

THE ECONOMIC AND FISCAL BENEFITS OF THE UNIVERSITY OF TEXAS PERMIAN BASIN

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Contents

Summary of Key Results	1
Introduction.....	3
Economic Benefits of University Operations and Student and Visitor Spending.....	5
University Operations	5
Student and Visitor Spending	5
Total Ongoing Operations Benefits	6
Economic Benefits of Construction Projects	9
Economic Benefits of Research Activity.....	11
Economic Benefits of Graduates	12
Fiscal Effects.....	13
Importance of UT Permian Basin to the Energy Sector and Economic Development.....	15
Conclusion.....	17
Appendix A: Methods Used	18
US Multi-Regional Impact Assessment System.....	18
US Multi-Regional Econometric Model.....	22
Appendix B: Detailed Sectoral Results.....	28
Operations, Student Spending, and Visitor Spending.....	28
Operations	28
Student Spending.....	32
Tourism and Visitor Spending.....	36
Construction	40
Employed Graduates	44

Summary of Key Results

The educational opportunities offered by the University of Texas Permian Basin (UT Permian Basin) enhance employment prospects for students and improves the regional workforce and economic development potential. In fulfilling its primary role, UT Permian Basin generates a significant economic stimulus as well as incremental tax receipts throughout the area.

- Summing the economic benefits of **operations, student spending, and visitor spending** results in an estimate of the total economic benefits of the University. Including multiplier effects, the total impact of ongoing operations and related spending is estimated to be **\$113.1 million** in yearly gross product and **1,670 jobs** in the Odessa Metropolitan Statistical Area (MSA), **\$54.4 million** in gross product each year and **783 jobs** in the Midland MSA, **\$177.5 million** in gross product each year and **2,551 jobs** in the Permian Basin, and even larger effects for Texas.
- Recent and ongoing **construction** projects lead to additional estimated gains in business activity of **\$163.1 million** in gross product and **1,899 job-years** of employment in the Odessa MSA, **\$86.4 million** in gross product and **1,001 job-years** of employment in the Midland MSA, and **\$304.4 million** in gross product and **3,705 job-years** of employment in the Permian Basin.
- In addition, **research** at UT Permian Basin leads to notable gains in business activity, and many **graduates** of the university are working in the area, increasing the overall capabilities of the regional labor force and generating substantial economic activity.

Business activity generates tax revenue, and the economic stimulus associated with the University of Texas Permian Basin leads to a notable increase in tax receipts to the State and local government entities including cities, counties, schools, and special districts.

- The Perryman Group estimates that fiscal benefits of **operations, student spending, and visitor spending** of the University of Texas Permian Basin total **\$13.6 million** to the State each year, **\$5.7 million** to local governments in the Odessa area per year, **\$2.8 million** to local governments in the Midland area per year, and **\$8.9 million** to local governments across the Permian Basin Region each year (including effects within the MSAs).

- **Recent and ongoing construction** projects generate another **\$28.9 million** to the State, **\$7.9 million** to local entities in the Odessa area, **\$4.2 million** to local government entities in the Midland area, and **\$14.6 million** to local entities in the Permian Basin Region during the construction process (including effects in the MSAs).

The economic and fiscal benefits of the University of Texas Permian Basin are substantial. However, the University's importance to the region goes even beyond these effects. In particular, UT Permian Basin provides crucial education to support the petroleum sector and economic development efforts.

- Well-trained workers are essential to economic growth and development as well as the health of cornerstone industries such as petroleum.
- In addition, education available at UT Permian Basin improves quality of life for students and other area residents, enhances success of local businesses, and improves the outlook and potential for the region.

Introduction

The University of Texas Permian Basin (UT Permian Basin) is the only four-year educational institution in the region, site of some of the largest and most geopolitically significant oil and gas resources in the world. A combination of factors is causing sweeping change in the petroleum sector, and major analysts and energy companies anticipate continuing and substantial increases in Permian Basin production over the next few years. A top-quality workforce is essential to taking advantage of the opportunities offered by the petroleum sector as well as to attracting others such as emerging technology industries.

The quality education offered by UT Permian Basin enhances employment opportunities for students and improves the regional workforce and economic development potential.

The educational opportunities offered by UT Permian Basin enhance employment prospects for students and improve the regional workforce and economic development potential. In fulfilling its primary role, UT Permian Basin generates a significant economic stimulus as well as incremental tax receipts. The University provides direct well-paying jobs, engages in major projects, and supports important research. Graduates are essential to the current and future business complex and enhance the competitiveness of the area. These activities contribute to the economy of the local area, region, state, and nation.

The Perryman Group (TPG) was recently asked to examine the economic benefits of the University of Texas Permian Basin as well as the associated increase in tax receipts to the State and local governments. The Perryman Group measured the overall economic benefits associated with major categories of activity, including

- Ongoing operations, student and visitor spending, and research;
- Construction projects, and
- Contributions of graduates within the region and beyond.

Economic benefits including multiplier effects were measured for the Odessa Metropolitan Statistical Area (MSA), the Midland MSA, the Permian Basin Region, and Texas.¹ Note that effects for the Permian Basin Region include those within the MSAs as well as spillover to other parts of the region. Similarly, results for Texas include those within the Permian Basin Region as well as spillover to other parts of the state. This report and the accompanying Appendices describe The Perryman Group's results as well as the methods and assumptions used in this assessment.

¹ The Odessa MSA is equivalent to Ector County; the Midland MSA is comprised of Midland and Martin counties; and the Permian Basin Region includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties.

Economic Benefits of University Operations and Student and Visitor Spending

The Perryman Group measured economic benefits of major categories of ongoing University of Texas Permian Basin operations activity. Economic activity is generation through providing well-paying jobs for instruction, administration, and other aspects of the University and its facilities. Currently, UT Permian Basin employs approximately 1,100 persons including full-time, part-time, student, and contract employees. In addition, student and visitor spending and research activity lead to further benefits.

University Operations

Spending for University operations generates ripple effects through the economy. When multiplier effects are considered, the total annual increase in

When multiplier effects are considered, the total annual increase in business activity associated with University of Texas Permian Basin operations is estimated to include \$122.9 million in annual gross product and 1,837 jobs in the Region.

business activity associated with University of Texas Permian Basin operations is estimated to include **\$83.6 million** in gross product each year and **1,278** jobs in the Odessa MSA, **\$32.6 million** in gross product each year and **497** jobs in the Midland MSA, **\$122.9 million** in annual gross

product and **1,837** jobs in the Permian Basin Region and **\$143.2 million** in gross product each year and **2,003** jobs in Texas. (A brief overview of the methods used to measure economic impacts and a definition of terms is provided on page 8, with further detail in the Appendices to this report.)

Student and Visitor Spending

Current enrollment at the University of Texas Permian Basin is nearly 5,300 students. Students attending UT Permian Basin generate a substantial economic stimulus through spending for housing, food, and other living expenses. The Perryman Group estimated the direct student spending on a “net” basis, adjusting for individuals who would likely be in the area even without the University. Direct spending estimates were adjusted to reflect spending by out-of-area students as well as an estimate of those who would

leave the area if not for the presence of UT Permian Basin. Multiplier effects on these net direct student spending estimates were then quantified.

Out-of-area student spending leads to an estimated increase in business activity of **\$24.2 million** in gross product per year and **320** jobs in the Odessa MSA, **\$16.8 million** in gross product each year and **219** jobs in the Midland MSA, **\$43.6 million** in annual gross product and **566** jobs in the Permian Basin Region, and **\$50.9 million** in gross product per year and **629** jobs in Texas. (Again, note that the impacts from smaller geographic areas are included in the impacts of each of the larger geographic areas for all impacts throughout the report.)

University operations also lead to a significant number of visitors to the area. In addition to visiting students and personnel, people attend athletic and cultural events (in particular as related to the Wagner Noel Performing Arts Center), conferences, and other on-campus activities. Spending by out-of-area visitors generates significant economic activity in the local area including an estimated **\$5.4 million** in gross product each year and **73** jobs in the Odessa MSA, **\$5.0 million** per year in annual gross product and **67** jobs in the Midland MSA, **\$11.0 million** in annual gross product and **148** jobs in the Permian Basin Region, and **\$12.9 million** in annual gross product and **164** jobs in Texas (including multiplier effects).

Total Ongoing Operations Benefits

Summing the economic benefits of operations, student spending, and visitor spending results in an estimate of the total economic benefits of the University. Including multiplier effects, the total impact of ongoing operations and related

Including multiplier effects, the total impact of ongoing operations and related spending includes an estimated \$113.1 million in annual gross product and 1,670 jobs in the Odessa MSA, \$54.4 million in annual gross product and 783 jobs in the Midland MSA, and \$177.5 million in annual gross product and 2,551 jobs in the Permian Basin.

spending includes an estimated **\$113.1** million in yearly gross product and **1,670** jobs in the Odessa MSA, **\$54.4 million** in gross product each year and **783** jobs in the Midland MSA, **\$177.5 million** in gross product each year and **2,551** jobs in the Permian Basin and even larger effects for Texas. The tables below include

further detail, with results by major industry group in Appendix B.

The Annual Economic Benefits of Ongoing Operations and Student and Visitor Spending Associated with the University of Texas Permian Basin

		Total Expenditures (Millions of 2019 Dollars)	Gross Product (Millions of 2019 Dollars)	Personal Income (Millions of 2019 Dollars)	Employment (Permanent Jobs)
Odessa MSA	Operations	\$150.294	\$83.561	\$60.646	1,278
	Student Spending	\$47.946	\$24.216	\$15.252	320
	Visitor Spending and Tourism	\$9.198	\$5.367	\$3.304	73
	TOTAL ONGOING BENEFITS	\$207.437	\$113.144	\$79.202	1,670
Midland MSA	Operations	\$58.132	\$32.577	\$23.606	497
	Student Spending	\$33.153	\$16.817	\$10.484	219
	Visitor Spending and Tourism	\$8.439	\$5.003	\$3.048	67
	TOTAL ONGOING BENEFITS	\$99.724	\$54.396	\$37.139	783
Permian Basin Region	Operations	\$225.947	\$122.851	\$88.143	1,837
	Student Spending	\$88.198	\$43.566	\$27.208	566
	Visitor Spending and Tourism	\$19.588	\$11.044	\$6.748	148
	TOTAL ONGOING BENEFITS	\$333.733	\$177.461	\$122.099	2,551
Texas	Operations	\$275.857	\$143.231	\$99.227	2,003
	Student Spending	\$105.993	\$50.891	\$31.437	629
	Visitor Spending and Tourism	\$24.007	\$12.874	\$7.792	164
	TOTAL ONGOING BENEFITS	\$405.857	\$206.997	\$138.456	2,796

Note: The Odessa MSA is equivalent to Ector County; the Midland MSA is comprised of Midland and Martin counties; and the Permian Basin Region includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties. Student Spending is net incremental spending and includes spending by out-of-area students as well as an estimate of those who would leave the area for education in the absence of UT Permian Basin. Visitor Spending and Tourism includes estimated spending for athletic and cultural events, conferences, and other on-campus activities and visits to students and personnel. Components may not sum to totals due to rounding.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Measuring Economic and Fiscal Impacts

Any economic stimulus, whether positive or negative, generates multiplier effects throughout the economy. In this instance, ongoing operations, student and visitor spending, research activity, construction projects, and graduates of the University of Texas Permian Basin generate multiplier effects and dynamic responses rippling through the economy.

The Perryman Group's input-output assessment system (the US Multi-Regional Impact Assessment System, which is described in further detail in the Appendices to this report) was developed by the firm about 40 years ago and has been consistently maintained and updated since that time. The model has been used in hundreds of analyses for clients ranging from major corporations to government agencies and has been peer reviewed on multiple occasions. The impact system uses a variety of data (from surveys, industry information, and other sources) to describe the various goods and services (known as resources or inputs) required to produce another good/service. This process allows for estimation of the total economic impact (including multiplier effects) of the University of Texas Permian Basin. The models used in the current analysis reflect the specific industrial composition and characteristics of the Odessa Metropolitan Statistical Area (MSA, which includes Ector County), Midland MSA (Midland and Martin counties), Permian Basin Region (Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties), and Texas economies.

Total economic effects are quantified for key measures of business activity:

- **Total expenditures** (or total spending) measure the dollars changing hands as a result of the economic stimulus.
- **Gross product** (or output) is production of goods and services that will come about in each area as a result of the activity. This measure is parallel to the gross domestic product numbers commonly reported by various media outlets and is a subset of total expenditures.
- **Personal income** is dollars that end up in the hands of people in the area; the vast majority of this aggregate derives from the earnings of employees, but payments such as interest and rents are also included.
- **Job gains** are expressed as job-years of employment for a temporary stimulus (such as construction) or jobs for ongoing effects.

Business activity associated with UT Permian Basin generates incremental taxes to the State and local governments which were also estimated. Monetary values were quantified on a constant (2019) basis to eliminate the effects of inflation. See the Appendices for additional information regarding the methods and assumptions used in this analysis.

Economic Benefits of Construction Projects

The University of Texas Permian Basin has completed several major construction projects over the past several years, involving a total estimated direct investment of more than \$300 million since 2010. Recent and ongoing improvements include student housing and residence halls, a student center, a science and computer technology building, an engineering building, a kinesiology building, and the Wagner Noel Performing Arts Center.

Recent and ongoing construction projects at the University of Texas Permian Basin generate \$304.4 million in gross product and 3,501 job-years of employment in the Permian Basin (including multiplier effects).

These enhancements enable the University to better fulfill its mission and accommodate a growing and changing student enrollment. In addition, these projects lead to multiplier effects across the economy and a substantial, though transitory, economic stimulus. The Wagner Noel Performing Arts Center also brings a significant number of visitors to the area, with a variety of musical and theater performances throughout the year.

When multiplier effects are considered, recent and ongoing major construction projects lead to estimated gains in business activity of **\$163.1 million** in gross product and **1,899** job-years of employment in the Odessa MSA, **\$86.5 million** in gross product and **1,001** job-years of employment in the Midland MSA, and **\$304.4 million** in gross product and **3,501** job-years of employment in the Permian Basin.

Economic Benefits of Recent and Ongoing Construction Projects at the University of Texas Permian Basin

	Total Expenditures (Millions of 2019 Dollars)	Gross Product (Millions of 2019 Dollars)	Personal Income (Millions of 2019 Dollars)	Employment (Job-Years)
Odessa MSA	\$337.491	\$163.081	\$113.061	1,899
Midland MSA	\$176.018	\$86.456	\$60.727	1,001
Permian Basin	\$636.370	\$304.423	\$209.557	3,501
Texas	\$1,100.859	\$514.383	\$346.884	5,705

Note: Based on direct investments since 2010 and The Perryman Group's estimates of multiplier effects. The Odessa MSA is equivalent to Ector County; the Midland MSA is comprised of Midland and Martin counties; and the Permian Basin Region includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties. Results by industrial sector are presented in Appendix B.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Economic Benefits of Research Activity

Research activity generates economic benefits on several levels, and ongoing research at UT Permian Basin leads to notable gains in business activity. First, conducting research involves jobs for researchers and others as well as various operational expenses. In addition, research activity results in spinoff benefits such as commercialization of discoveries and royalties.

The economic and social returns which could be anticipated from research at the University of Texas Permian Basin include an estimated \$2.9 million in gross product per year and 23 jobs in the United States.

Even beyond these effects are societal benefits of which enhance the economy. Once discoveries have been widely disseminated and deployed, they have the potential to generate benefits beyond those that are economic in nature. The economic and social returns which could be anticipated from research at the University of Texas Permian Basin include an estimated **\$2.9 million** in gross product per year and **23 jobs** in the United States. On a global basis, these returns rise to **\$3.7 million** in gross product and **29 jobs** (including the US impacts). Note that the spinoff and social benefits of research in one year continue to occur (and generally increase) on an ongoing basis. Thus, these contributions also tend to cumulate and expand over time. This activity is likely to increase significantly as the region addresses the innovations associated with energy production (petroleum and renewable), water resource management, environmental challenges, and other phenomena associated with its dynamic economic base.

The Annual Economic and Social Benefits of Research at the University of Texas Permian Basin

	Total Expenditures (Millions of 2019 Dollars)	Gross Product (Millions of 2019 Dollars)	Personal Income (Millions of 2019 Dollars)	Employment (Permanent Jobs)
United States	\$6.272	\$2.900	\$1.952	23
Global	\$7.903	\$3.654	\$2.460	29

Note: Based on typical patterns as described in the Appendices to this report. These gains are in addition to operational and spinoff effects of research.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Economic Benefits of Graduates

Many graduates of UT Permian Basin are working in the area, increasing the overall capabilities of the regional labor force and generating substantial economic activity. While some of these individuals would still be employed in the region even without attending UT Permian Basin, the presence of the University has clearly contributed to their individual productivity as well as the economy. These highly skilled graduates provide critical needs in engineering, management, health care, education, and other key sectors throughout the region.

Across the region, annual benefits of employed graduates are estimated to include \$6.5 billion in gross product and 52,356 jobs.

The Perryman Group estimates that annual economic benefits of employed graduates include **\$2.8 billion** in gross product each year and **22,726** jobs in the Odessa MSA, **\$2.4 billion** in gross product and **18,272** jobs in the Midland MSA when multiplier effects are considered. Across the region, annual benefits of employed graduates are estimated to include **\$6.5 billion** in gross product and **52,356** jobs, with even larger benefits for Texas.

The Annual Economic Benefits of Employed Graduates of the University of Texas Permian Basin

	Total Expenditures (Millions of 2019 Dollars)	Gross Product (Millions of 2019 Dollars)	Personal Income (Millions of 2019 Dollars)	Employment (Permanent Jobs)
Odessa MSA	\$7,494.573	\$2,770.230	\$1,547.218	22,726
Midland MSA	\$6,971.195	\$2,418.498	\$1,323.502	18,272
Permian Basin Region	\$18,330.288	\$6,531.489	\$3,624.934	52,356
Texas	\$25,740.176	\$9,735.339	\$5,458.986	80,161

Note: The Odessa MSA is equivalent to Ector County; the Midland MSA is comprised of Midland and Martin counties; and the Permian Basin Region includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties. Adjusted for industrial employment patterns, retirees, unemployment, and labor force participation.

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Fiscal Effects

Business activity generates tax revenue. The economic stimulus associated with the University of Texas Permian Basin generates a notable increase in tax receipts to the State and local government entities including cities, counties, schools, and special districts. Taxes are generated through the economic effects measured in the preceding sections.

Increased retail sales associated with the economic stimulus measured in this study were quantified, for example (results appear in Appendix B). A portion of these retail sales are taxable and lead to increased receipts to local taxing

entities. Similarly, visitor outlays can lead to gains in occupancy tax revenues.

Economic benefits also affect demand for housing and, hence, property tax values. When the total economic effects are considered (such as those measured in this study), the gains in taxes from these sources are significant.

The Perryman Group estimates that fiscal benefits of

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operations, student spending, and visitor spending of the University of Texas Permian Basin total **\$13.6 million** to the State each year, **\$5.7 million** to local governments in the Odessa area per year, **\$2.8 million** to local governments in the Midland area per year, and **\$8.9 million** to local governments across the Permian Basin Region each year (including effects within the MSAs).

Recent and ongoing construction projects generate another **\$28.9 million** to the State, **\$7.9 million** to local entities in the Odessa area, **\$4.2 million** to local government entities in the Midland area, and **\$14.6 million** to local entities in the Permian Basin Region during the construction process (including effects in the MSAs).

Fiscal benefits from **graduates** include estimated annual gains of **\$453.7 million** to the State, **\$107.5 million** to local entities in the Odessa area, **\$92.1 million** to

local entities in the Midland area, and **\$252.9 million** to local entities across the Permian Basin Region (including effects within the MSAs).

Fiscal Benefits of the University of Texas Permian Basin

	State of Texas (Millions of 2019 Dollars)	Local Entities in the Odessa MSA (Millions of 2019 Dollars)	Local Entities in the Midland MSA (Millions of 2019 Dollars)	Local Entities in the Permian Basin (Millions of 2019 Dollars)
Ongoing Operations (per year)	\$7.32	\$4.06	\$1.56	\$5.89
Student Spending (per year)	\$5.01	\$1.35	\$0.94	\$2.40
Visitor Spending (per year)	\$1.26	\$0.30	\$0.28	\$0.60
TOTAL ONGOING EFFECTS (per year)	\$13.59	\$5.71	\$2.78	\$8.89
Construction (total)	\$28.93	\$7.88	\$4.18	\$14.57
Graduates (per year)	\$453.72	\$107.48	\$92.14	\$252.85

Note: The Odessa MSA is equivalent to Ector County; the Midland MSA is comprised of Midland and Martin counties; and the Permian Basin Region includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler counties. Increased tax receipts are associated with the total economic benefits measured in this study.

Source: The Perryman Group

Importance of UT Permian Basin to the Energy Sector and Economic Development

The economic and fiscal benefits of the University of Texas Permian Basin are substantial. However, the University's importance to the region goes even beyond these effects. In particular, UT Permian Basin provides crucial education to support the petroleum sector and economic development efforts.

Texas oil production has risen dramatically in recent years, up about 500% since 2010. These increases began after decades of falling production and talk of "peak oil" and the effective end of the industry. In the Permian Basin, production levels increased from less than one million barrels per day (bpd) in April 2011 to more than two million bpd in July 2016, topping the prior record from 1973, before surging to more than three million bpd in February 2018 and on to over 4.6 million in November 2019.² Production levels are projected to continue to expand over the next several years.

Technological advances from exploration through completion have led to extremely impressive increases in the amount of oil being recovered, and costs are now on a definitive downward trajectory. The Permian Basin Region is the largest and one of the most cost-effective production areas in the US, has demonstrated a continuing pattern of efficiency increases, and is expected to continue to see strong activity.

As the only comprehensive four-year university in the area, UT Permian Basin provides needed workers for the industry, support sectors, and the economy in general. UT Permian Basin's five largest undergraduate majors are Business, Management, Marketing, and Related Support Services; Psychology; Engineering; Multi/Interdisciplinary Studies; and Health Professions and Related Programs.³ A recent study by The Perryman Group found that many of these are well-matched to the largest future occupational needs.⁴

² Drilling Productivity Report, US Energy Information Association, December 2019.

³ 2019 Texas Public Higher Education Almanac, Texas Higher Education Coordinating Board, Spring 2019.

⁴ Priority Midland by the Numbers, The Perryman Group, August 2019.

Specific programs particularly important to the industry include engineering, where students recently achieved a 100% pass rate on the fundamentals of engineering exam. Programs are highly respected, with four undergraduate options including chemical, electrical, mechanical, and petroleum engineering.

UT Permian Basin is also integral to attracting quality corporate locations and expansions. Any company seeking to locate or expand is going to be, of necessity, initially concerned with the fundamental factors that impact its success. Some of these items are beyond the control of local or state entities, such as proximity to customers, suppliers, or required raw materials. Others, however, can be affected by community policies and investments.

For example, an adequate workforce with the appropriate skills is essential to any corporate location or expansion. Efforts to improve educational systems and available training options can positively affect the ability to attract new economic activity.

Well-trained workers are essential to economic growth and development as well as the health of cornerstone industries such as petroleum. In addition, education available at UT Permian Basin improves quality of life for students and other area residents, enhances success of local businesses, and improves the outlook for the region. It is an essential resource in defining the future of one of the world's most significant economic areas.

Conclusion

As the only four-year educational institution in the Permian Basin region, the University of Texas Permian Basin is an essential aspect of higher education in the area. In addition to offering opportunities for students to prepare for future jobs, the university serves one of the world's most important oil and gas reserves and enhances economic development prospects for the region. With expanding enrollment and ongoing improvements of facilities and programs, the university's importance will only increase over time.

The Perryman Group estimates that ongoing operations, out-of-area student spending, and out-of-area visitor spending associated with UT Permian Basin generate business activity including **\$113.1 million** in yearly gross product and **1,670** jobs in the Odessa MSA, **\$54.4 million** in gross product each year and **783** jobs in the Midland MSA, and **\$177.5 million** in gross product each year and **2,551** jobs in the Permian Basin. Construction projects lead to a notable, though transitory, additional stimulus, and graduates remaining in the area further increase the economic effects of the university.

The Perryman Group's assessment of economic benefits indicates that thousands of jobs are directly or indirectly supported or enhanced by the university. UT Permian Basin is an important aspect of ensuring the preparedness of the local area, region, state, and nation for the workforce needs of the future.

Appendix A: Methods Used

US Multi-Regional Impact Assessment System

The basic modeling technique employed in this study is known as dynamic input-output analysis. This input-output segment of the methodology essentially uses extensive survey data, industry information, and a variety of corroborative source materials to create a matrix describing the various goods and services (known as resources or inputs) required to produce one unit (a dollar's worth) of output for a given sector. Once the base information is compiled, it can be mathematically simulated to generate evaluations of the magnitude of successive rounds of activity involved in the overall production process.

There are two essential steps in conducting an input-output analysis once the system is operational. The first major endeavor is to accurately define the levels of direct activity to be evaluated. In this case, input data regarding employment, enrollment, research activity, attendance at events, construction budget estimates, and other needed information was provided by the University of Texas Permian Basin, with supplementary research by The Perryman Group. Societal and economic benefits of research were estimated on a global and national scale and were determined based on detailed academic studies related to the relevant returns to investments in basic research.⁵

The second major phase of the analysis is the simulation of the input-output system to measure overall economic effects of the direct excess costs of the current situation. The present study was conducted within the context of the US Multi-Regional Impact Assessment System (USMRIAS) which was developed and is maintained by The Perryman Group. This model has been used in hundreds of diverse applications across the country and has an excellent reputation for accuracy and credibility; it has also been peer reviewed on multiple occasions. The systems used in the current simulations reflect the unique industrial structure of the Odessa MSA, Midland MSA, Permian Basin Region, and Texas economies.

⁵ See, in particular, Hall Bronwyn, Jacques Mairesse, and Pierre Mohnen; *Measuring the Returns to R&D*; chapter prepared for the *Handbook of the Economics of Innovation*, editors B.H.Hall and N. Rosenberg. December 2009. Frontier Economics, Rates of return to investment in science and innovation, report prepared for the Department for Business Innovation and Skills, July 2014.

The USMRIAS is somewhat similar in format to the Input-Output Model of the United States which is maintained by the US Department of Commerce. The model developed by TPG, however, incorporates several important enhancements and refinements. Specifically, the expanded system includes (1) comprehensive 500-sector coverage for any county, multi-county, or urban region; (2) calculation of both total expenditures and value-added by industry and region; (3) direct estimation of expenditures for multiple basic input choices (expenditures, output, income, or employment); (4) extensive parameter localization; (5) price adjustments for real and nominal assessments by sectors and areas; (6) measurement of the induced impacts associated with payrolls and consumer spending; (7) embedded modules to estimate multi-sectoral direct spending effects; (8) estimation of retail spending activity by consumers; and (9) comprehensive linkage and integration capabilities with a wide variety of econometric, real estate, occupational, and fiscal impact models.

The impact assessment (input-output) process essentially estimates the amounts of all types of goods and services required to produce one unit (a dollar's worth) of a specific type of output. For purposes of illustrating the nature of the system, it is useful to think of inputs and outputs in dollar (rather than physical) terms. As an example, the construction of a new building will require specific dollar amounts of lumber, glass, concrete, hand tools, architectural services, interior design services, paint, plumbing, and numerous other elements. Each of these suppliers must, in turn, purchase additional dollar amounts of inputs. This process continues through multiple rounds of production, thus generating subsequent increments to business activity. The initial process of building the facility is known as the *direct effect*. The ensuing transactions in the output chain constitute the *indirect effect*.

Another pattern that arises in response to any direct economic activity comes from the payroll dollars received by employees at each stage of the production cycle. As workers are compensated, they use some of their income for taxes, savings, and purchases from external markets. A substantial portion, however, is spent locally on food, clothing, health care services, utilities, housing, recreation, and other items. Typical purchasing patterns in the relevant areas are obtained from the Center for Community and Economic Research *Cost of Living Index*, a privately compiled inter-regional measure which has been widely used for several decades, and the *Consumer Expenditure Survey* of the US Department of Labor. These initial outlays by area residents generate further secondary activity as local providers acquire inputs to meet this consumer demand. These consumer spending impacts are known as the *induced effect*. The USMRIAS is designed to provide realistic, yet conservative, estimates of these phenomena.

Sources for information used in this process include the Bureau of the Census, the Bureau of Labor Statistics, the Regional Economic Information System of the US Department of Commerce, and other public and private sources. The pricing data are compiled from the US Department of Labor and the US Department of Commerce. The verification and testing procedures make use of extensive public and private sources.

Impacts were measured in constant 2019 dollars to eliminate the effects of inflation.

The USMRIAS generates estimates of the effect on several measures of business activity. The most comprehensive measure of economic activity used in this study is **Total Expenditures**. This measure incorporates every dollar that changes hands in any transaction. For example, suppose a farmer sells wheat to a miller for \$0.50; the miller then sells flour to a baker for \$0.75; the baker, in turn, sells bread to a customer for \$1.25. The Total Expenditures recorded in this instance would be \$2.50, that is, $\$0.50 + \$0.75 + \$1.25$. This measure is quite broad but is useful in that (1) it reflects the overall interplay of all industries in the economy, and (2) some key fiscal variables such as sales taxes are linked to aggregate spending.

A second measure of business activity frequently employed in this analysis is that of **Gross Product**. This indicator represents the regional equivalent of Gross Domestic Product, the most commonly reported statistic regarding national economic performance. In other words, the Gross Product of Texas is the amount of US output that is produced in that state; it is defined as the value of all final goods produced in a given region for a specific period of time. Stated differently, it captures the amount of value-added (gross area product) over intermediate goods and services at each stage of the production process, that is, it eliminates the double counting in the Total Expenditures concept. Using the example above, the Gross Product is \$1.25 (the value of the bread) rather than \$2.50. Alternatively, it may be viewed as the sum of the value-added by the farmer, \$0.50; the miller, \$0.25 ($\$0.75 - \0.50); and the baker, \$0.50 ($\$1.25 - \0.75). The total value-added is, therefore, \$1.25, which is equivalent to the final value of the bread. In many industries, the primary component of value-added is the wage and salary payments to employees.

The third gauge of economic activity used in this evaluation is **Personal Income**. As the name implies, Personal Income is simply the income received by individuals, whether in the form of wages, salaries, interest, dividends, proprietors' profits, or other sources. It may thus be viewed as the segment of overall impacts which flows directly to the citizenry.

The fourth measure, **Retail Sales**, represents the component of Total Expenditures which occurs in retail outlets (general merchandise stores, automobile dealers and service stations, building materials stores, food stores, drugstores, restaurants, and so forth). Retail Sales is a commonly used measure of consumer activity.

The final aggregates used are **Jobs and Job-Years**, which reflect the full-time equivalent jobs generated by an activity. For an economic stimulus expected to endure (such as the ongoing operations of a facility), the Jobs measure is used. It should be noted that, unlike the dollar values described above, Jobs is a “stock” rather than a “flow.” In other words, if an area produces \$1 million in output in 2018 and \$1 million in 2019, it is appropriate to say that \$2 million was achieved in the 2018-19 period. If the same area has 100 people working in 2018 and 100 in 2019, it only has 100 Jobs. When a flow of jobs is measured, such as in a construction project or a cumulative assessment over multiple years, it is appropriate to measure employment in Job-Years (a person working for a year, though it could be multiple people working for partial years). This concept is distinct from Jobs, which anticipates that the relevant positions will be maintained on a continuing basis.

In addition to the economic aggregates, the model fully integrates the specific provisions and rate structures associated with major sources of State and local revenues on a detailed industrial basis, allowing for the estimation of the fiscal benefits associated with the economic stimulus.

US Multi-Regional Econometric Model

Overview

The US Multi-Regional Econometric Model (also known as the Texas Econometric Model) was developed by Dr. M. Ray Perryman, President and CEO of The Perryman Group (TPG), beginning 40 years ago as a Texas model and has been consistently maintained, expanded, and updated to a national level since that time. It is formulated in an internally consistent manner and is designed to permit the integration of relevant global, national, state, and local factors into the projection process. It is the result of four decades of continuing research in econometrics, economic theory, statistical methods, and key policy issues and behavioral patterns, as well as intensive, ongoing study of all aspects of the global, US, state, and metropolitan area economies. It is extensively used by scores of federal and State governmental entities on an ongoing basis, as well as hundreds of major corporations. It is employed in the current analysis to generate estimates of the industrial composition necessary to allocate various benefits.

This section describes the forecasting process in a comprehensive manner, focusing on both the modeling and the supplemental analysis. The overall methodology, while certainly not ensuring perfect foresight, permits an enormous body of relevant information to impact the economic outlook in a systematic manner.

Model Logic and Structure

The US Multi-Regional Econometric Model revolves around a core system which projects output (real and nominal), income (real and nominal), and employment by industry in a simultaneous manner. For purposes of illustration, it is useful to initially consider the employment functions. Essentially, employment within the system is a derived demand relationship obtained from a neo-Classical production function. The expressions are augmented to include dynamic temporal adjustments to changes in relative factor input costs, output and (implicitly) productivity, and technological progress over time. Thus, the typical equation includes output, the relative real cost of labor and capital, dynamic lag structures, and a technological adjustment parameter. The functional form is logarithmic, thus preserving the theoretical consistency with the neo-Classical formulation.

The income segment of the model is divided into wage and non-wage components. The wage equations, like their employment counterparts, are individually estimated at the 3-digit North American Industry Classification System (NAICS) level of aggregation. Hence, income by place of work is measured for

approximately 90 production categories. The wage equations measure real compensation, with the form of the variable structure differing between “basic” and “non-basic.”

The basic industries, comprised primarily of the various components of Mining, Agriculture, and Manufacturing, are export-oriented, i.e., they bring external dollars into the area and form the core of the economy. The production of these sectors typically flows into national and international markets; hence, the labor markets are influenced by conditions in areas beyond the borders of the particular region. Thus, real (inflation-adjusted) wages in the basic industry are expressed as a function of the corresponding national rates, as well as measures of local labor market conditions (the reciprocal of the unemployment rate), dynamic adjustment parameters, and ongoing trends.

The “non-basic” sectors are somewhat different in nature, as the strength of their labor markets is linked to the health of the local export sectors. Consequently, wages in these industries are related to those in the basic segment of the economy. The relationship also includes the local labor market measures contained in the basic wage equations.

Note that compensation rates in the export or “basic” sectors provide a key element of the interaction of the regional economies with national and international market phenomena, while the “non-basic” or local industries are strongly impacted by area production levels. Given the wage and employment equations, multiplicative identities in each industry provide expressions for total compensation; these totals may then be aggregated to determine aggregate wage and salary income. Simple linkage equations are then estimated for the calculation of personal income by place of work.

The non-labor aspects of personal income are modeled at the regional level using straightforward empirical expressions relating to national performance, dynamic responses, and evolving temporal patterns. In some instances (such as dividends, rents, and others) national variables (for example, interest rates) directly enter the forecasting system. These factors have numerous other implicit linkages into the system resulting from their simultaneous interaction with other phenomena in national and international markets which are explicitly included in various expressions.

The output or gross area product expressions are also developed at the 3-digit NAICS level. Regional output for basic industries is linked to national performance in the relevant industries, local and national production in key related sectors, relative area and national labor costs in the industry, dynamic adjustment

parameters, and ongoing changes in industrial interrelationships (driven by technological changes in production processes).

Output in the non-basic sectors is modeled as a function of basic production levels, output in related local support industries (if applicable), dynamic temporal adjustments, and ongoing patterns. The inter-industry linkages are obtained from the input-output (impact assessment) system which is part of the overall integrated modeling structure maintained by The Perryman Group. Note that the dominant component of the econometric system involves the simultaneous estimation and projection of output (real and nominal), income (real and nominal), and employment at a disaggregated industrial level. This process, of necessity, also produces projections of regional price deflators by industry. These values are affected by both national pricing patterns and local cost variations and permit changes in prices to impact other aspects of economic behavior. Income is converted from real to nominal terms using the appropriate Consumer Price Index.

Several other components of the model are critical to the forecasting process. The demographic module includes (1) a linkage equation between wage and salary (establishment) employment and household employment, (2) a labor force participation rate function, and (3) a complete population system with endogenous migration. Given household employment, labor force participation (which is a function of economic conditions and evolving patterns of worker preferences), and the working age population, the unemployment rate and level become identities.

The population system uses Census information, fertility rates, and life tables to determine the “natural” changes in population by age group. Migration, the most difficult segment of population dynamics to track, is estimated in relation to relative regional and extra-regional economic conditions over time. Because evolving economic conditions determine migration in the system, population changes are allowed to interact simultaneously with overall economic conditions. Through this process, migration is treated as endogenous to the system, thus allowing population to vary in accordance with relative business performance (particularly employment).

Real retail sales is related to income, interest rates, dynamic adjustments, and patterns in consumer behavior on a store group basis. It is expressed on an inflation-adjusted basis. Inflation at the state level relates to national patterns, indicators of relative economic conditions, and ongoing trends. As noted earlier, prices are endogenous to the system.

A final significant segment of the forecasting system relates to real estate absorption and activity. The short-term demand for various types of property is

determined by underlying economic and demographic factors, with short-term adjustments to reflect the current status of the pertinent building cycle. In some instances, this portion of the forecast requires integration with the Multi-Regional Industry-Occupation System which is maintained by The Perryman Group. This system also allows any employment simulation or forecast from the econometric model to be translated into a highly detailed occupational profile.

The overall US Multi-Regional Econometric Model contains numerous additional specifications, and individual expressions are modified to reflect alternative lag structures, empirical properties of the estimates, simulation requirements, and similar phenomena. Moreover, it is updated on an ongoing basis as new data releases become available. Nonetheless, the above synopsis offers a basic understanding of the overall structure and underlying logic of the system.

Model Simulation and Multi-Regional Structure

The initial phase of the simulation process is the execution of a standard non-linear algorithm for the state-level system and that of each of the individual sub-areas, if any, being examined. The external assumptions are derived from scenarios developed through national and international models and extensive analysis by The Perryman Group.

Once the initial simulations are completed, they are merged into a single system with additive constraints and interregional flows. Using information on minimum regional requirements, import needs, export potential, and locations, it becomes possible to balance the various forecasts into a mathematically consistent set of results.

The iterative simulation process has the additional property of imposing a global convergence criterion across the entire multi-regional system, with balance being achieved simultaneously on both a sectoral and a geographic basis. This approach is particularly critical on non-linear dynamic systems, as independent simulations of individual systems often yield unstable, non-convergent outcomes.

It should be noted that the underlying data for the modeling and simulation process are frequently updated and revised by the various public and private entities compiling them. Whenever those modifications to the database occur, they bring corresponding changes to the structural parameter estimates of the various systems and the solutions to the simulation and forecasting system. The multi-regional version of the US Multi-Regional Econometric Model is re-estimated and simulated with each such data release, thus providing a constantly evolving and current assessment of state and local business activity.

The Final Forecast

The process described above is followed to produce an initial set of projections. Through the comprehensive multi-regional modeling and simulation process, a systematic analysis is generated which accounts for both historical patterns in economic performance and inter-relationships and best available information on the future course of pertinent external factors. While the best available techniques and data are employed in this effort, they are not capable of directly capturing “street sense,” i.e., the contemporaneous and often non-quantifiable information that can materially affect economic outcomes. In order to provide a comprehensive approach to the prediction of business conditions and to achieve the property of statistical consistence, it is necessary to compile and assimilate extensive material regarding current events and factors affecting the forecast.

This critical aspect of the forecasting methodology includes activities such as (1) daily review of hundreds of financial and business publications and electronic information sites; (2) review of major newspapers and online news sources on a daily basis; (3) direct discussions with key business and political leaders; (4) face-to-face discussions with representatives of major industry groups; and (5) frequent site visits to various regions. The insights arising from this “fact finding” are analyzed and evaluated for their effects on the likely course of the future activity.

Another vital information resource stems from the firm’s ongoing interaction with key players in the international, domestic, and state economic scenes. Such activities include visiting with corporate groups on a regular basis and being regularly involved in the policy process at all levels. The firm is also an active participant in many major corporate relocations, economic development initiatives, and regulatory proceedings.

Once organized, this information is carefully assessed and, when appropriate, independently verified. The impact on specific communities and sectors that is distinct from what is captured by the econometric system is then factored into the forecast analysis. For example, the opening or closing of a major facility, particularly in a relatively small area, can cause a sudden change in business performance that will not be accounted for by either a modeling system based on historical relationships or expected (primarily national and international) factors.

The final step in the forecasting process is the integration of this material into the results in a logical and mathematically consistent manner. In some instances, this task is accomplished through “constant adjustment factors” which augment relevant equations. In other cases, anticipated changes in industrial structure or regulatory parameters are initially simulated within the context of the Multi-

Regional Impact Assessment System to estimate their ultimate effects by sector. Those findings are then factored into the simulation as constant adjustments on a distributed temporal basis. Once this scenario is formulated, the extended system is again balanced across regions and sectors through an iterative simulation algorithm analogous to that described in the preceding section.

Appendix B: Detailed Sectoral Results

Operations, Student Spending, and Visitor Spending

Operations

The Annual Economic Impact of Operations Associated with The University of Texas Permian Basin on Business Activity in the Odessa Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$243,536	\$72,573	\$48,210	1
Mining	\$2,366,003	\$527,851	\$250,811	1
Utilities	\$5,904,165	\$1,333,657	\$581,972	2
Construction	\$4,893,996	\$2,629,662	\$2,167,004	29
Manufacturing	\$10,631,083	\$2,860,379	\$1,631,940	21
Wholesale Trade	\$5,602,114	\$3,791,309	\$2,186,102	24
Retail Trade*	\$24,857,275	\$18,649,734	\$10,841,900	317
Transportation & Warehousing	\$4,252,298	\$2,808,696	\$1,857,570	24
Information	\$2,080,517	\$1,285,589	\$548,861	5
Financial Activities*	\$16,456,620	\$3,702,597	\$1,251,612	12
Business Services	\$3,986,728	\$2,410,843	\$1,966,629	23
Health Services	\$5,828,414	\$4,076,262	\$3,446,517	54
Other Services	\$63,191,098	\$39,412,115	\$33,866,770	766
Total, All Industries	\$150,293,848	\$83,561,267	\$60,645,898	1,278

Source: US Multi-Regional Impact Assessment System, The Perryman Group

The Annual Economic Impact of Operations Associated with The University of Texas Permian Basin on Business Activity in the Midland Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$288,652	\$87,038	\$57,403	1
Mining	\$1,045,488	\$239,511	\$124,078	1
Utilities	\$3,596,738	\$813,690	\$355,072	1
Construction	\$1,140,189	\$613,083	\$505,219	7
Manufacturing	\$1,031,750	\$369,215	\$231,354	3
Wholesale Trade	\$1,335,627	\$903,905	\$521,200	6
Retail Trade*	\$9,064,215	\$6,797,339	\$3,951,026	115
Transportation & Warehousing	\$2,374,310	\$1,563,993	\$1,034,369	13
Information	\$1,485,729	\$916,125	\$391,123	3
Financial Activities*	\$7,502,284	\$1,884,616	\$686,546	7
Business Services	\$1,609,134	\$973,870	\$794,428	9
Health Services	\$1,761,313	\$1,235,847	\$1,044,920	16
Other Services	\$25,896,144	\$16,179,022	\$13,909,466	315
Total, All Industries	\$58,131,572	\$32,577,254	\$23,606,204	497

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Operations Associated with The University of Texas Permian Basin on Business Activity in the Permian Basin Region

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$4,300,839	\$1,249,177	\$844,106	13
Mining	\$3,513,005	\$798,984	\$397,443	2
Utilities	\$12,565,160	\$2,841,997	\$1,240,171	5
Construction	\$6,034,184	\$3,242,005	\$2,671,619	36
Manufacturing	\$16,876,547	\$4,752,039	\$2,685,824	37
Wholesale Trade	\$6,937,741	\$4,695,215	\$2,707,302	29
Retail Trade*	\$35,392,908	\$26,555,102	\$15,437,775	451
Transportation & Warehousing	\$8,200,764	\$5,405,949	\$3,575,299	46
Information	\$4,680,538	\$2,887,131	\$1,232,610	10
Financial Activities*	\$24,699,700	\$5,874,470	\$2,099,728	20
Business Services	\$5,595,862	\$3,367,409	\$2,746,943	32
Health Services	\$7,589,727	\$5,320,784	\$4,498,774	71
Other Services	\$89,560,291	\$55,860,578	\$48,005,594	1,086
Total, All Industries	\$225,947,267	\$122,850,840	\$88,143,187	1,837

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Operations Associated with The University of Texas Permian Basin on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$4,531,291	\$1,355,460	\$897,068	13
Mining	\$3,941,221	\$912,830	\$501,820	2
Utilities	\$13,189,207	\$2,982,081	\$1,301,302	5
Construction	\$7,161,231	\$3,842,327	\$3,166,317	42
Manufacturing	\$32,694,944	\$10,173,093	\$5,698,159	87
Wholesale Trade	\$8,222,344	\$5,564,569	\$3,208,580	35
Retail Trade*	\$37,735,519	\$28,324,030	\$16,468,173	480
Transportation & Warehousing	\$8,446,468	\$5,574,849	\$3,687,006	48
Information	\$5,847,992	\$3,605,822	\$1,539,440	13
Financial Activities*	\$44,282,496	\$11,989,821	\$3,997,860	39
Business Services	\$9,972,051	\$6,136,619	\$5,005,908	58
Health Services	\$8,744,808	\$6,120,466	\$5,174,909	81
Other Services	\$91,087,066	\$56,649,499	\$48,580,620	1,099
Total, All Industries	\$275,856,638	\$143,231,466	\$99,227,162	2,003

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

Student Spending

The Annual Economic Impact of Out-of-Area Student Spending Associated with The University of Texas Permian Basin on Business Activity in the Odessa Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$88,284	\$25,493	\$16,740	0
Mining	\$811,318	\$179,998	\$86,439	0
Utilities	\$3,368,468	\$756,019	\$329,910	1
Construction	\$1,421,184	\$728,302	\$600,169	8
Manufacturing	\$3,225,428	\$859,841	\$490,578	5
Wholesale Trade	\$1,784,899	\$1,207,844	\$696,452	7
Retail Trade*	\$15,853,386	\$11,971,040	\$6,973,116	201
Transportation & Warehousing	\$1,281,826	\$884,967	\$585,286	8
Information	\$1,211,967	\$751,160	\$320,693	2
Financial Activities*	\$8,841,610	\$971,913	\$358,085	3
Business Services	\$1,529,327	\$859,035	\$700,751	8
Health Services	\$3,062,999	\$2,170,987	\$1,835,587	29
Other Services	\$5,465,362	\$2,849,501	\$2,258,230	46
Total, All Industries	\$47,946,058	\$24,216,100	\$15,252,036	320

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Out-of-Area Student Spending Associated with The University of Texas Permian Basin on Business Activity in the Midland Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$187,060	\$55,000	\$35,726	0
Mining	\$652,830	\$150,022	\$80,862	0
Utilities	\$3,088,996	\$693,411	\$302,590	1
Construction	\$589,011	\$301,845	\$248,737	3
Manufacturing	\$534,052	\$191,092	\$119,686	1
Wholesale Trade	\$758,144	\$513,036	\$295,822	3
Retail Trade*	\$11,153,543	\$8,421,670	\$4,905,537	141
Transportation & Warehousing	\$1,216,213	\$836,059	\$552,940	7
Information	\$1,208,965	\$747,253	\$319,026	3
Financial Activities*	\$6,866,660	\$886,282	\$352,133	3
Business Services	\$1,107,690	\$621,326	\$506,842	6
Health Services	\$1,947,956	\$1,383,952	\$1,170,144	18
Other Services	\$3,842,251	\$2,015,603	\$1,594,316	33
Total, All Industries	\$33,153,371	\$16,816,551	\$10,484,361	219

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Out-of-Area Student Spending Associated with The University of Texas Permian Basin on Business Activity in the Permian Basin Region

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$1,912,219	\$529,938	\$356,728	5
Mining	\$1,493,557	\$339,322	\$173,069	0
Utilities	\$7,379,502	\$1,656,539	\$722,870	3
Construction	\$2,034,524	\$1,042,612	\$859,177	11
Manufacturing	\$6,444,976	\$1,779,977	\$998,125	12
Wholesale Trade	\$2,543,043	\$1,720,881	\$992,275	11
Retail Trade*	\$27,701,946	\$20,917,998	\$12,184,717	352
Transportation & Warehousing	\$2,905,485	\$1,997,314	\$1,320,954	17
Information	\$2,714,024	\$1,678,330	\$716,530	6
Financial Activities*	\$15,901,599	\$1,915,710	\$744,422	7
Business Services	\$2,637,017	\$1,466,402	\$1,196,209	14
Health Services	\$5,010,955	\$3,557,331	\$3,007,762	47
Other Services	\$9,519,090	\$4,963,302	\$3,935,578	81
Total, All Industries	\$88,197,937	\$43,565,655	\$27,208,416	566

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Out-of-Area Student Spending Associated with The University of Texas Permian Basin on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$2,009,014	\$584,676	\$382,106	6
Mining	\$1,716,637	\$400,841	\$232,048	1
Utilities	\$7,613,390	\$1,709,046	\$745,782	3
Construction	\$2,562,066	\$1,312,958	\$1,081,959	14
Manufacturing	\$12,614,399	\$3,867,576	\$2,154,377	31
Wholesale Trade	\$3,217,752	\$2,177,460	\$1,255,541	14
Retail Trade*	\$28,579,960	\$21,580,991	\$12,570,912	363
Transportation & Warehousing	\$2,997,574	\$2,060,618	\$1,362,822	18
Information	\$3,126,057	\$1,931,516	\$824,628	7
Financial Activities*	\$21,809,660	\$3,657,005	\$1,377,681	13
Business Services	\$4,158,844	\$2,448,122	\$1,997,041	23
Health Services	\$5,521,868	\$3,913,779	\$3,309,136	52
Other Services	\$10,066,098	\$5,246,814	\$4,143,105	86
Total, All Industries	\$105,993,319	\$50,891,402	\$31,437,138	629

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

Tourism and Visitor Spending

The Annual Economic Impact of Out-of-Area Visitor Spending Associated with The University of Texas Permian Basin on Business Activity in the Odessa Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$22,527	\$6,011	\$3,902	0
Mining	\$143,366	\$31,789	\$15,088	0
Utilities	\$326,062	\$75,036	\$32,744	0
Construction	\$210,527	\$112,305	\$92,546	1
Manufacturing	\$681,725	\$179,226	\$101,937	1
Wholesale Trade	\$402,473	\$272,331	\$157,028	2
Retail Trade*	\$3,854,952	\$2,826,096	\$1,631,402	49
Transportation & Warehousing	\$859,246	\$622,111	\$411,442	5
Information	\$124,440	\$76,685	\$32,740	0
Financial Activities*	\$859,574	\$186,784	\$71,314	1
Business Services	\$235,705	\$145,062	\$118,331	1
Health Services	\$322,640	\$225,668	\$190,806	3
Other Services	\$1,154,298	\$607,781	\$444,731	10
Total, All Industries	\$9,197,535	\$5,366,885	\$3,304,011	73

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

**The Annual Economic Impact of Out-of-Area Visitor Spending Associated with
The University of Texas Permian Basin on Business Activity in the Midland Area**
Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$63,879	\$17,428	\$11,171	0
Mining	\$149,590	\$34,099	\$17,605	0
Utilities	\$472,072	\$109,246	\$47,671	0
Construction	\$115,730	\$61,784	\$50,913	1
Manufacturing	\$151,513	\$54,137	\$33,832	0
Wholesale Trade	\$228,242	\$154,439	\$89,052	1
Retail Trade*	\$3,641,838	\$2,666,003	\$1,538,295	46
Transportation & Warehousing	\$926,865	\$668,451	\$442,093	5
Information	\$216,437	\$133,025	\$56,790	0
Financial Activities*	\$936,911	\$230,723	\$94,321	1
Business Services	\$225,711	\$139,050	\$113,429	1
Health Services	\$230,514	\$161,748	\$136,760	2
Other Services	\$1,079,297	\$572,434	\$416,190	9
Total, All Industries	\$8,438,599	\$5,002,567	\$3,048,122	67

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Out-of-Area Visitor Spending Associated with The University of Texas Permian Basin on Business Activity in the Permian Basin Region

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$556,443	\$140,423	\$94,197	1
Mining	\$298,994	\$67,629	\$33,612	0
Utilities	\$981,101	\$226,827	\$98,981	0
Construction	\$345,274	\$184,138	\$151,740	2
Manufacturing	\$1,652,223	\$449,425	\$249,736	2
Wholesale Trade	\$630,715	\$426,773	\$246,079	3
Retail Trade*	\$7,697,365	\$5,643,676	\$3,258,001	98
Transportation & Warehousing	\$1,876,670	\$1,353,029	\$894,847	12
Information	\$402,963	\$247,792	\$105,793	1
Financial Activities*	\$1,834,820	\$424,809	\$170,451	1
Business Services	\$461,416	\$282,526	\$230,466	3
Health Services	\$553,154	\$387,835	\$327,918	5
Other Services	\$2,297,114	\$1,209,579	\$885,769	20
Total, All Industries	\$19,588,252	\$11,044,463	\$6,747,590	148

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Annual Economic Impact of Out-of-Area Visitor Spending Associated with The University of Texas Permian Basin on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$582,750	\$157,354	\$101,699	1
Mining	\$334,258	\$77,155	\$42,249	0
Utilities	\$1,037,296	\$239,439	\$104,484	0
Construction	\$440,355	\$234,452	\$193,203	2
Manufacturing	\$3,279,720	\$988,856	\$546,891	7
Wholesale Trade	\$827,639	\$560,017	\$322,914	3
Retail Trade*	\$7,908,322	\$5,802,971	\$3,350,790	101
Transportation & Warehousing	\$1,898,798	\$1,368,239	\$904,904	12
Information	\$507,196	\$311,779	\$133,108	1
Financial Activities*	\$3,233,911	\$849,454	\$320,760	3
Business Services	\$836,320	\$522,845	\$426,505	5
Health Services	\$688,347	\$481,887	\$407,443	6
Other Services	\$2,432,505	\$1,279,809	\$937,019	21
Total, All Industries	\$24,007,417	\$12,874,257	\$7,791,969	164

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

Construction

The Economic Impact of Recent and Ongoing Construction of Facilities Associated with The University of Texas Permian Basin on Business Activity in the Odessa Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	\$445,425	\$128,636	\$85,091	1
Mining	\$4,680,289	\$1,097,031	\$535,302	3
Utilities	\$10,027,828	\$2,259,745	\$986,092	4.1
Construction	\$125,658,315	\$55,447,374	\$45,692,088	611
Manufacturing	\$48,626,302	\$16,577,938	\$9,756,494	139
Wholesale Trade	\$16,741,825	\$11,329,693	\$6,532,801	71
Retail Trade*	\$50,296,520	\$38,142,876	\$22,247,463	638
Transportation & Warehousing	\$8,784,571	\$5,874,999	\$3,885,515	50.5
Information	\$3,823,531	\$2,362,511	\$1,008,632	8
Financial Activities*	\$26,976,197	\$5,393,606	\$2,198,883	21
Business Services	\$11,180,129	\$6,906,408	\$5,633,859	65
Health Services	\$11,095,813	\$7,756,889	\$6,558,522	103
Other Services	\$19,154,157	\$9,803,289	\$7,939,780	184
Total, All Industries	\$337,490,902	\$163,080,994	\$113,060,524	1,899

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Economic Impact of Recent and Ongoing Construction of Facilities Associated with The University of Texas Permian Basin on Business Activity in the Midland Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	\$763,810	\$225,102	\$147,759	2
Mining	\$3,370,683	\$890,875	\$479,161	3
Utilities	\$8,474,837	\$1,918,832	\$837,327	3.4
Construction	\$74,833,041	\$33,445,133	\$27,560,874	369
Manufacturing	\$6,556,141	\$2,493,402	\$1,544,116	21
Wholesale Trade	\$5,649,812	\$3,823,734	\$2,204,800	24
Retail Trade*	\$25,646,572	\$19,408,276	\$11,313,601	326
Transportation & Warehousing	\$6,970,698	\$4,631,443	\$3,063,071	39.8
Information	\$3,834,433	\$2,363,759	\$1,009,165	9
Financial Activities*	\$17,581,106	\$4,134,913	\$1,797,817	17
Business Services	\$7,199,395	\$4,457,716	\$3,636,353	42
Health Services	\$4,757,535	\$3,336,746	\$2,821,250	44
Other Services	\$10,380,356	\$5,326,479	\$4,312,053	101
Total, All Industries	\$176,018,420	\$86,456,411	\$60,727,347	1,001

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Economic Impact of Recent and Ongoing Construction of Facilities Associated with The University of Texas Permian Basin on Business Activity in the Permian Basin Region

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	\$10,118,238	\$2,849,761	\$1,923,149	29
Mining	\$9,844,160	\$2,548,977	\$1,327,045	9
Utilities	\$26,862,748	\$6,067,760	\$2,647,809	11.1
Construction	\$228,079,262	\$101,177,255	\$83,376,360	1,115
Manufacturing	\$85,827,157	\$29,447,049	\$17,067,193	248
Wholesale Trade	\$24,977,379	\$16,903,529	\$9,746,727	105
Retail Trade*	\$91,662,129	\$69,482,492	\$40,522,347	1,164
Transportation & Warehousing	\$21,704,837	\$14,467,644	\$9,568,384	124.1
Information	\$10,965,036	\$6,762,668	\$2,887,202	25
Financial Activities*	\$52,400,863	\$11,398,409	\$4,862,774	47
Business Services	\$20,961,228	\$12,912,476	\$10,533,270	122
Health Services	\$17,819,848	\$12,488,313	\$10,558,985	166
Other Services	\$35,147,111	\$17,916,186	\$14,535,850	337
Total, All Industries	\$636,369,996	\$304,422,516	\$209,557,093	3,501

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Economic Impact of Recent and Ongoing Construction of Facilities Associated with The University of Texas Permian Basin on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Job Years*
Agriculture	\$15,164,407	\$4,416,793	\$2,909,842	43
Mining	\$15,400,879	\$4,001,304	\$2,251,966	15
Utilities	\$40,546,839	\$9,153,971	\$3,994,551	16.6
Construction	\$319,340,890	\$141,981,379	\$117,001,497	1,564
Manufacturing	\$208,861,277	\$72,372,526	\$42,539,531	640
Wholesale Trade	\$43,337,483	\$29,328,723	\$16,911,203	183
Retail Trade*	\$139,514,368	\$105,718,683	\$61,648,609	1,771
Transportation & Warehousing	\$31,356,364	\$20,928,860	\$13,841,601	179.5
Information	\$19,496,980	\$12,020,595	\$5,131,976	44
Financial Activities*	\$128,500,775	\$31,450,202	\$12,684,842	127
Business Services	\$53,107,785	\$33,163,449	\$27,052,876	313
Health Services	\$30,562,785	\$21,392,831	\$18,087,838	284
Other Services	\$55,668,587	\$28,453,960	\$22,827,285	524
Total, All Industries	\$1,100,859,419	\$514,383,276	\$346,883,617	5,705

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars. A job-year is equivalent to one person working for one year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

Employed Graduates

The Estimated Annual Economic Impact Associated with Graduates of The University of Texas Permian Basin on Business Activity in the Odessa Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$6,922,452	\$2,050,118	\$1,354,403	19
Mining	\$3,178,002,584	\$703,594,670	\$327,978,387	1,638
Utilities	\$284,834,955	\$62,676,862	\$27,350,507	112
Construction	\$316,651,063	\$168,394,737	\$138,767,751	1,854
Manufacturing	\$683,938,140	\$220,692,290	\$133,413,935	1,657
Wholesale Trade	\$197,612,943	\$133,570,851	\$77,018,150	831
Retail Trade*	\$659,615,448	\$490,870,345	\$284,625,349	8,416
Transportation & Warehousing	\$114,802,353	\$76,626,677	\$50,678,134	657
Information	\$76,338,786	\$46,780,273	\$19,972,006	169
Financial Activities*	\$1,211,495,211	\$406,239,599	\$107,090,204	972
Business Services	\$229,594,623	\$141,409,386	\$115,353,831	1,335
Health Services	\$230,288,468	\$159,383,802	\$134,760,490	2,117
Other Services	\$304,476,173	\$157,940,581	\$128,854,964	2,949
Total, All Industries	\$7,494,573,198	\$2,770,230,190	\$1,547,218,112	22,726

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Estimated Annual Economic Impact Associated with Graduates of The University of Texas Permian Basin on Business Activity in the Midland Area

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$18,166,514	\$5,462,896	\$3,569,123	52
Mining	\$3,711,898,183	\$815,946,780	\$378,209,920	1,854
Utilities	\$344,395,787	\$76,218,188	\$33,259,577	137
Construction	\$185,980,718	\$99,821,663	\$82,259,274	1,098
Manufacturing	\$197,081,733	\$72,066,501	\$45,801,385	561
Wholesale Trade	\$107,424,794	\$72,601,196	\$41,862,506	451
Retail Trade*	\$541,526,631	\$402,604,117	\$233,357,058	6,912
Transportation & Warehousing	\$147,268,339	\$97,020,651	\$64,165,994	831
Information	\$114,505,489	\$70,584,599	\$30,134,836	256
Financial Activities*	\$966,956,199	\$325,254,869	\$97,237,528	887
Business Services	\$232,504,281	\$143,991,081	\$117,459,848	1,359
Health Services	\$149,376,068	\$104,230,638	\$88,127,977	1,384
Other Services	\$254,110,239	\$132,694,575	\$108,057,118	2,491
Total, All Industries	\$6,971,194,975	\$2,418,497,753	\$1,323,502,144	18,272

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Estimated Annual Economic Impact Associated with Graduates of The University of Texas Permian Basin on Business Activity in the Permian Basin Region

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$198,930,232	\$56,855,167	\$38,339,512	577
Mining	\$8,159,708,759	\$1,803,720,670	\$840,235,458	4,184
Utilities	\$1,038,341,807	\$227,577,901	\$99,308,939	410
Construction	\$630,703,429	\$337,329,721	\$277,980,704	3,715
Manufacturing	\$1,518,624,510	\$461,322,916	\$271,804,452	3,458
Wholesale Trade	\$361,554,056	\$244,370,831	\$140,906,391	1,523
Retail Trade*	\$1,545,523,729	\$1,149,940,572	\$666,716,633	19,726
Transportation & Warehousing	\$371,631,844	\$245,748,387	\$162,529,208	2,107
Information	\$262,828,244	\$161,714,645	\$69,041,173	587
Financial Activities*	\$2,591,837,423	\$860,486,080	\$247,276,356	2,254
Business Services	\$511,425,985	\$315,339,787	\$257,236,466	2,978
Health Services	\$437,438,388	\$303,966,124	\$257,006,177	4,039
Other Services	\$701,739,691	\$363,115,773	\$296,552,416	6,798
Total, All Industries	\$18,330,288,096	\$6,531,488,574	\$3,624,933,884	52,356

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.

The Estimated Annual Economic Impact Associated with Graduates of The University of Texas Permian Basin on Business Activity in Texas

Results by Industry

Industry	Total Expenditures	Gross Product	Personal Income	Jobs
Agriculture	\$281,478,700	\$82,075,674	\$54,046,783	809
Mining	\$8,526,518,579	\$1,888,541,987	\$885,821,786	4,436
Utilities	\$1,349,648,247	\$296,012,007	\$129,171,743	532
Construction	\$879,569,405	\$469,408,699	\$386,821,996	5,171
Manufacturing	\$3,295,303,271	\$1,047,579,560	\$607,613,838	8,338
Wholesale Trade	\$593,221,414	\$401,015,860	\$231,229,309	2,499
Retail Trade*	\$2,101,188,167	\$1,565,151,609	\$907,822,664	26,804
Transportation & Warehousing	\$500,116,902	\$330,534,420	\$218,603,675	2,835
Information	\$444,549,125	\$273,844,707	\$116,913,096	995
Financial Activities*	\$4,887,392,854	\$1,641,036,197	\$489,762,199	4,607
Business Services	\$1,133,321,045	\$704,012,135	\$574,293,505	6,650
Health Services	\$735,090,440	\$508,954,016	\$430,325,328	6,765
Other Services	\$1,012,777,987	\$527,172,418	\$426,560,147	9,719
Total, All Industries	\$25,740,176,136	\$9,735,339,288	\$5,458,986,071	80,161

Source: US Multi-Regional Impact Assessment System, The Perryman Group

Notes: Monetary values given in 2019 US dollars per year. Components may not sum due to rounding. Retail Trade includes restaurants, Financial Activities includes Real Estate.