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Converting Royalty Payment  
Structures for Patent Licenses

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The parties to a patent-licensing agreement may choose from a variety of royalty structures to determine the royalty payment that the licensee owes the patent holder for using its patents. Three common structures of a royalty payment are (1) an *ad valorem* royalty rate, (2) a per-unit royalty, and (3) a lump-sum royalty. A royalty payment for a license might use a single royalty structure or a combination of these three structures.

Converting a royalty payment with one structure into an equivalent payment with another structure enables one to compare royalty payments across different licensing agreements. For example, in patent-infringement litigation, an economic expert can estimate damages for the patent in suit by examining royalties of comparable licenses—that is, licenses that cover a similar technology and are executed under circumstances that are sufficiently comparable to those of the hypothetical license in question.<sup>1</sup> However, licenses for a single patented technology might specify the royalty payment using different structures. One license might specify a per-unit royalty, a second might specify a lump-sum royalty, and a third might combine a lump-sum payment with a royalty rate. To analyze and compare the different royalty payments of those licenses, an economic expert or court must convert the royalties to a common structure. For example, a question related to the conversion of the royalty structure arose in August 2016 in *Trustees of Boston University v. Everlight Electronics Co.*, where, in granting an interlocutory appeal, the court asked “whether a district court can correct a damages figure on a motion for remittitur by extrapolating a royalty rate and base

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\* Chairman, Criterion Economics, Washington, D.C. I thank Jeremy Skog and Jenny Jihyun Park for helpful comments. The views expressed here are solely my own. Email: [jgsidak@criterioneconomics.com](mailto:jgsidak@criterioneconomics.com). Copyright 2016 by J. Gregory Sidak. All rights reserved.

<sup>1</sup> See, e.g., *LaserDynamics, Inc. v. Quanta Comput., Inc.*, 694 F.3d 51, 79 (Fed. Cir. 2012).

from the jury's lump-sum award without express expert testimony explaining how to do so."<sup>2</sup>

Some courts have been skeptical that one can convert royalties across different structures. For example, also in August 2016 in *Baltimore Aircoil Co. v. SPX Cooling Technologies Inc.*, Judge Catherine Blake of the U.S. District Court for the District of Maryland excluded, in an order ruling on the patent holder's *Daubert* motion,<sup>3</sup> the opinion of the alleged infringer's economic expert, Kimberly Schenk of Charles River Associates, for using "lump sum agreements in calculating running royalty rates."<sup>4</sup> Judge Blake faulted Ms. Schenk for providing no justification for using the alleged infringer's sales projections in converting between the two royalty structures and concluded that her opinion "offer[ed] mere speculation masquerading as quantitative analysis."<sup>5</sup>

In this article, I explain how economic methodologies can enable an expert or a court to convert royalty payments reliably across different royalty structures. I show that such conversion of royalty payments requires not an accounting framework, but rather an *economic* framework. Projecting future sales, product prices, and market conditions are vital not only to producing accurate estimates of expected royalty payments, but also to converting those royalty payments across licenses that might specify different royalty payment schedules. Although those projection methods require additional judgment beyond a simple and straightforward calculation, converting royalty payments across different structures is a standard exercise that involves processes similar to those used to value patents outside adversarial proceedings.<sup>6</sup> The conversion of royalty payments across different structures need not be unreliable or inherently speculative.

In Part I, I describe three common structures of royalty payments for patents and analyze their main differences. In Part II, I explain how one can deconstruct a royalty payment into an equivalent payment with a different royalty structure in both simple and complex one-way licenses. In Part III, I show how to extend this framework to include the value of a cross license flowing back to the net licensor. I show that such methods enable courts to convert and reliably compare the royalty payments of different structures.

<sup>2</sup> Nos. 12-11935, 12-12326, 2016 WL 4238554, at \*2 (D. Mass. Aug. 9, 2016).

<sup>3</sup> *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589–97 (1993) (establishing the district court as "gatekeeper" for admitting scientific expert testimony); see also J. Gregory Sidak, *Court-Appointed Neutral Economic Experts*, 9 J. COMPETITION L. & ECON. 359, 384–86 (2013) (analyzing *Daubert* and its progeny).

<sup>4</sup> No. CCB-13-2053, 2016 WL 4426681, at \*25 (D. Md. Aug. 22, 2016).

<sup>5</sup> *Id.*

<sup>6</sup> See, e.g., Tim Heberden, *Intellectual Property Valuation and Royalty Determination*, in INTERNATIONAL LICENSING AND TECHNOLOGY TRANSFER: PRACTICE AND THE LAW ch. 4 (Adam Liberman, Peter Chrocziel & Russell Levine eds., Wolters Kluwer 2011).

I. THREE PRIMARY STRUCTURES  
OF ROYALTY PAYMENTS

A patent license typically contains one or more of the following three royalty structures: (1) an *ad valorem* royalty rate, (2) a per-unit royalty, or (3) a lump-sum royalty. If the license specifies a royalty rate, the parties calculate the royalty payment as a percentage of a royalty base, which is typically the sales price of each sold product that practices the licensed technology. The patent holder charges the licensee that royalty payment in increments at a predetermined frequency, often on a yearly or quarterly basis. Under a royalty-rate structure, the royalty payment is positively correlated with both the price and the number of sold units of the product that practices the licensed patent. An increase in the quantity of units sold, an increase in the per-unit price of the patent-practicing product, or some combination the two will increase the total royalty payment. However, the licensee will not pay the patent holder any royalty if it does not sell any patent-practicing products.

When a license specifies a per-unit royalty, the royalty payment is dependent on and positively correlated with the number of shipped units—that is, the volume of patent-practicing products that the licensee sells during the term of the license agreement. Thus, the royalty payment that a licensee pays under the terms of a per-unit royalty, like that of a royalty rate, varies directly with the licensee’s use of the patented technology. When the licensee’s shipment volume increases or decreases, the total royalty that the licensee pays changes accordingly. However, unlike a royalty rate, a per-unit royalty is independent of changes in the sales price of the patent-practicing product.

In contrast to a royalty rate or per-unit royalty, a lump-sum royalty specifies a fixed, aggregate amount that the licensee must pay to obtain the right to use the patented technology during the term of the license. A lump-sum royalty removes the administrative burden and costs of monitoring the actual use of the licensed technology because the royalty payment is independent of the licensee’s *actual* sales. The licensing parties typically agree upon the amount of the lump-sum royalty before the royalty-bearing sales occur—that is, they typically calculate a lump-sum payment in advance by using the licensee’s *projected* sales revenue or unit shipments for the duration of the license.<sup>7</sup> The licensee typically makes that payment at the beginning of the license term or according to a predetermined payment schedule. The licensee will pay the full amount of the predetermined lump-sum royalty regardless of the extent to which it actually uses the licensed technology.

<sup>7</sup> See, e.g., *Linkco, Inc. v. Fujitsu Ltd.*, 232 F. Supp. 2d 182, 188 (S.D.N.Y. 2002) (“[A] reasonable royalty may be computed in various ways, including a lump-sum royalty based on expected sales.”).

Thus, a lump-sum royalty might not reflect accurately the licensee's *ex post* use of the patented technology.<sup>8</sup>

## II. CONVERTING ROYALTY PAYMENTS OF A ONE-WAY LICENSE

Using economic methodologies, one can convert a royalty with any given structure into an equivalent royalty that uses a different structure. For example, one can convert a royalty payment that is specified as a per-unit royalty into an equivalent royalty payment under a different structure, such as an *ad valorem* royalty rate. I will use the term *derived royalty* to indicate a royalty that one obtains from the deconstruction or transformation of a royalty payment. Because the derived royalty and the original royalty payment of a license imply the same expected payment at the time of a license's issuance, the parties to a patent-licensing agreement will be indifferent between the two royalty payments.

I begin my analysis by examining a one-way license—that is, a license in which the parties determine the royalty that the licensee will pay the patent holder to use its licensed patents. The parties might determine the royalty payment using a single royalty structure or by using a complex structure that combines multiple royalty structures.

### A. Licenses That Use a Single Royalty Structure

Simple economic methodologies enable the conversion of royalties in one-way licenses that use a single royalty structure. Suppose that a license specifies a per-unit royalty and that one must convert that royalty into an equivalent *ad valorem* royalty rate. To do so, one should compare the expected royalty payments under the two royalty structures and find the royalty rate that makes the two payments equal under appropriate assumptions. For example, when the license specifies a per-unit royalty, the expected royalty payment that the patent holder will receive equals the per-unit royalty multiplied by the projected number of the patent-practicing product's sold units, which the parties estimate at the time of the license's issuance. Equation (1) states this relationship:

$$\text{Per-Unit Royalty Fee} \times \text{Projected Number of Units} = \text{Expected Royalty Payment.} \quad (1)$$

Conversely, when the license specifies an *ad valorem* royalty rate, the expected royalty payment equals the projected price of the licensed product multiplied

<sup>8</sup> See J. Gregory Sidak, *How Relevant Is Justice Cardozo's "Book of Wisdom" to Patent Damages?*, 16 COLUMBIA SCI. & TECH. L. REV. 246 (2016).

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