

# Punitive Damages Under Patent Law: Where Should We Go After *Halo*?

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## I. Introduction

On 13 June 2016, the U.S. Supreme Court issued a combined decision of *Halo Electronics v. Pulse Electronics* and *Stryker v. Zimmer* (hereinafter referred to as “Halo”),<sup>1</sup> rejecting the Court of Appeal for Federal Circuit (CAFC)’s rigid Seagate<sup>2</sup> test for awarding punitive damages for willful infringement under 35 U.S.C. §284. In its decision, the Supreme Court modified the Seagate test in three respects: 1) eliminated Seagate’s objective recklessness prong and focused on a subjective basis for punitive damages awarded to an infringer’s egregious conduct in the particular circumstances of the case, 2) lowered the patent owner’s burden of proof from the “clear and convincing evidence” standard to the “preponderance of the evidence” standard generally applied to infringement, and 3) adopted a simple “abuse of discretion” standard of review that requires greater deference by the CAFC to the district court’s decision on whether to enhance damages. Under the Supreme Court’s new test, it will likely be easier for patent holders to obtain punitive damages than in the past.

The Supreme Court’s decision brings about many interesting issues. For example, is the Supreme Court’s test more appropriate than the Seagate test? Is there a more appropriate test for punitive damages under patent law? How will it influence patent litigation and innovation? What factors should be considered when determining punitive damages in patent infringement? Is there a need to reform punitive damages rule under the Patent Act? Under the new test, is it necessary to introduce the split-recovery system to mitigate plaintiff’s incentive for seeking exorbitant damage amount? This paper analyzes the above issues using economic tools. The goal of this paper is to develop appropriate principles for determining punitive damages in patent in-

fringement cases.

## II. The history of punitive damages of U.S. patent law

To understand Halo and its impact, it is helpful to review the history of the statutory punitive damages provision and the subsequent case law interpreting it. This section gives a brief overview of the evolution of the punitive damages rule in statutory and case law.

### A. The evolution of punitive damages in U.S. Patent Act

#### 1. Patent Act of 1793

Punitive damages for patent infringement were included in the U.S. Patent Act of 1793, just three years after the U.S. Congress enacted the U.S. Patent Act in 1790.<sup>3</sup> The Patent Act of 1793 provided that “any infringer shall forfeit and pay to the patentee, a sum, that shall be at least equal to three times the price, for which the patentee has usually sold or licensed to other persons, the use of the said invention”.<sup>4</sup> This is the origin of treble damages in U.S. patent law. According to this provision, treble damages are mandatory as long as the infringement is found and the court has no discretion in deciding them.

#### 2. Patent Act of 1836 and current Patent Act

The remedy for patent infringement in the Patent Act of 1793 was amended by the Patent Act of 1836. The revised article provided that “it shall be in the power of the court to render judgment for any sum above the amount found by such verdict as the actual damages sustained by the plaintiff, not exceeding three times the amount thereof, according to the circumstances of the case.”<sup>5</sup> Compared with the Patent Act of 1793, the Patent Act of 1836 revised the mandatory treble damages and conferred discretion of enhanced damages on courts. This is the embryo of the cur-

rent provision of punitive damages in U.S. patent law and it remains as part of the current Patent Act. Today, the current Patent Act addresses all available damages, including compensatory damages and punitive damages, in patent actions: upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court. When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed. Increased damages under this paragraph shall not apply to provisional rights under section 154(d) of this title.<sup>6</sup>

#### B. The evolution of punitive damages standards in U.S. courts

##### 1. *Seymour v. McCormick*<sup>7</sup>

While the Patent Act contains no explicit limitations or conditions for awarding punitive damages, standards have arisen in the courts in an endeavor to clarify the standards for punitive damages. The first interpretation of the discretionary treble damages under the Patent Act of 1836 was *Seymour v. McCormick*. In that case, the Supreme Court explained that enhanced damages were prompted by the “injustice” of subjecting a “defendant who acted in ignorance or good faith” to the same treatment as the “wanton and malicious pirate.”<sup>8</sup> The Court also clarified that “where the injury is wanton or malicious, a jury may inflict vindictive or exemplary damages, not to recompense the plaintiff, but to punish the defendant.”<sup>9</sup>

##### 2. *Underwater Devices v. Morrison-Knudsen*<sup>10</sup>

The doctrine of willful infringement for punitive damages has undergone numerous changes since *Seymour v. McCormick*. In the case of *Underwater Devices v. Morrison-Knudsen*, the then-newly established CAFC first asserted its authority on this issue. In this case, Morrison-Knudsen was an engineering and construction firm and bade on an underwater-sewer project in Sand Island, Hawaii. Underwater Devices offered to license its two patents for laying underwater pipes to Morrison-Knudsen for \$200,000. Morrison-Knudsen refused the offer based on its in-house counsel’s eight sentences long written opinion, which asserted that the patents Underwater Devices intended to license were invalid and suggested refusal to discuss the payment of a royalty unless Underwater Devices sued.<sup>11</sup> Underwater Devices withdrew its offer and sued Morrison-Knudsen for patent

infringement. The district court found Morrison-Knudsen willfully infringed the patents and awarded tripled damages.<sup>12</sup> The CAFC affirmed and held that:

[w]here ... a potential infringer has actual notice of another’s patent rights, he has an affirmative duty to exercise due care to determine whether or not he is infringing. Such an affirmative duty includes, *inter alia*, the duty to seek and obtain competent legal advice from counsel before the initiation of any possible infringing activity.<sup>13</sup>

The rule of *Underwater Devices* greatly influenced the punitive damages in practice. It opened the door to punitive damages based on receipt of a notice letter combined with alleged inadequate investigation. It imposed an affirmative duty of due care to the accused infringer based on the notice of another’s patent rights. The affirmative duty to exercise due care requires a potential infringer to obtain an opinion letter from counsel.<sup>14</sup> To satisfy the affirmative duty, the counsel opinion usually needs to address the validity of the potentially infringed patent and whether the accused infringer’s action would infringe the patent rights of another.<sup>15</sup> This affirmative duty of due care shifted the burden of proof to the accused infringer. That is, the accused infringer has to obtain the counsel opinion and show that he did not willfully infringe the disputed patent. Failure to do so would result in an adverse inference. Even though an alleged infringer asserts the attorney-client privilege as an excuse for failure to produce an opinion letter, it is allowed to infer either that the alleged infringer obtained no advice or that the advice was negative in nature.<sup>16</sup> Therefore, when an individual becomes aware of another’s patent rights, it is vital to obtain an opinion from counsel. Obviously, the rule of adverse inference increased the pressure on the accused infringer to produce the counsel opinion.<sup>17</sup> After *Underwater Devices*, to avoid punitive damages, the accused infringer seriously rely on independent counsel’s opinion as to whether or not its product or process infringes an existing patent, or whether or not there is good reason to believe the alleged infringed patent is invalid.

##### 3. *Knorr-Bremse v. Dana*<sup>18</sup>

Recognizing the unfairness created by the adverse inference, the CAFC overturned *Underwater Devices* in its *en banc* decision in *Knorr-Bremse v. Dana*. The court acknowledged the importance of the attorney-client privilege, explaining that, in no other area of the law did the courts draw an adverse inference from negating the privilege.<sup>19</sup> Because patent law is not different from law in other areas, the

CAFC further stated that there was no reason for the attorney-client privilege to operate differently within the patent context.<sup>20</sup> The central importance of the attorney-client privilege necessitates that a defendant be free to assert the privilege without negative consequences as those created by the adverse inference. Therefore, while the affirmative duty of care still existed, courts would no longer make a negative inference when a party did not seek or chose to disclose counsel opinion after *Knorr - Bremse*. However, *Knorr - Bremse* does not fully solve the accused infringer's dilemma: obtaining and disclosing an opinion of counsel, therefore waiving the attorney-client privilege, remained one of the best ways to establish that he had discharged the affirmative duty of due care.<sup>21</sup>

#### 4. *In re Seagate*<sup>22</sup>

Facing the remained dilemma and criticism from academics and patent litigators, the CAFC issued an *en banc* decision in *In re Seagate Tech., LLC*. In that case, Seagate intended to rely on three letters from its outside opinion counsel to defend itself against a claim of willfulness, and it produced the counsel's work product relating to the opinions. In its decision, the CAFC unanimously overruled the "affirmative duty of due care" standard of *Underwater Devices*. After reviewing the history of willful infringement, the CAFC acknowledged that the "duty of care announced in *Underwater Devices* sets a lower threshold for willful infringement that is more akin to negligence."<sup>23</sup> The "affirmative duty of due care" and the reversed burden of proof following it were not consistent with the general understanding of willfulness in the civil context and recent Supreme Court decisions.<sup>24</sup>

The CAFC then announced a two-prong test to establish the willful patent infringement for enhanced damages. First, "to establish willful infringement, a patentee must show by clear and convincing evidence that the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent. The state of mind of the accused infringer is not relevant to this objective inquiry."<sup>25</sup> This objective prong is to be "determined by the record developed in the infringement proceedings."<sup>26</sup> Second, after establishing objective recklessness, a patentee must show by clear and convincing evidence that "this objectively-defined risk . . . was either known or so obvious that it should have been known to the accused infringer."<sup>27</sup> Further, Seagate created a tripartite standard of appellate review: the first prong, objective recklessness, was re-

viewed *de novo*; the second prong, subjective recklessness, was reviewed for substantial evidence, and the final decision whether to award enhanced damages, was reviewed for abuse of discretion.<sup>28</sup>

Seagate significantly changed the law of willful infringement in several ways. Firstly, the affirmative duty of due care imposed by *Underwater Devices* was abandoned. The abandonment of the affirmative duty of due care was followed by two corollaries. One is that the burden of proof for establishing willfulness shifted back to the patentee, even though the alleged infringer received notice of a patent before its action. After Seagate, it is certain that the burden is on the patentee to prove willful infringement.<sup>29</sup> The other is that the requirement that an accused infringer must produce an opinion of counsel at trial was eliminated.<sup>30</sup> However, this did not mean that opinions of counsel were irrelevant to willfulness. In certain scenario, the accused infringer's pre-litigation opinion of counsel on infringement or validity may preclude its conduct from being considered reckless and help it escape the punitive damage liability.<sup>31</sup>

Secondly, Seagate added an objective reckless requirement and created a two-step test to award punitive damage. Under this new test, both the objective and subjective requirements must be satisfied in order to show the willful infringement. Courts can proceed to consider whether to exercise its discretion to award enhanced damages only after both steps have been satisfied.<sup>32</sup> But the objective recklessness requirement brings some controversies. Later cases show that, during the infringement proceedings, the objective recklessness will not be found if the accused infringer "raise[s] a 'substantial question' as to the validity or noninfringement of the patent."<sup>33</sup> That is, a reasonable defense challenging the validity or infringement of the patent can negate the objective recklessness even if the defendant was unaware of the arguable defense when he acted or the defense was not successful in the end.<sup>34</sup> For instance, in *Butamax Advanced Biofuels LLC v. Gevo, Inc.*,<sup>35</sup> the district court granted Gevo's motion for summary judgment of no willful infringement, based on the fact that Gevo asserted invalidity and non-infringement arguments and its invalidity and non-infringement arguments are "credible and reasonable theories supported by expert testimony."<sup>36</sup>

Thirdly, in order to confine the awarding of punitive damages, the CAFC enhanced the burden of proof for willfulness to the clear and convincing evidence standard. Some commentators argued that Seagate set the bar for

showing willful infringement stunningly high.<sup>37</sup>

After Seagate, many observers predicted these changes made it more difficult for patent holder to obtain punitive damages.<sup>38</sup> For example, empirical evidence shows that, Seagate, together with Knorr-Bremse, resulted in approximately 26% fewer findings of willfulness as compared with before.<sup>39</sup>

### III. Halo's new rule: What has been changed

#### A. A short background of Halo

It was against this backdrop that the Supreme Court caught a chance to review Seagate last year. In *Halo Electronics, Inc., v. Pulse Electronics, Inc. and Stryker Corporation v. Zimmer, Inc.*,<sup>40</sup> the petitioner of the two cases applied to the Supreme Court for reviewing whether the Seagate test is consistent with 35 U.S.C. §284. In one case, Halo, a supplier of electronic components, sued Pulse for infringement of three patents regarding surface mount electronic packages. After one of its engineers concluded that Halo's patents were invalid, Pulse continued to sell the allegedly infringing products.<sup>41</sup> The jury found that Pulse had infringed Halo's patents, and that there was a high probability it had done so willfully. Nevertheless, the district court did not award punitive damages because Pulse's defense was not objectively baseless. That is, Halo had not shown objective reckless under the Seagate test. The CAFC affirmed the judgment. In another case, Stryker sued Zimmer for infringement of patents relating to medical equipment-pulsed lavage devices, which deliver pressurized irrigation for certain medical procedures in orthopedic medicine. Stryker won a jury verdict against Zimmer for wilful infringement. The district court awarded \$76.1 million in compensatory damages and another \$152.2 million in punitive damages, based on the evidence that Zimmer had "all but instructed its design team to copy Stryker's products" and then chose "a high-risk/high-reward strategy of competing immediately and aggressively in the pulsed lavage marketplace," while "opting to worry about the legal consequences later."<sup>42</sup> On appeal, the CAFC vacated the punitive damages award because Zimmer had asserted reasonable defenses at trial, meaning that Stryker had not satisfied the Seagate test's objective prong.

The Supreme Court vacated and remanded the both cases. The main content of the joint decision can be stated

as follows.

#### B. The interpretation of §284 of Patent Act

The Supreme Court first explained the courts' discretion to awarding damages under 35 U.S.C. §284. Awards of enhanced damages are not to be "meted out in a typical infringement case", "but are instead designed as a punitive or vindictive sanction for egregious infringement behavior."<sup>43</sup> District courts enjoy discretion in deciding whether to award enhanced damages, and in what amount.<sup>44</sup> The Supreme Court held that, although the CAFC's Seagate test recognized this, that test was "unduly rigid", "impermissibly encumbers the statutory grant of discretion to district courts" and could have the effect of insulating some of the worst patent infringers from enhanced damages.<sup>45</sup>

#### C. Elimination of Seagate's objective recklessness requirement

The Supreme Court scrutinized Seagate's two-part test and rejected the objective recklessness without hesitation. The Court was concerned that the objective recklessness "excludes from discretionary punishment many of the most culpable offenders."<sup>46</sup> "In the context of such deliberate wrongdoing, however, it is not clear why an independent showing of objective recklessness should be a prerequisite to enhanced damages."<sup>47</sup> Following its recent Octane Fitness rulings,<sup>48</sup> the Court restated that "a case presenting subjective bad faith alone could sufficiently set itself apart from mine-run cases to warrant a fee award,"<sup>49</sup> and the enhanced damages should be awarded "without regard to whether his infringement was objectively reckless."<sup>50</sup> The Court especially criticized the reasonable defense developed from Seagate:

The existence of such a defense insulates the infringer from enhanced damages, even if he did not act on the basis of the defense or was even unaware of it. Under that standard, someone who plunders a patent infringing it without any reason to suppose his conduct is arguably defensible-can nevertheless escape any comeuppance under 35 U.S.C. §284 solely on the strength of his attorney's ingenuity.<sup>51</sup>

As to the subjective requirement, the Court further stated that culpability should be measured by the knowledge of the actor at the time of the challenged conduct, not by "facts that the defendant neither knew nor had reason to know at the time he acted."<sup>52</sup>

#### D. Lower standard of burden of proof

As in Octane Fitness, the Supreme Court rejected

Seagate's requirement that enhanced damages be proved under the high "clear and convincing evidence" standard. The Court found that the Seagate test is "also inconsistent with §284 because it requires clear and convincing evidence to prove recklessness." Furthermore, it noticed that "nothing in historical practice supports a heightened standard", and "patent-infringement litigation has always been governed by a preponderance of the evidence standard."<sup>53</sup>

#### E. No tripartite framework for appellate review

Again, following Octane Fitness, the Court likewise rejected the Seagate's tripartite framework for appellate review. Thus, both the subjective recklessness and the final decision on whether to award enhanced damages should be reviewed for abuse of discretion.<sup>54</sup>

The following chart shows the main changes resulting from Halo in comparison with Seagate.

	Seagate's Rule	Halo's Rule
Objective requirement	Objective recklessness	No objective recklessness requirement
Subjective requirement	The accused infringer either knows or should know his action constituted infringement	The subjective willfulness of a patent infringer, intentional or knowing, may warrant enhanced damages
Standard of burden of proof	Clear and convincing evidence	Preponderance of the evidence
Standard of appellate review	Tripartite framework	Uniform standard of abuse of discretion

## IV. Halo's impacts: Good or bad?

Halo's new rule will have great influence on how courts will award punitive damages. Firstly, the elimination of objective recklessness will significantly increase the awarding rate of punitive damages and more risk of intentional ignorance. Secondly, the decreased burden of proof can greatly increase the legal cost of the defendant and enlarge *in terrorem* effect. Thirdly, Halo makes the standard of punitive damages more uncertain and can incur more legal error cost.

#### A. Increased awarding rate of punitive damages and intentional ignorance effect

1. The elimination of objective recklessness and increased awarding rate of punitive damages

Seagate's objective recklessness substantially limited

the scope in which the punitive damages may be granted. The reasonable defense which derived from objective recklessness further shielded the accused infringer from enhanced damages by challenging validity or infringement based on the arguable factors regardless of his awareness of the factors when he acted. This reasonable defense can negate objective recklessness even if it failed to challenge the validity or infringement of the disputed patent.<sup>55</sup> Halo abolished the requirement of objective recklessness and made the new standard that subjective recklessness alone could sufficiently warrant punitive damages award. The abolishment of objective recklessness will obviously make it difficult for the accused infringer to escape from being found willful infringement and significantly increase the awarding rate of punitive damages. Based on an empirical study by Christopher B. Seaman, we can reasonably predict that, after Halo, the rate of cases found willfulness could be approximately 11% greater than before.<sup>56</sup>

2. Subjective recklessness and intentional ignorance effect

According to Halo's new standard, the subjective recklessness alone could sufficiently warrant punitive damages award. Subjective recklessness becomes the most critical element for not only willful infringement, but also punitive damages. In American law, recklessness is defined as "conduct whereby the actor does not desire harmful consequence but foresees the possibility and consciously takes the risk," or alternatively as "a state of mind in which a person does not care about the consequences of his or her actions."<sup>57</sup> Usually, the subjective recklessness is determined by the knowledge of the actor when conducting the challenged action. Therefore, the fact that the infringer has knowledge of the patent could satisfy the subjective recklessness requirement and put the infringer in danger of willful infringement and punitive damages. "Any time an individual or company learns of a patent that might be relevant to its products, the company is in trouble."<sup>58</sup>

To avoid being found willful infringement and liable for treble damages, the manufacturers and researchers have strong incentives to not to read or learn any patents that may be similar to their products or processes. "What you do know will certainly harm you, they reason, so it is generally better not to know."<sup>59</sup> This phenomenon is called "intentional ignorance".<sup>60</sup> Many observers notice that companies and lawyers tell engineers not to read patents before starting their research, lest their knowledge of the patent disad-



vantage the company by making it a willful infringer.<sup>61</sup> Some also find that many of them never learn of the patent in the first place.<sup>62</sup> When their research leads to an invention, their patent lawyers commonly don't conduct a search for prior patents before seeking for their own protection; when they launch their own product, they don't conduct a search before launching, just wait and see if any patent owner claims that the new product infringes their patent.<sup>63</sup>

Obviously, the elimination of objective recklessness and the increased significance of subjective recklessness will exacerbate the intentional ignorance effect. In facing higher risk of being found willful infringement and liable for punitive damages, the companies will have greater incentive to ignore patent documents before they are sued. This effect is in conflict with one of the main purposes of the patent system: the dissemination of technological information. Courts had stated this idea many times that "patent rights are given in exchange for disclosing the invention to the public."<sup>64</sup> Actually, many basic rules of patent law are designed to achieve the goal of dissemination of information, making sure that the patentee discloses her invention to the public and that the public gets the benefit from that disclosure. The most important rule on this issue is the rule of written description, which requires that every patentee describe her invention in such "full, clear, concise and exact terms" as to enable anyone of ordinary skill in the art to make and use the invention.<sup>65</sup> If the public avoid the information contained in patents in order to escape the willful infringement, the patent system's goal of disclosure is frustrated.<sup>66</sup> Thus, the exacerbated intentional ignorance effect can have negative influence on information dissemination and impede imitation and refinement through imitation.

The Supreme Court recognized this problem in *Halo* when it mentioned the respondents' concern that unlimited discretion to award treble damages will "impede innovation as companies steer well clear of any possible interference with patent rights."<sup>67</sup> But the Court believed that this will not happen without giving further reason.

#### **B. Decreased burden of proof, increased litigation cost and *in terrorem* effect**

##### **1. Lowered evidentiary standard and higher likelihood of punitive damages**

*Halo* lowered the evidentiary standard of punitive damages from the clear and convincing evidence to a preponderance of evidence. Indeed, even under the clear and convincing standard, the threshold for showing that the defen-

dant has knowledge of a preexisting patent is remarkably low. Proving the defendant's knowledge of the patent and access to a drawing in the Official Gazette, reception of a cease and desist letter or an offer to license a patent, extensive knowledge of a particular product market, and over-concern about a competitor's product competing with its own product can all be sufficient to establish defendant's notice of plaintiff's patent and put the defendant in danger of willful infringement or punitive damages.<sup>68</sup> The lowered evidentiary standard can make the threshold for proof further lower.

This will produce two effects. One is the spurious or excessive notice letters from patentees.<sup>69</sup> The other is the obvious effect of making it more likely that a patent holder will be able to show the willfulness and get the punitive damages awarded. This effect will magnify with the elimination of objective recklessness requirement. Because of the double forces working in the same direction, the successful rate of willful infringement and punitive damages could be increased much greater than 11%.<sup>70</sup>

##### **2. Increased legal cost, more frivolous suits, and *in terrorem* effect**

With the lowered evidentiary standard to punitive damages for plaintiffs, defendants will have greater pressure to produce disproof to negate the plaintiffs' claim. The most effective way for defendants to repel punitive damage claim is by relying on the advice of counsel. The counsel's opinion letter will become more important after *Halo* and the potential defendants have to procure expensive opinion letters. This will increase the defendants' legal cost, especially following the excessive notice letters from patentees. According to the American Intellectual Property Law Association Economic Survey of 2015, the median charge from 2004 to 2014 for a validity/invalidity only opinion per patent is about \$10,000-\$13,000; for an infringement/non-infringement opinion per patent is about \$10,000; and for a combined opinion of validity and infringement per patent is about \$15,000-\$20,000.<sup>71</sup> A leading patent expert who advised Kodak told his story that, he reviewed patents for seven years before a commercial product was introduced, and spent three years reviewing fifty embodiments of the actual process Kodak was developing to make sure it would not infringe existing patents. Despite his work of sixty-seven opinions, Kodak was eventually found to infringe twenty claims in seven different patents.<sup>72</sup>

Lowered evidentiary standard, excessive notice letters,

and increased cost to defendants can predict more frivolous suits. The filing condition for plaintiff to sue is as follows:

$$P_p \times V - C_p > 0$$

Wherein,

$P_p$ =probability of winning for plaintiff;

$V$ =value of suing;

$C_p$ =plaintiff's litigation cost.

It is obvious that a plaintiff sues if he expects to gain more from suing than he expects to spend on litigating the case.<sup>73</sup> Halo lowered evidentiary standard and thus increased the probability of winning for the plaintiff. The expected value of the suit will increase. Holding other things constant, this will embolden the plaintiff to sue.

The maximum damages that the defendant is willing to pay is  $P \times V + C_d$ , wherein  $C_d$  is the defendant's litigation cost. After Halo, the value of the suit ( $P \times V$ ) will increase because of the enhanced probability of winning for the plaintiff. The defendant's litigation cost will increase too because of the expensive opinion letters. The maximum amount that defendant is willing to pay will increase, this means that the defendant has much more to lose than before. This will encourage the plaintiff to file more frivolous patent infringement suits, threatening the defendant to settle the suit.

Legal costs in patent infringement case are very high in the U.S. According to a study by Bessen and Meurer, the mean cost through trial for a patent suit with \$1 to \$25 million at stake is \$2.10 million. The cost for a similar suit through discovery is \$1.20 million. The mean cost through trial for a patent suit with more than \$25 million at stake is \$4.14 million. The cost for a similar suit through discovery is \$2.59 million. All numbers here are in 1992 U.S. dollars.<sup>74</sup> We should also notice that there can be asymmetric cost between plaintiff and defendant in patent willful infringement. To disprove the willful infringement and punitive damages, the defendant usually has to produce much more evidence and spend more money than the plaintiff. This will make the plaintiff's threat to sue more credible and enlarge the *in terrorem* effect.

#### C. Discretion of district court, uncertainty and legal error cost

In Halo, the Supreme Court emphasized the district courts' discretion in awarding enhanced damages and criticized Seagate test for that it unduly confined the ability of district courts to exercise the discretion conferred on them. Accordingly, the Court rejected Seagate's tripartite frame-

work for appellate review and applied abuse of discretion standard to review the decision of enhanced damages. Nevertheless, Halo does not explore how to exercise discretion in awarding punitive damages in patent cases. Instead, facing the concern that the district court may award punitive damages too readily, the Supreme Court believed that the sound legal principles developing over nearly two centuries could channel the exercise of discretion. Besides these changes, the Court lowered the evidentiary standard from the clear and convincing evidence to a preponderance of evidence for punitive damages.<sup>75</sup> All these changes make the standards for awarding punitive damages more uncertain.

The more uncertain standards, together with more frivolous patent infringement suits filed, will increase the legal error cost. Firstly, the more frivolous patent infringement suit can incur more false positive cases (Type I Error). Secondly, the lowered evidentiary standard and uncertain standards for punitive damages will enlarge the distribution of legal errors. This will increase more false positive and false negative cases (Type II Error) simultaneously. From the perspective of society, Halo's rule will incur increased legal error cost.

	Willful infringement	No Willful infringement
Test Positive (Willful infringement)	Correct Positive	False Positive (Type I Error)
Test Negative (No Willful infringement)	False Negative (Type I Error)	Correct Negative

## V. Where should we go after Halo

In sum, although Halo makes much easier for patentees to get punitive damages, its new rule can incur more social cost. In the conflict between protecting patent rights and maintaining the interest in technological innovation, Halo tipped to patentees' interests and failed to carefully keep the balance between the two competing interests. In order to keep the balance, it needs to consider the following measures:

#### A. Reconsider appropriate standard for punitive damages in patent infringement

The purposes of punitive damages are usually said to punish the defendant for outrageous misconduct and to de-

ter the defendant and others from similarly misbehaving in the future.<sup>76</sup> To achieve this main goal-proper deterrence, if a defendant will definitely be found liable for the harm for which he is responsible, the optimal damages (including punitive and compensatory damages) should be approximately equal to the damages that the infringer's conduct generates. The reason is that, if damages are equal to harm, potential infringers will in theory have socially correct incentives to take precautions and have the socially correct incentives to engage in risky activities. If infringers pay less than the harm they cause, underdeterrence may result. Conversely, if infringers are made to pay more than the harm they cause, wasteful precautions may be taken, product prices may be inappropriately high and risky but socially beneficial activities may be undesirably curtailed. When an infringer has a chance of escaping liability, the proper level of total damages to impose on him is the harm multiplied by the reciprocal of the probability of being found liable.<sup>77</sup>

Using the similar theory, Blair and Cotter formulate the above idea as follows:<sup>78</sup> Suppose one person infringes another's patent, the infringer will increase his profits by an amount that we denote as  $\pi$ ; suppose the probability of detecting the infringement is  $P$  and the probability of undetected infringement is  $(1-P)$ ; suppose the sanction for infringement is  $F$ . The expected return ( $E[R]$ ) to infringement can be written as:

$$E[R] = P(\pi - F) + (1-P)\pi;$$

$$\begin{aligned} \text{Then, we get: } E[R] &= P\pi - PF + \pi - P\pi \\ &= \pi - PF \end{aligned}$$

As easy to know, the potential infringer will be deterred if he earns less profit by infringing than by not infringing. Therefore, we get:

$$\pi - PF < 0;$$

$$F > \pi/P.$$

This means that, to achieve optimal deterrence to patent infringement, we should consider at least three elements to determine punitive damages: 1) measuring  $\pi$  accurately; 2) finding the multiplier  $(1/P)$  accurately from case to case; 3) the potential infringer may be risk-averse.<sup>79</sup>

Although Halo does not state what should be considered to limit district courts' discretion in awarding punitive damages, the CAFC indeed made some decisions guiding district courts to exercise their discretion on whether to enhance damages for willful infringement and how much to be enhanced in damages.<sup>80</sup> According to these decisions, in making this decision, the district court must consider the fol-

lowing nine factors: (1) whether the infringer deliberately copied the ideas or design of another, (2) whether the infringer, when knowing the other's patent protection, investigated the scope of the patent and formed a good faith belief that it was invalid or that it was not infringed, (3) the behavior of the infringer as a party in the litigation, (4) the defendant's size and financial condition, (5) the closeness of the case, (6) the duration of defendant's misconduct, (7) remedial action by the defendant, (8) defendant's motivation for harm, and (9) whether defendant attempted to conceal its misconduct.<sup>81</sup>

From the economic theory of punitive damages, many of the above factors are irrelevant to determination of punitive damages. Only three of them have some implied relation to punitive damages. Factors (4) and (6) may be concerned with defendant's profit from infringement; factor (9) may affect the probability of defendant's escaping from liability. The Courts should reconsider the factors for awarding punitive damages according to economic theory.

#### B. Differentiate certain kinds of cases

In the light of economic theory of punitive damages, the defendant's profit, the defendant's probability of escaping from liability and the defendant's risk-averse action are important factors that should be considered when deciding whether to award punitive damages and how much to be awarded for damages.<sup>82</sup> These factors may vary from case to case. If we can identify these factors from certain differentiated kinds of cases, it will be helpful.

It seems that some kinds of patent infringement are more likely than others to escape detection on the part of patent owners.<sup>83</sup> Blair and Cotter pointed out that, it may be possible to infringe a process patent without giving off any signal to the outside world; and even if the process results in the manufacture of some commercial product, it may be difficult or impossible to determine how the product was made.<sup>84</sup> Another example is the patent related to intermediate product imbedded in the end product with a changed appearance or property, which will make it difficult to be detected. The defendant's probability of escaping from liability is also related to the way to sell or license the infringing product in the market. If the infringing product is not sold in the open market but by an auction through one-to-one negotiation, it is harder to detect the infringement too. For the above kind of patent disputes, courts are inclined to award punitive damages in such disputes than others.

#### C. Introduce the split-recovery system



Halo significantly increased the awarding rate of punitive damages, decreased the burden of proof, increased the legal cost of the defendant and enlarged *in terrorem* effect. Obviously, there will be more frivolous suits and *in terrorem* effect after Halo. The greater the number of suits, the higher the legal costs borne by the parties, the higher cost the society will bear. Thus, awarding punitive damages to spur suit is socially undesirable, other things being equal.<sup>85</sup> In order to mitigate this effect, the split-recovery system can be a useful tool. Under the split-recovery system, the plaintiff is awarded only a part of the punitive damages paid by the defendant, with the remainder going to the public. This system can lessen plaintiff's incentives to file unnecessary litigation, but does not decrease deterrence because defendant's damage payments are unaffected. To date, thirteen states have enacted split-recovery statutes, eight of which are still in effect.<sup>86</sup> Because of Halo's negative effect on legal cost, it will be beneficial to introduce split-recovery system.

## VI. Conclusion

The patent law reflects a deliberated balance between "the protection of patent rights and the interest in technological innovation."<sup>87</sup> Halo failed to keep the delicate balance by eliminating objective recklessness, decreasing the burden of proof and increasing the legal costs for society. Halo heralds a broader opening for punitive damages. From the economic perspective, reconsidering the appropriate standard for exercising discretion, differentiating some kinds of cases, and introducing the split-recovery system for awarding punitive damages will be beneficial to mitigate the negative effects resulting from Halo.

The current Trademark Law of the PRC has introduced the punitive damages system for malicious infringement of trademark rights.<sup>88</sup> If everything goes as expected, the Patent Law of the PRC that is undergoing revision may also introduce the punitive damages system<sup>89</sup>. The analysis of Halo provides suggestions to the punitive damages system in the China's intellectual property law. First, it should be realized that higher punitive damages do not guarantee a good result. Overly high punitive damages may give rise to abuse of litigation, thereby causing overdeterrence to production and R&D that are beneficial to the society. We should watch out for this phenomenon. Second, the probability of accused infringer's escaping from liability for infringement de-

cides the amount of punitive damages. The higher the probability, the higher the amount of punitive damages. The relation therebetween is that the amount of punitive damages (including compensatory damages)=infringement profits/(1-probability of accused infringer's escaping from liability for infringement). The probability of accused infringer's escaping from liability for infringement shall be determined according to the infringement type and circumstances of each case before finally deciding the amount of punitive damages. Subjective malice of infringer is not that relevant to the punitive damages. Third, punitive damages may exert different effects on infringing conducts. In comparison with patent infringement, trademark and copyright infringement may be readily detected by patentees. Except passing-off of trademark and piracy, it is relatively less likely that the trademark and copyright infringers escape from the liabilities for infringement. Thus, in the cases involving trademark and copyright infringement, account shall be taken of punitive damages for passing-off of trademark and piracy. As for patent infringement, a discreet attitude shall be adopted on a case-by-case analysis, so as to avoid overly high punitive damages from affecting dissemination of technological information and the chilling effect of innovations. ■

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<sup>1</sup> *Halo Electronics, Inc. v. Pulse Electronics, Inc., et Al. and Stryker Corporation, Et Al. v. Zimmer, Inc., et Al.* 579 U. S. (2016).

<sup>2</sup> *In re Seagate Technology, LLC*, 497 F. 3d 1360 (2007).

<sup>3</sup> Patent Act of 1793, ch. 11, 1 Stat. 318 ; Patent Act of 1790, ch. 7, 1 Stat. 109.

<sup>4</sup> Patent Act of 1793, ch. 5, 1 Stat. 322 .

<sup>5</sup> Patent Act of 1836, ch. 357, 5 Stat. 123.

<sup>6</sup> 35 U.S. C. §284 (2013).

<sup>7</sup> 16 How. 480 (1854).

<sup>8</sup> *Id.* at 488-489.

<sup>9</sup> *Id.* at 489.

<sup>10</sup> 717 F.2d 1380 (Fed. Cir. 1983)

<sup>11</sup> *Id.* at 1385.

<sup>12</sup> *Id.* at 1386.

<sup>13</sup> *Underwater Devices v. Morrison-Knudsen*, 717 F.2d 1380, at 1389-90.

<sup>14</sup> Id. at 1390.

<sup>15</sup> Id.

<sup>16</sup> *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1580.

<sup>17</sup> Justin P. Huddleson, Objectively Reckless: A Semi-Empirical Evaluation of *In re Seagate*, 15 B.U. J. SCI. & TECH. L. 102, 110 (2009).

<sup>18</sup> *Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH v. Dana Corp.*, 383 F.3d 1337 (Fed. Cir. 2004).

<sup>19</sup> Id. at 1344-45.

<sup>20</sup> Id. at 1344-45.

<sup>21</sup> See Christopher B. Seaman, Willful Patent Infringement and Enhanced Damages After In Re Seagate: An Empirical Study , 97 IOWA L. REV. 417, 428 (2012). See also Christopher Ryan Lanks, Note, In Re Seagate: Effects and Future Development of Willful Patent Infringement, 111 W. VA. L. REV. 607, 616 (2009).

<sup>22</sup> *In re Seagate Tech., LLC*, 497 F.3d 1360 (Fed. Cir. 2007) (*en banc*), cert. denied, 552 U.S. 1230 (2008).

<sup>23</sup> Id. at 1371.

<sup>24</sup> Id.

<sup>25</sup> Id. at 1371.

<sup>26</sup> Id.

<sup>27</sup> Id.

<sup>28</sup> Id. at 1374.

<sup>29</sup> *Kellogg v. Nike, Inc.*, 592 F. Supp. 2d 1166, 1171 (D. Neb. 2008).

<sup>30</sup> *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (“Because we abandon the affirmative duty of due care, we also reemphasize that there is no affirmative obligation to obtain opinion of counsel”).

<sup>31</sup> Id. at 1374.

<sup>32</sup> Id. at 1371.

<sup>33</sup> *Bard Peripheral Vascular, Inc. v. W. L. Gore & Assoc., Inc.*, 776 F. 3d 837, 844 (CA Fed. 2015).

<sup>34</sup> See *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371. See also *Spine Solutions, Inc. v. Medtronic Sofamor Danek USA, Inc.*, 620 F. 3d 1305, 1319 (CA Fed. 2010).

<sup>35</sup> *Butamax Advanced Biofuels LLC v. Gevo, Inc.* Nos. 12-1036-SLR; 12 -1200-SLR; 12-1300-SLR (D. Del. Aug. 3, 2015).

<sup>36</sup> Id.

<sup>37</sup> See Patent Hawk, Waiving Under Willfulness, PATENT PROSPECTOR, [http://www.patenthawk.com/blog/2007/08/waiving\\_under\\_willfulness\\_1.html](http://www.patenthawk.com/blog/2007/08/waiving_under_willfulness_1.html).

<sup>38</sup> See Monte Cooper & Don Daybell, In re Seagate Revises Patent Law on Willfulness, <http://www.orrick.com/publications/item.asp?action=article&articleID=1246>.

<sup>39</sup> See Christopher B. Seaman, Willful Patent Infringement and Enhanced Damages After In Re Seagate: An Empirical Study, 97 IOWA L. REV. 417, 444 (2012). The study gave the following table to show

this result:

	Before Knorr-Bremse (1983–1999)	After Knorr-Bremse, Before Seagate (Sept. 2004– Aug. 2007)	After Seagate (Aug. 2007– July 2010)
% Willful	63.8% (349 of 547)	48.2% (66 of 137)	37.2% (64 of 172)
p = 0.000			

Table 2: Willfulness Findings: Knorr-Bremse and Seagate

<sup>40</sup> See supra note 1.

<sup>41</sup> 769 F. 3d 1371, 1374-1375 (CA Fed. 2014).

<sup>42</sup> App. to Pet. for Cert. in No. 14-1520, at 77a.

<sup>43</sup> See supra note 1.

<sup>44</sup> Id.

<sup>45</sup> Id.

<sup>46</sup> Id.

<sup>47</sup> Id.

<sup>48</sup> *Octane Fitness LLC v. ICON Health & Fitness Inc.*, 134 S. Ct. 1749 (2014); *Highmark Inc. v. Allcare Health Mgmt. Sys. Inc.*, 134 S. Ct. 1744 (2014).

<sup>49</sup> Id.

<sup>50</sup> Id.

<sup>51</sup> See supra note 1.

<sup>52</sup> Id.

<sup>53</sup> Id.

<sup>54</sup> Id.

<sup>55</sup> See *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371. See also *Bard Peripheral Vascular, Inc. v. W. L. Gore & Assoc., Inc.*, 776 F. 3d 837, 844 (CA Fed. 2015); *Spine Solutions, Inc. v. Medtronic Sofamor Danek USA, Inc.*, 620 F. 3d 1305, 1319 (CA Fed. 2010).

<sup>56</sup> See Christopher B. Seaman, Willful Patent Infringement and Enhanced Damages After In Re Seagate: An Empirical Study, 97 IOWA L. REV. 417, 442 (2012).

<sup>57</sup> Bryan A. Garner (ed.), Black ’ s Law dictionary, P1053 (8th ed. abr. 2005).

<sup>58</sup> Mark A. Lemley & Ragesh K. Tangri, Ending Patent Law ’ s Willfulness Game, 18 BERKELEY TECH. L.J. 1085,1100 (2003).

<sup>59</sup> Id. at 1101.

<sup>60</sup> Mark A. Lemley elaborated the Intentional Ignorance effect in several papers. See also Mark A. Lemley, Ignoring Patents, 19 MICH. ST. L. REV. 19 (2008); See also Mark A. Lemley & Ragesh K. Tangri, Ending Patent Law ’ s Willfulness Game, 18 BERKELEY TECH. L.J. 1085,1100 (2003).

<sup>61</sup> See, e.g., Edwin H. Taylor & Glenn E. Von Tersch, A Proposal to

Shore Up the Foundations of Patent Law that the Underwater Line Eroded, 20 HASTINGS COMM. & ENT. L.J. 721, 737 (1998).

<sup>62</sup> John P. Walsh et al., Effects of Research Tool Patents and Licensing on Biomedical Innovation, in PATENTS IN THE KNOWLEDGE-BASED ECONOMY (Wesley M. Cohen & Stephen A. Merrill eds., 2003), p285.

<sup>63</sup> See Mark A. Lemley, Ignoring Patents, 19 MICH. ST. L. REV. 19, 22 (2008).

<sup>64</sup> See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 736 (2002); *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l*, 534 U.S. 124, 142(2001); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989).

<sup>65</sup> Patent Act, 35 U.S.C. § 112 1(2000).

<sup>66</sup> See supra note 58.

<sup>67</sup> See supra note 1.

<sup>68</sup> See Robert A. White, Patent Litigation: Procedure & Tactics, § 11.07 [3] (2011).

<sup>69</sup> See Federal Trade Commission, To Promote Innovation: The Proper Balance of Competition And Patent Law And Policy (2003), at 31.

<sup>70</sup> See supra note 57.

<sup>71</sup> See American Intellectual Property Law Association, 2015 Report of the Economic Survey, p29.

<sup>72</sup> James Bessen & Michael J. Meurer, Patent Failure: How Judges, Bureaucrats, And Lawyers Put Innovators At Risk (2008), p 55.

<sup>73</sup> Robert G. Bone, Civil Procedure: The Economics Of Civil Procedure (2003), p34.

<sup>74</sup> See supra note 72.

<sup>75</sup> See supra note 1.

<sup>76</sup> David G. Owen, A Punitive Damages Overview: Functions, Problems and Reform, 39 Villanova L. R., Vol. 363, 364(1994).

<sup>77</sup> For the elaborated explanation, see A. Mitchell Polinsky & Steven Shavell, Punitive Damages: An Economic Analysis, 111 Harv. L. Rev. 869 (1998).

<sup>78</sup> Roger D. Blair & Thomas F. Cotter, An Economic Analysis of Damages Rules in Intellectual Property Law, 39 Wm. & Mary L. Rev. 1585, 1619-1620 (1998).

<sup>79</sup> Id. at 1621.

<sup>80</sup> *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1336 (Fed. Cir. 2011); *Read Corp. v. Portec, Inc.*, 970 F.2d 816 (Fed. Cir. 1992)).

<sup>81</sup> *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1336, 1348 (Fed. Cir. 2011) (summarizing the factors found in *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826-27 (Fed. Cir. 1992)).

<sup>82</sup> See supra note 78.

<sup>83</sup> See Thomas F. Cotter, An Economic Analysis of Enhanced Damages and Attorney's Fees for Willful Patent Infringement, 14 Fed. Cir. B.J.

291, 315 (2004-2005).

<sup>84</sup> See supra note 78.

<sup>85</sup> See A. Mitchell Polinsky & Steven Shavell, Punitive Damages: An Economic Analysis, 111 Harv. L. Rev. 869, 922 (1998).

<sup>86</sup> Alaska, California, Illinois, Indiana, Iowa, Missouri, Oregon, and Utah currently retain their split-recovery statutes. See Alaska Stat. § 09.17.020(j) (2004); Cal. Civ. Code § 3294.5(b) (West 2006); Ga. Code Ann. § 51-12-5.1(e)(2) (2000); 735 Ill Comp. Stat. Ann. 5/2-1207 (2003); Ind. Code § 34-51-3-6 (1999); Iowa Code. § 668A.1(2) (1998); Mo. Ann. Stat. § 537.675(g) (2005); Or. Rev. Stat. § 31.735 (2003); and Utah Code Ann. § 78B-8-201 (2004).

<sup>87</sup> See supra note 1.

<sup>88</sup> Article 63.1 of the Trademark law of the PRC.

<sup>89</sup> Article 68.1 of the Draft Patent Law of the PRC (Draft for Comments).