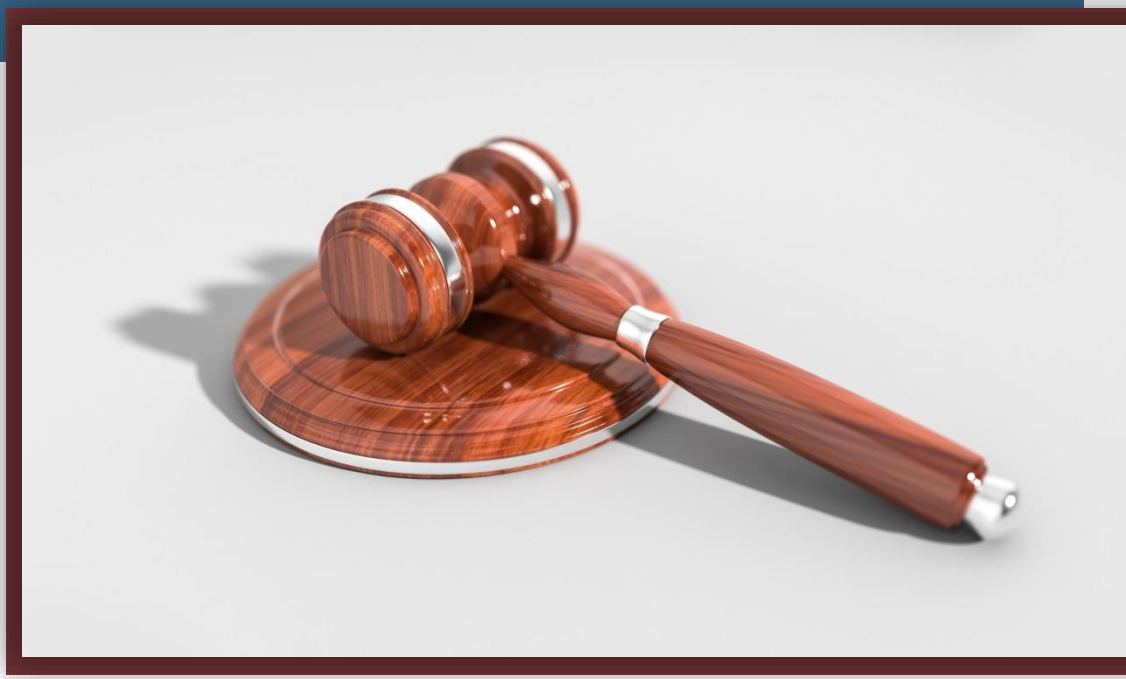
Economic Benefits of Tort Reform

An assessment of excessive tort costs in Illinois and potential economic benefits of reform

September 2018



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The Perryman Group

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Introduction

The civil justice system is a crucial institutional framework in America. When working properly, the system provides a fair and equitable forum for the resolution of disputes among parties, appropriately compensating those that have legitimately been harmed. Additionally, it acts as an effective deterrent to undesirable behavior. The civil justice system is designed to provide proper remedies for injured parties and incentives for responsible actions; it is not intended to be punitive, random, or unpredictable.

As part of this framework, tort litigation can be highly beneficial to society in terms of promoting equal and impartial justice as well as establishing part of the critical context in which economic activity can prosper. It provides for systematic resolution of disputes, reduces conflict, and encourages production using safe practices that benefit society as a whole.

Tort reform can lead to substantial economic benefits, and states which have implemented reform have seen improved judicial efficiency and better economic performance.

On the other hand, a flawed civil justice system which generates exorbitant levels of damages or numbers of awards and which is unpredictable in its outcomes may result in negative impacts through the misallocation of society's scarce economic and human resources. When such imbalances occur, tort reform can lead to substantial economic benefits, and states which have implemented reforms have seen improved judicial efficiency and measurable improvement in economic performance.

The Perryman Group estimates that excessive tort costs to the Illinois economy result in

- **$4.5 billion** in annual direct costs,
- **$7.7 billion** in annual output (gross product) and **81,685** jobs when dynamic effects are considered, and
- **$397.2 million** in annual State revenues and **$335.4 million** in annual local government revenues.

In order to evaluate the actual and potential economic benefits of tort reform in Illinois, The Perryman Group (TPG) analyzed outcomes the

state using Ohio, which has engaged in notable tort reform in the recent past, as a benchmark. In this way, the excessive costs of the Illinois tort system and the resulting consequences for economic activity can be quantified. Reform can reduce or eliminate these costs to the benefit of the state.

Background

A tort is either an act or an omission that harms or injures another person.[1] Tort lawsuits make up the majority of civil litigation, and there are a wide variety of cases that fall under the category.[2] The three main types of tort cases are intentional torts, negligence, and strict liability.[3] Intentional torts are when a defendant purposefully harms a plaintiff and include battery, assault, and trespassing.[4] Negligence cases must prove that there was a breach of duty that caused an injury and would include car accidents and medical malpractice suits.[5] Strict liability torts are product liability cases where a defective product was made or sold and caused harm and do not depend on whether a level of care was met.[6]

Tort reform generally refers to making changes to the civil justice system to limit either the ability to file a lawsuit or the amount of damages that can be received, responding to the belief that verdicts in tort cases have grown to be excessive and to distort economic activity in undesirable ways. The level of tort reform measures varies from state to state. For example, as of 2016, 33 states had laws capping the amount of damages that can be awarded in medical malpractice lawsuits from anywhere to $250,000 to $2.25 million.[7]

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[1] Tort, Wex Legal Dictionary, Legal Information Institute, Cornell Law School, (n.d.), https://www.law.cornell.edu/wex/tort.
[2] The 3 Different Types of Tort Law, The Babcock Law Firm LLC, (n.d.), https://www.injurylawcolorado.com/legal-library/tort-law-types.html.
[3] Tort, Wex Legal Dictionary, Legal Information Institute, Cornell Law School, (n.d.), https://www.law.cornell.edu/wex/tort.
[4] Intentional Tort, Wex Legal Dictionary, Legal Information Institute, Cornell Law School, (n.d.), https://www.law.cornell.edu/wex/intentional_tort.
[5] Negligence, Wex Legal Dictionary, Legal Information Institute, Cornell Law School, (n.d.), https://www.law.cornell.edu/wex/negligence; The 3 Different Types of Tort Law, The Babcock Law Firm LLC, (n.d.), https://www.injurylawcolorado.com/legal-library/tort-law-types.html.
[6] Tort, Wex Legal Dictionary, Legal Information Institute, Cornell Law School, (n.d.), https://www.law.cornell.edu/wex/tort.
[7] Bennett, Doug, Which States Have Tort Reform: Where to Practice?, Merritt Hawkins, January 17, 2018, https://www.merritthawkins.com/news-and-insights/blog/healthcare-news-trends/which-states-have-tort-reform-where-to-practice/.

Economic Costs of the US Tort System

The cost of the US civil justice system provides a framework for analysis of the economic impact of tort reform. Not all tort costs are due to excessive litigation and lawsuit abuse. Clearly, there is a need for a system to create incentives for firms to produce safe products, conduct business fairly, and otherwise follow the prevailing laws. It is also important that truly injured parties have a mechanism to be fully and fairly compensated. An efficient system leads to trust among market participants, enhanced business activity, and a higher standard of living.

If the justice system generates exorbitant levels of damages or numbers of awards, it may result in negative impacts through the misallocation of society's scarce economic and human resources.

However, an inadequately balanced justice system can be counterproductive. In particular, if the system generates exorbitant levels of damages or numbers of awards, it may result in negative impacts through the misallocation of society's scarce economic and human resources.

Some of these negative effects include (among others):

- increased costs and risks of doing business in an area,
- disincentives for innovations which promote consumer welfare,
- enhanced incentives to file lawsuits of questionable merit resulting in increased inefficiencies,
- higher insurance premiums than would exist under a more balanced approach,
- increased health care costs and declining availability of medical services,
- deterrence of economic development and job creation initiatives, and
- diversion of activity to unproductive purposes.

In short, an overly aggressive tort environment is a drain on the economy of a state and the country as a whole.

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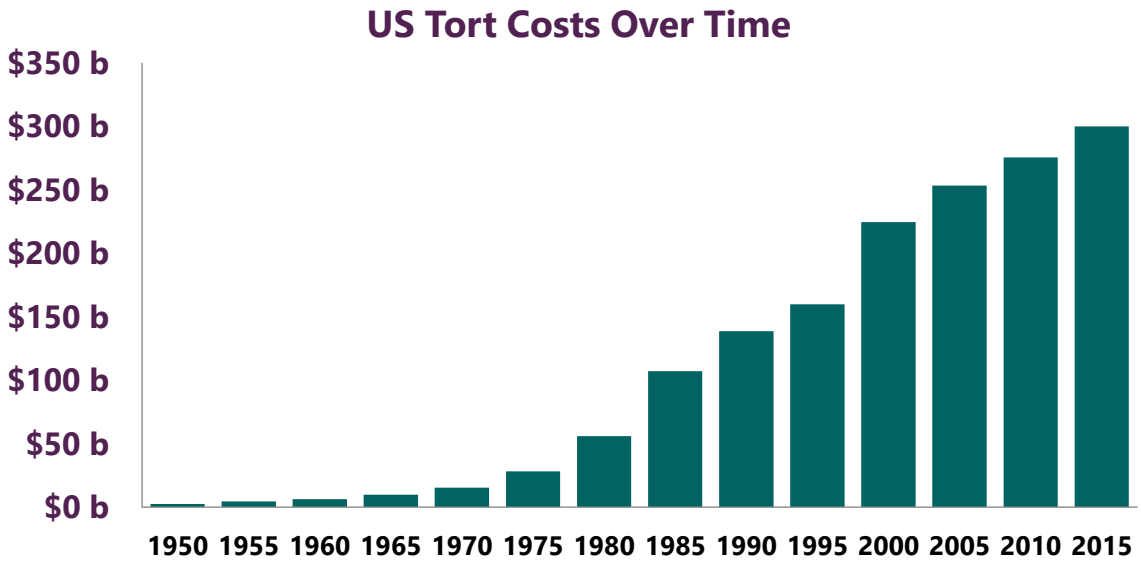
The size of the tort system in the US has grown substantially over the years. One consistent source of estimates of the size of the tort system that was available for many years dating back to 1950 has been Towers Watson and its predecessors. Although the information has not been updated for several years, the series

exhibits a high (in excess of 96%), consistent, and statistically significant correlation with widely used economic data related to the legal system maintained by Bureau of Economic Analysis and the Bureau of the Census. Consequently, it can be estimated in an empirically appropriate manner. This value suggests that the cost of the US tort system by this measure is approximately $307.6 billion as of 2018.[8] This estimate is based on statistics from the insurance industry and includes benefits paid to third parties as well as legal and administrative costs.[9] This aggregate does not represent the total cost of the tort system but is a consistent and useful measure that is widely recognized.

It should be noted that not all of these costs would be characterized as undesirable, as a substantial portion of these payments are to compensate victims for legitimate harm or damage they received. It is interesting to observe how these costs have grown historically, as illustrated in the graph below.



Units: Nominal US Dollars
Source: Towers Watson, Perryman Group

There is also evidence that the US tort system is expensive by international standards. A 2013 study by the US Chamber Institute for Legal Reform found that the US had the highest liability costs as a percentage of GDP among the

[8] U.S. Tort Cost Trends, 2011 Update, Towers Watson, 2012, p. 5.
[9] U.S. Tort Cost Trends, 2011 Update, Towers Watson, 2012, p. 8.
(footnote continued)

advanced western countries of the US, Canada, and the Eurozone.[10] These findings reflect both higher frequency of claims and higher claims cost in the US. [11] These findings suggest that the resources consumed by the tort system in the US are well above the level required to maintain an efficient and productive economy.

These excess expenditures reduce the competitiveness of American businesses. They also increase corporate incentives to locate factories elsewhere where there are more reasonable tort environments. Even variation among the litigation environment in the states affects where businesses choose to locate. A 2017 survey of corporate attorneys found that 85% of respondents indicated that the litigation environment in a state is likely to impact business decisions.[12]

Industry-Specific Effects

Several industries are particularly hard hit by litigation including certain types of manufacturing and health care delivery. Highly litigated **manufacturing industries** include, among others, categories such as chemicals, pharmaceuticals, tires, power tools, welding equipment, and electrical equipment. Litigation has threatened the viability of numerous companies in these sectors.

The threat of litigation can significantly decrease product innovation. When businesses operate in a high-liability-risk environment, they respond by reducing investments in product innovation because new products have more uncertain safety characteristics and can leave them vulnerable to lawsuits.

An unbalanced civil justice system can also reduce product safety research and the availability of safety-enhancing equipment. In fact, a 2006 study by Paul H. Rubin and Joanna M. Shepherd demonstrated that tort reforms passed in the states between 1981 and 2000 prevented approximately 22,000 net accidental deaths from occurring in the US during that timeframe. The researchers argued that an overly expensive liability system increases the cost of many risk-reducing products and services, making them less accessible, and in some cases unavailable to consumers.[13]

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[10] International Comparisons of Litigation Costs, U.S. Chamber Institute for Legal Reform, June 2013, p. 2.
[11] International Comparisons of Litigation Costs, U.S. Chamber Institute for Legal Reform, June 2013, p. 4-5.
[12] 2017 Lawsuit Climate Survey- Ranking the States, Executive Summary, U.S. Chamber, Institute for Legal Reform, September 2017, p. 3.
[13] Ibid.

Another vulnerable sector is **health care delivery**. Since 1975 (the first year for which insured medical malpractice costs were separately identified), the escalation in medical malpractice litigation costs has outpaced the increase in overall US tort costs. The result has been an enormous rise in insurance premiums for providers, in some cases leading to reductions in the provision of important procedures and practitioners leaving the profession.

Another consequence of this phenomenon is an increase in "defensive medicine." Defensive medicine is defined as when "doctors order tests, procedures, or visits, or avoid high-risk patients or procedures, primarily (but not necessarily solely) to reduce their exposure to malpractice liability" and also as administering "precautionary treatments with minimal expected medical benefit out of fear of legal liability."[14]

Many of these tests are quite costly (in addition to other issues such as patients incurring needless pain or inconvenience). The savings from the reduction or elimination of defensive medicine would allow millions of Americans to obtain health insurance. Moreover, the premature deaths and lost productivity due to reduced access to health care from liability-driven rising health care expenditures could be reduced. In addition, the supply of doctors tends to be restricted by the higher risk and costs associated with an excessive system, thus further reducing access to health care. In a 2008 study, The Perryman Group found that, after accounting for other factors, malpractice reforms in Texas led to a statistically significant increase in licensed physicians.[15]

Tort reform can enhance the efficiency of the economy and the competitiveness of the state's businesses.

Benefits of Tort Reform

Tort reform involves a number of benefits including enhancing product innovation, increasing productivity, reducing accidental deaths, improving access to health care through lower costs, and many others. These effects, in turn, enhance the efficiency of the economy and the competitiveness of the state's businesses.

[14] Ibid.

[15] The Perryman Group, *A Texas Turnaround: The Impact of Tort Reform on Business Activity in the Lone Star State*, 2008.

Innovation is greater with reform; new products are often higher risk because they have a less well-defined safety history. Legal reform that decreases exposure to liability lawsuits has been shown to **enhance innovation and increase productivity and employment**.

Reform has also been linked to a net **decrease in accidental deaths** because it enables consumers to buy more risk-reducing products. A 2007 study found that there were actually fewer accidental deaths (non-motor-vehicle) from 1981-2000 in states that had tort reforms.[16] As reform ameliorates companies' expected liability from such products, they respond by lowering prices and increasing product offerings for items such as pharmaceuticals, safety equipment, and medical services and devices.

The Pacific Research Institute found a measurable link between a state's legal environment and the growth rate of its real, per capita output, and concluded that the position of states relative to one another in terms of civil justice frameworks explained about 12% of the variation among the 50 states in their output growth rates.[17] A later 2009 report analyzing how state tort reform affects tort losses and tort insurance premiums also found that out of the 25 tort reforms examined, 18 reforms significantly reduced tort losses and insurance premiums over the 1996 to 2006 timeframe. The reforms that resulted in the greatest reduction were those aimed at reducing frivolous lawsuits, capping appeal bonds, setting negligence standards, and limiting non-economic-damages and medical-malpractice damages.[18]

The Perryman Group has also reached a similar conclusion in several studies.[19] Economic benefits occur because tort reform enhances the efficiency, fairness, and predictability of the civil justice system.

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[16] Rubin, Paul H. and Joanna M. Shepherd, Tort Reform and Accidental Deaths, *Journal of Law and Economics* Vol. 50, May 2007.

[17] Pacific Research Institute, *US Tort Liability Index: 2006 Report*, May 2006.

[18] Tort Law Tally: How State Tort Reforms Affect Tort Losses and Tort Insurance Premiums, Pacific Research Institute, April 2009.

[19] The Perryman Group, *The Current and Projected Impact of Judicial Reforms on Economic Activity in Alabama*, 2002; The Perryman Group, *The Potential Impact of Judicial Reforms on Economic Activity in Mississippi*, 2002; The Perryman Group, *The Negative Impact of the Current Civil Justice System on Economic Activity in West Virginia*, 2002; The Perryman Group, *The Negative Impact of the Current Civil Justice System on Economic Activity in Arkansas*, 2003; and The Perryman Group, *The Impact of the Proposed Judicial Reforms in House Bill 4 (HB4) on Business Activity in Texas: An Initial Assessment*, 2003. *(footnote continued)*

Tort Reform and Economic Development

Tort reform can cover many areas of legislation, from setting the interest rate used to calculate judgments to trespasser liability laws. The most recognizable form of tort reform is caps set to limit punitive and noneconomic damages, which are the damages that go beyond the direct costs arising from the harm caused by the defendant. Other forms of tort reform include rules qualifying an expert witness in a case, limiting when medical malpractice may be applied, allowing a class action to form, and lowering the barriers for a more thorough representation of the general population to serve as jurors.[20] Any of these changes can involve economic benefits.

The Perryman Group has extensive experience in the area of economic development and has studied the relationship between the judicial system and economic growth. Tort reform is an important aspect of fundamental economic health and development, which involves much of what state government does on an ongoing basis.

The first requirement for prosperity is an overall environment that is conducive to economic success. The primary role of government in achieving a fundamental advantage is to perform its traditional functions in an exemplary fashion. Key aspects of fundamental economic development include an educated workforce, quality infrastructure, balanced and efficient judicial structure, and a stable and competitive tax and regulatory environment. Other initiatives which positively impact the costs of doing business (such as effective workers' compensation and unemployment insurance systems) or the quality of life (such as crime reduction or improved public health) also contribute to the overall climate for growth.

Improving the climate for economic development through actions such as tort reform can help states win the competition for desirable corporate locations and expansions.

Improving the climate for economic development through actions such as tort reform can help states to be more attractive for desirable corporate locations and expansions.

[20] A recent review of some of these reforms in various states can be found in Cook, Andrew C., Tort Reform Update: Recently Enacted Legislative Reforms and State Court Challenges, The Federalist Society, December 2012.

Impact of Excessive Tort Costs

The Perryman Group measured the current annual impact of excessive tort costs compared to the benchmark state of Ohio on several measures of business activity. The Ohio legislature has enacted several laws aimed at improving the judicial system in the state. Examples include placing a cap on noneconomic damages for medical malpractice and certain other punitive damages, as well as reforms dealing with joint and several liability, prejudgment interest, and tort cases involving nursing homes, silica and asbestos. Ohio falls near the middle of the US Chamber's Institute for Legal Reform's rankings of 2017 Lawsuit Climate (Illinois ranked 48th). Thus, this analysis provides an assessment of the losses relative to a typical state with regard to its tort environment.

*The total current impact of excessive tort costs on the Illinois economy) includes losses of an estimated **$4.5 billion** in annual direct costs, as well as **$7.7 billion** in output (gross product) each year and about **81,685** jobs when multiplier effects are considered.*

The total current impact of excessive tort costs on the Illinois economy includes losses of an estimated **$4.5 billion** in annual direct costs, as well as **$7.7 billion** in output (gross product) each year and about **81,685** jobs when dynamic effects are considered. All major industry groups are negatively affected, with the retail trade, business services, health services, and other services industries experiencing the greatest losses. The yearly fiscal losses (as of 2018) are estimated at **$397.2 million** in State revenues and **$335.4 million** to local governments. Tort reform can reduce or eliminate these costs. Thus, these results may also be viewed as a measure of the benefits of reasonable reform measures.

*The yearly fiscal losses (as of 2018) are estimated at **$397.2 million** in State revenues and **$335.4 million** to local governments.*

The Current Annual Impact of Excessive Tort Costs on Business Activity in Illinois

Industry	Total Expenditures	Gross Product	Personal Income	Employment
Agriculture	-$0.244 b	-$0.069 b	-$0.046 b	-706
Mining	-$0.253 b	-$0.062 b	-$0.035 b	-220
Construction	-$0.742 b	-$0.359 b	-$0.296 b	-4,059
Total Manufacturing	-$2.628 b	-$0.840 b	-$0.466 b	-6,448
Transportation and Utilities	-$1.361 b	-$0.558 b	-$0.328 b	-3,648
Information	-$0.415 b	-$0.255 b	-$0.110 b	-1,016
Wholesale Trade	-$0.573 b	-$0.387 b	-$0.223 b	-2,478
Retail Trade	-$1.965 b	-$1.472 b	-$0.855 b	-25,675
Financial Activities	-$2.913 b	-$1.074 b	-$0.429 b	-4,355
Business Services	-$1.861 b	-$1.336 b	-$1.090 b	-12,956
Health Services	-$1.087 b	-$0.749 b	-$0.633 b	-10,221
Other Services	-$1.022 b	-$0.532 b	-$0.426 b	-9,903
TOTAL	-$15.064 b	-$7.693 b	-$4.938 b	-81,685

Units: Dollar amounts in billions of 2018 US dollars, employment in permanent jobs
Notes: Retail Trade includes Restaurants, Financial Activities includes Real Estate
Source: The Perryman Group

These effects are based on the current size of the state's population and economy and can be expected to rise over time in the absence of meaningful reforms. Descriptions of measures of economic activity and methods used are briefly outlined on the following page and explained in further detail in the Appendix to this report.

Measuring Economic Impacts

Any economic stimulus, whether positive or negative, generates multiplier effects throughout the economy. In this instance, excessive costs of the Illinois tort system lead to negative multiplier effects rippling through the economy.

The Perryman Group compared Illinois' tort costs to those in the benchmark state used in this study (Ohio), which has enacted notable reforms, to quantify the amount of excess costs. Dynamic effects were then measured using integrated simulations of The Perryman Group's input-output assessment and econometric models (the US Multi-Regional Impact Assessment System and the US Multi-Regional Econometric Model), which are described in further detail in the Appendices to this report) developed by the firm about 35 years ago and consistently maintained and updated since that time. These models have been used in hundreds of analyses for clients ranging from major corporations to government agencies. The impact system uses a variety of data (from surveys, industry information, and other sources) to describe the various goods and services (known as resources or inputs) required to produce another good/service. This process allows for estimation of the total economic impact (including multiplier effects) of excessive tort costs, which represents the potential benefits of tort reform. Through integrating this system with the econometric model, the dynamic effects on productivity and other economic phenomena can be estimated. The models used in the current analysis reflect the specific industrial composition and characteristics of the Illinois economy.

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 permanent jobs because effects would be ongoing.

Business activity also generates incremental taxes to the State and local governments. Monetary values were quantified on a constant (2018) basis to eliminate the effects of inflation. See the Appendices for additional information regarding the methods and assumptions used in this analysis.

Conclusion

The judicial system is essential to resolving disputes, compensating those that have been harmed, and deterring undesirable behavior. However, if it becomes imbalanced or unpredictable, it can cause misallocation of resources and unreasonably constrain economic growth.

Tort reform can significantly reduce excessive tort costs, leading to substantial economic benefits as well as other positive outcomes.

As noted, The Perryman Group estimates that excessive tort costs are harming the Illinois economy, costing the state economy an estimated **$7.7 billion** in output (gross product) each year and **81,685** jobs (including dynamic effects). Tort reform can significantly reduce or eliminate these costs, leading to substantial economic benefits as well as other positive outcomes. A strong judicial system is essential, and correcting imbalances is in the interest of Illinois residents, businesses, and society as a whole.

Appendix: Methods Used

US Multi-Regional Impact Assessment System

The basic modeling technique employed in this study is known as dynamic input-output analysis. This input-output segment of the methodology essentially uses extensive survey data, industry information, and a variety of corroborative source materials to create a matrix describing the various goods and services (known as resources or inputs) required to produce one unit (a dollar's worth) of output for a given sector. Once the base information is compiled, it can be mathematically simulated to generate evaluations of the magnitude of successive rounds of activity involved in the overall production process. Through embedding the system with a state-level econometric model in an integrated manner (see the next section or more detail), the market responses to the forms can also be examined.

There are two essential steps in conducting an input-output analysis once the system is operational. The first major endeavor is to accurately define the levels of direct activity to be evaluated. In this case, Ohio was used as a benchmark to measure the excess cost incurred in Illinois relative to that is occurring in a state that has implemented notable reforms. As noted in the report, the Towers Watson measure of tort cost may be readily and reliably estimated. To accomplish this task, TPG developed a regression model relating US litigation costs as reported over time to other variables which are both (1) highly correlated with the costs of US litigation and (2) available at both the national and state levels. These series included various relevant categories of income, employment, and gross product. The result of this effort was a model exhibiting excellent correlation (over 96%), strong statistical properties, and stability in estimation and predictive environments over multiple time periods. This system was then implemented using the state level information for Ohio and Illinois, thus producing estimates of litigation costs within the state that should be highly reliable.

As noted in the report, this measure is based on claims data and does not capture all aspects of direct tort costs. In particular, both efficiency losses and administrative costs need to be estimated as inputs to the simulation process. Tort costs function in manner that is conceptually equivalent to a tax on activity. Thus, the efficiency losses can be estimated as the so-called "welfare triangle" using a widely accepted method originally developed by noted economist Dale

Jorgenson.[21] This approach has been used in numerous contexts, including prior assessments of tort reform impacts.[22]

The administrative costs effects may be approximated using the well-established concept of rent-seeking and rent-avoidance behavior.[23] The data noted above provides sufficient information to implement all of these direct cost categories. By comparing the relative changes in the amounts (thus accounting for size differentials) in Ohio and Illinois in light of the reform in Ohio, it is possible to derive the direct losses associated with excessive tort costs in Illinois. As noted in the report, there are many other elements of potential impacts of tort reform measures. Generally, however, the effects are consequences of the incremental direct costs and, thus, should be reflected in the dynamic simulations.

The second major phase of the analysis is the simulation of the input-output system to measure overall economic effects of the direct excess costs of the current situation. The present study was conducted within the context of the US Multi-Regional Impact Assessment System (USMRIAS) which was developed and is maintained by The Perryman Group. This model has been used in hundreds of diverse applications across the country and has an excellent reputation for accuracy and credibility; it has also been peer reviewed on multiple occasions. The system used in the current simulations reflects the unique industrial structure of Illinois. As a part of this analysis, the USMRIAS is integrated with a dynamic econometric model in order to capture the various market responses to the excess costs. It should be noted that the results of the model can also be reviewed in a converse manner. In other words, the losses associated with excess costs may also be interpreted as the potential gains from reforms if these unnecessary outlays are eliminated.

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

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[21] See, for example, Dale W. Jorgenson and Kun-Young Yun, *Investment, Vol. 3: Lifting the Burden: Tax Reform, the Cost of Capital, and U.S. Economic Growth* (Cambridge, Mass.: MIT Press, 2001). The original estimation concept was presented in Arnold C. Harberger, "Monopoly and Resource Allocation," *American Economic Review* 44 (1954), pp. 77–87.
[22] See, for example, President's Council of Economic Advisers, *Who Pays for Tort Liability Claims? An Economic Analysis of the U.S. Tort Liability System* (April 2002), p. 12.
[23] The classic reference outlining this process is Gordon Tullock, "The Welfare Costs of Tariffs, Monopolies and Theft," *Western Economic Journal* 5 (1967), pp. 224–32.

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. Moreover, the model uses specific local taxing patterns to estimate the fiscal effects of activity on a detailed sectoral basis.

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

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

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

Commerce. The verification and testing procedures make use of extensive public and private sources.

Impacts were measured in constant 2018 dollars to eliminate the effects of inflation.

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

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

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

The fourth measure, **Retail Sales**, represents the component of Total Expenditures which occurs in retail outlets (general merchandise stores, automobile dealers and service stations, building materials stores, food stores,

drugstores, restaurants, and so forth). Retail Sales is a commonly used measure of consumer activity.

The final aggregates used are **Permanent Jobs and Person-Years of Employment,** 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 Permanent Jobs Measure is used. 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 2016 and $1 million in 2017, it is appropriate to say that $2 million was achieved in the 2016-17 period. If the same area has 100 people working in 2016 and 100 in 2017, 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. In this instance, the permanent jobs given the current size of the economy are measured.

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

US Multi-Regional Econometric Model

Overview

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

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

Model Logic and Structure

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

The income segment of the model is divided into wage and non-wage components. The wage equations, like their employment counterparts, are individually estimated at the 3-digit North American Industry Classification

System (NAICS) level of aggregation. Hence, income by place of work is measured for approximately 90 production categories. The wage equations measure real compensation, with the form of the variable structure differing between "basic" and "non-basic."

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

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

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

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

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

relative area and national labor costs in the industry, dynamic adjustment parameters, and ongoing changes in industrial interrelationships (driven by technological changes in production processes).

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

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

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

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

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

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

Model Simulation and Multi-Regional Structure

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

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

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

It should be noted that the underlying data for the modeling and simulation process are frequently updated and revised by the various public and private entities compiling them. Whenever those modifications to the database occur, they bring corresponding changes to the structural parameter estimates of the various systems and the solutions to the simulation and forecasting system. The multi-regional version of the US Multi-Regional Econometric Model is re-

estimated and simulated with each such data release, thus providing a constantly evolving and current assessment of state and local business activity.

The Final Forecast

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

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

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

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

The final step in the forecasting process is the integration of this material into the results in a logical and mathematically consistent manner. In some instances, this task is accomplished through “constant adjustment factors” which augment relevant equations. In other cases, anticipated changes in industrial structure or regulatory parameters are initially simulated within the context of the Multi-Regional Impact Assessment System to estimate their ultimate effects by sector. Those findings are then factored into the simulation as constant adjustments on a distributed temporal basis. Once this scenario is formulated, the extended system is again balanced across regions and sectors through an iterative simulation algorithm analogous to that described in the preceding section. In the present instance, the impact system is embedded within the econometric system to allow the interaction of the excessive tort costs with market responses.