which the interdependencies (sales/purchase relationships) between producing sectors are insignificant.

Interindustry relationships were first described in 1758 by the Frenchman Francois Quesnay, founder of the physiocratic or "natural order" philosophy of economic thought. The physiocrats depicted the flow of goods and money in a nation, and thus made the first attempt to describe the circular flow of wealth on a macroeconmic basis. Wassily Leontief was born in Russia in 1906 and first studied economic geography at the University of St. Petersburg before moving to Berlin and China. He came to the United States in 1931 and, after a brief 3-month stint at the National Bureau of Economic Research in New York, he was hired by Harvard University. At Harvard, Professor Leontief undertook a research project that encompassed a 42-industry input-output table showing how changes in one sector of the economy lead to changes in other sectors. From this research, he developed the concept of multipliers from input-output tables, and was subsequently awarded the Nobel prize in economics in 1973 for his development of input-output (I-O) economics.

The historical transactions data in the I-O model represent the sales and purchases between sectors that occurred over an estimation period. These data describe each sector's "purchases" and "sales" linkages with the rest of the economy. For each productive sector the transaction data take into account all sales revenue and costs, with the difference between revenue and costs being profit, which is a part of value added. (Total value added to a product at each stage of its production is the sum of wages and salaries, rents, profits, interest, and dividends.) The historical transaction or descriptive data are used to create the *descriptive* model of information about local economic interactions called *regional economic* accounts. These accounts, or transaction tables, describe a local economy in terms of the flow of dollars from purchasers to producers within the defined region.

For example, an increase in government purchases (first round) of output from the "manufacturing" sector of a region may require the "manufacturing" industry, in order to expand output, to purchase (second round) factor inputs from other sectors of the regional economy. In turn, these other sectors may have to purchase (third round) inputs to deliver the supporting production of factors to the "manufacturing" sector. The rounds of spending will continue with each round becoming increasingly weaker in its impact because of leakages from the region attributable to imports, savings, and taxes.

The first round is called the direct effects of the change in final demand (consumption) in a sector(s) of the economy. The second and subsequent rounds are collectively referred to as the indirect effects of interindustry purchases (reduction in purchases) in response to direct effects.

The *open* I-O model just described does not take into account changes in spending in the region, in response to the direct effects, for household consumption. Changes in spending from households as income or population increases (decreases) due to changes in the level of production are called induced effects.

Induced effects are incorporated into the I-O descriptive model by forming a *closed* model. That is, transactions of the household sector are made endogenous to the model by treating households as a producing sector. The household sector sells its labor to the other producing sectors and purchases factor inputs, i.e. consumption expenditures, in order to maintain its labor.

There are two steps in impact analysis using the I-O model. First, the descriptive model is created; then, the predictive model is derived from the descriptive model. The descriptive model contains information about interindustry transactions called the *regional economic accounts*. The information describes the flow of dollars from purchasers to producers within the region.

In addition to the regional economic accounts, the descriptive I-O model includes the *social accounts*. Social accounting data include, for example, taxes paid by businesses and households to government, and transfer payments from government to businesses and households. Trade flows also are a part of the social accounts.

Trade flows describe the movement of goods and services between the region and the rest of the world, that is imports and exports. The analyst must choose between *regional purchase coefficients* (RPCs) or supply/demand pooling. RPCs are econometrically derived to predict local purchases based upon a region's characteristics. In contrast, *supply/demand pooling* presumes everything than can be purchased locally, will be. Hence, it will lead to larger multipliers than RPCs, because the leakages for imports are less. (The analyst decides if local purchase coefficients - LPCs - are to be applied to an event during impact analysis. If the LPCs were to be applied, the model's RPCs are used to determine how much of the first-round expenditure is used to purchase local products and how much is for imported items.)

The regional economic accounts and social accounts are used to build *multipliers*. The

multipliers are the *predictive* I-O model. A set of multipliers are expected changes in output for each industry in the model given a one dollar change in final demand for any particular industry or commodity.

A multiplier measures the effects of a change in final demand(s) in a region. The change in economic activity is called the *impact*. The impact is essentially the expected or predicted consequence of a change in final demand(s) within the region due to a single event or a group of events. A group of related events may be referred to as a project.

A Type I multiplier measures the direct and indirect effects of a change in economic activity. It only captures interindustry effects within the region. In addition to the direct and indirect effects, a Type II multiplier captures the induced effects of changes in household income and expenditures. A Type III multiplier also captures direct, indirect, and induced effects. However, the Type III multiplier estimates the induced effects based upon changes in employment. It assumes the region is at full employment, then each job added or subtracted by the impact is associated with the region's average expenditures per person. A Type II multiplier is most commonly used in impact analyses.

Personal consumption expenditures (PCE) are spending by households and are strongly related to total personal income. Total personal income is income from all sources, including employment income and transfer payments that are based on place of residence. Because of commuting patterns, PCE in a region may not be strongly related to employment income in that location. Hence, the income based induced effects of the Type II multiplier are normally adjusted so that a regional average amount of transfer payments is associated with a change in employment income. Such multiplier is called a Social Accounting Matrices (SAM) Income multiplier. However, suppose that an increase (decrease) in employment income is not anticipated to be associated with a corresponding change in regional transfer payments. For instance, it may be believed that an increase in final demand will only generate low paying jobs. Then, it is likely that the under-employed will be hired and transfer payments will not increase in the region. Accordingly, a Specific Disposable Income may be applied to the Type II multipliers. That is, the change in household consumption expenditures is estimated by disposable income, which is defined as a specified (by the analyst) percentage of employment income.

A change in final demand may be applied to an industry or to a commodity. Industries are businesses producing goods and services; commodities are the goods and services being produced. An industry can make more than one commodity. An industry usually is named for the primary, by value, commodity it produces. Commodities produced by an industry, other than its primary commodity, are called secondary commodities or by-products. An industry applied change in final demand has a direct effect on the selected industry only. A commodity applied change in final demand directly affects all industries that produce the commodity, whether as a primary or secondary commodity. The analyst chooses between an industry or commodity applied change in final demand. The choice is appropriately based on the circumstance for the change in final demand. The choice will affect the predicted impact.

As an alternative to estimating the economic impact of a change in final demand ("at the factory door"), the analyst may estimate the impact of a change in sales and employee payroll for a particular institution, e.g. state/local government education, or business sector. Then, a typical expenditure pattern for the institution or industry is generated to assess the economic impact of the change in sales and payroll. (If the event under study is believed to have an atypical expenditure pattern, this alternative approach is inappropriate. Instead the analyst should specify the expenditure pattern of the institution or industry in detail.) Using this alternative approach, the direct effect on final demand, i.e. output, in the region will be less than the change in sales. This happens because the model includes the institution's or industry's production function and final demand is an estimate of the value, in producer prices, of the factor inputs needed to generate the specified change in level of sales. The difference between the estimated change in final demand and the change in sales is total value added. Also, with this approach, the induced effects are interpreted as resulting from a change in household spending by the suppliers of the institution's or industry's factor inputs (first round) as well as subsequent rounds of interindustry sales/purchases.

Margins are used to convert purchaser prices to producer prices. Margins depend on the consumer. For example, households pay the full retail margins, but government may pay little or no retail margins because it has more buying power than individual households. Margins split a purchaser price into appropriate producer values, each value impacting a specific industry. For example, the purchaser price of a tire at an automotive retailer includes the producer price at the factory door plus transportation costs, the wholesaler's markup, and the retailer's markup. Unless edited by the analyst, margins used in impact analysis are national averages.

A deflator may be used to convert expenditures to the base year (estimation period) used to calculate predictive multipliers and to inflate the reports of impact analysis to the current year. Deflators are associated with commodities, and are also used to adjust margin values.

A predicted regional impact may be gauged in terms of output (a change in production measured in dollars), of employment (a change in employment measured by number of jobs), or of personal income (a change in income from all sources, including employment and transfer payments, for persons residing in the region).

I-O Model Assumptions.

The following are the fundamental assumptions of the I-O model. First, it is assumed that the proportions in which each sector purchases its inputs from all other sectors are invariant over the period of analysis. The implications of this assumption are unchanged technology, constant relative prices, no shift in the mix production activities within sectors, and no new significant firm has moved into or out of the region.

Second, the I-O model assumes linear production functions, that is a sector's inputs remain in proportion to its output. This implies that no industry enjoys economies of scale. Third, each sector of the regional economy is assumed to be homogeneous. An increase (decrease) in a sector's final demand will always have the same impact on the economy. And fourth, in the closed I-O model, in assumed that the household sector's marginal propensity to consume equals its average propensity to consume.