INTELLECTUAL PROPERTY

PATENT DAMAGES REMEDIES

THE CONVERGENCE OF ECONOMICS AND LAW

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INRODUCTION: THE MEASUREMENT OF DAMAGES

Once a patent is held valid, enforceable and infringed, then the issue of damages must be addressed. In patent cases both in the United States and Canada damages are provided for by statute. "In the United States a patentee whose patent has been infringed is entitled to: (1) an award of lost profits from sales the patentee would have made "but for" the infringement; or (2) a reasonable royalty on infringing sales; or (3) a combination of (1) and (2). A reasonable royalty award provides the floor below which damages cannot fall." (Linck, p.1)

"In Canada Section 55 (1) of the Patent Act provides (inter alia):

> A person who infringes a patent is liable to the patentee and to all persons claiming under the patentee for all damages sustained by the patentee or by any such person, after the grant of patent, by reason of infringement." (William L. Hayhurst Q.C. p.271)

The Canadian statute does not infer that a reasonable royalty is the floor for damages; however, it may coexist or be applied exclusively of a lost profit calculation.

In intellectual property cases the court has an obligation to award damages or an equivalent remedy to a successful plaintiff. A damage award focuses on the loss suffered by the person wronged, as opposed to an accounting of profits, which focuses on the benefits of the unlawful action enjoyed by the wrongdoer. Accounting of infringer's profits, as an equity remedy has not been available in the United States since 1946.

Damage principles in intellectual property cases are for the most part consistent with a modern understanding of general tort principles. This was emphasized by the English Court of Appeal in Gerber Garments v. Lectra:

> "Infringement of a patent is a statutory tort; and in the ordinary way one would expect the damage recoverable to be governed by the same rules as with many or most other torts. We were referred to Halisbury's laws of England (4th edn.) vol. 12 Para. 1128 and following, to establish the elementary rules (1) that the overriding principle is that the victim should be restored to the position he or she would have been in if no harm had been done, and (2) that the victim can recover loss which was (i) foreseeable, (ii) caused by the wrong, and (iii) not excluded from recovery by public and social policy. The requirement of causation is sometimes confused with foreseeability, which is remoteness." (Gerber Garment Technology v. Lectra Systems Ltd., (1997) R.P.C. 443, at 452 (C.A.), per Staughton L.J.)

Although this may seem like an ordinary statement, recent intellectual property cases still refer back to the old "natural and direct" standard of causation and remoteness. The classic statement is that "the loss must be the natural and direct consequence of the [defendants] acts." (Lord Macnaghten in United Horse - Shoe, United Horse Shoe and Nail Co v. Stewart & Co. (1888), 5R.P.C. 260, at 268 (H.L.))

This was specifically disapproved by the English Court of Appeal:

> "I am inclined to think that a court might in some cases, where there did not exist a quoted figure for a license, estimate the damages in a way closely analogous to a

royalty calculation. It is the duty of the defendant to respect the monopoly rights of the plaintiff. The reward to a patentee for his invention is that he shall have exclusive right for the use of his invention, and if you want to use it, it is your duty to obtain his permission. I am also inclined to think that it would be right for the court to consider what would have been the price which [although none was quoted] could have reasonably been charged for that permission, and estimate the damages in that way. Indeed, I think that in many cases that would be the best and safest way to arrive at a sound conclusion as to a proper figure. But I am not going to say a word which will tie down future judges and prevent them from exercising their judgment, as best they can in all circumstances of the case." (Lord Buckley, in Meters Ltd. v. Metropolitan Gas Meters Ltd. 28 R.P.C. 157, at 164 – 165)

The whole subject matter of the calculation of damages is one that is not capable of being mathematically ascertained by any exact figure. Thus, as a first step, the referee hearing a damages case reference must determine the plaintiffs "but for" operating reality to discover the basis for restoring the plaintiff to where he or she would have been "but for" the infringement. If the royalty was regularly subjugated through licensing, the award would be based on a royalty award which will later be discussed in greater detail within this paper. If the intellectual property was exploited through manufacturing and distribution, the referee can divide the infringer's sales into, (1) those the patentee would have captured "but for" the infringement, and (2) those the right holder would not have captured. For the sales the plaintiff would have captured the court will award lost profits, and for those the right holder would not have captured the court will award the patentee a

reasonable royalty on the sales. Finally, if the parties cannot establish either lost profits or a normal licensing policy, the default remedy in damages is a reasonable royalty, or in one of equity, a calculation of infringers disgorgement of profits.

If only the real world were that simple. The courts in both Canada and the United States have in the late 1990s and in recent years (especially in the United States where due to the greater number of cases, the case law has progressed at a much faster pace than in Canada) court decisions have taken a very broad view of the notion "damages adequate to compensate infringement": the U.S. Supreme Court and the Supreme Court of Appeals (CAFC) has interpreted this to mean that "adequate damages should approximate those damages that will fully compensate the patentee for infringement." (Rite Hite v. Kelly Co., Inc. 35 USPQ2nd 1065, 1068 discussing General Motors v Devex Corp., 461 U.S. 648) As a result a number of additional damage measures have been allowed by the courts, including (but not limited to): damages for price erosion, lost profits on convoyed but non-patented products, market spoilage, lost profits due to accelerated market entry, opportunity costs, evaluation of non-infringing alternatives and economic theory.

The availability of each of these damage measures depends to a large extent on the facts and circumstances of each case as well as the ability of the patent holder to support each measure of damage claimed such that the loss is not speculative. The analysis and measurement of damages in patent infringement actions is generally undertaken under the assumption that the defendants have been (or will be) found liable for the alleged infringement. The same assumption is made for the purposes of this paper. I will explain

and outline these additional damage measures as well explain the importance of recognizing economic theory and the market in which it operates as they relate to the "but for" world of damages.

PURPOSE OF COMPENSATORY DAMAGES

"Compensatory damages compensate the plaintiff for economic harm caused by the defendant. The purpose of awarding these damages is to discourage socially undesirable behavior and encourage socially desirable behavior. A provision allowing for damages equal to the profit that the innovator would have made, absent infringement, maintains the financial incentive to innovate. This assurance also discourages innovators from diverting scarce resources from productive uses to less efficient means of protecting their invention. Protecting intellectual property by providing for compensatory damage awards under the Patent Act is a less costly and more effective means of accomplishing society's objectives. Thus, to be efficient a damage award needs to return to the patent owner an amount at least equal to its economic harm."(O'Brien, p.2)

Damage awards greater than their economic harm can lead to socially undesirable behavior as innovators will have an incentive to litigate rather than negotiate and/or mitigate. If the cost of an unknowing infringer's investment is greater than the profits that the patent owner forgoes, a negotiated license based on these savings will increase social welfare. As well, if companies (infringers) face the risk of unreasonably high damage

awards they will be reluctant to pursue innovation and products that have the possibility of infringement. If they cannot resolve the uncertainty about infringement without an expensive trial, companies will minimize their exposure by restraining research and development in the uncertain technology. For these reasons, it is of great importance that compensatory damage awards be it a reasonable royalty, lost profits or a combination of both, accurately measure the patent owner's economic harm and no more than that.

ECONOMIC THEORY AND THE FIRST LAW OF DEMAND

Economic theory can be a powerful tool in the calculation of patent infringement damages. "In my opinion it is best to treat accountants (forensic) and economists as complements rather than substitutes. Accountants, I believe are better suited than economists for assisting in the fashioning of discovery requests, reviewing financial documents and quantifying damages. Economists, on the other hand, are better equipped to assist in the development of an effective damage theory. I have experienced the benefits of this complementary relationship in working with Coopers & Lybrand in patent cases." (Glick P.7)

Ultimately, calculating economic compensation requires a determination of what the patent owner's income would have been absent the infringement. If there had been no infringement, the patent holder may have produced and sold the product itself, or it may have licensed another producer or seller, either exclusively or non-exclusively. If it would have produced the product "but for" the infringement, then lost profits are the appropriate

approach to compensation. If the patent owner would have licensed the patent "but for" the infringement, then the best damage measure is the lost "reasonable" royalty.

The problem is that the most likely optimal strategy for the patent owner, absent infringement, may have involved both production and licensing. The patent owner is likely to be the lowest cost producer over a limited range of output, while others may be more efficient in producing additional units of output or selling in other markets. Under such circumstances, the patent owner has an incentive to produce a limited range of output and then license any further production. This is because the licensee can produce more cheaply, and therefore, sell the patented item more profitably than could the patent owner over these additional units of output. The licensee's costs, however, must include the royalty charged by the patent owner. As a result, the division of output between patent owner and the licensee is functionally related to the size of the royalty. The patent owner's price is also related to the level of output it can sell. Thus, for the patent owner, the decision of what range of output to produce, what price to charge and what royalty to offer is really a single integrated decision.

The optimal combination of production and licensing will depend on (i) the nature of the competition, (ii) the number and characteristics of the competitors, (iii) the cost structure (economies of scale) of the patent owner and the potential licensees, and (iv) the extent to which licenses are passed on in the final product prices. These factors are uniquely suited to economic analysis. Economic theory can be used to model such a situation and simultaneously compute an estimate of size of lost profits and the optimal (or reasonable

royalty). This is only an example of the possible application of economic theory and is still in its infancy in regards to current litigation in the courts.

To begin to understand the true "but for" the infringement reality we must grasp the fundamental understanding of the First Law of Demand and secondly defining the economic market in which the affected parties compete.

"Unfortunately, economic testimony in damage claims lacks the fundamental economic analysis that economists refer to as the "First Law of Demand." (Bret A. Margolin, Ph.D. P.1) The First Law holds that an increase in the price of a product leads to a decrease in the quantity sold. Logically, this concept should play a major role in lost profit analysis. Yet, economic experts often develop lost profit opinions without considering how an assumed change in price would affect the quantity sold.

The First Law of Demand "the central principle in market economics, recognizes an inverse relationship between price and quantity. Holding everything else constant, an increase in a product's price leads to a decrease in quantities sold. Economists present this concept graphically using demand curves (see Figure 1); a downward sloping curve with price plotted on the vertical axis and quantity plotted on the horizontal axis.

Figure 1: **The Demand Curve (Margolin, 2003)**
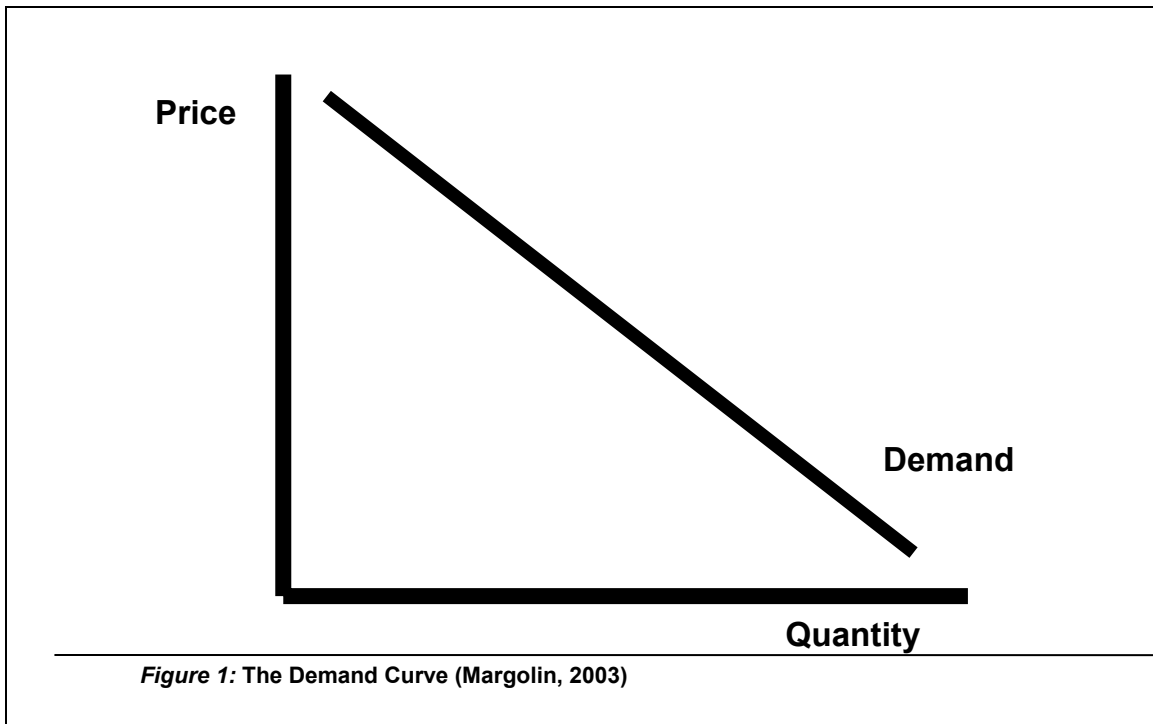
A demand curve illustrates the quantity demanded at any given price, and as reflected by the slope of the curve, the rate at which demand drops as price increases. Some factors for determining a price sensitivity, or "elasticity of demand", include: the availability of substitute products, the price of the good relative to the consumers income, whether the item is a luxury or necessity, and the amount of time consumers have to respond to price changes. To fully understand these economic relationships it is extremely important to understand the role of Market Definition and the competition within.

THE ROLE OF MARKET DEFINITION

When a valid patent is infringed, its owner is entitled to relief. In many cases, that relief will include monetary reward. Depending on the circumstances and facts of the infringement, the award may include a reasonable royalty on an infringer's sales, any

profits lost as a result of the infringement, and in some cases (Canada) disgorgement of the defendant's ill gotten gains.

In the United States, the CAFC in recent years has increasingly relied upon sophisticated economic analysis to support a "make whole standard" for patent damages. Briefly stated, such a standard ensures that an infringer's monetary payment fully compensates a successful plaintiff for economic damages suffered as a result of the infringement. If evidence establishes that a patent holder would willingly have licensed the invention in an arm's length negotiations then an award equal to the lost royalty revenue, plus appropriate interest would be awarded. If instead the plaintiff used or would have used the invention to increase his sales , lower its costs or both then it can be made whole again only by an award that properly accounts for the profits lost as a result of the infringement.

As practitioners know all too well, it is no simple matter to calculate economic damages accurately, even if the legal framework supporting the damages theory is clearly articulated. Transactions affected by an infringer's actions take place in markets, and accurately reconstructing these markets as they would have looked "but for" infringement is likely to require a healthy dose of sophisticated economic market analysis. Although defining the market can be a challenging intellectual exercise it is only the first stop on a journey whose ultimate goal is the accurate reconstruction of the "but for" world that would have existed absent the infringement. (Stewart, 1995)

Real world information is sometimes muddied by data imperfections and difficulties separating the impact of an infringer's action from, say, the impact of technological change or business cycles. Courts may therefore look at shortcuts that estimate loss sales based on readily available information. The market share approach put forth in State Industries v. Mor-Flo is such a shortcut. (State Industries v. Mor-Flo Industries et al., 883 F.2d 1573 (Fed. Cir. 1989) There the court awarded damages based on the theory that if the infringer had not been selling, the plaintiff's sales would have increased in proportion to its share of non-infringing sales of water heater wraps.

Using Marian B. Stewart's hypothetical example, consider an imaginary inventor of a "smart" computer chip that improves the quality of a high-volume household appliance such as a refrigerator. The incremental cost of each chip is one dollar. The investor's market research indicates that the demand for the chip by refrigerator manufacturers, who could use it in a variety of ways, is given by the following schedule. (Stewart, 1995)

SMART CHIPS			DUMB CHIPS
Price $ per chip	Sales Vol (million)	Profit (million)	Sales Volume (million)
10	5	45	30
9	7	56	29
8	9	63	28
7	11	66	27
6	13	65	26
5	15	60	25
4	18	54	24
3	23	46	21
2	30	30	18

The inventor utilizes its patent protected "monopoly" power by charging a price of $7 per "smart" chip and sells 11 million smart chips. Its profits total $66 million. Manufacturers of "dumb" chips the only micro processors used in refrigerators prior to the invention, sell 27 million units, less than their pre invention peak of 35 million. Meanwhile, dumb chips sell for $1.50 each.

Now imagine that an infringer enters the marketplace, its smart chip a blatant copy and virtually identical to the patented chip. However, because of lack of technical support is priced one dollar below the patented "smart" chip. The patent holder decides to keep its price at $7 a chip (thereby making price erosion, which will be dealt with later in this paper, a non issue in this example) and its sales volume drops to 7 million units. The infringer sells 5 million smart chips; dumb chips drop to 26 million units.

What damage award will make the patent holder whole? Its profits would have fallen to $42 million [(7-1) x 7 million]. Ignoring interest and cost behavior assumptions, it has been damaged by $24 million [66million-42million].

In this example we have perfect information about the "but for" world. As in State Industries suppose one assumed that the relevant market included all computer chips used in refrigerators. During the infringing period non-infringing sales, the patent holders sales plus the sales of dumb chips totaled $88 million [(7mil.x $7) + (26 mil. x $1.50)]. The patent holder's share was 55.7 percent ($49 divided by $88). A lost profit award of $6 per chip for 55.7 percent of the infringer's sales would amount to $16.7 million [5million x .557 x $6], not nearly enough to make the patent holder whole. On the other hand,

defining the market as only smart computer chips used in refrigerators would over compensate the plaintiff. He would have been awarded $30 million dollars [5mil. x $6].

The solution is a market analysis sufficiently sophisticated to recognize that for some applications; dumb chips are in the market, while for others only smart chips compete. An analysis which accounts for some recognition of substitutability will yield a more accurate damage calculation.

In the hypothetical case above, the trace of the correct solution lies in the data on dumb chips sales before and after infringement. In the period prior to infringement 11 million smart chips and 27 million dumb chips were sold. Dumb chip's sales fell to 26 million when the infringer entered the market, a one million unit drop, while sales of the patented unit dropped by 4 million. This analysis leaves no doubt that the relevant market in which the smart chips competed in included only a small number of dumb chips. The original assumption that all dumb chips were in the market led to erroneous conclusions, as shown above, and led to an inadequate damage award. Excluding dumb chips entirely led to an over generous decision.

A recent real world example of the above hypothetical case is Windsurfing International Inc. v. BIC Leisure Products Inc. In the mid 1980s, BIC Leisure Products Inc. (BIC) manufactured and sold sailboards. Windsurfing had the patent on sailboard technology, which BIC infringed. At trial to determine damages, BIC argued that they competed in different relevant markets. Windsurfer, the defendant, urged that they competed in a

market of relatively high-priced/one design boards, while BIC offered lower-price entry-level boards in competition with Windsurfers licensees, not Windsurfer itself. The District court disagreed, awarding Windsurfer lost profits in accordance with its market share of the sailboard market and its established royalties on its licensees share of that market.

On appeal the CAFC reversed the award of lost profits persuaded by the evidence that (1) Windsurfer's boards sold for 65 to 80 percent more than BIC's, (2) demand for sailboards is relatively elastic, particularly at entry level, and (3) BIC's customers demonstrated a preference for sailboards priced around the $350 rather than the one design boards priced around $600, the Court reasoned that without BIC in the market , BIC's customers would have likely sought boards in the same $350 price range. Due to a delay in the legal process, the court, with the advantage of hindsight, was able to observe a natural experiment on substitutability The sales of Windsurfer continued to decline after BIC 's infringement was enjoined. According to the record, BIC's exit was to the benefit of O BRIAN, a Windsurfer licensee whose average price was midway between Windsurfer's and BIC's price. The boards sold also resembled BIC's and were sold under the same distribution channels. (BIC Leisure Products, Inc. v. Windsurfing Intern, Inc., 1 F.3d 1214, 1218 (Fed. Cir. 1993))

This was a big step forward by the courts to incorporate market definition into the economic reality of the decision at hand. "The Federal Circuit reached beyond the standard market share approach to lost profits and held that the two products at issue,

while arguably part of the same product market, were sufficiently differentiated that the

patent owner would have sold to very few of the infringers customers. This was the

courts conclusion despite the fact that the patent owner had the significant overall market

share." (Glick, p.3) The BIC decision represents a clear advancement in the Federal

Circuit's economic line of thinking in making damage decisions.

In the real world sales data reflect not only just the effect of infringement, but also the

overall market expansion or contraction, the possible role of substitutes and other product

specific factors adding to the clearest view of the facts upon which judgments are made.

Modern statistical analysis such as regression analysis assists in the exploring and

analyzing of elasticity and cross elasticity of products. Common sense also helps too, as

does close attention to Company marketing documents that describe the working of the

markets in which a patented product competes. The payoff to a careful market analysis is

likely to be a principled led damage calculation which will withstand scrutiny and closely

mirror reality. (Stewart, 1995)

PRICE EROSION (LOST PROFITS DUE TO PRICE REDUCTION)

A successful plaintiff may also claim damages from price reductions forced by the

competition of the infringer. There is Canadian case law to the effect that, for this head of

damage to be sustained, the plaintiff's price reduction must have been reasonable in the

circumstances (United Horse- Shoe and Nail Co. v. Stewart & Co. (1888), 78 5 R.P.C.

260 at 264 (H.L.)), must have been in response to the defendant's lower price, and must

not lower the plaintiff's price below that of the defendant. (Colonial Fastener Co. v. Lightning Fastener Co., [1937] 1 D.L.R. 21 at 30 (S.C.C.))

"Note however that these cases followed the old rule of causation "natural and direct" which has been supplanted by modern day tort law." (Stack, Davidson, and Cole p.9)

This argument was also brought up by both parties in the Allied Signal reference but was rejected by Heald D. J. due to insufficient evidence. He did not rule on the issue. The Plaintiff argued that as a general proposition, a patentee is entitled to claim lost profits upon proof that it was unable to make reasonable price increases in the ordinary course of business due to the presence of the infringer. This appears to be a novel concept, although it was not contested as a legal principal by the defendant. In the plaintiff's submission, the patentee must prove that it was competition by the infringer, and not other factors, that prevented it from raising its prices. "However, the patentee need not prove that the infringer undercut its prices or even sold any product; it will suffice if the patentee can show that its prices were affected by the infringer's market presence through marketing schemes or other means." (Meters Ltd v. Metropolitan Gas Meters Ltd. (1911), 28 R.P.C. 152 at 160 (C.A.), per Lord Cotton) "Considering my conclusion, infra, that the plaintiff has not met its case on this issue, I prefer not to express my opinion as to whether such a claim is possible in law."(Allied Signal Inc. v. Du Pont Canada Inc. [1998], F.C.J. No.190 218 at 57, per Heald D. J.)

However, the American courts (much more progressive than the Canadian courts due to the vast number of cases tried) have awarded damages for such price effects where

sufficient proof of the effect has been offered. In the U.S. once a patent owner establishes infringement, the Patent Act requires the award of damages sufficient to compensate for the infringement. In determining whether to award loss profits, the courts frequently rely on the Panduit factors. These are as set out below:

"To obtain as damages the profit on sales he would have made absent the infringement, i.e., the sales made by the infringer, a patent owner must prove: (1) demand for the patented product, (2) absence of acceptable non infringing substitutes, (3) his manufacturing and marketing capability to exploit the demand, (4) the amount of profit he would have made." (Panduit Corp v. Stahlin Brothers Fibre Works, Inc., 575 F.2d 1152, 1156, 197 U.S.P.Q.2d (BNA) 1161, 1168 (5th Cir. 1978))

The federal circuit court explains that the Panduit factors are appropriate when "a patent owner maintains that it lost sales equal in quantity to the infringers sales" (Water Technologies Corp. v. Calco Ltd., 850 F.2d 660, 671-672, 7 U.S.P.Q.2d (BNA) 11097, 1106 (Fed. Cir.1988)); the Panduit factors are conditions which allow the inference that the patentee made the infringer's sales. When assessing damages in two-supplier markets, the courts normally assume that the patentee would have made the sales "but for" the infringement, and would have made those sales at the price actually charged with the infringement.

"A small minority of price infringement cases awarding loss profits add a component for price erosion caused by infringement." (Ronald B. Coolley, pp. 515, 518) Such cases

usually assess damages by assuming that "but for" the infringement, the patentee would have sold the quantity actually sold by the infringer, and the patentee would have sold that quantity at the uneroded price level. (T.W.M. Manufacturing Co v. Dura Corp., 789 F.2d 895, 902, 229 U.S.P.Q. (BNA) 525, 529 (Fed. Cir. 1986)) In T.W.M. the Federal Circuit Court upheld an award of damages based on price erosion because of the proffered evidence that T.W.M. had to give special discounts to compete with Dura's pricing tactics. The court further dismissed defendant Dura's argument that there was no correlation between the special discounts and its infringing activity.

Similarly, in Brooktree Corp. v. Advanced Micro Devices Inc., the Federal Circuit Court upheld an award of lost profits based on price erosion because of evidence presented by Brooktree that "it was forced to reduce its prices when A.M.D. announced its chips at lower prices, and that "but for" the infringement, Brooktree would have continued to sell its chips at the prices that had already been established." (Brooktree Corp. v Advanced Micro Devices, Inc., 977 F.2d 1555, 1579 (Fed. Cir. 1992))

To an economist, there are two things wrong with this picture? First, awards for price erosion should be more common-place. One would always expect some price effect from competition between the patentee and the infringer since competition nearly always results in a lower price. When the relevant market only includes two competitors, one may infer that the patentee would have charged a higher price "but for" the competition caused by the infringement.   As well, if there were non-infringing competitors in the market, a portion of the price reduction would be attributable to the natural competition.

Complex analysis would be required to separate the portion due to infringement and non-infringement. It is very important to properly define the market in which the patentee operates as mentioned above. Second, a lower price necessarily implies a higher quantity, other things being equal, a necessary consequence of price erosion is quantity accretion. This link between price and quantity is obvious to an economist, but it has been recognized by few courts. As explained above this analysis requires an appreciation of reality and the First Law of Demand. (Werden, Beavers and Froeb, 1999)

Economic principles teach that there is a direct (inverse) relationship between the level of output and price. This relationship is measured by the economist's concept of "elasticity." A product is said to be very elastic when consumers are willing to switch to a different good that is only slightly less expensive. Gasoline and groceries are common examples of elastic goods. This is demonstrated by the way gas stations display their prices in big signs at intersections and grocery stores always promise to give the lowest price in town.

 An inelastic good is one in which consumers are not willing to switch as portrayed in the Marlborough Cigarette ad "I'd rather fight than switch." Prescription medicine is a good example of an inelastic product; an AIDS patient is not likely to quit buying the prescribed medicine regardless of price increases.

A hypothetical example of the interrelation between price and quantity when analyzing the economic effect of price erosion on a damage award (First Law of Demand) adapted

from Bret A. Margolin Ph.D. in his article "Demand Curves Slippery Slope complete with illustrations is set out below:

**CASE STUDY: Acme Products Company v. Grande Products Corporation**

Acme Products Company (Acme) manufactures a small line of consumer products, including a patented product. Acme sells 150,000 units of the patented products at an average price of $20 during 2000. In January 2001, Grande Products (Grande) begins marketing an infringing product at an average price of $12. In response Acme reduces its price to $12, and by the end of 2001, sells a total of 250,000 units. During this same period Grande sells 150,000 infringing units. Acme claims both price erosion and sales damages.

With respect to price erosion, Acme claims that, "but for" the infringement, it would have maintained it price of $20 (pre infringement) rather that reducing its price to $12 to meet the competition (assuming no non-infringing competitors) of Grande. Acme calculates its price erosion damages by multiplying the $8 price difference by the 250,000 units it sold during the infringement period to arrive at damages from price erosion of $2,000,000.

Grande offers a defense that, "but for" the infringement Acme would still have lowered its price to $18, and thereby calculate price erosion damages at $1.5 million [($6 x 250,000 units)]. Even though Grande and Acme disagree on damages they at least agree on methodology. What is wrong with this picture? At first glance the methodology put

forth by both sides may seem intuitively correct, however, it is in direct violation of the economic law, The First Law of Demand. It does not take into consideration that the mirror image of price erosion is quantity accretion.

Acme sold 150,000 units when pricing its products at $20, and 250,000 units at a price of $12 (respectively, points A and B in Figure 2). While holding everything else constant, the demand curve for Acme's products intersects these two points as illustrated in Figure 2. The plaintiff's model of price erosion claims, however, that it would have sold 250,000 units at $20 apiece, as illustrated as point C in figure 2. This creates price erosion damages of $2 million, as illustrated by the rectangle coordinate ($20, C, B and $12), which is achieved by mismatching the non-eroded price with the quantity sold at the eroded price.

Figure 2: Evaluating Acme's Price Erosion Claim (Margolin, 2003)
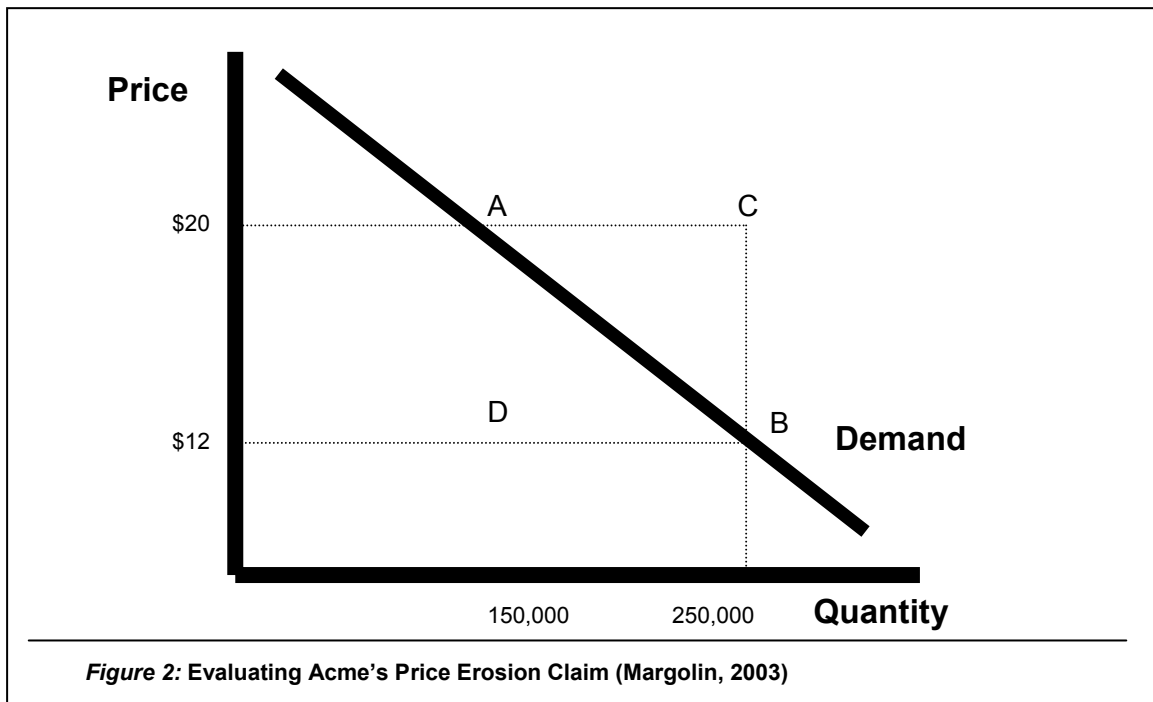
Off the demand curve in economically undefined space (as Grande's defense at $18 and 250,000 units), Acme's point C violates the First Law of Demand (see Figure 2). True price erosion damages are not $ 1.2 million ($8 x 150,000 units), as represented in Figure 2 by the rectangle coordinates ($20, A, D and $12). This is because we know, holding all else constant, that Acme's 100,000 unit increase is sales is a consequence of the reduction in price to $12 not the price erosion caused by the infringer. We also know that Acme must reduce its claim by a further $8 per unit as represented by the marginal cost savings on lost unit sales as illustrated by the Marginal Cost line in Figure 3. The lower price created by Grande's infringement, therefore, has yielded additional sales of 100,000 Acme units. This has generated $400,000 in additional profits. As a result lost profits in a economic sense are the price erosion rectangle ($20, A, D and $12) minus the profits associated with the additional units sold created directly by the price erosion, represented by rectangle coordinates (D, B, E and F), or $800,000 [($8 x 150,000 units) – ($4 x 100,000 units)].

Figure 3: Marginal Cost Line (Margolin, 2003)
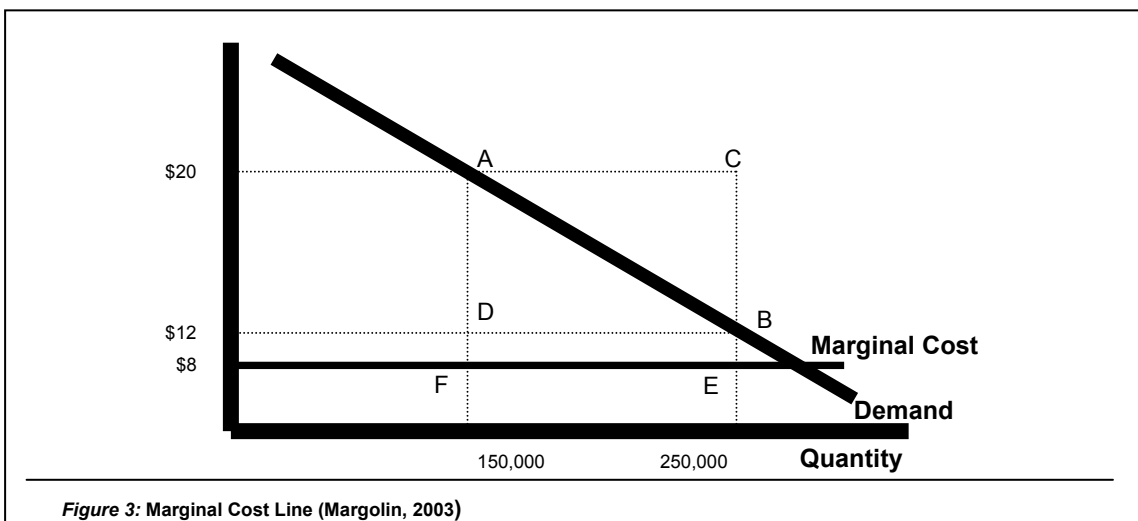
Acme also claimed under the guidelines of Panduit (see above) lost profits on sales in the "but for" world of $600,000 [($12-$8) x 150,000 units]. From an economic perspective this damage claim cannot co-exist with Acme's price erosion claim. The demand curve (Figure 2) tells us that at $20 per unit, the market would have only purchased 150,000 units not the 250,000 units put forth in Acme's original claim. The damage calculation must assume that Acme would have made all these sales.

Acme would have exhausted the markets demand for its product with no further room for Grande to make sales unless the price was reduced. The conflict arises and the model collapses when Acme assumes that it would make Grande's sales at $12 per unit. Thus, Acme should be precluded from claiming both price erosion and lost sales damages unless we allow the convergence of two mutually exclusive "but for" worlds.

What is the amount for which damages should be claimed? Somewhere between $600,000 and $1,200,000 would be our focal point as the benefit of accretion, which means the additional 100, 000 units achieved by Acme must be factored in. Not surprisingly the courts would most likely have awarded a settlement for ($600,000 + $2,000,000) $2.6 million. This would be erroneous as it fails to recognize the dynamics of the relationship between price and quantity.

As a means of summing up this head of damage, Panduit, a case that the Circuit Courts have used for guidance over the years addressed this issue by wishing it away. In Panduit, the master had denied recovery for price cut damages because the profits lost by the cut were more than adequately compensated by the gain in profits arising from the increase

in plaintiff's sales volume due to reduced price. (Panduit, 575 F.2d at 1157, 197 U.S.P Q. (BNA) at 730)

CONVOYED SALES AND UNPATENTED COMPONENTS

In addition to damages on the patented item, profits on accessories, spare parts, or related services can be included in the measure of the patentee's damages. These are often referred to as convoyed sales in the literature and can, under the right conditions of proximity, lead to major damage award in their own rights. Such a claim will require the plaintiff to demonstrate that these related sales are in fact sold as a consequence of the patented product.

"Until the recent English case of Gerber v. Lectra [1997], there were no Canadian or U.K. cases where the court has clearly awarded lost profits on convoyed sales. It has always been argued that such sales are too remote." (Stack, Davidson, and Cole, p.10) In Gerber, the defendant infringed on the patent holder's cutting machines. The plaintiff claimed for the loss of convoyed sales of service, spares and notably control software used in conjunction with the patented machines.

Jacob J. held that under modern tort law, all damages were compensable if they were foreseeable, specifically damages for lost convoyed sales.

"I hold that infringement of patent is another case where a secondary loss can be recovered, provided that secondary loss is a foreseeable consequence of the

infringement. The secondary loss may consist of sales of unpatented items which go with the patented item as a commercial matter (here the CAD, service and spares) and such loss as the patentee can establish results from the infringer establishing a business pre-expiry (of the patents expiry date which hints at prohibiting future damages). In all cases it remains critical that the patentee can establish the factual basis: that his loss is caused by the infringement and forseeably so." (Gerber Garment Technology v. Lectra Systems, [1995] R.P.C. 383 at 402)

The two key cases regarding damages stemming from convoyed sales in the United States were Rite Hite v. Kelley and King v. Perego. " In Rite Hite and King the Federal Circuit court appear to depart from the very formulaic view of Panduit (see above), and moves toward an economic view of damages, focusing on what profits the patent holder would have made absent the infringement. However, not so as far as convoyed sales were concerned. With respect to convoyed sales the courts rejected economic theory and regressed back to a formalistic point of view. They rejected the fact that the financial and marketing dependence on the patented item should prevail and relied on a test which essentially says that the convoyed sales be "functionally related" to the patented item." (McDaniel and Ansems p. 462)

This head of damage deserves attention due to the growing complexity of the economy and how ancillary services and goods are currently marketed. In the majority opinion of Rite- Hite, it is clear that under the correct set of facts, a patentee may recover lost profits damages on unpatented product and services. There is no legal principle, as is the case in

most damage scenarios regarding patents, which precludes recovery of damages on an item or service not covered by the patent in suit. The issue is one of fact and turns on foreseeability of the injury. Even if these facts are satisfied, recovery will depend on the patentee's ability to demonstrate "reasonably" that "but for" the infringement, the patent holder would have made the sale. (McDaniel and Ansems 1996)

The importance of Hite-Rite and King are that loss profits damages were awarded to the patent holder, even though the plaintiff did not use its patented technology. However, the common thread in both cases is that the patentee "but for" the infringement would have made the sales at issue. Therefore, in both cases, the level of proof necessary was to submit evidence adequate (reasonable probability) to establish "but for" causation. The damage issues decided in these cases were that the competing infringements of patented items were impeding the sales of non-patented items. In a sense this solidified modern day tort theory in the courts allowing the principles of causation and foreseeability to play their part in the decision making process.

How did these cases impact on the doctrine of convoyed sales in the U.S.?
In Rite- Hite and King the Federal Circuit Court also made important rulings on the issue of convoyed sales, which are unpatented goods and services sold along with patented goods. The question is, under what circumstances a patent holder may make a claim for lost profits associated with those unpatented goods that the patented item helps to sell or convoy? (McDaniel Ansems, 1996)

The terminology of the law in this area tends to be quite confusing. There are several different terms the courts use to convey similar concepts, including "the entire market value rule" (EMVR), "accessories", "collateral sales", "convoyed sales" and apportionment. (McDaniel and Ansems, 1996)

The EMVR refers to situations where the patented and unpatented items are somehow connected and comprise the whole with no apportionment. The situation usually arises where, after infringement, the patentee seeks damages for the entire apparatus that contains at least one of the patented features, and perhaps several unpatented features. A previous edition of Terrel on Patents states:

"Where infringement is a part of the article manufactured and sold by the defendant, the plaintiff is only entitled to recover damages in respect of that part alone, if the infringing part is clearly separable and does not co-operate with the rest to produce the new effect which is the feature of the patented invention in question. But where it is an integral part of the machine (or process) as a whole, damages must be based on the fact that the plaintiff has lost an order for the whole machine, and the profits on the whole machine must be taken into account." (Terrel on the law of patents, 8th ed. (London: Sweet & Maxwell, 1934), at 441-442)

To recover the entire value of the apparatus, the plaintiff must demonstrate that the patented feature drove the sale that is served as the customer demand of the entire machine. This point was effectively argued in the Canadian equity case Beloit Canada Ltée v. Valmet OY [(1994), 55 C.P.R. (3d) 433 F.C.T.D], in which it was proven that

"reasonably probable" other parts and circumstances, other than the patented press portion of the paper making machines, drove the sale, thereby making apportionment a consideration in the accounting of infringers profits. Even though this was not a damage case, but one of equity, it serves as model for when apportionment is a valid consideration.

When the patented item does not serve the basis of customer demand, but rather represents only a small portion of the machine or process apportionment must take place in determining the relative contribution of the patented feature to the value of the whole structure.

Several other terms are used to describe unpatented components which are sold in conjunction with, but not necessarily physically connected to, the patented item. "Collateral sales" and "convoyed sales" are terms used almost interchangeably when a court is seeking to determine whether the patented item is capable of "helping along" the sales of other related goods. The remainder of our discussion under this head of damage will use the term "convoyed sales" to denote items sold alongside, embedded in, connected to, or physically separate from the patented device or process.

"In 1984, the federal Circuit Court decided Paper Converting v. Magna-Graphics. This was the first U.S. case that determined lost profits on non-patented items that were not physically attached to the patented device. The patent holder claimed that it lost profits on the entire rewinder line not just on the patented rewinder. The courts justified this position, the Federal Court applied a standard that looked at the reasonable probability

that the plaintiff would have made the convoyed (other parts of the rewinder line) sales, as well as sales of the patented rewinder." (McDaniel and Ansems p. 469) The court stated:

"The deciding factor …is whether normally the patentee (or its licensee can anticipate (foreseeability) sale of such unpatented components as well as the patented ones. It is not the physical joinder or separation of the contested items that determines their inclusion or exclusion from the compensation base, so much as their" financial and_marketing dependence" of the accessories on the patented item under standard marketing procedures of the goods in question." (Quoting Leesona Corp. v. United States), 599 F.2d 958, 974 (Ct. Cl. 1981)

The financial and marketing standard was utilized throughout the 80s and early 90s and closely mirrored economic theory, not just the formalistic approach used in many of the prior cases. The U.K. case of Gerber, mentioned above, seemed to closely follow this approach even though the words financial and marketing were not specifically mentioned but the spirit of causation and foreseeability was.

Unfortunately, in Hite-Rite, the majority of the court rejected the idea that the patent holder may recover damages because an unpatented convoyed good has a "financial and marketing dependence" on the patented good. The standard that the court set forth in Hite-Rite was again formalistic and coined as a "functional unit test." The test to be satisfied is as set out below:

The patented and unpatented components must either:

1. be analogous to components of a single assembly; or

2. be parts of a complete machine; or

3. constitute one functional unit

"To determine whether the unpatented components have a "functional relationship" with the patented component, the Court will consider whether the items have a useful purpose independent of each other. In addition, the court emphasized that absolutely no weight would be given to the fact that units are sold along with the patented component as a matter convenience or business advantage." (McDaniel and Ansems p. 470)

In my opinion, the Courts confused the EMVR with economic common sense and took a huge step backwards not making a decision based on causation and foreseeability. The Federal Circuit progressed in many areas using economic criteria but, unfortunately, here they did not. It will be interesting to keep an eye on Canadian cases to see where they will go. The future of the law in this area is unpredictable, the best solution remains that the courts will swing more towards an economic analysis of damages eschewing the functional relationship requirement (U.S. cases) for convoyed goods.

NON INFRINGING ITEMS (PRODUCT SUBSTITUTES)

To establish lost profits, the patent holder must demonstrate that its sales and the sales of the infringer comprise the entire market. If there are non-infringing substitutes, the courts will likely find speculative any attempt to determine the percentage of the infringer's

sales that would have been made by the patentee, and the patent holder then must prove a reasonable royalty.

The economic value of a patent depends upon the nature and extent of non-infringing alternatives. If there are numerous non-infringing substitutes for the patented invention when it is priced at its incremental cost of production, competition will limit the invention's price to incremental cost. In this competitive case, the invention has no economic value, and the patent holder's economic losses and reasonable royalty are zero. However, this is rarely the case, especially where the infringer believes it may be faced with litigation and is willing to gamble with the potential costs of litigation. It must believe that the infringed invention has economic value compared with non-infringing substitutes.

At the other extreme is the monopoly case, in which there are no infringers and the patentee sets a monopoly price, unrestrained by competition. Most patent infringement cases likely fall somewhere between the competitive and monopoly schemes, where competition from non-infringing substitutes is weak enough to allow the patent holder to elevate price above cost or charge some royalty, but strong enough so that the patent holder's optimal price or royalty is less that the monopoly price or royalty.

This suggests that the determination of patent damages, calculated by either lost profits or reasonable royalty, depends fundamentally upon the extent and nature of substitute products for the patented product. If there exists plentiful, close substitutes for the

patented product, competition from these substitutes would restrain the patent holder's

potential profits or royalty he could reasonably charge. Conversely, in the absence of

close substitutes, the patent holder's profits or royalty would be limited only by the

nature of the demand for the invention and the cost of producing it, but not by

competition.

Lost profits in patent cases are calculated by comparing the plaintiff's actual economic

condition with his economical condition in a "but for" world. In this "but for" world the

court assumes that the infringer does not sell any units of the infringed product. The

threshold question the court must ponder is whether there exists non-infringing products,

or even, as I will discuss later, if the infringer could have produced a non-infringing

substitute with the technology available at the time of infringement. If so, the courts have

been reluctant to calculate the plaintiff's profits by apportioning the infringer's sales and

profits between the patent holder and non-infringing firms.

"In late 1999 the court of appeals in Grain Processing in a landmark U.S. case decided to

award damages to the plaintiff for the market value or economic benefit of the inventions

that they were unable to capture during infringement." (Schleicher P.503)

The true meaning of Grain Processing is that in determining the plaintiff's lost profits, the

market value of the patented invention is the difference between the profits that would be

made by a patent owner in the absence of any infringement and the profits that would be

made by the patentee if others (including the infringer) used the next most available

substitute technology that would not infringe on the patent owner.

Substitutes are important in the determination of damages caused by an infringement because they determine the amount of lost sales caused by infringement or the value of being able to exclude others from using the patented invention. If there are products that are freely substituted by consumers for the patented technology, then it is unlikely that the infringement would result in sizable lost sales. The infringement would just add one or more products to select from. (Schleicher 2,000)

The absence of acceptable substitutes is what makes Panduit (see above second Panduit condition) a unique and extreme case. It is not common in the real world for a product to have no substitutes. If all products were scaled according to the number of substitute products, Panduit would be on the extreme end of that scale (no substitutes) with most other products elsewhere along that scale. (O'Brien, 1999)

"Alone this would not have been a problem if Pundit's place on the scale would have been recognized. The courts have realized since Panduit that the problem was that there was no other precedent for recovering lost profit damages and most plaintiff's after Panduit (1978 decision) argued that their were no substitutes for their products." (O'Brien, P.3) Unfortunately, the courts were just as confused and frequently agreed, therefore, Panduit and subsequent cases forced common situations into erroneous economic situations, that is a "but for" world with no substitutes.

They even went as far as to recognize non-substitute products as those that did not conform identically physically to the infringed product. The result was a series of decisions that defied economic reality. A product need not be identical to be a suitable substitute and detract sales from the plaintiff's "but for" market. It only need be similar enough that consumers are willing to purchase it in place of another product. If consumers substitute, then the economic harm suffered by the plaintiff will decrease. By how much must be determined and quantified.

"Most products fall between these two extremes. They have substitutes but not necessarily perfect ones." (O'Brien, P.4) Some customers will not substitute other products without the patented technology for one with the patented change (even if they are functionally similar). Thus an infringement with other substitutes may cause some varied degree of lost sales and a license (royalty) would have some value to the infringer. It is this value which must be determined by careful economic analysis as well as understanding the market in which the patent occupies with some uncertainty.

As mentioned above in Grain Processing, the CACF returned to the basic economics that had been forgotten after Panduit. In Grain Processing the court ruled, "the "but for" inquiry therefore requires a reconstruction of the market as it would have developed absent the infringing product, to determine what the patentee would …have made."(Grain Processing Corp. V. American Maze Products Co., 185 F.3d 1341, 51 U.S.P.Q.2d 1556 (Fed. Cir. 1999) at 1350)

More significantly, it ruled that not only does the "but for" world of the plaintiff have to be analyzed but that of the defendant must be considered as well. Specifically the CACF said:

"By the same token, a fair and accurate reconstruction of the "but for" market also must take into account, where relevant, alternative actions the infringer forseeably would have undertaken, had he not infringed. Without the infringing product a rational would-be infringer is likely to offer a non-infringing alternative, if available, to compete with the patent owner rather than leave the market altogether. The competitor in the "but for" marketplace is hardly likely to surrender its complete market share when faced with a patent, if it can compete in some other lawful manor. Moreover, only by comparing the patented invention to its next best alternative(s) regardless of whether the alternative(s) were actually produced and sold during the infringement can the court discern the market value of the patent owner's exclusive right, and therefore, his expected profit or reward had the infringer's activities not prevented him from taking full economic advantage of this right." ."(Grain Processing Corp. V. American Maze Products Co., 185 F.3d 1341, 51 U.S.P.Q.2d 1556 (Fed. Cir. 1999) at 1350-51)

By asserting the defendants next best position the CAFC made a major commitment to economic analysis while further defining the role of substitutes in the plaintiff's journey to proving patent damages. It is important to realize that the infringer's alternatives may be more far reaching than the product or process itself. "For example the infringer may be in a position to commit more marketing resources, cut prices or take other steps to offset

the lack of the patented technology. By his production of the infringing product, the infringer has shown his intention to be in the market place with a competitive product. The CAFC was correct in saying that the competitor is hardly likely to surrender its complete market share when faced with a patent." (O'Brien, P.8)

As with all patent damage cases the outcome as well as the theory must be determined by the facts. However, without proper economic and market analysis the facts will be a blur.

DIFFERING COST APPROACHES IN PATENT DAMAGES

Having decided numerically, on lost sales, the court needs to determine what profits to assign them, usually on a profit per item basis. In order to calculate profit, the costs need to be determined. In determination of costs, similar to an equity award in accounting for infringer's profits, there is a choice to be made between costing alternatives. The methodologies are absorption and differential methods, plus certain opportunity or economic related costs. In differential costing, fixed costs are not deducted from revenues to determine profits; in absorption costing, some portions of fixed costs are deducted. Therefore, the use of absorption costing decreases the quantum of damages.

"The time over which the profits would have been earned, the circumstances of the plaintiff, physical sales volumes, and capacity constraints, the operating reality of the plaintiff will push one to a logical choice between absorption and differential

accounting. They are not really alternatives in the computation of damages: There is

an appropriate place for the application of each." (Stack, Davidson and Cole, P.8)

Generally, over the short term, the variable or differential costing method is appropriate.

Since most damage claims for infringement are of a short determinate time period,

differential costing is most often the accepted method. If there are additional fixed costs

that are new to the process or are necessary to earn incremental revenue (example

increased capacity) they too may be deducted under the variable cost method. However,

those fixed cost that will continue regardless should not be deducted as it is inappropriate

to deduct these costs a second time from the damage award.

"The applicability of certain opportunity costs will depend on the facts, because there is

no general rule." (Stack, Davidson and Cole, P.8) If because of the infringement, the

patentee put his assets to alternative use one may then argue that this is an opportunity

cost realized and should reduce lost profits. The theory behind this is one of mitigation,

that is, the plaintiff in fact enjoyed this "opportunity benefit." The most difficult hurdle in

arguing its utilization is that of "remoteness", linking causation (infringement) to the

alternative use of assets.

Summarized in figure 4 below is the usual effect on damages of the three cost approaches

discussed above. Use of an absorption approach rather than the differential method

allows for smaller lost profit awards because the absorption method allows for the

deduction of "continuing" fixed costs, variable and semi-variable costs. This method is

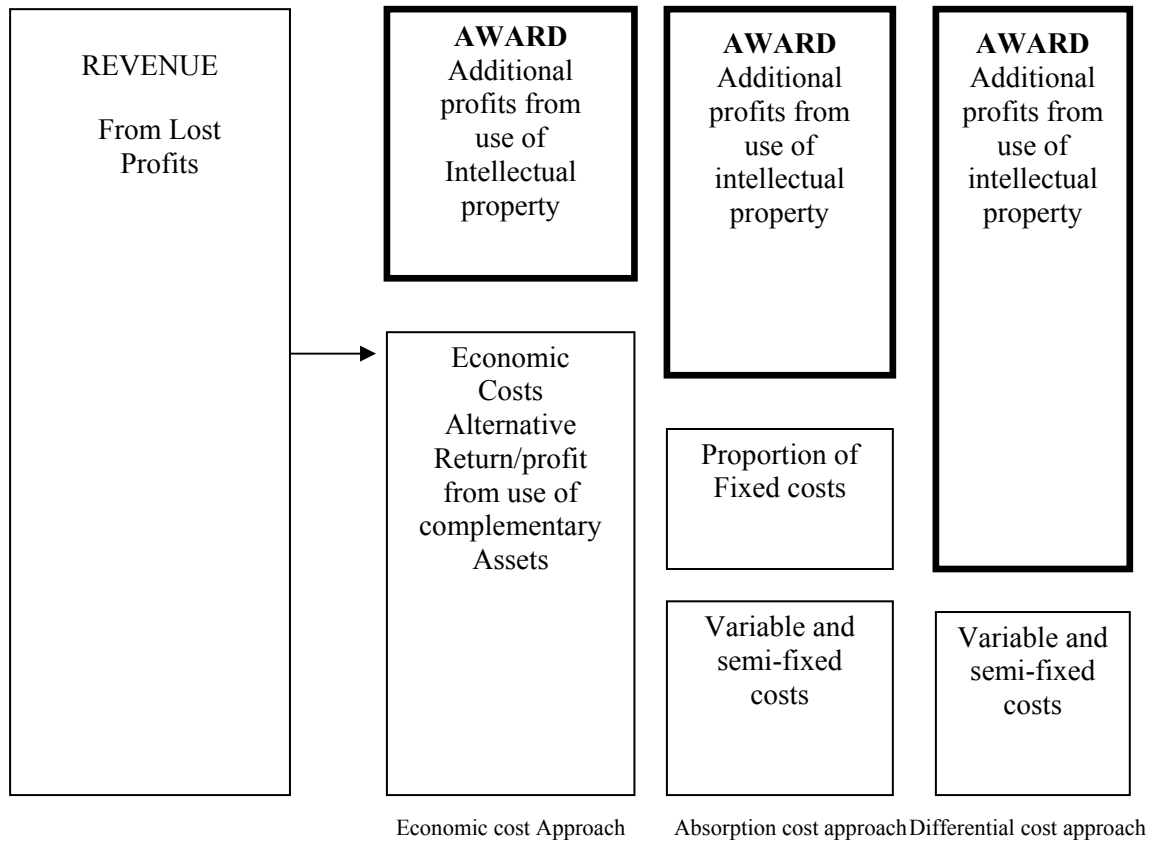more comprehensive but not always the most appropriate.

REVENUE From Lost Profits	**AWARD** Additional profits from use of Intellectual property	**AWARD** Additional profits from use of intellectual property	**AWARD** Additional profits from use of intellectual property
	Economic Costs Alternative Return/profit from use of complementary Assets	Proportion of Fixed costs	
		Variable and semi-fixed costs	Variable and semi-fixed costs
	Economic cost Approach	Absorption cost approach	Differential cost approach

Figure 4 (Stack, Davidson and Cole, P.418)

FUTURE DAMAGE AWARDS

"Various theories may provide grounds for awarding future profits based on past

infringements. As with an award of lost profits to directly compensate for past

infringement, future lost profits can be awarded to compensate the patentee for future

lost sales, future price erosion and future increased expenses." (Marchese P.5)

 These theories are discussed under the following heads of damages:

Market Spoilage

Damages for market spoilage are lost profits where the patentee can demonstrate the

market for his patent has in some way been made bad by the infringer. In a spoiled

market the sales of the infringed patent will decline upon infringement and recover (after

injunction) in the subsequent post infringement market when the patent holder regains

control.

Evidence that market spoilage has occurred could include comparison of the patent

holder's growth rates of sales to market projections pre infringement, surveys of

consumers or marketing studies, or factual evidence showing that infringement has had a

negative effect on the patented items after injunction. In Lam Inc. v. Johns-Manville

Corporation et al., Lam was awarded damages for lost sales in addition to lost profits on

defendant sales. The Court noted,

 "On top of all this the record shows that hastily developed CLASSPACK (the

 infringing product) didn't work very well and the entire concept of the fixture

 received a bad name. The market reasoned that if a giant couldn't make a good

product, the pigmy surely couldn't." (quoting Lam, Inc. v. Johns-Manville Corp., 718
F2nd 1056, 1064 (Fed. Cir. 1984)

Future Price Erosion

In Brooktree Corp v. Advanced Micro Devices, as previously mentioned, damages were
awarded upon appeal for past price erosion. Brooktree cross appealed claiming lost
profits for future price erosion. Specifically, Brooktree argued due to the erosion caused
by AMD's infringement it could not recover as a matter of practical marketing the price
decrease for a two year post infringement period.

> "The burden of proving future injury is commensurately greater than damages that
> have already incurred, for the future always harbors unknowns. We take note of the
> discussion before the trial judge of the uncertainties of future pricing , future
> competition , and future markets, in this fast moving field, as well as the requirements
> of proof for future losses. Brooktree, has not shown that the district court has erred in
> determining that the evidence was too speculative to meat the threshold requirements
> for a sustainable jury verdict." (Marchese P.8)

Even though this claim was rejected it did serve to establish that such damages are
plausible under the appropriate circumstances. One should never loose sight of the fact
that future price erosion damages are very speculative, being limited by the market's self
correction and the future development of substitutes which do not infringe. Therefore,
patentees should anticipate that there will be difficulties in prevailing.

Accelerated Market Reentry

The accelerated reentry theory seeks lost profits (or profits expected to be lost) by the patent owner in the form of lost sales to the infringer after expiration of the patent. Infringement damages frequently end after expiration of the patent, because after the patent expires, a competitor is free to use the previously patented feature and reenter the market. However, new entrants begin with zero market share at the bottom (or at least the lower end) of the learning curve with respect to manufacturing and marketing the previously patented feature.

Parties that have infringed on the patent may have gained a head start by accumulation of production know-how, having pre-existing manufacturing facilities, and establishing name recognition, goodwill or relationships with customers or distribution channels. Thus a patent holder may be damaged even after patent expiration if an infringer has a head start relative to what a new entrant should have had.

In order to have a claim for accelerated market reentry damages, a patent holder must be able to prove traditional lost profit damages. Additionally the trial/injunction must be near or subsequent to the patent expiration date. If there is a substantial time remaining before patent expiration, the injunction could eliminate any advantage the infringer would have had.

The accuracy of assessing the degree of future lost profits in patent infringement cases rely on principles largely economic in nature. Thus it is vital that the plaintiff understand the market forces such as elasticity, accounting for non-infringing alternatives and the First Law of Demand when assessing the above mentioned possible heads of future lost profit damages. It is also important to realize that market based evidence from the past may be inconsequential to the future. (Marchese, Fall 1994)

REASONABLE ROLYALTIES

Hypothetical Negotiations

In those cases (as mentioned above) where the plaintiff cannot prove in fact or amount of lost profit or an established royalty, an award of a "reasonable royalty" may be granted for the use or apportioned use of the patented product, by an infringer. "Although the governing legal rules with respect to reasonable royalties are somewhat more straightforward than the rules relating to lost profits, courts have aptly described the actual calculation as involving more the talents of a conjurer than those of a judge" (Blair, Cotter, P38)

Probably the most cited modern case on reasonable royalties is a 1970 U.S. district court opinion , Georgia – Pacific Corp. v. United States Plywood Corp., which listed (in no particular order) 15 factors that courts had considered in assessing reasonable royalties. This was not intended to be a "Boiler Plate" solution, but simply food for thought of

issues to be considered when reviewing the facts of the case presented. Below I will discuss the main thrust of these factors that I consider to be the most important: (Georgia Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 116 (S.D.N.Y. 1970), mod'd. and aff'd 496 F2d 295 (2d Cir. 1971))

Factors 1 and 2 focus on licenses for the patent at issue by reviewing licenses completed in the industry for comparable patents. However, in conducting a hypothetical negotiation, there may be factors that exist that must be considered in addition to existing licenses. For this reason the first factor requires consideration be given of actual royalties received by the patent holder for licensing the patent in suit.

The type of license being negotiated has an impact on the royalty rate as well. Factor 3 requires the negotiators to determine whether the license would be exclusive or non - exclusive and also determine if the sales territory would be restricted. Therefore, a hypothetical non-exclusive license would command a lower royalty rate than one that is exclusive. However, the non-exclusive royalty would have some economic value depending on market share.

Factor 4 analyzes the patentee's established licensing and marketing program. If the patent holder intends not to license that would tend to increase the hypothetical royalty, and conversely, a patent holder's desire to license would tend to decrease the royalty. The willingness of the patentee to license must be proven to the court though a documented

licensing program that has produced licenses with other unrelated parties in arms-length transactions.

An important consideration to the negotiators is the commercial relationship between licensor and licensee, which is considered in factor five. If the parties are direct competitors in the same line of business and selling similar products in the same sales territories, the licensor would attempt to negotiate a higher rate to ensure compensation for lost sales.

Factor 6 considers whether and to what extent the patented item drives the sales of unpatented items of the licensor and licensee. Sales of such unpatented items would tend to increase the royalty rate in hypothetical negotiations. Courts often recognize the value of convoyed sales by either adding them to the royalty base or by calculating the royalty using the patented sales as the base at an increased royalty rate.

Factor 8 relates to the profitability of the product made under the patent and the commercial success and popularity of that product. This factor is always discussed during a hypothetical negotiation. In consideration of this factor, the courts have accepted both estimates of profits prepared around the time of the hypothetical negotiation and actual profits as detailed by sales records relating to infringing products. Evidence of actual sales and profits of the infringer is also considered important by the courts, but the profits must relate to a relevant business unit that had the responsibility for the technology at issue. This evidence must be probative of the expectations for the future that the negotiators would have had as of the time of negotiation.

Factor 11 considers the extent to which the infringer has made use of the invention and any evidence showing such use. If the infringer has not sold high numbers of the infringing products or such products are not part of the defendant's main business lines, the hypothetical royalty rate is likely to be lower.

Factor 13 allows for apportionment of profit in the hypothetical negotiation. Because companies do not often keep their financial records in a manner that allows this break down of profits, the use of expert witnesses (forensic accountants and economist) can play a major role in convincing the court of profit attributable to the patented product.

Factor 14, the opinion testimony of "qualified" experts, is often considered by the courts, and, (depending on the substance of the testimony) can either be given great weight in the hypothetical negotiation or be dismissed completely. Such testimony will be rejected if not supported by the facts of the case.

Finally factor 15 allows the court to determine the amount "a willing licensor and licensee would agree upon at the time of infringement." At this stage in the hypothetical negotiation, the court looks at all the factors and other considerations such as non infringing alternatives, Entire Market Value Rule, and the amount of profit left for the infringer. Most of these considerations have been discussed above when considering lost profit damage calculations, the principles are the same.

"As a matter of logic the willing licensor/licensee approach suggests that the range of possible royalties the parties would agree to (assuming they would have agreed to anything-an important qualification) as of the date the infringement began should fall between the maximum incremental profit (or cost savings) the infringer could have expected to earn from the her next best alternative to licensing the invention." (Blair, Cotter, P40)

Two premises are to be understood when dealing with hypothetical negotiations. First, the patent is presumed to be valid and second, the defendant's proposed use is infringing, despite the fact that parties negotiating at arm's length in real negotiations would discount the license value to allow for the uncertainty with respect to these two premises.

These premises make economic sense, because an award that reflected the uncertainties of the parties would in a sense be "double counting." That is, recognizing the uncertainty twice, once at the negotiation date and twice when deciding to go to trial. The courts also in many cases utilize "hindsight", that is, they take into account events past the hypothetical negotiation date. Such a consideration may be the commercial success of the patent despite the fact that this success would not have been known at the infringement date (date of the hypothetical negotiations). As Sherry and Teece point out,

"This use of hindsight is analogous to awarding the owner of a stolen lottery ticket the ex post value of the ticket (either 0 or $1,000,000, depending on whether the

ticket was a winner) rather than its expected value ex ante ($1,000,000 discounted by the very low probability of its being a winner". (Sherry & Teece, p.426-428)

There have been many criticism launched against the supposition that a royalty can be hypothetically negotiated. One such criticism is that it is clear that negotiations cannot be created as the equivalent of ordinary royalty negotiations among truly "willing" patent owners and licensees. Such an approach would ignore the cost of litigation and would impose a compulsory license on the patentee. Therefore, many have criticized that in reality this fiction is a short cut damage award.

I am of the opinion that the Georgia Pacific guidelines are applicable considerations to all royalty calculations and help guide the pluses and minuses of the royalty rates and are not meant solely for the purposes of hypothetical negotiations. They represent economic logic in determination of the market value of a royalty.

The Established Royalty Rate

In determining a reasonable royalty, it is normally to the infringer's advantage to prove that there is or was an established royalty rate. A rate is considered established when: (1) it has been widely applied in a number of license agreements containing similar terms; and (2) when those terms are essentially the same as those the infringer would have needed to avoid infringement. Unless these conditions are met the rate will probably not be considered established and thus will not be controlling.

Thus, the rate given in a single license, a license granted to avoid litigation or in a license to a minor competitor will not be considered an established royalty rate. Further, a rate even if established does not necessarily create a ceiling on the rate used in the damages calculation. Damage awards greater than a reasonable royalty rate can be granted by the court to serve as a deterrent to infringement.

The Analytical Approach

In determining a reasonable royalty an analytical approach may be used. Theoretically, this approach is also based on a hypothetical negotiation between a willing licensor and licensee but focuses primarily on what the infringer would have been willing to pay. In certain cases it can yield a very high royalty rate, particularly if the infringer's expectations prior to the infringement were high and can be proven. There is no requirement that the infringer actually made any profit, rather, only that it expected to do so.

The analytical approach begins with the anticipated gross profit of the infringer; subtracts the infringers overhead expenses; allocates an acceptable or "normal" net profit to the infringer; and awards the remaining profit to the patentee.

This approach tries to split profits between plaintiff and defendant while allowing the defendant to keep a reasonable portion of the profit. The problem is in establishing what a

reasonable profit is and what normal expectations within the industry are. With the great diversity of production methodology, capitalization of assets and the related cost of capital, independent to each market participant, I would argue that normalized profits cannot be determined on an industry wide basis but only based on the facts of each infringer.

This method also has other flaws in that it ignores the cost or contribution of all other complementary assets that are unique to the infringer. It also leads to incorrect results when other intellectual properties are used to produce a normal profit. The method ignores as well the alternative licensees available in the market place and uses as its baseline only the profits made by the infringer. If, however, the plaintiff had more lucrative options available in the market place to exploit his technology than licensing it, the patentee should be restored to that higher level. (Stack, Davidson and Cole, 2000)

The ideal solution is one where not only are analytical methods utilized but where the integration of economic theory and investment return analysis is incorporated. By this I mean that the use of opportunity costs and the next best alternative for both infringer and patent holder should be factored in. For example, if the infringer could alternatively use available non infringing processes to create the same result, the profit earned should be subtracted from the above stated methodology. The opposite is true if, as mentioned above, the plaintiff had a better use for his technology.

As well, the infringers weighted average cost of capital (WACC) should be considered when determining a royalty rate that will provide an investment quality return on the hypothetical licensee's assets that are contributed to the licensing relationship. One must remember however, that the expected return on infringers intellectual property includes profit which does not belong to him and must be factored out.

One should always remember to incorporate the logic of the Georgia-Pacific guidelines when interpreting a range and hence a final royalty amount translated to a percentage of sales.

CONCLUSION

This paper discussed the increasing importance of economic and financial analysis in the ever evolving, dynamic field of patent damages. I have shown how the courts are continuing along the continuum of one dimensional analysis to one of multi tiered logic simulating the real "but for" world. In future litigation, the team of expert witnesses in the world of intellectual property damages must be prepared to possess the skill and dynamics to properly assess and interpret financial information with an understanding of the economic theory which surrounds it. Experts in the specialty of patent damages should not be afraid to test novel theories relating to the "but for" world, but must be prepared to provide a sound basis and reasonable probability for its acceptance.

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