

## **Economic Impact of Prairie View A&M University on The Local, Regional and State Economies in Texas**

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### **ABSTRACT**

Prairie View A&M University (PVAMU) plays an important role in the social and economic life of the local, state and national economy. This study presents estimates of the economic impacts of the University's contributions, both short-term and long-term, on the local (Waller County), regional (Houston-The Woodlands-Sugar Land Metropolitan Statistical Area), and state (Texas) economies in 2019. The study measures short-term economic benefits like the total output, value-added, labor income, and employment (jobs) created; and the long-term benefits like the contributions PVAMU makes to increase the lifetime earnings potential of its students.

The study used the latest version of Minnesota IMPLAN software with built-in multipliers, survey questions, and administrative data; in addition to other standard techniques found in the economic impact analysis literature. The study finds the myriad economic impact of PVAMU University greater than greater than the direct spending by the University for pay-roll, goods and services, construction, and direct spending by PVAMU students. The impacts include \$176 million annual contribution to Waller county's income base and employment impact of 1,925 high paying jobs created. For the greater Houston economy, it adds \$291 million annually to the income base through direct compensation and induced spending, while the employment impact is 4,183 high paying jobs created. Finally, the economy of Texas had a direct spending impact of \$354 million with 5,300 jobs supported.

**Keywords:** economic impact study, IMPLAN modeling, Non-quantifiable impacts

## 1. Introduction

The general consensus that universities and other higher institutions have impact on the economies of their locations has become more evident and these impacts are comparable across regions to show the different levels of developments and impacts. The economic impact study has become a standard tool used by most universities to show and persuade state legislatures of the importance of expenditures on higher education. Kotosz et al (2015) explained that economic impact studies have become a political tool in the review of education, as such, conservative assumptions and methods have to be used to promote objectivity in the research process involved in economic impact studies. In separate studies, Wissema (2009), Pawlowski (2009), and Lukovics-Zuti (2013 and 2014) suggested that the universities are changing with time and identified four generations of universities that differ based on the goals, role, output, language, and management.

This study estimates PVAMU's short-term economic impact, which could be defined as the increase in overall economic activity generated from expenditures related to the PVAMU. This involves the economic benefits that PVAMU provided to the local (Waller county), regional (Houston-The Woodlands-Sugar Land Metropolitan Statistical Area), and state (Texas) economy in fiscal year 2019. Following the study by NCES, (2006), the economic impact is estimated from five categories of university-related expenditures: (1) university spending on wages and salaries of faculty and staff, (2) university spending on other budget categories (other than wages and salaries), (3) spending by undergraduate students, (4) spending by graduate students, and (5) spending by visitors. The estimated results measure the extent to which the University creates additional economic activities, labor income, and employment.

The university expenditures generate additional business spending, which set in motion a chain spending reaction known as *indirect and induced spending*. The estimated results measure the extent to which the University creates additional economic activities, labor income, and employment. This economic impact analysis sheds light on the extent of the University's role in supporting the local community and the citizens of Texas.

### 1.1 The Study Area

PVAMU is one of the eleven campuses of the Texas A&M University system in Texas. PVAMU is unique as Historically Black Land-Grant institution among the system. PVAMU has nine colleges and schools, with over 70-degree programs, including Agriculture, Arts, Business, Criminal and Juvenile Justice, Education, Engineering, Natural Sciences, and Nursing. PVAMU serves the local, state and region through 3 campus locations, research centers, and 36 extension offices across the state of Texas. This study hinges on economic impacts, but it should be noted that the university also significantly contributes to other aspects of the local and regional economies through the arts, the culture, the sports events, and the social and political life in the city of Prairie View, the state, and the regional economy. Specifically, the University has 36 extension offices across the state for community outreach activities to the respective community. For this study, PVAMU is the core input region that creates economic impacts to the other places that will be examined.

Prairie View, the city where the university resides is a small city and the faculty, staff, and students of PVAMU reside in surrounding cities and Counties. As a result, there will be impact spill-overs to surrounding regions that are accounted in the IMPLAN modeling. Generally, the local economic impact of educational entity like Prairie View A&M University is

an issue that attracts considerable attention in literature. Hence, the structure of this study is as follows. In the first part, we examine related literature. In the second part we take a theoretical overview and model specification of the impacts of universities. In the third part, we focus on estimation methods. The fourth section presents the estimation results and discussion. The fifth section presents the University's non-quantifiable impacts and Section 6 concludes.

## 2. Literature Review

Measuring the total economic impact of a university on a defined study area is a challenging task. There are several facets of this economic impact: short and long-term benefits, and tangible and intangible benefits. The short-term tangible economic benefits measure the changes in overall economic activities associated with expenditures related to universities. NCES (2006) reported that the long-term intangible benefits capture the positive effects of universities on human capital, labor productivity, technology transfer, business assistance and recruitment, increased lifetime earnings of graduates, and other positive social externalities, are difficult to quantify. Most impact studies have generally focused on capturing the short-term tangible benefits universities deliver to pre-defined study areas.

Among the early impact studies, Caffrey and Issacs (1971) made a seminal contribution to the impact study literature. The study estimated the short-term economic impacts of universities on their local economies. Using linear cash flow formulae and multipliers. Their models estimated the economic benefits to three groups within the local economy -- local businesses, local government, and local individuals. The more recent impact studies have used more sophisticated input-output models, which are reviewed in Stokes and Coomes (1998). Among other significant impact studies, Elliot et al (1988) discuss how the focus of impact studies can be expanded from measuring only the short-term spending impacts to include the long-term economic impact of universities on local development.

Jafri et al (2004) provide a good summary of many short-term impact studies conducted by universities. For example, the University of Colorado and the University of Massachusetts conducted studies estimating the economic effects at the state level, while Southern Illinois University and the University of Waterloo studies had a more regional focus, and the Texas A&M University-Corpus Christi, Sam Houston State University, and Tarleton State University studies had a more local focus. Using social accounting matrix models, these studies derived several measures of multipliers, which are summarized in Table 1:

The Thurgood Marshall Scholarship Fund (2021) published a comprehensive overview of the economic impacts of 42 public HBCUs that are members of the fund (Thurgood Marshall Scholarship Fund, 2001). The study reported only the direct spending associated with the HBCUs, but the multiplier effects of direct spending (the re-spending and induced effects) and the total economic impact of individual institutions on their host communities were not reported. Based on the estimated direct spending, the study concluded: "Through buying and spending together the students and the universities are a significant portion of the economic activity of the host communities. The impact is greatest felt in the more rural communities while the greatest spending is in the metropolitan communities."

Another group that conducts research to assess the economic impact of colleges and universities is Appleaseed, Inc. Since 1993, this group has assisted a variety of for-profit firms, non-profit organizations, and academic institutions with strategic planning, program development, and economic research. In determining the direct and indirect impact of academic institutions, they utilize the IMPLAN modeling system. Appleaseed's recent publications using

IMPLAN data include a lengthy analysis of Tulane University's growing economic impact on the greater New Orleans area (June 2015) and a focused study of Harvard University's significant impact on economic activity in Boston (January 2009). In 2012, Appleseed released an update to the 2005 economic impact analysis of Brown University on Providence and the state of Rhode Island. Appleseed (2012) emphasized Brown University's spending contributed to Rhode Island's post-recession economy recovery. They found, based on the direct, indirect, and induced effects of the University's spending on payroll, purchasing, and construction in fiscal year 2011, the University contributed to more than \$725 million in Rhode Island economic output and 7,800 full time jobs. When factoring in student, faculty, and visitor spending, the University's contribution to statewide economic output rises to \$834 million and full-time jobs increase to 8,909.

In 2015, Appleseed published an analysis of Johns Hopkins University's impact on Baltimore and the state of Maryland. The study revealed that Johns Hopkins University's multiplied impact on the state of Maryland's economic output was \$9.1 billion. This figure is a reflection of spending by the University, as well employees, students, affiliates, vendors, and contractors. This economic output is also responsible for generating nearly 40,000 full-time jobs in the state. It is noted that these universities are major employers and purchasers of goods and services in their states. Additionally, they attract thousands of students while employing large shares of their states' full-time workforce.

Carroll and Smith (2006) published a study analyzing the economic impact of Bowling Green State University on Ohio's economy. Using the IMPLAN Group's Type III multipliers, their primary finding was that every state-supported dollar Bowling Green received translated into \$8 of economic activity. This economic impact is low relative to most economic impact studies because Carroll and Smith (2006) did not account for Bowling Green's contribution to the development of human capital in their analysis. They "concur with the view that inclusion of a measure of human capital will substantially overestimate the [economic] impacts." Thus, the economic impact of Bowling Green was solely a result of capital improvements, employee spending, student spending, and visitor spending.

Humphreys (2000) estimated the short-term economic impacts of 100 Historically Black Colleges and Universities (HBCUs), including PVAMU, on their regional economies for the year 2014. The economic impact estimates are based on IMPLAN regional input-output models for each HBCU's regional economy in conjunction with data collected from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS) and the Bureau of Labor Statistics' Consumer Expenditure Survey data. The study estimates four indicators of economic impact --total output, total value added, total labor income, and total employment. The key findings of this study are summarized below.

- The collective initial spending of all HBCUs in their host communities totaled \$10.3 billion in 2014.
- The combined total economic impact of all HBCUs was \$14.8 billion (70 percent of this total is initial impact, while the remaining 30 percent is the multiplier effect).
- The collective labor income impact of all HBCUs was \$7.3 billion.
- The combined employment impact of all HBCUs was 134,090 jobs.

Similarly, Humphreys (2017) reports the following short-term economic impacts of PVAMU on the Greater Houston Region (Houston-Baytown Metropolitan Statistical Area) in the year 2014. This present study improves upon the Humphreys (2017) study in many important ways: first, it estimates the short-term economic impact of PVAMU on three levels - the local,

regional, and state level; second, this study uses the most recent available statistics (Fiscal Year 2019, or FY 2019); third, it relies upon a more accurate local measure of student spending than Humphreys' study, which applies national average student spending estimates to PVAMU students, and finally, this study includes the impact of construction spending and visitor spending related to PVAMU, types of spending omitted in the Humphreys study.

### **3. Theory and Methods**

#### **3.1 Theoretical Overview**

Beck et al (1995) defined economic impact as the difference between existing economic activity in a region given the presence of the institution and the level that would have been present without the institution. Ojumu et al. (2016) reported that the economic impact analysis measures the economic effects of new businesses, a new project ventures, or new injections into the region of interest will have on the region or economy of interest. It is a counterfactual policy tool that shows a condition contrary to the present situation. For Educational institution like PVAMU, Garrido-Iserte and Gallo-Rivera (2010) showed that the regional and local impacts can be observed in many areas which are beyond the local economy. Results of economic impacts of tertiary institutions are generally used to support the need for more funding from the government or other private institutions or individuals. Pellenbarg (2005) developed a list of economic impacts measures from a mixture of the three university missions, which are education, research, and university-enterprise Co-operation.

Garrido-Iserte and Gallo-Rivera (2010) developed a matrix of economic impacts with subjective and objective long-term impacts on knowledge but stressed the need to separate short term and long term economic impacts, which could allow better planning and greater future impacts. Johnson (1994) suggested separating local and non-local impacts as a better a choice in order to identify the territorial levels of identify impacts. The study showed the direct and indirect impacts, while attesting to various negative impacts of universities. The study further stressed the need for a net approach where individuals could spend more, if the government did not tax them to be able to pay for the expenditures of universities.

While gross impacts are easier to define and compute, it can easily become more difficult with larger institutions where students, staff, and faculty live in communities outside the institution's local community. This could create questions on where the staff would work, where students would pursuit their studies, and how large the difference of knowledge in the local economy or what would be the difference of house prices and other living expenses. Johnson (1994) showed that for larger territories, the difference between gross and net impact gets smaller. In addition, several literature show that direct and indirect impacts are classified and measured in relation to the size and activities of the university. These perceptions are classified into two, three, or four folds. The classifications are as direct and indirect impacts, induced impacts (Koophaus, 2008), and catalytic impacts (Lukovics-Dusek (2014a) and Lukovics-Dusek (2014b), Dusek-Lukovics (2011).

Kotosz et al. (2015) developed a modified version of the classification of impacts as follows: "1. direct impact: output, income and workplaces created on-site owing to the investments and operation of the university, 2. indirect impact: income and employment generated in the companies providing inputs for the university, 3. induced impact: income and employment generated with the multiplier impact owing to spending the incomes, 4. catalytic



impact: productivity growth achieved through the operation of the university, the income and employment created through the companies settling because of the university and the spending of the visitors to the university”.

**3.1 Model Specification**

A primary tool for evaluating money inflows to local economies and how they produce the regional economic benefit as outflows is the input-output (I-O) model. This I-O is a complex web of transactions which are arranged according to a particular accounting system in IMPLAN (Impact Analysis for Planning, 2009) called “input-output accounts. This section explains the model and the interdependent interactions from the inputs to the direct, indirect and implicit multipliers as outputs.

For this research, the IO model is used to determine where monies (dollars) and resources deployed at PVAMU will have their highest economic and workforce impacts in the local, state, and regional economies. The I-O model uses the direct spending by PVAMU’s employees (faculty, staff, and researchers), other institutional expenditures (including construction), students and visitors expenditures as input for the model.

The various expenditures are expected to create ripples of economic outflows as multipliers (impacts) to the local economies of Waller County, the state of Texas, and the other regions. The outputs impacts that flows through households, businesses, and governments (taxes) are connected in a complex web of interdependent relationships based on production, sales, purchases, and government taxes on goods and services. These activities create direct, indirect, and implicit economic impacts in various places where PVAMU employees, students, contractors are respectively located and then tend to have effects on other places.

The data for this research is a one year data from survey of 2019 activities. This makes the basic static input-output model appropriate. In general terms, the model is written as a matrix that expresses the different multipliers efficiently:

$$X = AX + Y \dots\dots\dots (1)$$

Where A represents the square matrix array of technical coefficients, X represents a column of total outputs from each industry, and Y represents a column of final demand, one component from each industry. The output from PVAMU are the salaries paid to the employees and contractor, the graduates produced by the University, and services from the different centers. The outputs, X are delivered to other industries, AX plus output delivered to the final demand, Y. This is equivalent to:

$$X - AX = Y \dots\dots\dots (2)$$

The output, X is factored from the left side, and the result becomes

$$(I - A)X = Y \dots\dots\dots (3)$$

I is the identity matrix. The components of the technical coefficients, A, and those of the final demand, Y, are determined from the data survey and administrative data of expenditures from PVAMU. These predetermined data are used to determine the final demand. To solve for X, equation 3 then becomes

$$X = (I - A)^{-1}Y \dots\dots\dots (4)$$

Where the inverse matrix,  $(I - A)^{-1}$ , is the Leontief (1941) inverse of the matrix of the multipliers of direct spending, labor income, employment, and the lifetime earning of PVAMU students. In this current study, PVAMU represent the initial industry in the local region, the

input-output table then accounts for the flow of money within the sectors in Waller County economy.

Using the flow of money information, IMPLAN models how money inflow into PVAMU, and the inflow is used and re-used in other sectors of the County economy and other counties where employees and students from PVAMU reside. These flows generate waves of economic activities as “economic multiplier” effects in these locations. IMPLAN is designed to capture these flow of money and compute multipliers that show the impacts of these interactions within the specified region and across the State of Texas. To determine impacts across the country, the model uses national industry data and county-level economic data to generate a series of multipliers that are used to estimate the total economic impacts from all the economic activities. Intuitively, the total multiplier for PVAMU is then determined by the addition of all the direct, indirect, and induced effects.

### 3.2. Data and Methods

This study follows IMPLAN method by using input/output matrix-based model. Armstrong and Taylor (2000) and Lengyel and Rechnitzer (2004) supposed the use of local consumption proportion of students, employees and spending of visitors. The expenditure data of the university was obtained from public information. In the case of PVAMU’s multi-campus institutions (the Northwest campus and the Nursing School in Houston Downtown), allocation of expenditures by campus has been based on our estimation. Where the expenditures cannot be definitely allocated, we used related relevant activities such as, the number of students, number of academic and non-academic staff. The estimation of visitors’ expenditures are based on the different events that attract visitors to PVAMU like the homecoming, graduations, and other sport events like football, basketball, and tracks.

The data to assess economic activities and economic impacts were collected using a mixture of direct mail surveys and on-line surveys sent to a randomly selected sample of PVAMU employees and students. To obtain expenditures of faculty, staff, and students, we asked them to complete surveys based on a random representative sample. The survey was focused on a one-year period of expenditure by the respondents. Ojumu et al. (2016) used one-year period in the survey to estimate economic impact of recreation fishing in Alabama. This period helps to avoid memory loss and double counting by the respondents on questions related to frequency since a longer period could lead to memory problems and double counting. Computationally, the sample mean was estimated and multiplied by the number of students enrolled at the university to determine our population. The same was done for the staff and faculty population. We analyzed the survey and official documents of the universities, following Johnson (1994) and estimated the impacts by separating local and non-local items using IMPLAN (Impact Analysis for Planning, 2009). The IMPLAN model reflects the amount of additional regional economic values that can be expected from given activities (Hodges and Mulkey, 2005). The model separates producer prices, which are different from the collected final market price data. This allows the model to clearly analyze changes in the economy by using the marginal differences between the producer prices and final market prices. Within the IMPLAN model, counties, cities and states are separated by the ratio of the difference between the producer price and the final market price and the Regional Purchasing Coefficient (RPC). Ojumu et al (2016) explained that the RPC determines the percentage of the final consumer price that

remains in the local economy where the final product or service is purchased. The value of the RPC differs for every County, City, State, and Region.

There is widespread consensus that universities and colleges have a significant impact on the local and surrounding economies where they are located. Using IMPLAN data, Gorjidoz and Vasigh, (2011) studied the economic impact of Embry-Riddle Aeronautical University on Yavapai County, Arizona. Similar to our study, they identified and assessed four main areas of the University's impact: University operations, payroll, student spending, and visitor spending.

Tables 3, 4, and 5 in the appendix present the data regarding the University's revenue sources and expenditures for fiscal year 2019, and the degrees awarded to students. Table 3 represents the initial inputs into PVAMU while tables 4 and 5 both represent the initial output from the PVAMU. These represent the initial input and outputs in equation 1. These are administrative data gathered from the *PVAMU Fact Book* and Alumni Office, Office of Institutional Research, Comptroller's Office, and direct surveys.<sup>i</sup>

Data on direct spending by PVAMU, including wages and salaries of PVAMU employees, and construction and other institutional spending, were assembled from official PVAMU financial documents as well as specially-tailored data provided to us by PVAMU's Office of Institutional Research and the Comptroller's Office. Spending data includes wages and salaries paid to PVAMU employees; construction and other spending by PVAMU; estimated spending by PVAMU students; and estimated spending by visitors to PVAMU. Data on spending by students, visitors, and faculty were estimated based on information gathered by surveying a representative sample of PVAMU undergraduate and graduate students as well as faculty.

## 4. Results and Discussion

The results of this impact study are separated into short-term impacts, long-term impacts, and the non-quantifiable impacts.

### 4.1. Estimated Short-Term Economic Impact of Prairie View A&M University

For the purpose of this study, the impact analysis shows the impacts and multipliers which are induced by PVAMU direct expenditures and activities on the local, state, and regions in United States. The impacts are separated into value-added impacts, labor income impacts, and employment impacts. The results in tables 7, 8, and 9 (appendix) are calculated with multipliers developed by the IMPLAN modeling system and data gathered from the PVAMU Fact Book, Alumni Office, Office of Institutional Research, Comptroller's Office, and direct surveys of faculty, staff, and students. IMPLAN is proprietary software from IMPLAN Group, LLC that uses local, state, and national economic data to calibrate a sophisticated multi-region input-output model embedded in a social accounting matrix. This software allows us to follow the input-output approach to estimating the short-term economic impact of a university pioneered by Caffrey and Issacs (1971) and used in most economic impact studies of universities. By gathering data regarding spending related to PVAMU and inputting this data into the IMPLAN model, we derive estimates of PVAMU's economic impact on the local, regional, and state economies.



Tables 7, 8 and 9 were presented in the appendix show estimates of the present study; the tables show the various economic impacts of Prairie View A&M University on the Waller County, Greater Houston region, and Texas economies. For comparison purposes, tables 10 through 24 (appendix) present estimates from six prior years' economic impact studies of PVAMU authored by Quddus et al (2006, 2008, 2010, 2012, 2015, and 2017).

#### a. Initial Spending (Direct Spending) Impact

The initial spending within the local economy is the aggregation of all five types of direct expenditures like spending on wages and salaries, spending on other budget categories (including construction), spending by undergraduate students, spending by graduate students, and spending by visitors. In FY 2019, initial spending associated with PVAMU totaled \$176.70 million in Waller County, \$291.06 million in Greater Houston, and \$354.60 million in Texas. Next, for each category of initial spending, four indicators of economic impact are computed. They are total output, total value-added, labor income, and total employment.

#### b. Total Output Impact

The total output impact was computed for each category of initial spending consistent along with their multipliers. The initial rounds of direct spending (discussed in section 3.1) lead to subsequent rounds of spending as the money circulates through the economy. For example, a student who pays her rent supports the jobs of property maintenance workers, who will then spend their wages on other items in the community, further increasing economic activity. The total output impact is the largest measure of economic impact, which estimates the value of production by all industries and households. In FY 2019, PVAMU's total output impact is estimated at \$235.25 million in Waller County, \$586.42 million in Greater Houston, and \$765.47 million in Texas.

#### c. Total Value-Added Impact

Total value-added impact avoids double-counting of intermediate goods (both produced in the region and purchased outside the region) by excluding expenditures related to foreign and domestic trade and subtracting the value of intermediate goods procured by firms. This measure is approximately equal to the increase in the local economy's gross regional product caused by PVAMU spending and is superior to the total output impact for measuring the true benefit of PVAMU spending on the economy.<sup>1</sup> In FY 2019, PVAMU generated a total value-added impact of \$125.82 million in Waller County, \$348.756 million in Greater Houston, and \$433.27 million in Texas.

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<sup>1</sup> "Value-added (or gross regional product) consists of employee compensation, proprietor income, other property income, and indirect business taxes. Value-added is equivalent to gross output (sales or receipts and other operating income, commodity taxes, and inventory change) minus intermediate inputs (consumption of goods and services purchased from industries or imported). It is often referred to as the state- or regional-level counterpart of the nation's gross domestic product (GDP)." Humphreys (2006).

#### d. Labor Income Impact

The labor income received by local residents includes wages, salaries, and the value of perquisites. It does not include non-labor income such as government transfer payments and capital gains. In FY 2019, PVAMU generated a total labor income impact of \$112.10 million in Waller County, \$229.73 million in Greater Houston, and \$301.92 million in Texas.

#### e. Employment Impact

PVAMU spending supports not only the jobs on campus but also jobs created by the multiplier effects of this spending, including for example, the jobs at privately-owned off-campus apartment complexes where students reside. In FY 2019, PVAMU-related spending supported a total of 1,925 jobs in Waller County, 4,183 jobs in Greater Houston, and 5,300 jobs in Texas.

### 4.2. Estimated Long-Term Impacts

#### a. Effects on Lifetime Earnings Potential: The Education Premium

It is generally accepted that a college education significantly enhances human capital of graduates, which in turn helps them achieve significant boosts to their earnings potential. The income-enhancing benefit to increased education is sometimes known as the “education premium.” Consistent with this connection between education and earnings, Donovan and Bradley (2019) reported that for the period 1979-2018 “Wages for workers with a high school diploma or less education declined in real terms at the top, middle, and bottom of the wage distribution, whereas wages rose for workers with at least a college degree.” Thus the education premium is increasing over time, making a college degree increasingly important for economic success.

Researchers have devised estimates of the typical economic benefit to educational achievement over a person’s adult lifetime. These estimates, known as “synthetic work-life earnings” (or lifetime earnings) measure the hypothetical amount of income that the median full-time worker will earn over her lifetime, at different levels of education upon beginning her career. Julian and Kominski (2011), for example, calculated these estimates of lifetime earnings for the typical American worker:

- High school graduate: \$1,371,000
- Bachelor’s degree: \$2,422,000
- Master’s degree: \$2,834,000
- Doctorate degree: \$3,525,000

#### b. Total and Incremental Lifetime Earnings of PVAMU Graduates

This study combines inflation-adjusted lifetime earnings estimates, along with projections of the geographic location where 2018-19 PVAMU graduates will reside, to project the distribution of the education premium for 2018-19 PVAMU graduates by geographic region. The study assumes that each PVAMU graduate will earn a lifetime income equal to that projected by the estimates of Julian and Kominski (2011), increased by 11.74% to adjust for inflation between 2011 and 2019. The following inflation-adjusted estimates are derived:

In the 2018-19 academic year, PVAMU awarded 1,146 Bachelor's degrees, 374 Master's degrees, and 21 Doctoral degrees. The most recent alumni residency data indicate that among the PVAMU alumni with bachelor's degrees, 5.9% reside in Waller County, 50.8% reside in the Houston-The Woodlands-Sugar Land (H-W-SL) MSA, 87.8% reside in Texas, and 12.2% reside outside of Texas. For alumni with master's degrees, the corresponding figures are 4.9% in Waller County, 59.7% in the H-W-SL MSA, 92.7% in Texas, and 7.3% outside of Texas. For alumni with doctoral degrees, the corresponding figures are 4.5% in Waller County, 56.4% in the H-W-SL MSA, 93.1% in Texas, and 6.9% outside of Texas. Given this residency breakdown and the total lifetime earnings per graduate estimated in Table 24, we derive that the University contributes \$244.73 million in total lifetime earnings to 2018-19 graduates who reside in Waller County. The corresponding figures for 2018-19 graduates who reside in the Greater Houston Area, state of Texas, and other states are \$2.33 billion, \$3.90 billion, and \$0.47 billion respectively. We also derive that the University contributes an education premium—that is, lifetime earnings above the amount earned by those with only a high school diploma—of \$1.80 billion in additional lifetime earnings to 2018-19 PVAMU graduates who reside in Texas. The corresponding figures for 2018-19 graduates who reside in the Greater Houston Area, Waller County, and other states are \$1.08 billion, \$0.11 billion, and \$0.21 billion respectively.

The breakdown of the total and incremental lifetime earnings for 2018-19 graduates with Bachelor's, Master's, and Doctorate degrees in the four geographic areas is given in Table 25 and Table 26.

## 5. Non-Quantifiable Impacts

Through a variety of activities (teaching, research, and service) conducted by departments and special centers, Prairie View A&M University serves the greater community. This section briefly describes the activities of a subset of these organizations. For current information and greater details on an organization, please visit the organization's homepage.

- Future Aerospace, Science and Technology

(<http://www.pvamu.edu/pages/5158.asp>)

The Future Aerospace Science & Technology (FAST) Center at Prairie View A&M University (PVAMU) was established with funds from the US Air Force Office of Scientific Research in 1995.

- International Goat Research Center (<http://www.pvamu.edu/pages/5157.asp>)

The International Goat Research Center was built in 1981 and currently home to over 1,000 dairy and meat goats. The Center is one of the largest and longest established goat research programs in the country.

- Community Urban Rural Enhancement Service (CURES) Center

(<http://www.pvamu.edu/soa/resources/research-center/c-u-r-e-s-center/>)

Through collaboration, the Community Urban Rural Enhancement Service Center works with public and private entities to bring workable solutions to challenging community problems. By engaging students through the Community Urban Rural Enhancement Service Learning STUDIO, the CURES Center brings unprecedented focus and coordination of national, state and local resources to underserved areas and populations.

- PVAMU Athletics Department (<http://www.pvpanthers.com/>)

The PVAMU Athletics Department has partnered with community organizations at various intervals throughout the year. Through these partnerships, the Department aims to promote the University and its athletic programs.

- Center for International Business Education

(<http://www.pvamu.edu/pages/4478.asp>)

The Center for International Business Education was established in spring 2005 with a \$168,000 grant from the Business and International Education (BIE) Program of the U.S. Department of Education. To date, the Center has received over \$600,000 in external funding from various sources.

- Small Business Development Center (<http://www.pvamu.edu/sbdc>)

The Small Business Development Center promotes small business success by providing management education. It assists small businesses in creating jobs and economic growth by utilizing the elements of quality counseling and training, community involvement and the leveraging of resources.

- Computational Fluid Dynamics Institute (CFDI)

(<http://www.pvamu.edu/pages/5158.asp>)

The Computational Fluid Dynamics Institute was established on February 16, 1996 at the Roy G. Perry College of Engineering at Prairie View A&M University (PVAMU) in partnership with Rocketdyne Division of Pratt & Whitney. The purpose of the Institute was to conduct applied research and development in a key engineering discipline and to provide a mechanism for the development of an advanced degree program with concentration on CFD.

## 6. Conclusion

This study reported the extent to which Prairie View A&M University impacts the local, regional, and state economies with additional business activity, household income, employment, and lifetime earnings potential. In addition to the quantifiable economic impact, this report also presented a summary of various service and outreach activities through which the University impacts the greater community. Based on this study's presentation of Prairie View A&M University's short- and long-term contributions, it can be concluded that the University plays a measurably significant role in the social and economic life of the local, regional, and state economies.

**Appendix 1**

**Table 1: Summary of Multipliers from Several Impact Studies**

	Total Output Multiplier	Employment Multiplier	Value Added Multiplier
University of Colorado (state level)	1.90	1.80	
University of Massachusetts (state level)	2.40	1.98	
Southern Illinois University (36 county region)	2.00		
SIU-Carbondale (19 county region)	1.78		
SIU-Edwardsville (14 county region)	1.75		
University of Waterloo (region only)			0.84
University of Waterloo (entire province)			1.46
University of Waterloo (region only)		1.34	
University of Waterloo (entire province)		1.65	
Texas A&M – Corpus Christi (local level)	2.75		
Sam Houston State University (local level)	1.70		
Tarleton State University (local level)	1.48		
Tarleton State University (state level)	1.70		

Source: Jafri et al (2004)

**Table 2: Regional/local economic impacts of universities**

Economic impacts of a university	Description
Employment at the university	Number of university jobs and related institutions
University income	State contributions, fees, benefits arising from entrepreneur activity, etc
University expenditure	Purchase of goods and services by the university
Income and expenditures of the university employees	Wages and salaries, social security costs
Effects on the job market	Qualified job provision effect upon productivity; flexible working supply of the students
Generation of business	Companies created by university students and employees, with or without employment knowledge and technology
Knowledge marketing	The sale of knowledge in a variety of ways: from ideas, courses and patents

Source: Pellenbarg (2005)

**Table 3: PVAMU Sources of Revenue FY 2019**

State Appropriations	\$59,088,842
Tuition and Fees	\$45,114,148
Contracts & Grants - Operating	\$34,044,218
Contracts & Grants - Non-Operating	\$29,433,855
Federal Appropriations	\$9,837,777
Gifts	\$2,284,041
Other Income	\$5,508,225
Investment Income	\$4,496,349
Available University Fund (AUF)	\$27,386,212
Auxiliary Operations	\$18,444,739
<b>Total Revenue</b>	<b>\$235,638,407</b>

Source: Comptroller’s Office, PVAMU



**Table 4: Sources of Expenditures FY 2019**

Wages, Salaries & Benefits	\$115,192,505
Operating Expenses & Equipment	\$105,528,411
Net Student Aid	\$18,472,743
Capital Outlay - Non-Construction	\$7,193,475
Other Expenditures	\$8,576,064
Debt Service	\$14,006,421
<b>Total Expenditures</b>	<b>\$268,969,619</b>

Source: Office of Financial Management Services, PVAMU

**Table 5: Degrees Awarded by Level from 2006/07 – 2018/19 Academic Years**

	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19
Undergraduate	851	776	868	879	904	1,026	1,008	1,022	1,162	1,063	1,108	1,096	1,146
Graduate	757	752	709	560	549	462	441	462	454	417	484	394	395
Total	1,608	1,528	1,577	1,439	1,453	1,488	1,449	1,484	1,616	1,480	1,592	1,490	1,541

Source: Office of Institutional Research, PVAMU

**Table 6: External Estimates of the Economic Impact of PVAMU, from Humphreys (2017)**

	Initial Spending (mil \$)	Output Impact (mil \$)	Value-added Impact (mil \$)	Labor Income Impact (mil \$)	Employment Impact
Wages, salaries, benefits	82.2	183.1	142.7	116.8	1,863
Other institutional spending	82.0	95.5	55.9	36.7	587
Student spending	101.8	124.1	69.1	37.3	728
<b>Total impact</b>	<b>266.1</b>	<b>402.8</b>	<b>267.7</b>	<b>190.8</b>	<b>3,178</b>

**Table 7: Economic Impact of PVAMU on Waller County (FY 2019)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	88,419,268	91,531,214	90,132,295	89,106,868	1,410
Other Institutional Spending*	27,482,545	58,978,252	22,616,829	17,603,089	334
Undergraduate Students	48,987,800	68,107,526	10,475,293	4,226,757	143
Graduate Students	2,620,217	3,689,805	576,431	250,712	9
Visitors	9,191,153	12,943,035	2,021,996	879,443	30
<b>Total</b>	<b>176,700,983</b>	<b>235,249,831</b>	<b>125,822,843</b>	<b>112,066,869</b>	<b>1,925</b>

**Table 8: Economic Impact of PVAMU on Houston-The Woodlands-Sugar Land MSA (FY 2019)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	92,905,461	214,798,777	165,502,132	112,250,097	2,205
Other Institutional Spending*	59,904,808	156,443,669	76,328,019	57,262,423	885
Undergraduate Students	102,358,2940	159,171,867	79,563,188	44,518,075	804
Graduate Students	19,986,320	31,183,553	15,231,462	8,741,802	161
Visitors	15,909,231	24,822,296	12,124,335	6,958,527	128
<b>Total</b>	<b>291,064,114</b>	<b>586,420,162</b>	<b>348,749,136</b>	<b>229,730,924</b>	<b>4,183</b>

**Note: The Houston-The Woodlands-Sugar Land MSA (also called Greater Houston in this report) includes these counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.**

**Table 9: Economic Impact of PVAMU on the State of Texas (FY 2019)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	92,905,461	233,472,961	172,134,688	137,261,749	2,316
Other Institutional Spending	83,598,000	230,387,805	110,400,071	81,317,232	1,359
Undergraduate Students	133,159,985	227,290,449	112,694,164	61,897,070	1,202
Graduate Students	24,265,528	40,133,336	20,535,564	11,581,537	228
Visitors	20,669,930	34,186,491	17,492,662	9,865,417	195
<b>Total</b>	<b>354,598,903</b>	<b>765,471,041</b>	<b>433,257,149</b>	<b>301,923,005</b>	<b>5,300</b>

Notes for tables 6,7,8: Other institutional spending includes construction spending.

Calculations based on data provided by the University, direct surveys, authors' assumptions (following standard practice of other economic impact studies), and the IMPLAN multipliers.

**Table 10: Economic Impact of PVAMU on Waller County (FY 2016)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	75,525,431	78,603,385	77,290,510	76,238,258	1,036
Other Institutional Spending*	25,714,681	54,357,726	20,717,023	15,506,741	314
Undergraduate Students	40,267,656	55,545,968	8,729,278	3,845,135	123
Graduate Students	4,888,822	6,952,594	1,169,585	524,151	16
Visitors	8,218,830	11,715,009	2,013,897	828,757	26
<b>Total</b>	<b>154,615,421</b>	<b>207,174,683</b>	<b>109,920,293</b>	<b>96,943,042</b>	<b>1,515</b>

Source: Quddus et al (2017)

**Table 11: Economic Impact of PVAMU on Houston-The Woodlands-Sugar Land MSA (FY 2016)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	79,896,566	163,095,483	129,342,915	97,277,817	1,632
Other Institutional Spending*	51,729,527	132,395,518	66,799,919	51,336,867	840
Undergraduate Students	88,031,040	135,684,359	65,681,791	39,228,168	743
Graduate Students	32,661,607	50,718,045	24,477,669	14,484,982	279
Visitors	16,034,571	24,868,290	12,157,773	7,119,212	135
<b>Total</b>	<b>268,353,310</b>	<b>506,761,694</b>	<b>298,460,067</b>	<b>209,447,046</b>	<b>3,630</b>

Source: Quddus et al (2017)

**Table 12: Economic Impact of PVAMU on the State of Texas (FY 2016)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	79,896,566	191,575,407	142,770,210	116,453,785	1,826
Other Institutional Spending*	70,740,375	194,903,540	97,101,326	73,178,192	1317
Undergraduate Students	113,579,528	191,700,739	90,026,477	53,292,579	1095
Graduate Students	36,219,862	58,369,751	29,507,255	17,319,801	360
Visitors	16,973,623	29,062,495	14,075,224	8,149,521	167
<b>Total</b>	<b>317,409,954</b>	<b>665,611,932</b>	<b>373,480,492</b>	<b>268,393,878</b>	<b>4,766</b>

Source: Quddus et al (2017)

**Table 13: Economic Impact of PVAMU on Waller County (FY 2012)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	67,307,051	71,652,201	70,135,242	68,412,557	1,144
Other Institutional Spending*	15,570,197	34,314,139	15,802,536	11,107,333	277
Undergraduate Students	30,220,250	43,002,526	8,347,509	3,007,019	106
Graduate Students	1,570,129	2,283,908	459,595	172,663	6
Visitors	7,430,781	11,129,194	2,411,654	916,087	30
<b>Total</b>	<b>122,098,408</b>	<b>162,381,968</b>	<b>97,156,536</b>	<b>83,615,659</b>	<b>1,563</b>

Source: Quddus et al (2012)

**Table 14: Economic Impact of PVAMU on Houston-Baytown-Sugar Land MSA (FY 2012)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	67,557,051	136,823,138	110,870,139	82,330,069	1,602
Other Institutional Spending*	41,173,389	107,428,618	53,482,787	41,960,876	583
Undergraduate Students	67,384,945	99,339,553	49,828,460	28,371,826	553
Graduate Students	36,468,170	54,310,510	27,885,391	15,963,874	318
Visitors	14,449,774	21,694,066	11,314,812	6,377,045	127
<b>Total</b>	<b>227,033,329</b>	<b>419,595,885</b>	<b>253,381,589</b>	<b>175,003,690</b>	<b>3,182</b>

Source: Quddus et al (2012)

**Table 15: Economic Impact of PVAMU on the State of Texas (FY 2012)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	67,557,051	160,406,387	122,609,917	97,688,574	1,788
Other Institutional Spending*	59,883,415	167,374,451	82,755,300	62,528,394	912
Undergraduate Students	85,103,492	135,426,451	65,411,692	35,637,949	784
Graduate Students	40,363,221	65,953,518	33,262,026	19,732,155	412
Visitors	14,828,978	24,412,835	12,525,378	6,794,373	152
<b>Total</b>	<b>267,736,157</b>	<b>553,573,642</b>	<b>316,564,313</b>	<b>222,381,445</b>	<b>4,047</b>

Source: Quddus et al (2012)

**Table 16: Economic Impact of PVAMU on Waller County (FY 2010)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	69,634,822	71,224,320	70,665,765	70,076,181	1,146
Other Institutional Spending*	14,369,201	29,664,677	12,969,035	10,379,307	178
Undergraduate Students	19,861,698	26,373,874	4,215,820	1,754,488	66
Graduate Students	2,695,738	3,457,301	491,465	207,428	7
Visitors	2,411,752	3,202,508	607,492	260,442	8
<b>Total</b>	<b>108,973,211</b>	<b>133,922,680</b>	<b>88,949,577</b>	<b>82,677,846</b>	<b>1,405</b>

Source: Quddus et al (2010)

**Table 17: Economic Impact of PVAMU on Houston-Baytown-Sugar Land MSA (FY 2010)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	69,884,822	128,280,580	97,141,132	84,012,789	1,448
Other Institutional Spending*	42,106,320	109,458,468	50,846,714	38,054,457	484
Undergraduate Students	56,491,324	81,534,269	36,564,311	18,683,832	423
Graduate Students	36,831,160	53,158,637	23,839,166	12,181,468	276
Visitors	10,774,298	15,550,609	6,973,722	3,563,471	81
<b>Total</b>	<b>216,087,923</b>	<b>387,982,562</b>	<b>215,365,045</b>	<b>156,496,017</b>	<b>2,711</b>

Source: Quddus et al (2010)

**Table 18: Economic Impact of PVAMU on the State of Texas (FY 2010)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	69,884,822	137,383,859	108,604,130	90,541,502	1,621
Other Institutional Spending*	61,705,382	168,983,051	59,535,056	42,244,366	765
Undergraduate Students	75,091,484	118,400,698	54,858,393	28,767,092	695
Graduate Students	39,701,585	62,599,579	29,004,155	15,209,435	368
Visitors	10,774,298	16,988,402	7,871,207	4,127,568	100
<b>Total</b>	<b>257,157,571</b>	<b>504,355,589</b>	<b>259,872,941</b>	<b>180,889,963</b>	<b>3,549</b>

Source: Quddus et al (2010)

**Table 19: Economic Impact of PVAMU on Waller County (FY 2008)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	66,444,727	70,195,218	67,616,335	66,948,752	1,124
Other Institutional Spending*	12,245,719	26,389,524	3,894,139	2,804,270	68
Undergraduate Students	25,538,122	28,628,234	8,172,199	3,881,795	144
Graduate Students	7,633,526	8,557,183	2,404,561	1,145,029	43
Visitors	2,862,493	3,217,443	973,248	435,099	16
<b>Total</b>	<b>114,724,588</b>	<b>136,987,604</b>	<b>83,060,482</b>	<b>75,214,944</b>	<b>1,395</b>

Source: Quddus et al (2008)

**Table 20: Economic Impact of PVAMU on Houston-Baytown-Sugar Land MSA (FY 2008)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	66,444,727	119,432,483	89,671,960	78,482,817	1,402
Other Institutional Spending*	35,209,312	89,924,583	23,132,518	13,872,469	263
Undergraduate Students	57,860,914	80,426,671	34,369,383	18,399,771	446
Graduate Students	48,606,785	67,563,432	28,872,431	15,456,958	374
Visitors	12,171,894	18,038,747	8,106,482	4,272,335	110
<b>Total</b>	<b>220,293,633</b>	<b>375,385,917</b>	<b>184,152,774</b>	<b>130,484,350</b>	<b>2,595</b>

Source: Quddus et al (2008)

**Table 21: Economic Impact of PVAMU on the State of Texas (FY 2008)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	66,444,727	136,915,426	98,205,045	83,061,953	1,554
Other Institutional Spending*	52,109,442	137,138,295	36,163,953	21,566,431	435
Undergraduate Students	70,821,192	105,452,755	46,741,987	25,212,345	648
Graduate Students	55,556,961	82,724,315	36,667,595	19,778,278	509
Visitors	12,171,894	18,026,575	8,106,482	4,272,335	110
<b>Total</b>	<b>257,104,217</b>	<b>480,257,369</b>	<b>225,885,061</b>	<b>153,891,342</b>	<b>3,256</b>

Source: Quddus et al (2008)

**Table 22: Economic Impact of PVAMU on Waller County (FY 2006)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	61,008,219	76,995,040	65,886,528	63,159,647	1,221
Other Institutional Spending*	64,640,079	82,163,636	4,834,860	3,485,498	92
Undergraduate Students	20,784,834	23,310,070	6,649,719	3,153,174	127
Graduate Students	7,453,353	8,348,002	2,352,760	1,116,482	45
Visitors	1,913,197	2,147,865	651,289	289,853	12
<b>Total</b>	<b>155,799,683</b>	<b>192,964,613</b>	<b>80,375,156</b>	<b>71,204,654</b>	<b>1,497</b>

Source: Quddus et al (2006)

**Table 23: Economic Impact of PVAMU on Houston-Baytown-Sugar Land MSA (FY 2006)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	61,008,219	112,136,641	83,432,131	72,604,989	1,443
Other Institutional Spending*	64,640,079	132,268,508	28,642,719	17,154,106	354
Undergraduate Students	51,452,028	71,482,741	30,534,689	16,366,268	431
Graduate Students	30,568,183	42,480,522	18,196,093	9,721,412	256
Visitors	7,255,202	10,751,764	4,833,674	2,537,604	71
<b>Total</b>	<b>214,923,712</b>	<b>369,120,176</b>	<b>165,639,306</b>	<b>118,384,379</b>	<b>2,555</b>

Source: Quddus et al (2006)

**Table 24: Economic Impact of PVAMU on the State of Texas (FY 2006)**

	Initial Spending (\$)	Total Output Impact (\$)	Value-added Impact (\$)	Labor Income Impact (\$)	Employment Impact
Wages and Salaries	61,008,219	127,494,923	90,957,464	76,673,505	1,576
Other Institutional Spending*	64,640,079	170,014,297	44,858,651	26,697,040	589
Undergraduate Students	63,757,160	94,942,289	42,064,710	22,683,009	634
Graduate Students	31,448,748	46,835,999	20,746,858	11,195,985	313
Visitors	7,255,202	10,751,764	4,833,674	2,537,604	71
<b>Total</b>	<b>228,109,408</b>	<b>450,039,272</b>	<b>203,461,357</b>	<b>139,787,143</b>	<b>3,183</b>

Source: Quddus et al (2006)



**Table 25: Total Lifetime Earnings Estimates of an Individual PVAMU Graduate**

Education Level	Lifetime Earnings	Education Premium (Earnings above a High School Diploma)
High school Graduate	\$1,531,897	
PVAMU Bachelor's Degree Graduate	\$2,706,240	\$1,174,343
PVAMU Master's Degree Graduate	\$3,166,591	\$1,634,694
PVAMU Doctoral Degree Graduate	\$3,938,685	\$2,406,788

**Table 26: Total Lifetime Earnings of 2018-19 Graduates (millions)**

Area	Graduates with Bachelor's Degrees	Graduates with Master's Degrees	Graduates with Doctorate Degrees	Total Lifetime Earnings
Waller County	\$182.98	\$58.03	\$3.72	\$244.73
H-W-SL MSA	\$1,575.49	\$707.03	\$46.65	\$2,329.17
State of Texas	\$2,722.99	\$1,097.85	\$77.01	\$3,897.84
Other States	\$378.36	\$86.45	\$5.71	\$470.53

**Table 27: Education Premium: Incremental Lifetime Earnings to 2018-19 Graduates**

Area	Graduates with Bachelor's Degrees	Graduates with Master's Degrees	Graduates with Doctorate Degrees	Total Lifetime Earnings Gains
Waller County	\$79.40	\$29.96	\$2.27	\$111.63
H-W-SL MSA	\$683.66	\$364.91	\$28.51	\$1,077.16
State of Texas	\$1,181.61	\$566.75	\$47.06	\$1,795.41
Other States	\$164.19	\$44.63	\$3.49	\$212.31

Lifetime earnings of 2018-19 PVAMU graduates above the earnings of the same number of high school graduates.

**References**

1. Armstrong, H. W., Taylor, J. (2000). *Regional Economics and Policy*. Oxford: Blackwell
- Beck, R., Elliott, D., Meisel, J., Wagner, M. (1995). Economic impact studies of regional public colleges and universities. *Growth and Change*, pp. 245-260.
2. Beck, R., Elliott, D., Meisel, J., Wagner, M. (1995). Economic impact studies of regional public colleges and universities. *Growth and Change*, pp. 245-260.
3. Dusek, T. – Lukovics, M. (2011). *Analysis of the economic impact of the Budapest Airport on the local economy*. 58th Annual North American Meetings of the Regional Science Association International (RSAI). Miami, Florida, US
4. Garrido-Iserte, R., Gallo-Rivera, M. T. (2010). The impact of the university upon local economy: three methods to estimate demand-side effects. *Annals of Regional Science*, 44, pp. 39-67.
5. Henry M. Robison. (2009) *Input-Output Guidebook: A Practical Guide for Regional Economic Impact Analysis*. Economic Modeling Specialists Inc. (EMSI) Input-Output Guidebook, 2009
6. Hodges, A., M. Rahmani, and D., Mulkey. (2005) "Economic Impact of the Florida Citrus Industries in 2003-2004." (EDIS FE633), Food and Resource Economics Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida, Gainesville, FL.
7. Humphreys, J.M. (2017). *The Economic Impact of University System of Georgia Institutions on their Regional Economies*. A monograph jointly published by the Board of Regents of the University System of Georgia and the Selig Center for Economic Growth, Terry College of Business, University of Georgia.
8. IMPLAN. (2009). "Overview of IMPLAN" IMPLAN Pro User's Guide, 2009.
9. Johnson, T. M. (1994). *Estimating the Economic Impact of a College or University on a Nonlocal Economy*. PhD dissertation, Texas: Texas Tech University.
10. Klophaus, R. (2008). The impact of additional passengers on airport employment: The case of German airports. *Airport Management*, 2, pp. 265-274
11. Kotosz Balázs Gyula, Gaunard-Anderson Marie-France, and Lukovics Miklós: *The Local Economic Impact of Universities: An International Comparative Analysis*. In: *Researching Economic Development and Entrepreneurship in Transition Economies*, 2015.10.22-2015.10.24., Graz, Ausztria. pp. 598-610.
12. Kotosz, B., M. Gaunard-Anderson, and M. Lukovics,. "The Local Economic Impact of Universities: An International Comparative Analysis", 2015

13. Lengyel, I., Rechnitzer, J. (2004). *Regionális gazdaságtan*. Budapest-Pécs: Dialóg-Campus.
14. Leontief, Wassily. 1941. *The structure of the American economy*. Cambridge, Massachusetts: Harvard University Press.
15. Lukovics M. – Dusek T. (2014a). Economic Impact Analysis of the ELI R&D Infrastructure and Science Park. *Journal Mittelforum and Next Europe*, 1, pp. 72-85
16. Lukovics, M. – Dusek, T. (2014b). The Economic Impact of the ELI R&D Infrastructure and Science Park in the Szeged sub-region. *Diverse Regions: Building Resilient Communities and Territories. Regional Studies Association Annual International Conference 2014*, Izmir, Turkey
17. Lukovics, M. and Zuti, B. (2013): Successful universities towards the improvement of regional competitiveness: „Fourth Generation” universities. Paper presented at the “*European Regional Science Association (ERSA) 53th Congress „Regional Integration: Europe, the Mediterranean and the World economy”* 53th Congress of the European Regional Science Association, Palermo, Italy.
18. Lukovics, M. and Zuti, B. (2014). „Fourth Generation” Universities and Regional Development. In Hamm, R. – Kopper, J. (eds.): *Higher Education Institutions and Regional Development*. Mönchengladbach, pp. 14-31
19. Ojumu, Gbenga; Hite, Diane; and Fields, Deacue (2016) "Economic Impact of Recreational Fishing in Alabama," *Professional Agricultural Workers Journal: Vol. 3: No. 2, 5*.
20. Pawlowski, K. (2009). The ‘fourth generation university’ as a creator of the local and regional development. *Higher Education in Europe*, 1, pp. 51-64.
21. Pellenbarg, P. H. (2005). *How to Calculate the Impact of University on the Regional Economy*. Paper presented to the Conference on Knowledge and Regional Economic Development, Barcelona, 9-11 June 2005.
22. National Center for Education Statistics (NCES)-United States Department of Education. (2006) *Economic Impact of the Nation’s Historically Black Colleges and Universities*. Institute of Education Sciences (IES) – 2007 Technical Report. U.S. Department of Education, NCES 2007-178.
23. Thurgood Marshall Scholarship Fund (TMSF). (2001). *Economic Impact Snapshot of the Thurgood Marshall Scholarship Fund: Member Colleges and Universities and Scholarship Evaluation Report*. National Office, 60 East 42nd Street, Suite 833, New York, NY 10165.
24. Wissema, J. G. (2009). *Towards the third generation university. Managing the university*

*in transition.* Edward Elgar, Cheltenham.

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