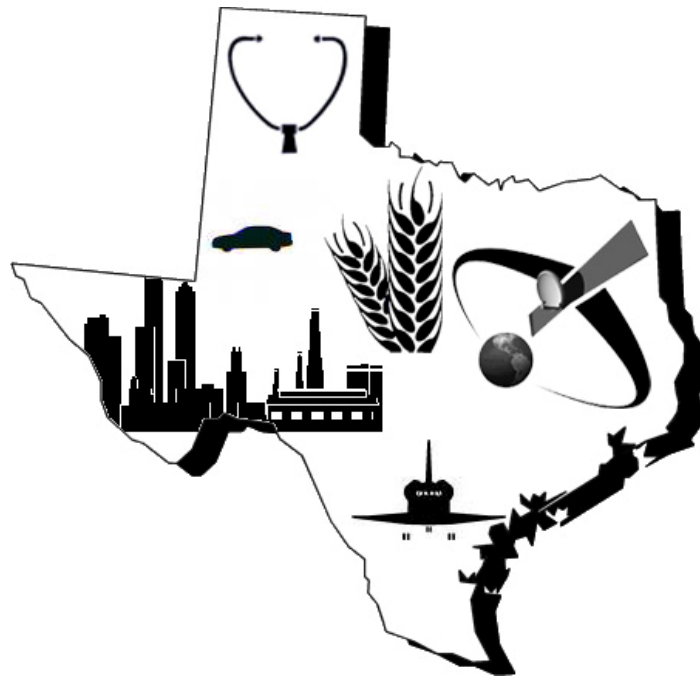




# The Potential Impact of an Initiative to Increase the Pool of Engineering Graduates on Business Activity In Texas





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# INTRODUCTION



# Introduction

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- The pool of available engineering talent is a major determinant of economic growth and potential. As operations in industries ranging from manufacturing to oil and gas exploration to construction become increasingly complex and sophisticated, the need for engineers will rise. Moreover, most of the emerging sectors expected to dominate the business landscape of the future are critically dependent on these skilled professionals.
- Geographic areas able to meet the growing demand for engineers will benefit. Such regions will enjoy an edge in the competitive arena for quality corporate locations. In fact, the availability of a substantial supply of scientific and engineering personnel is frequently cited as the most important factor in attracting desirable new activity, and technology centers tend to cluster around areas with these types of workers. In addition, the capacity, efficiency, and productivity of the economy will be enhanced.
- Stimulating the number of engineering students and, hence, the number of engineers entering the workforce has significant positive effects.
- The Perryman Group (TPG) was recently asked to evaluate the potential gains stemming from a 25% increase in the number of engineering students completing degrees in state universities in Texas. This report sets forth findings from this analysis.



## Highlights of Study Findings

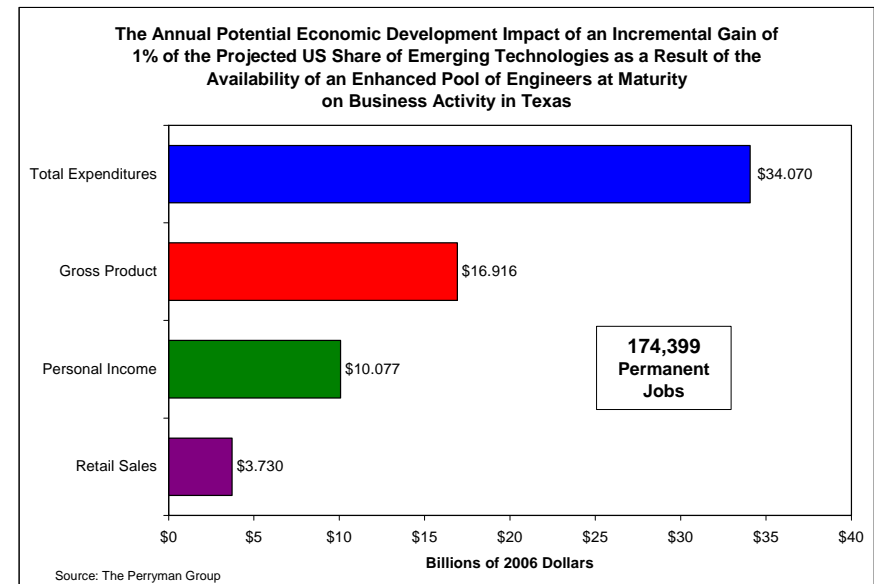
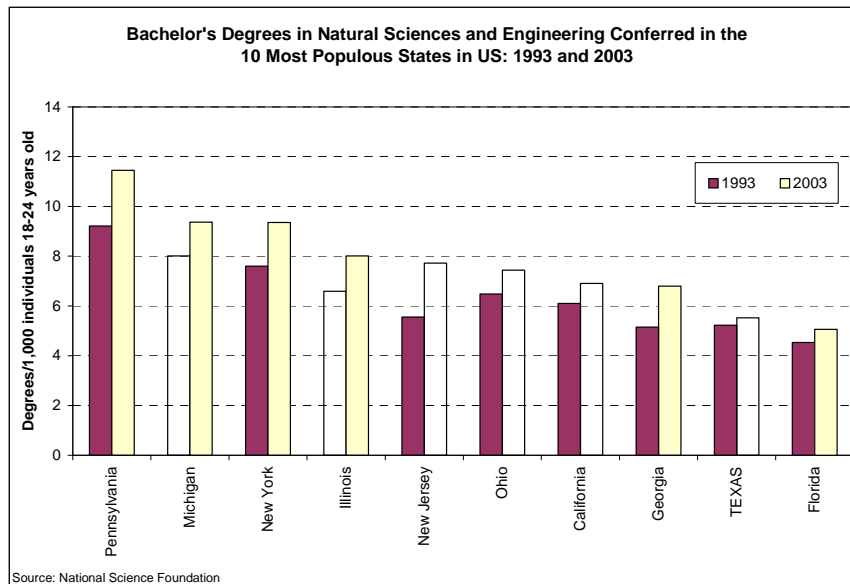
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- Engineers are critical to future economic growth and a primary factor in capturing emerging technology sectors.
- Texas presently lags most of its key competitor states in the number of engineering degrees awarded.
- An initiative to improve graduation rates of engineers from state universities in Texas would have notable positive effects on business activity. **By the 15<sup>th</sup> year of implementation, this program would be responsible for an overall stimulus to business activity over \$4.7 billion (constant 2006 dollars) in gross state product and more than 50,000 permanent jobs.** These benefits are observed across all regions of the state and will compound over time.



## Highlights of Study Findings (cont.)

- If the greater relative concentration of engineers improves the ability to attract emerging, high-growth sectors, the economic development benefits will be quite substantial. If Texas were to generate a 1% increment of the US market share for these industries, the aggregate gains to the economy would total almost \$17 billion (constant 2006 dollars) in annual output and more than 174,000 permanent jobs.





## The Perryman Perspective

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- The Perryman Group is a Texas-based economic research and analysis firm with more than 20 years of experience in assessing the economic impact of corporate expansions, regulatory changes, real estate developments, and myriad other types of events affecting business activity.
- TPG has conducted hundreds of impact analyses for the US and Texas economies as well as all Texas metro areas and counties.
- TPG has maintained an extensive set of economic models for more than two decades, including econometric, impact assessment, demographic, occupational, and real estate absorption models developed to specifically reflect the underlying structure of the Texas economy and its various regions.
- Impact studies have been performed for hundreds of clients including many of the largest corporations in the world, governmental entities at all levels, educational institutions, major health care systems, utilities, and economic development organizations. In particular, numerous analyses have been completed relating to the effects of specific educational programs, occupational expansions, and other issues directly analogous to the present initiatives. TPG has also frequently examined the economic development potential of various initiatives centered on technology or educational expansion.
- TPG has extensive experience in economic development work, including studies for dozens of communities and a major study for the state of Texas which now provides guidance for public policy. In particular, TPG has been actively involved in the analysis and creation of numerous business parks and industrial facilities and has conducted myriad target industry studies.





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# THE GROWING NEED FOR ENGINEERS



# Growth in Engineering-Related Occupations

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- Engineering occupations as a group are anticipated to grow significantly faster than overall employment.
- Across the US, hundreds of thousands of new engineering-related jobs are projected to be created during the next 10 years. Half of the new jobs are expected to fall within the professional, scientific, and technical services sector; other significant sources of jobs include government and manufacturing.
- In particular, industrial engineering is projected to have large gains (growth in the range of 20% over the next decade) closely followed by civil and environmental engineering. Computer-related engineering fields are also expected to continue to see strong growth.



# Factors Contributing to Growth in the Need for Engineers

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- The evolution of the US business environment is generating demand for engineers.
- As noted, industrial processes are becoming increasingly complex, incorporating sophisticated manufacturing, packaging, quality control monitoring, and other highly technical aspects.
- Research and development in materials, instruments, and myriad other arenas is requiring high-level engineering training.
- Other fundamental trends are also adding to the need for engineers. The following are just a few examples of the changes ongoing in many fields.
  - An aging population increases the need for medical devices and equipment, and employment for biomedical engineers is expected to grow.
  - Employment for environmental engineers is expected to expand in response to increased environmental regulations and ongoing efforts to maintain a safe and clean environment.
  - With global demand for energy growing at a rapid pace, significant investments are needed in developing indigenous energy resources and environmentally friendly technologies. Meeting the projected energy demand in an increasingly energy consuming world is directly tied to successfully supporting that energy delivery in areas ranging from research and development in the renewable energy sector to expansion in the nuclear fuels industry.
  - At the same time, the aging of the baby boomers will affect retirement rates in the fields of science and engineering over the next twenty years, though to a lesser extent than in some other occupations.



## High-Growth Occupations

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- Many of the occupations projected to see the fastest growth in the coming decade are in computer and mathematical fields; many of these require engineering degrees.
- Computer software engineering is among the five fastest growing occupations in the economy. It is also among the top 20 in terms of the projected numerical increase in employment. In Texas, tens of thousands of such jobs are likely to be created in the next decade.
- Overall, Texas engineering occupations show a strong projected growth rate for the foreseeable future, with particularly notable expansion in the agricultural, biomedical, environmental, surveying and mapping, and aerospace fields (all with growth rates of 20% or above over the past decade).



## Industrial Need for Engineers

- Industries such as aerospace manufacturing, architectural and engineering services, computer and electronic manufacturing, and oil and gas extraction are particularly dependent on engineers. They also employ approximately 40% of some of the most popular engineering specialties.

<b>Concentration of Engineering Employment in Selected Industries</b>		
<b>Specialty</b>	<b>Industry</b>	<b>Percent</b>
Aerospace	Aerospace product and parts manufacturing	59.6
Civil	Architectural, engineering and related services	46.0
Computer Hardware	Computer and electronic product manufacturing	43.2
Chemical	Chemical manufacturing	27.8
Chemical	Architectural, engineering and related services	16.3
Electrical	Architectural, engineering and related services	19.6
Electrical	Navigational, measuring, electro-medical and control instruments manufacturing	10.8
Materials	Computer and electronic product manufacturing	14.3
Mechanical	Architectural, engineering and related services	18.1
Mechanical	Machinery manufacturing	13.4
Mining & Geological	Mining	49.9
Petroleum	Oil and gas extraction	47.4



## Beyond Traditional Fields

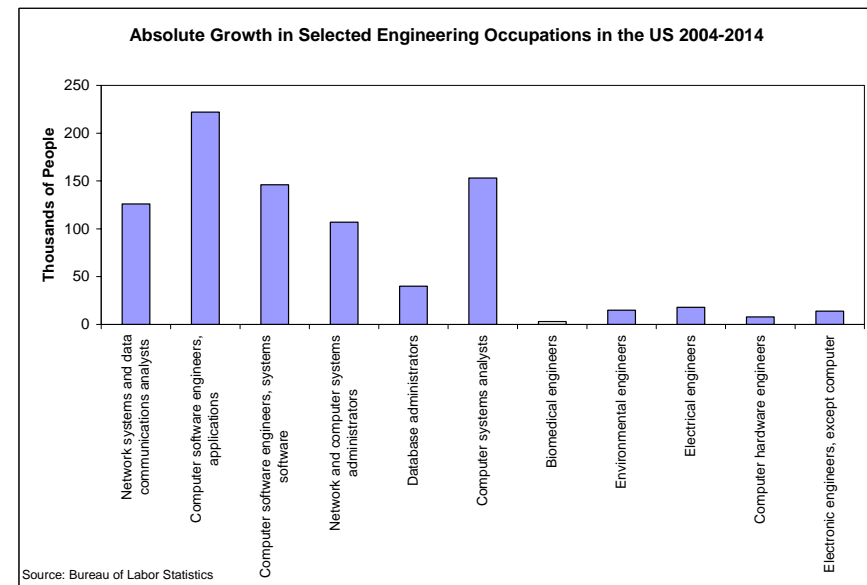
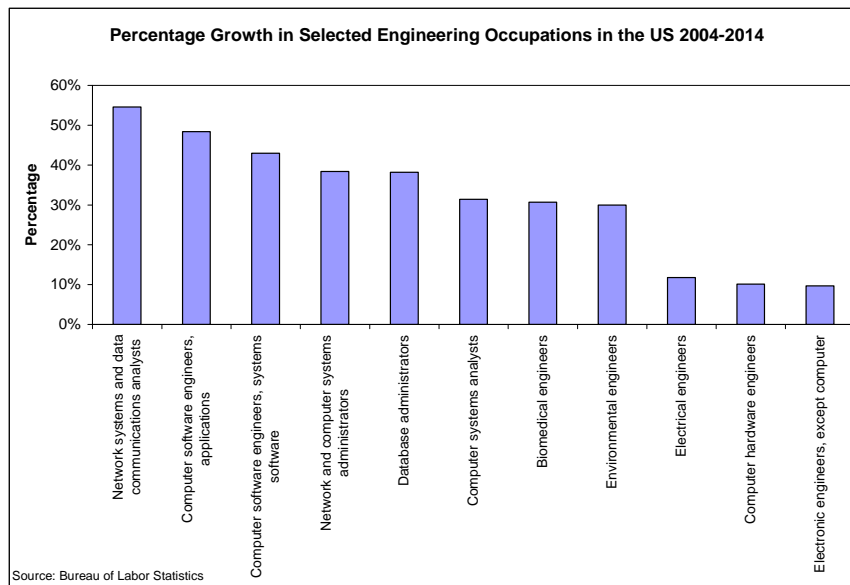
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- The need for degrees in science and engineering also goes beyond the traditionally defined science/engineering occupations.
- The National Science Foundation found that 12.9 million workers indicated they needed bachelor's degree-level knowledge in science/engineering fields, though only 4.9 million were working in occupations formally defined as science/engineering.
- Sixty-six percent of those with science/engineering degrees working in non-science/engineering occupations reported that their job was related to their degree, even many in management and marketing.
- Seventy-three percent of those with a science/engineering bachelor's degree reported that their work was closely or somewhat related to the field of their degree. This number is lower, yet still large, for engineering degree recipients (59%). The percentage goes up with the level of degree; 91% of master's degree recipients and 96% of doctoral degree recipients indicate they have jobs closely or somewhat related to their degrees.



# Growth in Engineering Occupations

- The future demand for engineers is expected to increase across a broad spectrum.
- In Texas alone, the Bureau of Labor Statistics estimates the need for hundreds of thousands of new engineers in the next few years. If the state is successful in its efforts to attract emerging technologies, the demand will be even higher.





## High Demand Occupations Often Yield High Incomes

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- There has been a notable increase in median real salaries for engineers over the past decade.
- According to a recent study by the National Science Foundation, recipients of science/engineering bachelor's degrees earned 32.6% more 15-19 years after graduation than those with other types of degrees.
- From 1993-2003, those receiving a bachelor's degree in engineering saw the largest increase in median real earnings (34%) among all fields. Real median earnings also increased for master's degree recipients (48% for engineering) and those with engineering PhDs (19%).
- Engineering degrees are, thus, typically more financially rewarding for individuals than most other fields of study.





## Problems with Insufficient Numbers of Engineers

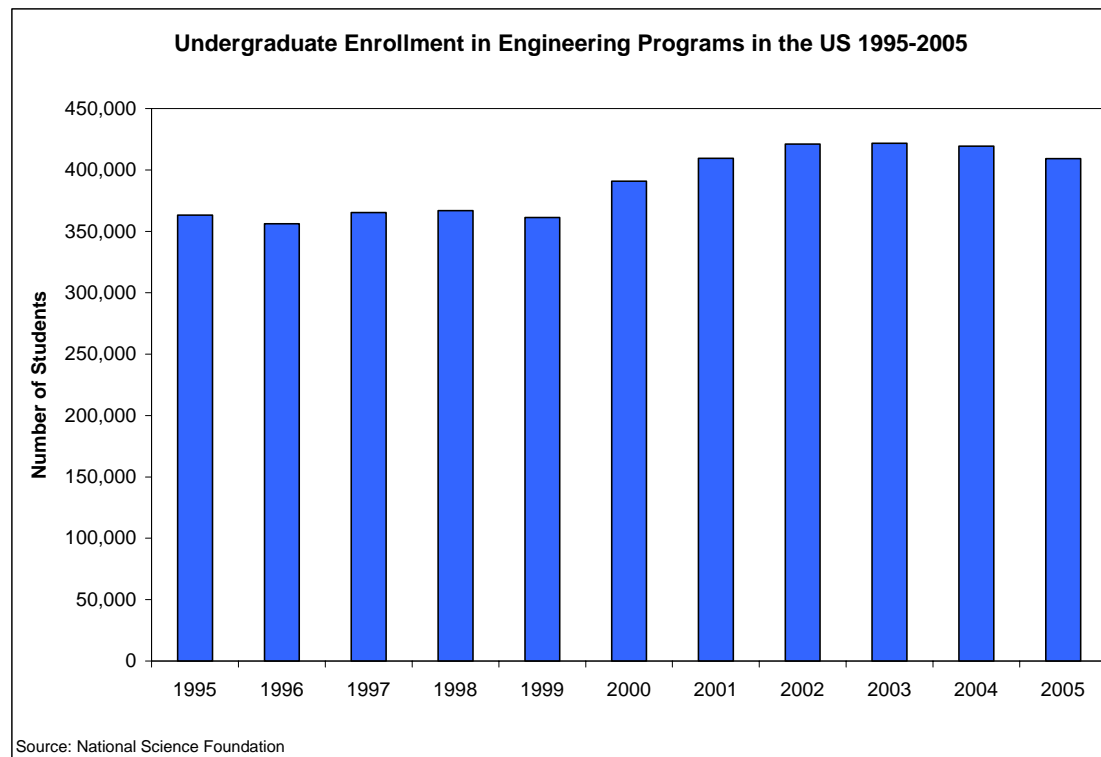
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- Engineering is essential to everything from innovation to national security.
- The future success of the US economy is directly tied to the ability to maintain a position at the forefront of technological change. An insufficient supply of engineers hampers this capacity and constrains growth in the economy.
- In addition, a lack of engineers in the US can also increase dependency on foreign talent or outsourcing and contribute to industrial vulnerability.



# US Engineering Enrollment

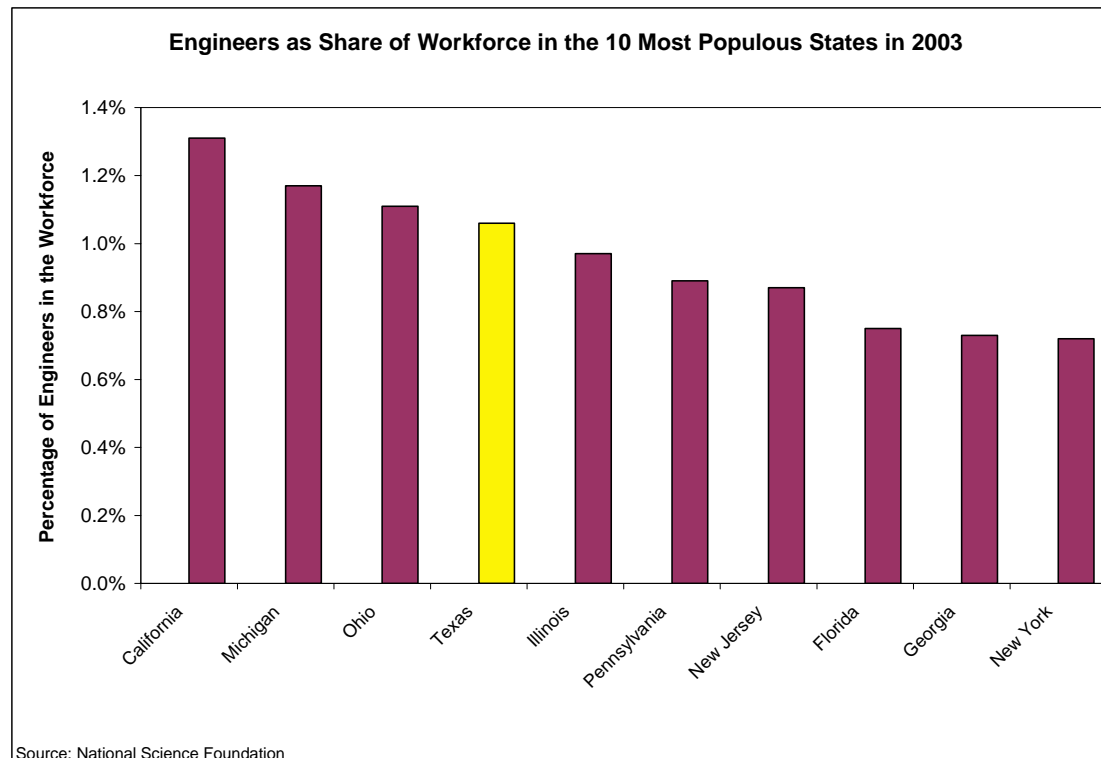
- In spite of the growing need for engineers, enrollment in US undergraduate programs in engineering has been relatively flat, even decreasing over the past few years.





## Texas' Position Relative to Other States

- Compared to other populous states, particularly those most often directly competitive for desirable new economic activity, Texas' workforce has a smaller proportion of engineers.





## Texas at a Disadvantage

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- Lagging other regions in the area of science/engineering graduates is not in keeping with Texas' economic development goals.
- As noted, many of the growth industries of the future will rely heavily on engineers and other scientists, and regions unable to supply the necessary workforce will find it difficult to attract desirable corporate locations and expansions.
- The Texas Industry Cluster Initiative introduced by Governor Rick Perry in 2004, for example, focuses on building a competitive advantage through six target industry clusters believed to offer overall economic growth and bring high-paying jobs to Texas. The industry clusters include advanced technologies and manufacturing, aerospace and defense, biotechnology and life sciences, information and computer technology, petroleum refining and chemical products, and energy. All of these have a clear need for engineers.
- In order to achieve optimal economic performance, it is essential that Texas generate a sufficient pool of engineering graduates to meet future needs.



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# TEXAS' ENGINEERING DEGREE PROGRAMS



# Universities Offering Engineering Degrees

- More than two dozen public universities in Texas are currently offering engineering degrees. Some 35,000 students are enrolled in these programs.

## All Engineering Student Enrollments in Texas Universities 2004

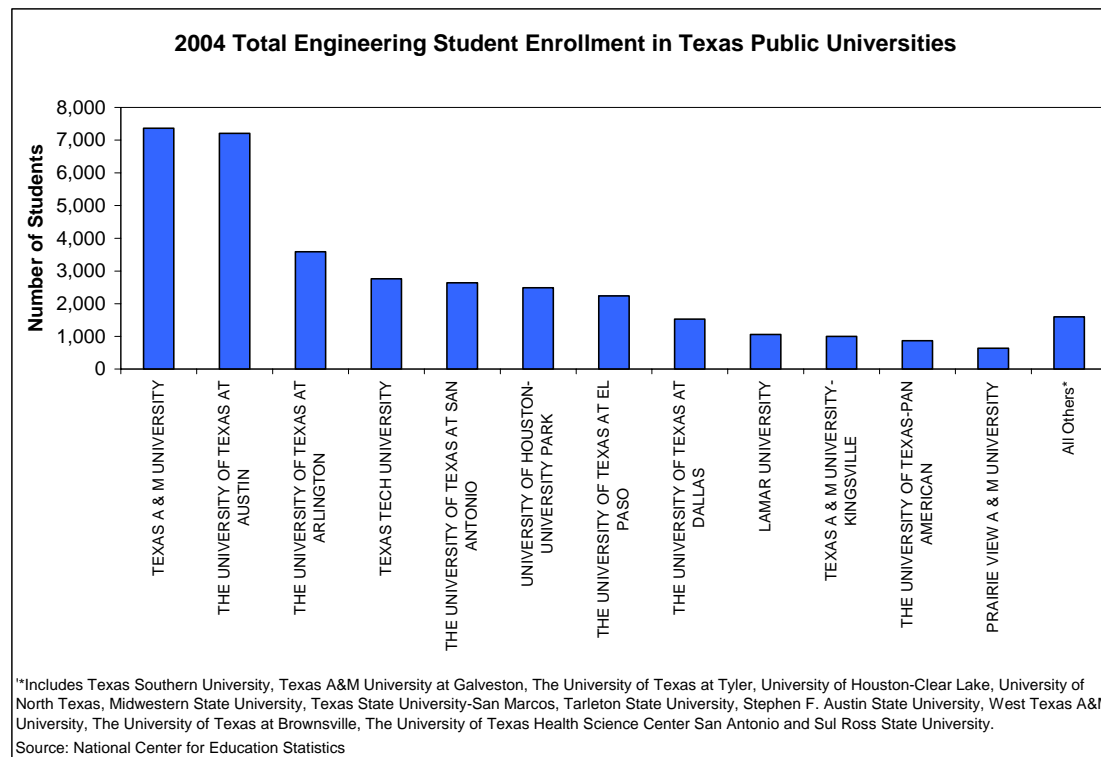
1	TEXAS A & M UNIVERSITY	7,364
2	THE UNIVERSITY OF TEXAS AT AUSTIN	7,208
3	THE UNIVERSITY OF TEXAS AT ARLINGTON	3,589
4	TEXAS TECH UNIVERSITY	2,761
5	THE UNIVERSITY OF TEXAS AT SAN ANTONIO	2,635
6	UNIVERSITY OF HOUSTON-UNIVERSITY PARK	2,484
7	THE UNIVERSITY OF TEXAS AT EL PASO	2,240
8	THE UNIVERSITY OF TEXAS AT DALLAS	1,531
9	LAMAR UNIVERSITY	1,058
10	TEXAS A & M UNIVERSITY-KINGSVILLE	998
11	THE UNIVERSITY OF TEXAS-PAN AMERICAN	868
12	PRAIRIE VIEW A & M UNIVERSITY	638
13	TEXAS SOUTHERN UNIVERSITY	302
14	TEXAS A & M UNIVERSITY AT GALVESTON	236
15	THE UNIVERSITY OF TEXAS AT TYLER	217
16	UNIVERSITY OF HOUSTON-CLEAR LAKE	210
17	UNIVERSITY OF NORTH TEXAS	148
18	MIDWESTERN STATE UNIVERSITY	126
19	TEXAS STATE UNIVERSITY-SAN MARCOS	105
20	TARLETON STATE UNIVERSITY	74
21	STEPHEN F. AUSTIN STATE UNIVERSITY	69
22	WEST TEXAS A & M UNIVERSITY	43
23	THE UNIVERSITY OF TEXAS AT BROWNSVILLE	41
24	THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER-SAN ANTONIO	19
25	SUL ROSS STATE UNIVERSITY	6
	<b>TOTAL</b>	<b>34,970</b>

Source: National Center for Education Statistics  
(<http://nces.ed.gov/ipeds/pas/dct/search/index.asp>)



# Program Size

- The largest engineering programs are at Texas A&M University and The University of Texas at Austin. However, several other universities have current engineering student enrollments exceeding 1,000. Relatively new programs at some schools are beginning to see significant growth.





# Engineering Programs Offered

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- A wide variety of courses of study are offered through about 29 different programs.
- Bachelor's degrees available at Texas' public universities include

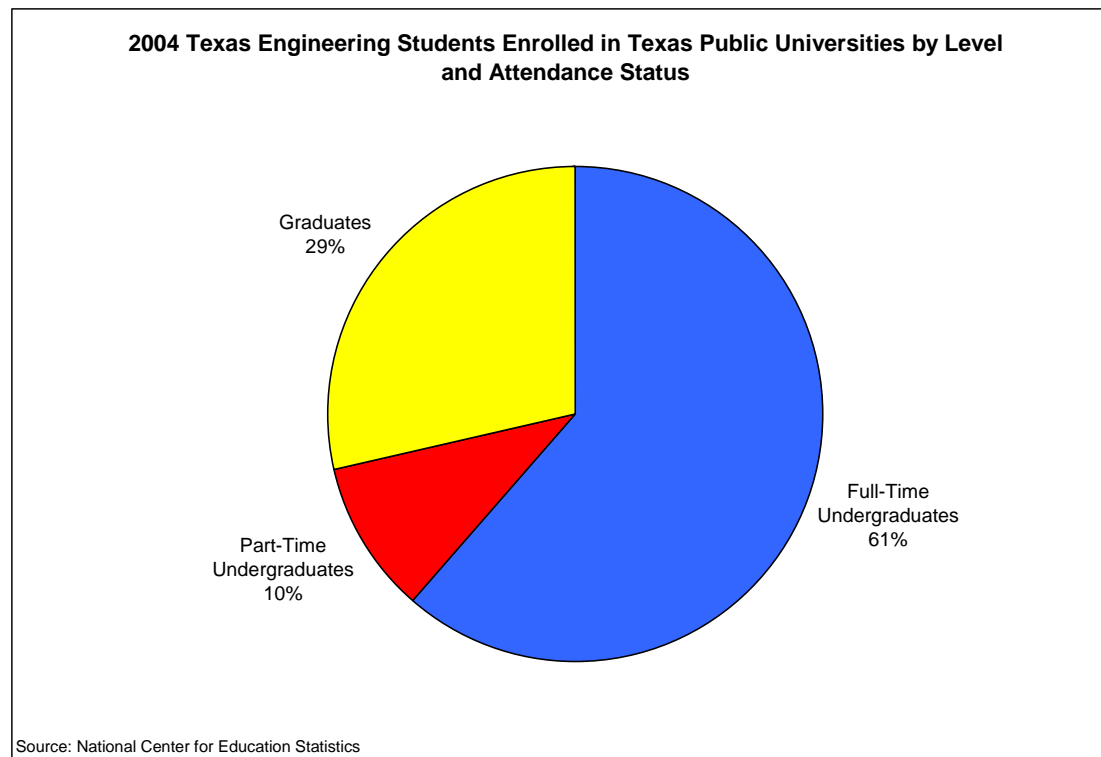
GENERAL ENGINEERING	ENVIRONMENTAL ENGINEERING
AEROSPACE, AERONAUTICS, & ASTRONOMIC ENGINEERING	ENVIRONMENTAL HEALTH ENGINEERING
AGRICULTURAL ENGINEERING	GAS ENGINEERING
ARCHITECTURAL ENGINEERING	INDUSTRIAL ENGINEERING
BIOENGINEERING	INDUSTRIAL SAFETY ENGINEERING
BIOMEDICAL ENGINEERING	MANUFACTURING ENGINEERING
CHEMICAL ENGINEERING	MARITIME SYSTEMS ENGINEERING
CIVIL ENGINEERING	MECHANICAL ENGINEERING
COMPUTER ENGINEERING	METALLURGICAL ENGINEERING
COMPUTER NETWORKS & DATA COMMUNICATIONS ENGINEERING	NAVAL ARCHITECTURE & MARINE ENGINEERING
COMPUTER SOFTWARE ENGINEERING	NUCLEAR ENGINEERING
ELECTRIC, ELECTRONIC, & COMMUNICATIONS ENGINEERING	OCEAN ENGINEERING
ENGINEERING PHYSICS	PETROLEUM ENGINEERING
	RADIATION PROTECTION ENGINEERING





# Texas Engineering Enrollment

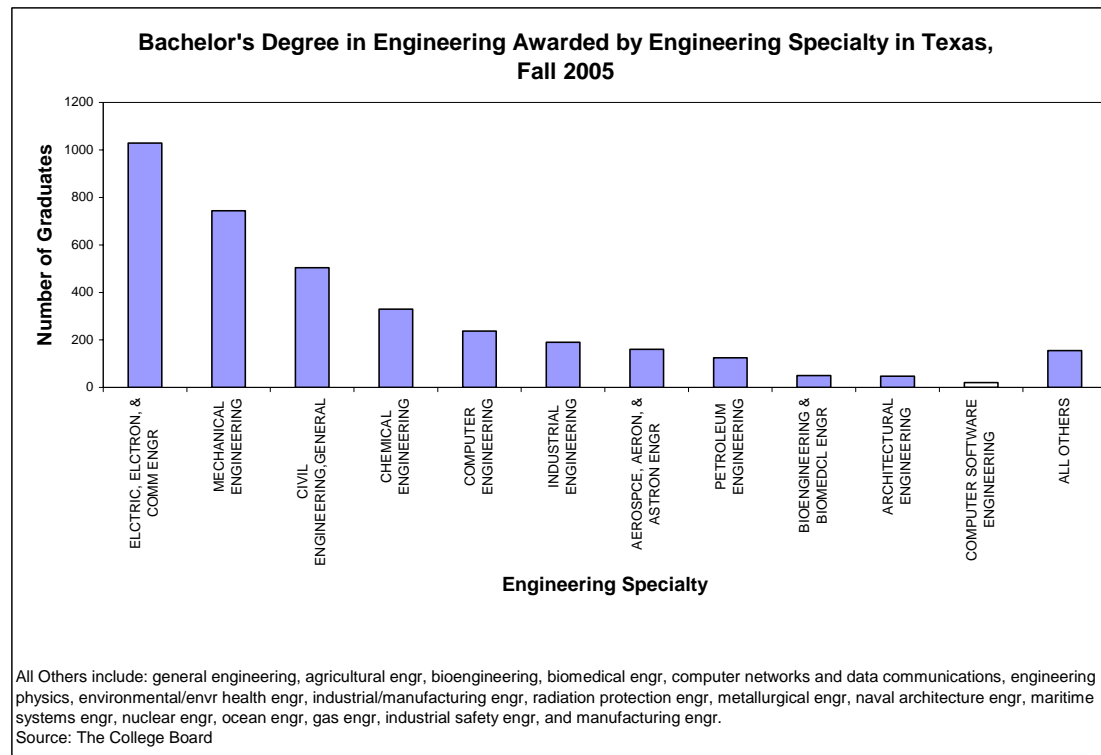
- Some 35,000 students were enrolled in engineering programs in Texas public universities in Fall 2004, most on a full-time, undergraduate basis.





# Largest Degree Programs

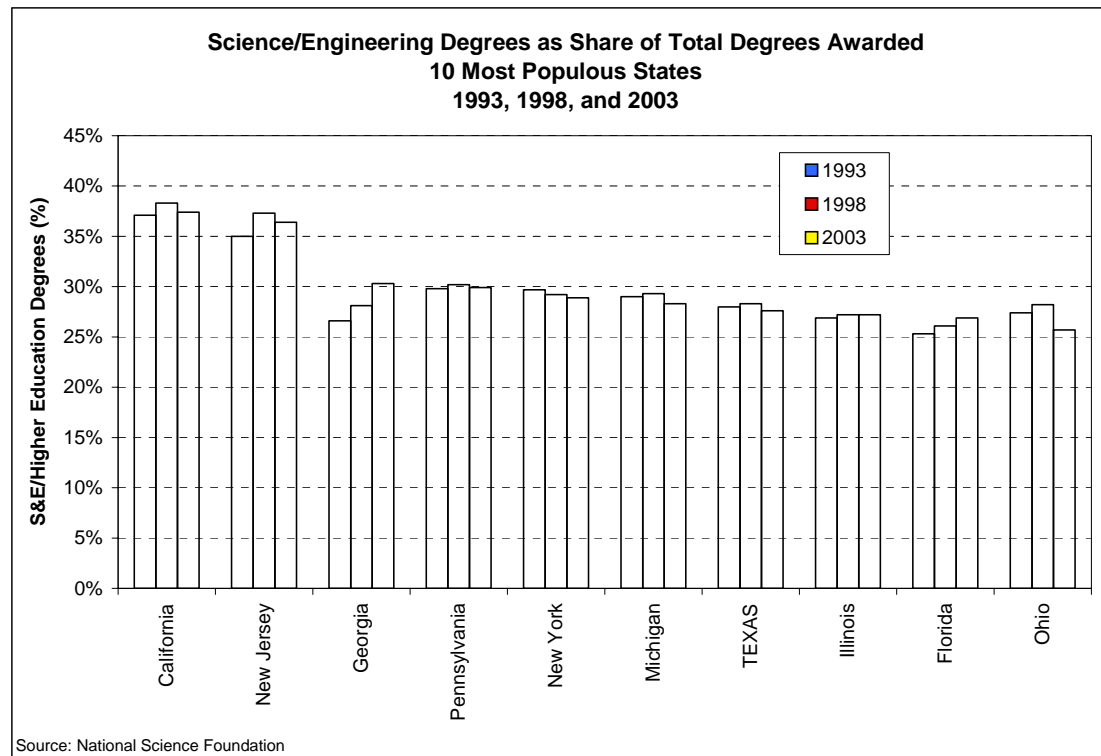
- The largest engineering specialties in terms of degrees granted in Texas currently include electrical, mechanical, and civil.





# Texas Lags in Proportion of Science/Engineering Degrees

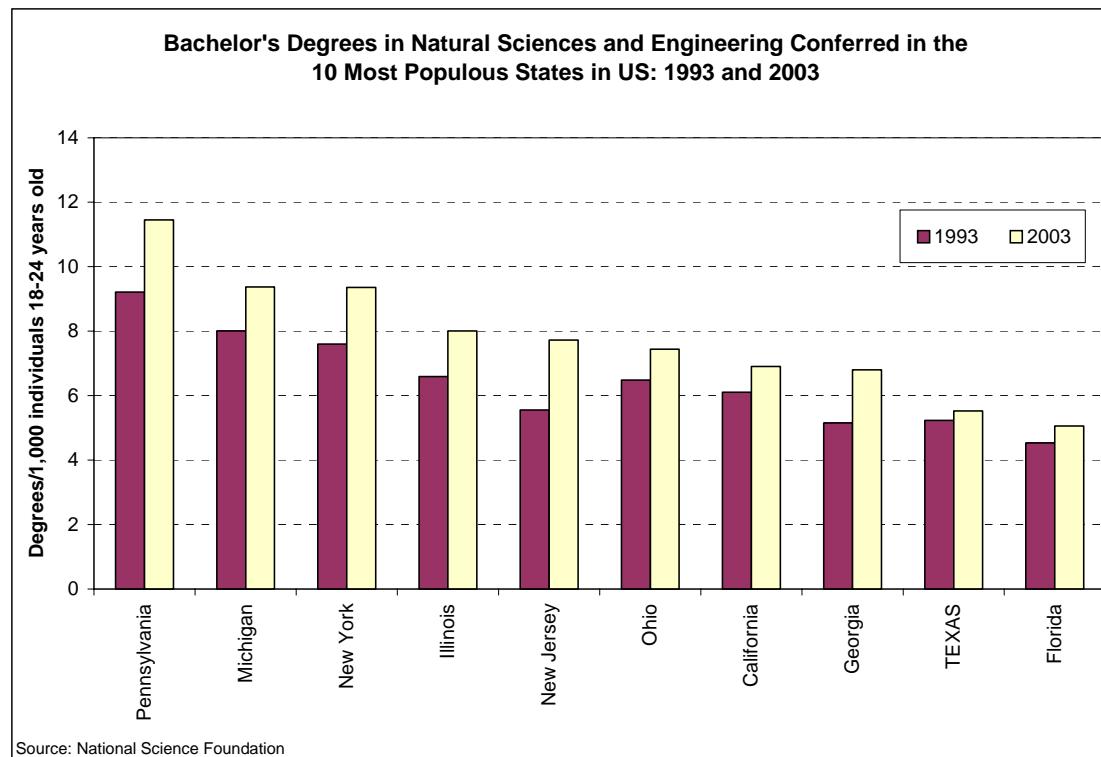
- Even with the large numbers of students enrolled and graduating from Texas public universities, the state lags several other populous states in the proportion of science and engineering degrees awarded. The proportion is also remaining quite stable over time. If this pattern persists, the competitiveness of the state will erode in the future.





# Texas Also Lags in Science/Engineering Degrees Given Population Size

- Texas ranks 9th of the 10 most populous states in the science/engineering degrees awarded per thousand college-age residents. Moreover, during the past 10 years, the Texas rate has remained essentially flat, while other states have seen notable increases.





# Boosting Engineering Enrollment is a Worthwhile and Beneficial Endeavor

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- Given the facts that
  - the need for engineers is growing rapidly,
  - high-growth industries of the future will require a steady supply of workers with engineering degrees, and
  - Texas is currently lagging the pace of other states in enrolling students and awarding engineering degrees,it is apparent boosting engineering enrollment in the state is worthy of a concerted effort.
  
- Increasing the pool of engineering graduates would bring sizable economic (and other) benefits. The magnitude of these gains is explored in the following section.



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# ECONOMIC IMPACT OF INCREASING THE NUMBER OF ENGINEERING GRADUATES



## Channels of Impact

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- As noted, a larger pool of engineers improves the capacity and productivity of the workforce.
- In addition, the existence of such a labor pool enhances the state's position in the competitive arena of economic development.
- The Perryman Group developed a model of the likely impact of increasing the state's pool of engineers by 25%. The analysis utilized data related to
  - the current numbers of engineering students,
  - projected employment patterns,
  - productivity and income statistics, and
  - other cogent information.
- The model assumes the increase in enrollment needed to generate the additional graduates occurs over a 5-year period. Results are given as of the 10th year and the 15th year following initial implementation to reflect the time required for the effects of the enhanced pool of engineers to work their way through the economy.



## Methods Used to Measure Impact

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- The basic modeling technique employed in this study is known as dynamic input-output analysis, which 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.
- The incremental engineers are allocated based on current distribution of degree programs and projected future demand. Income levels are obtained from the Bureau of Labor Statistics; value-added (gross output) is then determined by allocating the new engineers to those fields in which they tend to concentrate and using an input-output model to derive the appropriate income/output ratios.
- A detailed explanation of the methods and terms used in this study, including the pertinent input-output model, may be found in Appendix A.





## Results Overview

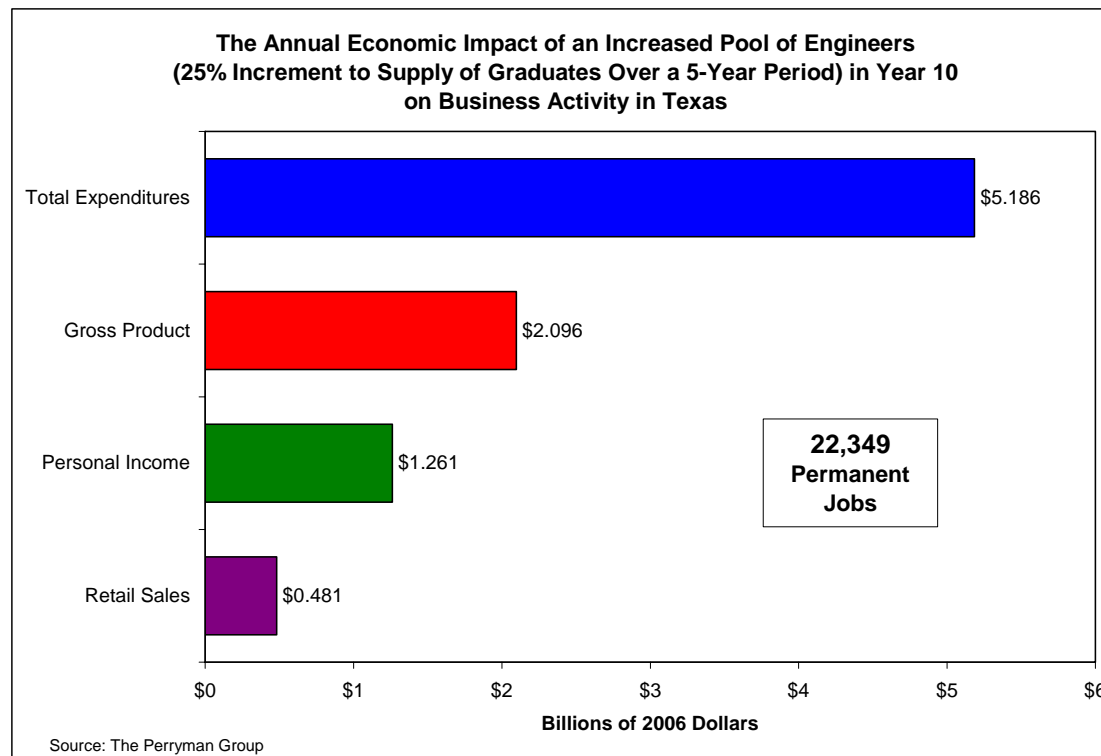
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- Increasing the numbers of engineers in Texas would lead to a substantial gain in business activity across the state.
- In fact, growth of 25% in the pool of engineering graduates (through enrollment expansion over a 5-year period) would increase overall employment in the state by 22,349 in 10 years and 50,285 in 15 years due to gains in the capacity and productivity of the state economy.
- Communities large and small would share in these gains.
- Beyond these immediate positive effects, the larger numbers of engineers would enhance Texas' competitive position in key economic development arenas. If the workforce advantages led the state to capture an additional 1% of projected growth in emerging technologies, the impact would include the creation of more than 174,000 permanent jobs.
- Further detail related to results for the state as well as for various regions are presented in the following slides. All results are given in constant (2006) dollars to eliminate the effects of inflation.



## Results: Gains in Texas in 10 Years

- If the pool of engineering graduates increases by 25% over a period of several years, the Texas economy will see substantial benefits. In fact, The Perryman Group estimates that 10 years from now, the state's annual output (gross product) would be enhanced by \$2.1 billion and 22,349 permanent jobs would be added.



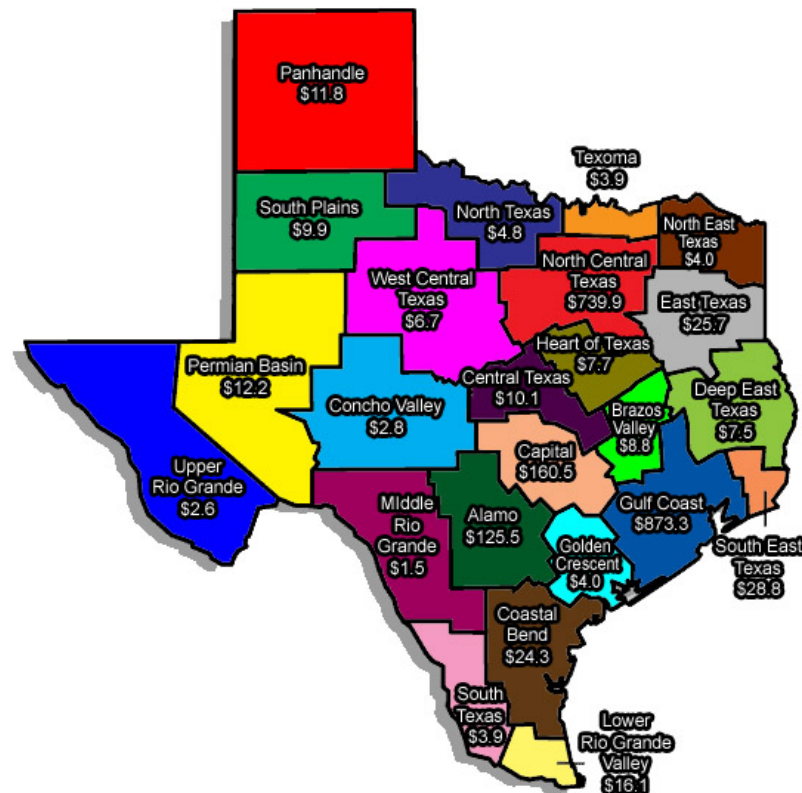
See the Appendices to this report for results by sector.



## Results: Regional Gains in Output 10 Years

- As noted, the positive effects of this larger pool of engineering graduates would be felt in communities across the state. The accompanying map illustrates the gains in output that could be expected to occur in 10 years (in millions of 2006 dollars).

Gains in Gross Product (constant 2006 dollars) by Region—Year 10



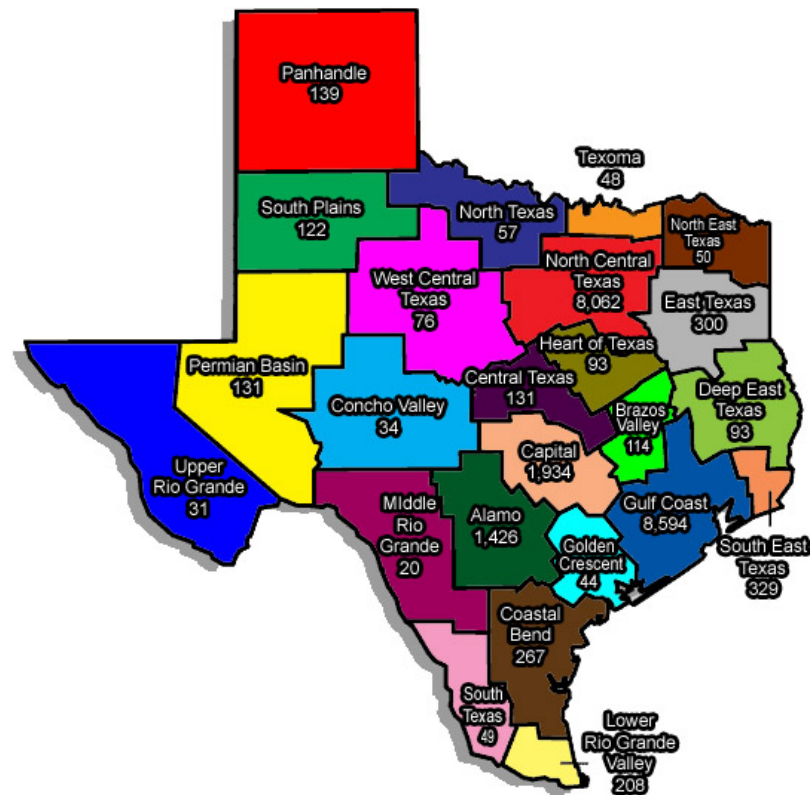
See the Appendices to this report for results for counties and for other measures of economic activity.



## Results: Regional Gains in Employment 10 Years

- Job growth would also be enhanced with a larger pool of engineers. This map depicts the additional jobs that could be expected to occur in 10 years.

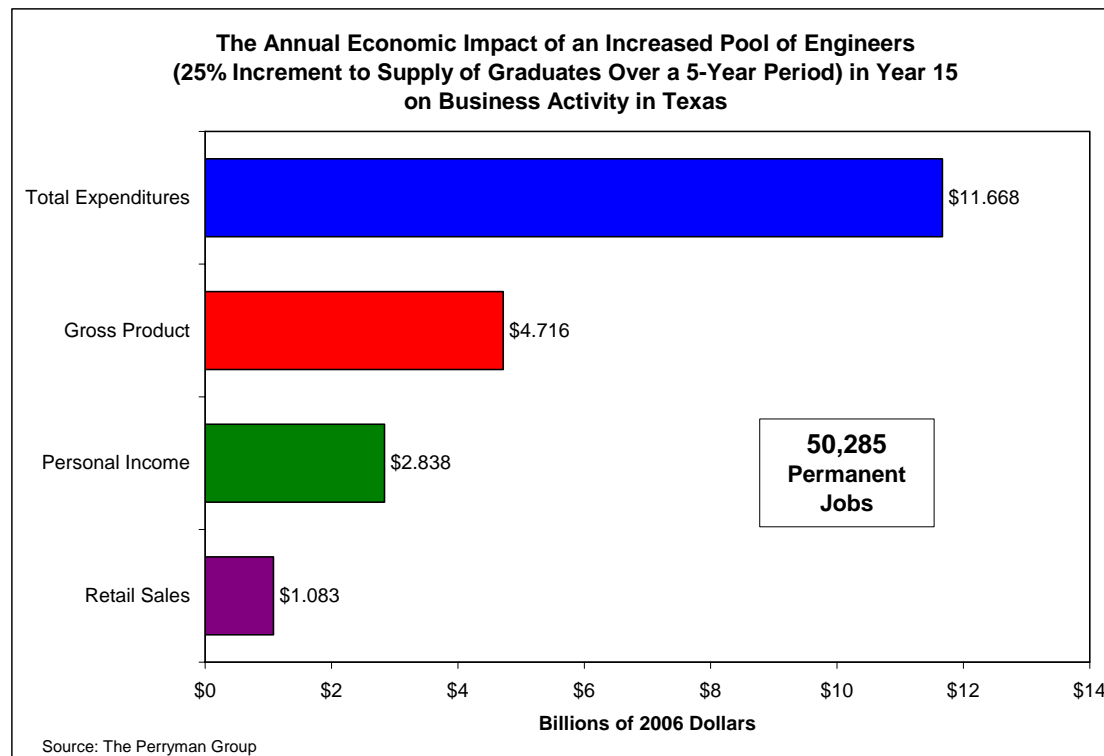
Gains in Employment by Region—Year 10





## Results: Gains in Texas in 15 Years

- Over a longer time horizon, the economic effect of increasing the pool of engineering graduates by 25% becomes even more pronounced. The Perryman Group estimates that 15 years from now, the Texas economy would be larger by \$4.7 billion in annual output and 50,285 permanent jobs. These values would continue to compound over time as a larger number of graduates enter the economy.



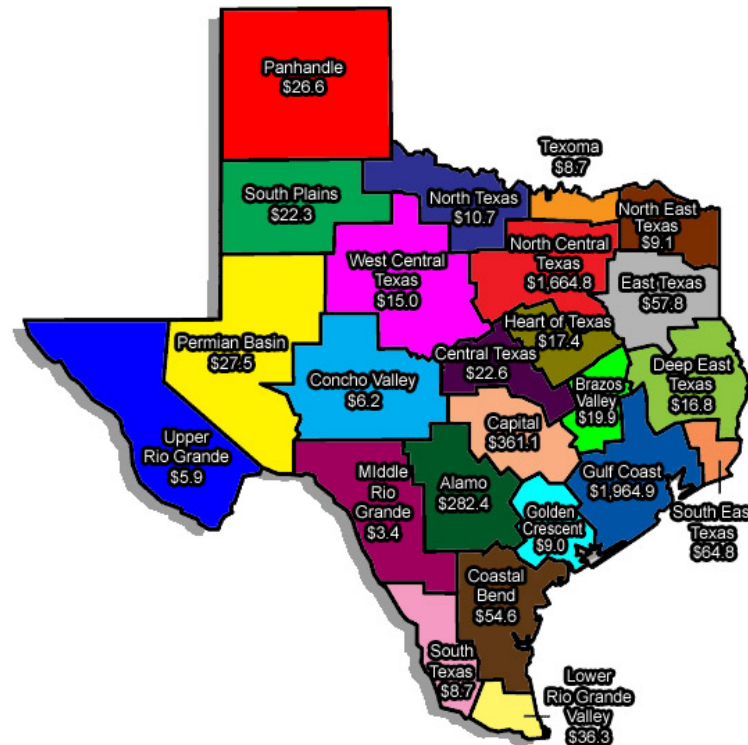
See the Appendices to this report for results by sector.



## Results: Regional Gains in Output 15 Years

- The accompanying map illustrates the gains in output that could be expected to occur in 15 years on a regional basis with the larger pool of engineering graduates (in millions of 2006 dollars).

Gains in Gross Product (constant 2006 dollars) by Region—Year 15



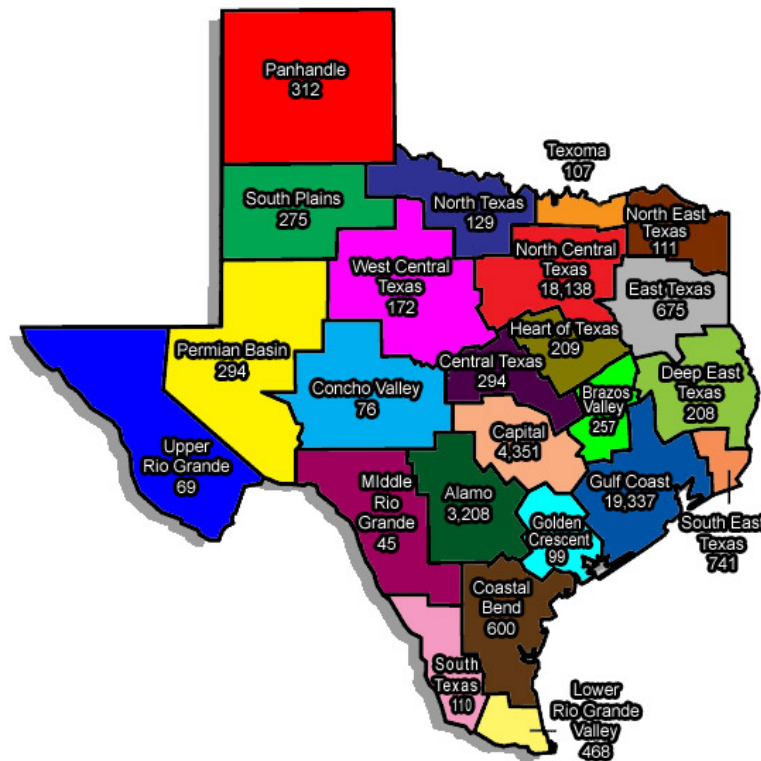
See the Appendices to this report for results for counties and for other measures of economic activity.



# Results: Regional Gains in Employment 15 Years

- Employment across the state would also grow as a result of the larger pool of engineering graduates.

Gains in Employment by Region—Year 15





## Results: Potential Economic Development Effects

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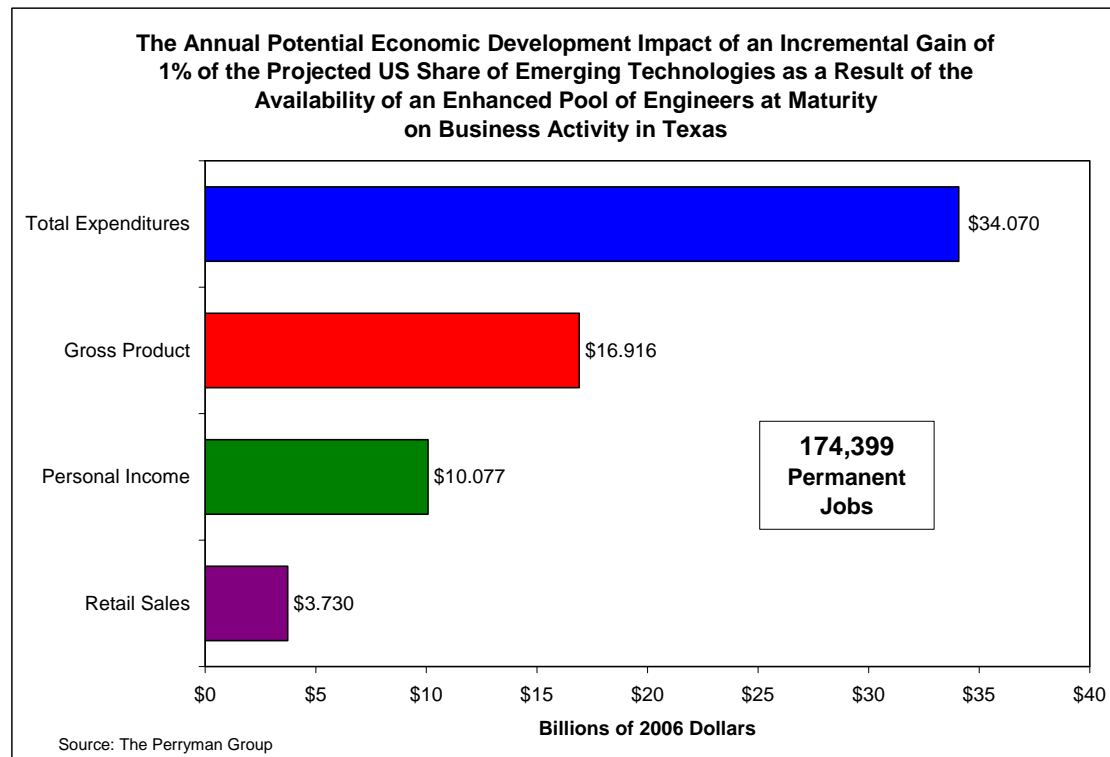
- Without a doubt, the larger pool of engineering graduates improves Texas' economic productivity and capacity. Moreover, the availability of such a workforce increases the likelihood that Texas will be able to attract companies in key emerging technologies. These industries will serve as important engines for economic growth in the future; those geographic areas which can cement a position at the forefront of these fields will see notable economic gains.
- In order to illustrate this phenomenon, TPG examined a scenario in which the expanded supply of engineers leads to an additional investment of emerging technologies equal to 1% of the projected US market share over the next 15 years.
- This level of stimulated "value-capture" is quite plausible given the critical role that scientific and engineering personnel play in the success of such enterprises. Moreover, it represents only about 22% of the added capture rate achieved by Texas in microelectronics following the location of Sematech in Austin. Thus, while this scenario is clearly hypothetical, it is indicative and illustrative of the type of enhancement that can be expected from an aggressive effort to meet the engineering demands of a rapidly evolving global economy.





## Results: Potential Economic Development Effects (cont.)

- If Texas can attract an additional 1% share of the projected emerging sectors (such as nanotechnology, genomics, and advanced materials science), the gains to the economy would include almost \$17.0 billion in annual output (in constant 2006 dollars) and more than 174,000 permanent jobs.





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# CONCLUSION



## Conclusion

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- The economy is evolving toward increasing complexity. The pace of scientific advance is dazzling. The depth and breadth of technology available is growing exponentially. All of these trends increase the need for persons trained in the disciplines of engineering.
- Texas is currently lagging some other areas in the relative size of its workforce of engineers.
- Increasing the numbers of engineers would lead to notable gains in the economy's capacity and productivity. In fact, adding 25% to the pool of engineering graduates would lead to job gains across the state of 22,349 in 10 years and 50,285 in 15 years. These enhanced opportunities would be spread through communities large and small.
- In addition, a larger pool of engineering graduates would give Texas a competitive advantage in attracting the high-growth industries of the future. If another 1% share of projected emerging technologies expansion was sited in Texas, the state would see gains of more than 174,000 jobs.
- Clearly, efforts to increase the number of engineering students and graduates are worthy of substantial support.



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# APPENDICES



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# APPENDIX A: Detailed Impact Methodology



# Methodology

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- The basic modeling technique employed in this study is known as dynamic input-output analysis. This 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. The second step is the simulation of the input-output system to measure overall economic effects.
- In the present instance, the incremental number of engineers entering the workforce (adjusted for attrition) was allocated to the workforce under the assumption of a 25% increase in the number of engineering graduates (achieved through enrollment gains over a five-year period). Specifically, the increased personnel were assigned to specific sectors based on current and projected patterns in degrees and the occupational sectors in which various types of engineers are employed. Incremental income is obtained from the Bureau of Labor Statistics, as in the industrial and occupational patterns. The scenario for economic development was derived from projection of global growth in emerging sectors and the expected portion to be captured by the US (based on current research and development outlays relative to other parts of the world).
- Once the direct input values were determined, 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. In addition, the model has been in operation and continually updated for over two decades. The systems used in the current simulations reflect the unique industrial structures of the economy of the state of Texas.



## Methodology (cont.)

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- The USMRIAS is somewhat similar in format to the Input-Output Model of the United States and the Regional Input-Output Modeling System, both of which are 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 models used for the present investigation have been thoroughly tested for reasonableness and historical reliability.
- As noted earlier, 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*.



## Methodology (cont.)

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- 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, healthcare services, utilities, housing, recreation, and other items. Typical purchasing patterns in the relevant areas are obtained from the *ACCRA 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. Note that all monetary values, unless otherwise noted, are given in constant (2006) dollars to eliminate the effects of inflation.





## Methodology (cont.)

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- 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, say, Amarillo is the amount of US output that is produced in that area. 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.



## Methodology (cont.)

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- 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 **Permanent Jobs and Person-Years of Employment**. The Person-Years of Employment measure reveals the full-time equivalent jobs generated by an activity. It should be noted that, unlike the dollar values described above, Permanent Jobs is a "stock" rather than a "flow." In other words, if an area produces \$1 million in output in 1999 and \$1 million in 2000, it is appropriate to say that \$2 million was achieved in the 1999-2000 period. If the same area has 100 people working in 1999 and 100 in 2000, it only has 100 Permanent 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 Person-Years (a person working for a year). This concept is distinct from Permanent Jobs, which anticipates that the relevant positions will be maintained on a continuing basis.



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# APPENDIX B: Detailed Results



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# Year 10



# Detailed Results

**Table 1**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Sectoral Results**

Sector	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Employment (Permanent Jobs)
Agricultural Products & Services	\$61,293,353	\$19,212,782	\$13,084,976	244
Forestry & Fishery Products	\$1,283,714	\$1,165,943	\$432,432	5
Coal Mining	\$48,388,710	\$13,932,701	\$14,681,827	121
Crude Petroleum & Natural Gas	\$341,745,222	\$74,884,279	\$34,536,545	188
Miscellaneous Mining	\$12,523,813	\$4,936,466	\$2,901,894	36
New Construction	\$85,091,381	\$33,154,321	\$27,321,224	440
Maintenance & Repair Construction	\$128,856,588	\$73,491,574	\$60,561,638	974
Food Products & Tobacco	\$115,916,032	\$29,933,226	\$15,291,334	342
Textile Mill Products	\$1,881,654	\$462,279	\$391,170	9
Apparel	\$26,499,942	\$14,691,272	\$7,444,298	240
Paper & Allied Products	\$24,655,909	\$10,948,731	\$4,949,850	86
Printing & Publishing	\$28,885,157	\$14,289,246	\$9,326,910	183
Chemicals & Petroleum Refining	\$571,710,530	\$140,016,097	\$65,745,678	568
Rubber & Leather Products	\$22,824,528	\$9,667,352	\$5,651,496	129
Lumber Products & Furniture	\$9,304,880	\$3,175,603	\$2,264,029	52
Stone, Clay, & Glass Products	\$21,696,250	\$10,939,143	\$5,721,214	106
Primary Metal	\$51,049,337	\$16,217,803	\$12,071,735	203
Fabricated Metal Products	\$45,801,077	\$17,714,796	\$11,436,703	220
Machinery, Except Electrical	\$387,028,515	\$148,498,579	\$106,087,999	1,337
Electric & Electronic Equipment	\$94,845,941	\$53,957,661	\$32,257,720	338
Motor Vehicles & Equipment	\$9,579,596	\$2,067,485	\$1,343,182	22
Transp. Equip., Exc. Motor Vehicles	\$53,518,937	\$27,620,883	\$18,049,262	248
Instruments & Related Products	\$15,100,297	\$6,426,783	\$4,884,954	74
Miscellaneous Manufacturing	\$8,046,379	\$3,138,877	\$2,164,918	40
Transportation	\$170,130,762	\$104,710,710	\$69,251,917	1,067
Communication	\$151,340,230	\$93,743,053	\$40,021,935	415
Electric, Gas, Water, Sanitary Services	\$1,002,386,935	\$239,964,870	\$104,714,269	573
Wholesale Trade	\$157,849,577	\$106,773,270	\$61,566,406	834
Retail Trade	\$325,479,554	\$269,629,796	\$161,230,001	4,730
Finance	\$56,352,850	\$31,175,510	\$18,153,599	207
Insurance	\$62,224,120	\$37,249,025	\$22,268,937	315
Real Estate	\$393,506,923	\$65,379,756	\$10,534,100	106
Hotels, Lodging Places, Amusements	\$35,117,444	\$18,354,566	\$12,041,226	342
Personal Services	\$67,143,200	\$41,264,580	\$32,104,535	634
Business Services	\$225,284,811	\$141,820,388	\$115,689,082	1,668
Eating & Drinking Places	\$155,676,827	\$91,146,957	\$48,495,056	2,582
Health Services	\$111,198,841	\$77,814,042	\$65,792,492	1,248
Miscellaneous Services	\$99,384,555	\$41,612,523	\$36,074,593	1,009
Households	\$5,038,543	\$5,038,543	\$4,931,946	413
<b>Total</b>	<b>\$5,185,642,912</b>	<b>\$2,096,221,472</b>	<b>\$1,261,473,081</b>	<b>22,349</b>

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



## Detailed Results (cont.)

**Table 2**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas**  
**Detailed Results by Comptroller's Economic Region**

<b>Economic Region</b>	<b>Total Expenditures (2006 Dollars)</b>	<b>Gross Product (2006 Dollars)</b>	<b>Personal Income (2006 Dollars)</b>	<b>Retail Sales (2006 Dollars)</b>	<b>Employment (Permanent Jobs)</b>
High Plains	\$47,979,232	\$21,764,109	\$13,269,145	\$6,718,766	261
Northwest Texas	\$26,643,505	\$11,411,717	\$6,951,625	\$3,432,377	134
Metroplex	\$1,718,816,558	\$743,755,029	\$448,745,917	\$175,876,511	8,109
Upper East Texas	\$72,370,115	\$29,746,721	\$18,294,935	\$8,772,202	350
Southeast Texas	\$86,945,910	\$36,258,467	\$22,130,230	\$10,962,404	422
Gulf Coast	\$2,336,095,950	\$873,272,206	\$519,110,835	\$165,208,595	8,594
Capital	\$338,652,779	\$160,502,652	\$100,865,672	\$46,017,222	1,934
Central Texas	\$58,935,818	\$26,623,605	\$16,568,585	\$8,724,503	338
Alamo	\$297,337,917	\$125,503,604	\$74,915,753	\$34,962,994	1,426
Coastal Bend	\$72,646,907	\$28,241,207	\$16,875,536	\$7,916,612	311
South Texas Border	\$45,999,827	\$21,494,352	\$13,229,545	\$7,450,036	277
West Texas	\$37,400,248	\$15,007,327	\$8,915,032	\$4,335,757	164
Upper Rio Grande	\$45,818,147	\$2,640,476	\$1,600,271	\$778,403	31
<b>TOTAL STATE IMPACT</b>	<b>\$5,185,642,912</b>	<b>\$2,096,221,472</b>	<b>\$1,261,473,081</b>	<b>\$481,156,381</b>	<b>22,349</b>

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



## Detailed Results (cont.)

**Table 3**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas**  
**Detailed Results by Council of Governments (COG) Region**

COG	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Panhandle	\$27,871,894	\$11,831,860	\$7,124,466	\$3,625,432	139
South Plains	\$20,107,338	\$9,932,250	\$6,144,679	\$3,093,334	122
North Texas	\$10,678,659	\$4,751,205	\$2,948,361	\$1,484,585	57
North Central Texas	\$1,710,032,518	\$739,891,105	\$446,335,060	\$174,651,980	8,062
North East Texas	\$10,958,435	\$4,045,212	\$2,497,953	\$1,324,790	50
East Texas	\$61,411,680	\$25,701,509	\$15,796,983	\$7,447,412	300
West Central Texas	\$15,964,846	\$6,660,512	\$4,003,263	\$1,947,792	76
Upper Rio Grande	\$45,818,147	\$2,640,476	\$1,600,271	\$778,403	31
Permian Basin	\$30,854,012	\$12,239,801	\$7,274,223	\$3,403,760	131
Concho Valley	\$6,546,236	\$2,767,526	\$1,640,809	\$931,997	34
Heart of Texas	\$18,137,708	\$7,735,463	\$4,704,232	\$2,285,940	93
Capital	\$338,652,779	\$160,502,652	\$100,865,672	\$46,017,222	1,934
Brazos Valley	\$19,386,124	\$8,836,819	\$5,501,568	\$3,013,618	114
Deep East Texas	\$16,958,357	\$7,474,842	\$4,624,165	\$2,479,103	93
South East Texas	\$69,987,554	\$28,783,625	\$17,506,065	\$8,483,300	329
Gulf Coast	\$2,336,095,950	\$873,272,206	\$519,110,835	\$165,208,595	8,594
Golden Crescent	\$10,244,791	\$3,981,647	\$2,377,019	\$1,141,907	44
Alamo	\$297,337,917	\$125,503,604	\$74,915,753	\$34,962,994	1,426
South Texas	\$8,651,703	\$3,850,085	\$2,326,938	\$1,503,587	49
Coastal Bend	\$62,402,116	\$24,259,559	\$14,498,517	\$6,774,705	267
Lower Rio Grande Valley	\$34,347,019	\$16,129,563	\$9,973,309	\$5,372,871	208
Texoma	\$8,784,041	\$3,863,924	\$2,410,857	\$1,224,531	48
Central Texas	\$21,411,985	\$10,051,322	\$6,362,784	\$3,424,945	131
Middle Rio Grande	\$3,001,105	\$1,514,704	\$929,298	\$573,578	20
<b>TOTAL STATE IMPACT</b>	<b>\$5,185,642,912</b>	<b>\$2,096,221,472</b>	<b>\$1,261,473,081</b>	<b>\$481,156,381</b>	<b>22,349</b>

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



## Detailed Results (cont.)

**Table 4**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas**  
**Detailed Results by Metropolitan Statistical Area (MSA)**

MSA	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Abilene	\$11,332,984	\$4,712,782	\$2,832,572	\$1,297,545	53
Amarillo	\$23,077,188	\$9,984,490	\$6,039,281	\$3,078,342	119
Austin-Round Rock	\$331,588,436	\$157,605,653	\$99,118,273	\$45,158,236	1,900
Beaumont-Port Arthur	\$69,987,554	\$28,783,625	\$17,506,065	\$8,483,300	329
Brownsville-Harlingen	\$12,149,809	\$5,657,002	\$3,479,712	\$1,860,963	72
College Station-Bryan	\$16,126,315	\$7,420,144	\$4,616,226	\$2,555,498	97
Corpus Christi	\$58,913,088	\$22,751,522	\$13,584,986	\$6,203,944	248
Dallas-Plano-Irving MD*	\$1,430,017,523	\$617,994,491	\$371,544,379	\$141,451,293	6,637
Fort Worth-Arlington MD*	\$274,758,301	\$119,711,608	\$73,470,564	\$32,482,858	1,398
El Paso	\$44,516,476	\$2,054,688	\$1,243,413	\$569,735	23
Houston-Baytown-Sugar Land	\$2,332,242,138	\$871,700,243	\$518,164,712	\$164,683,568	8,575
Killeen-Temple-Fort Hood	\$20,095,342	\$9,497,718	\$6,021,665	\$3,236,991	124
Laredo	\$8,019,552	\$3,574,881	\$2,159,699	\$1,388,535	45
Longview	\$20,395,147	\$8,634,289	\$5,377,834	\$2,373,609	99
Lubbock	\$17,918,131	\$8,368,696	\$5,201,450	\$2,536,885	103
McAllen-Edinburg-Pharr	\$22,107,887	\$10,426,292	\$6,465,428	\$3,491,039	135
Midland	\$18,734,776	\$7,413,679	\$4,371,851	\$2,003,601	77
Odessa	\$8,655,732	\$3,460,337	\$2,099,264	\$974,505	38
San Angelo	\$5,395,367	\$2,297,264	\$1,363,298	\$769,882	28
San Antonio	\$292,175,144	\$123,319,164	\$73,606,625	\$34,203,687	1,399
Sherman-Denison	\$5,350,031	\$2,443,562	\$1,531,894	\$809,895	31
Texarkana	\$4,738,949	\$2,154,597	\$1,332,867	\$731,125	27
Tyler	\$24,997,688	\$10,569,472	\$6,474,437	\$3,163,655	126
Victoria	\$8,399,021	\$3,216,948	\$1,915,278	\$894,540	35
Waco	\$15,833,598	\$6,805,625	\$4,147,706	\$1,980,440	82
Wichita Falls	\$8,204,833	\$3,740,131	\$2,343,572	\$1,165,191	46
<b>TOTAL STATE IMPACT</b>	<b>\$5,185,642,912</b>	<b>\$2,096,221,472</b>	<b>\$1,261,473,081</b>	<b>\$481,156,381</b>	<b>22,349</b>

\*Metropolitan Division

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





# Detailed Results (cont.)

**Table 5**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Anderson	\$2,351,271	\$1,047,232	\$636,387	\$348,380	13
Andrews	\$593,393	\$239,412	\$140,703	\$66,519	3
Angelina	\$5,369,315	\$2,394,286	\$1,493,580	\$757,085	30
Aransas	\$1,226,300	\$475,673	\$283,536	\$157,195	5
Archer	\$105,991	\$45,929	\$28,584	\$16,145	1
Armstrong	\$109,538	\$42,759	\$25,511	\$10,361	0
Atascosa	\$1,829,326	\$696,334	\$408,813	\$193,110	7
Austin	\$4,083,368	\$1,657,476	\$994,202	\$392,775	17
Bailey	\$180,758	\$74,374	\$42,796	\$24,034	1
Bandera	\$614,684	\$241,734	\$141,514	\$86,873	3
Bastrop	\$2,329,526	\$980,990	\$592,187	\$326,623	12
Baylor	\$110,932	\$47,184	\$28,024	\$15,495	1
Bee	\$904,261	\$394,745	\$245,170	\$154,015	5
Bell	\$18,199,726	\$8,697,580	\$5,525,836	\$2,933,257	114
Bexar	\$277,660,400	\$117,339,360	\$70,000,704	\$32,286,568	1,328
Blanco	\$662,222	\$266,816	\$156,938	\$89,704	3
Borden	\$23,188	\$9,138	\$5,254	\$2,353	0
Bosque	\$419,063	\$175,682	\$107,866	\$46,526	2
Bowie	\$4,738,949	\$2,154,597	\$1,332,867	\$731,125	27
Brazoria	\$20,432,254	\$8,307,800	\$5,106,088	\$2,484,029	97
Brazos	\$15,416,133	\$7,124,340	\$4,433,807	\$2,455,858	93
Brewster	\$731,526	\$352,451	\$217,251	\$121,293	4
Briscoe	\$16,755	\$6,753	\$3,964	\$2,135	0
Brooks	\$195,517	\$79,114	\$46,831	\$30,979	1
Brown	\$805,627	\$371,796	\$232,489	\$133,632	5
Burleson	\$493,384	\$207,640	\$128,433	\$70,191	3
Burnet	\$3,400,100	\$1,398,795	\$848,465	\$403,091	16
Caldwell	\$611,726	\$246,708	\$152,479	\$79,078	3
Calhoun	\$1,285,627	\$450,244	\$272,197	\$108,695	5
Callahan	\$173,410	\$67,547	\$39,612	\$22,626	1
Cameron	\$12,149,809	\$5,657,002	\$3,479,712	\$1,860,963	72
Camp	\$272,260	\$107,713	\$64,405	\$33,462	1
Carson	\$137,698	\$50,064	\$29,578	\$10,413	1
Cass	\$629,320	\$253,297	\$152,753	\$86,970	3
Castro	\$85,019	\$37,689	\$22,759	\$13,826	0
Chambers	\$797,608	\$271,292	\$155,009	\$55,780	3
Cherokee	\$1,339,627	\$554,038	\$339,882	\$164,350	6
Childress	\$105,029	\$42,001	\$24,585	\$15,626	1
Clay	\$377,430	\$156,514	\$98,363	\$43,056	2
Cochran	\$33,706	\$14,590	\$8,872	\$4,214	0

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Coke	\$25,487	\$9,618	\$5,631	\$3,240	0
Coleman	\$264,701	\$108,048	\$63,402	\$35,677	1
Collin	\$85,691,886	\$39,724,907	\$25,131,567	\$12,721,815	496
Collingsworth	\$102,037	\$43,159	\$25,604	\$15,416	0
Colorado	\$409,097	\$183,922	\$113,861	\$72,064	2
Comal	\$5,223,479	\$2,198,581	\$1,322,457	\$699,411	27
Comanche	\$489,826	\$205,529	\$123,146	\$61,966	2
Concho	\$50,660	\$22,254	\$13,980	\$7,420	0
Cooke	\$2,548,686	\$1,048,470	\$650,619	\$309,443	12
Coryell	\$1,585,921	\$729,073	\$454,701	\$285,156	10
Cottle	\$103,551	\$50,145	\$31,179	\$16,070	1
Crane	\$34,891	\$15,425	\$9,727	\$5,123	0
Crockett	\$61,963	\$24,596	\$14,220	\$9,978	0
Crosby	\$26,627	\$12,012	\$7,557	\$3,182	0
Culberson	\$11,762	\$5,834	\$3,558	\$2,954	0
Dallam	\$309,896	\$141,346	\$85,601	\$34,366	2
Dallas	\$1,282,814,215	\$535,542,342	\$320,900,879	\$117,020,386	5,658
Dawson	\$245,663	\$104,723	\$62,731	\$34,711	1
Deaf Smith	\$299,617	\$123,282	\$72,635	\$31,078	1
Delta	\$130,101	\$64,740	\$41,957	\$17,637	1
Denton	\$45,270,535	\$18,992,565	\$11,303,760	\$5,023,042	210
DeWitt	\$668,060	\$273,234	\$167,351	\$83,326	3
Dickens	\$46,661	\$19,803	\$11,849	\$6,640	0
Dimmit	\$157,801	\$63,489	\$38,072	\$25,023	1
Donley	\$59,881	\$29,554	\$18,620	\$13,716	0
Duval	\$60,254	\$22,611	\$13,135	\$6,545	0
Eastland	\$403,182	\$156,500	\$94,668	\$48,598	2
Ector	\$8,655,732	\$3,460,337	\$2,099,264	\$974,505	38
Edwards	\$25,264	\$11,311	\$6,650	\$4,281	0
El Paso	\$44,516,476	\$2,054,688	\$1,243,413	\$569,735	23
Ellis	\$5,008,139	\$18,742,483	\$11,100,653	\$5,026,697	211
Erath	\$1,413,470	\$661,042	\$410,954	\$249,075	9
Falls	\$245,849	\$106,467	\$63,678	\$33,283	1
Fannin	\$885,324	\$371,892	\$228,344	\$105,193	4
Fayette	\$1,368,370	\$578,453	\$348,628	\$164,895	7
Fisher	\$51,071	\$21,439	\$12,539	\$8,273	0
Floyd	\$50,331	\$19,918	\$12,136	\$4,382	0
Foard	\$22,301	\$10,267	\$6,378	\$3,489	0
Fort Bend	\$54,159,586	\$21,101,014	\$12,680,196	\$5,310,594	227
Franklin	\$342,645	\$145,912	\$88,873	\$58,541	2



# Detailed Results (cont.)

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Freestone	\$425,684	\$164,925	\$97,246	\$60,012	2
Frio	\$309,285	\$119,496	\$68,653	\$38,706	1
Gaines	\$218,460	\$84,554	\$49,163	\$25,832	1
Galveston	\$21,499,064	\$8,561,939	\$5,071,413	\$2,545,223	96
Garza	\$151,309	\$61,652	\$38,294	\$23,108	1
Gillespie	\$1,174,251	\$505,824	\$313,002	\$174,802	6
Glasscock	\$2,753	\$1,006	\$561	\$168	0
Goliad	\$128,443	\$51,442	\$30,912	\$20,051	1
Gonzales	\$436,417	\$177,858	\$105,482	\$59,693	2
Gray	\$923,038	\$335,926	\$197,314	\$95,474	3
Grayson	\$5,350,031	\$2,443,562	\$1,531,894	\$809,895	31
Gregg	\$16,358,876	\$7,031,938	\$4,405,462	\$1,922,220	82
Grimes	\$831,948	\$337,169	\$211,005	\$100,079	4
Guadalupe	\$1,857,912	\$818,116	\$512,295	\$267,193	10
Hale	\$663,043	\$310,520	\$192,419	\$126,526	4
Hall	\$118,636	\$49,260	\$28,647	\$15,877	1
Hamilton	\$241,305	\$98,233	\$59,462	\$33,043	1
Hansford	\$160,871	\$54,373	\$29,839	\$11,725	0
Hardeman	\$51,537	\$23,840	\$14,334	\$10,892	0
Hardin	\$2,135,608	\$866,399	\$519,609	\$278,986	10
Harris	\$2,171,131,880	\$808,062,710	\$479,586,868	\$147,730,370	7,869
Harrison	\$5,300,839	\$2,002,167	\$1,226,027	\$468,630	21
Hartley	\$24,806	\$11,593	\$7,352	\$4,158	0
Haskell	\$108,282	\$43,752	\$26,362	\$14,027	1
Hays	\$7,343,126	\$3,396,344	\$2,131,738	\$1,056,668	42
Hemphill	\$127,192	\$44,032	\$24,365	\$11,142	0
Henderson	\$2,922,326	\$1,176,589	\$703,285	\$372,717	14
Hidalgo	\$22,107,887	\$10,426,292	\$6,465,428	\$3,491,039	135
Hill	\$767,755	\$306,073	\$182,689	\$103,828	4
Hockley	\$442,845	\$186,856	\$114,054	\$69,082	2
Hood	\$1,616,391	\$642,540	\$384,626	\$213,363	7
Hopkins	\$1,406,745	\$636,089	\$396,910	\$231,682	8
Houston	\$3,363,162	\$1,344,947	\$797,307	\$324,317	14
Howard	\$1,404,975	\$543,251	\$320,652	\$163,614	6
Hudspeth	\$6,342	\$2,620	\$1,446	\$1,182	0
Hunt	\$2,820,646	\$1,245,889	\$760,901	\$443,964	15
Hutchinson	\$696,577	\$262,684	\$157,796	\$84,121	3
Irion	\$18,377	\$6,419	\$3,612	\$1,834	0
Jack	\$189,877	\$74,691	\$44,873	\$24,579	1
Jackson	\$458,888	\$181,728	\$105,917	\$60,407	2

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Jasper	\$1,332,153	\$554,899	\$335,439	\$191,996	7
Jeff Davis	\$388,281	\$159,311	\$96,236	\$58,917	2
Jefferson	\$64,745,074	\$26,645,039	\$16,203,847	\$7,823,024	305
Jim Hogg	\$31,366	\$12,291	\$7,028	\$4,342	0
Jim Wells	\$1,124,474	\$518,240	\$315,548	\$202,020	7
Johnson	\$5,545,687	\$2,379,482	\$1,472,311	\$693,301	28
Jones	\$292,170	\$117,756	\$69,736	\$36,021	1
Karnes	\$362,910	\$132,512	\$75,128	\$40,542	1
Kaufman	\$2,545,874	\$1,058,443	\$652,687	\$322,909	13
Kendall	\$3,592,800	\$1,429,774	\$858,738	\$457,324	17
Kenedy	\$18,683	\$7,586	\$4,730	\$3,789	0
Kent	\$9,310	\$3,541	\$2,061	\$1,086	0
Kerr	\$3,316,327	\$1,426,608	\$852,345	\$505,257	18
Kimble	\$121,673	\$44,786	\$25,274	\$14,463	0
King	\$4,269	\$2,135	\$1,305	\$493	0
Kinney	\$6,313	\$2,415	\$1,358	\$807	0
Kleberg	\$715,571	\$307,844	\$185,238	\$111,421	4
Knox	\$46,609	\$19,944	\$11,847	\$5,875	0
La Salle	\$35,525	\$146,748	\$92,440	\$59,727	2
Lamar	\$1,683,949	\$16,810	\$10,379	\$8,187	0
Lamb	\$191,922	\$699,197	\$420,304	\$235,717	8
Lampasas	\$309,695	\$71,065	\$41,129	\$18,578	1
Lavaca	\$282,406	\$131,879	\$82,992	\$43,941	2
Lee	\$1,159,532	\$458,657	\$277,733	\$133,405	5
Leon	\$188,427	\$86,584	\$54,424	\$32,421	1
Liberty	\$2,113,322	\$886,579	\$551,164	\$252,149	10
Limestone	\$445,759	\$176,692	\$105,047	\$61,851	2
Lipscomb	\$15,852	\$6,586	\$3,970	\$1,903	0
Live Oak	\$312,157	\$117,515	\$68,250	\$40,031	1
Llano	\$474,119	\$194,278	\$115,635	\$67,890	2
Loving	\$4,945	\$1,458	\$856	\$311	0
Lubbock	\$17,891,503	\$8,356,684	\$5,193,893	\$2,533,702	103
Lynn	\$74,877	\$29,120	\$16,673	\$5,139	0
Madison	\$298,043	\$138,536	\$87,211	\$63,310	2
Marion	\$92,144	\$40,185	\$24,668	\$15,661	1
Martin	\$94,940	\$35,213	\$20,059	\$9,104	0
Mason	\$264,980	\$108,102	\$63,602	\$37,018	1
Matagorda	\$1,268,127	\$464,079	\$269,771	\$146,837	5
Maverick	\$1,056,864	\$485,926	\$296,139	\$199,030	7
McCulloch	\$314,525	\$137,480	\$83,137	\$49,654	2



# Detailed Results (cont.)

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
McLennan	\$15,833,598	\$6,805,625	\$4,147,706	\$1,980,440	82
McMullen	\$37,481	\$13,207	\$7,282	\$2,455	0
Medina	\$865,285	\$357,255	\$211,455	\$125,315	4
Menard	\$38,948	\$15,886	\$9,248	\$5,802	0
Midland	\$18,734,776	\$7,413,679	\$4,371,851	\$2,003,601	77
Milam	\$802,124	\$316,735	\$194,746	\$98,884	4
Mills	\$119,344	\$67,183	\$43,430	\$27,801	1
Mitchell	\$363,216	\$147,942	\$89,080	\$45,596	2
Montague	\$581,649	\$239,089	\$147,224	\$79,873	3
Montgomery	\$55,899,423	\$22,013,583	\$13,513,247	\$5,653,512	246
Moore	\$824,330	\$287,822	\$161,816	\$73,228	3
Morris	\$1,236,893	\$463,144	\$284,059	\$91,506	5
Motley	\$4,468	\$1,720	\$984	\$575	0
Nacogdoches	\$3,089,539	\$1,531,771	\$975,361	\$634,143	22
Navarro	\$1,342,564	\$557,788	\$337,122	\$163,858	7
Newton	\$109,662	\$59,381	\$38,826	\$27,218	1
Nolan	\$824,039	\$347,099	\$202,991	\$114,516	4
Nueces	\$55,396,828	\$21,402,765	\$12,783,686	\$5,759,412	232
Ochiltree	\$308,078	\$111,429	\$65,621	\$28,280	1
Oldham	\$3,121	\$1,519	\$961	\$822	0
Orange	\$3,106,872	\$1,272,186	\$782,608	\$381,291	15
Palo Pinto	\$712,841	\$278,946	\$164,511	\$85,556	3
Panola	\$739,617	\$295,617	\$181,124	\$90,336	3
Parker	\$5,466,968	\$2,216,899	\$1,348,280	\$648,547	26
Parmer	\$60,189	\$22,495	\$13,183	\$3,621	0
Pecos	\$151,442	\$59,085	\$34,386	\$21,570	1
Polk	\$1,320,418	\$536,669	\$317,581	\$171,967	6
Potter	\$19,083,444	\$8,220,998	\$4,967,215	\$2,537,701	98
Presidio	\$163,760	\$65,573	\$38,368	\$24,323	1
Rains	\$342,669	\$132,762	\$78,195	\$45,465	1
Randall	\$3,746,507	\$1,670,669	\$1,016,976	\$519,867	20
Reagan	\$25,591	\$9,973	\$5,702	\$3,200	0
Real	\$46,398	\$17,131	\$9,696	\$5,375	0
Red River	\$77,752	\$30,808	\$18,354	\$9,414	0
Reeves	\$149,824	\$58,870	\$34,123	\$22,958	1
Refugio	\$120,628	\$47,175	\$27,346	\$19,506	1
Roberts	\$7,696	\$2,613	\$1,438	\$986	0
Robertson	\$216,798	\$88,164	\$53,986	\$29,448	1
Rockwall	\$5,736,126	\$2,623,122	\$1,651,975	\$874,842	33
Runnels	\$512,304	\$191,611	\$109,565	\$59,221	2

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Rusk	\$2,491,871	\$967,667	\$590,997	\$259,299	11
Sabine	\$346,507	\$148,352	\$92,495	\$54,182	2
San Augustine	\$66,769	\$26,000	\$15,267	\$8,407	0
San Jacinto	\$673,950	\$281,018	\$175,736	\$91,322	3
San Patricio	\$2,289,961	\$873,084	\$517,764	\$287,337	10
San Saba	\$153,870	\$71,453	\$43,482	\$28,226	1
Schleicher	\$91,455	\$34,350	\$19,825	\$7,540	0
Scurry	\$285,323	\$130,199	\$78,990	\$50,045	2
Shackelford	\$114,659	\$45,146	\$26,748	\$14,646	1
Shelby	\$707,978	\$332,979	\$218,059	\$120,038	4
Sherman	\$5,698	\$2,455	\$1,510	\$706	0
Smith	\$24,997,688	\$10,569,472	\$6,474,437	\$3,163,655	126
Somervell	\$301,530	\$109,429	\$64,860	\$23,615	1
Starr	\$445,967	\$201,224	\$123,884	\$86,648	3
Stephens	\$336,099	\$147,357	\$92,105	\$54,269	2
Sterling	\$12,782	\$5,789	\$3,507	\$2,824	0
Stonewall	\$4,513	\$2,091	\$1,299	\$914	0
Sutton	\$142,806	\$57,427	\$33,385	\$20,977	1
Swisher	\$56,486	\$21,123	\$12,108	\$4,945	0
Tarrant	\$262,011,582	\$114,371,897	\$70,192,172	\$30,906,018	1,335
Taylor	\$10,867,405	\$4,527,479	\$2,723,224	\$1,238,898	51
Terrell	\$26,434	\$12,224	\$7,563	\$4,098	0
Terry	\$226,922	\$96,774	\$55,782	\$40,165	1
Throckmorton	\$13,102	\$5,735	\$3,400	\$1,908	0
Titus	\$712,082	\$279,815	\$171,800	\$89,728	3
Tom Green	\$5,376,990	\$2,290,846	\$1,359,686	\$768,048	28
Travis	\$308,355,960	\$146,707,905	\$92,225,162	\$41,718,232	1,764
Trinity	\$130,041	\$62,532	\$38,885	\$24,627	1
Tyler	\$448,863	\$202,008	\$125,629	\$73,803	3
Upshur	\$1,544,400	\$634,684	\$381,374	\$192,089	7
Upton	\$53,509	\$20,371	\$11,576	\$5,759	0
Uvalde	\$949,624	\$424,490	\$258,066	\$144,263	5
Val Verde	\$698,341	\$349,841	\$218,210	\$128,233	5
Van Zandt	\$805,310	\$394,991	\$245,438	\$154,348	5
Victoria	\$6,984,950	\$2,715,262	\$1,612,169	\$765,794	29
Walker	\$1,245,198	\$558,412	\$348,295	\$188,779	7
Waller	\$1,451,683	\$556,831	\$330,788	\$167,814	6
Ward	\$285,540	\$113,698	\$66,521	\$40,909	1
Washington	\$1,941,392	\$854,387	\$532,704	\$262,310	10
Webb	\$8,019,552	\$3,574,881	\$2,159,699	\$1,388,535	45



## Detailed Results (cont.)

**Table 5 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 10 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Wharton	\$1,605,340	\$646,569	\$389,932	\$208,669	8
Wheeler	\$483,903	\$209,674	\$125,496	\$83,938	3
Wichita	\$7,721,412	\$3,537,688	\$2,216,625	\$1,105,990	43
Wilbarger	\$402,940	\$157,477	\$91,354	\$48,799	2
Willacy	\$89,323	\$46,270	\$28,170	\$20,869	1
Williamson	\$12,948,098	\$6,273,705	\$4,016,707	\$1,977,635	80
Wilson	\$531,256	\$238,010	\$150,649	\$87,894	3
Winkler	\$173,545	\$67,356	\$39,232	\$22,624	1
Wise	\$1,734,063	\$743,330	\$457,801	\$234,992	9
Wood	\$1,852,783	\$746,455	\$445,300	\$216,798	8
Yoakum	\$118,096	\$46,895	\$27,762	\$16,374	1
Young	\$1,011,039	\$408,381	\$241,423	\$120,195	4
Zapata	\$154,817	\$61,690	\$36,327	\$24,062	1
Zavala	\$24,975	\$13,353	\$8,665	\$6,840	0
<b>TEXAS</b>	<b>\$5,185,642,912</b>	<b>\$2,096,221,472</b>	<b>\$1,261,473,081</b>	<b>\$481,156,381</b>	<b>22,349</b>

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



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# Year 15



## Detailed Results (cont.)

**Table 6**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Sectoral Results**

Sector	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Employment (Permanent Jobs)
Agricultural Products & Services	\$137,910,045	\$43,228,759	\$29,441,197	549
Forestry & Fishery Products	\$2,888,357	\$2,623,372	\$972,972	12
Coal Mining	\$108,874,597	\$31,348,576	\$33,034,110	272
Crude Petroleum & Natural Gas	\$768,926,749	\$168,489,629	\$77,707,225	424
Miscellaneous Mining	\$28,178,579	\$11,107,049	\$6,529,261	82
New Construction	\$191,455,608	\$74,597,223	\$61,472,755	989
Maintenance & Repair Construction	\$289,927,323	\$165,356,041	\$136,263,686	2,192
Food Products & Tobacco	\$260,811,072	\$67,349,759	\$34,405,502	770
Textile Mill Products	\$4,233,721	\$1,040,128	\$880,132	21
Apparel	\$59,624,870	\$33,055,363	\$16,749,671	539
Paper & Allied Products	\$55,475,794	\$24,634,646	\$11,137,163	194
Printing & Publishing	\$64,991,604	\$32,150,803	\$20,985,547	412
Chemicals & Petroleum Refining	\$1,286,348,693	\$315,036,218	\$147,927,775	1,278
Rubber & Leather Products	\$51,355,189	\$21,751,541	\$12,715,865	290
Lumber Products & Furniture	\$20,935,979	\$7,145,108	\$5,094,066	118
Stone, Clay, & Glass Products	\$48,816,562	\$24,613,071	\$12,872,731	239
Primary Metal	\$114,861,008	\$36,490,056	\$27,161,403	457
Fabricated Metal Products	\$103,052,423	\$39,858,292	\$25,732,581	495
Machinery, Except Electrical	\$870,814,158	\$334,121,803	\$238,697,997	3,008
Electric & Electronic Equipment	\$213,403,367	\$121,404,738	\$72,579,870	761
Motor Vehicles & Equipment	\$21,554,091	\$4,651,840	\$3,022,159	49
Transp. Equip., Exc. Motor Vehicles	\$120,417,608	\$62,146,986	\$40,610,839	559
Instruments & Related Products	\$33,975,669	\$14,460,261	\$10,991,146	167
Miscellaneous Manufacturing	\$18,104,352	\$7,062,472	\$4,871,065	90
Transportation	\$382,794,213	\$235,599,099	\$155,816,813	2,401
Communication	\$340,515,518	\$210,921,869	\$90,049,355	934
Electric, Gas, Water, Sanitary Services	\$2,255,370,603	\$539,920,958	\$235,607,105	1,289
Wholesale Trade	\$355,161,548	\$240,239,857	\$138,524,415	1,877
Retail Trade	\$732,328,996	\$606,667,041	\$362,767,503	10,642
Finance	\$126,793,913	\$70,144,898	\$40,845,598	465
Insurance	\$140,004,270	\$83,810,306	\$50,105,107	709
Real Estate	\$885,390,577	\$147,104,451	\$23,701,726	238
Hotels, Lodging Places, Amusements	\$79,014,248	\$41,297,773	\$27,092,758	770
Personal Services	\$151,072,200	\$92,845,304	\$72,235,204	1,427
Business Services	\$506,890,824	\$319,095,874	\$260,300,435	3,752
Eating & Drinking Places	\$350,272,861	\$205,080,653	\$109,113,875	5,809
Health Services	\$250,197,393	\$175,081,594	\$148,033,107	2,807
Miscellaneous Services	\$223,615,249	\$93,628,177	\$81,167,835	2,270
Households	\$11,336,723	\$11,336,723	\$11,096,878	929
<b>Total</b>	<b>\$11,667,696,552</b>	<b>\$4,716,498,311</b>	<b>\$2,838,314,432</b>	<b>50,285</b>

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



## Detailed Results (cont.)

**Table 7**  
**The Annual Economic Impact of an Increased Pool of Engineers**  
**(25% Increment to Supply of Graduates Over a 5-Year Period) in**  
**Year 15 on Business Activity in Texas**  
**Detailed Results by Comptroller's Economic Region**

<b>Economic Region</b>	<b>Total Expenditures (2006 Dollars)</b>	<b>Gross Product (2006 Dollars)</b>	<b>Personal Income (2006 Dollars)</b>	<b>Retail Sales (2006 Dollars)</b>	<b>Employment (Permanent Jobs)</b>
High Plains	\$107,953,272	\$48,969,246	\$29,855,576	\$15,117,223	587
Northwest Texas	\$59,947,885	\$25,676,363	\$15,641,155	\$7,722,848	301
Metroplex	\$3,867,337,256	\$1,673,448,816	\$1,009,678,314	\$395,722,150	18,246
Upper East Texas	\$162,832,760	\$66,930,121	\$41,163,604	\$19,737,454	787
Southeast Texas	\$195,628,298	\$81,581,550	\$49,793,017	\$24,665,409	950
Gulf Coast	\$5,256,215,887	\$1,964,862,464	\$1,167,999,378	\$371,719,338	19,337
Capital	\$761,968,752	\$361,130,967	\$226,947,761	\$103,538,749	4,351
Central Texas	\$132,605,589	\$59,903,111	\$37,279,317	\$19,630,131	760
Alamo	\$669,010,314	\$282,383,108	\$168,560,444	\$78,666,737	3,208
Coastal Bend	\$163,455,540	\$63,542,715	\$37,969,956	\$17,812,376	699
South Texas Border	\$103,499,610	\$48,362,293	\$29,766,476	\$16,762,582	622
West Texas	\$84,150,557	\$33,766,485	\$20,058,821	\$9,755,453	370
Upper Rio Grande	\$103,090,831	\$5,941,071	\$3,600,610	\$1,751,408	69
<b>TOTAL STATE IMPACT</b>	<b>\$11,667,696,552</b>	<b>\$4,716,498,311</b>	<b>\$2,838,314,432</b>	<b>\$1,082,601,857</b>	<b>50,285</b>

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



## Detailed Results (cont.)

**Table 8**  
**The Annual Economic Impact of an Increased Pool of Engineers**  
**(25% Increment to Supply of Graduates Over a 5-Year Period)**  
**in Year 15 on Business Activity in Texas**  
**Detailed Results by Council of Governments (COG) Region**

COG	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Panhandle	\$62,711,762	\$26,621,684	\$16,030,048	\$8,157,222	312
South Plains	\$45,241,510	\$22,347,562	\$13,825,528	\$6,960,001	275
North Texas	\$24,026,983	\$10,690,210	\$6,633,813	\$3,340,317	129
North Central Texas	\$3,847,573,164	\$1,664,754,986	\$1,004,253,886	\$392,966,956	18,138
North East Texas	\$24,656,479	\$9,101,726	\$5,620,393	\$2,980,777	111
East Texas	\$138,176,281	\$57,828,395	\$35,543,211	\$16,756,677	675
West Central Texas	\$35,920,902	\$14,986,153	\$9,007,343	\$4,382,532	172
Upper Rio Grande	\$103,090,831	\$5,941,071	\$3,600,610	\$1,751,408	69
Permian Basin	\$69,421,527	\$27,539,553	\$16,367,001	\$7,658,460	294
Concho Valley	\$14,729,030	\$6,226,933	\$3,691,820	\$2,096,993	76
Heart of Texas	\$40,809,843	\$17,404,793	\$10,584,523	\$5,143,365	209
Capital	\$761,968,752	\$361,130,967	\$226,947,761	\$103,538,749	4,351
Brazos Valley	\$43,618,780	\$19,882,843	\$12,378,529	\$6,780,641	257
Deep East Texas	\$38,156,303	\$16,818,395	\$10,404,372	\$5,577,983	208
South East Texas	\$157,471,996	\$64,763,155	\$39,388,645	\$19,087,426	741
Gulf Coast	\$5,256,215,887	\$1,964,862,464	\$1,167,999,378	\$371,719,338	19,337
Golden Crescent	\$23,050,781	\$8,958,706	\$5,348,293	\$2,569,290	99
Alamo	\$669,010,314	\$282,383,108	\$168,560,444	\$78,666,737	3,208
South Texas	\$19,466,331	\$8,662,691	\$5,235,611	\$3,383,071	110
Coastal Bend	\$140,404,760	\$54,584,009	\$32,621,662	\$15,243,086	600
Lower Rio Grande Valley	\$77,280,793	\$36,291,517	\$22,439,946	\$12,088,960	468
Texoma	\$19,764,091	\$8,693,830	\$5,424,429	\$2,755,194	107
Central Texas	\$48,176,966	\$22,615,475	\$14,316,265	\$7,706,126	294
Middle Rio Grande	\$6,752,486	\$3,408,084	\$2,090,920	\$1,290,551	45
<b>TOTAL STATE IMPACT</b>	<b>\$11,667,696,552</b>	<b>\$4,716,498,311</b>	<b>\$2,838,314,432</b>	<b>\$1,082,601,857</b>	<b>50,285</b>

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





## Detailed Results (cont.)

**Table 9**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas**  
**Detailed Results by Metropolitan Statistical Area (MSA)**

MSA	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Abilene	\$25,499,215	\$10,603,760	\$6,373,288	\$2,919,475	120
Amarillo	\$51,923,672	\$22,465,103	\$13,588,382	\$6,926,269	267
Austin-Round Rock	\$746,073,982	\$354,612,719	\$223,016,114	\$101,606,031	4,276
Beaumont-Port Arthur	\$157,471,996	\$64,763,155	\$39,388,645	\$19,087,426	741
Brownsville-Harlingen	\$27,337,070	\$12,728,253	\$7,829,351	\$4,187,167	163
College Station-Bryan	\$36,284,209	\$16,695,324	\$10,386,508	\$5,749,870	218
Corpus Christi	\$132,554,449	\$51,190,924	\$30,566,219	\$13,958,875	558
Dallas-Plano-Irving MD*	\$3,217,539,426	\$1,390,487,606	\$835,974,853	\$318,265,409	14,934
Fort Worth-Arlington MD*	\$618,206,176	\$269,351,117	\$165,308,769	\$73,086,430	3,145
El Paso	\$100,162,071	\$4,623,047	\$2,797,678	\$1,281,903	53
Houston-Baytown-Sugar Land	\$5,247,544,811	\$1,961,325,546	\$1,165,870,602	\$370,538,027	19,295
Killeen-Temple-Fort Hood	\$45,214,519	\$21,369,866	\$13,548,747	\$7,283,229	279
Laredo	\$18,043,993	\$8,043,481	\$4,859,323	\$3,124,204	102
Longview	\$45,889,081	\$19,427,150	\$12,100,126	\$5,340,620	224
Lubbock	\$40,315,794	\$18,829,566	\$11,703,262	\$5,707,991	232
McAllen-Edinburg-Pharr	\$49,742,745	\$23,459,157	\$14,547,212	\$7,854,839	303
Midland	\$42,153,247	\$16,680,777	\$9,836,664	\$4,508,102	174
Odessa	\$19,475,397	\$7,785,759	\$4,723,344	\$2,192,637	86
San Angelo	\$12,139,575	\$5,168,845	\$3,067,421	\$1,732,235	64
San Antonio	\$657,394,074	\$277,468,118	\$165,614,907	\$76,958,296	3,148
Sherman-Denison	\$12,037,569	\$5,498,015	\$3,446,762	\$1,822,263	70
Texarkana	\$10,662,635	\$4,847,844	\$2,998,951	\$1,645,032	61
Tyler	\$56,244,797	\$23,781,312	\$14,567,484	\$7,118,225	284
Victoria	\$18,897,797	\$7,238,133	\$4,309,376	\$2,012,715	78
Waco	\$35,625,596	\$15,312,657	\$9,332,338	\$4,455,991	184
Wichita Falls	\$18,460,875	\$8,415,295	\$5,273,037	\$2,621,680	103
<b>TOTAL STATE IMPACT</b>	<b>\$11,667,696,552</b>	<b>\$4,716,498,311</b>	<b>\$2,838,314,432</b>	<b>\$1,082,601,857</b>	<b>50,285</b>

\*Metropolitan Division

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



# Detailed Results (cont.)

**Table 10**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Retail Sales (2006 Dollars)	Employment (Permanent Jobs)
Anderson	\$5,290,360	\$2,356,272	\$1,431,870	\$783,855	28
Andrews	\$1,335,135	\$538,678	\$316,581	\$149,667	6
Angelina	\$12,080,959	\$5,387,144	\$3,360,555	\$1,703,442	67
Aransas	\$2,759,174	\$1,070,264	\$637,957	\$353,689	12
Archer	\$238,480	\$103,341	\$64,314	\$36,326	1
Armstrong	\$246,461	\$96,208	\$57,399	\$23,312	1
Atascosa	\$4,115,983	\$1,566,751	\$919,830	\$434,496	17
Austin	\$9,187,578	\$3,729,320	\$2,236,955	\$883,744	39
Bailey	\$406,706	\$167,341	\$96,291	\$54,077	2
Bandera	\$1,383,038	\$543,902	\$318,406	\$195,465	6
Bastrop	\$5,241,433	\$2,207,228	\$1,332,420	\$734,901	27
Baylor	\$249,597	\$106,165	\$63,055	\$34,864	1
Bee	\$2,034,588	\$888,175	\$551,633	\$346,535	11
Bell	\$40,949,383	\$19,569,555	\$12,433,130	\$6,599,829	255
Bexar	\$624,735,901	\$264,013,560	\$157,501,584	\$72,644,779	2,987
Blanco	\$1,489,999	\$600,335	\$353,111	\$201,835	7
Borden	\$52,173	\$20,560	\$11,822	\$5,294	0
Bosque	\$942,892	\$395,283	\$242,699	\$104,684	5
Bowie	\$10,662,635	\$4,847,844	\$2,998,951	\$1,645,032	61
Brazoria	\$45,972,571	\$18,692,549	\$11,488,698	\$5,589,066	219
Brazos	\$34,686,299	\$16,029,766	\$9,976,066	\$5,525,681	210
Brewster	\$1,645,934	\$793,015	\$488,814	\$272,908	10
Briscoe	\$37,698	\$15,194	\$8,920	\$4,804	0
Brooks	\$439,914	\$178,007	\$105,369	\$69,702	2
Brown	\$1,812,660	\$836,541	\$523,101	\$300,672	11
Burleson	\$1,110,115	\$467,189	\$288,973	\$157,931	6
Burnet	\$7,650,224	\$3,147,289	\$1,909,046	\$906,954	36
Caldwell	\$1,376,383	\$555,094	\$343,077	\$177,926	7
Calhoun	\$2,892,661	\$1,013,050	\$612,443	\$244,563	11
Callahan	\$390,172	\$151,980	\$89,128	\$50,908	2
Cameron	\$27,337,070	\$12,728,253	\$7,829,351	\$4,187,167	163
Camp	\$612,584	\$242,355	\$144,911	\$75,290	3
Carson	\$309,821	\$112,644	\$66,552	\$23,430	1
Cass	\$1,415,970	\$569,919	\$343,695	\$195,683	7
Castro	\$191,292	\$84,801	\$51,208	\$31,110	1
Chambers	\$1,794,618	\$610,407	\$348,771	\$125,504	6
Cherokee	\$3,014,161	\$1,246,585	\$764,736	\$369,789	15
Childress	\$236,316	\$94,501	\$55,316	\$35,158	1
Clay	\$849,217	\$352,156	\$221,316	\$96,877	4
Cochran	\$75,839	\$32,827	\$19,962	\$9,482	0

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Coke	\$57,345	\$21,640	\$12,670	\$7,289	0
Coleman	\$595,577	\$243,108	\$142,655	\$80,273	3
Collin	\$192,806,744	\$89,381,041	\$56,546,026	\$28,624,083	1,116
Collingsworth	\$229,583	\$97,108	\$57,610	\$34,686	1
Colorado	\$920,468	\$413,823	\$256,187	\$162,145	6
Comal	\$11,752,829	\$4,946,807	\$2,975,528	\$1,573,675	60
Comanche	\$1,102,109	\$462,439	\$277,077	\$139,425	5
Concho	\$113,985	\$50,072	\$31,454	\$16,694	1
Cooke	\$5,734,544	\$2,359,058	\$1,463,892	\$696,246	28
Coryell	\$3,568,321	\$1,640,414	\$1,023,076	\$641,600	22
Cottle	\$232,990	\$112,827	\$70,153	\$36,158	1
Crane	\$78,504	\$34,707	\$21,886	\$11,527	0
Crockett	\$139,417	\$55,342	\$31,994	\$22,451	1
Crosby	\$59,912	\$27,028	\$17,002	\$7,161	0
Culberson	\$26,464	\$13,125	\$8,005	\$6,647	0
Dallam	\$697,265	\$318,029	\$192,603	\$77,323	4
Dallas	\$2,886,331,984	\$1,204,970,269	\$722,026,978	\$263,295,869	12,731
Dawson	\$552,742	\$235,627	\$141,144	\$78,101	3
Deaf Smith	\$674,138	\$277,385	\$163,428	\$69,926	3
Delta	\$292,727	\$145,664	\$94,402	\$39,684	2
Denton	\$101,858,705	\$42,733,271	\$25,433,460	\$11,301,846	472
DeWitt	\$1,503,135	\$614,776	\$376,541	\$187,483	7
Dickens	\$104,988	\$44,557	\$26,660	\$14,941	1
Dimmit	\$355,051	\$142,851	\$85,662	\$56,301	2
Donley	\$134,731	\$66,496	\$41,895	\$30,860	1
Duval	\$135,572	\$50,876	\$29,554	\$14,726	1
Eastland	\$907,160	\$352,125	\$213,003	\$109,345	4
Ector	\$19,475,397	\$7,785,759	\$4,723,344	\$2,192,637	86
Edwards	\$56,845	\$25,451	\$14,963	\$9,631	0
El Paso	\$100,162,071	\$4,623,047	\$2,797,678	\$1,281,903	53
Ellis	\$11,268,313	\$42,170,588	\$24,976,469	\$11,310,068	475
Erath	\$3,180,308	\$1,487,345	\$924,647	\$560,419	20
Falls	\$553,161	\$239,550	\$143,275	\$74,888	3
Fannin	\$1,991,978	\$836,757	\$513,775	\$236,685	10
Fayette	\$3,078,832	\$1,301,520	\$784,413	\$371,014	15
Fisher	\$114,910	\$48,237	\$28,213	\$18,614	1
Floyd	\$113,244	\$44,816	\$27,306	\$9,859	0
Foard	\$50,177	\$23,100	\$14,349	\$7,851	0
Fort Bend	\$121,859,069	\$47,477,282	\$28,530,441	\$11,948,836	510
Franklin	\$770,950	\$328,303	\$199,965	\$131,717	4



# Detailed Results (cont.)

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Freestone	\$957,789	\$371,080	\$218,804	\$135,026	4
Frio	\$695,891	\$268,865	\$154,469	\$87,088	3
Gaines	\$491,535	\$190,246	\$110,618	\$58,122	2
Galveston	\$48,372,895	\$19,264,362	\$11,410,680	\$5,726,751	217
Garza	\$340,444	\$138,718	\$86,161	\$51,993	2
Gillespie	\$2,642,065	\$1,138,104	\$704,254	\$393,305	14
Glasscock	\$6,195	\$2,264	\$1,261	\$379	0
Goliad	\$288,998	\$115,744	\$69,552	\$45,115	1
Gonzales	\$981,938	\$400,181	\$237,334	\$134,309	5
Gray	\$2,076,836	\$755,833	\$443,956	\$214,816	8
Grayson	\$12,037,569	\$5,498,015	\$3,446,762	\$1,822,263	70
Gregg	\$36,807,471	\$15,821,861	\$9,912,289	\$4,324,996	184
Grimes	\$1,871,883	\$758,630	\$474,760	\$225,178	9
Guadalupe	\$4,180,303	\$1,840,762	\$1,152,664	\$601,183	23
Hale	\$1,491,846	\$698,669	\$432,943	\$284,684	9
Hall	\$266,931	\$110,835	\$64,457	\$35,722	1
Hamilton	\$542,937	\$221,025	\$133,789	\$74,347	3
Hansford	\$361,960	\$122,340	\$67,139	\$26,382	1
Hardeman	\$115,958	\$53,640	\$32,251	\$24,506	1
Hardin	\$4,805,117	\$1,949,398	\$1,169,120	\$627,719	22
Harris	\$4,885,046,731	\$1,818,141,098	\$1,079,070,454	\$332,393,334	17,705
Harrison	\$11,926,889	\$4,504,876	\$2,758,561	\$1,054,417	48
Hartley	\$55,814	\$26,085	\$16,543	\$9,355	0
Haskell	\$243,635	\$98,443	\$59,315	\$31,561	1
Hays	\$16,522,034	\$7,641,773	\$4,796,411	\$2,377,504	95
Hemphill	\$286,181	\$99,073	\$54,822	\$25,070	1
Henderson	\$6,575,233	\$2,647,324	\$1,582,392	\$838,613	31
Hidalgo	\$49,742,745	\$23,459,157	\$14,547,212	\$7,854,839	303
Hill	\$1,727,448	\$688,664	\$411,051	\$233,613	8
Hockley	\$996,402	\$420,427	\$256,621	\$155,435	5
Hood	\$3,636,880	\$1,445,715	\$865,409	\$480,066	17
Hopkins	\$3,165,176	\$1,431,199	\$893,048	\$521,284	18
Houston	\$7,567,114	\$3,026,131	\$1,793,940	\$729,712	32
Howard	\$3,161,193	\$1,222,315	\$721,467	\$368,131	13
Hudspeth	\$14,269	\$5,895	\$3,253	\$2,660	0
Hunt	\$6,346,453	\$2,803,251	\$1,712,028	\$998,920	35
Hutchinson	\$1,567,299	\$591,039	\$355,041	\$189,273	6
Irion	\$41,348	\$14,442	\$8,127	\$4,126	0
Jack	\$427,223	\$168,054	\$100,963	\$55,304	2
Jackson	\$1,032,497	\$408,889	\$238,312	\$135,917	5

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Jasper	\$2,997,343	\$1,248,522	\$754,737	\$431,991	15
Jeff Davis	\$873,633	\$358,449	\$216,531	\$132,564	4
Jefferson	\$145,676,416	\$59,951,338	\$36,458,656	\$17,601,803	686
Jim Hogg	\$70,574	\$27,654	\$15,812	\$9,771	0
Jim Wells	\$2,530,067	\$1,166,040	\$709,982	\$454,545	15
Johnson	\$12,477,796	\$5,353,835	\$3,312,699	\$1,559,926	64
Jones	\$657,382	\$264,952	\$156,907	\$81,046	3
Karnes	\$816,547	\$298,152	\$169,037	\$91,219	3
Kaufman	\$5,728,217	\$2,381,497	\$1,468,546	\$726,545	29
Kendall	\$8,083,801	\$3,216,992	\$1,932,161	\$1,028,979	38
Kenedy	\$42,036	\$17,069	\$10,643	\$8,525	0
Kent	\$20,947	\$7,968	\$4,637	\$2,444	0
Kerr	\$7,461,737	\$3,209,868	\$1,917,777	\$1,136,829	39
Kimble	\$273,765	\$100,769	\$56,867	\$32,542	1
King	\$9,605	\$4,804	\$2,935	\$1,109	0
Kinney	\$14,204	\$5,433	\$3,055	\$1,817	0
Kleberg	\$1,610,035	\$692,649	\$416,786	\$250,698	9
Knox	\$104,870	\$44,875	\$26,656	\$13,218	1
La Salle	\$79,932	\$330,184	\$207,991	\$134,385	5
Lamar	\$3,788,885	\$37,822	\$23,352	\$18,420	1
Lamb	\$431,825	\$1,573,192	\$945,685	\$530,363	19
Lampasas	\$696,814	\$159,897	\$92,541	\$41,800	2
Lavaca	\$635,414	\$296,727	\$186,731	\$98,867	4
Lee	\$2,608,946	\$1,031,979	\$624,899	\$300,162	12
Leon	\$423,960	\$194,813	\$122,453	\$72,948	2
Liberty	\$4,754,974	\$1,994,803	\$1,240,118	\$567,334	23
Limestone	\$1,002,957	\$397,558	\$236,356	\$139,164	5
Lipscomb	\$35,667	\$14,818	\$8,932	\$4,283	0
Live Oak	\$702,352	\$264,409	\$153,563	\$90,071	3
Llano	\$1,066,769	\$437,125	\$260,178	\$152,752	5
Loving	\$11,127	\$3,279	\$1,927	\$700	0
Lubbock	\$40,255,882	\$18,802,539	\$11,686,259	\$5,700,830	231
Lynn	\$168,473	\$65,520	\$37,515	\$11,562	1
Madison	\$670,596	\$311,705	\$196,224	\$142,447	4
Marion	\$207,323	\$90,417	\$55,503	\$35,238	1
Martin	\$213,615	\$79,228	\$45,132	\$20,484	1
Mason	\$596,204	\$243,230	\$143,104	\$83,290	3
Matagorda	\$2,853,286	\$1,044,177	\$606,985	\$330,384	11
Maverick	\$2,377,945	\$1,093,332	\$666,313	\$447,817	15
McCulloch	\$707,681	\$309,330	\$187,059	\$111,721	4



# Detailed Results (cont.)

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
McLennan	\$35,625,596	\$15,312,657	\$9,332,338	\$4,455,991	184
McMullen	\$84,333	\$29,717	\$16,385	\$5,523	0
Medina	\$1,946,892	\$803,823	\$475,775	\$281,958	10
Menard	\$87,633	\$35,744	\$20,808	\$13,054	0
Midland	\$42,153,247	\$16,680,777	\$9,836,664	\$4,508,102	174
Milam	\$1,804,779	\$712,654	\$438,178	\$222,489	8
Mills	\$268,524	\$151,162	\$97,717	\$62,551	2
Mitchell	\$817,235	\$332,870	\$200,429	\$102,590	4
Montague	\$1,308,711	\$537,949	\$331,255	\$179,714	7
Montgomery	\$125,773,702	\$49,530,563	\$30,404,806	\$12,720,401	553
Moore	\$1,854,742	\$647,600	\$364,086	\$164,762	6
Morris	\$2,783,009	\$1,042,073	\$639,134	\$205,887	11
Motley	\$10,053	\$3,869	\$2,214	\$1,293	0
Nacogdoches	\$6,951,463	\$3,446,485	\$2,194,563	\$1,426,823	49
Navarro	\$3,020,768	\$1,255,024	\$758,525	\$368,680	15
Newton	\$246,739	\$133,606	\$87,360	\$61,241	2
Nolan	\$1,854,088	\$780,973	\$456,730	\$257,661	9
Nueces	\$124,642,863	\$48,156,222	\$28,763,293	\$12,958,677	523
Ochiltree	\$693,175	\$250,714	\$147,647	\$63,631	3
Oldham	\$7,023	\$3,417	\$2,162	\$1,850	0
Orange	\$6,990,463	\$2,862,419	\$1,760,869	\$857,904	33
Palo Pinto	\$1,603,892	\$627,629	\$370,149	\$192,501	7
Panola	\$1,664,138	\$665,139	\$407,528	\$203,257	8
Parker	\$12,300,679	\$4,988,022	\$3,033,631	\$1,459,231	58
Parmer	\$135,426	\$50,614	\$29,662	\$8,148	1
Pecos	\$340,744	\$132,942	\$77,368	\$48,532	2
Polk	\$2,970,940	\$1,207,505	\$714,557	\$386,925	13
Potter	\$42,937,749	\$18,497,246	\$11,176,234	\$5,709,826	220
Presidio	\$368,460	\$147,540	\$86,329	\$54,726	2
Rains	\$771,006	\$298,714	\$175,939	\$102,296	3
Randall	\$8,429,642	\$3,759,006	\$2,288,197	\$1,169,701	45
Reagan	\$57,579	\$22,439	\$12,829	\$7,201	0
Real	\$104,395	\$38,545	\$21,817	\$12,093	0
Red River	\$174,941	\$69,318	\$41,297	\$21,182	1
Reeves	\$337,104	\$132,459	\$76,776	\$51,656	2
Refugio	\$271,413	\$106,143	\$61,528	\$43,887	1
Roberts	\$17,316	\$5,880	\$3,234	\$2,219	0
Robertson	\$487,795	\$198,369	\$121,469	\$66,258	2
Rockwall	\$12,906,284	\$5,902,024	\$3,716,943	\$1,968,395	75
Runnels	\$1,152,684	\$431,124	\$246,521	\$133,247	5

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

County	Total Expenditures	Gross Product	Personal Income	Retail Sales	Employment (Permanent Jobs)
Rusk	\$5,606,710	\$2,177,251	\$1,329,744	\$583,424	24
Sabine	\$779,642	\$333,793	\$208,113	\$121,909	4
San Augustine	\$150,231	\$58,500	\$34,350	\$18,915	1
San Jacinto	\$1,516,387	\$632,290	\$395,406	\$205,475	8
San Patricio	\$5,152,412	\$1,964,438	\$1,164,969	\$646,509	22
San Saba	\$346,208	\$160,769	\$97,834	\$63,509	2
Schleicher	\$205,775	\$77,288	\$44,606	\$16,965	1
Scurry	\$641,977	\$292,948	\$177,727	\$112,601	4
Shackelford	\$257,982	\$101,578	\$60,184	\$32,953	1
Shelby	\$1,592,952	\$749,204	\$490,633	\$270,085	10
Sherman	\$12,821	\$5,524	\$3,397	\$1,588	0
Smith	\$56,244,797	\$23,781,312	\$14,567,484	\$7,118,225	284
Somervell	\$678,441	\$246,215	\$145,935	\$53,134	3
Starr	\$1,003,425	\$452,753	\$278,740	\$194,957	6
Stephens	\$756,222	\$331,554	\$207,235	\$122,105	4
Sterling	\$28,758	\$13,026	\$7,892	\$6,354	0
Stonewall	\$10,154	\$4,706	\$2,923	\$2,055	0
Sutton	\$321,314	\$129,210	\$75,116	\$47,198	1
Swisher	\$127,094	\$47,527	\$27,243	\$11,126	0
Tarrant	\$589,526,059	\$257,336,769	\$157,932,388	\$69,538,541	3,004
Taylor	\$24,451,660	\$10,186,828	\$6,127,253	\$2,787,520	115
Terrell	\$59,477	\$27,505	\$17,016	\$9,220	0
Terry	\$510,574	\$217,742	\$125,510	\$90,370	3
Throckmorton	\$29,479	\$12,905	\$7,649	\$4,293	0
Titus	\$1,602,185	\$629,584	\$386,550	\$201,888	7
Tom Green	\$12,098,227	\$5,154,403	\$3,059,294	\$1,728,108	63
Travis	\$693,800,911	\$330,092,787	\$207,506,615	\$93,866,022	3,968
Trinity	\$292,592	\$140,697	\$87,492	\$55,410	2
Tyler	\$1,009,941	\$454,519	\$282,666	\$166,056	6
Upshur	\$3,474,899	\$1,428,038	\$858,093	\$432,201	16
Upton	\$120,395	\$45,835	\$26,047	\$12,958	0
Uvalde	\$2,136,654	\$955,103	\$580,650	\$324,591	12
Val Verde	\$1,571,267	\$787,141	\$490,973	\$288,525	10
Van Zandt	\$1,811,948	\$888,729	\$552,236	\$347,282	12
Victoria	\$15,716,138	\$6,109,340	\$3,627,381	\$1,723,036	66
Walker	\$2,801,695	\$1,256,427	\$783,663	\$424,753	16
Waller	\$3,266,287	\$1,252,871	\$744,273	\$377,582	14
Ward	\$642,465	\$255,821	\$149,673	\$92,046	3
Washington	\$4,368,133	\$1,922,371	\$1,198,583	\$590,198	23
Webb	\$18,043,993	\$8,043,481	\$4,859,323	\$3,124,204	102



## Detailed Results (cont.)

**Table 10 (continued)**  
**The Annual Economic Impact of an Increased Pool of Engineers (25% Increment to Supply of Graduates Over a 5-Year Period) in Year 15 on Business Activity in Texas—Detailed Results by County**

<b>County</b>	<b>Total Expenditures</b>	<b>Gross Product</b>	<b>Personal Income</b>	<b>Retail Sales</b>	<b>Employment (Permanent Jobs)</b>
Wharton	\$3,612,015	\$1,454,781	\$877,348	\$469,505	17
Wheeler	\$1,088,781	\$471,766	\$282,366	\$188,861	6
Wichita	\$17,373,177	\$7,959,797	\$4,987,407	\$2,488,477	97
Wilbarger	\$906,615	\$354,323	\$205,547	\$109,799	4
Willacy	\$200,978	\$104,107	\$63,383	\$46,954	1
Williamson	\$29,133,221	\$14,115,837	\$9,037,591	\$4,449,679	180
Wilson	\$1,195,327	\$535,522	\$338,959	\$197,760	7
Winkler	\$390,477	\$151,552	\$88,273	\$50,903	2
Wise	\$3,901,642	\$1,672,491	\$1,030,051	\$528,732	20
Wood	\$4,168,762	\$1,679,523	\$1,001,926	\$487,796	19
Yoakum	\$265,717	\$105,513	\$62,464	\$36,842	1
Young	\$2,274,838	\$918,858	\$543,203	\$270,440	10
Zapata	\$348,339	\$138,802	\$81,736	\$54,139	2
Zavala	\$56,193	\$30,044	\$19,497	\$15,390	0
<b>TEXAS</b>	<b>\$11,667,696,552</b>	<b>\$4,716,498,311</b>	<b>\$2,838,314,432</b>	<b>\$1,082,601,857</b>	<b>50,285</b>

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



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# Economic Development Scenario



## Detailed Results (cont.)

**Table 11**  
**The Annual Potential Economic Development Impact of an Incremental Gain of 1% of the Projected US Share of Emerging Technologies as a Result of the Availability of an Enhanced Pool of Engineers at Maturity on Business Activity in Texas—Detailed Sectoral Results**

Sector	Total Expenditures (2006 Dollars)	Gross Product (2006 Dollars)	Personal Income (2006 Dollars)	Employment (Permanent Jobs)
Agricultural Products & Services	\$475,470,637	\$127,347,723	\$86,730,888	1,612
Forestry & Fishery Products	\$10,801,897	\$10,112,856	\$3,750,686	57
Coal Mining	\$49,063,203	\$14,321,525	\$15,091,533	119
Crude Petroleum & Natural Gas	\$346,380,356	\$76,048,662	\$35,073,551	200
Miscellaneous Mining	\$24,994,944	\$9,960,287	\$5,855,094	76
New Construction	\$0	\$0	\$0	0
Maintenance & Repair Construction	\$491,091,536	\$261,221,190	\$215,262,530	3,532
Food Products & Tobacco	\$1,124,590,687	\$284,331,049	\$145,249,888	2,824
Textile Mill Products	\$13,699,034	\$3,433,409	\$2,904,985	77
Apparel	\$211,129,817	\$116,911,480	\$59,240,833	1,878
Paper & Allied Products	\$272,390,368	\$122,462,042	\$55,364,189	979
Printing & Publishing	\$303,911,244	\$153,280,518	\$100,049,651	1,976
Chemicals & Petroleum Refining	\$4,928,087,629	\$1,953,371,356	\$917,221,275	7,892
Rubber & Leather Products	\$408,400,279	\$165,986,388	\$97,034,880	2,249
Lumber Products & Furniture	\$59,189,810	\$20,716,262	\$14,769,552	357
Stone, Clay, & Glass Products	\$150,313,781	\$89,639,798	\$46,881,990	889
Primary Metal	\$204,446,374	\$46,008,392	\$34,246,395	600
Fabricated Metal Products	\$270,883,675	\$109,228,590	\$70,518,120	1,405
Machinery, Except Electrical	\$154,360,432	\$67,644,738	\$48,325,683	599
Electric & Electronic Equipment	\$8,085,521,617	\$4,728,606,595	\$2,826,921,893	27,314
Motor Vehicles & Equipment	\$70,561,929	\$14,922,290	\$9,694,500	160
Transp. Equip., Exc. Motor Vehicles	\$38,710,290	\$17,659,044	\$11,539,560	161
Instruments & Related Products	\$764,431,311	\$321,322,627	\$244,234,468	3,640
Miscellaneous Manufacturing	\$63,633,697	\$24,965,188	\$17,218,778	318
Transportation	\$866,470,140	\$574,557,635	\$379,991,911	6,112
Communication	\$635,883,053	\$390,598,608	\$166,759,085	1,716
Electric, Gas, Water, Sanitary Services	\$1,400,604,069	\$317,950,791	\$138,745,244	684
Wholesale Trade	\$1,382,843,224	\$935,395,499	\$539,357,376	7,018
Retail Trade	\$2,421,915,179	\$2,006,956,320	\$1,200,095,707	36,608
Finance	\$455,466,677	\$248,014,688	\$144,419,673	1,494
Insurance	\$474,628,047	\$284,194,278	\$169,902,532	2,378
Real Estate	\$2,884,762,985	\$461,992,495	\$74,437,009	769
Hotels, Lodging Places, Amusements	\$285,519,429	\$148,471,651	\$97,402,538	2,762
Personal Services	\$534,606,865	\$327,876,960	\$255,093,576	5,002
Business Services	\$1,222,101,743	\$743,198,186	\$606,259,282	8,584
Eating & Drinking Places	\$1,307,668,756	\$765,982,978	\$407,543,833	21,439
Health Services	\$855,102,400	\$598,499,716	\$506,037,053	9,726
Miscellaneous Services	\$780,098,510	\$331,668,028	\$287,528,548	7,991
Households	\$40,714,800	\$40,714,800	\$39,853,274	3,205
<b>Total</b>	<b>\$34,070,450,423</b>	<b>\$16,915,574,645</b>	<b>\$10,076,607,564</b>	<b>174,399</b>

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