

An Assessment of the Impact of the America Invents Act and the Patent Trial and Appeal Board on the US Economy

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Contents

Executive Summary	ii
Introduction	1
PTAB and AIA Background	1
Direct Cost Savings	4
Total Economic Benefits	4
Conclusion	9
Appendix: Methods Used	10



Executive Summary

BACKGROUND

Innovation has long been recognized as the key factor supporting US economic growth and competitiveness. A critical element of the infrastructure facilitating product development and commercialization is the system that protects intellectual property and encourages its widespread adoption and implementation. The current framework that facilitates this process includes the Leahy-Smith America Invents Act (AIA) and the Patent Trial and Appeal Board (PTAB). The AIA and PTAB reduce the need for patent litigation, reducing costs and generating substantial economic benefits.

Primary Benefits of AIA/PTAB Trials

Conducted before a panel of three technically trained administrative patent judges, while district court case may be with a jury	Discovery more limited in scope which lowers the cost to litigate	Typically conclude within 12 months compared to several years for district court litigation
The Perryman Group estimates that the direct cost savings from the AIA/PTAB over the 2014-19 period was \$2.644 billion or about \$262,200 for each of the 10,085 proceedings . These savings are due to fewer patent lawsuits and lower costs per case.	\$2.644 BILLION total savings over the 2014-19 period	\$262,200 PER CASE average over the 2014-2019 period

The Perryman Group estimates that over the 2014-19 period, cost savings associated with AIA/PTAB led to the following increase in US business activity (including multiplier effects):

+\$2.95
BILLION
in gross product

+\$1.41
BILLION
in personal income

+13,500
job-years
of employment

TAKEAWAY

Economic performance in the United States over the long term is tied to innovation, and AIA and PTAB not only support innovation, but also generate substantial economic benefits.

Introduction

Innovation has long been recognized as the key factor supporting US economic growth and competitiveness. A critical element of the infrastructure facilitating product development and commercialization is the system that protects intellectual property and encourages its widespread adoption and implementation. The current framework that facilitates this process includes the Leahy-Smith America Invents Act (AIA) and the Patent Trial and Appeal Board (PTAB). The AIA and PTAB reduce the need for and cost of patent litigation, reducing transaction costs and generating many substantial economic benefits.

The AIA and PTAB reduce the need for patent litigation, reducing costs and generating substantial economic benefits.

The Perryman Group (TPG) was recently asked to estimate the effect of the AIA and PTAB on US economic activity. This process involves first estimating the direct cost savings associated with reduced litigation and then computing the total economic benefits of the associated efficiency gains as they ripple through the economy. This report presents results of TPG's analysis.

PTAB and AIA Background

The Leahy-Smith America Invents Act (AIA) was enacted into law on September 16, 2011. It was the culmination of a decade of Congressional consideration on how to improve patent quality and represented the most significant reforms to the US patent system in almost 60 years.

One significant aspect of the AIA was that it transitioned the United States from a first-to-invent to a first-to-file system, making the US system more in line with the rest of the world. Other notable provisions of the AIA include improvements to patent quality and examination, improved administrative challenges of patent validity, increased certainty in damages calculations, supplemental examination processes, changes to the best mode requirement, authority for the Patent and Trademark Office to set fees, and a ban on tax and

embryonic stem cell patents. The AIA represents a significant change to America's patent system with the goal of improving patent quality, which is important to US invention innovation, and, hence, competitiveness.¹

The AIA also changed the way patent litigation is conducted, allowing for a faster and less costly mechanism. Trials under the AIA are overseen by the PTAB, which is an adjudicative body within the US Patent and Trademark

PTAB trials typically cost less to litigate and conclude within 12 months from institution, whereas district court litigation may take several years.

Office (USPTO), and are intended to be an alternative to district court litigation with several key differences. One difference is that AIA

trials are conducted before a panel of three technically trained administrative patent judges, while district court cases often involve a jury. Although discovery is available in both forums, discovery before the PTAB is more limited in scope which lowers the cost to litigate. Another key difference is that PTAB trials typically are resolved within 12 months from institution, whereas district court litigation may take several years to conclude.²

There are two phases to proceedings under the AIA. First, the PTAB decides whether to institute a trial based on the petitions and any preliminary response the patent's owner may file. If a trial is instituted, it is conducted as phase two of the process. At the conclusion, the PTAB issues a final written decision regarding whether the challenged claims of the patent should stand.

Although the AIA expanded its scope, the PTAB has existed in some form since the 1800s, and consists of statutory members (like the USPTO Director) and administrative patent judges. The PTAB decides appeals from the decisions of patent examiners and adjudicates the patentability of issued patents challenged by third parties in post-grant proceedings. If an applicant for a patent receives a second or final rejection from an examiner, the

¹ "The American Invents Act: Promoting American Innovation, Creating American Jobs, Growing America's Economy," <https://www.leahy.senate.gov/imo/media/doc/PRESS-Summary-OnePager-FINAL.pdf>; and "Summary of the America Invents Act," Vedder Price, The National Law Review, April 12, 2012, <https://www.natlawreview.com/article/summary-america-invents-act>.

² Gongola, Janet, "The Patent Trial and Appeal Board: Who are they and what do they do?," Patent Trial and Appeal Board, United States Patents and Trademark Office, Summer 2019, <https://www.uspto.gov/learning-and-resources/newsletter/inventors-eye/patent-trial-and-appeal-board-who-are-they-and-what>.

applicant may seek review of the rejection by the PTAB. The PTAB decides about 12,000 appeals and 1,500 trial proceedings per year, though it varies over time.³

The types of trials under the AIA include *inter partes* review, covered business method review, post grant review, and derivation proceedings. Under *inter partes* review, covered business method review, and post grant review a

Over the 2014-19 period, the PTAB oversaw about **10,085 cases** under the AIA. These matters typically involved technology-oriented patents in high value-added industries.

member of the public can challenge the patentability of claims in an issued patent in a petition to the

PTAB. For example, in *inter partes* reviews, a petition may challenge an issued patent on grounds of anticipation or obviousness. These petitions often identify prior art patents and publications that might not have been considered by the examiner. Other post grant proceedings may present other challenges to patentability. For example, post grant review proceedings may challenge the written description support or subject matter eligibility of claims. In addition, in a derivation, the PTAB determines whether one party derived a claimed invention from another.⁴

Over the 2014-19 period, the PTAB oversaw roughly 10,085 petitions filed with the AIA. These matters typically involved technology-oriented patents in high value-added industries. On average, about one-third of those petitions mature into full proceedings, while roughly one-third are resolved through settlement, and the remaining one-third are denied institution.⁵

³ *Id.* The USPTO keeps statistics, updated monthly, at <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/statistics>

⁴ Gongola, Janet, “The Patent Trial and Appeal Board: Who are they and what do they do?,” Patent Trial and Appeal Board, United States Patents and Trademark Office, Summer 2019, <https://www.uspto.gov/learning-and-resources/newsletter/inventors-eye/patent-trial-and-appeal-board-who-are-they-and-what>.

⁵ See <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/statistics>.

Direct Cost Savings

The direct cost savings emanating from the PTAB process established in the AIA stem from both

- reductions in the number of patent lawsuits filed in district courts and
- reductions in adjudication cost per case.

The Perryman Group estimated the effect of AIA/PTAB on the numbers of cases filed based on historical patterns and trends in other types of litigation. In addition, the cost of patent litigation was evaluated based on changes over

Direct cost savings over the 2014-19 period are estimated to be \$2.644 billion, or about \$262,200 per case.

time relative to other relevant types of litigation over a similar period. Cost savings were then

derived through a multi-stage process involving compilation of a database of patent matters and their resolution by stage and size of risk over approximately 20 years, analysis of the numbers reaching discovery or trial phases, and estimation of costs with and without AIA/PTAB. (See the Appendix for additional detail.)

The results of The Perryman Group's analysis indicate estimated **direct cost savings over the 2014-19 period of \$2.644 billion, or about \$262,200 per case.**

Total Economic Benefits

Because these estimated direct savings represent a net gain in efficiency (reduction in cost with no corresponding loss of output), it is appropriate to consider the secondary (or "multiplier" effects) as these funds circulate through the economy. To estimate overall benefits, the direct savings were

allocated across industrial categories in a manner consistent with the volume of patent cases filed⁶ and simulated using the Input-Output Model of the United States and related industrial data maintained by BEA.

Any economic stimulus, whether positive or negative, generates multiplier effects throughout the economy. In this case, the economic stimulus is gains in



efficiency associated with cost reductions described in this summary. The public input-output model of the United States maintained by the Bureau of Economic Analysis of the US Department of Commerce

(BEA) was then used to calculate total economic benefits.

The input-output process uses a variety of data (from surveys, industry information, and other sources) to describe the various goods and services (known as resources or inputs) required to produce another good/service. This process allows for estimation of total economic impacts (including multiplier effects).

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

- Total expenditures (or total spending) measure the dollars changing hands as a result of the economic stimulus.
- Gross product (or output) is production of goods and services that will come about in each area as a result of the activity. This measure is parallel to the gross domestic product numbers commonly reported by various media outlets and is a subset of total expenditures.
- Personal income is dollars that end up in the hands of people in the area; the vast majority of this aggregate derives from the earnings of employees, but payments such as interest and rents are also included.
- Job gains are expressed as job-years of employment for cumulative measures. A job-year is one person working for one year, though it could be multiple persons working partial years.

⁶ “2018 Patent Litigation Study,” PwC, May 2018, <https://www.pwc.com/us/en/services/forensics/library/patent-litigation-study.html>.

Monetary values were quantified on a constant (2019) basis to eliminate the effects of inflation. Additional detail regarding the methods used is provided in the Appendix.

The Perryman Group estimates that over the 2014-19 period, cost savings associated with AIA/PTAB led to an **increase in US business activity of \$2.95 billion in gross product, \$1.41 billion in personal income, and nearly 13,500 job-years of**

Over the 2014-19 period, cost savings associated with AIA/PTAB led to an increase in US business activity of an estimated

- ✓ **\$2.95 billion** in gross product,
- ✓ **\$1.41 billion** in personal income, and
- ✓ **nearly 13,500** job-years of employment (including multiplier effects).

employment (including multiplier effects). With about 10,085 AIA/PTAB trials over the 2014-19 period, the estimated economic benefit averaged over **\$292,900 per case** in US gross product and **\$139,985** in personal income.

The industry group experiencing the largest gains was manufacturing, with an estimated increase of **\$1.41 billion** in gross product and almost **5,100** job-years of employment (including multiplier effects).

For the manufacturing industry, The Perryman Group estimates that over the 2014-2019 period, cost savings associated with AIA/PTAB led to increases in US business activity (including multiplier effects) of:

+\$1.41
BILLION
in gross product

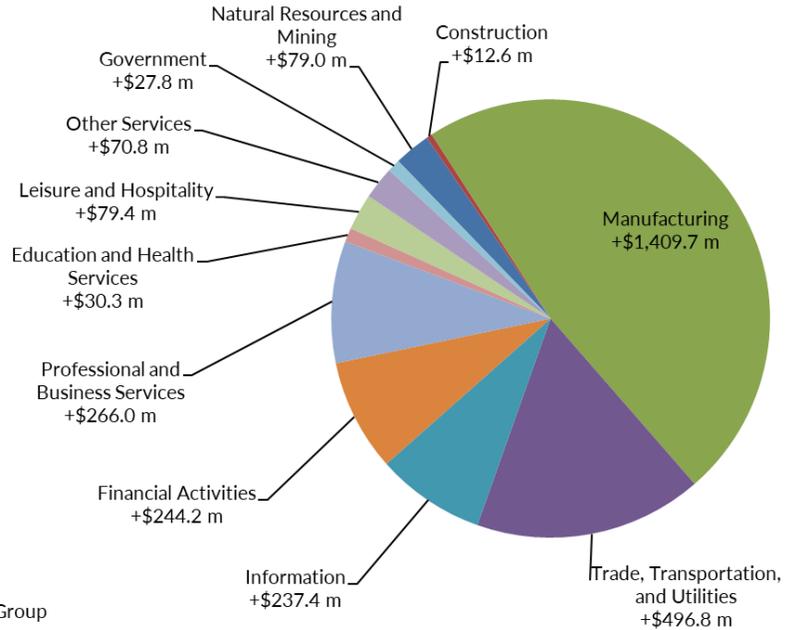
+\$0.67
BILLION
in personal income

+5,096
job-years
of employment

All industry groups are positively affected, as described in the following graphics and table.

The Estimated Cumulative Impact (2014-2019) of the Cost Savings Associated with AIA and PTAB on Business Activity in the US

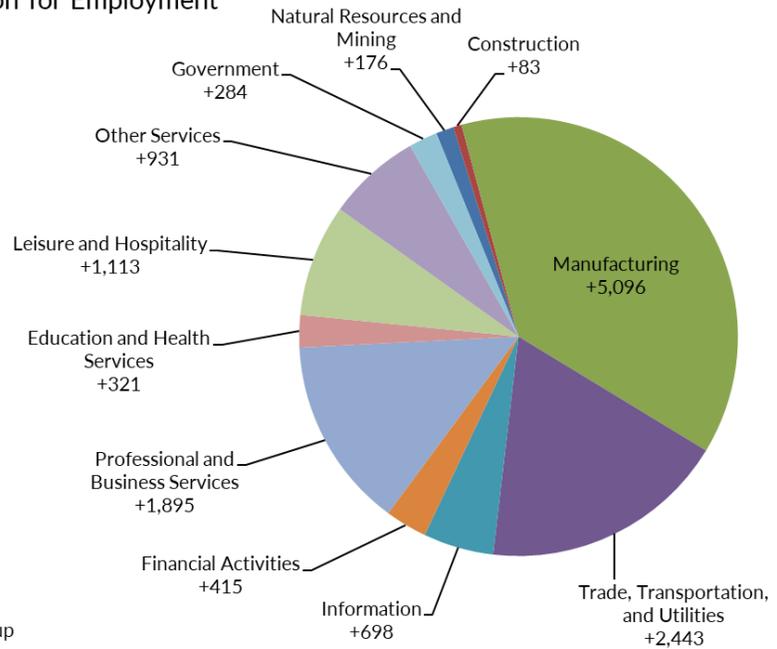
Industry Composition for Gross Product



Source: The Perryman Group

The Estimated Cumulative Impact (2014-2019) of the Cost Savings Associated with AIA and PTAB on Business Activity in the US

Industry Composition for Employment



Source: The Perryman Group

The Estimated Cumulative Impact (2014-19) of the Cost Savings Associated with the Leahy-Smith America Invents Act (AIA) and the Patent Trial and Appeal Board (PTAB) on US Business Activity

Industry	Total Expenditures	Gross Product	Personal Income	Job-Years
Agriculture	+\$30.7 m	+\$11.1 m	+\$4.0 m	+86
Mining	+\$119.4 m	+\$67.9 m	+\$16.5 m	+90
Utilities	+\$115.7 m	+\$78.8 m	+\$20.6 m	+75
Construction	+\$24.2 m	+\$12.6 m	+\$8.3 m	+83
Manufacturing	+\$3,758.3 m	+\$1,409.7 m	+\$671.1 m	+5,096
Wholesale Trade	+\$274.2 m	+\$183.7 m	+\$82.6 m	+680
Retail Trade	+\$219.2 m	+\$150.5 m	+\$83.8 m	+1,147
Transportation & Warehousing	+\$158.0 m	+\$83.7 m	+\$48.0 m	+542
Information	+\$399.2 m	+\$237.4 m	+\$83.8 m	+698
Finance and Insurance	+\$124.4 m	+\$77.2 m	+\$17.5 m	+320
Real Estate	+\$269.2 m	+\$167.0 m	+\$37.9 m	+95
Professional Services	+\$169.1 m	+\$107.1 m	+\$77.2 m	+608
Management Services	+\$149.5 m	+\$94.7 m	+\$68.3 m	+499
Administrative Services	+\$101.3 m	+\$64.2 m	+\$46.3 m	+788
Education Services	+\$1.8 m	+\$1.1 m	+\$0.9 m	+14
Health and Social Services	+\$46.9 m	+\$29.2 m	+\$23.5 m	+307
Amusement and Recreation Services	+\$21.1 m	+\$12.8 m	+\$7.7 m	+104
Accommodation and Food Services	+\$109.6 m	+\$66.6 m	+\$39.8 m	+1,009
Other Services	+\$117.6 m	+\$70.8 m	+\$52.0 m	+931
Government	+\$43.5 m	+\$27.8 m	+\$22.0 m	+284
Total, All Industries	+\$6,252.9 m	+\$2,954.0 m	+\$1,411.7 m	+13,454

Source: The Perryman Group

Notes: Based on The Perryman Groups estimates of cost savings associated with AIA/PTAB and the related multiplier effects through the economy. Monetary values given in millions of 2019 US dollars. A job-year is one person working for one year, though it could be multiple individuals working for partial years. Components may not sum to total due to rounding.

Conclusion

The Leahy-Smith America Invents Act and the Patent Trial and Appeal Board lead to substantial cost savings in patent litigation. These savings and the related increase in efficiency generate economic benefits across the economy.

The Perryman Group estimates that over the 2014-19 period, the total

Over the 2014-19 period, cost savings associated with AIA/PTAB led to increases in US gross product of an estimated **\$292,900** per case.

economic benefits of AIA/PTAB included an increase in US business activity of **\$2.95 billion** in

gross product and nearly **13,500** job-years of employment when multiplier effects are considered. These benefits are concentrated in the manufacturing sector.

Economic performance in the United States over the long term is critically tied to the rate of innovation. The AIA and PTAB enhance the efficiency of the innovation process, thus fostering future prosperity.

Appendix: Methods Used

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.

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. Second, the resulting inputs are used in a simulation of an input-output system, in this case the Input-Output Model of the United States maintained by the US Department of Commerce.

Estimation of Direct Savings

In order to assess the patterns in cases filed, TPG initially examined historical data on the number of cases initiated. The evidence revealed a substantial drop in matters over time. To isolate the effects of AIA/PTAB, the historical correlation between patent and trademark filings⁷ was used to project the future path of patent case initiations over the 2014-19 period in the absence of the new framework. As noted below, other intervening factors were also considered in the analysis. The calculated increment was converted to a constant rate of growth over the period based on the trend in the projections. The values were also compared to patterns in total federal civil litigation filings⁸ and estimates of overall civil litigation costs⁹ and found to be consistent.

⁷ “Just the Facts: Intellectual Property Cases-Patent, Copyright, and Trademark,” Figure 1, United States Courts, February 13, 2020, <https://www.uscourts.gov/news/2020/02/13/just-facts-intellectual-property-cases-patent-copyright-and-trademark>.

⁸ “Federal Judicial Caseload Statistics 2019,” United States Courts, <https://www.uscourts.gov/statistics-reports/federal-judicial-caseload-statistics-2019>.

⁹ See for example, “Economic Benefits of Tort Reform, An assessment of excessive tort costs in California and potential economic benefits of reform,” The Perryman Group, November 2019, <https://californiacala.org/reports-1/economic-benefits-of-tort-reform>.

The determination of the cost savings for various types of litigation and the number of cases in each representative category involved a multi-stage process. Using data from the widely respected biennial self-reported litigation cost surveys conducted by American Intellectual Property Law Association (AILPA).¹⁰ it was possible to develop a database of estimated patent litigation costs by amount at risk and stage at which the case was resolved dating back to 2001. A comparable series was developed for trademark litigation in order to establish a benchmark for trends in other types of intellectual property matters. As with the number of cases, the patterns in trademark cases were used to estimate the cost of patent matters by risk and size category in the absence of AIA/PTAB. These patterns were compared with overall civil litigation cost estimates and found to be reasonable.

In order to determine aggregate cost savings, it was necessary to determine the number of cases that proceed to the later stages of discovery or trial. The analysis was limited to only matters with more than \$1 million at risk. This assumption may result in a modest understatement of the overall direct benefits. It is likely to be negligible, however, in that (1) the overwhelming majority of smaller matters are resolved early in the process due to cost considerations and (2) the expense of a PTAB proceeding and other expense relative to the amounts at risk make it unlikely to be a cost effective investment in many instances.

Although only about 10% of cases reach the late discovery and/or trial phases, the vast majority of these have substantial amounts at risk. Data from the major courts where patent cases are tried provide a valid mechanism to estimate the proportion that progress to the major stages of discovery and trial are associated with higher amounts at risk¹¹. Moreover, data related to damage awards in major jurisdictions and by industry provide a basis to estimate a distribution of cases according to categories of risk.¹² The combination of these analysis segments then permits computation of estimated costs over the 2014-19 period both with and without the presence of AIA/PTAB, with the difference being the direct savings associated with the patent review process.

Three final adjustments to these estimates are also implemented. First, the typical cost of a PTAB proceeding was deducted for each matter in order to determine a net

¹⁰ “Report of the Economic Survey (various years 2001-2019),” American Intellectual Property Law Association (AIPLA), www.aipla.org.

¹¹ Yoon, James C., “IP Litigation in United States,” Wilson Sonsini Goodrich & Rosati, August 2016, <https://law.stanford.edu/wp-content/uploads/2016/07/Revised-Stanford-August-4-2016-Class-Presentation.pdf>.

¹² “2018 Patent Litigation Study,” PwC, May 2018, <https://www.pwc.com/us/en/services/forensics/library/patent-litigation-study.html>.

savings amount. This segment of the analysis may result in a modest understatement of the actual direct benefits in that some matters would not involve a patent review.¹³ Second, all values are converted to constant 2019 dollars using the Implicit Price Deflator for Professional Services obtained from the Bureau of Economic Analysis of the US Department of Commerce (BEA). This procedure is necessary to eliminate any inflationary effects and allow the savings to be aggregated on a consistent basis. Finally, one intervening occurrence which is commonly mentioned as a potential causal factor in cost reductions is the *Alice Corp v. CLS Bank International* case,¹⁴ in which the Supreme Court limited the scope of software cases. Although the patterns in this sector seem to be consistent with those of other technology industries, TPG reduced the computed savings in the software component by 50%.

The end result of this analysis is an estimated **direct savings over the 2014-19 period of \$2.644 billion**. Once these direct effects were estimated, total economic impacts were quantified through model simulation as described below.

Model Simulation

Simulations of the Input-Output Model of the United States maintained by the US Department of Commerce were utilized to measure overall economic effects of the direct cost savings estimated during the course of this analysis and described above.

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*.

¹³ Landau, Josh, "IPR and Alice Appear Responsible for Reduced Patent Litigation Costs," Patent Progress, October 18, 2018, <https://www.patentprogress.org/2018/10/18/ipr-and-alice-appear-responsible-for-reduced-patent-litigation-costs/>.

¹⁴ *Id.* See also, for example, Baker Botts, Open to Close: An Empirical Study of Patent Case Termination Times, May 1, 2020, <https://www.bakerbotts.com/insights/publications/2020/may/open-to-close-an-empirical-study-of-patent-case-termination-times>.

Another pattern that arises in response to any direct economic activity comes from the payroll dollars received by employees at each stage of the production cycle. As workers are compensated, they use some of their income for taxes, savings, and purchases from external markets. A substantial portion, however, is spent locally on food, clothing, health care services, utilities, housing, recreation, and other items.

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

Definitions of Terms

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

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

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

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

About The Perryman Group

The Perryman Group has served the needs of more than 2,500 private-sector clients in numerous industries including

- the 9 largest firms in the US,
- 8 of the 10 largest law firms in the US,
- 3 of the 4 largest domestic foundations,
- the 6 largest energy companies doing business in the US,
- the 12 largest technology companies in the world,
- the 5 largest financial institutions in the US,
- two-thirds of the Global 25, and
- more than one-half of the Fortune 100.

The firm has also completed over 1,000 public policy studies on a variety of issues, and Dr. Perryman has served as advisor and/or consultant to several Presidents, numerous House and Senate Committees, 10 Cabinet departments, numerous foreign governments, and more than 100 other state and federal agencies. He has testified extensively regarding economic, financial, statistical, and damages issues in state and federal courts as well as in more than 100 regulatory proceedings.