

EXHIBIT AB-S-24



Assessment of an Internal Benchmark for Alberta Crown Timber

PREPARED FOR

The Province of Alberta

PREPARED BY

Dr. Mark Berkman

Dr. Kevin Neels

Dr. Charles Gibbons

March 10, 2017

THE **Brattle** GROUP

This report was prepared for the Province of Alberta. All results and any errors are the responsibility of the authors and do not represent the opinion of The Brattle Group or its clients.

Acknowledgement: We acknowledge the valuable contributions of many individuals to this report and to the underlying analysis, especially Andy Abernethy and Michelle Cleary of The Brattle Group.

Copyright © 2017 The Brattle Group, Inc.

Table of Contents

I.	Qualifications.....	1
A.	Mark Berkman.....	1
B.	Kevin Neels.....	2
C.	Charles Gibbons	3
II.	Introduction and Summary of Conclusions	3
III.	The Role of Benchmarking	6
IV.	The Alberta Softwood Timber Market.....	8
A.	Production and Exports	8
B.	Softwood Timber Harvests on Crown Lands.....	11
V.	The Province of Alberta Does Not Manipulate Timber or Log Output	15
A.	Any Minimum Production or Processing Requirements Have Not Been Enforced	15
B.	The Annual Allowable Cut is Driven by Ecological Factors to Ensure Sustainable Harvests Rather Than to Encourage Additional Production.....	16
C.	Mills Have Been Allowed to Close or Reduce Output.....	18
D.	The Province Has Not Prevented Tenure Acquisition Activity.....	20
E.	Though Long-Term Tenure Contracts are Tied to Market Conditions and Associated Timber Can Be Resold.....	22
F.	The Province Does Not Restrict Log Exports or Imports.....	25
1.	Export Policies are Administrative and Designed to Ensure Compliance with AACs.....	25
2.	Import Policies are Designed to Keep Out Forest Pests	26
VI.	The Crown Stumpage System Tends to Raise Log Prices, Not Lower Them	26
A.	Demand for Logs is Driven by a Broader Lumber Market.....	27
B.	Log Supply and Demand in a Market with Private Timberland Ownership.....	27
C.	Log Supply and Demand under the Crown Stumpage System	30
D.	An Analogy to the Effects of Government Taxes.....	32
VII.	The TDA Transaction Data	34
A.	Source of the TDA Transaction Data	34
B.	TDA Transaction Data Summary Statistics.....	35
VIII.	Cost-Adjusted Alberta Log Prices from the TDA Transaction Data Provide a Conservative Estimate of the Value of Standing Timber	37
A.	Reaction to the Use of the TDA Transaction Data in Past Proceedings	37
B.	General Formulation of the Benchmarking Calculation	37

List of Figures

Figure 1. Total area of softwood timber harvest in Alberta, 2001-2014.....	9
Figure 2. Exports of Alberta softwood lumber by destination, 2006-2015.....	10
Figure 3. Share of U.S. imports of Alberta softwood lumber by state, 2006-2015 average.....	10
Figure 4. Alberta mills and FMA holders	13
Figure 5. Coniferous FMA and quota AAC and volume harvested on Crown lands, FY2001-FY2015.....	17
Figure 6. Timber dues as a function of the Random Lengths index price (up to index price of \$500)	24
Figure 7. Prevailing timber dues, 2006-2016.....	24
Figure 8. Equilibrium log price and quantity in a private standing timber market.....	28
Figure 9. Equilibrium log price and quantity under Crown ownership of timberlands.....	31

List of Tables

Table 1. Comparison of rights and obligations for primary commercial coniferous forest tenure types.....	12
Table 2. Alberta mill closures and curtailments, 2007-2015	19
Table 3. Coniferous tenure acquisition activity in Alberta, 2012-2016.....	21
Table 4. Volume of coniferous log transactions in the TDA transaction data by sales type.....	36
Table 5. Volume-weighted average price (\$CAD) of coniferous log transactions in the TDA transaction data by sales type.....	36

I. Qualifications

This report was authored by Drs. Mark Berkman, Kevin Neels and Charles Gibbons of The Brattle Group (Brattle), an economics and financial consulting firm. Below, we provide a summary of our qualifications in this matter. Detailed CVs for each author are attached as Appendix A.

A. MARK BERKMAN

Dr. Mark P. Berkman, a Brattle principal, is an expert in applied microeconomics. His experience spans the areas of the environment, energy, and natural resources; health and safety; labor and employment; intellectual property; antitrust; commercial litigation and damages; and public finance. He has assisted both public and private clients and provided testimony before state and federal courts, arbitration panels, regulatory bodies, and legislatures.

His environmental work has involved the review of proposed air, water, solid waste, and worker and product safety regulations. Dr. Berkman has quantified the costs and benefits of these regulations, as well as toxic tort and product liability claims. In addition, he has valued natural and water resources as well as property damages associated with pollution from Superfund sites, landfills, paper mills, and power plants.

His work on energy matters includes the valuation of coal resources, power plants, and transmission rights-of-way. Dr. Berkman has frequently estimated the economic impacts of renewable energy projects, water projects, coal mines, and landfills. He has also prepared energy demand and price forecasts. He has extensive experience working with Native American tribes on energy and resource valuation matters including coal reserves, timber, and rights-of-way.

Dr. Berkman has been called on to address questions of market power in a variety of industries including solid waste, healthcare, natural gas, coal, computer manufacturing, and medical devices. He has testified regarding market definition and market power and participated in Hart-Scott-Rodino proceedings. Clients in a variety of industries ranging from computer chip to shoe manufacturers have sought Dr. Berkman's assistance to value patents, trade secrets, and trademarks. Dr. Berkman earned his Ph.D. from the University of Pennsylvania's Wharton School.

B. KEVIN NEELS

Dr. Kevin Neels, a Brattle principal, has more than 30 years of experience as a consultant and research experience as an economic expert. He has worked on behalf of numerous public and private sector clients in a wide range of industries. A skilled econometrician, he specializes in the use of quantitative techniques to resolve practical business, legal and regulatory problems. His extensive practical experience in the use of economic analysis to inform business decision making and win the support of legislative, legal and regulatory authorities has taught him how to effectively communicate analytical results in laymen's terms.

Dr. Neels has offered expert testimony on a number of occasions, either in the form of an expert report, in deposition or orally. He has also supported leading academic expert witnesses. Dr. Neels has played a key role in legal and regulatory proceedings for which the financial stakes have often run into tens or hundreds of millions of dollars. His work in support of counsel has touched all phases of the legal process, including discovery, development of theory, preparation of expert testimony, examination of opposing witnesses, preparation of trial exhibits and development of cross-examination strategy.

A frequent focus of Dr. Neels' work has been estimation of economic damages. He directed the team of economists working for the Plaintiff in the trial that resulted in the largest damage judgment that had then ever been awarded in a patent infringement lawsuit. He has testified in court and before arbitration panels in disputes involving damages claims measured in tens or hundreds of millions of dollars. On many occasions he has developed econometric models to support economic damage claims and testimony in antitrust litigation. He has also frequently been responsible for review and analysis of damage estimates put into evidence by opposing experts and for development of strategies for refuting these claims.

Dr. Neels has extensive experience in the areas of antitrust economics. He has been designated as an expert witness and has offered deposition testimony in a number of antitrust disputes. His work has addressed issues of both geographic and product market definition, as well measurement of antitrust damages.

Prior to joining The Brattle Group, Dr. Neels served as Vice President at Charles River Associates. He has also served as a researcher at the Rand Corporation and at the Urban Institute, as a Director with the economic consulting firm of Putnam, Hayes & Bartlett, and as a Management Consultant in the Transportation Practice of the firm now known as KPMG. Dr.

Neels is currently a member of the American Economic Association, the Licensing Executives Society, and the American Bar Association.

Dr. Neels has authored numerous research reports, monographs and articles for peer-reviewed journals. He has often been asked to offer expert testimony in legal and regulatory proceedings. He regularly serves as an invited speaker at conferences and industry forums, and his opinions and observations on industry developments are frequently quoted in the popular and trade press. Dr. Neels earned his Ph.D. from Cornell University.

C. CHARLES GIBBONS

Dr. Charles Gibbons is a Senior Associate with The Brattle Group who specializes in applying sophisticated econometric and statistical models to legal, regulatory, and policy issues. His work has been used in a variety of litigation matters, including structural modeling of antitrust damages, models of mortgage delinquencies, forensic analysis of product defects, and impacts of an environmental accident on outdoor recreation. He has also conducted conjoint surveys to calculate the value that consumers place on features of products and developed models for forecasting electricity sales and peak demand for utilities. His work has been used for class certification, liability determination, and damage calculations.

Additionally, Dr. Gibbons was a lecturer at the University of California, Berkeley where he last taught a graduate-level course in probability and statistics in the Department of Agricultural and Resource Economics. He received a Ph.D. in economics and an M.A. in statistics from the University of California, Berkeley. His dissertation proposed new methods in applied econometrics and a theory of competition for online advertising auction platforms.

II. Introduction and Summary of Conclusions

We have been asked by the Government of Alberta (or “the Province”) to conduct an economic analysis regarding certain aspects of the allegations that it provides the right to harvest provincially-owned standing softwood timber to lumber producers in Alberta at prices below what would be charged by private owners of timberlands and that these timber sales at allegedly

“less than adequate remuneration” constitute a countervailable subsidy.¹ These allegations are the latest in the “Softwood Lumber War” that dates back to 1982.²

We understand that, to determine whether the right to harvest standing timber is being provided at less than adequate remuneration, the U.S. Department of Commerce (“USDOC”) has started its analysis in prior cases by examining whether there is an internal market-determined price resulting from actual transactions that can be used as a benchmark price.³ This is, in fact, the preferred benchmark under USDOC regulations.⁴ The Petition argues that such benchmark data based on market-determined prices do not exist in Alberta because the large majority of timber in the province is provided by the Government of Alberta at administered prices.⁵

The position of the Province is that an internal benchmark does exist in the form of an implied value of standing timber derived by subtracting average logging, transportation, and other costs from actual observed log prices in Alberta; we call this the “average residual value.” The Province asserts that, while it may administratively set the charges owed to the Province for the right to cut timber on provincial (“Crown”) lands, it does not set prices in or otherwise interfere with the market for logs in the province. Thus, the calculation described above provides a within-jurisdiction, market-based measure of the average residual value that would arise in a private market. The log market transaction prices are obtained from information provided by an independent body that collects such records for purposes unrelated to the trade dispute. In this report, these data are called the “TDA transaction data.”⁶ In the previous softwood lumber

¹ Petitions for the Imposition of Antidumping Duties and Countervailing Duties on Imports of Certain Softwood Lumber Products from Canada on Behalf of the Committee Overseeing Action for Lumber International Trade Investigations (“Coalition”) (hereinafter, “Petition”), Vol. III, at 2 (Nov.25, 2016).

² The history of these challenges is chronicled by Daowei Zhang in his book, see *THE SOFTWOOD LUMBER WAR: POLITICS, ECONOMICS, AND THE LONG U.S.-CANADIAN TRADE DISPUTE* (2007).

³ See, e.g., *Certain Softwood Lumber Products From Canada*, 66 Fed. Reg. 43,186, 43,196 (USDOC Aug. 17, 2001) (Lumber IV Investigation Prelim. Determination); *Certain Softwood Lumber Products from Canada*, 67 Fed. Reg. 15,545 (USDOC Apr. 2, 2002) (Lumber IV Investigation Final Determination) and accompanying Issues and Decision Memorandum at 34.

⁴ 19 C.F.R. § 351.511(a)(2)(i).

⁵ Petition, Vol. III, at 31-32.

⁶ “TDA” is the abbreviation for “Timber Damage Assessment.” This name refers to the primary use of these data—to serve as a basis for informing the compensation rate for removal of timber related to

Continued on next page

4 | brattle.com

dispute (Lumber IV), the NAFTA Panel found that the USDOC failed to demonstrate that the TDA transaction data are unreliable for benchmarking purposes.⁷

The Government of Alberta requested that we determine whether calculations using the TDA transaction data can serve as an in-jurisdiction benchmark for the stumpage fees paid for the harvest of standing timber on Crown lands. We conclude that log prices in Alberta are not depressed as a result of the Crown stumpage system and, if anything, the Crown system results in higher log prices than would arise under a private timber market. We further conclude that the TDA transaction data can be used to calculate an in-jurisdiction benchmark for stumpage dues. Specifically, we find that:

- The Province of Alberta has not enacted any policies for economic purposes or social objectives that increase the output of logs or lumber above the levels that would be observed in a private market;
- Prices in the Alberta log market are, if anything, higher than those that would prevail if the province's timberlands were instead in private hands because Crown stumpage dues act like a tax on log production; and
- Subtracting the appropriate costs from the log prices observed in the TDA transaction data to determine implied stumpage rates provides a conservative (relative to the position of the Province) estimate of the average stumpage rates that would prevail in a private timber market, thereby serving as an in-market benchmark.

Our conclusions focus only on the availability of an appropriate in-jurisdiction benchmark and we have not been asked to evaluate whether the Province is providing the right to harvest timber from Crown lands at "less than adequate remuneration."

The remainder of the paper is organized as follows: In Section III, we review the role of benchmarking for purposes of detecting a subsidy by a trading partner. In Section IV, we provide background on the Alberta softwood timber market. In Section V, we consider whether the Province enforces policies, such as minimum production requirements or import restrictions,

Continued from previous page

conflicting rights on Crown lands, such as those for subsurface industrial operations—but does *not* mean that only damaged timber are included in the data. See Section VII.

⁷ *Certain Softwood Lumber Products from Canada Final Affirmative Countervailing Duty Determination*, USA-CDA-2002-1904-03, Decision of the Panel at 24 (Binational NAFTA Panel June 7, 2004).

that encourage overproduction (and thereby lower prices) in the timber, log, or lumber markets. In Section VI, we explain why prices under the Crown stumpage dues regime are likely to be higher, not lower, than those arising under a private timberland system. In Section VII, we describe the most comprehensive source of data on Alberta log prices and transactions, the TDA transaction data. Lastly, in Section VIII, we provide a general framework for how the TDA transaction data can be used in a benchmarking exercise. The documents that we rely on for these opinions are listed in Appendix B.

III. The Role of Benchmarking

USDOC regulations state that a countervailable benefit exists to the extent that goods are provided by a government for less than adequate remuneration.⁸ The regulations state that the preferred approach (known as “Tier 1”) for determining the adequacy of remuneration compares the government price to a market-determined price for the good resulting from actual transactions in the jurisdiction.⁹ If there is no suitable Tier 1 price, then a “Tier 2” approach compares the government price to a “world market price” that is reasonably available to purchasers in the jurisdiction.¹⁰ If there is no such world market price available to purchasers in the jurisdiction, then a “Tier 3” approach assesses whether the government price is “consistent with market principles.”¹¹

The Province of Alberta proposes using a Tier 1, in-market benchmark based on prices in the local log market as reflected in the TDA transaction data. For these prices to serve as an appropriate Tier 1 benchmark, the log prices that are observed in the market must approximate those that would be observed under a private timber market, rather than reflect the effects of government-set prices. Alternatively, if log prices under the Crown system are higher than they would be under a private timber market, then in-province log prices would serve as a conservative benchmark.

⁸ 19 C.F.R. § 351.511(a)(1).

⁹ 19 C.F.R. § 351.511(a)(2)(i).

¹⁰ 19 C.F.R. § 351.511(a)(2)(ii).

¹¹ 19 C.F.R. § 351.511(a)(2)(iii).

In the following sections, we demonstrate that Alberta log prices as reflected in the TDA transaction data do provide a conservative basis for calculating a benchmark for Crown stumpage fees. After offering an overview of the Alberta softwood timber industry, we show that the Province does not induce uneconomic log market output and that the volumetric stumpage dues levied by the Province have, if anything, a tendency to raise, not lower, log prices above those that would arise under a private timber market. Then, we present the most comprehensive source for Alberta log market prices, the TDA transaction data. We conclude by presenting a general framework that uses these data to calculate average residual value.

Use of an internal benchmark for Crown timber is necessary to obtain reliable estimates of the average residual value. Economic or econometric models derived using data from other regions are unable to capture important and unique features of the Alberta timber industry. For example, Alberta's forests, because of their northern location, produce smaller trees that grow more slowly than those in more southern locations. Alberta's forests also include less commercial tree species variation than forests elsewhere. Alberta's forests are not served by as extensive a transportation network as other regions and thus face a transportation disadvantage to certain lumber markets.¹²

The obstacles to reliance on other regions as benchmarks have been addressed in the academic literature. For example, Leefers and Potter-Witter (2006) estimate a model of federal and state stumpage rates for Michigan, Minnesota, and Wisconsin.¹³ Their model is called a "hedonic pricing model," which is a standard econometric technique for modeling the price of a product using its features as control variables. Though they account for many features of the timberland and the contract agreements, they caution that:

Hedonic pricing models are not readily adaptable to other market situations without re-estimation of coefficients [that is, estimating a new model in the other market]... [M]arkets dominated by Crown lands have very different structures, and models would have to be estimated accordingly.¹⁴

¹² Rod Simpson, MNP LLP, "Cross Border Analysis of Stumpage and Log Prices in Alberta and Six Other Jurisdictions," March, 2017.

¹³ Larry A. Leefers and Karen Potter-Witter, *Timber Sale Characteristics and Competition for Public Lands Stumpage: A Case Study from the Lake States*, 52 FOREST SCI. 460, 460-467 (2006).

¹⁴ *Id.* at 467.

They conclude by stating that “U.S. market-based estimates have a number of weaknesses and nuances that are not easily extended to new geographic regions.”¹⁵ Instead, they propose estimating the residual value of timber, as we do here, stating that “[t]he residual value method... is more suited to areas with little competition [for standing timber],” as is the case in Alberta.¹⁶

This point is echoed by Yang and Kant (2008), who state that:

Direct cross-border comparison of timber prices does not provide theoretically sound evidence on the existence of subsidies on timber prices in Canada. The obvious reason... are [sic] that the comparison ignores the wide differences in timber characteristics, locational characteristics, operating costs, and [sic] sales conditions, and the size of the forestland... that vary significantly between and even within jurisdictions throughout the United States and Canada that affects [sic] the local stumpage prices.¹⁷

Thus, these academic studies support the conclusion that the use of an in-jurisdiction benchmark is essential to accurately evaluate whether the stumpage system in Alberta results in timber being provided for “less than adequate remuneration.”

IV. The Alberta Softwood Timber Market

In this section, we provide an overview of the Alberta softwood timber market, describe the extent of Provincial ownership of timberlands, and discuss the responsibilities of operators leasing Crown lands.

A. PRODUCTION AND EXPORTS

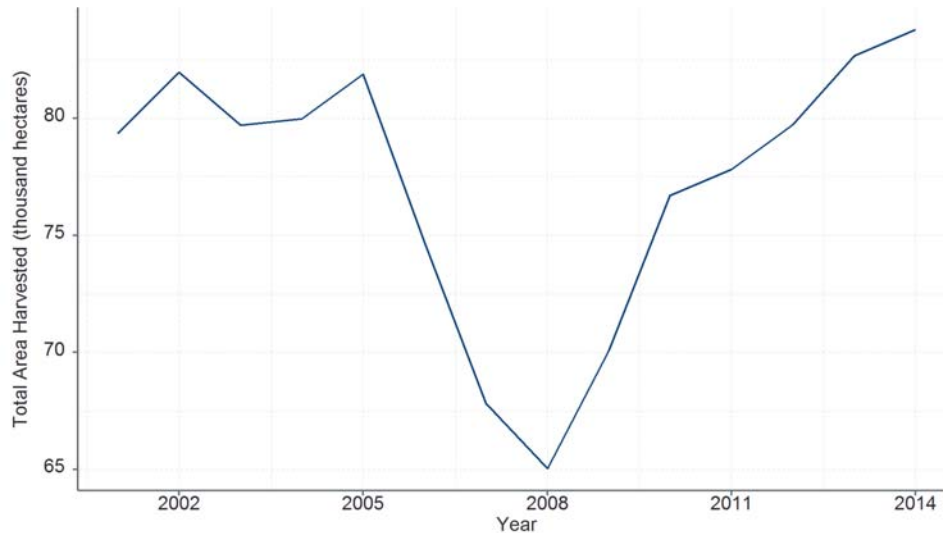
Softwood lumber is derived from coniferous trees, primarily including spruce, pine, and fir species in Alberta. It is commonly used in residential construction, notably in the form of 2”x4” framing lumber.

¹⁵ *Id.* at 467.

¹⁶ *Id.* at 467.

¹⁷ Feng’e Yang and Shashi Kant, *Rent Capture Analysis of Ontario’s Stumpage System Using an Enhanced Parity Bounds Model*, 84 LAND ECON. 667, 670 (2008) (internal citations omitted).

To produce lumber, standing timber is harvested and turned into logs, then delivered to mills. As shown in Figure 1, the annual area of softwood timber harvested in Alberta was around 80,000 hectares in 2001, fell during the Great Recession, and returned to its earlier levels by 2013.¹⁸



Source: National Forestry Database, Canadian Forest Service, *Alberta Forest Products – Softwood*, http://nfdp.ccfm.org/dynamic_report/dynamic_report_ui_e.php, (accessed Oct. 20, 2016).

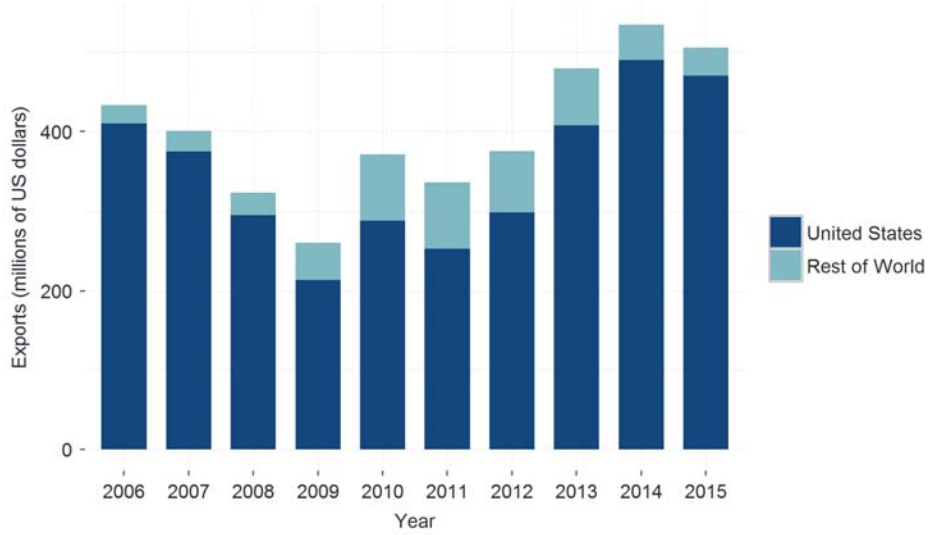
Figure 1. Total area of softwood timber harvest in Alberta, 2001-2014

Softwood lumber is exported from Alberta and the majority of these exports are destined for the U.S. In 2015, 40% of Alberta lumber shipments by volume was exported to the U.S.¹⁹ Figure 2 shows that the amount exported to the U.S. fell during the Great Recession and the concomitant decrease in residential home construction and increased when construction rebounded. Some of

¹⁸ The impact of the U.S. Great Recession was most directly felt in the softwood lumber industry through declines in new residential construction. New construction began falling in the U.S. in 2006 and hit its lowest level in 2010. As of 2015, new housing starts remained below 2005 levels. (U.S. Census Bureau. *New Housing Units Under Construction*, https://www.census.gov/construction/nrc/historical_data/index.html (accessed Dec. 8, 2016).

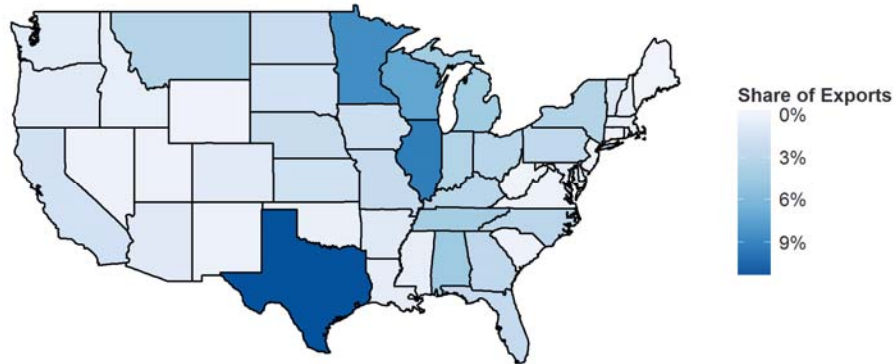
¹⁹ Source for Alberta shipments to the U.S.: Global Affairs Canada, *Softwood Lumber: Monthly Export Reports (Canada-US)*, http://www.international.gc.ca/controls-controles/softwood-bois_oeuvre/recent_reports-rapports_recents.aspx?lang=eng, (accessed Jan. 3, 2016); Source for total Alberta Shipments: Statistics Canada, *Lumber Production, Shipments, and Stocks*, <http://www5.statcan.gc.ca/cansim/a26?id=3030064&retrLang=eng&lang=eng>, (accessed Jan. 3, 2016).

the lumber sent to the U.S. stays in the northern part of the country, but the largest share heads to Texas, as seen in the map of Figure 3.



Source: Trade Data Online, Canada Innovation, Science and Economic Development, *Alberta Exports, Product 4407* <https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?&productType=HS6&lang=eng>, (accessed Oct. 4, 2016).

Figure 2. Exports of Alberta softwood lumber by destination, 2006-2015



Source: Trade Data Online, Canada Innovation, Science and Economic Development, *Alberta Exports, Product 4407* <https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?&productType=HS6&lang=eng>, (accessed Oct. 4, 2016).

Figure 3. Share of U.S. imports of Alberta softwood lumber by state, 2006-2015 average

B. SOFTWOOD TIMBER HARVESTS ON CROWN LANDS

Based on harvests reported to the Government of Alberta, 98% of softwood timber harvested in Alberta came from Crown lands from 2006 through 2014.²⁰ Different parcels of Crown lands are governed under different contractual terms known as “tenures.” The largest volume of timber is harvested under tenure known as Forest Management Agreements (“FMAs”). There were 20 FMAs in 2015 that represented 70.1% of the Crown timber harvest. Under an FMA, a tenure holder has the right to harvest the standing timber on a given parcel and must manage and harvest that timber in accordance with plans filed with the Province and Provincial regulations.²¹ Another type of tenure, Coniferous Timber Quotas (“quotas”), is based on harvested volume, rather than area.²² There were 91 coniferous timber quotas in the province in addition to 42 deciduous timber quotas.²³ Commercial Timber Permits (“CTPs”) are also volume-based. There were 197 coniferous and deciduous CTPs active in 2015 and the coniferous CTPs include permits issued under the Coniferous Community Timber Program.²⁴ Quotas and FMAs are both generally 20-year agreements that can be renewed, while CTPs are relatively short-term. Table 1 compares these tenure types.

Figure 4 maps the FMAs and shows the locations of the 64 sawmills in Alberta that received coniferous timber in 2015. There are 44 small mills (annual volumes of timber less than 100,000 cubic meters), 13 moderately-sized mills (annual volumes greater than 100,000, but less than 1,000,000 cubic meters), and 7 large mills (annual volumes greater than 1,000,000 cubic meters). An additional 107 existing mills received no coniferous timber volume in 2015.

²⁰ National Forestry Database, Canadian Forest Service, *Alberta Forest Products – Softwood* http://nfdp.ccfm.org/dynamic_report/dynamic_report_ui_e.php, (accessed Sept. 14, 2016).

²¹ See generally, the Alberta Forests Act, R.S.A. 2000 C. F-22 (“Forests Act”) and the Timber Management Regulations, Alberta Regulation 60/1973 (as updated by AR 62/2013).

²² Though quotas could be area-based, none currently are.

²³ Information provided by Alberta Agriculture and Forestry.

²⁴ Information provided by Alberta Agriculture and Forestry.

Table 1. Comparison of rights and obligations for primary commercial coniferous forest tenure types

	Forest Management Agreement	Coniferous Timber Quota	Commercial Timber Permit
Term	20 years, renewable after 8 years	20 year, renewable	1 to 5 years, non-renewable
Allocation Base	Area	Volume, Area	Volume
Relative Size	FMA areas vary between 84,307 ha and 6,552,051 ha	Average is 49,400 m ³	Generally under 5,000 m ³
Timber Rights	Standing Timber	Harvested Coniferous Timber	Harvested Timber
Forest Management Planning (FMP) Responsibility	Yes	No, the FMA holder or the government are responsible	No, the FMA holder or the government are responsible
Annual Operating Plan (AOP) Responsibility	Yes	Yes	Yes
Harvest Authority	FMA with approved FMP & AOP	Timber Licence, AOP	Timber Permit, AOP
Forest Inventory Responsibility	Yes	No	No
Assessed Holding & Protection Charges	Yes	Yes	Yes
Reforestation Responsibility	Yes	Yes, if quota is 10,000 m ³ or greater. If under 10,000 m ³ , quota holder can reforest or pay reforestation levy in lieu	Unless also an FMA and/or quota holder who otherwise reforests, No, must pay reforestation levy in lieu
% of 2015 Commercial Coniferous Harvest Volume	70.1%	27.8%	1.8%

Source: Alberta Agriculture and Forestry

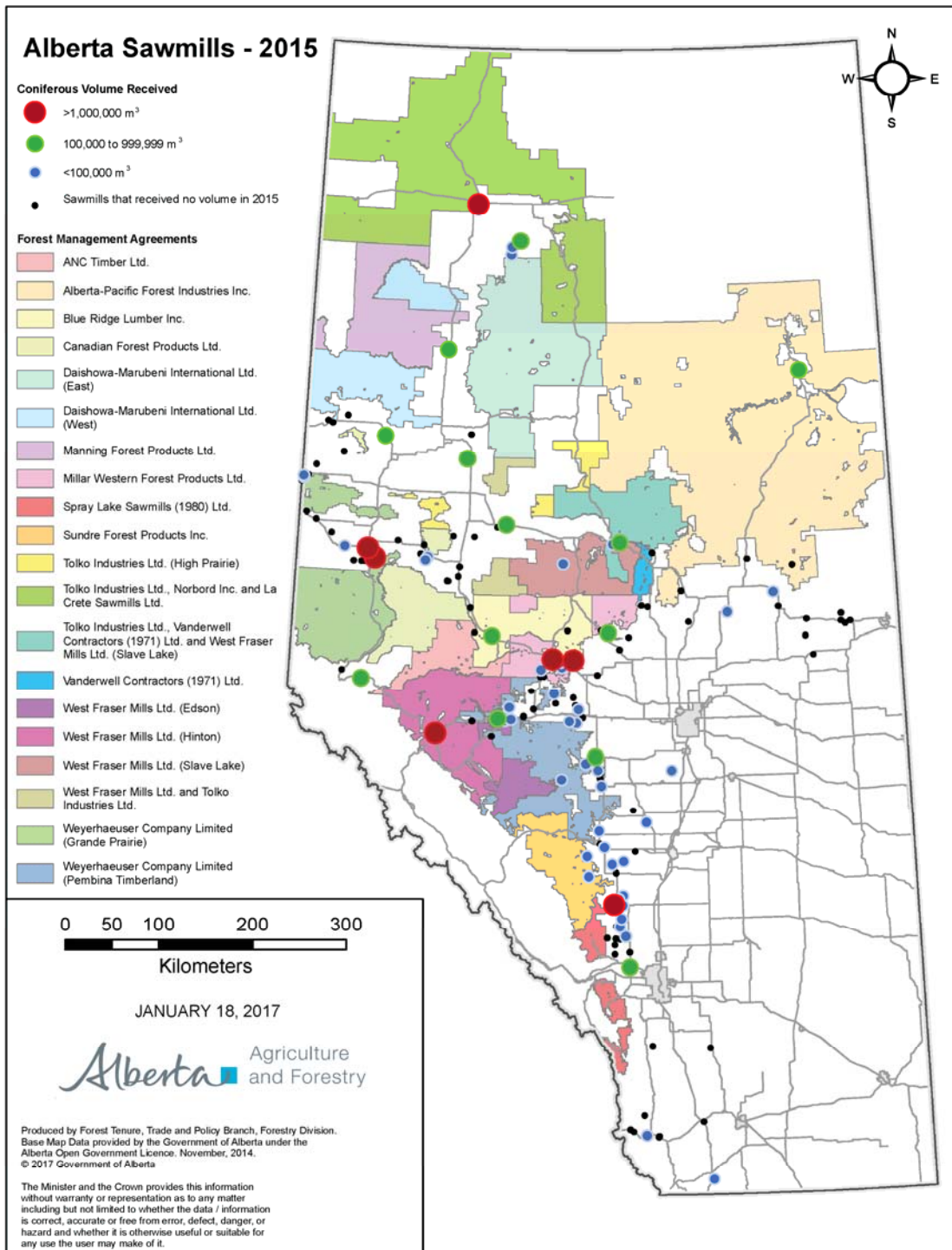


Figure 4. Alberta mills and FMA holders

The FMAs grant the FMA holders the right to harvest timber from Crown lands through their tenure agreements, but these agreements also impose obligations as defined by Alberta's Acts, regulations, standards, policy directives, and procedures to ensure that the Province's forests are managed in a manner consistent with sustainable forestry practices and principles. Operationally, these objectives are articulated in Forest Management Plans that are submitted by the FMA holder in accordance with the Alberta Forest Management Planning Standard and with input from the public and other stakeholders. The Forest Management Plans are subsequently approved by the Province.

FMA holders incur significant costs executing the approved plans. These costs would otherwise be borne by Alberta as the landowner and are often referred to as in-kind costs. They include, but are not limited to:

- Primary and secondary road construction and maintenance;
- Basic reforestation and reforestation levies;
- Forest management and planning;
- Forest inventory;
- Environmental protection;
- Fire, insect, and disease prevention;
- Land use and overlapping tenure administration; and
- Log scaling.

In a private timber market, these costs are typically paid by the landowner, rather than the harvester. Thus, to compare the prevailing Crown stumpage rates in Alberta to those in a private timber market, one must consider both the direct payments to the Crown (*i.e.*, stumpage dues and Holding and Protection charges) as well as the in-kind costs paid by the tenure holder in Alberta that would be paid by the landowner in the private market. The in-kind costs may even exceed the direct stumpage fees charged by the Province.

Indeed, in the *Lumber IV* 3rd Administrative Review, the USDOC recognized that at least the first six of the categories listed above are related to the harvest of timber on Crown lands and

ought to be included as an adjustment to the stumpage dues and Holding and Protection charges.²⁵

V. The Province of Alberta Does Not Manipulate Timber or Log Output

In considering the impact of Provincial regulations on the timber, log, or lumber markets, we first ask whether the Province implements policies designed to directly control output in any of these markets. Specifically, we consider the “policies and practices that inhibit market response” outlined in the USDOC Policy Bulletin, which include:

- Appurtenancy requirements that tenure holders and mills be integrated;
- Minimum cut requirements;
- Mill closure restrictions;
- Long-term, non-transferrable tenure;
- Minimum processing requirements; and
- Offsetting provincial actions.²⁶

In short, we find that the Province does not follow any of these policies or any others designed to uneconomically increase output in the timber or log markets.

A. ANY MINIMUM PRODUCTION OR PROCESSING REQUIREMENTS HAVE NOT BEEN ENFORCED

Minimum production requirements could be used to encourage uneconomic overproduction and thereby drive log prices below those that would arise in a private market. Through revisions to the Timber Management Regulation in 1996, all provisions containing minimum cut controls were removed. Despite a legacy reference in the Forests Act enabling the invoking of penalties for failure to cut the authorized volume of timber or the timber on the authorized amount of forest land during a quadrant, the Province has informed us that there have not been any

²⁵ *Certain Softwood Lumber Products From Canada*, 71 Fed. Reg. 33,932, 33,951 (USDOC June 12, 2006) (Lumber IV 3rd Admin. Review Prelim. Results).

²⁶ *Proposed Policies Regarding the Conduct of Changed Circumstance Reviews of the Countervailing Duty Order on Softwood Lumber from Canada (C 122 839)*, 68 Fed. Reg. 37,456, 37,457 (USDOC June 24, 2003).

enforcement actions based on these clauses.^{27, 28} We conclude that there is no evidence that the Province is using minimum production requirements to generate overproduction.

To illustrate that tenure holders are not affected by minimum production clauses, we examine the harvest-to-annual allowable cut (“AAC,” discussed further below) ratio (“utilization”) for each FMA and quota holder by quadrant from FY2001 to FY2015. We find utilization levels of 10% or less for 18.4% of quadrant-tenure observations and more than one-third (36.1%) had utilization below 50%.²⁹ Thus, we find that a substantial fraction of tenure holders produced substantially below approved levels without having their contracts revoked or otherwise being disciplined by the Province. Accordingly, we conclude that the Province is not using minimum production requirements to encourage uneconomic and excessive levels of production.

B. THE ANNUAL ALLOWABLE CUT IS DRIVEN BY ECOLOGICAL FACTORS TO ENSURE SUSTAINABLE HARVESTS RATHER THAN TO ENCOURAGE ADDITIONAL PRODUCTION

As part of its harvest oversight responsibilities, the Province approves an annual allowable cut (“AAC”) level that establishes the maximum harvest permitted by a tenure holder.³⁰ The AAC is set to ensure that the harvest is sustainable, which can be affected by factors that include:

- “Forest inventory, growth and yield data;
- The area available for timber harvest (i.e., changes and additions to provincial parks and other reserved areas);
- Forest Management Agreement (FMA) and [Forest Management Unit] FMU boundaries;
- Calculation procedures and models;
- Catastrophic events, such as wildfire, insects and diseases; or
- Management strategies.”³¹

²⁷ See Alberta Forests Act, § 25 (“Non-compliance”).

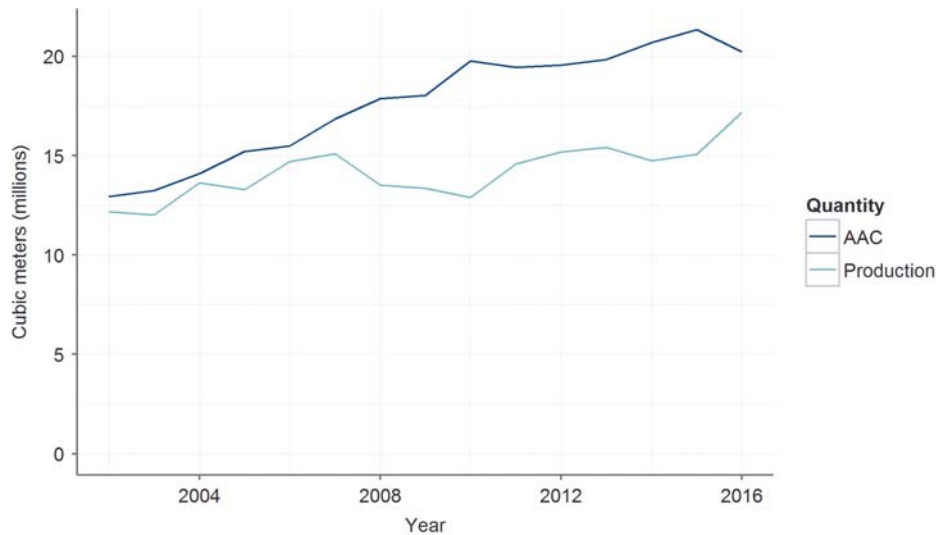
²⁸ A “quadrant” is a five-year harvest planning window for the tenure holder (five years is one-quarter of a twenty year contract term).

²⁹ Data provided by Alberta Agriculture and Forestry.

³⁰ For an FMA or quota tenure holder, the AAC that is enforced is defined over a quadrant, though a target maximum cut is established for each year within the quadrant.

³¹ Alberta Agriculture and Forestry, SUSTAINABLE FOREST MANAGEMENT 2014 FACTS & STATISTICS: ANNUAL ALLOWABLE CUT 1(2016).

These sustainability goals have not served to interfere with the overall production levels of tenure holders in Alberta. If this had been the case, then the AAC should serve as a binding constraint, but, to the contrary, actual production levels have been notably below the AAC, as shown in Figure 5.³² The amount of timber cut is a function of market forces and, because the AAC is not a measure of how many trees are economic to cut, we do not necessarily expect production to exhaust the AAC. For example, the AAC could include timber far from existing or planned roads or from mills, lower-quality timber, or timber in difficult terrain. Thus, the gap between production and the AAC does not imply that the Province is using the AAC to encourage overproduction nor has the AAC been a binding constraint on production over the past decade.



Source: Alberta Agriculture and Forestry.

Figure 5. Coniferous FMA and quota AAC and volume harvested on Crown lands, FY2001-FY2015

³² AAC has risen largely in response to an increased threat of mountain pine beetle infestation. *See id.* at 7 (“Alberta is implementing a strategy to reduce the area of pine trees at greatest risk of insect infestation... Removing the most susceptible stands will help slow the spread of beetles and reduce the impact on Alberta’s forest.”).

C. MILLS HAVE BEEN ALLOWED TO CLOSE OR REDUCE OUTPUT

Another way the Province could encourage overproduction of lumber is by forcing mills to stay open when it is uneconomic to do so. To the contrary, we observe many mills reducing capacity or temporarily or permanently shuttering operations, especially at the height of the Great Recession. A list of these closures and curtailments is given in Table 2. Relatedly, Alberta does not have any appurtenancy restrictions that require logging and milling operations to be integrated when the companies would prefer to be independent, which would reduce the economic efficiency of production and could lead to overproduction. As with the minimum production requirements discussed above, we do not find evidence that the Province is pursuing policies to encourage overproduction of logs or lumber.

Table 2. Alberta mill closures and curtailments, 2007-2015

Year	Company	Details	Impact on Production
2007	Ainsworth Lumber Co. LTD. – Grande Prairie OSB Mill	Production curtailment (1 week)	Estimated 10 Million sf (3/8" basis) of lost OSB production annually
	Boucher Bros. Lumber Ltd. – Nampa Sawmill	Production curtailment (50% of capacity)	20 Million fbm of lost lumber production annually
	Footner Forest Products Ltd./Ainsworth Lumber Co. LTD. – High Level OSB Mill	Mill closure	700 Million sf (3/8" basis) of lost OSB production annually
	Tolko High Level Saw Mill	Indefinite production curtailment from three shifts down to two shifts per 24 hour period	Estimated 60 Million fbm of lost lumber production annually
	Tolko Slave Lake OSB Mill #1	Original six week shutdown extended indefinitely effective March 27, 2007	240 Million sf (3/8" basis) of lost OSB production annually
	West Fraser – Hinton Sawmill Mill	Indefinite shutdown of weekend shift	Estimated 72 Million fbm of lumber production lost annually
	Weyerhaeuser – Claresholm I-joist Plant	Mill closure	Estimated 30 Million fbm of lost production annually
2008	Ainsworth Lumber Co. LTD. – Grande Prairie OSB Mill	Production curtailments (5 weeks in total)	Estimated 54 Million sf (3/8" basis) of lost OSB production annually
	Boucher Bros. Lumber Ltd. – Nampa Sawmill	Production curtailment (50% of capacity)	20 Million fbm of lost lumber production annually
	Canfor - Grande Prairie Sawmill	Production Curtailment to 4 days a week	46 Million fbm of lost lumber production annually
	Millar Western - Fox Creek	Mill destroyed by fire	60 Million fbm of lost lumber production annually
	Slave Lake Pulp	Production Curtailment to 65% capacity for 6 months	Estimated 40,000 ADMT of lost BCTMP production annually
	St. Jean Lumber	Permanent Mill Closure	Equivalent of 14.5 Million fbm of lost lumber production annually
	Tolko – High Level Sawmill	Production Curtailment	13.5 Million fbm of lost lumber production annually
2009	Vanderwell Contractors	Production Curtailment from two shifts to one shift	Estimated 60 Million fbm of lost lumber production annually
	Weyerhaeuser – Drayton Valley OSB Mill	Mill closure	415 Million sf (3/8" basis) of lost OSB production annually
	Alberta Newsprint Company – Whitecourt	Extended 3 Week Maintenance Shutdown	Approximately 15 thousand tonnes of pulp (BCTMP) production annually
	Canfor - Grande Prairie	Production Curtailment (2 weeks)	6 Million fbm of lumber production annually
	DMI – Peace River	1 Week Shutdown	Approximately 6 thousand tonnes of pulp production annually
	Foothills Forest Products Ltd. – Grande Cache	Sawmill Production Curtailment (down from 80hr to 50hr week)	39 Million fbm of lumber production annually
	Millar Western – Boyle	Sawmill Production Curtailment (down from 2 to 1 shift)	72 Million fbm of lumber production annually
	Millar Western - Edmonton	Head Office	n/a
	Millar Western – Whitecourt	Production Curtailment (down from 3 to 2 shifts)	108 Million fbm of lumber production annually
	Millar Western – Whitecourt	Indefinite Production Curtailment from 25,000 mt/month to 15,000 mt/month	Approximately 120 thousand tonnes of pulp (BCTMP) production annually
	Slave Lake Pulp – Slave Lake	Indefinite Production Curtailment	Approximately 30 thousand tonnes of pulp (BCTMP) production annually
	Tolko - High Level	Original 2 Week Shutdown Extended to April 20, 2009	83 Million fbm of lumber production annually
	Tolko – Slave Lake (#2)	Plant Shutdown	750 million sf (3/8" basis) of (rated capacity) OSB/OSL production annually
Weyerhaeuser – Edson	Indefinite 29% Production Curtailment	124 million sf (3/8" basis) of (rated capacity) OSB/OSL production annually	
Weyerhaeuser – Grande Prairie	Extended 4 Week Maintenance Shutdown	Approximately 28 thousand tonnes of pulp (BCTMP) production annually	
2015	Millar Western Forest Products – Boyle	Indefinite closure	Less than 100,000 cubic meters annually

Source: Alberta Mill Closure and Curtailment Announcements (2007-2015)

D. THE PROVINCE HAS NOT PREVENTED TENURE ACQUISITION ACTIVITY

The Government of Canada has not prevented mergers and acquisitions between companies with coniferous tenures in Alberta, including mergers with or acquisitions by international firms, nor has the Province of Alberta prevented reassignment of tenures between companies. Examples of such tenure sales are given in Table 3. Mergers and acquisitions may be important activities in a well-functioning market. In particular, they offer ways for an acquiring company to enter a market or for a selling company to exit one. Relatedly, as we discuss further in Section V.E, tenure holders are able to sell standing timber to one another. Hypothetically, the Province could limit transfers of tenure rights in order to affect the number and identities of mills operating in the Province, but we do not find evidence of such manipulation. We conclude that the Province is not preventing companies from re-allocating tenure assignments and standing timber based on market forces.

Table 3. Coniferous tenure acquisition activity in Alberta, 2012-2016

Year	Seller	Buyer	Tenure Type	Total Coniferous	
				AAC (m ³)	AAC (m ³)
2016	St. Jean Lumber (1984) Ltd.	Ed Bobocel Lumber (1993) Ltd.	Quota	23,811	
2015	Millar Western Forest Products Ltd.	Northland Forest Products Ltd.	Quota	303,217	
2015	Mitsubishi Corp., Oji Holdings	Hokuetsu Kishu Paper Co. Ltd.	FMA	836,761	
2015	Manning Diversified Forest Products Ltd.	West Fraser Mills Ltd.	FMA	570,833	
2015	1025849 Alberta Ltd.	Precision Forest Industries Ltd.	Quota	3,500	
2015	Stella-Jones Canada Ltd.	Balcaen Consolidated Contractors Ltd.	Quota	13,810	
2015	Fort Assiniboine Lumber Ltd.	Spruceland Millworks Inc.	Quota	5,941	
2014	Rocky Wood Preservers Ltd.	Sundre Forest Products Inc. (West Fraser Mills Ltd.)	Quota	96,308	
2014	Lakeshore Timber Company Ltd.	West Fraser Mills Ltd.	Quota	15,986	
2014	Edson Timber Products Ltd.	Brisco Wood Preservers Ltd.	Quota	5,940	
2014	1113341 Alberta Ltd	West Fraser Mills Ltd.	Quota	15,924	
2014	Spruceland Millworks Inc.	Vanderwell Contractors (1971) Ltd.	Quota	17,634	
2014	Edson Community Harvesting Operation	West Fraser Mills Ltd.	Quota	14,974	
2014	Gordon Buchanan Enterprises Ltd.	West Fraser Mills Ltd.	FMA/Quota	407,488	
2014	Cold Creek Timber Ltd.	Millar Western Forest Products Ltd.	Quota	10,000	
2013	Ventnor Enterprises Inc.	Evergreen Lumber Inc.	Quota	9,955	
2013	Vanderwell Contractors (1971) Ltd.	Spruceland Millworks Inc.	Quota	19,977	
2012	Sundance Forest Industries Ltd.	West Fraser Mills Ltd.	FMA	795,129	
2012	Gray, Franklin	Sundre Forest Products Inc. (West Fraser Mills Ltd.)	Quota	8,190	

Source: Alberta Agriculture and Forestry

E. THOUGH LONG-TERM TENURE CONTRACTS ARE TIED TO MARKET CONDITIONS AND ASSOCIATED TIMBER CAN BE RESOLD

A hypothetical concern is that the twenty year length of FMA leases distorts the allocation of timber resources. This issue is alleviated by two factors. First, under its agreement, a tenure holder can sell Crown timber by virtue of its tenure rights to other companies to harvest.³³ Thus, the tenure holder can resell its timber, perhaps to a company that is more efficient or otherwise better able to extract value from the timber. In this way, although the tenure holder operates under a long-term contract, it can resell the standing timber to another company, eliminating any theoretical inefficiency of the contract.³⁴ Further, the long-term tenure agreement reduces uncertainty for the tenure holder, which increases the tenure holder's willingness to invest in the parcel and actually encourages the tenure holder to maintain a sustainable harvest.³⁵ Second, the timber dues are not fixed during the length of the tenure; rather, they vary from month-to-month based on the market index for lumber, as we discuss further below.

Crown stumpage dues payments by FMA or quota tenure holders include two primary components.³⁶ The first is a flat annual fee that is based on the area of the FMA called a "holding and forest protection charge." The second and larger component is a volumetric charge per cubic meter harvested from the parcel called "timber dues." The Holding and Protection charge was originally designed as a charge for holding the timber stumpage right and for a portion of the land base's protection costs. For all practical purposes, the monies collected through this charge are now only part of the overall revenues derived from commercial timber use. Today, timber dues serve as the primary royalty for harvesting Crown timber.

³³ These transactions are recorded in the TDA transaction data.

³⁴ For these same reasons, offering FMA holders the right of first refusal for renewing the agreement also does not distort the efficiency of the market.

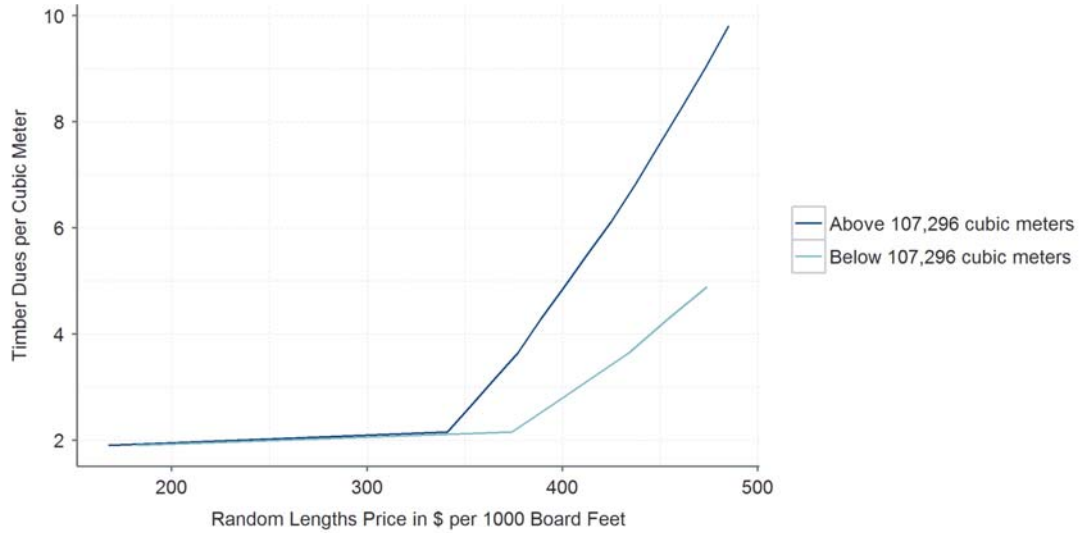
³⁵ As an example, Brown et al. (2012) find that "each additional year on a timber-sale contract increased [Minnesota state] stumpage prices by 4%. In addition to the opportunity to enhance state treasury revenue, timber-sale contracts spanning several years benefit logging businesses by providing added flexibility in managing their timber portfolio to respond to changing market conditions, and their inventory of purchased stumpage." Ross N. Brown, Michael A. Kilgore, Jay S. Coggins, and Charles R. Blinn, *The Impact of Timber-Sale Tract, Policy, and Administrative Characteristics on State Stumpage Prices: An Econometric Analysis*, 21 FOREST POLICY & ECON., 71, 79 (2002) (internal citation omitted).

³⁶ Note that tenure holders are required to make other payments to the Crown and incur other costs as part of their tenure agreements.

Timber dues for timber of standard quality are calculated based on a schedule referenced in the tenure contract and found in Schedule 3 of the Timber Management Regulation. It currently uses the price index for “western spruce, pine, and fir that is kiln-dried, random lengths, 2”x4”, #2 and better” calculated and published by Random Lengths, a company that aggregates information about the lumber industry.³⁷ The value of the index translates into a timber dues charge per cubic meter of timber harvested, as shown by the relationship in Figure 6. The charges per cubic meter are different for the first 107,296 cubic meters of annual harvest and for additional production above this level.

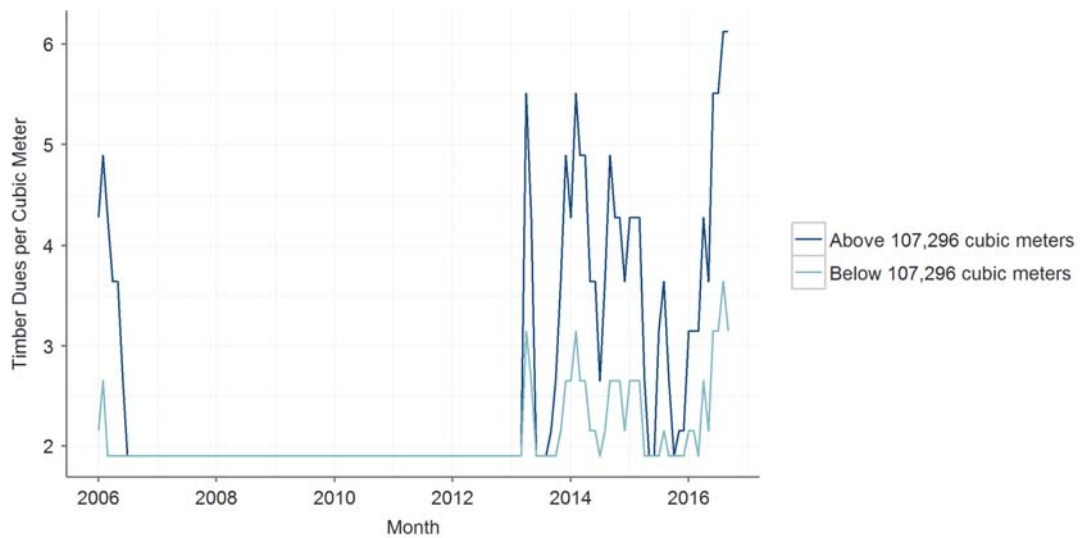
Thus, despite a contract length of 20 years, the stumpage dues paid by a tenure holder vary over the course of the contract in response to market conditions. For example, the Random Lengths index price fell during the Great Recession, when residential construction and the associated demand for lumber fell, and the resulting stumpage dues reached its minimum value. As demand began to rebound, timber dues increased, as seen in Figure 7. This figure demonstrates that Crown timber dues reflect market forces and are not fixed over the life of a tenure.

³⁷ Sched. 3 ¶ (a)(1), Timber Management Regulations (as updated by AR 62/2013). Prior to 2010, timber dues were based on the “standard and better” price index, which was discontinued in that year.



Source: Timber Management Regulation (as updated by AR 62/2013)

Figure 6. Timber dues as a function of the Random Lengths index price (up to index price of \$500)



Source: Alberta timber dues letters.

Figure 7. Prevailing timber dues, 2006-2016

F. THE PROVINCE DOES NOT RESTRICT LOG EXPORTS OR IMPORTS

We examine the Province's log import and export policies to determine whether the Province uses these mechanisms to influence log output. We do not observe the Province using import or export policies to either induce or suppress production in Alberta. Rather, the import and export policies are largely aimed at protecting the integrity and sustainability of Alberta's forests by ensuring compliance with AACs and keeping out invasive pests.

1. Export Policies are Administrative and Designed to Ensure Compliance with AACs

Section 31 of Alberta's Forests Act regulates the export of softwood logs harvested from Alberta Crown lands. Timber harvested from private land is not subject to provincial export regulations. If the logs harvested from Crown land are intended for export, then the disposition holder must submit an application to Alberta requesting authorization to export the harvested timber. A letter from the applicant indicating the specified disposition(s), species, volume, product, and destination of the timber to be exported serves as the application. There is no fee or tax associated with the export of Alberta logs.

In recent years, Alberta has not denied any export authorization applications.³⁸ For example, in 2015, Alberta received 12 export authorization applications for softwood logs. All 12 were approved. Alberta had also approved an additional 5 export authorizations for softwood logs from Alberta prior to the start of 2015 that remained valid during part of the year. In total, 294,786 cubic meters of coniferous volume from Alberta was authorized for export and 144,587 cubic meters were ultimately shipped during that year, all of which were destined for British Columbia.³⁹ There have been no commercial exports of logs to the U.S. since 2005.⁴⁰

³⁸ Information provided by Alberta Agriculture and Forestry.

³⁹ Information provided by Alberta Agriculture and Forestry.

⁴⁰ The logs exported to the U.S. were shipped to Montana in 2002-2005. The vast majority of these logs were from timber killed during a large fire in the Province in the early 2000s. Fire-killed wood is lighter, making its transportation to the U.S. more economical than standard logs.

2. Import Policies are Designed to Keep Out Forest Pests

The Crown also retains the authority to approve log imports under the Timber Management Regulation 164.1. The primary purpose of these authorizations is to guard against importation of pests that may infest Alberta forests. Those wanting to import products that meet the criteria of regulated coniferous forest products must apply for and obtain approval in writing from the Province at least 3 months prior to importation. The Province may withhold its approval if, in its opinion, the importation or movement of the product could cause or increase the damage to forest growth by insects or disease. If approval is granted, however, there is no requirement for the importer to report the actual volume imported.⁴¹

In 2015, Alberta approved 7 import requests for softwood logs.⁴² Alberta also approved an additional import request for softwood logs prior to the start of 2015 that remained valid during a portion of the year. With the exception of pulp logs imported by Weyerhaeuser, the other importers are not usual participants in the forest products industry and the volume and species (*e.g.*, Douglas fir, cedar, and hemlock) delineated in the applications suggest that these imports are not used as inputs to commercial sawmilling operations, but rather most likely used in log home building, furniture making, or woodworking.

VI. The Crown Stumpage System Tends to Raise Log Prices, Not Lower Them

In this section, we discuss how standard economic models of supply and demand can be used to compare outcomes under the Crown stumpage system to those that would arise in a market with private timberland ownership. In particular, we show that the Crown stumpage system, if anything, tends to raise prices in the log market, rather than lower them. As we will discuss in Section 0, this makes the prices observed in the Alberta log market a conservative (*i.e.*, upwardly-biased) benchmark against which to compare Provincial stumpage dues.

⁴¹ The export process is different in this regard. It is the interest of the Province to ensure accurate accounting of volume of timber harvested from Crown land for the purposes of sustainability (*i.e.*, ensuring compliance with AACs) and revenue (accurate assessment of timber dues).

⁴² Information provided by Alberta Agriculture and Forestry.

A. DEMAND FOR LOGS IS DRIVEN BY A BROADER LUMBER MARKET

Lumber producers demand logs for purposes of milling them into lumber. The price that they are willing to pay for logs will be driven primarily by the price that they can receive for the resulting lumber. Thus, to understand the demand for logs, it is important to consider the price that Alberta mills receive for lumber.

Though logs generally do not travel far from where they are cut, lumber is often shipped much longer distances. For example, we show in Figure 3 that much of Alberta's softwood lumber exported to the U.S. travels to Texas. This indicates that lumber produced in Alberta is sold in a broad geographic market that extends beyond the borders of the province and even those of Canada. Of course, lumber produced in many other regions is also sold in this broad market. As a result, Alberta lumber competes with lumber produced in other Canadian provinces and several timber-producing regions in the United States. The price of lumber in this broad market is determined not only—and not even primarily—by the supply of lumber from Alberta, but also by the supply of lumber from various other timber regions. This implies that lumber prices are determined by forces outside the Province's control. Because log demand is determined by lumber prices, the Province cannot exert influence on the demand for logs.

B. LOG SUPPLY AND DEMAND IN A MARKET WITH PRIVATE TIMBERLAND OWNERSHIP

The log market is reasonably competitive and we can apply standard supply and demand analysis to assess the price and quantity of logs that would arise in "equilibrium," that is, as determined by economic forces. Figure 8 shows the log market equilibrium under a private standing timber market regime.⁴³

⁴³ In this simplified exposition, all logs are assumed to sell for the same price. This can be considered a quality- and species-adjusted price in a more realistic context. Further, this exposition assumes that all logs are delivered to the mill gate; again, this can be considered a delivered-equivalent price.

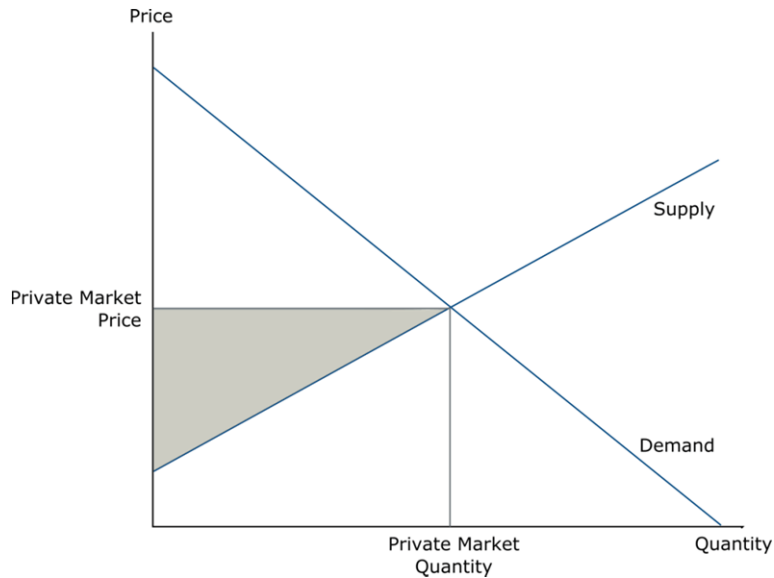


Figure 8. Equilibrium log price and quantity in a private standing timber market

Mill demand for those logs is a function of the costs of milling them into lumber and the price that mills can obtain for finished lumber in the international market. Recall from the previous section that the demand for logs by mills is driven primarily by the price of finished lumber, which is set in a market much broader than the province of Alberta. Given this international lumber price, some mills will find it profitable to produce lumber and others will not. This difference could arise because firms employ different milling technologies (based partly on the age of the mill) or because of differences in the distances that logs and lumber need to be shipped to and from the mill. Additionally, a mill might experience “decreasing returns to scale,” whereby costs increase with the amount of lumber that the mill produces, partly because labor is more expensive when mills are operated for longer periods (due to overtime payments, for example) and increased maintenance costs from continual operation. These explanations are consistent with the standard economics result known as the “law of demand,” which states that demand is downward-sloping; that is, as the price of logs increases, mills demand fewer logs.⁴⁴

⁴⁴ To the extent that there are not returns to scale or productivity differences between mills, then the demand curve will mostly be driven by lumber prices, which, because Alberta mills are a piece of a much broader market, are unaffected by the lumber output of these mills. In this case, the demand curve will be relatively “flat” (*i.e.*, very elastic or sensitive to price).

The supply of logs is a function of the costs of harvesting and transporting logs. The supply of logs is upward-sloping because some timber, both within a particular parcel and across parcels, is more costly to harvest and transport than others. For example, some parcels are further from mills, while others are closer and some trees within a parcel are close to a road, while others are up a hillside and more difficult to access.

This supply curve does *not* reflect the price charged by landowners for standing timber.⁴⁵ Instead, this price is determined by the surplus obtained for each log, which is the difference between the selling price of that log and the cost of harvesting and transporting it. In Figure 8, this surplus is shaded gray. The surplus is split between the harvester and the landowner based on each party's next-best alternative.⁴⁶ For assessing outcomes in the log market, the division of this surplus between the parties is not important, as it does not affect market prices and quantities.

Notice that the surplus is large for some logs and close to zero for others. Harvesters are willing to cut and landowners are willing to sell standing timber until the costs of delivering that timber to the mill just equal the value of the log.⁴⁷ Thus, the value of standing timber varies from tree-to-tree and diminishes to nothing for the least profitable trees harvested.

⁴⁵ In this discussion, the “landowner” is the party that owns the land and the “harvester” is the party that harvests the timber and delivers it to a mill. In the actual market, multiple parties may be involved in harvesting and delivering timber to a mill, but separation of these roles does not alter our overall conclusions.

⁴⁶ For example, consider a landowner selling timber to a very efficient and productive harvester—that is, a harvester with lower costs than its competitors. If the landowner sold the timber to a competitor, the surplus would be smaller because the harvesting costs would be higher. Thus, the landowner is willing to accept a smaller share of the surplus and the harvester is able to obtain a financial return on its productivity. This is called “Nash bargaining” in the economic literature.

⁴⁷ This may not be possible if the sustainable level of harvest caps the harvest at level where the least profitable tree that may be cut still generates a surplus. As shown in Figure 5 in Section V.B, however, the AAC does not appear to bind the market and thus this is less likely to be a concern.

C. LOG SUPPLY AND DEMAND UNDER THE CROWN STUMPAGE SYSTEM

In contrast, under Provincial ownership, the stumpage charged by the Province is the same for any cubic meter of volume harvested irrespective of the surplus that it generates.⁴⁸ This situation is shown in Figure 9.⁴⁹ As discussed in Section VI.A, the demand for logs is independent of Provincial policies and it remains unchanged from Figure 8. Under this system, the supply curve *does* include the Crown stumpage dues because it is a constant amount for each tree, resulting in a parallel, upward shift in the supply curve. Rather than splitting the surplus for a given tree with the landowner, the harvester pays a fixed amount irrespective of the size of those gains.⁵⁰ The difference between the price of the log and the cost of harvesting and transporting the log plus Crown stumpage is kept entirely by the harvester. The equilibrium price and quantity in this market are given by P and Q in the figure respectively. The dark gray quadrilateral is the stumpage collected by the Province. For reference, the supply and surplus in the private timber market are kept in this figure in faded colors.⁵¹

For the cheapest logs to harvest and transport, up to point A in Figure 9, the stumpage charged by the Province is less than the surplus that those logs would generate in a private standing timber market.⁵² For the logs between A and Q, Crown stumpage is higher than the surplus that would arise for those logs in a private standing timber market. Logs between Q and B would be harvested in a private standing timber market, but, because of the fixed nature of the Crown's stumpage, they are not harvested under the Crown system. As a result, quantities are lower and prices are higher under the Crown system.

⁴⁸ The tenure holder is also required to pay a fixed Holding and Protection charge. Because this does not vary with output (that is, it is a fixed costs), it does not influence the supply curve. Certain indirect costs are a function of output and must be considered part of the Crown stumpage rate along with stumpage dues. For further discussion, see Section IV.B.

⁴⁹ For purposes of our analysis here, we assume that all timber is harvested from Crown lands. This is a simplification, but allows us to qualitatively illustrate the impact of the Crown stumpage regime.

⁵⁰ Here, the "landowner" is the Crown and the "harvester" is the tenure holder, who is assumed to harvest and deliver the timber to a mill. As above, these roles could be separated without changing our fundamental conclusions.

⁵¹ The old supply curve still represents the costs of harvesting and transporting logs in this market, excluding Crown stumpage dues.

⁵² This is seen by noting that the faded triangle extends above the quadrilateral for these logs.

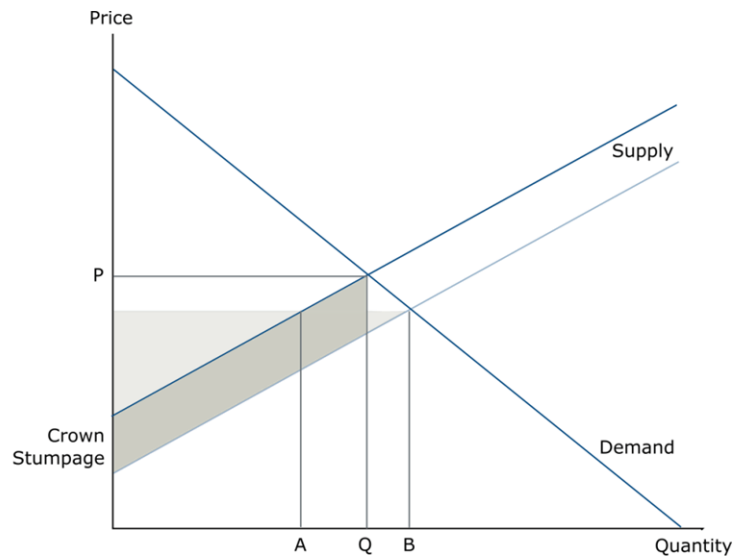


Figure 9. Equilibrium log price and quantity under Crown ownership of timberlands

Taken to an extreme, leaving low-quality trees uncut is called “high-grading.” In discussing the BC stumpage system at the time, Grafton et al. (1998) state that:

Charges were calculated for individual species and then applied to the harvested volume within that stand. The system had a number of weaknesses and led to ‘high-grading’ whereby firms harvest only those trees that provide a net return equal to or in excess of the stumpage, leaving trees, often damaged behind.⁵³

They mention that “[t]his problem arises with any levy where charges are based on the volume harvested.”⁵⁴ Boscolo and Vincent (2007) call this “the standard result” of volume-based charges.⁵⁵

Reduced output and increased prices in the log market do not arise because Crown stumpage is higher or lower than average payments to landowners than in a purely private timber market. Instead, these changes arise because Crown stumpage dues are higher than payments to

⁵³ Grafton et al., *supra* note **Error! Bookmark not defined.** at S44, (internal citations omitted).

⁵⁴ Grafton et al., *supra* note **Error! Bookmark not defined.** at n.3.

⁵⁵ Marco Boscolo and Jeffrey R. Vincent, *Area Fees and Logging in Tropical Timber Concessions*, 12 ENV’T & DEV. ECON. 505, 509 (2007).

landowners for the *marginal* tree—that is, the tree that is just able to cover its harvesting and transportation costs. As discussed above, both the landowner and the harvester have incentives to cut a tree with no surplus (or, perhaps, a minimal amount) so long as the costs can be recuperated. Thus, because the Crown charges any amount for these marginal trees, they are no longer economic to harvest, reducing the quantity supplied and raising prices.

To reiterate, to determine how the level of Crown stumpage dues affects the log and timber markets, Crown stumpage dues must be compared to the surplus arising from the *marginal* tree, not the average tree. Thus, even if Crown stumpage dues are lower than the average surplus generated by timber in the private market, what matters for market outcomes is the comparison between the level of Crown stumpage and the surplus from the least profitable tree harvested. Thus, under the appropriate comparison, *any* level of Crown stumpage exceeds the surplus of the marginal tree, which reduces timber and log output and *raises* log prices.⁵⁶

Logs, of course, are necessary for the production of lumber. Because the Crown stumpage system tends to increase log prices and decrease the quantity supplied, less lumber would be produced in Alberta under the Crown system than in a private timber market. Thus, the Crown stumpage system cannot be used to export more lumber than economically justified in a private Alberta timber market or, more generally, to provide an advantage to the domestic lumber industry relative to competitors in other markets.

D. AN ANALOGY TO THE EFFECTS OF GOVERNMENT TAXES

In the preceding two sections, we showed that Crown stumpage dues tend to increase prices and reduce output in the log market. The reason is because stumpage payments in a private market are a share of the surplus arising from the timber harvest, whereas stumpage dues under the Crown system are a fixed amount and independent of the surplus generated by the harvest.

⁵⁶ The quantity of logs sold would not be affected if the demand for logs was perfectly inelastic; that is, if mills demand the same quantity of logs irrespective of price. In this circumstance, only price would increase. At the other extreme, the price of logs would not change if the demand for logs was perfectly elastic; that is, mills are willing to pay the same price for any quantity of logs delivered. In this circumstance, only quantity would be affected. These are extreme cases and unlikely to arise in practice, but both would reduce the competitiveness of the Alberta lumber industry.

Our conclusions have a natural parallel to the economic consequences of taxes. The Crown stumpage dues system is akin to a standard volume-based tax system. For example, in the United States, the federal government levies a tax of \$3.40 per gallon on sparkling wine, which is about 67 cents per bottle. Though consumers may pay \$10 for an inexpensive bottle of sparkling wine, the retailer retains only \$9.33 (that is, \$10 less the \$0.67 tax, ignoring state taxes) and “[i]t is irrelevant to the suppliers how much consumers pay per gallon; all that matters to suppliers is the amount they receive per gallon.”⁵⁷ Because the effective price that suppliers receive is lower, the supply curve shifts downward—that is, at any price paid by consumers, suppliers are willing to offer less sparkling wine than they would absent the tax. Thus, in the face of the shifted supply curve,

[t]he tax makes consumers worse off because [...] the new price they face is higher than the original price... But the consumers’ price does not increase by the full amount of the tax... Producers also pay part of the tax in the form of a lower price received per gallon... Thus, the tax makes both producers and consumers worse off.⁵⁸

As a parallel, in the case of the Crown stumpage regime, log prices are higher than under a private stumpage system because the Crown timber dues are higher than the stumpage payment for the *marginal* log under a private system. Because of this difference, fewer logs are produced and log buyers (*i.e.*, the mills) are worse off because they pay higher prices and receive fewer logs.⁵⁹ This result holds whether the harvester and the mill are independent or integrated.

In a private timber market, landowners and harvesters split the surplus that arises from the logs—that is, they split the difference between the sale price of the logs and the total costs of harvesting those logs. This surplus is called economic profits. Here, the landowner’s share of the surplus is akin to a tax on economic profits. Such a tax is perfectly efficient from an economic perspective:

[a]s long as a firm maximizes economic profits, a tax on them induces no adjustments in firm behavior—all decisions regarding prices and production are

⁵⁷ Harvey S. Rosen, PUBLIC FINANCE 279 (7th ed. 2005).

⁵⁸ *Id.* at 280-281.

⁵⁹ Whether log sellers (*i.e.*, the harvesters) are worse off depends upon how the surplus from the logs would be split under the private system.

unchanged... [B]y virtue of the fact that the tax leaves behavior unchanged, it generates no misallocation of resources [*i.e.*, it is perfectly efficient].⁶⁰

This result arises because a firm's decisions from maximizing pre-tax profits are identical to those from maximizing post-tax profits.

In summary, a tax system based on volume sold is less economically efficient than a tax based on economic profits because it increases prices and reduces quantity sold. By analogy, the log market under the Crown stumpage system is less efficient than under a private timberland system because log prices are higher and quantities sold are lower. The analogy to government tax systems confirms our analysis of the Alberta log market outlined above.

VII. The TDA Transaction Data

In the previous section, we demonstrated that log prices under the Crown stumpage system are higher than they would be under a private timberland system. As a result, actual log transaction prices serve as an upper bound for those that would be observed under a private timber system. In this section, we discuss the most complete database of log transactions and prices in the province: the TDA transaction data. Then, in the following section, we discuss how these data can be used as the basis for an in-market benchmarking exercise.

A. SOURCE OF THE TDA TRANSACTION DATA

The Province leases the right to cut timber from its lands, but that is not the only resource that the government leases from its lands. Other dispositions leased by the Province include mineral, oil, and gas rights and access rights for pipelines. Parties holding these non-timber dispositions may come into conflict with timber rights holders—that is, trees may need to be removed in order to access subsurface deposits. The removal of trees to grant access for overlapping disposition holders is called “timber damage.” Note that this name does not imply that the timber itself is damaged for commercial sale. Under the Province's agreements, FMA holders are due compensation for the loss of timber or improvements made by the FMA holder.⁶¹

⁶⁰ Rosen, *supra* note 57 at 435.

⁶¹ Alberta Forests Act § 16(2).

The compensation due to the FMA holder is negotiated with the conflicting disposition holder. To facilitate setting these prices, an independent authority, the Joint Energy/Utility and Forest Industry Management Committee (“JMC”), surveys mills representing a substantial proportion of timber harvested in the province to collect information on arm’s length standing timber and log transactions, as well as the costs of harvesting and transporting logs.⁶² In 2015, the companies that responded to the survey represented 78.7% of the coniferous timber harvest in the province.⁶³ Note that this survey represents all arm’s length transactions at these mills, not just timber damage and includes timber harvested from both Crown and private lands. Consequently, this is the most complete data set on log prices in the Province. These are the TDA transaction data. The JMC provides an annual summary of implied standing timber and log values using these transactions that can be used by the holders of competing dispositions to establish reasonable compensation to the FMA holder. The parties are encouraged to undertake their own research and use the JMC summaries to arrive at prices that best fit their specific circumstances.

B. TDA TRANSACTION DATA SUMMARY STATISTICS

Table 4 shows the volumes of coniferous log transactions included in the TDA transaction data from 2012 through 2015. Most transactions in the data involve logs delivered to a mill, though transactions involving “decked” logs (that is, logs that have been cut, but not transported from the roadside) and standing timber are also recorded. The 2015 averages are based on responses from 21 of 27 mills surveyed. Across the four years, there are over 1,300 transactions per year in the data, which is more than sufficient to perform statistical analysis using these data.

Table 5 shows the average prices corresponding to the volumes in Table 4. It must be reiterated that these transactions are between independent, private parties and thus represent prices

⁶² Though logs constituting the TDA transaction data may have been harvested from Crown lands, the transactions themselves must be between two private parties. The timber may be on Crown lands, but it is sold by the tenure holder by virtue of its tenure rights and not sold by the Province. Standing timber transaction prices are net of any stumpage dues owed to the Province (*i.e.*, stumpage is not included as part of the transaction payment). In 2015, the data also permit calculation of a value gross of (*i.e.*, inclusive of) stumpage costs. These gross payments are needed for the approach proposed in Section VIII.B.

⁶³ Though the reporting companies represent nearly 80% of the coniferous timber harvest, the transactions reported as part of the TDA represent 11.7% of the harvest.

established by willing participants independent of government intervention. These data are not collected by the Province nor are these prices used by the Province to set any price or fee.

Table 4. Volume of coniferous log transactions in the TDA transaction data by sales type

Year	Volume (thousands m ³)			Total
	Delivered to the mill	Logged and skidded into decks	Standing, on the stump	
2012	1,514.0	96.1	123.3	1,733.3
2013	1,554.7	11.4	44.5	1,610.7
2014	1,552.2	78.6	112.9	1,743.6
2015	1,814.1	52.5	6.2	1,872.7

Source: Letter from Rod Simpson to Murray Anderson, Re: Timber Damage Assessment (TDA) Table—2016 Update Apr. 27, 2016

Table 5. Volume-weighted average price (\$CAD) of coniferous log transactions in the TDA transaction data by sales type

Year	Price per cubic meter		
	Delivered to the mill	Logged and skidded into decks	Standing, on the stump
2012	40.1	19.6	6.31
2013	40.8	23.5	9.4
2014	43.7	31.0	7.4
2015	47.7	21.8	10.4

Source: Letter from Rod Simpson to Murray Anderson, Re: Timber Damage Assessment (TDA) Table—2016 Update, Apr. 27, 2016

VIII. Cost-Adjusted Alberta Log Prices from the TDA Transaction Data Provide a Conservative Estimate of the Value of Standing Timber

In this section, we discuss how the TDA transaction data can be used as part of an in-market benchmarking analysis.

A. REACTION TO THE USE OF THE TDA TRANSACTION DATA IN PAST PROCEEDINGS

A comparison based on the TDA transaction data falls into the most preferred benchmarking category, that of in-market benchmarks. The USDOC rejected this comparison in the past and instead used prices in various other jurisdictions in its own analysis.⁶⁴ In response to directives from the NAFTA Panel, the USDOC also produced analysis using the TDA transaction data.⁶⁵ In discussing the use of the TDA transaction data as a source for a benchmark analysis, the Binational NAFTA Panel stated that “[i]t does not appear from the briefs of the parties that there is a serious challenge to the [TDA transaction] data, and there is no substantial evidence for the [USDOC] to have rejected the use of this data.”⁶⁶

B. GENERAL FORMULATION OF THE BENCHMARKING CALCULATION

Consider a hypothetical example in which Alberta timberlands are largely in private hands and that landowners are in a strong negotiating position relative to harvesters, such that the

⁶⁴ See, e.g., *Certain Softwood Lumber Products From Canada*, 69 Fed. Reg. 33,204, 33,214 (USDOC June 12, 2004) (Lumber IV 1st Admin. Review Prelim. Results); *Certain Softwood Lumber Products From Canada*, 69 Fed. Reg. 75,917 (USDOC Dec. 20, 2004) (Lumber IV 1st Admin. Review Final Results) and accompanying Issues and Decision Memorandum at 64-66; *Certain Softwood Lumber Products from Canada*, 70 Fed. Reg. 33,088, 33,099 (USDOC June 7, 2005) (Lumber IV 2nd Admin. Review Prelim. Results); *Certain Softwood Lumber Products From Canada*, 70 Fed. Reg. 73,448 (USDOC Dec. 12, 2005) (Lumber IV 2nd Admin. Review Final Results) and accompanying Issues and Decision Memorandum at 40-42; *Certain Softwood Lumber Products From Canada*, 71 Fed. Reg. 33,932-33,941 (USDOC June 12, 2006) (Lumber IV 3rd Admin. Review Prelim. Results).

⁶⁵ See, e.g., *Certain Softwood Lumber from Canada*, Final Affirmative Countervailing Duty Determination USA-CDA-2002-1904-03, Remand Determination at 14 (USDOC Jan. 12, 2004); *Certain Softwood Lumber from Canada*, Final Affirmative Countervailing Duty Determination, Second Remand Determination, USA-CDA-2002-1904-03, Second Remand Determination at 8-9 (USDOC July 30, 2004).

⁶⁶ *Certain Softwood Lumber Products from Canada*, Final Affirmative Countervailing Duty Determination, USA-CDA-2002-1904-03, Decision of the Panel at 24 (Binational NAFTA Panel June 7, 2004).

landowners could extract nearly all the shaded surplus shown in Figure 8, leaving harvesters with only enough to cover their fixed costs of operation.⁶⁷ Thus, the rents received by the harvesters would be zero. Rents in this context are defined as:^{68,69}

$$\begin{aligned} \text{Economic profit} &= \text{Revenues from log sales} \\ &\quad - \text{Harvesting costs} \\ &\quad - \text{Transportation costs} \\ &\quad - \text{Timber dues, in-kind costs, and other Crown} \\ &\quad \quad \text{fees or charges related to the harvest of} \\ &\quad \quad \text{Crown timber ("total Crown charges")} \end{aligned}$$

This framework can be used to determine what the total Crown charges would need to be such that the rents received by the harvester would be zero given that the rights and responsibilities of tenure holders remain with the harvester and the rights and responsibilities of the Crown are shifted to the private landowner.⁷⁰ We can then compare this result to actual total Crown charges.

It is reasonable to assume that the costs would be the same under both regimes, as the costs of harvesting and transporting logs are unlikely to be affected by changes in ownership of the land. Prices, though, may be different. As discussed in Section VI, prices observed in the actual Alberta log market overstate the prices that would be observed in a private timberland regime. Thus, were we to calculate average rents by subtracting average costs from the log price observed in the TDA transaction data, we would overstate average residual value.⁷¹ Again, this overstatement arises because log prices under the Crown stumpage system will be higher than those that would

⁶⁷ To the extent that landowners are unable to capture the entire surplus, then the “netting out” calculation discussed in this section overstates the stumpage rates that would arise in a private market.

⁶⁸ Relatedly, Grafton et al. define this quantity (which they call a Ricardian rent) as “the revenue from harvesting trees less all economic costs, an allowance for risk, conservation costs, depreciation, and a normal rate of return for capital.” Grafton et al., *supra* note **Error! Bookmark not defined.** at S45.

⁶⁹ The specific calculation will depend on whether the tenure holder (or purchaser of private standing timber) provides its own harvesting and transportation services or those services are contracted.

⁷⁰ As above, the “harvester” in the context of the Crown system is the tenure holder and the party that harvests and delivers the timber to a mill. Contracting these services out does not change our conclusions. Maintaining the rights and responsibilities of the tenure holder implies that the harvester still bears the in-kind costs and does not bear any additional costs.

⁷¹ Average revenue (where the average is taken over the volume produced) is just the log price. This calculation requires using TDA transaction data gross of stumpage payments.

arise if timberlands were privately held. Furthermore, this calculation presumes that the harvester is not able to capture any of the surplus from the harvest, which is an additional conservative (relative to the position of the Province) assumption.

As a result, we conclude that use of the TDA transaction data in the calculation above provides a conservative (relative to the position of the Province) estimate of the average residual value that would arise in a privatized timber market and that would be split between the harvester and landowner.

Appendix A

MARK P. BERKMAN

Principal

San Francisco, CA

+1.415.217.1000

Mark.Berkman@brattle.com

Dr. Mark P. Berkman is an expert in applied microeconomics. His experience spans the areas of the environment, energy, and natural resources; environmental health and safety; labor and employment; intellectual property; antitrust; commercial litigation and damages; and public finance. He has assisted both public and private clients and provided testimony before state and federal courts, arbitration panels, regulatory bodies, and legislatures.

His environmental work has involved the review of proposed air, water, solid waste, and worker and product safety regulations. Dr. Berkman has quantified the costs and benefits of these regulations, as well as toxic tort and product liability claims. In addition, he has valued natural and water resources as well as property damages associated with pollution from Superfund sites, landfills, and power plants.

His work on energy matters includes the valuation of coal resources, power plants, and transmission rights-of-way. He has also prepared energy demand and price forecasts. He has extensive experience working with Native American tribes on energy valuation matters.

Dr. Berkman has also been involved in several Lanham Act cases where he has determined the value of consumer product characteristics. The products include food, wine, electronic devices, cosmetics, and software. Clients in a variety of industries ranging from computer chip to shoe manufacturers have sought Dr. Berkman's assistance to value patents, trade secrets, and trademarks. He has also been called on to address questions of market power in antitrust proceedings in a variety of industries including solid waste, computer manufacturing, and medical devices. He has testified regarding market definition and market power and participated in Hart-Scott-Rodino proceedings.

Dr. Berkman also has substantial experience in labor and discrimination litigation. He has conducted statistical analyses of alleged discrimination in hiring, promotion, pay, and contracting, and completed damage analyses regarding these allegations. He has also conducted statistical analyses regarding mortgage lending discrimination.

Prior to joining Brattle he was a co-founder and director at Berkeley Economic Consulting and a vice president at both Charles River Associates and NERA Economic Consulting.

AREAS OF EXPERTISE

- Antitrust/Competition
- Commercial Damages
- Environmental Litigation and Regulation
- Intellectual Property
- Product Liability
- Utility Regulatory Policy and Ratemaking

MARK P. BERKMAN

- Employment and Discrimination

EDUCATION

- University of Pennsylvania, Wharton School – Ph.D. in Public Policy Analysis – Managerial Science and Applied Economics
- Harvard University – M.A. in Planning, Policy Analysis and Administration
- George Washington University, B.A. in Economics and Urban Affairs

EXPERIENCE

- 2008 – 2010: Director, *Berkeley Economic Consulting*
Responsible for managing and conducting projects in the areas of environment, energy, intellectual property, antitrust, labor, and public finance
- 2002 – 2008: Vice President, *Charles River Associates*
- 1993 – 2002: Vice President, *NERA Economic Consulting*
- 1988 – 1993: Senior Consultant, *NERA Economic Consulting*
- 1984 – 1988: Senior Analyst, *NERA Economic Consulting*
- 1983 – 1984: Economic Analyst, *NERA Economic Consulting*
- 1980 – 1983: Research Fellow, *University of Pennsylvania*
- 1977 – 1980: Associate Budget Analyst, *Congressional Budget Office*
- 1976 – 1977: Teaching Assistant, *Harvard University*
- 1975 – 1976: Research Assistant, *The Urban Institute*
- 1973 – 1975: Staff Assistant, *United States Congress, Office of Congressman Charles Vanik*

PROFESSIONAL AFFILIATIONS

- American Economic Association
- Association for Public Policy Analysis and Management
- Association of Environmental and Resource Economists
- Western Economic Association

PUBLICATIONS

- “Produced Water — Emerging Challenges, Risks, and Opportunities,” with Earl Hagström, et al., *Environmental Claims Journal*, Vol. 28, No. 2 2016 pp. 122-139.
- “The Legal and Economic Implications of Hydraulic Fracturing Bans,” with Earl Hagström, ed. Donna L. Drogos, in *Hydraulic Fracturing: Environmental Issues*, 181-196. Washington, DC:

MARK P. BERKMAN

American Chemical Society, 2015. [DOI:10.1021/bk-2015-1216.ch008](https://doi.org/10.1021/bk-2015-1216.ch008)

- “Electricity – Water Nexus: Is a Crisis Imminent?” *Water Policy* 17, no. 6 (2015): 1163-1175.
- “Reply to Comment on Effect of Coal-fired Power Generation on Visibility at a Nearby National Park.” *Atmospheric Environment*, 55 (2012) 297-298.
- “The Adverse Impact of Particulate Matter on Property Values,” with Kyle Hubbard and Timothy Savage, *International Real Estate Review*, available online at http://www.umac.mo/fba/irer/forth/irer_forth_IR1143%20.html.
- “Effect of Coal-Fired Power Generation on Visibility in a Nearby National Park,” with Jonathan Terhorst. *Atmospheric Environment*, 44 (2010) 2524-2531.
- “Estimating Toxic Tort and Environmental Damages,” with Gordon Rausser in Earl Hagström, editor, *Perchlorate, A Scientific, Legal, and Economic Assessment*, Tucson, AZ, Lawyers and Judges Publishing Co., March 2006.
- “The Airline Crisis and Labor: Negotiations Will Play a Key Role,” with Mark Kiefer and Robert Litan. TNR/ON, *The New Republic*, June 13, 2005, pp. 5–8.
- “What’s Wrong with America’s Airlines, and How Can It Be Fixed?” with Mark Kiefer and Robert Litan, TNR/ON, *The New Republic*, May 16, 2005, pp. 3–6.
- “Valuing Intellectual Property Assets for Licensing Transactions,” *The Licensing Journal*, Vol. 22, No. 4, April 2002.
- “Where is the Market Failure? A Review of OSHA’s Economic Analysis for Its Proposed Ergonomics Standard,” with Jesse David, *Journal of Labor Research*, Vol. XXII, No. 1, winter 2001.
- “Water Subsidies in Southern California: Do They Exist and Have They Contributed to Urban Sprawl? A Comment on an Article by Steven Erie and Pascale Joassart-Marcelli,” with Jesse David, *California Western Law Review*, Vol. 37, No. 1, fall 2000.
- “Complying with New Rules for Controlling Nitrogen Oxides Emissions,” With Jonathan Falk and John Wile, *The Electricity Journal*, January-February 2000, pp. 40–50.
- “The Regional Costs and Benefits of Acid Rain Control,” Dissertation, University of Pennsylvania, May 1991.
- “Valuing Flexibility in Utility Planning Using Dynamic Programming,” with J. Falk. *EPRI Proceedings from Conference on Decision Support Methods for the Electric Power Industry*, Cambridge, Mass., May 1990.

MARK P. BERKMAN

- “Environmental Regulation Will Affect Electric Utility Fuel Consumption Patterns,” *Energy*, August 1989.
- “Equal Time: Dunbar & Berkman Reply,” a reply to M. Crew and P. Kleindorfer, “Landfill Tipping Fees Should Be Much Higher,” *Waste Age*, February 1988, p. 134.
- “The Underpricing of Landfills,” with Fred Dunbar. *Viewpoint*, summer 1987, pp. 25–33.
- “Sanitary Landfills Are Too Cheap!” with Fred Dunbar. *Waste Age*, May 1987.
- “Regional Economic Trade-offs in Sulfur Emissions Control Policy,” with P. Blair. *Geographic Dimensions of Energy*, F. Calzonetti and B. Solomon, Dordrecht Holland: D. Reidel Publishing Co., 1985.
- “Regional Impacts of Federal Coal Policy,” with P. Blair, *International Journal of Energy Systems*, Vol. 4, No. 2, 1984.
- “Multiregional Analysis of Federal Coal Policy,” with P. Blair, *Journal of Resource Management and Technology*, Vol. 12, No. 2, April 1983.
- “Energy Development, Local Growth and the Federal Role,” Congressional Budget Office, Working Paper, Washington, D.C.: Government Printing Office, 1980.
- “The World Oil Market in the 80s: Implications for the United States,” with E. Erlich, Congressional Budget Office, Washington, D.C.: Government Printing Office, 1980.
- “An Evaluation of the Strategic Petroleum Reserve,” with B. Holt. Washington, D.C.: Government Printing Office, Committee Print 96 IFC, June 1980.
- “The Budgetary, Economic, and Energy Implications of Alternative Synthetic Fuel Proposals,” *Synthetic Fuels Report by the Subcommittee on Synthetic Fuel of the Committee on the Budget*, United States Senate, Washington, D.C.: Government Printing Office, September 1979.
- *Energy Conservation in Maine: Weatherization Improvements to the Existing Housing Stock*, Cambridge, Mass., Harvard University, June 1977.
- *An Evaluation of Solid Waste Disposal Options for Rockport, Massachusetts*, Cambridge, Mass., Harvard University, February 1977.
- “New Evidence on Racial Differences in Commuting Behavior,” with J. Goodman. *Journal of Public Data Use*, Vol. 5, No. 4, 1977.

MARK P. BERKMAN

TESTIMONY AND REPORTS

Environment, Energy, and Natural Resources

- Direct Testimony of Mark P. Berkman, PhD on behalf of NorthStar Decommissioning Holdings, LLC and Entergy, et.al, Docket No. 8880, December 16, 2016.
- Pennsylvania Power Plants' Contribution to the State Economy, with Dean Murphy prepared for the Pennsylvania Building and Construction Trade Council, the Pennsylvania Chamber of Business and Industry, Allegheny Conference on Community Development, and the Greater Philadelphia Chamber of Commerce, December 2016.
- "The Economic Impacts of Decommissioning Vermont Yankee: A Comparison of Two Approaches." Prepared for NorthStar and Entergy, December 16, 2016.
- Electricity Cost and Environmental Effects of Retiring the Quad Cities and Clinton Nuclear Plants with Dean Murphy, prepared for Chicagoland Chamber of Commerce, Illinois Hispanic Chamber of Commerce and Illinois Retail Merchants Association, October 2016.
- Response to Comments by Gregory House to Kern County California Regarding Agricultural Elements of the Willow Springs Solar Project, with Stephen Hamilton on behalf of First Solar, January 20, 2016.
- "New York's Upstate Nuclear Power Plants' Contribution to the State Economy," with Dean Murphy. Prepared for the New York State IBEW Utility Labor Council, the Rochester Building and Construction Trades Council and the Central and Northern New York Building and Construction Trades Council, December 2015.
- Testimony on behalf of the New Hampshire Public Utility Commission regarding the economic impacts associated with a proposed settlement enabling the divestiture of all remaining power plants by Public Service of New Hampshire, October, 2015.
- "Analysis for the Boston 2024 Proposed Summer Olympic Plans," with Coleman Bazelon, Steve Herscovici, and Pallavi Seth. Prepared for the Commonwealth of Massachusetts Office of the Governor, President of the Senate, and Speaker of the House. August 17, 2015.
- "The Nuclear Industry's Contribution to the U.S. Economy," with Dean Murphy. Prepared for Nuclear Matters, July 2015. (Additional studies were prepared for selected states including Arizona, New York, Ohio, and Pennsylvania).
- Deposition Testimony of Dr. Mark Berkman in the matter of The Chickasaw Nation and The Choctaw Nation v. United States Department of the Interior, *et al.*, United States District Court for the Western District of Oklahoma, No. Civ. 05-1524-W, on behalf of plaintiff's breach of trust claims, May 8, 2015.

MARK P. BERKMAN

- Deposition Testimony of Dr. Mark Berkman in the matter of Briggs, et.al vs. Freeport McMoran, et.al, United States District Court for the Western District of Oklahoma, Case No. 13-cv-1157-M, on behalf of plaintiffs regarding class certification, April 8, 2015.
- “Surviving the Storm,” with Bay Area Council Economic Institute, March 2015.
- Declaration of Dr. Mark Berkman in the matter of Briggs, et.al vs. Freeport McMoran, et.al, United States District Court for the Western District of Oklahoma, Case No. 13-cv-1157-M, on behalf of plaintiffs regarding class certification, February 23, 2015.
- Expert Report of Mark P. Berkman, PhD on behalf of The Chickasaw Nation and The Choctaw Nation v. United States Department of the Interior, *et al.*, United States District Court for the Western District of Oklahoma, No. Civ. 05-1524-W, on behalf of plaintiff’s breach of trust claims, January 15, 2015
- “Comments on the Draft Amendments to the Statewide Water Quality Control Plans to Control Trash: The Role of Polystyrene Bans,” with David Sunding. Prepared for Dart Container Corporation. August 5, 2014.
- “A Learning Investment-based Analysis of the Economic Potential for Offshore Wind: The case of the United States,” with Jurgen Weiss and Mark Sarro. Prepared for the Center for American Progress, the US Offshore Wind Collaborative, the Clean Energy States Alliance, and the Sierra Club. February 28, 2013.
- Expert Witness Report of Mark P. Berkman in C&A Carbone, Inc. et al v. The County of Rockland et al. New York Southern District Court 7:08-cv-06459-KMK, on behalf of plaintiff regarding the interstate nature of waste and recyclable materials, December 17, 2012.
- “The Employment Impacts of Proposed Tariffs on Chinese Manufactured Photovoltaic Cells and Modules.” With Lisa Cameron and Judy Chang. Prepared for the Coalition for Affordable Solar Energy, January 30, 2012.
- “Employment Impacts of the Proposed Bay Delta Conservation Plan Habitat Restoration Measures.” With David Sunding. Prepared for the Delta Habitat Conservation and Conveyance Program, November 3, 2011.
- “Economic and Fiscal Impacts of the Alta Wind Energy Center.” With Michelle Tran and Kyle Hubbard. Prepared for Alta Windpower Development, LLC, October 20, 2011.
- “Employment Impacts for Proposed Bay Delta Water Conveyance Tunnel Options.” With David Sunding and Michelle Tran. Prepared for the Metropolitan Water District of Southern California on behalf of the Delta Habitat Conservation and Conveyance Program, September 19, 2011.
- “Economic Analysis of SB568’s Proposed Polystyrene Ban.” With David Sunding. Prepared for Dart Container Corporation, August 15, 2011.

MARK P. BERKMAN

- Deposition Testimony of Mark P. Berkman on behalf of the West Bay Sanitary District in the matter of *San Francisco Baykeeper v. West Bay Sanitary District*, United States District Court for the Northern District of California, Case No. cv-09-5676-EMC, regarding water pollution damages, July 28, 2011.
- Rebuttal Expert Report of Mark P. Berkman on behalf of West Bay Sanitary District in the matter of *San Francisco Baykeeper v. West Bay Sanitary District*, United States District Court for the Northern District of California, Case No. cv-09-5676-EMC, regarding water pollution damages, June 2011.
- “Economic and Fiscal Impacts of the Desert Sunlight Solar Farm.” With Michelle Tran and Wesley Ahlgren. Prepared for First Solar, May 2011.
- “Economic and Fiscal Impacts of the Topaz Solar Farm.” With Michelle Tran and Stephen Hamilton. Prepared for First Solar, March 2011.
- Rebuttal Testimony of Mark P. Berkman and David L. Sunding in the Matter of the Application of California American Water Company (U 210 W) for a Certificate of Convenience and Necessity to Construct and Operate its Coastal Water Supply Project to Resolve the Long-Term Water Supply Deficit in its Monterey District and to Recover all Present and Future Costs in Connection Therewith in Rates, Application 04009-019, on behalf of the Marina Coast Water District regarding the benefits of a regional water supply project, May 27, 2010.
- Declaration of Mark P. Berkman, PhD in Support of Real Party in Interest Potrero Hills Landfill, Inc.’s Memorandum of Points and Authorities in Opposition to Petition for Writ of Mandate, Sierra Club vs. County of Solano: Board of Supervisors of Solano County: and Does 1-10, Superior Court of the State of California, County of Solano, Case No. FCS034073, regarding the interstate nature of waste disposal, December 9, 2009.
- Direct Testimony of Mark P. Berkman and David L. Sunding in the Matter of the Application of California American Water Company (U 210 W) for a Certificate of Convenience and Necessity to Construct and Operate its Coastal Water Supply Project to Resolve the Long-Term Water Supply Deficit in its Monterey District and to Recover all Present and Future Costs in Connection Therewith in Rates, Application 04009-019, on behalf of the Marina Coast Water District regarding the benefits of a regional water supply project, June 24, 2009.
- Deposition Testimony in the matter of *Watkins & Shepard Trucking vs Soco West, Inc*, Superior Court of the State of California for the County of Los Angeles –Central District, Case No. BC379287, on behalf of defendants regarding the influence of environmental risk on real estate price, September 9, 2008
- Deposition testimony, In Re Mt. Konocti Mutual Water Company, Inc, Official Committee of Unimproved Lot Owners vs. Mt Konocti Mutual Water Company, Case No. 90-11573, regarding water connection fee methodology on behalf of defendants, January 14, 2008.

MARK P. BERKMAN

- Declaration, In Re Mt. Konocti Mutual Water Company, Inc, Official Committee of Unimproved Lot Owners vs. Mt Konocti Mutual Water Company, Case No. 90-11573, regarding water connection fee methodology, on behalf of defendants, January 4, 2008.
- Hilmar Supplemental Environmental Project, Managing Salt in the Central Valley, submitted to the California Regional Water Quality Control Board, Central Valley Region in compliance with Order No. R5-2006-0025, with David Sunding and Yoram Rubin, November 16, 2007.
- Measures to Reduce the Economic Impacts of a Drought-Induced Water Shortage in the San Francisco Bay Area for the San Francisco Public Utilities Commission with David Sunding, Robert Gamble, and Sean Randolph, May 3, 2007.
- Analysis of the Economic Impacts of a Shutdown of Limestone Mining in Florida's Lake Belt District on behalf of the Miami Dade Limestone Products Association with Ann McDermott, March 21, 2007.
- Valuation of Hells Canyon Jet Boat Outfitters and the Impact of the River Flow Restrictions on behalf of Idaho Power Corp., April, 2006.
- Expert Testimony in the matter of *Quality Control Services, Inc. v. Dougherty County*, United States District Court for the Middle District of Georgia Albany Division, Case no. 1:05 CV-19 (WLS) on behalf of plaintiffs regarding the Pike Balancing test, 2006.
- Deposition Testimony in the Matter of *Corbitt v. American Furniture Manufacturing Inc. and W.S. Bradcock Corporation*, United States District Court, Middle District of Alabama Civil Action 2:05CV58-T, on behalf of defendants regarding product liability, November 18, 2005.
- Expert Report and Direct Testimony of Mark Berkman and David Sunding in the matter of Hilmar Cheese Company Inc., Hilmar Whey Protein Inc., California Regional Water Quality Control Board Central Valley Region, ACL Complaint No. R5-2005-0501, August 2005.
- Economic Impacts of Critical Habitat Designation for Vernal Pool Species, prepared for the U.S. Fish and Wildlife Service, U.S. Department of Interior with David Sunding, June 25, 2005.
- "Environmental liability forecasts regarding manufactured gas plant sites for Pacific Gas & Electric," September 2004. (Confidential)
- Expert Report of Mark Berkman in the matter of *BFI Waste Systems of North America, Inc. v. City and County of Denver and Waste Management of Colorado, Inc.* on behalf of the plaintiff. Filed in the United States District Court for the District of Colorado. August 30, 2004.
- Expert report in the matter of *United Haulers Association, Inc. et al. v. Oneida-Herkimer Solid Waste Management Authority, County of Oneida and County of Herkimer* before the U.S. District Court for the Northern District of New York. Performed an analysis on behalf of the plaintiffs of the solid waste flow control laws enacted by Oneida and Herkimer Counties, New

MARK P. BERKMAN

York. November 15, 2002.

- “Forecast of Environmental Remediation Liability for Pacific Gas & Electric.” With Gordon Rausser, October 10, 2002.
- “The Economic Impacts of Closing the Canton Mill.” With Burton Griffith. Prepared for Blue Ridge Paper Products, Inc., June 1, 2001.
- “Estimates of Environmental Risk Associated with the BMI Site.” Prepared for Marsh & McLennan, March 2000.
- “The Effect of CO2 Reduction Policies on the Canadian Electricity Industry and Economy.” Prepared for ATCO Electric, EPCOR, New Brunswick Power, Nova Scotia Power, Ontario Power Generation, Saskatchewan Power and TransAlta Utilities, July 5, 1999.
- “The Economic Impacts of Policies to Reduce Alfalfa Water Consumption.” Report, prepared for Natural Resources Defense Council, October 12, 1998.
- “Market Opportunities for Environmental Remediation and Site Management” Report prepared for Pacific Corp, 1998.
- “Comments on CalFed’s Draft EIS of March 1998.” Prepared for Save San Francisco Bay Association, June 30, 1998.
- “Evaluation of Tax Claim Against the State of Montana.” Prepared for the Fort Peck Reservation, September 18, 1997. (Confidential)
- Deposition Testimony on behalf of homeowners in Benicia, California, regarding property value diminution in *Lagrimas v. Southhampton et al.*, September 1997.
- Testimony before the Trade Waste Commission, City of New York on behalf of the New York City Economic Development Commission, regarding maximum rate regulation of commercial waste collection, January 21, 1997.
- “Costs and Benefits of the Proposed Enclosed Unloader at the Fresh Kills Landfill.” Prepared for the New York City Law Department, December 1996.
- Deposition Testimony on behalf of Browning-Ferris Industries, in the matter of *W.J. Curry & Son v. Velsicol Chemical Co. v. Kraft et al.* regarding the allocation of Superfund remediation costs, July 12, 1996.
- “Estimating Employment Effects of Electric Price Increases in U.S. Manufacturing Industries and Assessing Such Effects in New Jersey.” Prepared for Jersey Central Power & Light, June 28, 1996.
- “Estimate of Employment Effects of Electric Price Increases in U.S. Manufacturing Industries and

MARK P. BERKMAN

Assessing Such Effects in Maryland.” Prepared for Allegheny Power, Maryland, June 17, 1996.

- Rebuttal Testimony on behalf of Central and South West Energy, Inc. in the matter of Application No. 93-2, CSW Energy, Inc. and KVA Resources, Inc., Northwest Regional Power Facility, Before the State of Washington Energy Facility Site Evaluation Council regarding the costs and benefits of controlling residual NOx and CO emissions and CO2 emissions at a proposed natural gas-fired power plant in Washington, October 1995.
- Affidavit on behalf of the New York City Law Department, in the matter of the Application of New York City Department of Environmental Protection for Renewals of the State Pollutant Discharge Elimination System Permits for New York City’s 14 Publicly Owned Treatment Works regarding the costs and benefits of proposed pollution control investments, August 24, 1995.
- “The Cost of Flow Control.” Prepared for Browning-Ferris Industries, May 3, 1995.
- “Economic Impacts of VOC Emission Reductions Beyond the 15% Plan in the Cincinnati CMSA.” Prepared for Cincinnati Gas & Electric, April 27, 1995.
- Prefiled Rebuttal Testimony before the Montana Public Service Commission, on behalf of the Montana Power Company, Docket No. 94.8.30, regarding affiliated coal prices, January 13, 1995.
- Prefiled Direct Testimony before the Montana Public Service Commission, on behalf of the Montana Power Company, Docket No. 94.8.30, regarding affiliated coal prices, August 22, 1994.
- “Water Quality Benefits of Floatable Reduction in the New York Bight.” Expert Witness Report and Testimony on behalf of the New York City Law Department before the State of New York Department of Environmental Conservation in the Matter of the Application of The New York City Department of Environmental Protection for Renewals for the State Pollutant Discharge Elimination System (SPDES) Permits for New York City’s 14 Publicly Owned Sewage Treatment Works. DEC No. 0026131, April 27, 1994.
- “Comments Regarding Water Pricing and Water Markets Under the Reclamation Reform Act of 1982,” to the U.S. Bureau of Reclamation on behalf of the Natural Resources Defense Council, March 14, 1994.
- “Initial Comments of National Economic Research Associates, Inc. on Florida DSM Employment Impacts,” prepared with J. Landon and P. Griffes for Florida Power & Light Company, January 1994.
- Rebuttal testimony before the Montana Public Service Commission on behalf of the Montana Power Company, Docket No. 93.6.24, regarding affiliated coal prices, October 15, 1993.
- Declaration on behalf of the Hacienda Improvement Association before the Superior Court of the State of California, Case No. BS 021186, *Hacienda La Puente Unified School District of Los Angeles County, et al. v. County of Sanitation District No. 2 of Los Angeles County, et al.*,

MARK P. BERKMAN

regarding solid waste disposal capacity in Los Angeles, October 14, 1993.

- “A Review of Environmental Damage Studies.” Prepared for Ontario Hydro, October 1993.
- Direct prefiled testimony before the Montana Public Service Commission on behalf of the Montana Power Company, Docket No. 93.6.24, regarding affiliated coal prices, June 21, 1993.
- “Environmental Externalities Briefing Book.” Prepared for Florida Power & Light Company, April 17, 1993.
- “External Costs of Electric Utility Resource Selection in Nevada.” Prepared with D. Harrison, Jr., A. Nichols, and S. Bittenbender for Nevada Power Company, March 1993.
- “The Economic Impacts of AOX Reduction on the U.S. Pulp and Paper Industry.” Sponsored by Georgia-Pacific Corporation, October 22, 1992.
- “Appraisal of the 107th Meridian Strip Coal Reserves.” Prepared for the Crow Indian Tribe, July 1992.
- “Carbon Tax Impacts on Coal Production and Rail Shipments.” Prepared with John Wile for Association of American Railroads, May 1992.
- “Socio-Economic Impacts of Strategies to Comply with the Clean Air Act Amendments of 1990.” Prepared for The Cincinnati Gas & Electric Company Licensing and Environmental Affairs Department, May 1992.
- “The Environmental and Social Costs Associated with Wood Roof Removal Legislation.” Prepared with Clayton Environmental Consultants for Steel Roofing Manufacturers’ Association, February 1992.
- “The Economic Feasibility of VOC Control Technologies for the Wood Furniture and Cabinet Industries.” Prepared for the American Furniture Manufacturers Association, Business and Institutional Furniture Manufacturers Association, Kitchen Cabinet Manufacturers Association, National Paint and Coatings Association, January 1992.
- Rebuttal testimony before the Texas Public Utility Commission on behalf of Houston Lighting and Power, Docket No. 10473, regarding the treatment of environmental externalities, October 4, 1991.
- “Key Issues in Least-Cost Planning.” With Kent Anderson, National Economic Research Associates, Inc. Working Paper #10, August 1991.
- “Hydroelectric Relicensing: Comparing the Value of Power and Nonpower Uses.” With Mike Rosenzweig, April 1, 1991.

MARK P. BERKMAN

- Expert testimony before the District Court of the Fifth Judicial District of the State of Idaho, *State of Idaho, ex rel. R. Keith Higginson v. United States, State of Idaho, et al.*, Case No. 39576, on behalf of the United States, regarding water claims fees, February 4, 1991.
- “An Evaluation of State Efforts to Incorporate Environmental Externalities Into Electric Utility Planning.” Prepared for Central Maine Power and the Energy Research Group, with John Wile, January 1991.
- Testimony before the Oregon Environmental Quality Commission, on behalf of the Oregon Department of Environmental Quality, regarding out-of-state waste charges, November 1, 1990.
- “Evaluation of Out-of-State Waste Surcharge Proposal.” Prepared for Oregon Department of Environmental Quality, October 5, 1990.
- “Environmental Regulation Beyond the Clean Air Act Amendments: Incorporating Externalities,” Prepared with John Wile for the Energy Research Group, June 26, 1990.
- “Economic Impacts of Proposed SO₂ Emissions Standards on Hamilton County, Ohio.” Prepared for the Hamilton County SO₂ Task Force, June 1990.
- Expert testimony before the Indiana Utility Regulatory Commission on behalf of Northern Indiana Public Service Company regarding acid rain legislation and coal price forecasts, September 27, 1989.
- “Electric Utilities and the Environment in the 1990s.” Prepared with Lewis Perl for the Energy Research Group, June 20, 1989.
- “The Impact of Environmental Regulation on Electric Utility Fuel Use.” *NERA Energy Outlook*, Special Report, April 17, 1989.
- Affidavit for the New York City Department of Sanitation in *The Presidents’ Council of Trade Waste Associations, Inc., et al. v. Edward I. Koch, Mayor of the City of New York, et al.*, commenting on increases in waste disposal rates and methods used to determine rates, October 27, 1988.
- Determination of Market Price for Angel Mining Inc.’s and Diversified Fuels Inc.’s Contracts With Taiwan Power Company.” With Fred Dunbar and Jerry Hausman before the International Chamber of Commerce on behalf of Angel/Diversified, April 1987.
- “Economic Review of The McKinley County Coal Exchange.” With Fred Dunbar, Washington, D.C.: National Coal Association, February 1987.
- “Lessons For the Interstate Gas Pipeline Industry From Railroad Deregulation.” With Fred Dunbar, Washington, D.C.: The Interstate Natural Gas Association of America, 1986.

MARK P. BERKMAN

- Testimony before the Vermont Public Service Board on capacity planning and load forecasting on behalf of Central Vermont Public Service Corporation, July 12, 1985.
- “The Economics of U.K. Coal Mining.” With S. Barrett, December 1984.
- “Pricing Solid Waste Disposal in New York City,” November 1984.
- “Risk Analysis of the Pacific Power and Light Company PCB Handling and Disposal Program.” With B. Price, October 19, 1984.
- “An Evaluation of Capacity Planning and Load Forecasting for Central Maine Power Company.” With Lew Perl and John Wile, February 17, 1984.
- Expert Witness Report and Testimony before the United States District Court, District of Montana, on the coal severance taxes and the market for Western coal, on behalf of the Crow Indian Tribe, 1984.
- Co-author, “Solar Energy Technologies: Market Estimates and Federal R & D Payoff.” Prepared for the Energy Research Advisory Board, sponsored by the U.S. Department of Energy, 1982.
- Co-author, “Analysis of Proposed Changes to Federal Surface Mining and Coal Leasing Policy.” Final Report for the U.S. Department of Energy, October 1982.
- Co-author, “Barriers and Incentives for Fuel Cell Commercialization.” Prepared for the U.S. Department of Energy, 1981.

Environmental Health and Safety

- “A Review of the National Fire Incident Reporting System and the National Fire Protection Association’s Upholstered Furniture Fire Statistics.” Prepared for the Fire Prevention Alliance, August 31, 2015.
- “A Review of the Pipeline and Hazardous Materials Safety Administration’s Draft Regulatory Impact Analysis. Docket No. PHMSA-2012-0082 (HM-281).” Prepared for The Railway Supply Institute, November 2014.
- “Distributed Generation Standard Contracts and Renewable Energy Fund: Jobs, Economic and Environmental Impact Study.” With Jurgen Weiss and Stephen Lagos. Prepared for Rhode Island Office of Energy Resources and Commerce RI, April 30, 2014.
- Expert Report of Mark P. Berkman in the matter of *SPS Limited Partnership, LLLP et al. v. Severstal Sparrow Point, LLC et al.*, Prepared for Counsel on behalf of Arcelor Mittal USA, LLC, March 14, 2013.

MARK P. BERKMAN

- Expert Report of Mark P. Berkman in the matter of Jorge Santiago, Sr. v. Wholesale Furniture Distributors Inc., 139th District Court, Hidalgo Texas, Cause No. C-1311-07-C on behalf of defendant regarding the risks of death and injury from upholstered furniture ignited home fires, June 15, 2009.
- Expert Report of Mark P. Berkman in the matter of Price v. Price, Circuit Court of the Fifteenth Circuit in and for the County of Palm Beach Florida, Case No. 50 2007 DR1982 MBFC, regarding environmental and business risks associated with a construction and demolition landfill, December 2008.
- Expert Report of Mark P. Berkman in the matter of John Stewart Edwards v. La-Z-boy et.al, in the District Court 258th District, Polk County Texas, on behalf of defendant regarding the impact of fire safety regulations on upholstered furniture fires, May 16, 2008.
- “An Evaluation of the CPSC Staff Preliminary Regulatory Analysis of the Draft Upholstered Furniture Flammability Standard.” on behalf of the American Home Furnishings Alliance National Home Furnishings Associations and the Upholstered Furniture Action Council, March 2, 2006.
- Deposition Testimony in the matter of Seng v. Levitz et al. in the Superior Court of the State of Washington, in and for Snohomish County, on behalf of the defendants regarding product liability. Oakland, California, August 27, 2003.
- “Assessing the Need for a Federal Small Open Flame / Cigarette Ignition Upholstered Furniture Flammability Standard.” On behalf of the Upholstered Furniture Action Council, February 16, 2001.
- “A Review of the Federal Motor Carrier Safety Administration’s Economic Analysis for its Proposed Hours of Service Standard.” Prepared for the American Trucking Associations, August 3, 2000.
- “A Review of OSHA’s Economic Analysis For Its Proposed Ergonomics Standard.” On behalf of the National Coalition on Ergonomics, February 29, 2000.
- Testimony before the U.S. House of Representatives Committee on Education and the Workforce on behalf of the American Trucking Association regarding the costs and benefits of a proposed ergonomics standard, July 1997.
- “Benefit-Cost Analysis of OSHA’s Proposed Ergonomics Standard on the Trucking Industry.” On behalf of the ATA Foundation, September 1996.
- Testimony on behalf of the Inter-Industry Wood Dust Coordinating Committee, before the Occupational Safety and Health Administration, Department of Labor, Docket No. H-020, August 12, 1988.

MARK P. BERKMAN

- “The Economic Impact of OSHA’s Proposed Air Contaminants Rule on the Wood Products Industries.” Prepared for the Inter-Industry Wood Dust Coordinating Committee, July 25, 1988.

Labor and Employment

- Report on behalf of The Consumer Financial Protection Bureau. “The Effect of Race and Ethnicity on (redacted) Mortgage Loan Origination and Pricing.” Prepared with Charles Gibbons and Stephen Lagos. November 25, 2014.
- Report on behalf of The Consumer Financial Protection Bureau. “The Effect of Race and Ethnicity on (redacted) Mortgage Loan Origination and Pricing.” Prepared with Charles Gibbons, Pavitra Kumar, and Stephen Lagos. July 8, 2014.
- Report on behalf of The Consumer Financial Protection Bureau. “The Effect of Race and Ethnicity on (redacted) Mortgage Loan Origination and Pricing.” Prepared with Charles Gibbons, Pavitra Kumar, and Stephen Lagos. August 1, 2013.
- Expert Report on behalf of L-3 Communications/ L-3 on the Matter of Tanya Rahim vs. L-3 Titan Corporation regarding damages attributed to alleged wrongful injury claim, August 22, 2012.
- Deposition Testimony on behalf of Chevron U.S.A. Inc. in the matter of *Richard O. Jacks v. Chevron U.S.A. Inc., Paul Moran and Kevin Hofer*, United States District Court for the Northern District of California San Francisco Division, Case no. C09-4523 JSW, regarding damages attributed to alleged wrongful termination, November 15, 2011.
- Expert Report on behalf of Chevron U.S.A. Inc. in the matter of *Richard O. Jacks v. Chevron U.S.A. Inc., Paul Moran and Kevin Hofer*, United States District Court for the Northern District of California San Francisco Division, Case no. C09-4523 JSW, regarding damages attributed to alleged wrongful termination, August 23, 2011.
- Deposition Testimony on behalf of the City and County of San Francisco in the matter of *City and County of San Francisco, et al. v. United States Postal Service, et al.*, United States District Court for the Northern District of California San Francisco Division No. 3:09-cv-01964-RS (EDL), regarding costs to provide centralized service to single occupancy hotels, July 7, 2011.
- Expert Report on behalf of the City and County of San Francisco in the matter of *City and County of San Francisco, et al. v. United States Postal Service, et al.*, United States District Court for the Northern District of California San Francisco Division No. 3:09-cv-01964-RS (EDL), regarding costs to provide centralized service to single occupancy hotels, June 2011.
- Deposition Testimony in the matter of *Associated General Contractors of America v. California Department of Transportation*, United States District Court Eastern District of California No. 2:09-cv-01622-JAM-GGH, November 2010.
- Rebuttal Report in the matter of *Associated General Contractors of America v. California*

MARK P. BERKMAN

Department of Transportation, United States District Court Eastern District of California No. 2:09-cv-01622-JAM-GGH, October 2010.

- Expert Report in the matter of Associated General Contractors of *America v. California Department of Transportation*, United States District Court Eastern District of California No. 2:09-cv-01622-JAM-GGH regarding the adequacy of the statistical study that supported the introduction of a race conscious contracting program by defendant, September 2010.
- Trial Testimony in the matter of *Amy Moran v. Qwest Communications et al.*, Superior Court of the State of California, City and County of San Francisco Case No. CGC08-480654 on behalf of plaintiff regarding damages attributable to alleged gender discrimination and sexual harassment, February 2, 2010.
- Measuring Minority- and Woman-Owned Construction and Professional Service Firm Availability and Utilization for the San Mateo County Transit District and Peninsula Joint Powers Board, with Robert Fairlie and Mathew Johnson, April 2008.
- Measuring Minority- and Woman-Owned Construction and Professional Service Firm Availability and Utilization for the Santa Clara Valley Transit Authority, with Robert Fairlie and Mathew Johnson, December 2007.
- Arbitration Testimony in the Matter of *George Santana v. The New Santana Band* on behalf of the Defendant regarding damages arising from alleged wrongful termination, February 16, 2006.
- Trial Testimony in the Matter of *Public Works Contract Cases, City of San Francisco, et. al. v. William D. Spencer et. al. and F.W. Spencer & Son Inc., et. al. v. David Norman, et. al.* Judicial Council Coordination Proceeding No 4379, on behalf of defendant regarding evidence of discrimination in public contracting, November 14, 2005.
- Deposition Testimony in the matter of *Carlos Torres et. al. v. Gristedes Operating Corporation et al.*, United States Court Southern District of New York, Case No. 04 CV 3316 (PAC) (ASP), October 25, 2005.
- Expert Report of Mark Berkman in the matter of *Carlos Torres et. al. v. Gristedes Operating Corporation et. al.*, United States Court Southern District of New York, Case No. 04 CV 3316 (PAC) (ASP), regarding a wages and hours claim on behalf of defendant, October 11, 2005.
- Deposition Testimony in the Matter of *Public Works Contract Cases, City of San Francisco, et. al. v. William D. Spencer et. al. and F.W. Spencer & Son Inc., et. al. v. David Norman, et. al.* Judicial Council Coordination Proceeding No 4379, October 7, 2005.
- Declaration of Mark P. Berkman PhD, in the matter of *Public Works Contract Cases, City of San Francisco, et. al. v. William D. Spencer et. al. and F.W. Spencer & Son Inc., et. al. v. David Norman, et. al.* Judicial Council Coordination Proceeding No 4379, June 10, 2005.

MARK P. BERKMAN

- Trial Testimony of Mark P. Berkman in the matter of *Barbara Niesendorf v. Levi Strauss & Company* on behalf of the defendant, regarding alleged wrongful termination. San Francisco, CA, June 10, 2004.
- Deposition Testimony of Mark P. Berkman in the matter of *Barbara Niesendorf v. Levi Strauss & Company* on behalf of the defendant, regarding alleged wrongful termination. San Francisco, CA, April 29, 2004.
- Deposition Testimony of Mark P. Berkman in the matter of *Michelle Hamamura v. Kelly-Moore Paint Company, Inc.* on behalf of the defendant, regarding alleged gender discrimination. San Jose, CA, February 12, 2004.
- Trial Testimony of Mark P. Berkman in the matter of *Willard E. Kopetski v. Chevron Corporation et al.*, Superior Court of the State of California in and for the County of San Francisco, on behalf of defendant Chevron Corporation, regarding alleged wrongful termination. San Francisco, CA, January 21, 2004.
- Expert Report in the matter of *Michelle Hamamura v. Kelly-Moore Paint Company, Inc.* in the United States District Court, Northern District of California, on behalf of defendant Kelly-Moore Paint Company, Inc. January 20, 2004.
- Trial Testimony in the matter of *National Association for the Advancement of Colored People, et al. v. The State of Florida Department of Corrections, et al.*, In the United States District Court for the Middle District of Florida, Ocala Division, on behalf of the plaintiffs. Ocala, Florida, November 12–13, 2003.
- Expert witness report of Mark P. Berkman, Ph.D., filed in the matter of *Jeri Hewitt v. Amerigas Propane, Inc.*, calculating damages estimates on behalf of the defendant with regard to alleged wrongful termination. November 5, 2003.
- Supplemental expert report of Mark P. Berkman filed in the matter of *National Association for the Advancement of Colored People, et al. v. The State of Florida Department of Corrections, et al.*, In the United States District Court for the Middle District of Florida, Ocala Division, on behalf of the plaintiffs. October 20, 2003.
- Trial Testimony in the matter of *Daniel Millar v. San Francisco Bay Area Rapid Transit District*, Superior Court for the State of California, for the County of Alameda, on behalf of San Francisco Bay Area Rapid Transit District, regarding alleged wrongful termination. Oakland, CA, October 8–9, 2003.
- Deposition Testimony of Mark P. Berkman in the matter of *Willard E. Kopetski v. Chevron Corporation et al.*, Superior Court of the State of California in and for the County of San Francisco, on behalf of defendant Chevron Corporation, regarding alleged wrongful termination. San Francisco, CA, August 18, 2003.

MARK P. BERKMAN

- Rebuttal Report of Dr. Mark P. Berkman in the matter of *Mark J. True v. Allstate Insurance Company et al.*, United States District Court, Eastern District of California, on behalf of the defendant. Report filed July 9, 2003.
- Expert Witness Report of Dr. Mark P. Berkman in the matter of *Mark J. True v. Allstate Insurance Company et al.*, United States District Court, Eastern District of California, on behalf of the defendant, outlined proper methods for damage calculation. Report filed June 18, 2003.
- Deposition Testimony in the matter of *Daniel Millar v. San Francisco Bay Area Rapid Transit District*, Superior Court for the State of California, For the County of Alameda, on behalf of San Francisco Bay Area Rapid Transit District, regarding alleged wrongful termination. Walnut Creek, CA, April 3, 2003.
- Expert Witness Report in the matter of *Alpheus Ray Brokaw v. Qualcomm, Inc.*, U.S. District Court, Southern District of California, on behalf of Qualcomm, Inc. regarding alleged wrongful termination. Report filed January 23, 2003.
- Deposition Testimony and Trial Testimony in the matter of *Lannie Staniford v. Acordia Inc., Acordia of California Insurance Services, Robert DeValle, James Wells, Wells Fargo and Company, and DOES 1 through 20 inclusive*, in the Superior Court of the State of California, in and for the County of San Francisco, on behalf of defendant Acordia, Inc. regarding alleged wrongful termination. Deposition December 23, 2002; Trial Testimony January 13, 2003, both in San Francisco, CA.
- Deposition of Mark P. Berkman before the U.S. District Court, Southern District of California, in the matter of *Durante et al. v. Qualcomm, Inc.* on behalf of Qualcomm, Inc. regarding alleged age-based termination. San Diego, CA, December 10, 2002. Declaration filed in San Diego, CA, November 6, 2002.
- Trial Testimony on behalf of the NAACP in the matter of *NAACP v. State of Florida Department of Corrections*, U.S. District Court, Middle District of Florida, Ocala Division regarding statistical evidence of race discrimination in the promotion, training and discipline of black corrections officers, Ocala, Florida, November 6, 2002.
- Expert Testimony on behalf of the NAACP in the matter of *NAACP v. State of Florida Department of Corrections*, U.S. District Court, Middle District of Florida, Ocala Division regarding the adequacy of available data for statistical analysis. Ocala, Florida, September 14, 2001.
- Trial Testimony of Mark P. Berkman in the matter of *Dawn Goodman v. City of San Jose* before the Superior Court of the State of California on behalf of the City of San Jose regarding economic damages related to alleged wrongful termination, San Jose, CA, August 16, 2001.
- Deposition of Mark P. Berkman in the matter of *Victoria Aguinaldo Boudakian v. Avco Financial*

MARK P. BERKMAN

Services, et al. Testimony before the United States District Court for the Eastern District of California on behalf of Avco Financial Services regarding alleged gender-based pay discrimination and termination, Oakland, CA, June 19, 2001.

- Trial Testimony of Mark P. Berkman in the matter of *Lucy Sales et al. v. County of Contra Costa et al.*, before the U.S. District Court for the Northern District of California, on behalf of Contra Costa County regarding the utilization of minority- and women-owned firms by the County, June 18, 2001.
- Deposition of Mark P. Berkman in the matter of *Lucy Sales et al. v. County of Contra Costa et al.*, regarding comments on reports filed by plaintiff's experts, February 16, 2001.
- Affidavit of Mark P. Berkman in the matter of *National Association for the Advancement of Colored People, et al. v. State of Florida Department of Corrections, et al.*, to examine the Florida Department of Corrections data regarding the hiring and promotion of staff and analyze it for evidence of race and gender discrimination, April 4, 2001 and September 13, 2000.
- Deposition of Mark P. Berkman in the matter of *Lucy Sales et al. v. County of Contra Costa et al.*, regarding the calculation of the utilization of minority- and woman-owned firms in professional services and purchasing by the County, October 17, 2000 and July 18, 2000.
- Amended Declaration of Mark P. Berkman in the matter of *Lucy Sales et al. v. County of Contra Costa et al.*, to calculate the utilization of minority- and woman-owned firms in professional services and purchasing by the County, September 19, 2000 and July 14, 2000.
- "A Statistical Analysis of Coaches' Salaries at California State University, Fresno. Prepared with Michael Liu, (Confidential), March 2000.
- "A Statistical Analysis of Fair Lending." Prepared with Anthony Yezer and Stuart Gabriel, (Confidential), January 1999.
- "The Availability of Minority and Woman-Owned Businesses for the Southern California Regional Rail Authority." Prepared at the request of the Southern California Regional Rail Authority, December 1996.
- Testimony before the California Public Utilities Commission, on behalf of The Joint Utilities Subcommittee, consisting of 12 California utilities, regarding NERA's study to estimate the availability of service disabled veteran-owned establishments within the geographic and product markets from which the California utilities purchase goods and services, October 17, 1996.
- "California Disabled Veteran Business Enterprise Availability Study." Prepared for The Joint Utilities Subcommittee, consisting of 12 California utilities, October 15, 1996.
- "An Analysis of the Utilization and Availability of Minority and Woman-Owned Businesses in the Los Angeles Metropolitan Area." Prepared with D. Evans et al., March 7, 1996.

MARK P. BERKMAN

- “The Oregon Health Plan Economic Impact Analysis for the Employer Mandate.” Prepared with John Gaisford et al. for the Oregon Office of the Health Care Administrator, February 10, 1995.
- “The Economic Impact of Health Care Reform in Arizona.” Prepared for the Arizona Affordable Health Care Foundation, February 8, 1994.
- “The Utilization of Minority and Women-Owned Business Enterprises by Member Agencies of the Regional Transit Association.” Prepared with D. Evans et al., May 1993.
- “The Utilization of Minority and Woman-Owned Business Enterprises by the San Francisco Redevelopment Agency.” Prepared with D. Evans et al., April 1993.
- “The Utilization of Minority and Woman-Owned Business Enterprises by the City of Hayward.” Prepared with D. Evans et al., March 1993.
- “Economic Implications of *Los Angeles Times* Job Fair-Related Activities.” Prepared with Richard T. Rapp, on behalf of the *Los Angeles Times*, October 27, 1992.
- Declaration on behalf of San Francisco Bay Area Rapid Transit District in *RGW Construction, Inc. San Francisco Bay Area Rapid Transit District, et al.*, regarding evidence of discrimination against minority contractors in the Bay Area, October 8, 1992.
- “The Utilization of Minority and Woman-Owned Business Enterprises by Alameda County.” Prepared with D. Evans et al., June 1992.
- “The Utilization of Minority and Woman-Owned Business Enterprises by Contra Costa County.” Prepared with D. Evans et al., May 1992.

Intellectual Property

- Deposition Testimony of Dr. Mark P. Berkman in the matter of Western Sugar Cooperative et.al. vs. Archer-Daniels-Midland Company et. al. in the United States District Court Central District of California, Case No. CV11-3473 CBM (MANx), November 19, 2014
- Expert Report of Mark P. Berkman in the matter of Western Sugar Co-operative et.al. v. Archer Daniels Midland et.al, United States District Court Central District of California, Case No. CV11-3473 CBM (MANx), on behalf of plaintiffs provided rebuttal to defendant’s counterclaim damage estimate, September 30, 2014.
- Trial Testimony in the matter of *PQ Labs Inc. v. ZaagTech, Inc.*, in the United States District Court, Northern District of California, Case No. 12-cv-00450-cw, March 12, 2014.
- Rebuttal Report of Dr. Mark P. Berkman in the matter of *PQ Labs Inc. v. ZaagTech, Inc.*, in the United States District Court, Northern District of California, Case No. 12-cv-00450-cw, on behalf of defendants regarding alleged misappropriation of trade secrets and breach of contract, October

MARK P. BERKMAN

25, 2013.

- Deposition Testimony in the matter of PQ Labs Inc. v. ZaagTech, Inc., in the United States District Court, Northern District of California, Case No. 12-cv-00450-cw, on behalf of defendants regarding alleged misappropriation of trade secrets and breach of contract, October 4, 2013.
- Deposition Testimony in the matter of *GigOptix v. M/A COM et.al*, Superior Court of the State of California, Case No. 1-11-cv-199643, on behalf of defendants regarding damages attributed to alleged trade secret misappropriation, September 13, 2013.
- Expert Report of Mark P. Berkman, on behalf of PQ Labs, Inc., in the matter of *PQ Labs Inc. v. ZaagTech, Inc.*, in the United States District Court, Northern District of California, Case No. 12-cv-00450-cw, to calculate damages regarding alleged misappropriation of trade secrets and breach of contract, August 30, 2013.
- Deposition Testimony in the matter of *Quickie LLC v Greenberg Traurig et.al*, United States District Court Southern District of New York, 07Civ.10331 (RMB) (DFE), on behalf of plaintiffs, April 13, 2009.
- Expert Report of Mark P. Berkman in the matter of *CAL-PAL v. California Police Youth Charities, Inc.*, United States District Court, Northern District of California, Case No. 3:08-cv-01991-PJH on behalf of plaintiffs regarding damages regarding alleged trademark infringement and violations of the Uniform Trade Secret Act, January 9, 2009.
- Expert Rebuttal Report of Mark Berkman, PhD in the matter of *Quickie LLC v Greenberg Traurig et.al*, United States District Court Southern District of New York, 07Civ.10331 (RMB) (DFE), on behalf of plaintiffs regarding patent infringement damages, October 17, 2008.
- Expert Report of Mark Berkman, PhD in the matter of *Quickie LLC v Greenberg Traurig et.al*, United States District Court Southern District of New York, 07Civ.10331 (RMB) (DFE), on behalf of plaintiffs regarding patent infringement damages, July 21, 2008.
- Trial Testimony in the matter of *Ultra Clean Technology Systems and Service, Inc. v. Celerity, Inc.* before the United States District Court Northern District of California- San Francisco. June 12, 2007.
- Deposition Testimony in the matter of *Ultra Clean Technology Systems and Service, Inc. v. Celerity, Inc.* before the United States District Court Northern District of California- San Francisco. February 8, 2007.
- Expert Report of Mark Berkman in the matter of *Ultra Clean Technology Systems and Service, Inc. v. Celerity, Inc.* before the United States District Court Northern District of California- San Francisco. January 12, 2007.
- Deposition Testimony in the matter of Hank Spacone, on behalf of and a trustee for the General

MARK P. BERKMAN

Unsecured Creditors' Liquidating Trust of At Home Corporation, and on behalf of and in the name of the At Home Liquidating Trust of At Home Corporation, Microsoft Corporation, Civil Action NO. C034739 (CW), September 27, 2005.

- Expert Report of Mark Berkman in the matter of Hank Spacone, on behalf of and a trustee for the General Unsecured Creditors' Liquidating Trust of At Home Corporation, and on behalf of and in the name of the At Home Liquidating Trust of At Home Corporation, Microsoft Corporation, Civil Action NO. C034739 (CW), August 19, 2005.
- Expert Report of Mark P. Berkman in the matter of *Monster Cable Products, Inc. v. Discovery Communications, Inc.* before the United States District Court for the Northern District of California—San Francisco. July 23, 2004. Rebuttal Report filed August 13, 2004. Deposition Testimony taken in San Francisco on August 18, 2004.
- Trial Testimony of Mark P. Berkman before the U.S. District Court for the District of Connecticut in the matter of *Raytek Corporation v. Omega Engineering, Inc. and Newport Electronics, Inc.*, regarding false advertising and a patent infringement claim. Bridgeport, CT, June 16, 2004.
- Deposition Testimony of Mark Berkman in the matter of *Vladimir I. Makhov v. Litton Systems, Inc., et al.*, providing damages estimates on behalf of respondents with regard to an alleged breach of contract. May 27, 2004.
- Supplemental Expert Report of Mark Berkman in the matter of *Vladimir I. Makhov v. Litton Systems, Inc., et al.*, providing damages estimates on behalf of respondents with regard to an alleged breach of contract. Before the American Arbitration Association, New York City Office, May 4, 2004.
- Expert Report of Mark Berkman in the matter of *Vladimir I. Makhov v. Litton Systems, Inc., et al.*, providing damages estimates on behalf of respondents with regard to an alleged breach of contract. Before the American Arbitration Association, New York City Office, April 26, 2004.
- Supplemental Expert Report of Mark P. Berkman in the matter of *Quickie, LLC, v. Medtronic, Inc.*, U.S. District Court for the Southern District of New York, on behalf of the plaintiff, Quickie, LLC, filed March 5, 2004.
- Deposition Testimony of Mark P. Berkman in the matter of *Quickie, LLC, v. Medtronic, Inc.*, U.S. District Court for the Southern District of New York, on behalf of the plaintiff, Quickie, LLC, calculating damages for alleged patent infringement. Washington, DC, August 20, 2003.
- Rebuttal report with Timothy Savage, Ph.D. and Phillip Taylor, Ph.D., in the matter of *Tyson Foods, Inc. v. ConAgra Foods, Inc.*, U.S. District Court for the Western District of Arkansas, on behalf of the defendant, responding to opposing expert's damages calculations. August 8, 2003.

MARK P. BERKMAN

- Expert witness report with Timothy Savage, Ph.D. and Phillip Taylor, Ph.D., in the matter of *Tyson Foods, Inc. v. ConAgra Foods, Inc.*, U.S. District Court for the Western District of Arkansas, on behalf of the defendant, calculating economic damages resulting from alleged false advertising under the Lanham Act. July 30, 2003.
- Expert witness report of Mark P. Berkman before the U.S. District Court for the Southern District of New York in the matter of *Quickie, LLC, v. Medtronic, Inc.* on behalf of the plaintiff, Quickie, LLC, calculating damages for alleged patent infringement. June 18, 2003.
- Expert witness report of Mark P. Berkman before the U.S. District Court for the Northern District of California in the matter of *Molecular Probes, Inc. v. Texas Fluorescence Laboratories, Inc.* on behalf of the plaintiff, Molecular Probes, Inc., calculating damages for alleged patent infringement. San Francisco, CA, November 15, 2002.
- Deposition Testimony of Mark P. Berkman before the U.S. District Court for the District of Connecticut in the matter of *Raytek Corporation v. Omega Engineering, Inc. and Newport Electronics, Inc.*, regarding false advertising and a patent infringement claim, July 18, 2001.
- Trial Testimony of Mark P. Berkman in *Caliper Technologies Corp. v. Bertram Rowland; Flehr, Hohbach, Test, Albritton & Herbert; Aclara Biosciences, Inc., and Does One Through One Hundred*, estimated damages related to the misappropriation of trade secrets for a computer chip, October 5, 2000.
- Deposition Testimony of Mark P. Berkman in *Caliper Technologies Corp. v. Bertram Rowland; Flehr, Hohbach, Test, Albritton & Herbert; Aclara Biosciences, Inc., and Does One Through One Hundred*, September 7, 2000.
- Expert Witness Report of Mark P. Berkman (Confidential) in *Baxter Healthcare Corporation v. Spectranetics, Inc.*, to determine reasonable royalties in a patent infringement suit involving medical lasers, April 25, 2000.
- Trial Testimony of Mark P. Berkman, on behalf of R.E. Service Company, Inc., in the matter of *Johnson & Johnson Associates, Inc. v. R.E. Service Co., Inc.*, in the United States District Court, Northern District of California, Case No. C 97-04382 CRB, regarding damages associated with an alleged patent infringement, October 21, 1998.
- Expert Report with Kent Anderson in *Canon v. Nu-Kote International, U.S. District Court for the Central District of California, Southern Division*, regarding damages from alleged infringement of trademark, trade dress and design patents, August, 1998.
- Deposition Testimony of Mark P. Berkman, on behalf of R.E. Service Company, Inc., in the matter of *Johnson & Johnson Associates, Inc. v. R.E. Service Co., Inc.*, in the United States District Court, Northern District of California, Case No. C 97-04382 CRB, to calculate damages regarding an alleged patent infringement, July 10, 1998.

MARK P. BERKMAN

- Second Supplemental Expert Report of Mark P. Berkman, on behalf of Cellnet Data Systems, Inc., in the matter of *Cellnet Data Systems, Inc. v. Itron, Inc.*, to calculate damages regarding Itron's alleged infringement of their patent on remote electric meter reading, June 30, 1998.
- Expert Witness Report of Mark P. Berkman, on behalf of R.E. Service Company, Inc., in the matter of *Johnson & Johnson Associates, Inc. v. R.E. Service Co., Inc.*, in the United States District Court, Northern District of California, Case No. C 97-04382 CRB, to calculate damages regarding an alleged patent infringement, June 22, 1998.
- Expert Reports of Mark P. Berkman, on behalf of Cellnet Data Systems, Inc., in the matter of *Cellnet Data Systems, Inc. v. Itron, Inc.*, to calculate damages regarding Itron's alleged infringement of their patent on remote electric meter reading, April 1, 1998 and May 19, 1998.

Antitrust

- Expert Rebuttal Report of Mark Berkman, Ph.D. in the matter of *Sinclair Oil Corporation vs. eprime, Inc. and OneOK Energy Services Company, L.P.* Docket No. 055CV 435 CVE-FHM, on behalf of Sinclair Oil regarding allegations of price fixing in violation of the Sherman Antitrust Act. January 2017.
- Expert Report of Mark Berkman, Ph.D. in the matter of *Sinclair Oil Corporation vs. eprime, Inc. and OneOK Energy Services Company, L.P.* Docket No. 055CV 435 CVE-FHM, on behalf of Sinclair Oil regarding allegations of price fixing in violation of the Sherman Antitrust Act. April 2016.
- Expert Report of Mark Berkman, Ph.D. and John Simpson, Ph.D. in the matter of *Arger, et al. v. Renown Health, et al.* on behalf of St. Mary's Hospital for mediation purposes, February 2015. Confidential.
- Expert Report of Mark P. Berkman in Support for Summary Adjudication of Tesoro Refining and Marketing Company, California Public Utilities Commission, Application No. A08-09-04, regarding market power in the transport of crude oil on behalf of Tesoro, November 16, 2009.
- Deposition Testimony in the matter of *Southern Waste Systems LLC and Sun Recycling v. The City of Coral Springs Florida, Waste Management Inc., of Florida and the Broward Solid Waste Disposal District*, United States District Court Southern District of Florida Miami Division, Case No. 06-61448-CIV on behalf of plaintiffs, April 14, 2009.
- Expert Report of Mark P. Berkman in the matter of *Southern Waste Systems, LLC and Sun Recycling v. The City of Coral Springs Florida, Waste Management Inc. of Florida and the Broward Solid Waste Disposal District*, United States District Court Southern District of Florida Miami Division, Case No. 06-61448-CIV on behalf of plaintiffs regarding Commerce Clause violations and damages, February 2, 2009.
- Sworn Declaration of Mark P. Berkman in Support for Summary Adjudication of Tesoro Refining

MARK P. BERKMAN

and Marketing Company, California Public Utilities Commission, Application No. A08-09-04, regarding market power in the transport of crude oil, December 18, 2008.

- Trial Testimony in the matter of *Groeniger & Co. v. Ferguson Enterprise Inc.*, Superior Court of the State of California, County of Kern, No. 253924, on behalf of defendants regarding antitrust and anticompetitive act claims, May 16, 2007.
- Deposition Testimony in the matter of *Groeniger & Co. v Ferguson Enterprises, Inc.*, Superior Court of the State of California, County of Kern, No. 253924, April 21, 2007.
- *Waste Services Inc. v. Waste Management Inc.* in the United States District Court, Middle District of Florida, Orlando Division, Case no. 6:05-CV-00320-ACC-DAB, 2006.
- In Re High Pressure Laminates Antitrust Litigation in the United States District Court for the Southern District of New York, 2004.
- Expert witness report of Mark P. Berkman before the U.S. District Court for the Northern District of California in the matter of *Molecular Probes, Inc. v. Texas Fluorescence Laboratories, Inc.* on behalf of the plaintiff, Molecular Probes, Inc., critiquing defendant's antitrust counterclaim. San Francisco, CA, December 6, 2002.
- Trial Testimony of Mark P. Berkman before the U.S. District Court for the District of Minnesota on behalf of Superior-FCR Landfill, Inc., in the matter *Superior-FCR Landfill, Inc. v. Wright County, Minnesota*, regarding the impact of a county-need based zoning decision on interstate commerce, June 15, 2001.
- Arbitration Testimony of Mark P. Berkman in the matter of *Raisin Bargaining Association v. American Raisin Packers et al.*, on behalf of the American Raisin Packers regarding the free tonnage price for raisins in 2001, April 30, 2001.
- Expert Witness Report on Damages of Mark P. Berkman in *Cardiac Pacemakers Inc, Guidant Sales Corp, and Eli Lilly Company vs. St. Jude Medical, Inc., Pacesetter, Inc., Ventritex, Inc. and John Does 1-10*, regarding alleged anti-competitive actions by plaintiff, February 26, 2001.
- Expert Witness Report of Mark P. Berkman in *Cardiac Pacemakers Inc, Guidant Sales Corp, and Eli Lilly Company vs. St. Jude Medical, Inc., Pacesetter, Inc., Ventritex, Inc. and John Does 1-10*, regarding counterclaim damages, January 18, 2001.
- Deposition Testimony of Mark P. Berkman on behalf of Superior-FCR Landfill, Inc., in the matter *Superior-FCR Landfill, Inc. v. Wright County, Minnesota*, regarding the effects on interstate commerce of Wright County's zoning policies, August 24, 2000.
- Expert Witness Report of Mark P. Berkman on behalf of Superior-FCR Landfill, Inc., in the matter *Superior-FCR Landfill, Inc. v. Wright County, Minnesota*, regarding the effects on interstate commerce of Wright County's zoning policies, April 3, 2000.

MARK P. BERKMAN

- Affidavit of Mark P. Berkman, December 29, 1999, and Supplemental Affidavit of Mark P. Berkman, January 15, 2000, prepared on behalf of Waste Management of New York in the matter of *Waste Management of New York v. Town of Oyster Bay et al.*, reviewing the Town of Oyster Bay's contracting procedures and terms for a solid waste disposal contract.
- Rebuttal Report of Mark P. Berkman, on behalf of Randy's Sanitation, Inc., in the matter of *Randy's Sanitation, Inc. v. Wright County, Minnesota, Patrick Sawatzke, and Kenneth Jude*, January 21, 1999.
- Expert Witness Report of Mark P. Berkman, on behalf of Randy's Sanitation, Inc., in the matter of *Randy's Sanitation, Inc. v. Wright County, Minnesota, Patrick Sawatzke, and Kenneth Jude*, regarding the impacts of Wright County's flow control ordinance on interstate and intrastate trade, November 2, 1998.
- Investigation of the Proposed Merger of Waste Management, Inc. with USA Waste before the U.S. Department of Justice as required by the Hart-Scott-Rodino Act, 1998.
- Testimony before the Trade Waste Commission, City of New York on behalf of the New York City Economic Development Commission, regarding maximum rate regulation of commercial waste collection, January 21, 1997.
- *Strobe Data, Inc. v. Digital Equipment Corporation*, before the United States District Court, Western District of Washington, C96-947C, 1997.
- Investigation of the Proposed Acquisition of United Waste by USA Waste, before the U.S. Department of Justice as required by the Hart-Scott-Rodino Act, 1997.
- Expert Witness Report of Mark P. Berkman, on behalf of *Robinson Rubber Co. Inc., et al. v. Hennepin County, Minnesota*, before the United States District Court, District of Minnesota, Civil Court File No. 4-95-220, regarding the impact of Hennepin County's flow control ordinance on the demand for solid waste management services, December 30, 1996.
- Expert Witness Report of Mark P. Berkman, on behalf of Entex Information Services, in the matter of *Daniels et al. v. Random Access et al.*, in the United States District Court for the District of Colorado, Civil Action No. 95-Z-1785, regarding Sherman Act claims and damages, July 15, 1996.
- *Jerry Duke v. Browning Ferris Industries of Tennessee and Browning Ferris Industries*, Tennessee Circuit Court, 1996.
- Expert Witness Report of Mark P. Berkman in the matter of *Ben Oehrlein et al. v. Hennepin County, Minnesota*, in the United States District Court for the District of Minnesota Fourth Division, addresses what the market price for solid waste disposal in Hennepin County, Minnesota, would have been between 1989 and 1995 but-for a County Ordinance restricting

MARK P. BERKMAN

waste to designated disposal facilities, November 1, 1995.

- Affidavit of Mark P. Berkman in Support of Class Certification, on behalf of *Robinson Rubber Co. Inc., et al. v. Hennepin County, Minnesota*, before the United States District Court, District of Minnesota, Civil Court File No. 4-95-220, regarding the impact of Hennepin County's flow control ordinance on solid waste disposal costs on County residents and businesses, October 30, 1995.
- Declaration on behalf of *Ben Oehrlein et al. v. Hennepin County, Minnesota*, before the United States District Court, District of Minnesota, Civil Court File No. 4-94-63, regarding the geographic market for solid waste disposal, August 3, 1995.
- *Novadyne Computer Systems, Inc. v. Tandem Computers, Inc.*, before the United States District Court, Central District of California, No. 91-1941 THJ (KX), October, 1995.
- Affidavit on behalf of Kauai Publishing Company in *Hawaii Press Newspapers, Inc. v. Wolf Publishing et al.*, No. 88-1836-6, regarding predatory pricing claims made against Kauai Publishing, March 11, 1994.
- Investigation of the Proposed Acquisition of Attwoods, Inc. by Browning-Ferris Industries, Inc. before the U.S. Justice Department as required by the Hart Scott Rodino Act, 1994.
- Expert testimony before the U. S. District Court, District of Rhode Island, *Metals Recycling, Inc. v. American Waste Services, Inc., et al.*, on behalf of American Waste regarding market power and tying in solid waste disposal and transportation, July 17–21, 1992.
- *Metals Recycling, Inc. v. American Waste Services, Inc., and Enviroco Transportation Management, Inc.*, before the U.S. District Court, District of Rhode Island, No. 91-0149B, 1992.
- Deposition testimony on behalf of Kauai Publishing Company regarding *Hawaii Press Newspapers, Inc. v. Wolf Publishing, et al.*, First Circuit Court, State of Hawaii, Civil Case No. 88-1836-06, regarding alleged market power and predatory pricing, October 29, 1991.
- *Hawaii Press v. Wolf Publishing et al.*, before the Circuit Court of the First Circuit, State of Hawaii, No. 88-1836-06, 1991.
- *High Technology Careers, a California partnership v. San Jose Mercury News, a California Corporation*, before the U.S. District Court, Northern District of California, San Jose Division, No. 90-20579-SW, 1991.
- *BPHC Acquisition Inc. v. Penthouse International, Donald J. Trump, et al.* before the Superior Court of New Jersey, 1990.
- *Zapata Gulf Marine Corporation v. Puerto Rico Maritime Shipping Authority, et al.* before the U.S. District Court of the Eastern District of Louisiana, 1990.

MARK P. BERKMAN

- *ETSI Pipeline Project v. Burlington Northern Inc., et al.*, in the United States District Court for the Eastern District of Texas, Beaumont Division, No. B-84-979-CA, 1989.
- *Landmarks Holding Corporation, et al. v. David W. Bermant, et al.*, before the United States District Court, District of Connecticut, 1984.
- *Jefferson Disposal v. Parish of Jefferson, et al.*, before the United States District Court, for the Eastern District of Louisiana, 1984.
- *Scenic Trails, Inc. v. Greyhound Lines, Inc., et al.*, before the United States District Court, Western District of Wisconsin, 1984.

Commercial Litigation and Damages

- Expert witness report of Mark P. Berkman, Ph.D., in the matter of *Neptec Optical Solutions v. Nabuo Takahashi and Nomura Jimusho (U.S.A.)*, U.S. District Court for the Eastern District of Tennessee at Knoxville, reviewing and evaluating plaintiff's damages estimates and providing damages assessments on behalf of the defendant. November 10, 2003.—*Confidential*.
- Declaration of Mark P. Berkman before the American Arbitration Association Commercial Arbitration Tribunal in the matter of *Javad Ashjaee v. Topcon Positioning Systems, Inc.* on behalf of the plaintiff, Javad Ashjaee, calculating damages resulting from certain alleged practices by defendant Topcon Positioning Systems, Inc. that violate the Non-Compete, License and Permissible Activities Agreement between the parties. San Francisco, October 30, 2002.
- Deposition of Mark Berkman, in the matter of *Isuzu Motors Limited v. Consumers Union of United States, Inc.* in the United States District Court, Central District of California, Case No. 97 5685 RAP (RBNx), regarding rebuttal report to plaintiff's damage estimates, July 27, 1999.
- Expert Report of Mark P. Berkman and Kenneth E. Train, in the matter of *Isuzu Motors Limited v. Consumers Union of United States, Inc.* in the United States District Court, Central District of California, Case No. 97 5685 RAP (RBNx), rebuttal report to plaintiff's damage estimates, July 16, 1999.
- Supplemental Expert Report of Mark P. Berkman and Kenneth E. Train in the matter of *Suzuki Motor Corporation Japan v. Consumers Union of United States, Inc.* in the United States District Court, California Central Division Case No. SACV 96-340 AHS (ANx), response to surrebuttal report to plaintiff's damage estimates, June 10, 1999.
- Declaration of Mark P. Berkman in the matter of *Walters Furniture v. Alameda Newspapers Inc.*, in Superior Court of California, County of Alameda, Case No. 800147-8, regarding damages resulting from overstated newspaper circulation claims, June 2, 1999.
- Deposition of Mark P. Berkman in the matter of *Suzuki Motor Corporation Japan v. Consumers Union of United States*, regarding damage estimates, April 9, 1999.

MARK P. BERKMAN

- Expert Report of Mark P. Berkman and Kenneth E. Train, in the matter of *Suzuki Motor Corporation Japan v. Consumers Union of United States, Inc.*, in the United States District Court, California Central Division Case No. SACV 96-340 AHS (ANx), rebuttal report to plaintiff's damage estimates, February 23, 1999.
- Expert Witness Report of Mark P. Berkman in the matter of *Ben Oehrlein et al. v. Hennepin County, Minnesota*, in the United States District Court for the District of Minnesota Fourth Division, February 6, 1998.
- Expert Testimony and Report before the United States District Court, for the District of Minnesota Fourth Division, Civil Court File No. 4-96-CIV 188, on behalf of Edward Kraemer & Sons, in the matter of *Edward Kraemer & Sons, Inc. v. Wybierala et al.*, regarding estimating the lost profits suffered by a landfill owner as a result of unauthorized discounts to customers, December 8, 1997.
- "Report on Damages Newark Group Industries, Inc. Recycled Fibers Division Eastern Region (Newark)," on behalf of Newark Group Industries, Inc., in the matter of *The Newark Group Industries, Inc. v. Joseph Merante, et al.*, Superior Court of New Jersey, Chancery Division: Essex County regarding business damage claims, November 1996.
- Expert witness report and testimony before the Rhode Island Superior Court, *Landfill & Resource Recovery, Inc. v. Department of Environmental Management of the State of Rhode Island, et al.* (Sup. Ct., C.A. No. 81-4091), on behalf of Landfill and Resource Recovery regarding the fair market value for a landfill site, July 3, 1989.

Tribal and Indian Affairs

- Expert Report on behalf of plaintiffs in the matter of Chickasaw Nation and Choctaw Nation v. United States Department of Interior, U.S. District Court for Western District of Oklahoma, No. CIV 05-1524-W, regarding the valuation of tribal land including timber, natural gas, and gravel assets allegedly improperly sold by the Department, April, 2015.
- Testimony in the matter of Thermal Energy Company v. Bureau of Land Management, Navajo Nation, Intervenor of ILBA 2006-71, regarding the commercial quantities of coal on behalf of the Navajo Nation, January 9, 2011.
- Deposition Testimony in the matter of The Ponca Tribe of Indians of Oklahoma, et.al v. Continental Carbon Company et.al. United States District Court for the Western District of Oklahoma. Case No. CIV-05-445-C, May 30, 2008.
- Expert Report of Mark P. Berkman in the matter of The Ponca Tribe of Indians of Oklahoma, et.al v. Continental Carbon Company et.al. United States District Court for The Western District of Oklahoma Case No. CIV-05-445-C on behalf of plaintiff regarding property damage and unjust enrichment resulting from alleged failure to reduce particulate emissions, March 3, 2008.

MARK P. BERKMAN

- Deposition testimony in the matter of Rincon San Luiseño Band of Mission Indians; and HCAL Corporation, a Nevada Corporation, vs. Dan McAllister, in his official capacity as Treasurer-Tax Collector of San Diego County, on behalf of the Rincon Tribe, May 26, 2005.
- Supplemental Expert Report in the matter of Rincon San Luiseño Band of Mission Indians; and HCAL Corporation, a Nevada Corporation, vs. Dan McAllister, in his official capacity as Treasurer-Tax Collector of San Diego County, on behalf of the Rincon Tribe, May 23, 2005.
- Expert Report of Mark Berkman, PhD, “Economic Impact of the Harrah’s Rincon Casino on San Diego County, California,” in the matter of *Rincon San Luiseño Band of Mission Indians; and HCAL Corporation, a Nevada Corporation, vs. Dan McAllister, in his official capacity as Treasurer-Tax Collector of San Diego County*, on behalf of the Rincon Tribe, March 21, 2005.
- Affidavit of Mark Berkman in the matter of the *Navajo Nation v. United States of America*, on behalf of the Navajo Nation. Filed in the United States Court of Federal Claims, August 20, 2004.
- Testified before the Public Utilities Commission of the State of California on behalf of the Navajo Nation, in the matter of the Application of Southern California Edison Regarding the Future Disposition of the Mohave Generating Station, June 23, 2004.
- Prepared Superceding testimony of Mark P. Berkman, Ph.D., before the Public Utilities Commission of the State of California on behalf of the Navajo Nation, in the matter of the Application of Southern California Edison Regarding the Future Disposition of the Mohave Generating Station, May 14, 2004.
- “Preliminary Estimate of Revenues Derived by Wyoming and Fremont county from Residents and Businesses on the Wind River Reservation and Expenditures by Wyoming and Fremont County for Services to the Reservation, 1988–2002,” prepared by Mark Berkman and Benjamin Arnold for the Northern Arapaho and Shoshone Business Council, November 18, 2003.
- Prepared Direct Testimony of Mark P. Berkman before the Public Utilities Commission of the State of California on behalf of the Navajo Nation in the matter of the Application of Southern California Edison Regarding the Future Disposition of the Mohave Generating Station, March 28, 2003.
- Trial Testimony of Mark P. Berkman in *Cayuga Indian Nation of New York et al. v. George P. Pataki et al.* to calculate prejudgement interest and critique defendant’s damage estimates in a land dispute dating back to 1795, August 15, 2000.
- Expert Witness Report of Mark P. Berkman in *Cayuga Indian Nation of New York et al. v. George P. Pataki et al.* to calculate prejudgement interest and critique defendant’s damage estimates in a land dispute dating back to 1795, April 28, 2000.
- Defendant’s Expert Witness Report of Mark P. Berkman, prepared on behalf of the Crow Tribal

MARK P. BERKMAN

Council, in the matter of *Railbox Co. et al. v. Crow Tribal Council* regarding the economic basis for taxation of rail cars shipped through the Crow Reservation, revised August 3, 1999.

- Affidavit of Mark P. Berkman, prepared on behalf of the Crow Tribe of Indians, in the matter of *Crow Tribe of Indians v. State of Montana* regarding the impact of Montana taxes on the Crow Tribe's ability to manage its coal resources, October 30, 1998.
- Expert Witness Report Disclosure of Mark P. Berkman, prepared on behalf of the Crow Tribal Council, in the matter of *Railbox Co. et al. v. Crow Tribal Council* regarding the economic basis for taxation of rail cars shipped through the Crow Reservation, September 9, 1998.
- Testimony before the United States District Court, District of Montana, on behalf of the Crow Tribe of Indians and the United States in *Crow Tribe of Indians and the United States v. State of Montana, et al.*, CV-78-110 BLG-JDS, regarding unjust enrichment and damages claims made by the Crow Tribe against the State of Montana, March 31, 1994.
- Testimony before the United States District Court, District of Arizona, on behalf of the Navajo Nation in *Peabody Coal Company v. The Navajo Nation*, regarding the Navajo/Hopi coal tax dispute, March 17, 1994.
- Affidavit for Marathon Oil Company and the Shoshone and Northern Arapaho Tribes of the Wind River Indian Reservation in *Marathon Oil Company, Shoshone and Northern Arapaho Tribes of the Wind River Reservation v. State of Wyoming, et al.*, demonstrating how state and local taxes infringe on the Tribes' abilities to manage their own energy resources and to provide necessary government services on the Reservation, November 19, 1992.
- "Comments Regarding Indian Gaming Markets," prepared for the U.S. Department of Justice in the matter of *U.S. v. Trump*, 1992.
- Testimony before the Select Committee on Indian Affairs, United States Senate, on behalf of the Crow Indian Tribe regarding coal reserve appraisal, July 23, 1992.
- Testimony before Select Committee on Indian Affairs, United States Senate, "State Taxation and Indian Economic Development," May 1, 1990.
- "Preliminary Estimate of Revenues Derived by Wyoming and Fremont County from Residents and Businesses on the Wind River Reservation and Expenditures by Wyoming and Fremont County for Services to the Reservation." Prepared for the Shoshone and Arapaho Tribes, June 3, 1988.

Other

- "Branch Bank Location: A Case Analysis." With Fred Dunbar, May 1986.
- "Household Eligibility Certification: Evidence from Major Income Transfer Programs and the

MARK P. BERKMAN

Experimental Housing Allowance program.” Working paper, Washington, D.C.: The Urban Institute, 1977.

- “A Framework for the Analysis of Income Accounting Systems in EHAP.” Washington, D.C.: The Urban Institute, Contract Report No. 216-17, 1975.

KEVIN NEELS

Principal

Washington, DC

+1.202.955.5050

Kevin.Neels@brattle.com

Dr. Kevin Neels has more than 30 years experience as a consultant and research experience as an economic expert. He has worked on behalf of numerous public and private sector clients in a wide range of industries. A skilled econometrician, he specializes in the use of quantitative techniques to resolve practical business, legal and regulatory problems. His extensive practical experience in the use of economic analysis to inform business decision making and win the support of legislative, legal and regulatory authorities has taught him how to effectively communicate analytical results in laymen's terms.

Dr. Neels has offered expert testimony on a number of occasions, either in the form of an expert report, in deposition or orally. He has also supported leading academic expert witnesses. Dr. Neels has played a key role in legal and regulatory proceedings for which the financial stakes have often run into tens or hundreds of millions of dollars. His work in support of counsel has touched all phases of the legal process, including discovery, development of theory, preparation of expert testimony, examination of opposing witnesses, preparation of trial exhibits and development of cross-examination strategy.

A frequent focus of Dr. Neels' work has been estimation of economic damages. He directed the team of economists working for the Plaintiff in the trial that resulted in the largest damage judgment that had then ever been awarded in a patent infringement lawsuit. He has testified in court and before arbitration panels in disputes involving damages claims measured in tens or hundreds of millions of dollars. On many occasions he has developed econometric models to support economic damage claims and testimony in antitrust litigation. He has also frequently been responsible for review and analysis of damage estimates put into evidence by opposing experts and for development of strategies for refuting these claims.

Dr. Neels has extensive experience in the areas of antitrust economics. He has been designated as an expert witness and has offered deposition testimony in a number of antitrust disputes. His work has addressed issues of both geographic and product market definition, as well measurement of antitrust damages.

Prior to joining The Brattle Group, Dr. Neels served as Vice President at Charles River Associates. He has also served as a researcher at the Rand Corporation and at the Urban Institute, as a Director with the economic consulting firm of Putnam, Hayes & Bartlett, and as a Management Consultant in the Transportation Practice of the firm now known as KPMG. Dr. Neels is currently a member of the American Economic Association, the Licensing Executives Society, and the American Bar Association.

KEVIN NEELS

Dr. Neels has authored numerous research reports, monographs and articles for peer-reviewed journals. He has often been asked to offer expert testimony in legal and regulatory proceedings. He regularly serves as an invited speaker at conferences and industry forums, and his opinions and observations on industry developments are frequently quoted in the popular and trade press. Dr. Neels earned his Ph.D. from Cornell University.

A sample of the project experience of Dr. Neels is shown below.

EXPERIENCE

Competition

- In an antitrust case involving the airline industry Dr. Neels directed the team of economists supporting a leading academic expert in preparing analysis and testimony regarding the profitability of the defendant in comparison with a panel of comparable firms. Careful analysis of accounting, financial and economic data regarding the defendant showed that this company was earning operating margins and rates of returns on assets well above those of other firms in similar industries that had not been accused of exercising market power.
- Dr. Neels served as the principal competition witness for the acquiring party in a proceeding before the Surface Transportation Board regarding the merger of the two largest short line railroad holding companies in the U.S.
- For a major supplier of navigational information, technology and products Dr. Neels provided expert testimony on the economic effects of various forms of anticompetitive behavior engaged in by a competitor. The practices in question had to do with exclusionary contracting practices, threats of patent litigation targeted at competitor's customers, and efforts to tie patent licenses to the purchase of unrelated software and services. Dr. Neels' testimony addressed issues both of antitrust liability and antitrust damages.
- For a major international air carrier accused of monopoly leveraging and attempted monopolization of a key market, Dr. Neels prepared a report analyzing the carrier's use of corporate discounts and travel agent override commissions, and rebutting arguments that these agreements could be construed as exclusive dealing.
- Dr. Neels played a major role in the preparation of expert testimony on behalf of a group of major domestic oil companies accused of conspiring to depress the prices paid to producers of a major input to tertiary oil recovery projects. This testimony focused on an examination of

KEVIN NEELS

purchase contracts involving the defendants to establish market prices for the input in question over the alleged damage period.

- For a group of physicians involved in a health insurance-related private antitrust lawsuit he conducted a critical review and analysis of damage models prepared by opposing experts. His findings provided the basis for expert testimony by a leading university-based economist. In addition, he provided assistance to counsel in the deposition of opposing economic experts.
- Working on behalf of a major air carrier in an antitrust case involving allegations of predatory pricing, Dr. Neels worked directly with the lead litigator for the case to develop a strategy to guide discovery. Subsequently, he conducted a variety of econometric analyses measuring the extent to which plaintiffs were harmed by the alleged predation.
- For the State of Queensland, Australia Dr. Neels provided consultation on the appropriate methodology for calculating damages arising from a price fixing conspiracy among producers of construction materials.
- For a consortium of major U.S. air carriers accused of engaging in collusion and price fixing, Dr. Neels directed a major economic analysis of industry pricing strategy and pricing dynamics. Drawing upon detailed data on daily fare changes, Dr. Neels prepared testimony and exhibits demonstrating the difficulty of engaging in coordinated pricing behavior.
- In an antitrust dispute in the airline industry, Dr. Neels was retained by the defendant to critique and rebut damage calculations prepared by experts for plaintiffs. Dr. Neels conducted a detailed analysis of the assumptions underlying plaintiff estimates of lost profits, documenting numerous instances in which specific assumptions were contradicted by industry experience or by business plans prepared by the plaintiff prior to litigation. He showed that correcting these errors resulted in dramatic reductions in estimates of plaintiff damages. The case was eventually dismissed without an award of damages.
- For a major manufacturer of business jet aircraft accused of monopoly leveraging and attempted monopolization Dr. Neels conducted an analysis of the structure of the business jet aircraft market, evaluating the extent to which availability of comparable models from other manufacturers constrained the ability of the defendant in the dispute to exercise market power.

KEVIN NEELS

Intellectual Property

- Working on behalf of a major manufacturer of medical devices involved in litigation over infringement of a number of its key patents, Dr. Neels provided expert testimony of damages arising from certain components of lost sales. The patents in question covered components used in spinal surgery. Dr. Neels testimony addressed lost sales of related but non-patented components sold by the patent owner. Relying on a combination of econometric analysis and evidence drawn from contemporaneous business documents prepared by both the plaintiff and the defendant, Dr. Neels established that these related sales were a significant element of the companies' business planning and sales training procedures, and quantified the volume of sales and profits lost as a result of the infringement of the patents. Based upon his testimony and that of the other plaintiff damage witnesses, the jury awarded \$226 million in damages.
- For a leading global textile manufacturer involved in a patent infringement lawsuit, Dr. Neels offered expert testimony on the appropriate royalty rate to apply to sales made by the plaintiff that potentially infringed patents owned by the defendants, and on the damages suffered by defendants as a result of infringement of its patents.
- For a major North American rail car manufacturer involved in a patent infringement lawsuit Dr. Neels offered expert testimony on the economic value of an innovative car design relative to existing designs, and on the damages imposed on the manufacturer as a result of infringement of its patents on this new design.
- On behalf of a diversified U.S. manufacturer charged with patent infringement Dr. Neels conducted a detailed analysis of the properties of the patent holder's products, and of the claims made about them in advertisements and marketing materials. He demonstrated that claims made in advertising contradicted statements made about the products both in the patents themselves and in deposition testimony by the patent holder. His testimony supported a Lanham Act counterclaim against the patent holder. Dr. Neels also identified a number of serious flaws in damage calculations prepared by experts working on behalf of the patent holder. These flaws included implausible assumptions regarding costs, and assertions that the patent holder could have raised prices to levels well in excess of those actually charged without suffering any loss in sales volumes.
- On behalf of a financial institution charging that a former employee and that employee's new employer had copied, used and attempted to sell proprietary software, Dr. Neels prepared expert testimony quantifying the market value of the software in question. Using a reasonable royalty

KEVIN NEELS

approach, he quantified the damages that the financial institution had suffered as a result of the theft.

- For a leading U.S. manufacturer of chemicals, adhesives, tape and label product that had been the victim of a concerted program of industrial espionage by a foreign competitor, Dr. Neels quantified the economic damages resulting from the resulting theft of technology and trade secret information. Executives of the foreign firm were apprehended by the FBI in a “sting” operation, and subsequently received criminal convictions under the Economic Espionage Act. Dr. Neels offered testimony in the sentencing hearing of the criminal case on the value of the stolen property. He also offered expert testimony in the civil lawsuit filed by the U.S. company seeking redress for damages suffered as a result of the theft. The jury in the civil trial awarded \$60 million in damages based on his testimony.
- For a biotechnology company involved in a trade secret misappropriation dispute with a competitor, Dr. Neels offered expert deposition testimony on potential fields of application for the technology in question and on the factors that influenced customer decisions to incorporate the new technology in their products. In response to claims that uncertainty over ownership of the new technology had diminished interest in the technology among potential licensors, he conducted an empirical investigation into the role that technology licensing deals play in the financing of biotechnology start-up companies. This investigation included an examination of failure rates among biotech startup companies.
- For the plaintiff in an antitrust counterclaim to a patent infringement lawsuit involving an important line of biotechnology products, Dr. Neels conducted an analysis of therapeutic substitution possibilities to support testimony on product market definition.
- Dr. Neels directed the team of economists responsible for conducting the damages study for the plaintiff in a major patent infringement lawsuit in the consumer products industry. His work included development of econometric models to forecast product sales in eight major world markets, analysis of the effects of incremental changes in sales volumes on company profits, review of historical pricing strategies, and calculation of economic damages for a wide range of “but-for” pricing and product introduction strategies. Dr. Neels and his team also played a key role in the analysis of the case advanced by the opposing side and in the development of cross-examination strategies for opposing expert witnesses.
- For a major manufacturer contemplating litigation over a serious incident involving theft of trade secrets by high-ranking company officials, Dr. Neels developed a system of economic forecasting

KEVIN NEELS

models to calculate the effects of the theft of sales of the company's products in a number of major international markets. Results of this confidential investigation played a key role in the company's subsequent decision to seek redress through the courts.

- To a biotechnology company whose lawyers had thorough oversight failed to secure patent protection in Japan for a valuable new technology, Dr. Neels offered advice regarding the extent to which the value of the technology to potential licensors had been diminished.

Commercial Damages

- Working on behalf of a major defense contractor Dr. Neels offered expert trial testimony regarding the damages that the company had suffered as a result of violation of a non-compete agreement. The agreement in question was intended to prohibit the founder of a family-owned business acquired by the defense contractor from re-entering the market and competing with the acquirer. The Court ruled that the founder and his family violated the terms of this agreement, Dr. Neels' testimony calculated the magnitude of the resulting injury. His work addressed the volume of business lost as a result of this competition, and the reductions in prices and profit margins the acquirer experienced on the business that was retained.
- In a case involving the commercial printing industry Dr. Neels offered expert testimony pointing out flaws in the damage analysis introduced by the economic expert for the plaintiff. In addition to identifying numerous computational and data transcription errors, he demonstrated that the opposing expert had significantly understated the plaintiff's increment costs, and that his conclusions were based upon a completely unrealistic view of the market that ignored actual and potential competition and assumed an ability on the part of the plaintiff to earn returns on investment well in excess of market level, essentially forever.
- For a major pharmaceutical company Dr. Neels offered expert testimony before an arbitration panel on the damages his client suffered as a result of the termination of a co-marketing agreement for a prescription hormonal therapy. This agreement provided that the pharmaceutical company would assume full responsibility for payment of the marketing expenses (including product launch costs) for a prescription product developed by its co-marketing partner. In exchange, the pharmaceutical company was to receive a specified fraction of the profits generated by the product over the life of the agreement. Its co-marketing partner terminated the agreement just as the product reached a breakeven point, and well before the agreement was due to expire. Dr. Neels quantified the profits that the pharmaceutical company would have earned had the agreement run

KEVIN NEELS

its expected course, as well as the profits the company could have expected to earn on its existing portfolio of products had it never entered into the agreement. In response to Dr. Neels' testimony, the arbitration panel awarded the pharmaceutical company approximately \$60 million in damages.

- On behalf of a Japanese engine manufacturer accused of violating the terms of an engine supply agreement with a U.S. manufacturer Dr. Neels offered expert testimony before an arbitration panel rebutting damage claims made by experts for the plaintiff. Dr. Neels showed that many elements of the damage claim could not be casually related to the actions of the defendant, and that plaintiff experts had failed to account for offsetting benefits with many of the costs allegedly incurred. In the end the damages awarded to the plaintiff were limited to payment of legal fees.
- On behalf of a financial institution charging that a former employee and that employee's new employer had copied, used and attempted to sell proprietary software, Dr. Neels prepared expert testimony quantifying the market value of the software in question. Using a reasonable royalty approach, he quantified the damages that the financial institution had suffered as a result of the theft.
- For a U.S. based manufacturer of business aircraft, Dr. Neels quantified the damages resulting from significant defects in a major subcontractor-supplied aircraft component. These defects had resulted in a number of plane crashes and the eventual grounding of a significant portion of the manufacturer's fleet. Dr. Neels developed a sophisticated econometric model that controlled for the effects of a number of market-related background factors, and isolated the effects of the component defects on sales, revenues and profits.
- For a group of automobile dealers, he conducted an econometric analysis to quantify the extent to which these dealers had suffered economic injury as a result of a scheme in which executives of the auto manufacturer accepted bribes from a subset of dealers in exchange for providing them with extra allotments of highly profitable car models. The settlement of this litigation awarded a payment of several hundred million dollars to the non-bribe paying dealers.
- For a group of automobile dealers engaged in a dispute with a distributor, Dr. Neels offered expert testimony analyzing the new auto allocation procedures used by the distributor, the distributor's policies regarding accessorization of new vehicles, and their economic effects of individual dealers. This work involved extensive econometric modeling of the dynamics of dealer inventories and the determinants of time to sale for individual vehicles.

KEVIN NEELS

Other Project Experience

- For an operator of vehicle and passenger ferry services to offshore islands, Dr. Neels conducted a detailed analysis of fares, costs, market structure, the extent to which particular services are subsidized, the structure of the market for ferry services, and the likely effects of changes in conditions of entry.
- For the U.S. Department of Energy, Dr. Neels conducted an extensive investigation of the technological, institutional and economic factors influencing the demand for residential heating fuels.
- For a Gas Research Institute study of natural gas usage in the steel industry, Dr. Neels provided consultation on statistical issues and worked closely with a team of analysts examining the economics of fuel substitution.
- As leader of a project funded jointly by the Ford Foundation, the U.S. Department of Housing and Urban Development and a consortium of local corporations, Dr. Neels directed a year-long study by the Rand Corporation of strategies for privatizing municipal services in Saint Paul, Minnesota. A major component of this project was a detailed analysis of the incentives created by different financing mechanisms, organizational structures and personnel management systems. Findings of the study were published in a major report entitled *The Entrepreneurial City*.
- For the New York State Science and Technology Foundation, Dr. Neels participated in a project to facilitate the transfer to civilian firms and the commercial exploitation of photonics technology developed for military applications at a research center established at a major New York State military installation. This project included an assessment of the commercial value of the technology, the identification of firms in the vicinity of the research center with the research focus and capabilities to absorb the technology, and the design of institutional mechanisms for facilitating and supporting technology transfer.

PUBLICATIONS

“The Economic Cost of Airline Flight Delay”. With Everett B. Peterson, Nathan Barczi and Thea Graham. *Journal of Transport Economics and Policy*, Volume 47, Part 1 (January 2013): 107-121.

“Federal Funding of Transportation Improvement in BRAC Cases.” Transportation Research Board (2011).

“Private Sector: Lessons for the Public Sector” in Freight Modeling:State of the Practice in Current

KEVIN NEELS

Practice Session of *Freight Demand Modeling Tools for Public-Sector Decision Making* in Conference Proceedings 40, Transportation Research Board, September 25-27, 2006, pp. 25,26.

“Pricing-Based Solutions to the Problem of Weather-Related Airport and Airway System Delay.” *Air Traffic Control Quarterly*, Vol 10(3) 261–284 (2002).

“Congestion, Pricing and the Economic Regulation of Airports.” Transportation Research Board, The Federal Aviation Administration, Conference on Airports in the 21st Century (April 20, 2000).

“Estimating the Effects of Display Bias in Computer Reservation Systems.” With Franklin Fisher, In *Microeconomics Essays in Theory and Applications*. Ed. Maarten-Pieter Schinkel. Cambridge University Press, 1999.

“Clinical and Economic Value of Cardiovascular Nuclear Medicine.” With Carla Mulhern. (September 1996).

“Insurance Issues and New Treatments.” *Journal of the American Dental Association*, 125 (January 1994): 45S-53S.

“Medical Cost Savings from Pentoxifylline Therapy in Chronic Occlusive Arterial Disease.” *Pharmacoeconomics* 4, No. 2, (February 1994): 130-140.

“Analyzing Rent Control: The Case of Los Angeles.” With M. P. Murray, C. P. Rydell, C. L. Barnett, and C. E. Hillestad. *Economic Inquiry* 29, No. 4 (October 1991): 601–625.

“Forecasting Intermodal Competition in a Multimodal Environment.” With Joseph Mather. *Transportation Research Record* 1139 (1987).

“Modeling Mode Choice in New Jersey.” With Joseph Mather. *Transportation Research Record* 1139 (1987).

“Direct Effects of Undermaintenance and Deterioration.” With C. Peter Rydell. In *The Rent Control Debate*. Ed. Paul L. Niebanck. Chapel Hill, NC: University of North Carolina Press, 1985.

“Energy and the Existing Stock of Housing.” With M. P. Murray. In *Energy Costs, Urban Development, and Housing*. Ed. Anthony Downs and Katherine L. Bradbury. Washington, D.C.: The Brookings Institution, 1984.

“Reducing Energy Consumption in Housing: An Assessment of Alternatives.” *International Regional Science Review* 7, 1 (May 1982).

KEVIN NEELS

“Production Functions for Housing Services.” *Papers of the Regional Science Association* 48 (1981).

PROFESSIONAL AFFILIATIONS

- American Bar Association
- American Economics Association
- International Trade Commission – Trial Lawyers Association
- Licensing Executive Society
- Transportation Research Board

TESTIMONY

Before the United States District Court, Southern District of New York, Expert Report in the matter of Richard Schoninger, Jacqueline Schoninger, Scott Schoninger, and Gerald Allen, Plaintiffs vs. James Green and William Wilkison, Defendants, Civil Action No. 15-CV-2233-PAC, February 16, 2017.

“Reply Report of Dr. Kevin Neels and Dr. Nicholas Powers to Accompany UPS Reply Comments,” Report on Behalf of the United Parcel Service, Docket No. RM2016-12, November 14, 2016.

Before the U.S. International Trade Commission, Expert Report in the matter of Certain Activity Tracking Devices, Systems, and Components thereof, Investigation No. 337-TA-963, February 12, 2016.

Before the United States District Court, Southern District of California, Expert Report Regarding Damages to Warsaw Orthopedic, Inc., Case No, 08-CV-01512-CAB (MDD), September 2015.

Before the Surface Transportation Board, Reply of the Kansas City Southern Railway Company, Verified Statement, Finance Docket No. 32760 (Sub-No.46), August 2015.

Before the Postal Regulatory Commission, Washington, D.C., Supplemental Report on Behalf of United Parcel Service, Docket No. Rm2015-7, June 2015.

Before the Postal Regulatory Commission, Washington, D.C., Report on Behalf of United Parcel Service, Docket No. Rm2015-7, March 2015.

“A Review of the Pipeline and Hazardous Materials Safety Administration’s Draft Regulatory Impact Analysis,” with Mark Berkman, prepared for The Railway Supply Institute, Committee on Tank Cars, submitted in Pipeline and Hazardous Materials Safety Administration Notice of Proposed Rulemaking for Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains, Docket No. PHMSA-2012-0082 (HM-251), November 2014.

Before the U.S. District Court, Southern District of Indiana, Evansville Division, Expert Report in the matter of Berry Plastics Corporation v. Intertape Polymer Corporation, Civil Action No. 3:10-cv-0076-RLY WGH, April 2014.

KEVIN NEELS

Before the United States International Trade Commission, Washington, D.C., Expert Report in the matter of Crawler Cranes and Components Thereof, Investigation No. 337-TA-887, December 2013.

Before the U.S. District Court, Central District of California, Declaration in the matter of Otto Bock Healthcare, LP v. Ossur HF and Ossur Americas, Inc., August 2013.

Before the Surface Transportation Board, Docket No. FD 35654, Verified Statement in the Genesee & Wyoming, Inc., Control, RailAmerica Inc., et. al., July 2012.

Before the Postal Regulatory Commission, Expert Testimony in the matter of Mail Processing Network Rationalization Service Changes, Docket No. N2012-1, April 2012.

Before the U.S. District Court, District Court of Delaware, Expert Report in the matter of Finjan, Inc. v. McAfee, Inc., Symantec Corp., Webroot Software, Inc., Websense Inc., and Sophos, Inc., April 2012.

Before the U.S. District Court, Northern District of Ohio Eastern Division, Expert Testimony in the matter of Skurka Aerospace, Inc. v. Eaton Aerospace L.L.C., April 2012.

Before the U.S. District Court, Northern District of New York, Expert Report in the matter of X-Ray Optical Systems, Inc. v. Innov-X Systems, Inc., April 2012.

Before the Surface Transportation Board, Docket No. 33506, Verified Statement in the Western Coal Traffic League – Petition for Declaratory Order, November 2011.

Before the U.S. District Court, Central District of California, Expert Report in the matter of PSI Systems, Inc., Plaintiff and Counterdefendant v. Stamps.com Inc., Defendant and Counterclaimant, Case No. CV08-05233 ODW(JEMx), September 2011.

Before the U.S. District Court, Southern District of California, Expert Testimony in the matter of Medtronic Sofamor Danek USA, Inc.; Warsaw Orthopedic Inc.; Medtronic Puerto Rico Operations Co.; and Medtronic Sofamor Danek Deggendorf, GmbH v. Nuvasive, Inc., September 2011.

Before the Court of Chancery of the State of Delaware, Expert Testimony in the matter of W.L. Gore & Associates, Inc., Plaintiff v. Darrell Long and BHA Group, Inc. (d/b/a GE Energy), Defendants, C.A. No. 4387-VEP, April 2011.

Before the Circuit Court for Baltimore City, Expert Disclosure in the matter of My Professional Advice, Inc. et al., v. Persels & Associates, LLC., et al., Case No. 24-C-09-004666, September 2010.

Before the U.S. District Court, District Court of Utah, Central Division, Testimony in the matter of K-Tec, Inc., v. Vita-Mix Corporation, Case No. 2:06-CV-108, May 2010.

KEVIN NEELS

Before the International Court of Arbitration of the International Chamber of Commerce, Testimony in the matter of Aviation Partners Inc., v. Dassault Aviation S.A., ICC Case No. 15948/VRO (c. 16047/VR), February 2010.

Before the Court of Common Pleas of Lehigh County, Pennsylvania Civil Division-At Law and in Equity, Testimony in the matter of DRS Newco III, Inc., n/k/a Night Vision Systems, LLC, vs. Night Vision Equipment Company Holdings, Inc., f/k/a Night Vision Equipment Company, Inc., Excalibur Holdings, Inc., f/k/a Excalibur Electro Optics, Inc. William H. Grube, Jr. and Phyllis Grube, Civil No. 2006-C-3878, November 2008.

Before the United States International Trade Commission, Washington, D.C., Expert Testimony in the matter of Certain Hard Disk Drives, Components Thereof, and Products Containing the Same, Inv. No. 337-TA-616, July 2008.

Before the U.S. District Court for the Northern District of Georgia Rome Division, Testimony in the matter of Interface, Inc., et. al. v. Collins & Aikman Floorcoverings, Inc., et. al., Civil Action No. 4:05-CV-0133-HLM, October 2007.

Before the U.S. District Court, Northern District of California, San Jose Division, Testimony in the matter of Tele Atlas N.V. and Tele Atlas North America vs. Navteq Corporation, Case No. C 05-1673 RMW July 2007.

Before the U.S. District Court, Middle District of Florida, Testimony in the matter of erinMedia, LLC vs. Nielsen Media Research, Inc. Civil Action No. 8:05-CV-1123-T24-EAJ. June 2007.

Before the U.S. District Court, District of Massachusetts, Testimony in the matter of DePuy AcroMed, Inc., and Biedermann Motech GMBH vs. Medtronic Sofamor Danek, Inc., f/k/a Sofamor Danek Group, Inc. and Medtronic Sofamor Danek, USA, Inc. Civil Action No. 01-CV-10165 (EFH), June 2007.

Before the U.S. Postal Rate Commission, Postal Rate and Fee Changes, Docket R2006-1. Expert Report and Live Testimony, October 2006.

Before the American Arbitration Association, Testimony in the matter of The New Piper Aircraft, Inc. v. AVCO Corporation, on behalf of its Textron Lycoming Division. Arbitration No. 55 Y 181 00528 03. June 2006.

Before the Surface Transportation Board, Docket No. 657 (Sub-No.1), Verified Statement in the opening submission of Union Pacific Railroad Company, May 2006.

Before the U.S. District Court Western District Central District of Washington at Seattle, Expert Report in the matter of Esquel Enterprises Ltd. vs. TAL Apparel Ltd and TALTECH Ltd., April 2006.

KEVIN NEELS

Before the U.S. Tax Court, Docket No. 21342-03, Testimony in the matter of Van der Aa Investments, Inc., a dissolved Delaware Corporation; and Terry L. Van der Aa, Trustee vs. Commissioner of Internal Revenue, December 2005.

Before the U.S. District Court for the District of Massachusetts, Docket No. 03-10820-GAO, Testimony in the matter of Paul Quaglia vs. Eaton Corporation and Cutler-Hammer, Inc., November 2005.

Before the U.S. Department of Transportation, Docket No. OST-2004-19214, Submission in support of American Airlines' comments on the joint application of Alitalia-Linee Aeree Italiane-S.p.A., Czech Airlines, Delta Airlines, Inc., KLM Royal Dutch Airlines, Northwest Airlines Inc., and Société Air France for approval of and Antitrust Immunity for Alliance Agreements, June 2005.

In the Matter of and Arbitration under Chapter Eleven of the North American Free Trade Agreement and the UNCITRAL Arbitration Rules, United Parcel Service of America, Inc, Investor, and The Government of Canada, Party, March 2005.

Before the U.S. District Court, Western District of Oklahoma, Testimony in the matter of Ponder, *et al.* vs. Gulfstream Aero Corporation, *et al.*, Civil Docket No. 5:02cv739, October 2004.

Before the Surface Transportation Board, Docket No. 27590 (Sub-No.3), Verified Statement in support of Trinity Industries' comments on TTX Company's application for approval of pooling of car service with respect to flatcars, April 2004.

Before the American Arbitration Association, Commercial Arbitration Tribunal, Testimony in the matter of Solvay Pharmaceuticals, Inc. vs. Duramed Pharmaceuticals, Inc., Case No. 53 181 00564 02, November 2003.

Before JAMS Arbitration, Testimony in the matter of Transcore Holdings, Inc. vs. Rocky Mountain Mezzanine Funding II, L.P.; Hanifen Imhoff Mezzanine Fund, L.P.; Moramerica Capital Corporation; and NDSBIC, L.P., and W. Trent Ates and Fred H. Rayner, September 2003.

Before the U.S. District Court Southern District of Ohio Western Division (Cincinnati), Testimony in the matter of Gooby Industries Corp., Century Box Division, and David S. Kagan vs. Frank J. Veneziano, and Weltman, Weinberg & Reis Co., L.P.A., September 2003.

Before the U.S. District Court Central District of California Western Division, Testimony in the matter of Winn Incorporated and Ben Huang vs. Eaton Corporation, July 2003.

Before the Superior Court of New Jersey, Law Division Docket No. CAM-L-6235-00, Testimony in the matter of Bruce Zakheim, M.D. on behalf of himself and all others similarly situated vs. AmeriHealth HMO, Inc., October 2002.

Before the U.S. District Court, Eastern District of Pennsylvania, Testimony in the matter of National

KEVIN NEELS

Steel Car, Ltd. vs. Canadian Pacific Railway, Civil Docket No. 2:02cv6877, August 2002.

Before the U.S. District Court for the District of New Hampshire, Affidavit in the matter of George Lussier Enterprises, Inc., d/b/a Lussier Subaru, et al. vs. Subaru of New England, Inc., Ernest J. Boch, and Joseph A. Appelbee, June 2002.

Before the U.S. District Court for the District of Massachusetts, Expert Report in the matter of City of New Bedford, and New Bedford Harbor Development vs. Woods Hole, Martha's Vineyard & Nantucket Steamship Authority, May 2002.

Before the Court of Common Pleas, Cuyahola County, Ohio, Affidavit in the matter of KeyBank National Association vs. Corrillian Corporation, et al, April 2002.

Before the U.S. District Court for the District of New Hampshire, Affidavit in the matter of George Lussier Enterprises, Inc., d/b/a Lussier Subaru, et al., vs. Subaru of New England, Inc., Ernest J. Boch, and Joseph A. Appelbee, February 2002.

Before the Court of Common Pleas, Cuyahola County, Ohio, Expert Report in the matter of KeyBank National Association vs. Corrillian Corporation, et al, January 2002.

Before the District Court of the Fourth Judicial District of the State of Idaho, in and for the County of Ada, Testimony in the matter of Dirk Dunham Construction, Inc. vs. Ada County Highway District, Case No. CV OC 0005122D, June 2001.

Before the Federal Court of Australia, Queensland District Registry, Expert Report in the matter of State of Queensland vs. Pioneer Construction Materials Pty. Limited, Boral Resources (QLD) Pty. Limited, CSR Limited, Hymix Industries Pty. Limited, Goodmix Concrete Pty. Limited, Amatek Limited (trading as Rocla Concrete), and Excel Concrete Pty. Ltd., January 2001.

Before the U.S. District Court, District of Massachusetts, Expert Report in the matter of J.E. Pierce Apothecary, Inc., Sutherland Pharmacy Inc., Meetinghouse Community Pharmacy Inc., and Medfield Pharmacy, Inc., on behalf of themselves and a class of similarly situated entities v. Harvard Pilgrim Health Care, Inc., Health New England, Inc., CVS Corporation, and Pharmicare Management Services, Inc., January 2001.

Before the U.S. Postal Rate Commission, Postal Rate and Fee Changes, Docket R2000-1. Expert Report and Live Testimony, May 2000.

Before the U.S. District Court, Northern District of Ohio, Eastern Division, Testimony in the matter of Avery Dennison Corporation vs. Four Pillars Enterprise Co., Ltd., P.Y. Young, Huen-Chan (Sally) Yang and Tenhuong (Victor) Lee, Case No. 1:97 CV. 2282, September 1999.

KEVIN NEELS

Before the American Arbitration Association, Testimony in the matter of Westerbeke Corporation vs. Daihatsu Motor Co., Ltd., Arbitration No. 13 T 153 01057 97, August 1999.

Before the Commonwealth of Massachusetts, Superior Court Department of the Trial Court, Worcester Division, Testimony in the matter of Performance Polymers, Inc. vs. Mohawk Plastics, Inc. and Dimeling Schreiber & Park, Civil Action No. 98-0230A (Mass./Worcester), July 1999.

Before the American Arbitration Association, Testimony in the matter of GCC Technologies Inc. vs. Toshiba TEC Corporation, American Arbitration Number 50 T1815897, March 1999.

Before the U.S. District Court, District of Maryland, Testimony in the matter of Borman Motor Company Limited Liability Co., et al. vs. American Honda Motor Company Inc., et al. Civil Action MDL-1069, August 1998.

Before the U.S. Postal Rate Commission, Postal Rate and Fee Changes, Docket R97-1. Expert Report and Live Testimony, February 1998.

Before the U.S. District Court, District of Kansas, Testimony in the matter of Timothy Mellon vs. The Cessna Aircraft Company. Civil Action 96-1454-JTM, Expert Report, November 1997.

Before the U.S. District Court, Southern District of New York, Testimony in the matter of Virgin Atlantic Airways Limited vs. British Airways PLC. Civil Action No. 93-7270 (MGC). Affidavit, August 1997.

Before the U.S. District Court, Western District of Pennsylvania, Testimony in the matter of Lazy Oil Co., John B. Andreassi and Thomas A. Miller Oil Co. vs. WITCO Corporation; Quaker State Corporation; Quaker State Oil Refining Corp.; Pennzoil Company; and Pennzoil Products Company. Civil Action No. 94-110E, Class Action. Expert Report, March 1996; live testimony April 28, 1997.

Before the U.S. District Court, Eastern District of Pennsylvania, Testimony in the matter of Stephen M. Clifton and Stephen M. Clifton Ultra Sonoco vs. Sun Refining & Marketing Company. Civil No. 95-CV-7694. Expert Report, February 1997.

Before the U.S. District Court, Northern District of Georgia, Testimony in the matter of ValuJet Airlines, Inc., vs. Trans World Airlines, Inc., and Delta Air Lines, Inc. Civil Action No. 1:95-cv-2896-GET. Expert Report, June 1996.

Before the State of Michigan, Testimony in the matter of Wayne State University, Lumigen, Inc. and A. Paul Schaap vs. Irena Bronstein and Tropix. Circuit Court Case No. 88-804-627CK, Court of Claims Case No. 88-11871CM. December 13, 1994.

Before the U.S. District Court, Central District of California, Testimony in the matter of Blecher &

KEVIN NEELS

Collins vs. Northwest Airlines. Case No. 92-7073-RG (SHx). November 15, 1993.

Before the U.S. District Court, District of Maine, Testimony in the matter of Penobscot Bay Women's Health Center vs. Penobscot Bay Medical Center. Civil Action No. 86-0110-8. July 19, 1990.

CHARLES E. GIBBONS

Senior Associate

San Francisco, CA

+1.415.217.1055

Charlie.Gibbons@brattle.com

Dr. Charles Gibbons is a Senior Associate with The Brattle Group who specializes in applying sophisticated econometric and statistical models to legal, regulatory, and policy issues. His work has been used in a variety of litigation matters, including structural modeling of antitrust damages, models of mortgage delinquencies, forensic analysis of product defects, and impacts of an environmental accident on outdoor recreation. He has also conducted conjoint surveys to calculate the value that consumers place on features of products and developed models for forecasting electricity sales and peak demand for utilities. His work has been used for class certification, liability determination, and damage calculations.

Additionally, Dr. Gibbons was a lecturer at the University of California, Berkeley where he last taught a graduate-level course in probability and statistics. He received a Ph.D. in economics and an M.A. in statistics from the University of California, Berkeley. His dissertation proposed new methods in applied econometrics and a theory of competition for online advertising auction platforms.

EDUCATION

University of California, Berkeley	Ph.D., economics	2012
University of California, Berkeley	M.A., statistics	2012
Cornell University	B.A. economics and government	2006

ACADEMIC POSITIONS

University of California, Berkeley	Lecturer	2012—2015
University of California, Berkeley	Instructor	2011

EXPERIENCE**Survey Design and Analysis**

- Submitted a report to a regulatory agency discussing the scientific reliability of product sampling data supporting nutrition label claims
- Designed a conjoint survey to elicit consumers' preferences for features of an online music streaming service and used state-of-the-art models to estimate willingness-to-pay for those features as part of a royalty setting proceeding

Causality Analysis for General Litigation

- Developed structural models for estimating antitrust damages
- Determined whether defective devices could be detected indirectly using historical measurements rather than directly through testing for class certification purposes

CHARLES E. GIBBONS

- Modeled the impact of an advertising campaign on demand for competing products in the context of a false advertising case using sales data and consumer sentiment analysis

Environmental Damages Litigation

- Estimated the impacts of an environmental accident on recreation to the affected area
- Calculated the value of surface water deliveries to growers in the Klamath Basin as part of an environmental takings case on behalf of the U.S. Department of Justice

Mortgage-Related Litigation

- Assessed the causal relationship between defective underwriting practices and subsequent mortgage delinquencies by a major lending institution on behalf of the U.S. Attorney's Office
- Evaluated mortgage origination and pricing records for evidence of racial discrimination practices at nationwide lending institutions for the Consumer Financial Protection Bureau

Utilities Consulting and Litigation

- Developed sales and peak demand forecasts for CLP Hong Kong and supported them before the utility's governing agency
- Calculated the costs of delinquent accounts to a major telecommunications firm for use in class action litigation

PUBLICATIONS

Under Review

“Broken or Fixed Effects?” (with Juan Carlos Suárez Serrato and Mike Urbancic)

In Process

“Quantile Regression for Peak Demand Forecasting” (with Ahmad Faruqui)

“Ad Server and Firm Strategies in Contextual Advertising Auctions”

“LATE for School: Instrumental Variables and the Returns to Education” (with Mike Urbancic)

“Housing Wealth and the Demand for Electricity” (with Joe Wharton)

ACADEMIC HONORS AND FELLOWSHIPS

National Science Foundation (IGERT) Politics, Economics, Psychology, and Public Policy Fellow

Searle Center on Law, Regulation, and Economic Growth (Northwestern University) Award

Institute for Humane Studies Fellow

University of California, Berkeley, Department of Economics Fellowship

CHARLES E. GIBBONS

PRESENTATIONS

California Energy Commission Demand Analysis Working Group, September 2014. “Quantile Regression for Peak Demand Forecasting.”

Center for Research in Regulating Industries, 2014. “The Application of Quantile Regression to Forecasting Peak Demand.” (Eastern and Western conferences)

Electric Utility Forecasters' Forum, June 2012. “Housing Wealth and the Demand for Electricity: Prometheus Bound.” (with Joe Wharton)

U.S. Federal Trade Commission, Microeconomics Conference, November 2011. “Ad Server and Firm Strategies in Contextual Advertising Auctions.”

Northwestern University, Searle Center Conference on Internet Search and Innovation, June 2011. “Firm Strategy in Contextual Advertising Auctions.”

University of California, Berkeley IGERT seminar, October 2009. “Broken or Fixed Effects?”

PROFESSIONAL AFFILIATIONS

Referee: *International Journal of Forecasting, Industrial Relations*

Member: American Economic Association, American Statistical Association

Appendix B

Documents Relied On

1. Academic Literature

1. Daowei Zhang, *The Softwood Lumber War: Politics, Economics, and the Long U.S.-Canadian Trade Dispute* (2007).
2. Feng'e Yang and Shashi Kant, *Rent Capture Analysis of Ontario's Stumpage System Using an Enhanced Parity Bounds Model*, 84 LAND ECON. 667, 670 (2008).
3. Harvey S. Rosen, *Public Finance* (7th ed. 2005).
4. Larry A. Leefers and Karen Potter-Witter, *Timber Sale Characteristics and Competition for Public Lands Stumpage: A Case Study from the Lake States*, 52 FOREST SCI. 460, 460-467 (2006).
5. Marco Boscolo and Jeffrey R. Vincent, *Area Fees and Logging in Tropical Timber Concessions*, 12 ENV'T & DEV. ECON. 505-509 (2007).
6. R. Quentin Grafton, Robert W. Lynch, and Harry W. Nelson, *British Columbia's Stumpage System: Economic and Trade Policy Implications*, 24 CANADIAN PUB. POLICY S42, S45 (1998).
7. Ross N. Brown, Michael A. Kilgore, Jay S. Coggins, and Charles R. Blinn, *The Impact of Timber-Sale Tract, Policy, and Administrative Characteristics on State Stumpage Prices: An Econometric Analysis*, 21 FOREST POLICY & ECON., 71, 79 (2002).

2. Other

8. Alberta Agriculture and Forestry, *Sustainable Forest Management 2014 Facts & Statistics: Annual Allowable Cut 1* (2016).
9. Alberta Agriculture and Forestry, *Alberta Mill Closure and Curtailment Announcements* (2007-2015).
10. Global Affairs Canada, *Softwood Lumber: Monthly Export Reports (Canada-US)*, http://www.international.gc.ca/controls-controles/softwood-bois_oeuvre/recent_reports-rapports_recents.aspx?lang=eng, (accessed Jan. 3, 2016).
11. National Forestry Database, Canadian Forest Service, *Alberta Forest Products – Softwood* http://nfdp.ccfm.org/dynamic_report/dynamic_report_ui_e.php, (accessed Sept. 14, 2016).
12. National Forestry Database, Canadian Forest Service, *Alberta Forest Products – Softwood*, http://nfdp.ccfm.org/dynamic_report/dynamic_report_ui_e.php, (accessed Oct. 20, 2016).
13. Rod Simpson, MNP LLP, "Cross Border Analysis of Stumpage and Log Prices in Alberta and Six Other Jurisdictions," March, 2017
14. Statistics Canada, *Lumber Production, Shipments, and Stocks*, <http://www5.statcan.gc.ca/cansim/a26?id=3030064&retrLang=eng&lang=eng>, (accessed Jan. 3, 2016).

15. Trade Data Online, Canada Innovation, Science and Economic Development, *Alberta Exports, Product 4407*
<https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?&productType=HS6&lang=eng>, (accessed Oct. 4, 2016).
16. U.S. Census Bureau. *New Housing Units Under Construction*,
https://www.census.gov/construction/nrc/historical_data/index.html (accessed Dec. 8, 2016).