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**Article**

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## Audit Fees, Patent Litigation, and Long-Term Performance

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ARTICLE INFO	ABSTRACT
<p>Article History</p> <p>Received 25 October 2021; Accepted 30 December 2021</p> <p><i>JEL Classifications</i> M41, M42</p> <p><b>Keywords:</b> Patent Litigation; Audit Fees; Long-Term Performance</p>	<p><b>Purpose:</b> The business risk of patent litigation contributes to auditors' professional skepticism and thereby results in different audit pricing decisions. Patent infringement is viewed as a specific news and thereby results in different economic consequences. This study examines the association among auditor reaction, patent litigation, and long-term economic consequences by exploring the different patent infringement cases.</p> <p><b>Design/methodology/approach:</b> This study adopts a regression model to examine my research issues.</p> <p><b>Finding:</b> The empirical results suggest that, (1) auditors consider patent settlement as a risk factor in the evaluation of business risks and lead to higher audit fees and lower business risk; (2) overseas patent litigation may affect auditors' perceived risk of patent litigation and lead to higher audit fees and lower business risk; (3) relative to Plaintiff companies, auditors perceive Defendant companies have a higher business risk and lead to higher audit fees and lower business risk; (4) relative to companies without overseas litigation, auditors perceive companies with overseas litigation have a higher business risk and lead to higher audit fees and lower business risk; (5) Defendant companies have the advantage of long-term growth performance within 3 years after settlement negotiations of patent litigation; (6) settlement negotiations would be a significant moderator for overseas patent litigation, and companies are more likely to obtain a favorable long-term performance.</p> <p><b>Research limitations/implications:</b> Research data is obtained from three different sources: First, the lawsuit information was hand-collected from the Market Observation Post System (<i>MOPS</i>). Second, the patent-related information was hand-collected from the Taiwan Patent Search System (<i>TPSS</i>). Third, audit fees and accounting data were obtained from the Taiwan Economic Journal (<i>TEJ</i>) database. Therefore, hand-collected data and lack of audit fees data restrict the research sample to a manageable size. The number of observations during the period 2010-2020, which totals 307 observations.</p> <p><b>Originality/value:</b> This study differs from previous studies in focusing on patent litigation cases to examine the association among auditor reaction, patent litigation, and long-term economic consequences by investigating whether auditors and market participants charge risk premiums for companies with the potential business risk of uncertain patent litigation, because potential business risk for patent litigation matters to market participants, and assessments of the perception of business risk can potentially provide useful and timely information to investors, auditors, and regulatory.</p>

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### 1. INTRODUCTION

In today's business environment, the patent plays a critical role in creating competitive advantage and sustaining economic growth in the future. Patents not only bring new opportunities for profitable development, but also attract more potential risk for infringement damages. Patent litigation cases are increasing rapidly in today's competitive environment and incurring a huge litigation cost. Such patent litigation not only harms the patent holder, but also harms the innovation development. Moreover, patent litigation is one of the most costly and controversial forms of business risk. Business risk is related with the financial structure, and the litigation risk for patent infringement can

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be seen as a warning sign. The following excerpts illustrate the potential relation between patent litigation and business risk:

March 13, 2012 -- Yahoo Inc sued Facebook Inc over 10 patents that include methods and systems for advertising on the Web, opening the first major legal battle among big technology companies in social media.....Yahoo's patent lawsuit follows Facebook's announcement of plans for an initial public offering that could value the company at about \$100 billion. (*Reuters.com*).

May 25, 2018 -- Samsung Electronics Co Ltd should pay \$539 million to Apple Inc for copying patented smartphone features, technology publication CNET reported, bringing a years-long feud between the technology companies into its final stages. (*Reuters.com*).

Business risk not only affects the company's prospect for sustainability and growth, but also affects the auditor's perspective for the acceptable audit risk and the investor's perspective for the long-term performance. Although previous studies (Almeida and Silva 2020; Anantharaman et al. 2016; Bryan and Mason 2016; Junjian and Dan 2015; Carpenter and Reimers 2013; Krishnan et al. 2013) have found that auditors are more likely to adopt different approaches to manage risky clients, few have focused on patent litigation risk to investigate whether and how auditors respond to audit risks arising from patent infringement when making audit pricing decisions. Although prior studies (Ball and Brown 1968; Basu 1997; Kim and Zhang 2014) have focused mainly on the release of good news and their short-term performance (price reactions), few have focused on the release of bad news (patent infringement) and subsequent long-term performance. This study differs from previous studies in focusing on patent litigation cases to examine the association among auditor reaction, patent litigation, and long-term economic consequences by investigating whether auditors and market participants charge risk premiums for companies with the potential business risk of uncertain patent litigation, because potential business risk for patent litigation matters to market participants, and assessments of the perception of business risk can potentially provide useful and timely information to investors, auditors, and regulatory.

## 2. RELATED LITERATURE

According to the definition of prior studies (Bell et al. 2002; Arens and Loebbecke 2000; Johnstone 2000; Colbert et al. 1996; Huss and Jacobs 1991), business risk can be divided into client and auditor business risks. Client business risk is typically defined as the risk that the client's economic condition will deteriorate in either short or long term (Arens and Loebbecke 2000; Huss and Jacobs 1991), and such risk may increase auditor's litigation risk and harm the reputation of audit firm (Tang et al., 2017; Lyon and Maher 2005). Auditor business risk is typically defined as the risk that an auditor will suffer loss resulting from the client's engagement (Johnstone 2000; Bell et al. 2002), and such risk may harm the performance and reputation of audit firm. In general, the public is difficult to differentiate between client and auditor business risks, because such risks are closely related to the auditor-client relationship and the client financial condition.

Client business risks may increase auditor business risk and bring potential litigation costs to auditors. When auditors perceive an increase in business risk, they are more likely to tend to charge the expected costs of litigation risk in response to increased business risk in order to mitigate potential litigation costs. Prior studies (Almeida and Silva 2020; Bryan and Mason 2016; Junjian and Dan 2015; Krishnan et al. 2013; Peel and Roberts 2003; Niemi 2002; Bell et al. 2001; Johnstone 2000; Pratt and Stice 1994) indicate that auditors are more likely to charge higher fees into effort and risk portions when the business risk is higher. Auditors adjust their audit pricing decisions not only in response to the increased risk, but also as a means to mitigate potential litigation concerns. Some studies indicate that auditors respond to an increased business risk by issuing unfavorable opinions (Anantharaman et al. 2016; Krishnan and Krishnan 1997), adjusting audit plans (Bell et al. 2002; Pratt and Stice 1994), increasing professional skepticism (Carpenter and Reimers 2013; Payne and Ramsay 2005), and resigning from risky clients (Krishnan et al. 2013; Krishnan et al. 1996).

As discussed above, there are many previous studies have investigated the relationship between business risk and auditor reaction, moreover, these studies particular focus on the situation of company financial distress and auditor detection failure. This study extends the previous studies, which focus on patent litigation cases, by investigating whether auditors charge risk premiums for companies with the potential business risk of uncertain patent litigation.

Patents play an increasingly important role in market establishment and economic development (Griliches 1981; Hall 2005; Jeong and Kim 2017; Lee 2020). In today's competitive environment, patents have already become a vital role of companies (Hirshleifer et al. 2013; Kogan et al. 2017). When a company suffers harm due to a patent-related litigation, the company's auditor is more likely to suffer reputation damages and performance deterioration. Patent litigation not only brings harm to companies and auditors, but also may bring considerable damages across countries. Therefore, understanding the impact of patent litigation concerns on the determinants of audit pricing decisions is a particular important issue in today's world. This study investigates the effect of patent infringement on auditors' pricing strategies. As engaging in cases with higher patent litigation risk signals higher challenging and risky audit areas that requires more audit efforts and audit fee premiums, I thus predict that auditors tend to charge the expected costs of potential litigation risk in response to increased patent litigation risk. This leads to the first research hypothesis:

**H1.** There is a positive relation between the patent litigation and audit fees.

According to positive accounting theory in economics, various information has the potential to significantly impact the market reaction. For example, bad news is more likely to attract market participants' attention (Ball and Brown 1968; Mendenhall and Nichols 1988; Hong et al. 2000; Heston and Sinha 2017), because it may hamper the growing prospect of long-term performance and the value of the company (Brown et al. 2006; Kothari et al. 2009; Godfrey et al. 2010). Patent litigation brings risks and uncertainty, and market participants view it as a negative signal or bad news (Santanam et al. 2008; Kiebzak et al. 2016; Wang and Chen 2017; Billings et al. 2021). Prior studies (Ball and Brown 1968; Basu 1997; Kim and Zhang 2014) focus mainly on the release of good news and their short-term performance (price reactions), and finding that stock prices reflect good news. In general, patent infringement is viewed as a specific bad news and its nature is involved in too many economic activities or events. Therefore, this study further conjectures that bad news drift may occur in subsequent months or years (Chan 2003; Parello and Spinesi 2005; Wang and Chen 2017; Bao et al. 2021) and bring economic consequences of patent litigation. This study differs from previous studies in focusing on bad news (patent litigation cases) to examine the release of patent litigation and subsequent long-term performance by exploring the different patent infringement cases. When a company suffers the event of patent infringement, it means the uncertain litigation risk inputs in a company is more likely to convert into company's perspective with a material adverse effect. Because the event of patent infringement signals higher operating risk in the future, I predict a negative relationship between the patent litigation and long-term performance. This leads to the second research hypothesis:

**H2.** There is a negative relation between the patent litigation and long-term performance.

### 3. METHODOLOGY AND DATA

The electronics industry has a large number of patents, and the possibility of patent litigation is higher than other industries. Thus, focusing on the electronics industry can help this study exploring the relationship between audit fees and patent litigation. Research data is obtained from three different sources: First, the lawsuit information was hand-collected from the Market Observation Post System (*MOPS*). Second, the patent-related information was hand-collected from the Taiwan Patent Search System (*TPSS*). Third, audit fees and accounting data were obtained from the Taiwan Economic Journal (*TEJ*) database. Hand-collected data and lack of audit fees data restrict the research sample to a manageable size. Therefore, research sample comprised 307 firm-year observations of the electronics firms listed on the Taiwan Stock Exchange (*TSE*)<sup>1</sup>. The number of observations during the period 2010-2020, which totals 307 observations (see Table 1).

**Table 1: Distribution of Patent Litigation<sup>a</sup> Observations by Case Year and Long-Term Performance<sup>b</sup>**

Year	Performance Period	Number of Observations	Percent of Sample
2010	2011~2015	52	16.94
2011	2012~2016	59	19.22
2012	2013~2017	49	15.96
2013	2014~2018	50	16.29
2014	2015~2019	52	16.94
2015	2016~2020	45	14.66
Total		307	100

<sup>a</sup> Patent litigation denotes companies involved in patent-related lawsuits.

<sup>b</sup> This study calculates the three-year and five-year stock performance following patent litigation as the measurement of long-term performance.

Plaintiffs who file lawsuits for patent protection, and they claim their rights for patent infringement. Defendants who may involve in violations of patent rights, and they may face charges for patent infringement claims. In patent infringement cases, plaintiffs and defendants may consider settlement negotiations to minimize litigation costs and risks. As for distribution of plaintiff and defendant by settlement of patent-related lawsuits, Table 2 shows there are 53 (17.26%) plaintiff companies and 254 (82.74%) defendant companies, and there are 218 (71.01%) no settlement companies and 89 (28.99%) settlement companies. These findings indicate that defendant companies are less likely to engage in further settlement negotiations. A possible reason is that, in general, defendant companies feel inappropriately high penalties and fines to impose on them.

**Table 2: Distribution of Plaintiff and Defendant<sup>a</sup> by Settlement<sup>b</sup>**

	Plaintiff	Defendant	Total
No Settlement	29 (9.45%)	189 (61.56%)	218 (71.01%)
Settlement	24	65	89

<sup>1</sup> Taiwan's electronics industry plays an important role in global competitive markets. Taiwan's electronics industry has the complete supply chain and it plays a dominant role in improving Taiwan's economic growth. Taiwan's electronics industry effectively produces high quality products and its products are ranked in the top three in the world (e.g., TSMC, UMC and Foxconn). In this study, I thus use Taiwan's electronics industry as research samples to examine my research questions.

	(7.82%)	(21.17%)	(28.99%)
<b>Total</b>	53 (17.26%)	254 (82.74%)	307

<sup>a</sup> Plaintiff (Defendant) denotes companies are involved in patent-related lawsuits as a plaintiff (Defendant).

<sup>b</sup> Patent litigation denotes companies have been negotiated settlements.

To test whether patent infringement affects auditors' pricing strategies, this study first estimates Equations (1) and (2). This study further estimates Equation (3) to determine whether long-term performance is affected by the effect of patent infringement.

$$LNAF_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it} \quad (1)$$

$$LNAF_{it} = \beta_0 + \beta_1 CASES_{it} + \gamma YEAR + \varepsilon_{it} \quad (2)$$

$$LR_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it} \quad (3)$$

where, for firm  $i$  and year  $t$ :

- $LNAF$  = the natural logarithm of audit fees;<sup>2</sup>
- $SETTLEMENT$  = 1 if plaintiffs and defendants have been negotiated settlements, else 0;
- $CASES$  = the natural logarithm of number of patent-related lawsuits;
- $LR$  = the holding period raw return for 1 year/3 years/5 years;<sup>3</sup>
- $YEAR$  = fiscal year dummies;
- $\varepsilon$  = error term.

#### 4. RESULTS AND DISCUSSION

Table 3 presents the regression results of audit fees adjustment. As shown in Column (1), the coefficient on  $SETTLEMENT$  is positively significant ( $t = 3.22$ ,  $p < 0.01$ ), indicating that auditors perceive the patent settlement as a business risk and incorporate such risk when determining audit fees. This study further partitions 307 observations into two groups: (1) Plaintiff companies ( $n = 53$ ) and (2) Defendant companies ( $n = 254$ ). As shown in Columns (2) and (3), the coefficients on  $SETTLEMENT$  are positively significant ( $p < 0.01$ ), indicating that auditors perceive no difference between patent settlement of plaintiff and defendant companies. These results are consistent with H1. These findings generally support the idea that auditors consider patent settlement as a risk factor in the evaluation of business risks, and high audit fees reflect auditors' assessment of risk.

**Table 3: Audit Fees and Patent Litigation - Considering Litigant**

$LNAF_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it}$ (1)							
Variables <sup>b</sup>	Pred. Sign	(1)		(2)		(3)	
		All		Plaintiff <sup>a</sup>		Defendant	
		Coef.	t-value <sup>c</sup>	Coef.	t-value	Coef.	t-value
<i>CONSTANT</i>		8.4024	63.21***	8.1044	28.75***	8.4511	56.57***
<i>SETTLEMENT</i>	?	0.3606	3.22***	0.5632	2.69***	0.3394	2.58***
<i>YEAR</i>		Included		Included		Included	
Adj. R <sup>2</sup>		2.59%		3.33%		2.27%	
N		307		53		254	

<sup>a</sup> Plaintiff (Defendant) denotes companies are involved in patent-related lawsuits as a plaintiff (Defendant).

<sup>b</sup> The definition of the variables reported in this table are:  $LNAF$  = the natural logarithm of audit fees;  $SETTLEMENT$  = 1 if plaintiffs and defendants have been negotiated settlements, else 0;  $YEAR$  = dummy variables controlling for years.

<sup>c</sup> Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

The overseas patent litigation is complex and multi-faceted, involving not only patent infringement concerns, but the law of extraterritorial patent enforcement. Therefore, overseas patent litigation may have higher litigation risk which in turn, increases business risk and audit fees. Table 4 presents the regression results of audit fees adjustment after considering cases of overseas litigation. After partitioning the sample into groups in which patent litigation is included and excluded overseas cases, Table 4 shows that the coefficient on  $SETTLEMENT$  is significant

<sup>2</sup> According to the audit fees literature (Craswell and Francis 1999; Francis et al. 2005),  $LNAF$  is measured as natural logarithm of audit fees as it provides a convenient interpretation.

<sup>3</sup> The measure of long-term performance is buy-and-hold returns (BHR). According prior literature (Ritter 1991; Ritter and Welch 2002), this study computes buy-and-hold returns from event month 1 to event month  $t$  (12/36/60), defined as:  $LR_t = [\Pi(1+r_{it}) - 1]$ . Where,  $r_{it}$  is the monthly actual return on security  $i$  in event period  $t$ .

and positive ( $t = 2.58, p < 0.01$ ) only in the overseas cases, which implies that overseas patent litigation may affect auditors' perceived risk of patent litigation and thereby results in higher audit fees.

**Table 4: Audit Fees and Overseas Patent Litigation**

$$LNAF_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it}. (1)$$

Variables <sup>b</sup>	Pred. Sign	(1)		(2)	
		No Overseas <sup>a</sup>		Overseas	
		Coef.	t-value <sup>c</sup>	Coef.	t-value
CONSTANT		7.91721	87.05***	8.6514	50.26***
SETTLEMENT	?	0.06211	0.69	0.3559	2.58***
YEAR		Included		Included	
Adj. R <sup>2</sup>		1.49%		2.47%	
N		83		224	

<sup>a</sup>No Overseas (Overseas) denotes companies aren't (are) involved in international patent-related lawsuits.

<sup>b</sup>The definition of the variables reported in this table are:  $LNAF$  = the natural logarithm of audit fees;  $SETTLEMENT$  = 1 if plaintiffs and defendants have been negotiated settlements, else 0;  $YEAR$  = dummy variables controlling for years.

<sup>c</sup>Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Auditors may perceive that an increase in the number of litigation cases may lead to an increase in patent litigation risk. This study further analyzes the impact of the number of litigation cases on the determination of audit fees. As shown in Column (1) of Table 5, the coefficient on  $CASES$  is positively significant ( $t = 7.26, p < 0.01$ ), indicating that auditors are more likely to charge higher audit fees when clients are involved in more patent litigation cases. This study partitions the sample into Plaintiff and Defendant companies. As shown in Columns (2) and (3), the coefficients on  $CASES$  are positively significant ( $p < 0.01$ ), indicating that auditors tend to charge higher audit fees when clients are associated with more patent litigation cases, no matter who prompts the patent litigation. Notably, the coefficient of  $CASES$  in Column (3) is larger than the coefficient of  $CASES$  reported in Column (2), implying that auditors perceive a higher business risk to be present in Defendant companies than in Plaintiff companies. These results imply that auditors tend to charge the expected costs of litigation risk in response to increased business risk.

**Table 5: Audit Fees and Litigation Cases**

$$LNAF_{it} = \beta_0 + \beta_1 CASES_{it} + \gamma YEAR + \varepsilon_{it}. (2)$$

Variables <sup>b</sup>	Pred. Sign	(1)		(2)		(3)	
		All		Plaintiff <sup>a</sup>		Defendant	
		Coef.	t-value <sup>c</sup>	Coef.	t-value	Coef.	t-value
CONSTANT		8.2333	64.71***	7.9760	29.15***	8.2684	57.99***
CASES	?	0.4425	7.26***	0.4325	3.61***	0.4673	6.58***
YEAR		Included		Included		Included	
Adj. R <sup>2</sup>		14.26%		12.80%		14.58%	
N		307		53		254	

<sup>a</sup>Plaintiff (Defendant) denotes companies are involved in patent-related lawsuits as a plaintiff (Defendant).

<sup>b</sup>The definition of the variables reported in this table are:  $LNAF$  = the natural logarithm of audit fees;  $CASES$  = the natural logarithm of number of patent-related lawsuits;  $YEAR$  = dummy variables controlling for years.

<sup>c</sup>Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6 shows the result for patent litigation cases relate to the determination of audit fees by partitioning the sample into two sub-samples according to overseas cases. As shown in Table 6, the coefficients on  $CASES$  are positively significant (at least at the 5% significance level), indicating that companies involving more patent litigation cases are more likely to be charged higher audit fees by their auditors, no matter whether these patent litigation cases are associated with the foreign infringement or not. Notably, the coefficient of  $CASES$  in Column (2) is larger than the coefficient of  $CASES$  reported in Column (1), implying that auditors perceive a higher business risk to be present in companies with overseas litigation than those without overseas litigation, and then charge higher fees to companies with overseas litigation for insuring increased business risk.

**Table 6: Audit Fees and Litigation Cases—Considering Overseas Litigation**

$$LNAF_{it} = \beta_0 + \beta_1 CASES_{it} + \gamma YEAR + \varepsilon_{it}. \quad (2)$$

Variables <sup>b</sup>	Pred. Sign	(1)		(2)	
		No Overseas <sup>a</sup>		Overseas	
		Coef.	t-value <sup>c</sup>	Coef.	t-value
CONSTANT		7.97981	90.60***	8.4319	50.53***
CASES	?	-0.18711	2.40**	0.4293	6.00***
YEAR		Included		Included	
Adj. R <sup>2</sup>		0.61%		13.75%	
N		83		224	

<sup>a</sup>No Overseas (Overseas) denotes companies aren't (are) involved in international patent-related lawsuits.

<sup>b</sup>The definition of the variables reported in this table are:  $LNAF$  = the natural logarithm of audit fees;  $CASES$  = the natural logarithm of number of patent-related lawsuits;  $YEAR$  = dummy variables controlling for years.

<sup>c</sup>Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Patent Litigation may affect not only auditors' perceived risk but also the delivery of future performance. Table 7 presents the regression results of long-term performance (1 year, 3 years, and 5 years). As shown in Column (1), the coefficient on  $SETTLEMENT$  is significant and positive ( $t = 1.96$ ,  $p < 0.1$ ) only in the Panel A. This study further partitions the sample into Plaintiff and Defendant companies. As shown in Columns (2) and (3), the coefficient on  $SETTLEMENT$  is significant and positive only in Panels A and B. Notably, the coefficient of  $SETTLEMENT$  ( $t = 2.58$ ,  $p < 0.01$ ) in Column (3) of Panel B is larger than the coefficient of  $SETTLEMENT$  ( $t = 1.83$ ,  $p < 0.1$ ) reported in Column (1) of Panel A. These results are consistent with H2. Empirical results indicate that Defendant companies have the advantage of long-term growth performance within 3 years after settlement negotiations of patent litigation. These results imply that settlement negotiations successfully play a strategic role in moderating the negative effect of patent litigation and bringing the stability of performance development.

**Table 7: Long-Term Performance and Patent Litigation**

$$LR_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it}. \quad (3)$$

**Panel A- Long-term performance for 1 year**

Variables <sup>b</sup>	Pred. Sign	(1)		(2)		(3)	
		All		Plaintiff <sup>a</sup>		Defendant	
		Coef.	t-value <sup>c</sup>	Coef.	t-value	Coef.	t-value
CONSTANT		0.1142	1.93*	0.0260	0.20	0.1282	1.93*
SETTLEMENT	?	0.0748	1.48	-0.0007	-0.01	0.1095	1.83*
YEAR		Included		Included		Included	
Adj. R <sup>2</sup>		23.46%		4.85%		25.87%	
N		274		52		222	

**Panel B- Long-term performance for 3 years**

Variables <sup>b</sup>	Pred. Sign	(1)		(2)		(3)	
		All		Plaintiff <sup>a</sup>		Defendant	
		Coef.	t-value <sup>c</sup>	Coef.	t-value	Coef.	t-value
CONSTANT		0.2237	1.92*	0.7630	2.78***	0.2474	2.17**
SETTLEMENT	?	0.1942	1.96*	0.0336	0.16	0.3394	2.58***
YEAR		Included		Included		Included	
Adj. R <sup>2</sup>		7.36%		5.02%		9.90%	
N		274		52		222	

**Panel C- Long-term performance for 5 years**

Variables <sup>b</sup>	Pred. Sign	(1)		(2)		(3)	
		All		Plaintiff <sup>a</sup>		Defendant	
		Coef.	t-value <sup>c</sup>	Coef.	t-value	Coef.	t-value
CONSTANT		1.6373	6.96***	3.2368	7.40***	1.3164	4.97***
SETTLEMENT	?	0.1297	0.65	0.0671	0.21	0.1496	0.63
YEAR		Included		Included		Included	
Adj. R <sup>2</sup>		9.10%		40.35%		6.35%	
N		274		52		222	

<sup>a</sup> Plaintiff (Defendant) denotes companies are involved in patent-related lawsuits as a plaintiff (Defendant).

<sup>b</sup>The definition of the variables reported in this table are: *LR* = the holding period raw return for 1 year/3 years/5 years; *SETTLEMENT* = 1 if plaintiffs and defendants have been negotiated settlements, else 0; *YEAR* = dummy variables controlling for years.  
<sup>c</sup>Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Overseas patent litigation can broadly affect company's performance, because the spillover effect of patent-related litigation is stronger for overseas patent litigation. Table 8 shows the result for overseas patent litigation relates to the long-term performance (1 year, 3 years, and 5 years). As shown in Table 8, the coefficient on *SETTLEMENT* is significant and positive only in overseas cases; moreover, the coefficient of *SETTLEMENT* ( $t = 2.40$ ,  $p < 0.05$ ) in Column (2) of Panel B is larger than the coefficient of *SETTLEMENT* ( $t = 2.04$ ,  $p < 0.05$ ) reported in Column (2) of Panel A. These results suggest that settlement negotiations would be a significant moderator for overseas patent litigation, and companies are more likely to obtain a favorable long-term performance. Notably, the advantage effect of settlement negotiations on long-term performance will decrease over time.

**Table 8: Long-Term Performance and Overseas Patent Litigation**

$$LR_{it} = \beta_0 + \beta_1 SETTLEMENT_{it} + \gamma YEAR + \varepsilon_{it} \quad (3)$$

<b>Panel A- Long-term performance for 1 year</b>					
Variables <sup>b</sup>	Pred. Sign	(1)		(2)	
		No Overseas <sup>a</sup>		Overseas	
		Coef.	t-value <sup>c</sup>	Coef.	t-value
<i>CONSTANT</i>		0.17141	1.71*	0.0886	1.20
<i>SETTLEMENT</i>	?	-0.05941	-0.58	0.1201	2.04**
<i>YEAR</i>		Included		Included	
Adj. R <sup>2</sup>		23.20%		23.05%	
N		76		198	
<b>Panel B- Long-term performance for 3 years</b>					
Variables <sup>b</sup>	Pred. Sign	(1)		(2)	
		No Overseas <sup>a</sup>		Overseas	
		Coef.	t-value <sup>c</sup>	Coef.	t-value
<i>CONSTANT</i>		0.51181	3.04***	0.0827	0.56
<i>SETTLEMENT</i>	?	-0.04871	-0.28	0.2863	2.40**
<i>YEAR</i>		Included		Included	
Adj. R <sup>2</sup>		12.01%		8.72%	
N		76		198	
<b>Panel C- Long-term performance for 5 years</b>					
Variables <sup>b</sup>	Pred. Sign	(1)		(2)	
		No Overseas <sup>a</sup>		Overseas	
		Coef.	t-value <sup>c</sup>	Coef.	t-value
<i>CONSTANT</i>		2.47321	6.42***	1.2269	4.22***
<i>SETTLEMENT</i>	?	-0.29941	-0.75	0.2836	1.22
<i>YEAR</i>		Included		Included	
Adj. R <sup>2</sup>		25.04%		4.81%	
N		76		198	

<sup>a</sup>No Overseas (Overseas) denotes companies aren't (are) involved in international patent-related lawsuits.

<sup>b</sup>The definition of the variables reported in this table are: *LR* = the holding period raw return for 1 year/3 years/5 years; *SETTLEMENT* = 1 if plaintiffs and defendants have been negotiated settlements, else 0; *YEAR* = dummy variables controlling for years.

<sup>c</sup>Asterisks \*, \*\*, \*\*\* indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

## 5. CONCLUSION

The business risk of patent litigation contributes to auditors' professional skepticism and thereby results in different audit pricing decisions and subsequent performance. This study examines the implications of patent litigation, as a potential red flag of auditor business risk, to the auditor's concerns, audit pricing, and long-term performance. The empirical results suggest that, (1) auditors consider patent settlement as a risk factor in the evaluation of business risks and lead to higher audit fees and lower business risk; (2) overseas patent litigation may affect auditors' perceived risk of patent litigation and lead to higher audit fees and lower business risk; (3) relative to Plaintiff companies, auditors perceive Defendant companies have a higher business risk and lead to higher audit fees and lower business risk; (4) relative to companies without overseas litigation, auditors perceive companies with overseas litigation have a higher business risk and lead to higher audit fees and lower business risk; (5) Defendant companies have the advantage of long-term growth performance within 3 years after settlement negotiations of patent litigation; (6)



settlement negotiations would be a significant moderator for overseas patent litigation, and companies are more likely to obtain a favorable long-term performance. Collectively, the empirical results suggest that auditors tend to charge higher audit fees in response to increased business risk when the companies are exposed to greater patent litigation risk; moreover, settlement negotiations successfully play a strategic role in moderating the negative effect of patent litigation and bringing the stability of performance development.

In my view, empirical results of this study have a number of implications for research, policy, and practice. From a research perspective, empirical results extend auditing literature by examining the effect of patent infringement on auditors' pricing strategies and add to auditing related literature on the important role that auditors' pricing strategies play a moderating role on uncertain business risks in patent infringement cases. Empirical results also extend accounting literature by examining the effect of patent infringement on company's long-term performance and add to accounting related literature on economic consequences that the event of patent infringement signals higher operating risk and brings adverse effects on long-term performance. From a policy perspective, the regulators could remind auditors to maintain their professional skepticism and pay attention to patent infringement cases. Moreover, the policy-makers could consider increasing the company's mandated disclosures to provide greater transparency about infringement-related information by which market participants can evaluate the company's perspective in the future. From a practice perspective, this study approves that the effect of patent infringement is viewed as a material business risk in deteriorating long-term performance. This study suggests that the voluntary disclosure for litigation-related information to the public plays an effective communication role in moderating the adverse effect of patent infringement in capital markets.

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