

Anti-counterfeiting strategy unfolded: A closer look to the case of a large multinational manufacturer

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Abstract

Research Summary: We examine in detail how one large mobile phone manufacturer develops its anti-counterfeit strategy and seizes counterfeit products on the market. We couple qualitative data (observations from 150 counterfeit sales points worldwide, two focus groups, a survey with 151 respondents, interviews with 90 informants) with econometric analysis of 3,333 fights the focal firm undertook against more than 2,000 counterfeiters in 75 countries over 6 years (2006–2011). We focus on firm's seizure of counterfeit products when consumers' safety is at risk. As the firm is more sensitive to product safety than counterfeiters, we found that the firm generally performs larger seizures when unsafe products are involved, but this is less true in the firm's main market, likely because higher profitability offers higher incentives to counterfeiters.

Managerial Summary: In companies' fight against counterfeiters, product safety plays a pivotal role. We suggest that companies have a particularly high incentive to seize counterfeit products when the product carries potential safety risks, because the occurrence of safety issues seriously harms its reputation. This

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research explores the anti-counterfeit strategy undertaken by a large manufacturer operating in the market of mobile phones and in the market of ancillary products (e.g., batteries and chargers). Results show that larger seizures occur in the ancillary rather than in the mobile phone market because while authentic companies have high incentives to seize mobile phone and accessories, as both involve safety risks, counterfeiters have a greater incentive in the main market and thus put less effort in ancillary markets.

KEYWORDS

counterfeit, intellectual property right, IPR, mobile phone, product safety

1 | INTRODUCTION

Counterfeiting—defined as the unauthorized manufacturing of products masquerading as genuine products by copying certain features (e.g., Fink, Maskus, & Qian, 2016; WTO, 1994)—is harmful to both consumers and firms. For consumers, counterfeit products are often of low quality and hazardous; for companies, such products usurp market share and can damage a firm's reputation (Chakraborty, Allred, Sukhdial, & Bristol, 1997; Green & Smith, 2002). In fact, counterfeiting is estimated to be worth nearly half a trillion USD per year (OECD and Kazmierczak, 2016). In 2004, seized counterfeit batteries were valued at more than \$2.3 million (U.S. Customs and Border Protection and U.S. Immigration and Customs Enforcement, 2006), and a 2008 OECD survey on counterfeiting revealed that one large mobile manufacturer had seized as many as 34 million counterfeit batteries carrying its name over a 1-year period.

Academic research has studied the strategies that firms can undertake to mitigate counterfeiting. For example, firms can engage in legal actions, invest in training and technology, or vertically integrate their retailers (Alcácer, Beukel, & Cassiman, 2017; Berger, Blind, & Cuntz, 2012; Olsen & Granzin, 1993; Qian, 2014; Wilson, Grammich, & Chan, 2016; Yang, Sonmez, & Bosworth, 2004). However, research has overlooked the role played by key features of the product being counterfeited in the development and success of authentic firms' anti-counterfeiting strategies.

This article addresses this gap by studying how one key product attribute, specifically *safety*, might affect anti-counterfeiting strategies and seizure. Product safety, which refers to “whether the operation or use of the product involves risk of injury” (Daughety & Reinganum, 1995, p. 1187), is typically considered a relevant product characteristic and a driver of its market performance. Studies in marketing, for instance, suggest that product safety is a relevant dimension of perceived product quality and, as such, can significantly drive consumers' purchase intention and companies' market performance (e.g., Tse, 1999). One prominent example of this issue involves the explosion of the lithium-ion batteries within Samsung Galaxy Note7s: On September 2, 2016, Samsung declared in a public statement that “as of September 1, 2016, there have been 35 cases reported globally and we are currently conducting a thorough inspection

with our suppliers to identify possible affected batteries in the market. However, because our customers' safety is an absolute priority at Samsung, we have stopped sales of the Galaxy Note7.” On October 14, 2016, Samsung released estimates of a negative profit impact in excess of \$3 trillion stemming from Galaxy Note7 safety issues.

Of course, companies have to worry about more than just the safety of their own products; they also have to contend with counterfeits, which are strongly characterized by safety problems across many industries, such as pharmaceuticals and food products (Deisingh, 2005; Rose, Hassan, & Falder, 2010). To compound matters, consumers are often unable to distinguish between authentic and counterfeit products (e.g., Grossman & Shapiro, 1988; Pathak, Velasco, & Calvert, 2019). Against that background, the present paper focuses on *deceptive counterfeit products*, that is, products that consumers do not know to be counterfeit (Grossman & Shapiro, 1988).¹ Thus, safety issues stemming from a counterfeit product might generate highly negative reputational spillovers for manufacturers of authentic products, giving them a strong incentive to fight unsafe counterfeiters.

In our attempt to understand how product safety might affect authentic firms' anti-counterfeiting strategies, we compiled a rich set of qualitative data derived from one large, multinational mobile phone company. Specifically, our dataset includes observations at 150 counterfeit sales points worldwide and at counterfeiters' sites or shops (in disguise); two focus groups; a survey with 151 respondents, and interviews with 90 informants (see the Appendix for a detailed description of our qualitative data). We used this background information on the institutional details of our focal firm's anti-counterfeiting strategy and actions to understand its incentives around safety protection in different markets. We then contrast this information with the information we gathered at counterfeiters' sites to form some prior on the outcome of the fight between the authentic firm and the counterfeiters. As a second step, we examined those outcomes by means of a confidential dataset about 3,333 fights undertaken by the company against more than 2,000 counterfeiters in 75 countries from 2006 to 2011 (details in the Appendix). The outcomes observed on the market correspond to a situation in which the presence of safety issues implies larger seizures by the firm, but this effect is stronger in the firm's ancillary market than its main (most profitable) market. By ancillary markets, we refer to the market for complementary accessories and components such as batteries, chargers, earphones, covers and neck strings; by main market, we refer to the market for mobile phones. This implies that the firm's paramount consideration of product safety must be considered alongside counterfeiters' low interest in safety and higher sensitivity to market profitability: When safety concerns push the firm to seize the highest number of counterfeit products *irrespective of the market*, smaller seizures on the main market will only occur if counterfeiters have higher incentives to act there rather than in less profitable ancillary markets. This intuition is confirmed by our interviews and observations at counterfeiters' sites.

We believe this research importantly advances extant knowledge: To the best of our knowledge, it is the first investigation into the role of product attributes—and product safety in particular—in determining counterfeit product seizing. Thus, the study offers novel insight into how product safety might shape the form and success of an authentic firm's anti-counterfeiting strategy.

¹To get a better understanding of consumers' ability to identify the type of products included in this study, we arranged two focus groups where participants were shown a sample of counterfeit and original products by our focal firm and some counterfeiters ($n = 27$ in focus Group 1 and $n = 40$ in focus Group 2). Consumers were asked to identify whether the product was original or counterfeit. They were right in 57% of cases, remarkably close to the 50% success rate obtainable by random choices.

Additionally, this research contributes to the literature on firms' misconduct (e.g., Barnett, 2014; Shi, Connelly, & Sanders, 2016). Firm misconduct has been defined as the "organizational pursuit of any action considered illegitimate from an ethical, regulatory, or legal standpoint" (Harris & Bromiley, 2007, p. 351). Counterfeiting is certainly a type of firm misconduct, as it is harmful to both consumers and authentic firms: For the former, such products are often of low quality and hazardous; for the latter, such products usurp market share and can damage a firm's reputation (Chakraborty et al., 1997; Green & Smith, 2002). In the discussion section, we will explain how this article can be useful for broadening this perspective.

2 | LITERATURE REVIEW

Being an illegal activity, counterfeiting is a highly challenging topic to investigate. Nonetheless, scholars have managed to study the magnitude and impact of counterfeit products at several levels. Prior research has, for instance, analyzed the socioeconomic effects of counterfeiting (for a recent review, see Fink et al., 2016), its effect on consumer behavior (e.g., Bian & Moutinho, 2009), its effects on authentic (i.e., victimized) firms, and the strategies adopted by such firms to prevent and minimize the negative impact of counterfeiting (see, for instance, Staake, Thiesse, & Fleisch, 2009). Overall, these studies clearly suggest that counterfeit products have a vast negative impact on consumers, firms, and economies.

As a consequence, researchers in strategy, management, and economics have sought to understand how authentic firms can fight counterfeit products. A set of regulations exists (especially in Western countries) that outlines the legal options available for firms in their fight against counterfeiters.² Such options consist of legal remedies for both eliminating counterfeit products and possibly being compensated for the loss caused by counterfeiting (Alkaersig, Beukel, & Reichstein, 2015; Wilson et al., 2016; Yang et al., 2004). Moreover, authentic firms might try to prevent counterfeiting by altering their own organization and business models. This could be done by embedding specific technologies in their authentic products (Shultz II & Saporito, 1996; Wald & Holleran, 2007; Wilson et al., 2016; Yang et al., 2004), investing in education and training, and exerting a tighter control over the entire supply chain (Liu, Li, Wu, & Lai, 2005; Stevenson & Busby, 2015). Firms can collaborate with relevant stakeholders, such as governmental agencies and competitors, to share information about counterfeiting and counterfeiters, as well as influence institutions' priority list of products that should be seized (Alcácer et al., 2017; Shultz II & Saporito, 1996; Wilson & Sullivan, 2016). Wilson et al. (2016), who interviewed the managers of large firms that have succeeded in their anti-counterfeiting activities, reported that success is driven by management support, the investment of adequate financial resources, and a deep understanding of counterfeiting as a phenomenon. Similarly, in her experimental study on the footwear sector in China, Qian (2008) found that actions such as differentiating products through innovation, vertically integrating a firm's supply chain, taking legal actions against counterfeiting firms, and increasing the prices of authentic products can effectively reduce counterfeiting. Finally, authentic firms can carry out advertising campaigns to influence consumers' behavior and thereby lower demand for counterfeit products. Such anti-counterfeiting advertisements might emphasize issues such as counterfeiters' link to

²Some examples include National IP legislations on industrial designs and trademarks, as well as cross-border or national regulations that provide a framework for stopping products at borders or customs.

terrorism, as well as the low quality, potential toxicity, and safety risks of counterfeit products (Green & Smith, 2002; Hoecht & Trott, 2014; Nill & Shultz, 1996; Yang et al., 2004).

Despite the breadth and depth of these investigations, little consideration has been given to the role played by the product itself—whether and how the characteristics of the product being counterfeited affect the outcome of the fight between an authentic firm and a counterfeiter. We tackle this issue by focusing on the role of a key product characteristic: product safety (Wowak, Mannor, & Wowak, 2015). Indeed, counterfeiting activities damage authentic companies and the whole industry not only because they trigger a decrease in product quality, but also because they increase the probability of product safety issues. To illustrate, in 2003, three users of Nokia phones were injured as their phones exploded. The explosion was caused by counterfeit batteries, for which quality control and testing are not the same as for Nokia batteries, a Nokia spokeswoman said.³ In response, Nokia decided to apply holographic stickers to mobile phone batteries to help consumers distinguish original from fake ones.⁴

The premise of our investigation is that product safety may act as a driver of anti-counterfeiting actions. Because companies are likely to be limited in the financial or political resources they have to fight the whole counterfeiting phenomenon, they might need to decide which counterfeiters are the most worthwhile targets for their anti-counterfeiting strategy. We argue that product safety is one metric that companies use to identify the most dangerous counterfeiters, especially when dealing with deceptive counterfeit products. After all, the safety risks of such counterfeit products can have negative reputational effects for the original manufacturer due to consumers being unaware of the product's counterfeit nature.

More generally, the idea that product safety is strictly interwoven with counterfeiting is supported by anecdotes from different industries. In the pharmaceutical industry, for instance, counterfeiters may add poisonous ingredients to drugs (Deisingh, 2005). As one example, Pfizer has identified floor wax, ink jet cartridges, brick dust, and talcum powder, among other ingredients, in counterfeit Viagra pills (Scinto, 2011). In the food industry, poisonous ingredients are widespread in the production of fake eggs, noodles, meat, walnuts, rice, and wine (Garcia, 2015). There are also unsafe counterfeit products in the mobile phone industry, where exploding batteries and chargers have created several problems for major players (e.g., Rose et al., 2010) and deleterious consequences for consumers' health—even death (e.g., Diouf & Pote, 2015; Patil et al., 2008; Pop, Bergveld, Danilov, Regtien, & Notten, 2005).

Despite the general acknowledgement that product safety represents an economic and social issue, the literature on strategy and management has yet to investigate how this factor can affect authentic firms' strategies and actions against counterfeit products. We fill this gap via a mix of qualitative background insights and quantitative results derived from the case of a large, multinational mobile phone manufacturer.

3 | BACKGROUND INSTITUTIONAL DETAILS ON THE ANALYZED CASE

The focal firm in our case is one of the largest multinationals operating in the mobile phone industry. The company designs, manufactures and sells mobile phones and the related

³<http://www.computerweekly.com/news/2240052955/Counterfeit-batteries-caused-Nokias-to-explode>. Accessed May 8, 2021.

⁴https://www.theregister.com/2004/12/16/nokia_battery_hologram/. Accessed May 8, 2021.

accessories. The mobile phone industry is heavily affected by counterfeiting worldwide (Alcácer et al., 2017), and particularly by the product safety issues illustrated above. Hence, it is a perfect setting for undertaking our analysis.

We started out by gathering background field data on counterfeiting as a phenomenon, and then on the focal firm's anti-counterfeiting strategy and related processes, actions and motivations. To this end, we combined public information with the firm's confidential reports. One of the authors also conducted observations at 150 counterfeit sales points worldwide, as well as 90 interviews with the focal firm's representatives, officials, lawyers and anti-counterfeiting managers over 15 years (2004–2018) of study. We then moved to the demand side and ran a survey with 151 respondents and two focus groups, both aimed at investigating consumers' perception of counterfeit mobile phones and accessories. Finally, we gathered data on counterfeiters through observation—in disguise—at their operation sites or salespoints (please see the Appendix for further information on the whole data gathering process and on the insights it provided us with, summarized in what follows).

From the outset, the firm's anti-counterfeiting strategy appears to be a series of single cases where a sample of counterfeit products is identified, brought to the headquarters and analyzed, and then the results are used to trigger a legal action aimed at stopping the counterfeiters and seizing their products for good. Despite this fragmented appearance, this series of cases is grounded in one consistent strategy informed by multiple threads: It is partly explicitly defined and partly tacitly shared; it is partly based on objective cost–benefit calculations and partly based on managers' intuitions. This idiosyncrasy helps the firm achieve a high degree of internal and external consistency while exploiting the adaptability and dynamics of a multiactor decision-making process amidst the peculiarities of each case. As the anti-counterfeiting manager explained, the firm has identified the appropriate level of codification for the procedure over time, largely by trial and error: “*The external lawyers and the internal team: they were asking me to prioritize [among cases] and I needed to give some kind of rule of thumb... Also so my team could act when I was not there.*”

Crucial to the construction of this “common ground” (Srikanth & Puranam, 2011) is the establishment of an anti-counterfeiting team. Our focal firm's anti-counterfeiting team is highly varied in terms of expertise: It includes legal experts, technical experts, detectives and forensic analysts who source knowledge from within and outside of the company as needed. The establishment of this team has greatly improved operational consistency, information diffusion and the replication of best practices, that paralleled the training and information sharing the firm usually undertakes toward customs officers, detectives, legal, sales, production and purchasing personnel, consumers, and even competitors.

Each single case proceeds through three main phases. First is the *identification phase*, where customs officers, detectives, firm employees, competitors or consumers identify counterfeit samples and send them (or pictures of them) to the headquarters. There, the case is assigned to the anti-counterfeiting team, which streamlines the information so it can be entered into the dataset of cases. The case then enters the *prioritization phase* where the team launches a cost–benefit analysis of the case in comparison to other current strategic operations, working alongside an external legal staff that is knowledgeable of the local legal system. The *action phase* starts when a decision is reached and the team appoints local legal representatives to undertake the desired action(s). In line with Alkaersig et al. (2015), the most common types of actions include customs actions (taken after the products have been withheld at a national border), administrative actions (when authorities raid a manufacturing site or sales point), criminal actions (typically executed by the police), and civil actions (other legal initiatives undertaken by the firm).

The aim of all these actions is to achieve the final official seizure of counterfeit products and possibly stop counterfeiters' operations. Seizing counterfeit products is a crucial aim of the firm's anti-counterfeiting strategy. As an external lawyer and expert in counterfeiting said: "*There is no way to avoid being copied. The only thing you can do is to stop it when you find the counterfeiting products.*" Indeed, other key practitioners in our interviews further emphasized this point: the higher the number of counterfeit products removed from the market, the higher the authentic firm's control over its brand. On the contrary, small seizures imply a larger presence of counterfeit products whose attributes will be increasingly associated with the authentic firm's brand, endangering its reputation.

Access to confidential documents, coupled with interviews and observation, allowed us to identify the four main drivers of the firm's commitment to stopping a counterfeiter and seizing counterfeit products. One of the firm's anti-counterfeiting managers gave us a perfect representation of three of them: "*We look at: [1] what kind of product it is [potentially explosive or not], [2] what it will cost us in lost revenues, [3] ... what country*" (emphasis added).

The first and most important driver of the firm's anti-counterfeiting actions is product safety, as safety issues arising from a counterfeit product might generate severe reputational spillover effects for the firm, especially in the case of deceptive counterfeit products. Indeed, one of the anti-counterfeiting coordinators confirmed that counterfeiting is strictly related to the release of unsafe products on the market: "*I don't remember that I've seen original batteries or chargers exploding, I've seen some original batteries overheated, but not exploded. On the other hand, there are several examples of counterfeit batteries exploding and harming people.*" Thus, the firm sees the seizure of unsafe counterfeit products as paramount to safeguarding its reputation, while seizing safe counterfeit products is a less pressing problem.

Second, the firm tunes its anti-counterfeiting strategies according to the type of market it operates in. The most profitable market is that for mobile phones, which is treated differently from the ancillary markets for complementary components such as earphones, covers, and neck strings.

Third, the firm considers the geographic location of the markets in which the anti-counterfeiting fight takes place. During the examination period, the firm's most lucrative markets were Europe, the United States and other parts of the Americas; thus, these regions received the bulk of the firm's attention in terms of seizing counterfeit products. Indeed, during the interviews, a firm representative explained that there might even be counterfeit products at the North Pole, but the very low importance of that market would likely not compel the firm to seize products there. However, this only remained true "*as long as they were not unsafe.*"

Eventually, the documents at our disposal revealed the existence of an additional factor that the company considered an important driver of its anti-counterfeiting actions: whether the product is a new release. This issue is particularly crucial in the mobile phone industry where firms continuously introduce new products.

In short, we used our rich qualitative data to unfold the institutional details of the focal firm's anti-counterfeiting strategy, processes and organization. We learned that the firm faces enormous reputational damages when consumers are hurt by a product and are not readily informed about the counterfeit nature of the unsafe product. Accordingly, the firm is pushed to consider product safety as the guiding principle in its anti-counterfeiting actions. The interviews indicate that this principle should override any other principle, including key drivers such as market importance and location. Thus, safety concerns equally dominate in product markets of different relevance.

To complete our picture of the firm's anti-counterfeiting strategy, it is important to shed light on how it is practically implemented in the field against actual counterfeiters. Of course, what we observed on the market is not entirely determined by the firm. Counterfeiters have their own strategies and preferences for different markets, but due to the illegal nature of their actions, these are

difficult to observe. Nonetheless, by combining observations of counterfeiters' sites and salespoints (in disguise) with interviews of focal firm actors, we were able to develop some intuitions on how counterfeiters strategize and act. A manager from our focal firm perfectly summarized such intuitions: "*Counterfeit companies don't care about safety, I mean if they would care they ... wouldn't make fake products with no or little quality control. What they care about is money.*" Thus, counterfeiters may be insensitive to safety concerns, treating safe and unsafe products equally. However, they may have a sensitivity to profitability that leads them to distinguish between more profitable markets (e.g., the market for mobile phones) and ancillary markets (e.g., the market for accessories).

Even if our empirical evidence only gives us a glimpse into the counterfeiters' side, we can speculate about the potential outcomes of the fights between the firm and the counterfeiters on the market. If our initial evidence that counterfeiters are insensitive to safety and sensitive to profitability is correct, while the firm prioritizes safety over anything else, we reach the following prediction: While safety issues always imply larger seizures (as ensuring safety is paramount for the firm), seizures should be smaller for the main market, as counterfeiters would be more active in that market compared to the ancillary markets. To further explore the validity of this position, we now turn to our regression analysis, which investigated the factors that underlie the fight between the authentic firm and the counterfeiters, as expressed in product seizures.

4 | REGRESSION ANALYSIS

4.1 | Sample

In order to further investigate the relations among the elements that emerged from the background analysis, we analyzed a confidential dataset from the firm that contained 3,333 cases against more than 2,000 counterfeiters in 75 countries from 2006 to 2011. However, there were only 908 cases where the firm registered the financial resources invested into the case, and only 792 cases of those featured information about the type of action undertaken. Thus, we focused our analysis on this subsample of 792 observations, as it contained the most complete information. However, for the sake of completeness, we also report the study we have conducted on the whole sample of 3,333 observations.

4.2 | Key variables

The background material allowed us to identify both the final aim of the firm's anti-counterfeiting strategy (i.e., seizing as many counterfeit products as possible) and the four key drivers of the firm's commitment to seizing as many products as possible (safety, market importance, market geographic location, and product novelty). While we focus our analysis on seizure size, the presence of safety issues, and their interaction with the importance of markets, we also gathered information about other variables that could be deemed important for determining seizure size and treated them as controls.

4.2.1 | SEIZURE_SIZE

There are many ways to measure firms' capacity for stopping counterfeiters, but we looked for a measure that could represent the firm's control over the attributes of its products on the market.

We thus followed Qian (2008) and counted the number of counterfeit products that the firm seized, in logs, for each case. We must caution that, while this measure is straightforward and easy to interpret, it is expressed in absolute terms. A more precise measure would involve the number of counterfeit products present on the market, but due to the illegal nature of counterfeiting, this last number is impossible to obtain. We tackled this issue in the robustness checks section, testing the effect of different estimates of the counterfeit market size (each with its own advantages and drawbacks). We always found confirmation of our main results: They do hold when the counterfeit market size is controlled for or placed as a denominator on the dependent variable side. Please see the Appendix for a detailed description of our tests.

4.2.2 | UNSAFE

Mobile phone accessories are prone to explosions that can cause injuries or even death (Meredith, 2010). Both the technical literature (Hoffman, 2013; Rose et al., 2010) and our interviewees agree that batteries and chargers are the riskiest components. To illustrate, a firm's manager said: "*dangerous products ... can be batteries that can explode or potentially dangerous chargers.*" Similarly, when asked "What is important in terms of batteries and chargers when it comes to the anti-counterfeiting strategy?," one of our interviewees replied: "*the potential danger that they can cause, that they might harm the consumer.*" Other attributes of batteries and chargers were basically considered irrelevant. We thus coded this dummy as 1 when these products were present in the seized batch, and 0 otherwise.

4.2.3 | MAIN_MARKET

Beyond interviewing firm representatives about the importance of the main market, we also reviewed publicly available information, such as Samsung's increase in profitability due to the launch of the Galaxy S7 and S7 edge before experiencing the explosions (Mu-Hyun, 2016) or Apple's increase in profit margins for the iPhone (see, e.g., Williams-Grut, 2015). Together, this information shows that mobile phones are relatively more expensive than accessory products and generate the highest revenues. This confirms the intuition that they are the most relevant product category for mobile phone manufacturers. Accordingly, we coded this variable as 1 when the batch contained at least one phone, and as 0 when it contained only components (e.g., batteries and chargers) or ancillary products (e.g., earphones).

4.3 | Controls

Geographic location matters greatly in the firm's anti-counterfeiting strategy. Europe and the Americas are the firm's core markets, while other markets receive less emphasis. Consequently, we generated GEO_IMPORTANCE, which took 1 if the geographic location of the seized product was Europe or the Americas, and 0 otherwise.⁵

⁵When reading the notes attached to each file in the firm's anti-counterfeit database, we found that, in a few cases, the products were seized at the production site and not in the market; however, this only occurred for a fraction of the cases.

Similarly, product novelty emerged as one of the four pillars guiding the firm's anti-counterfeiting strategy. To capture that, we used data derived from the firm's special operations that were geared specifically to newly released products. In 2010, for instance, the anti-counterfeiting team's special operation was able to spot counterfeit versions of the mobile phone X1 in China after only 5 months following its release on the market. Since we knew the name of all 19 of the firm's special operations over the period we investigated, we could identify these operations in the notes of each case. We used the data to create the dummy `NEWLY_RELEASED`, marked as 1 if the product had been protected by a special operation due to its novelty, and 0 otherwise.

We also created another control for a crucial dimension of the anti-counterfeiting strategy: the financial investment that the firm mobilized for each case, which represents its exerted effort. Indeed, our focus on product attributes implies that we should observe how much they determine the size of the seizure irrespective of the firm's financial investment in the case. This is because each case has idiosyncratic elements that imply different ways of conceiving monetary investments in combatting counterfeiting. We thus expect that safety concerns and market importance directly affect the amount of seized counterfeit products, without any necessary mediation by the firm's financial investment in the case-specific anti-counterfeiting actions. We included the variable `EFFORT` to measure the financial resources allocated to each case.⁶ In the robustness checks, we also used other measures for the firm's effort in each case that were more related to the ease of seizing counterfeit products under certain conditions. In the Appendix, we apply further statistical analysis to more deeply illuminate the relationship between effort, safety concerns and market importance.

Symmetrically, we wanted to account for counterfeiters' effort in each specific case. Knowing the financial resources they invested is impossible due to the illegal nature of their activity, but we could account for whether they had employed a lawyer to deal with a specific case. In such an occurrence, we marked the variable `COUNTERFEITER_EFFORT` as 1 and included it among the controls.

We also controlled for the type of action taken by the authentic firm to seize counterfeit products. Operationally, we created dummy variables for each of the action types (named, respectively, `CUST_ACTION`, `ADMIN_ACTION`, `CRIM_ACTION`, `CIVIL_ACTION`, `OTHER_ACTION`) based on the database information provided by both the focal firm and the external law firm. The latter variable was named as "other" either because the action taken was not identified in the data or because it was a special type of case (e.g., an Internet takedown falling outside the aforementioned categorization). In the estimations, we used customs actions as the baseline since this type is the largest in number.

There were several other control variables we built following our conversations with firm representatives. First, one specific coordinator of the anti-counterfeiting team might have more experience than others in dealing with counterfeit cases and therefore achieve better outcomes. Thus, we created fixed effects for each individual who dealt internally with the cases (`COORDINATOR`). Following the same logic, we captured the expertise of the external lawyers working with our focal firm through `EXPERIENCE_LAWYER`, valued 1 if at least one of the external lawyers had already dealt with a number of cases equal to or greater than 100, and 0 otherwise. We additionally considered the number of external lawyers in charge of representing the focal firm through `MANY_EXT_LAWYERS`, valued 1 when more than one external lawyer was employed by the firm for a specific case and 0 otherwise. Moreover, the case

⁶To obtain coefficients that were easily readable, we applied min-max normalization.

may have involved many counterfeiters at the same time, increasing its complexity. We accounted for multicounterfeiter cases by marking the variable COMPLEXITY with a 1, and 0 otherwise. We also considered the number of cases undertaken by the firm in the year and in the country where that specific case took place, called COUNTRY_CASES. This is captured by a series of eight dummies, each one capturing a different amount of cases, from low (the first dummy, up to 6 cases) to high (the eighth dummy, more than 70 cases).

Finally, in a very small number of cases (3.5% of 3,333), the withheld batch was found to involve original products rather than counterfeit products, likely due to errors in evaluating them in the first place. We accounted for those cases by assigning a value of 1 to the dummy ORIGINAL.

Finally, we introduced yearly fixed effects by building dummies from the variable START_YEAR, which reported the filing year of each case.⁷

4.4 | Descriptive statistics

Table 1 reports the variables' main descriptive statistics, while the correlation matrix can be found in the Appendix as Table 3A (together with some more details on the dependent and independent variables, results and robustness checks).

Out of the 792 counterfeit cases of our subsample, 70% were customs cases, 13% were criminal cases, 12% were administrative cases and only 3% were civil cases. The whole sample ($n = 3,333$) shows a similar distribution: 57% of cases were customs cases, 8% were criminal cases, 3% were administrative cases, 1% were civil cases, and 29% were cases classified as other. China is by far the country with the most actions undertaken over the 6-year observation period. Other important locations for seizures were Germany, France, Hong Kong, Great Britain, Russia, and the United States. A preliminary analysis of our measure SEIZURE_SIZE shows that the largest number of products seized in the 792-case subsample was equal to 188,587 products, less than one fourth of the 801,198 products seized in the largest case in the whole sample. A closer look at the distribution tails for the subsample shows that there was a high number ($n = 124$) of small seizures (batches of one to three products), and that in 50% of actions, the batches seized contained fewer than 100 products, indicating a left-skewed distribution. Regarding our main regressors, while almost 40% of the actions involved products seized in main markets (30% for the whole sample), only 6% of the cases in the subsample included products identified as being highly unsafe for consumers (4% in the whole sample). Numerosity can thus be an issue for UNSAFE. We will tackle this point in the robustness checks.

5 | RESULTS

We analyzed the correlation between SEIZURE_SIZE, UNSAFE and its interaction with MAIN_MARKET. We initially ran three models (with controls only; introducing UNSAFE; including both UNSAFE and its interaction with MAIN_MARKET) on the 792-observation subsample using SEIZURE_SIZE in logs as the independent variable, thus employing OLS (and checking for multicollinearity, correcting for heteroscedasticity via robust standard errors, and

⁷There were only four cases during 2005. To avoid the construction of the relative year dummy with only four unit values, we assimilated these into the dummy for 2006.

TABLE 1 Variables and descriptive statistics: Main subsample ($N = 792$) and whole sample ($N = 3,333$)

Subsample ($N = 792$)	Mean	SD	Median	min	max
SEIZURE_SIZE	2,364.429	11,491.49	100	1	188,587
LOGSEIZURE	4.603	2.67	4.615	.693	12.147
UNSAFE	0.057	0.232	0	0	1
MAIN MARKET	0.399	0.49	0	0	1
NEWLY RELEASED	0.028	0.164	0	0	1
GEO IMPORTANCE	0.458	0.499	0	0	1
EFFORT	1,709.489	3,800.451	440	0	33,203
COUNTERFEITER EFFORT	0.005	0.071	0	0	1
CUSTOMS ACTION	0.705	0.457	1	0	1
CRIMINAL ACTION	0.134	0.341	0	0	1
ADMINISTRATIVE ACTION	0.126	0.332	0	0	1
CIVIL ACTION	0.035	0.185	0	0	1
COMPLEXITY	0.024	0.153	0	0	1
EXPERIENCE LAWYER	0.432	0.496	0	0	1
MANY EXT LAWYERS	0.011	0.106	0	0	1
ORIGINAL	0.034	0.182	0	0	1
START YEAR	2,009.597	1.833	2,010	2,005	2,011
COUNTRY CASES	3.736	2.797	2	1	8
COORDINATOR	3.027	1.072	3	2	10
Population ($N = 3,333$)	Mean	SD	Median	min	max
SEIZURE_SIZE	2,186.036	18,929.6	48	1	801,198
LOGSEIZURE	4.011	2.677	3.892	.693	13.594
UNSAFE	0.043	0.202	0	0	1
MAIN MARKET	0.309	0.462	0	0	1
NEWLY RELEASED	0.029	0.167	0	0	1
GEO IMPORTANCE	0.645	0.479	1	0	1
COUNTERFEITER EFFORT	0.002	0.046	0	0	1
CUSTOMS ACTION	0.579	0.494	1	0	1
CRIMINAL ACTION	0.084	0.277	0	0	1
ADMINISTRATIVE ACTION	0.033	0.179	0	0	1
CIVIL ACTION	0.011	0.103	0	0	1
OTHER ACTION	0.293	0.455	0	0	1
COMPLEXITY	0.01	0.098	0	0	1
EXPERIENCE LAWYER	0.404	0.491	0	0	1
MANY EXT LAWYERS	0.006	0.079	0	0	1
ORIGINAL	0.035	0.185	0	0	1
START YEAR	2,008.608	1.301	2,009	2,005	2,011
COUNTRY CASES	3.542	2.476	3	1	8
COORDINATOR	5.207	3.345	3	1	10

testing for normality of errors via Jarque–Bera test: see the Appendix for details). In order to assess the robustness of our results, we kept SEIZURE_SIZE unchanged and ran a negative binomial regression; the results are presented in Model 4. Model 5 returns to the logs of SEIZURE_SIZE and reports an OLS (as Model 3), but extends the analysis to the whole sample of 3,333 observations (see Table 2).

Note that the use of linear models such as OLS eases the interpretation of the coefficients and their interactions (Hoetker, 2007). In any case, interactions must be judged with caution. It was rare for the seized products to be both unsafe and belong to the main market: only 2.2% of the cases. This percentage remained similar in the whole sample with 3,333 observations: 1.4%. We will describe the robustness tests we performed to make sure our results are insensitive to this problem.

The coefficients for UNSAFE are all positive and have p -values lower than .02 in all models. If we consider Model 2, we can also easily evaluate the economic significance of these results. As the dependent variable is expressed in logs and the model is an OLS, the coefficient represents the change in the percentage of the SEIZURE_SIZE when the product is unsafe rather than safe. SEIZURE_SIZE more than doubles (109% increase) when UNSAFE changed from 0 to 1, certifying that the size of the effect is remarkable. The coefficients of the interaction were also consistent across models: Negative and with p -values lower than .05. Thus, effect of safety concerns is less in the main market than in the ancillary markets. To see the combined effect, consider Figure 1, where we plotted the effect of changes from UNSAFE = 0 to UNSAFE = 1 in the two cases where MAIN_MARKET is 0 and 1, both for our focal subsample and the whole sample. Not only seizures are larger in ancillary markets rather than in the main market; moreover, the effect of safety concerns is only evident in the ancillary markets, while remaining quite small—if not invisible altogether—in the main market.

5.1 | Robustness checks

In the Appendix, we detail several robustness checks, briefly reported here.

As in Table 2, SEIZURE_SIZE is measured in absolute rather than relative terms, the first robustness tests we run were meant to check our results when controlling for the size of the counterfeit product market. To do this, we introduced proxies that could capture this size globally, and in two key areas (EU and Denmark) where we gathered extra data on the counterfeit market size. For the EU area, we had enough observations to also restrict our analysis to EU-only seizures, and to use the ratio between SEIZURE_SIZE and the size of the European counterfeit market as the dependent variable. Our main results were by and large confirmed (see the Appendix for the details).

Another key problem is the presence of dummy variables with a low number of “1,” the most problematic being UNSAFE (e.g., the percentage of “1” in UNSAFE is 6% in our subsample, and 4.3% in the whole sample). We first re-ran all our regressions while selectively deleting the most problematic controls (namely, NEWLY RELEASED, CIVIL_ACTION, COMPLEXITY, COUNTERFEITER EFFORT, MANY EXT LAWYERS, ORIGINAL) to see the effect on our results. We then evaluated the number of “1”s in UNSAFE in a series of ways: We first compared SEIZURE_SIZE distributions across safe and unsafe batches, and then we benchmarked our variable with thresholds indicated by the literature (e.g., Farley, Lehmann, & Sawyer, 1995). In both cases (detailed in the Appendix), we found support for the robustness of our results. As a third test, we evaluated our results against a simulation of 10,000 counterfactual coefficients. Specifically, we took our subsample and iterated our main regression (Model 3) 10,000 times, albeit modified to introduce a randomly generated UNSAFE variable and its

TABLE 2 Regressions for *LOGSEIZURE* (OLS) and for *SEIZURE_SIZE* (negative binomial) for the subsample of 792 cases, and for *SEIZURE_SIZE* (OLS) for the whole sample of 3,333 cases

<i>Dependent variable</i>	Subsample				Whole sample
	OLS			Neg. binomial	OLS
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)
	LOGSEIZURE			SEIZURE_SIZE	LOGSEIZURE
UNSAFE		1.09 (.02)	1.89 (.00)	2.12 (.00)	1.26 (.00)
MAIN_MARKET			-1.65 (.00)	-1.59 (.00)	-1.56 (.00)
UNSAFE_MAINMARKET			-2.07 (.00)	-2.85 (.00)	-0.81 (.05)
EFFORT ^a	6.05 (.00)	5.90 (.00)	6.04 (.00)	9.14 (.00)	
OTHER_ACTION					-1.30 (.00)
NEWLY_RELEASED	-0.92 (.09)	-0.92 (.07)	-0.86 (.08)	-1.26 (.00)	-0.77 (.00)
GEO_IMPORTANCE	0.24 (.39)	0.15 (.59)	0.34 (.24)	0.73 (.01)	-0.43 (.00)
COUNTERFEITER_E~T	0.98 (.52)	0.79 (.65)	-0.12 (.95)	-0.32 (.61)	1.17 (.27)
CRIMINAL_ACTION	0.10 (.74)	0.12 (.69)	-0.03 (.91)	0.20 (.47)	0.41 (.02)
ADMINISTRATIVE_~N	0.44 (.16)	0.47 (.14)	0.45 (.14)	0.42 (.17)	0.90 (.00)
CIVIL_ACTION	-0.71 (.24)	-0.81 (.18)	-0.94 (.08)	-1.21 (.00)	-0.13 (.76)
COMPLEXITY	0.66 (.21)	0.77 (.15)	1.33 (.01)	0.16 (.62)	1.32 (.00)
EXPERIENCE_LAWYER	-0.34 (.10)	-0.31 (.12)	-0.40 (.04)	-0.31 (.11)	-0.93 (.00)
MANY_EXT_LAWYERS	0.86 (.16)	0.92 (.13)	0.62 (.34)	-0.22 (.74)	0.48 (.41)
ORIGINAL	-0.38 (.46)	-0.31 (.55)	-0.23 (.61)	-0.21 (.63)	-0.35 (.11)
<i>YEAR dummies</i>	Yes	Yes	Yes	Yes	Yes
<i>COORDINATOR dummies</i>	Yes	Yes	Yes	Yes	Yes
<i>COUNTRY dummies</i>	Yes	Yes	Yes	Yes	Yes
<i>Constant</i>	3.15 (.01)	3.31 (.01)	3.24 (.01)	4.87 (.00)	4.19 (.00)
<i>F-test</i>	4.68	4.82	8.47		24.83
<i>ln(α) (p-value for χ²-test)</i>				1.13	
<i>Observations</i>	792	792	792	792	3,333
<i>R-squared</i>	.16	.16	.27	.04	.21

Note: Values in parentheses are *p*-values.

^aEFFORT has been normalized via mix-max normalization.

interaction with MAIN_MARKET. We then plotted the distribution of the resulting 10,000 coefficients, reporting our coefficient estimate and its 95% confidence interval in the same graph, first for UNSAFE and then for the interaction. Had our proposed mechanisms not been true, we would have observed a large overlap between the distribution of the 10,000 coefficients obtained with a random UNSAFE variable and the 95% confidence interval of our actual coefficients.⁸ As this was not the case (see Figure 2), we are confident in the robustness of our results with respect to a counterfactual argument.

⁸We thank the Associate Editor for suggesting this test.

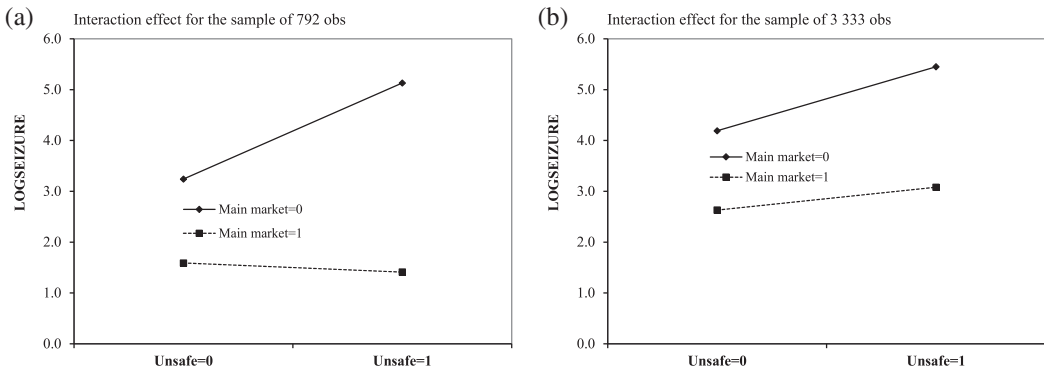


FIGURE 1 Effect of UNSAFE on LOGSEIZURE as moderated by MAIN_MARKET (both samples)

Afterward, we checked our results for alternative dependent variables (we employed a categorical variable distinguishing seizures above/below average as well as “special wins” for the firm, and investigated it via generalized ordered logit) and for alternative measures of EFFORT (exploiting the fact that withholding goods is easier when stopped at customs). Our results were confirmed in all cases (described in the Appendix).

As an extra check, we directly tackled the relationship between EFFORT, UNSAFE and MAIN_MARKET to make sure that we conceived EFFORT (i.e., a control rather than a mediator) correctly, which we confirmed (the Appendix provides details on this analysis).

5.2 | Interpretation of results

To explain why the largest effect of UNSAFE was observed in ancillary markets rather than the firm’s main market, we recall the evidence we presented in our background qualitative analysis. Clearly, the firm has a strong incentive to prevent the distribution of unsafe counterfeit products, as such failures will likely attract negative attention and harm the firm’s reputation. Therefore, authentic firms are fully committed to seizing batches containing potentially unsafe products. If counterfeiters are really insensitive to safety concerns, as our inevitably scant evidence on their side suggested, then their behavior should remain the same regardless of products’ relative safety. Thus, we should observe larger seizures when product safety is at stake. This is exactly our previous finding (recall, e.g., Model 2), corroborating our intuition on counterfeiters’ incentives and our prediction of association between safety concerns and larger seizures.

Moving forward, we learned from our qualitative investigation that the firm will show the highest commitment to seizing unsafe products regardless of whether these are main or ancillary products. After all, the brand image can be equally damaged from consumers being injured in either market. Frustrated anti-counterfeiting managers indicated that even a few incidents of “letting counterfeiters go” had immense influence on their subsequent years of work. When the infringer becomes a strategic target—perhaps due to the counterfeit products being unsafe for consumers—the authentic firm tries to chase it by all means, as confirmed by one anti-counterfeit manager of the focal firm: “I will not say that we don’t care about cost -we do- but if it is a strategic target, the infringer, then we can go forward no matter the cost.”

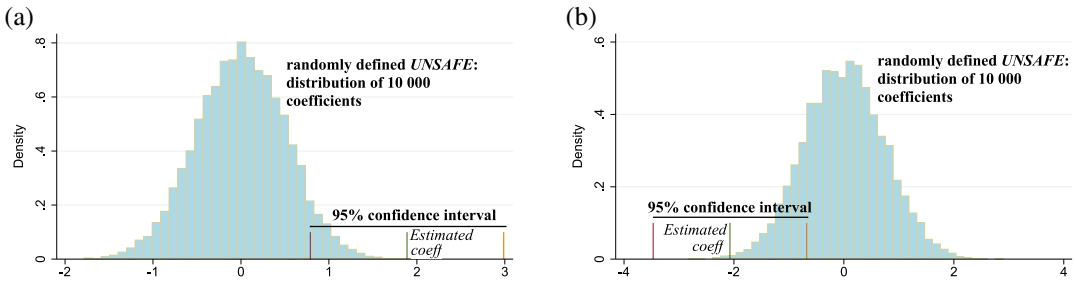


FIGURE 2 Simulation of the distribution of 10,000 coefficients for a randomly generated UNSAFE variable, and 95% confidence interval of the coefficient estimated in our regressions. (a) Simulation relative to the coefficient for UNSAFE. (b) Simulation relative to the coefficient for UNSAFE*MAIN_MARKET

On the contrary, our small evidence on counterfeiters suggests that their indifference to product safety should be matched by their vested interest in the economic value of their counterfeit products. According to a lawyer employed at the Beijing office of a multinational law firm: “*For the infringer, infringing is their life ... [it] is very calculated. [It] is done to maximize the value of the product from their manufacturing.*” Counterfeiters, we speculated, should be more concerned with profitability than safety. This would lead to a greater incentive to spread counterfeit products in the main (and more profitable) market rather than in ancillary markets. Thus, if our intuition is true, counterfeiters should care less about the fight for unsafe products in the ancillary markets vis-à-vis more profitable markets, making the firm realize larger seizures in the former. This is exactly what we observed in our regressions, confirming not only our intuition on counterfeiters’ incentives, but also our prediction that safety concerns are only associated with larger seizures for the main market.

6 | GENERAL DISCUSSION

The present study advances extant knowledge about anti-counterfeit strategies and actions by studying the role played by a key product attribute—namely, safety—as an important driver of the number of counterfeit products seized during firms’ fight against counterfeiters. We propose that the magnitude of this effect might depend on the various incentives that drive the strategies and actions undertaken by authentic firms and counterfeiters during their fight. In this case, the former might have a particularly high incentive to remove unsafe products from the market, so as to preserve brand reputation, while the latter are less likely to be affected by such a concern. Moreover, we advance the idea that the type of market the counterfeit product belongs to can modify the structure of the aforementioned incentives. Indeed, when safety is at stake, products belonging to the main market tend to be seized in smaller numbers than those in the ancillary markets. We reason that authentic firms have a strong incentive to remove unsafe products from both markets, but counterfeiters have a relatively greater incentive to fight against the authentic firm in the more profitable (main) market, which determines the outcomes observed in each market. In other words, our finding that seizures are relatively larger in the ancillary rather than main market is compatible with the idea that, while the firm fights hardest in all markets when safety is at stake, counterfeiters’ lack of safety concerns and their unique attention to market profitability push them to focus more on the main market than on

ancillary markets. This perspective on product attributes completes and extends current studies on counterfeiting that have mainly centered on firms' strategic actions (e.g., Alcácer et al., 2017; Berger et al., 2012; Yang et al., 2004).

From a methodological perspective, while prior studies have identified managers' perceptions of counterfeiting and investigated their own assessments of successful cases, our analysis provides detailed and objective information on the key variables at play in a large firm's anti-counterfeiting strategy and on its fight against counterfeiters in the actual markets. We show that using mixed data—a combination of background qualitative information from a wide series of sources and regression analysis on a large dataset of infringement cases—allows for a more detailed analysis of counterfeiting, going into more depth than the survey-based studies that prevail in the literature. Our insight into the counterfeiters' side, both directly (via observation in disguise) and indirectly (via induction from our results), is also noteworthy considering the difficulty of investigating illegal activities.

We also contribute to the broader literature on firm misconduct. Past work has shown that many companies see unethical or illegal actions as instrumental to gaining market share and prevailing over competitors (e.g., Barnett, 2014; Shleifer, 2004). Massari and Monzini (2004), for example, investigated the case of illegal trafficking in hazardous waste, claiming that the growing demand for clandestine and cheaper services in the sector has been an important driver of this illegal business. Firm misconduct has also been directly connected to the production of defective goods, with implications for the incentives and deterrents that firms face when deciding how to behave (Bromiley & Marcus, 1989). The present research advances extant knowledge on firm misconduct by providing an empirical investigation into counterfeiting and anti-counterfeiting strategies. Moreover, by combining direct observation, in-depth interviews, archival data and regression analysis, our investigation indirectly addresses the concerns highlighted by Pierce and Balasubramanian (2015) about the past reliance on single types of data (i.e., direct observation, randomized field experiments and archival data analysis) when analyzing corporate misconduct.

In terms of practical implications, this study highlights some ideas for managers seeking to stop the flow of counterfeit products into the market. First, managers should invest in an anti-counterfeiting team that includes a varied set of competencies: A team porous enough to include external competencies when needed during the three-phase process of seizure, and actionable enough to mobilize consumers, custom officers and salespersons to detect widespread infringements. Managers may also find inspiration in how our focal firm developed and enacted its anti-counterfeiting strategy. For example, firms should act with the awareness that counterfeiters will always have the option of moving to a new brand, while authentic firms are compelled to adhere to and revitalize their own brand(s). Thus, counterfeiters face no serious risks when ruining a firm's reputation in its main market, despite the enormous losses to said firm, and will act accordingly. While authentic firms can mobilize to limit the spread of unsafe counterfeit products, this effort is going to be much less effective in their main market and really only works well for ancillary markets.

The implications of our study go beyond single firms to the level of policy. In the Appendix, we develop a diff-in-diff test to establish the causal relationship between the ease of combatting counterfeiters due to a change in EU legislation (an exogenous shock that we claim changes firms' incentive to invest in seizing) and the seizure size. We show that the EU Directive had a significant effect on augmenting the size of seizures across all specifications we used. This proves that policies have a great influence on firms' ability to effectively fight counterfeiters.

Despite its advantages, our study features some limitations that might represent fruitful research avenues. On a theoretical level, future work could give more substance to the mechanism we envisioned here: For instance, they could apply game-theory modeling to understand how the different incentives of firms and counterfeiters play out on the market when product safety and market importance are at stake. Scholars may also investigate other potentially relevant variables, such as the notion of learning, which captures whether authentic firms and/or counterfeiters become better at fighting over time. Relatedly, our data only featured a dichotomous measure of counterfeiters' incentive (main vs. ancillary market). Future work could rank counterfeiters' incentives across products and interact the UNSAFE variable with this relative index to see if the effect we found remains. This could also help to illuminate the mechanisms that underlie the negative coefficient for the interaction term between UNSAFE and MAIN_MARKET.

On the methodological level, the main limitation of our work regards endogeneity: Counterfeiters will naturally be more attracted to original producers with higher margins, more well-known brands, and a less effective anti-counterfeiting team (e.g., Staake et al., 2009). Moreover, we were only able to observe the products that were withheld, rather than all available counterfeit products on the market. Although our controls and robustness checks mitigated possible biases stemming from the characteristics of each case, future research could find instrumental variables to eliminate any residual concern for endogeneity.

A final limitation is that we used data from one specific mobile phone manufacturer. In fairness, we do consider this setting to be quite representative of many large, multinational corporations facing counterfeit products in the business-to-consumer market. Furthermore, our focus on safety does reflect one of the industry's main concerns (as illustrated by the Motorola, Nokia, and Samsung examples). Nonetheless, we are aware that other industries may have distinct characteristics that could influence the results. That said, the benefits of our dataset are clear: The rich data from the focal firm allowed us to gain a much deeper understanding of the phenomenon than would otherwise be possible. Future research could try to reproduce comparable fine-grained data from other industries with counterfeit product safety issues (e.g., pharmaceuticals, food, etc.) with the intent of uncovering additional boundary conditions for firms' fight against counterfeit products.

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DATA AVAILABILITY STATEMENT

Data have been obtained from the focal firm under a confidentiality agreement that restrict data availability to the public.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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