NBER WORKING PAPER SERIES

COUNTERFEITERS: FOES OR FRIENDS?

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Working Paper 16785
http://www.nber.org/papers/w16785

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2011

I warmly acknowledge support from the Kauffman Foundation Grants. I am grateful to Josh Lerner, Eric Anderson, Philippe Aghion, Meghan Busse, Shane Greenstein, Angela Lee, Jin Li, Keith Maskus, Ivan Png, Scott Stern, K. Sudhir, Catherine Tucker and Florian Zettlemeyer for helpful discussions; to seminar participants at the Kellogg School of Management, Yale School of Management, University of Colorado, and Quantitative Marketing and Economics conference for comments. Cooperation from the Chinese Quality and Technology Supervision Bureau (QTSB) and the companies we interviewed and surveyed are gratefully acknowledged. The results in this paper do not necessarily represent the views of QTSB or of the National Bureau of Economic Research.

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JEL No. L25,L26,L6

ABSTRACT

This paper combines a natural policy experiment and randomized lab experiments to estimate the differential impacts of counterfeiting on the sales and purchase intent of branded products of various quality levels. I collect new product-line level panel data from Chinese shoe companies from 1993-2004. Exploiting the discontinuity of government enforcement efforts for the footwear sector in 1995 and the differences in authentic companies' relationships with the government, I identify heterogeneous effects of counterfeit entry on sales of authentic products of three quality tiers. In particular, counterfeits have both advertising effects for the brand and substitution effects for authentic products. The advertising effect dominates substitution effect for high-end authentic product sales, and the substitution effect outweighs advertising effect for low-end product sales. The positive effect of counterfeits is most pronounced for the high-fashion products (such as women's high-leg boots) and for the high-end shoes of the brands that were not yet well-known at the time of the entry by counterfeiters. I provide a theoretical framework to generalize such impacts due to counterfeits. Analogous heterogeneous effects of counterfeiting on consumer purchase intent for branded products of three quality tiers are also discovered in lab experiments. Responses in the lab allude to the fact that counterfeits could increase brand awareness as well as steal business.

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"Imitation is the sincerest flattery."
C. C. Colton (1780 -1832) "The Lacon"

1 Introduction

Upholding the protection of intellectual property rights (IPR) has been moved to the top of the trade agenda since the early nineties, and remains controversial (Lanjouw and Cockburn, 2000; McCalman, 2001; Chaudhuri, Goldberg and Jia, 2006). Advocates believe in the stimulating effects IPR has had on innovation, which would fuel faster economic growth. Such stimulating effects are shown to be very limited in practice, with inconclusive results from country case studies (Scherer and Weisburst, 1995; Kortum and Lerner, 1998; Sakakibara and Branstetter, 1999) and a generalizable conditional importance of patent effects only in countries of higher development and education levels (Qian, 2007). Although the number of innovations may not be so sensitive to IPR protection, inventors in countries without patent laws tend to historically concentrate in industries where secrecy was effective relative to patents (Moser 2005), and foreign direct investments could respond favorably to national patent protection (Branstetter, *et. al.*, 2006). Other related research, however, pinpoint the shortcomings of current patent systems (Jaffe and Lerner, 2004; Gans, *et. al.* 2003). The debate cultimated in the TRIPs (Trade-Related Intellectual Property) negotiations, which were largely motivated by the desire to reduce trade in counterfeit goods. Counterfeits affect many industries and can have large influences on what a brand means to consumers.

Counterfeiting stays at the center of the current trade disputes. The year 2007 alone witnessed a G-8 summit recommending stronger enforcement of IPRs, the initiation of a WTO dispute against China's IPR enforcement regime, and the launch of inter-governmental negotiations towards an Anti-Counterfeiting Trade Agreement (ACTA). In the fiscal year of 2009, the U.S. Customs and Border Protection seized more than $260 million worth of counterfeit goods, among which counterfeit footwear accounted for 40% of the total seizures (Schmidle, 2010). In fact, counterfeit footwear has topped the seizure list of the customs ser-

vice for four years already. Although curbing counterfeiting through tightening intellectual property protection has been a common practice worldwide to foster brand values, only a few studied the impacts of counterfeits. Grossman and Shapiro (1988a,1988b) theorize the implications of counterfeits in international trade, and Qian (2008) offers the first econometric study on the impacts of entry by counterfeiters on authentic price, quality (as proxied by unit production cost), advertising and self-enforcement expenditures. The sales responses remain a mystery partly due to lack of data.

Although this paper leverages the same natural policy experiment for the Chinese field data as in Qian (2008), it differs from the prior study in several important dimensions. To start with, I am able to significantly extend the brand-level panel data in Qian (2008) to footwear product-line details within each brand and to obtain product-line level sales data for the first time. As a result, I am able to go beyond the general impacts of counterfeiting on authentic manufacturer marketing norms (Qian 2008) and to study its sales impacts. The current paper provides careful empirical identifications of the heterogeneous effects of counterfeits on sales of authentic products at different quality tiers. I further explore the mechanisms of the sales impacts based on theories and randomized lab experiments. In addition to the new research question, new data, and a new approach of combining field studies with lab experiments, this study uncovers interesting findings that are surprising at first sight yet that shed new lights on linking two strands of theoretical literature on advertising and vertical differentiation. The discovery and understanding of the heterogeneous impacts at the theoretical and empirical levels are important in order to set priorities for IP enforcement policy. As a recent World Intellectual Property Organization study comments, "Governments are invariably resource constrained and completely eradicating violations of IP law – like violations of other types of law – is out of reach for even the best-resourced states"(Fink, et al 2010).

The natural experiment was created by the Chinese government's emergent reallo-

cation of IP enforcement resources away from monitoring footwear and fashion products to other sectors. This policy was implemented in response to a series of food poisoning and gas explosion accidents in the early nineties. Counterfeiters massively entered the Chinese footwear industry shortly after the policy shift, infringing on brands of both multinational corporations and Chinese enterprises. I am able to directly analyze short-term and long-term sales impacts of counterfeiting. I do so through a unique panel dataset with detailed financial information over a recent 12-year period for 31 branded shoe companies (including domestic brands and multinational brands operating in China) and their counterfeiters, whenever present, in China.[1] These financial data are supplemented by the Chinese Industrial Census database, eBay-in-China dataset, product catalog information, and interviews. The natural experiment and panel structure at the product-line level enable systematic analyses of the heterogeneous sales impacts of counterfeiting. In addition, I conducted controlled lab experiments to further test the causal effects of the exposure to counterfeits on consumers' purchase intent of authentic products at the three representative quality tiers. These experiments well complement the field studies by providing micro-foundations of the overall sales impacts based on individual purchase intent and motivations.

A number of insights emerge from this study. Counterfeit entry exhibits both negative substitution and positive advertising effects on authentic sales. The net-effect is positive for high-end authentic products and negative for low-end authentic products, even within the same brand. Furthermore, the positive marginal effect of counterfeits on authentic sales is most pronounced for the high-fashion products (such as women's high-leg boots) and for the high-end shoes of the brands that were not yet well-known at the time of the entry by counterfeiters. These findings, together with the stated purchase motivations in the lab experiments, reveal the potential advertising mechanism underlying the counterfeiting effects. That is, the

[1]The Chinese leather and sports shoes sector concentrates most of the brands, as compared to the other parts of the footwear industry, and accounts for approximately 6 billion USD annual sales. Some Chinese brands, such as Li-ning or Anta, occupy Chinese market share close to that of Nike's.

positive effect on high-end authentic products mainly comes from increased brand awareness and affinity due to the presence of counterfeits. Brands with less government protection seek to differentiate their products by moving up the quality ladder. Over time, these branded companies shift toward the higher-end product lines and shrink their low-end product line. Such heterogeneous sales impacts are directly linked to the corresponding impacts of being exposed to counterfeits on consumer's purchase intent for products of the three quality tiers. The experiment responses also suggest the double-edged effects of counterfeits in increasing brand awareness and substituting for the authentic product.

Prior literature on counterfeits remains inconclusive. Darby and Karni (1973) present a theoretical framework to explore the reasons for and determinants of using fraud information as means of attracting customers. They insightfully suggest using branding and client relationship as tools in monitoring qualities, but does not discuss what happens when brands are counterfeited. A stream of literature on online piracy has vigorously debated about the effect of file-sharing on original music sales in recent years, and Liebowitz (2006a,b) provide excellent surveys. Several empirical studies seem to point to a negative effect of piracy and file-sharing (Givon et. al. 1995, Hui and Png 2003, Liebowitz 2006,2008, and Hong 2008). Yet Oberholzer-Gee and Strumpf (2007) conclude the opposite based on an uniquely matched dataset of music downloads and purchases. Rob and Waldfogel (2006) conduct surveys on undergrad students. Although they find that the average drop in album purchases due to downloading was \$0.2, consumer surplus has increased due to the lower prices. On the theory side, Shapiro and Varian (1999) argue that file-sharing is a form of free samples and, as such, it may actually stimulate sales. Conner and Rumelt (1991) propose potential positive effects of piracy on the original software demand when consumer utility is a function of the size of the user base. They, however, point out that such network effects are likely to be rather specific to the software sector. Nevertheless, positive effects of counterfeits on authentic sales seem to exist in other sectors. Richardson (2009) surveys a sample of consumers, and find

that they purchased more branded purses when the brand is counterfeited. The prior literature has not provided generalizable guidance on the sale effects of counterfeits and the underlying economic mechanisms. This study collects detailed sales data at the product-line level for each of the 31 branded companies and their counterfeits in the original sample in Qian (2008). These new data enable rich analyses on the sales impacts of counterfeits at the product-line level.

The primary contribution of the paper is empirical, namely gathering detailed product-line level data to probe into the sales impacts of counterfeits, uncovering the heterogeneous effects of counterfeiting for different branded products through a natural experiment and suitable instruments, exploring mechanism of the sales impacts through stratification analyses on the field data and through theory, and conducting lab experiments to probe into the microfoundation of the impacts at the consumer level. There is a dearth of empirical studies of counterfeits or underground economics in general: the illicit nature of counterfeit implies "under the table" and difficult to measure. Since China faces serious counterfeit problems, the Chinese footwear sector has a strong incentive to investigate the effects of entry by counterfeiters. I conducted interviews and surveys of Chinese shoe companies and gathered external data to analyze empirically the sales effects of counterfeits. I obtained annual data for these companies' prices and production costs at the product-line level, financial statements, and marketing strategies from 1993-2004. These data corroborate trends in the Chinese Industrial Census database and the eBay dataset. I also gathered data on the entry time of the counterfeits of corresponding quality tiers of each brand from each authentic company's "brand protection" office, and cross-validated these data with the Quality and Technology Supervision Bureau. While the data are not exempt from limitations, they nonetheless represent a substantial improvement on previously available information.

A key difficulty in empirically measuring entry effects on authentic sales is that entry is often endogenous to these outcomes. This endogeneity problem is especially serious for

counterfeit entry, because the higher the authentic producer's sales, the more likely counterfeiters will enter to copy the brand. Under such circumstances, counterfeit entry will be positively correlated with authentic sales, even if entry is not the underlying cause. The natural experiment and IV strategy allow me to identify occasions in which counterfeiters of a brand are more likely to enter for exogenous reasons that are not related to the brand holder's sales prospects – "randomized" entry decisions – to infer entry impacts. The lab experiments also enable me to establish causal inference through randomized manipulations of the treatment with counterfeits. The combination of a natural policy experiment and randomized lab experiments assists causal inference that have internal and external validities. While the field data generate insights on the aggregated sales impacts, the lab experiments unravel such impacts at the consumer level.

The rest of the paper is organized as follows: Section 2 describes the field data, followed by empirical analyses and results in Section 3; Section 4 provides theoretical foundations for the findings; Section 5 documents the lab experimental design and results; Section 6 concludes and draws out policy implications. Figures and tables are included in the Appendix.

2 Field Data

2.1 Data Design

The ideal experiment that would test the sales impacts of counterfeits would randomly assign counterfeit entry for a set of brands in a large pool. Meanwhile other brands would be kept immune from counterfeiting. The exogeneity of counterfeit entry, however, may not hold in reality because entry is more likely to occur if the original producer has a larger sales, easier-to-copy quality, or a looser trademark management team. These unobserved time-variant firm characteristics are not captured by the fixed effects in panel econometric models, resulting in correlation between counterfeit entry and the error term. Simple OLS

without accounting for this entry endogeneity will lead to biased effect estimates.[2]

To account for these concerns, I locate appropriate instruments that would identify the effects of the counterfeit entry variable. Following Qian (2008), the IV strategy relies on a natural experiment in the Chinese IPR enforcement change and its differential impacts on different brands. The institutional context is explained in Qian (2008), while the remainder of this section explains the necessary details for completeness.

The advantage of studying the Chinese shoe industry primarily comes from the natural experiment, which stems from an enforcement change around the year 1995, due to external shocks exogenous to the shoe sector. In China, copyright and trademark laws were restored after 1976. In 1985, the Chinese government established the Quality and Technology Supervision Bureau (QTSB),[3] with a branch in each city and joint forces nationwide, to supervise product quality and outlaw counterfeit localities. Due to a series of accidents arising from low-quality or counterfeit agricultural products and gas tanks, the Chinese government issued notifications around 1995 to enhance quality supervision and combat counterfeits in seven main sectors prone to hazardous materials.[4] The majority of the Bureau workforce and funding went into these sectors, leaving loopholes for counterfeits to enter the footwear industry. For instance, in the early 1990s, approximately 10-12% of the Bureau's resources

[2]The omitted variable bias potentially enters OLS in two directions: an upward bias due to brand effects, which correlate positively with the sales outcome and counterfeit entry; and a downward bias due to internal management effects, which are positively correlated with the sales outcome but negatively correlated with the brand's counterfeit entry. In particular, a brand with good internal management may effectively ward off counterfeits as well as maintain high sales. In fact, when simply regressing log sale quantities on the fake entry dummy and a year trend, the entry coefficient is very large (=0.68). While the company-fixed effects help control for the omitted brand effects, they do not control for the time-variant management effects. The resulting OLS entry coefficient is, therefore, biased downward, as compared to the IV estimates.

[3]It was recently renamed the "Administration of Quality Supervision, Inspection and Quarantine." The Bureau enlarged its personnel and funding in 1991 in a joint effort with legislation to protect IPR and monitor product quality.

[4]These sectors included: pharmaceuticals; agricultural products (including fertilizers, pesticides, and other materials or instruments); fiber and cotton (particularly bacteria-infected or bleached counterfeits); food; tobacco; alcohol; and gas. Notification No. 52 of late 1994 highlighted fiber and cotton quality supervision, and Notification No. 10 of early 1996 highlighted gas and other major hazardous products.

were devoted to the footwear sector; this number, however, fell to 2% after 1995 (QTSB yearbooks). As the data show, authentic companies experienced significant counterfeit entry after this loosening of governmental monitoring and enforcement, with the highest level of entry occurring in 1996.

As expressed in interviews, authentic shoe producers were surprised at the massive entry of counterfeits[5] but soon reacted. The branded companies that had been infringed upon set up their own "brand-protection" offices to compensate for the lack of government monitoring. The company fixed-effects regression of the log of company enforcement investments on a legislation dummy is positive and significant at the 5% level (coefficient=3.2).

In light of the enforcement changes that are shown to have instigated massive counterfeit entries, the ideal experiment would translate into randomly loosening IPR enforcements for a group of brands in China at a certain time, while leaving the IPR enforcements of the other brands unchanged. Although the government enforcement change mainly presents itself with time variations, I am able to bring in brand-level variations by measuring the relationship between each sampled authentic producer and the government. Pertinent details will be discussed in the following paragraphs, but the bottom line is straightforward: After the enforcement-legislation change, the monitoring of counterfeits became decentralized, resulting in company-level supervision, carried out primarily through authentic manufacturers' own initiatives to protect their own brands. However, the authentic companies still had to rely on the government to outlaw the counterfeit localities once discovered by their own enforcement employees because only the government had such authority. Therefore, companies that had a poor relationship with the government received less attention and experienced more counterfeits. I thus exploit the interaction between the enforcement-legislation change and a proxy for the relationship between an authentic company and the government to identify entry impacts.

[5]These are illegal products that infringe upon others' brands that they do not own.

Before the enforcement change, the QTSB conducted regular inspections of shoe markets and factories. They confiscated and shut down counterfeit localities on the spot. The monitoring mechanism was, therefore, quite uniform across different brands. After the enforcement change, however, companies that had a good relationship with the government received faster responses when they reported counterfeit cases. All else being equal, this type of phenomenon reduced the incentives of counterfeiters to infringe upon these brands.[6] Brand-level variation in relationships with the government (the QTSB in particular) is therefore helpful for exploring the variation in counterfeit entries for different brands after the policy shift and, in turn, its effects on different authentic sales. The challenge is to obtain a proxy for such a relationship.

Previous literature on political connectedness largely measures country-level corruptions. Fisman (2001) pioneered such company-level measurement by linking the response of the share returns of firms traded on the Jakarta stock exchange to a string of rumors about the adverse state of President Suharto's health.However, it is hard to identify a political figure similar to Suharto in the Chinese context that I am examining. The shareholders or directors of the sampled shoe companies also did not participate in electoral votes, a scenario used in Khwaja and Mian (2005) to document the political connectedness of firms in Pakistan. The World Bank World Business Environment Survey (WBES) measures political connectedness with managers' impressions on how fast things get done in dealing with governments (Batra, *et al.* 2003). The only other alternative I found is a recent paper by Mobarak and Purbasari (2006), who propose that whether an Indonesian company acquired import licenses reflects its political connectedness. In the event that the political-connectedness element might play a role in the Chinese import-licensing system, I gather data for the sampled companies. I also collect data on CEO's biography and political connectedness for each company (See Appendix). However, I only use them in supplemental analyses of robustness checks because

[6]Chinese news agencies broadcast counterfeit-confiscation news and consequently counterfeiters are likely to know which brands are harder to infringe upon.

they do not reflect a company's relationship with the government agency of interest, i.e., the agency that is in charge of IPR enforcements and that influences counterfeit entry and quantities. I seek a relationship proxy that is most relevant in explaining brand-level variation in counterfeiting and least influential with respect to authentic sales, except when it affects counterfeiting. Based on these criteria, the number of days it took a branded company to obtain ISO certificates nationwide is the most appropriate proxy.

Since the late 1980s, all registered companies in China have been *mandated* to meet the standards set by the International Standards Organization (ISO).[7] For the shoe industry, the ISO sets standards for the basic equipment a company uses and the basic treatments pertaining to the environment and labor. The QTSB is in charge of ISO certification. For some companies, one month was sufficient to obtain the ISO certificate, but for others, the application date and grant date were more than 300 days apart. Of the companies that spent a long time fulfilling the ISO requirements, some were small, and others medium or large.

Through close readings of documents and multiple interviews with companies and the QTSB, I am able to confirm that the standards were rather basic and the differences in application times were largely due to bureaucracy. Notably, the standard for companies to be registered as legal enterprises surpassed the basic quality standard specified by the ISO. The companies also had to pass internal qualifications as outlined by the ISO before submitting their applications to the QTSB (QTSB 2000). I measure the actual number of work days these applications sat on the desks of QTSB officials. Thus, the variation in application time is largely due to relationships and not product quality or other company factors.[8] This is a more objective relationship proxy than managers' impressions recorded in World Bank

[7]This differs from the U.S., where companies adopt ISO standards voluntarily.

[8]Each registered branch of a branded company needed to apply for an ISO certificate at its local QTSB office. For instance, the brand Senda originated in Yancheng city and applied for an ISO certificate there; its subsidiaries in Shanghai, Jianhu, Beijing, Jilin, etc., also applied for and obtained ISO certificates from the corresponding QTSB branches. I use the number of work days it took each branded company to obtain ISO certificates, averaged across all the relevant cities where that company had production or management branches, as a proxy for the company's relationship with the government in the national market.

surveys (Batra *et al.* 2003).

The sampled shoe companies had to comply with two sets of ISO standards, one established in 1994 and the other in 2000. I obtain each company's application and grant dates for an ISO certificate corresponding to each set of standards and calculate the number of workdays between each pair of application and grant dates. I then construct a variable that equals the number of workdays between the application and grant dates for the 1994 certificate through the year 2000, and that equals the number of workdays to obtain the 2000 certificate from the year 2001 on. The correlation between the number of days to obtain both sets of ISO certificates is very high, 0.96, suggesting that the relationship between a company and the government was rather steady in the period under examination. Further, there are more variations in the ISO indicator across brands or firms within the same local area than across regions. When I regress the ISO values on the series of dummies indicating the city of application, none of the cities carries statistically significant coefficients. The p-values of these coefficients range from 0.23 to 0.64.[9]

There is also no significant correlation between this relationship proxy and the company's size, sales, product quality, or production costs in my data. The largest correlation amounts to only 0.08. The manager of a famous Chinese-branded company complained about its poor relationship with the QTSB and the consequent slow response in fighting its counterfeits: *"Our company bases success on our ability and product quality and [we] never cared to work on relationships (Guanxi). It is frustrating that we have to go through slow processes in some applications such as the ISO and wait months before the government outlaws the reported localities of our counterfeits."*[10] In addition, Chinese consumers hardly notice these ISO certificates. Therefore, the ISO does not signal product quality and is not likely to in-

[9] I also regress the number of days for passing each of the two sets of ISO standards, respectively, on the application city's per-capita income, growth rate, CPI, and income inequality measure for the relevant years and find no significant coefficients.

[10] I have translated these quotes into English from the original Chinese.

fluence prices in any way other than through affecting counterfeit entry and quantity.[11]

Figure II in Qian (2008) exhibits a generally positive relationship between the average number of workdays a branded company took to obtain the ISO certificates and the mean quantity of counterfeit sales it experienced after 1995. This correlation remains significant in regressions of counterfeit entry or sales on ISO days, after taking out company- and year-fixed effects. Section 3.1 provides more data to support IV validity.

2.2 Data Collection and Description

The design of my research suggests obtaining data on each brand's product prices, domestic sale quantities, costs, and sales, as well as information on counterfeit infringements. Due to the underground nature of counterfeits, I collect data through a combination of external data sources and original survey research. The Chinese Bureau of Statistics Industrial Census database contains detailed financial information and basic company characteristics (such as size and age) for all the registered companies in China. Several waves of data were available for the years 1995 and 1998-2005. While the database enlists the main products of each company, it does not contain any data on prices or product-level details. Systematic information about counterfeiting was not found in the existing Chinese or international data sources. It is therefore necessary to supplement data with my own survey research in China to acquire their financial statements and counterfeit confiscations.

Building on the database from Qian (2008), I gathered additional detailed information on sale quantities, transaction prices, and unit production costs at each quality tier for each general type of product, and on the corresponding counterfeits for each of the 31 branded companies that are sampled through stratified random sampling method. The data are taken from the companies' annual financial statements and other relevant company records. Details

[11] Many sectors are privatized in China, the footwear industry included. None of the companies in my sample is state-owned. Shoe prices are also freely set by supply and demand.

of the sampling and survey methods are discussed in Qian (2008). I specifically requested companies' assistance in obtaining data from their databases.[12] The data provided by the company corroborate those recorded in the Industrial Census for the years available. The sales, sale costs, profits, and export aggregates of my sample mirror the trends in the Census of shoe companies. In addition, the price data in my surveyed sample mirror the general price trends of the three quality levels in the eBay dataset collected by researchers at University of Chicago.[13] Qian (2008) details all the data diagnostics and sampling methods.

The detailed sale quantity, price, and cost data are now obtained for finer categorization of products as compared to Qian (2008). For instance, if a company produces six types of products, including high-leg, medium-leg, and regular leather shoes for both women and men, and there are three quality/cost levels within each type, then data on sales are disaggregated to each of the 18 quality-type combinations. The data approach a product-level panel. The input and production costs for the products within each quality-type combinations are very similar, although there are still variations in color and style (eg. sharp-pointing or round-headed) that the current data cannot fully capture. The life-cycle of each particular style is one to two years, however, the product lines remain active over the sampled years. That is, the machinery and organization of each product-line does not change for any existing quality tier, manufacturing various styles and colors corresponding to that product line. New product-lines added in later years are also clearly captured in the data and are analyzed. Such fine-level aggregations are appropriate for the analyses at hand, as I am exactly interested in the differential sales impacts at the quality-tier level.

In addition, I coded and compiled representative shoe characteristics from the annual

[12]The company contacts were very responsible and they most times would not even give casual estimates during interviews. Every time I have a follow-up question, they would email or fax me after checking back with their resources.

[13]The researchers collected transaction-level data on eBay for several product categories. Ting Zhu kindly shared the shoe data with me. For each transaction, the data includes the shoe brand and type, the final transaction price, shipping cost, seller and buyer IDs, product condition, starting bid, and number of bids.

catalogs that I requested from the companies and stores. These product characteristics are also helpful in better controlling for quality and costs. I compiled a dataset of different characteristics for each type of shoe in the catalogs, consisting of materials, comfort, decorative patterns on the shoes, support and cushioning effects, ventilation, *etc.* Hedonic regressions reveal that these characteristics together account for 90% of the cost variations (Qian, 2008). The results lend credibility to the company data and to the results.

I collected data on the year counterfeits entered the market for each quality tier of each brand, whenever existed, from the "brand-protection" offices of each authentic company. Because the branded companies and the government, QTSB in particular, worked together to track down counterfeits, the QTSB shared with each branded company their statistics of counterfeits of the corresponding brand they confiscated. Given the unusual nature of the data, it is important to consider both its reliability and limitations. On the very basic question of authenticity, I have no reason to doubt that the data actually represent the branded companies' records of discovered counterfeits, the QTSB's records of raided counterfeits from the marketplace and production locations, and the financial records of the counterfeiters. These book-keeping records were kept internally as a tool for managing the day-to-day operations of the counterfeiting companies, and were confiscated with all the counterfeits when the government investigated and shut down these illegal entities. The QTSB also kindly shared with me some statistics on the characteristics of the shoes they confiscated from the counterfeiters. The details are discussed in Qian (2008).

One limitation of the data is that only the discovered or captured counterfeits are reflected in the data. Although the branded companies reported to me that they were able to track down most of their counterfeits and the remaining ones were minor and not as influential to them, it is prudent to view the counterfeits' sales as lower bounds of the true values. To ameliorate this potential bias, I generate a dummy variable for counterfeiting presence which takes on value 1 if a branded product experiences any amount of counterfeiting, and

zero otherwise. I primarily study the impacts of entry and presence of counterfeiters on the authentic brands.

The data show that counterfeits for the authentic products of different quality levels within the same brand enter in the same years. It is possible that the annual data is too broad to capture monthly variations in entry by counterfeiters. This concern is clarified during interviews with branded companies. They reveal that counterfeiters usually imitate all levels of authentic products, even though they use similar inferior materials at large to produce shoes that mimic different appearances of these products. I analyze different quality tiers separately, so the brand level and quality-tier level variations in counterfeit entry is more relevant than any minor variations at the product level within a brand.

To control for the overarching economic environment and consumer purchasing power, I obtained data on a common set of macro-indicators: the GDP per capita PPP, GDP growth, and Consumer Price Index (CPI) in the sampled years from the World Development Indicator (WDI) database, and the annual Gini coefficients in China from the UN Human Development Reports. [14] Some descriptive statistics of the 31 companies over the 12 year panel are displayed in Table 1.

2.3 Data Insights

Table 2 tabulates the sales of shoes at the three broad quality tiers, which the companies classify, as percentages of total sales domestically. It is interesting to note that the quality lines moved upward after entry by counterfeiters. That is, the higher-end shoes occupy larger shares in total sales post-entry and the low-end shoes witness their shares decline dramati-

[14] Because neither the countefeiting treatment variable nor the policy shift experiment (supplemented with brand-level variation in relationships to government) exhibits regional variations (Qian 2008), regional factors are not likely to cause bias in estimates even if omitted. Furthermore, Qian (2008) collected regional level income per capita, growth, prices, and inequality data, and documented that results are unchanged to such regional controls. This paper therefore reports the national-level analyses.

cally.

We can potentially comprehend these differential effects of counterfeit entry on authentic sales of different quality levels with the following explanation. Entry by counterfeiters has two opposing effects on the branded products: business-stealing effect and advertising effect. The first effect arises when consumers substitute counterfeits for the authentic products of the infringed brand. This effect is most phenomenal when the quality of the counterfeits approaches that of the authentic products, as in the sample of the low-end products. The second effect arises when counterfeits increase the brand awareness and help to capture new customers for the brand. This positive effect will be more pronounced when the new customers who learned the brand name value high quality and authenticity. These consumers would then choose to purchase the high-end authentic products instead of counterfeits. In these cases, the new segment of customers recruited by the counterfeits will be gained by the authentic company, leading to the increased sales for the high-end products. I later present empirical tests for the hypothesis in Section 3 and formalize the intuitions in a theoretical framework in Section 4.

There is of course another layer of complexity associated with counterfeiting, namely asymmetric information generated by counterfeits as modeled in Qian (2010). Some consumers cannot distinguish counterfeits from authentic products, because counterfeits copy the branded products and mimic their appearances. Asymmetric information tends to enhance the business stealing effect when consumers are conned into purchasing the counterfeits. Qian (2010) shows that authentic companies innovate to differentiate their products from counterfeits, and counterfeits are limited in their technology. When the quality gap between the authentic and counterfeit products widens, it is harder for counterfeits to confuse consumers. Although counterfeiters attempt to mimic authentic products at most quality levels, their ability to imitate is increasingly limited when moving up the quality ladder. This business-conning effect therefore diminishes in the higher quality categories than the

low-end one. The increased sales in the high-end products could also be explained by the higher prices consumers are willing to pay for these authentic products, because they are willing to pay a premium for authenticity or for the search cost of authentic products. Qian (2008) also documents this phenomenon of increased willingness-to-pay.

To tease out the mere advertising effect on sales by the entry of counterfeits from the increases due to introducing new products, I separately compile the sales shares for products of fixed quality pre- and post-entry by counterfeiters and those for the new products introduced after the infringements in Table 3. Among the fixed quality tiers, the percentage sales of high-end shoes increased post-entry, but that of the medium-end and low-end shoes both declined. However, such decline in the medium-end shoes tend to be overcompensated by the new products in the same quality tier, whereas the new products in the low-end are not sufficient to make up for the category percentage drop. More formal regression analyses are carried out in the following section.

3 Empirical Identifications

With an even richer database than that of Qian (2008), there is more identification power at the product-quality level. In particular, each brand has several different quality levels, and I observe different sales quantity and values of products at each quality level. The loosening of the government enforcement for footwears therefore essentially created dozens of "mini-experiments" that I exploit to identify the entry effects of counterfeiters on authentic sales of these various products.

Since there is no within-brand variation in the entry timing of counterfeits for products of different quality levels, I conduct IV regressions of the entry effects on sales for each quality level separately, resulting in three sets of analyses. For each sample consisting of one quality level of all branded products, I execute the following two-stage least squares model.

3.1 First Stage IV Estimations

Following the identification strategy as in Qian (2008), I instrument for the entry of counterfeiters using the plausibly exogenous enforcement shift away from the footwear industry and its interactions with the relationship between each branded company and the government. I construct an indicator variable, Loose, to benchmark the years with diverted government enforcement efforts for shoes (Loose=0 prior to 1995 and 1 starting from 1995). I use this enforcement change and its interaction with the relationship between a branded company and the government (proxied by the days it took the brand to pass ISO standards, averaged across its subsidiaries in various regions) as the main instrumental variables for counterfeit entry. Because the enforcement change was due to a series of accidents that took place in other industries, it is plausibly exogenous. The IV exclusion restrictions are also fulfilled because tightened government enforcement elsewhere is not expected to affect shoe prices or sales directly. Since authentic prices are set by market equilibrium and the ISO time proxies for the relationship of a company only with the QTSB, this ISO proxy does not affect sales directly.

The entry by counterfeiters is identified with the equation below:

$$\begin{aligned} \text{Counterfeit}_{at} &= \gamma_0 + \gamma_1 * (\text{Relation*Loose})_{at} + \gamma_2 * \text{Loose}_t + \gamma_3 * \text{Relation}_{at} \\ &\quad + \gamma_4^T * \text{Year Dummies}_t + \gamma_5^T * \text{Firm Dummies}_a + \psi_{at} \end{aligned} \tag{1}$$

where Counterfeit_{at} is an indicator variable for the existence of counterfeits of brand a's product in the market at time t, and it equals 1 if there are positive amounts of counterfeits for a in the year t. Relation_{at} is the ISO proxy for the relationship between authentic company a and the government, and $(\text{Relation*Loose})_{at}$ stands for the interaction variable between this relationship proxy and the enforcement-change indicator.

In addition to the potential endogeneity of the entry variable, product price may be

endogenous to sales as well. I adopt the traditional IV of product cost for that. This is modeled as follows

$$lnP_{ajt} = \alpha_0 + \alpha_1 * lnC_{ajt} + \zeta_{ajt} \tag{2}$$

Where lnP_{ajt} denotes the log price of brand a's product j at the year t, and lnC_{ajt} similarly denotes the corresponding product cost in logs.

Different columns in Table 4 exhibit the estimations from several specifications of this first-stage IV regression. As shown in Columns (1) through (4), the legislation dummy and the interaction between Loose and relationships are highly correlated with counterfeit entry, statistically significant at the 1% level. The overall Wald Chi-square test or F-test for the instruments is highly significant as well. All these estimations tell a consistent and clear story that the policy shift and its interaction with the ISO relationship proxy are highly correlated with the treatment variable: counterfeit entry.[15]

3.2 IV Regressions for Sales of Fixed Quality Levels

The increases in sales share of high-end products in Table 2 could be in part due to the spillover effects of counterfeiting and, in part, a direct consequence of new product introductions after entry as documented in Qian (2008). To tease out these two parts, I match products of similar quality tiers before and after the entry by counterfeiters throughout the sample period, based on similar price and costs. I compile this sample of existing product-lines separately from the rest of the sample of new product-lines introduced after entry as authentic companies aimed to differentiate from the counterfeits. I then investigate the entry effects on sales of these existing product lines broken down to three quality tiers: high,

[15]To address the potential concern that the legislation-change dummy might be confounded with other macro changes that are not picked up by the year effects, I conduct robustness checks using the fraction of the resources the QTSB devoted to the shoe industry as an alternative instrument to the legislation dummy, as in Qian (2008). The results are similar to those presented here and are collected in Qian (2008).

medium, and low. The part of the sales increase due to potential advertising effect of counterfeits is expected to be captured by a positive coefficient on the entry dummy for the high-end shoes within the existing product lines.

To test the counterfeit entry effect on the authentic product sales of the three existing quality tiers (High-, Medium-, and Low-ends), I estimate equations (1), (2) and the following equation (3) simultaneously (SEM) within each quality tier of shoes separately. Standard errors are clustered at the company level (Table 5).

$$log(Sales_{ajt}) = \beta_0 + \beta_1 * \text{Entry}_{ajt} + \beta_2 * lnP_{ajt} + \beta_3^T * X_{ajt} + \beta_4^T * \text{YearDum}_t + \beta_5^T * \text{ProdDum}_{aj} + \epsilon_{ajt} \quad (3)$$

where Entry_{ajt} is an indictor variable that takes on value 1 if there is positive presence of counterfeits in the market for the brand a's product j in year t. lnP_{ajt} is the log price of the product, and X_{ajt} is a vector of control characteristics such as the company a's age and size and product j's shoe orientation (male or female) or usage (winter boots, slippery, etc.) at year t. The fixed effects for year (12 years) and product-lines within the quality tier of the 31 branded companies control for year-specific confounding factors and time-invariant product attributes.

Using the log sales quantity and values as alternative dependent variables, I arrive at robust results. Table 5 presents the results and reveals interesting patterns. Counterfeit entry hurts low-end products but has positive effects on the high-end ones, statistically significant at the 5% levels. The sales of the high-end authentic products increased significantly after counterfeiters enter, controlling for year and product-line fixed effects and other time-varying company and shoe characteristics such as company age and size. This reflects the potential advertising effect of counterfeits for the brand. Counterfeits could serve as a form of mass advertising, increasing brand awareness especially for customers who would not have been captured by the brand otherwise. This relates to the "diseconomies of scope" theory proposed by Bresnahan et al (2010) and to the findings in Godes and Mayzlin (2009) that "the WOM (word of mouth) that is most effective at driving sales is created by less-loyal (not

highly-loyal) customers".

Benchmarking against the overall observed change in sales (Tables 1 and 3), the point estimate of the entry coefficient in the high-end sales sample implies that 29% of the increases in the sales of high quality tier shoes can be attributed to the positive spillover effects of counterfeits.[16] The medium-end authentic products did not witness significant changes in sales due to counterfeiting, although the sign of the coefficient on the instrumented entry variable was negative. However, the sales of the low-end authentic products have dipped significantly upon entry of counterfeits, both in quantity and values. The coefficients on the instrumented entry dummy are -0.58 for low-end sale quantity and -0.75 for values, implying a 44% drop in sale quantity and 53% drop in sale values for the low-end shoes. A similar back-of-the-envelope calculation reveals that 86% of the decline in low-end sales after the entry by counterfeiters comes from the negative substitution effect.[17] This demonstrates the moderate advertising and fierce competitive effects of counterfeits.

In robustness checks, I repeat the simultaneous equations model analyses by adding a control for the log average price of counterfeits of each quality tier, as instrumented by the log unit product cost of counterfeits. The estimation results do not change qualitatively. That is, the entry coefficients remain positive and signficiant for the high-end sales quantity and values, and negative and significant for the low-end sales quantity and values. Since the data for counterfeit prices are less systematic, I keep my main specifications as described earlier. I further conduct robustness analyses with controls for time-variant brand advertising expenditure. The results are qualitatively similar. Qian (2008) shows that authentic brand's advertising expenditure did not change significantly after the entry by counterfeits, so this control does not collinear with the main treatment variable. However, because advertisement

[16] Drawing relevant summary statistics on the sale quantities, prices, and percentages of total sales pre- and post-entry by counterfeiters, the overall observed percentage change in sales equals to $\frac{558.28*32.24*17.0\%-309.38*26.21*13.9\%}{558.28*32.24*17.0\%} = 172\%$. The fraction of change due to the spillover effect of counterfeits is $\frac{50\%}{172\%} = 29\%$.

[17] The overall percentage drop in low-end sales $= \frac{558.28*32.24*32.1\%-309.38*26.21*5.6\%}{558.28*32.24*32.1\%} = -61\%$, of which the counterfeiting effect accounts for $\frac{-53\%}{-61\%} = 86\%$.

is endogenous to sales, I do not include this control in the main regression specifications. To the extent that the IV teases out plausibly exogenous parts of the counterfeit entry, the sales responses are less susceptible to omitted variable biases, especially in the time period immediately following entry.[18]

3.3 Dynamic Effects of Counterfeits on Product-level Sales

While the previous section tests the overall impacts of counterfeit entry, this section traces the dynamic entry effects on authentic sales over a longer time horizon. For the samples of shoes at each quality tier, I regress the log sale quantity on the set of dummies indicating different years relative to entry by counterfeiters, controlling for the set of time-varying company characteristics, macro conditions, and company-fixed effects. That is, I simultaneously estimate the following equations:

$$lnP_{ajt} = \alpha_0 + \alpha_1 * lnC_{ajt} + \zeta_{ajt} \quad (4)$$

$$ln(Sales_{ajt}) = \beta_0 + \sum_{k=-5}^{5} \beta_{1k} * \text{YearToEntry}_{a,j,k} + \beta_2 * ln\hat{P}_{ajt} + \beta_3^T * X_{ajt} + \beta_4^T * \text{YearDum}_t + \beta_5^T * \text{ProdDum}_{aj} + \epsilon_{ajt} \quad (5)$$

where I regress the log sale quantity of brand a product j at year t on the set of dummies indicating years (k) relative to entry from 5 years pre-entry to 5 years post-entry, controlling for the instrumented log product price and other characteristics. I plot the regression coefficients on the year indicators against the corresponding years relative to entry for the sample of existing product-lines and the sample of new product-lines in Figures 1 and 2, respectively. Because the new products were introduced only after facing the competition from counterfeiting, the coefficients for years prior to infringements were not plotted in Figure 2.

[18]The regional-level macro-economic environment data exhibit a drastic widening of inequality in the late 1980s and early 1990s, instead of the late 90s when the authentic quality upgrades and price hikes are most pronounced. So the increases in high-end shoe sales are not likely to be attributed to inequality. I also gathered data on CPI specifically for the shoes and garments sector from the Yearbooks, and found this price index to follow the overall CPI quite closely (correlation coefficient =.89). The sales increase is not an artifact of inflation either.

Figure 1 demonstrates the positive effects of counterfeits on the high-end shoes. Such an advertising effect is felt immediately upon entry of counterfeits and lasted for a few years before it dwindled. It is possible that counterfeits first served to improve consumer awarenesses of the brand, and later could contribute negatively to the brand equity because some consumers might misattribute the inferior counterfeit quality to the brand itself. The negative impacts on the other two quality tiers are quite large and long-lasting. Some of the dips in these sales are compensated by the sales of new products in these two tiers, as indicated in Figure 2. The regression underlying Figure 1 uses the year of entry by counterfeits as the benchmark, so that all the coefficients plotted indicate the relative change in log sale quantity of a particular quality tier in the respective year relative to entry. Because almost all of the new products were introduced only a year or later after counterfeits entered the market, Figure 2 uses the first year of observation, one year after entry, as the benchmark of comparison. These two figures are most suitable for demonstrating the dynamic changes in log sale quantity in the years relative to entry within each quality tier.

3.4 Mechanisms of the Spillover Effect of Counterfeits

While the negative effect of entry by counterfeiters on the sales of low-end shoes are consistent with the traditional business-stealing intuitions, the positive effect on the sales of high-end shoes was at first surprising and unexpected. Yet positive effects of IP infringement have been termed the "piracy paradox" in a recent paper by Raustiala and Sprigman (2009), who study historical incidences of fashion innovation and found that imitation could turn a formerly innovative design into a non-exclusive feature and stimulate further product differentiations. The positive effect of counterfeiting on authentic product innovations is also identified in Qian (2008), exploiting the same natural policy experiment in China. The positive effect that illegal imitation can have on authentic product sales is conjectured in some prior theoretical literature, through a few potential mechanisms. A commonly cited mecha-

nism is the network effects where consumer utility of a product is an increasing function in the size of user base, and this argument is proposed particularly for the software and book copyright cases (Takeyama 1991, Conner and Rumelt 1991, Givon and Muller 1995, Khan 2004). Others suggest that imitation could serve as a signal for the original product's or idea's high quality (Castro et al. 2008; Biais and Perotti 2008), and that the copy could be a trial product for the authentic product (Shapiro and Varian, 2001). All these mechanisms speak to the advertising effect of counterfeits. Another strand of literature, however, propose that copyists create barriers to entry for competitors (Givon and Muller 1995) and help the originator establish its own technology as an industry standard with switching costs further cementing the originator's competitive position (Katz and Shapiro 1994).

Unlike software and other high-tech industries, there is very little standard-claiming behavior in the Chinese shoe sector. In addition, the shoe industry size has been stabilized since the late 1980s, and the national statistics show that the number of employees in the footwear and garment industry has been approximately 1,750,000 headcounts throughout the 1990s (Tables 12-2 and 13-2 in each Year Book, Chinese National Bureau of Statistics). According to the Basic Unit Census of China (The National Bureau of Statistics, 1996), the massive entry of legal shoe companies took place in the late 1980s. The number of companies increased from 348 in 1984 to 1058 in 1985, with some further increase in the following years. The 1990s witnessed some declines in the number of shoe companies, but the industry size stabilized around 1000 registered firms. These evidence seems to suggest that the positive spillover effect of counterfeits is not likely to work through the entry barriers argument in this particular context. In this subsection, I present a set of analyses that demonstrate the potential advertising effect of counterfeiting, even though the data at hand may not provide further test of the alternative forms of the advertising effect as discussed in the previous paragraph.

The first piece of evidence in the data that point to the advertising effect is that the

positive sales impacts of counterfeits is most pronounced in the high-fashion product lines, notably women's high-leg boots. This is expected because people buy them not just out of necessity but to keep up with the latest style. Shakespeare has it that "The fashion wears out more apparel than the man." Table 6 reports the IV regression results on the log sale quantities and values of the three quality tiers of these fashion boots, and the entry effects on the high-end fashion boots are estimated to be as high as 0.65 for log sale quantities and 0.66 for log sale values, statistically significant at the 1% levels. The demand-enlarging effects for the non-fashion products are much more moderate (coefficients are estimated to be .46 in the sale quantity equation and .36 in the sales equation) (Table A.2).

The second piece of evidence that speaks to the advertising effect is that the sales impacts of counterfeits are more positive for high-end shoes of the set of brands that were less famous at the time of being infringed. The Chinese Trademark Office grants "well-known (famous) brands" to national and international brands according to the Chinese Trademark Law and the Paris Convention.[19] I repeat the IV regression estimations for three tiers of shoes among the set of brands that were not listed as "famous" at the time of infringement by the counterfeits. As shown in Table 7, the average effect of counterfeiting on the sale quantities of high-end shoes is 0.56 and that on the sale values of high-end shoes is 0.65, higher than the corresponding effect sizes in the complete sample, and are statistically significant at the 5% levels. For these non-famous brands, the entry effect on the medium-tiered shoe sales was also positive. While the effect on the low-tiered shoes was still negative and statitically signficiant, the point estimates were less negative than those estimates in the full sample. The demand-enlarging effects for the famous brands are much smaller, with 12% of the increase in sales for the high-tiered shoes attributable to the spillover effects (Table A.3). The effect on the low-tiered shoes are again significantly negative.

[19]The modern concept of the "famous" trademark is codified in Article 6bis of the International Convention for the Protection of Intellectual Property (the Paris Convention), which uses the French expression "notoirement connue" literally "notoriously known" or, in better English, "well known".

In sum, these stratification analyses show that the positive marginal effects of entry by counterfeits on the sales of authentic shoes are largest among the high-fashion boots and the high-tier shoes of the less famous brands. These are exactly the set of products and brands that are expected to benefit most from mass advertising. Counterfeiting and imitations help to establish "trends", which are key drivers of sales (Raustiala and Sprigman, 2010). The results, therefore, provide notable evidence to the advertising effects of counterfeits. The positive effect extends beyond the fashion industry as well. In an interview with the New York Times, the chief executive of LogMeIn (Michael Simon), a company whose software is used in smartphones and tablets, commented that "If people are going to steal something, we sure as hell want them to steal our stuff. When you have a saturated market like Microsoft and have no growth in these devices, then it might be different"(Schmidle, 2010). The lab experiments in Section 5 further enrich evidences for the advertising mechanism based on respondents' stated preference and purchase motivations.

3.5 Discussions of Results from the Field Data

The findings presented so far further enhances those in Qian (2006), which indicate that the authentic producer upgrades quality in response to their counterfeit infringements. In particular, among the set of branded companies whose products started at similar price and quality levels, only those experienced counterfeit infringements strived to innovate after being counterfeited massively. The companies that had a good relationship with the government and did not experience massive counterfeiting threats did not witness internal quality upgrades. Such effects encounter interesting developments here. Not only did firms innovate to ameliorate competition from counterfeits, they also gradually shift production lines to the high-end shoes over time. The findings in this study that counterfeits have positive effects for high-end products and a negative substition effect for the low-end products explains the incentives for the aforementioned business strategies. These strategies brought forth positive

elements to consumers, since the quantity demanded increased, product variety increased, and the deflated price associated with basic characteristics kept stable.

4 Theoretical Framework

Assimilating advertising effects into a vertical differentiation model, I link these two strands of theoretical literature in a stylized model to conceptualize and generalize the empirical findings in this study. While I relegate the model details to the appendix, I summarize the key intuitions and insights of the model in this section.

I start with the vertical differentiation model pioneered by Mussa and Rosen (1978) and Gawbszewicz and Thisse (1979). Counterfeiters usually imitate the authentic products by reverse-engineering to different degrees (Schmidle, 2010). Its quality is hence below or, at best, equivalent to that of the authentic product. The vertical differentiation model provides an appropriate and useful framework of conceptualizing the competition between the authentic and counterfeit producers. I extend the model in the traditional single-product setting to one where the incumbent branded producer has multiple products, as in the real world. I study a market with a multi-product brand, facing the threat of counterfeit infringements.

The model yields insights on two opposing effects of entry: substitution effect and demand-enlarging effect. Like in the case of any new entry, the entry of counterfeiters imposes competition on the incumbent branded producer, and steals demand from the authentic brand when some consumers trade down to purchase the counterfeits. This substitution effect is more negative when counterfeits are closer substitutes to the authentic product. In the case of deceptive counterfeits, where consumers cannot discern counterfeits from the authentic products, the business stealing effect will be even stronger. The vertical differentiation model also informs us of an opposite positive effect of entry. The entry of a lower quality product could help to capture a segment of consumers whose valuation of the product quality

is so low that they are not willing to pay the high price for the original product. With the introduction of counterfeits, these consumers now participate in the marketplace by enjoying a lower quality (or authenticity) counterfeits at a lower price.

I derive closed-form solutions for the negative substituion effect and the positive demand-enlarging effect. Furthermore, I bring an element of advertising into this vertical differentiation framework to explain an additional positive effect counterfeits could potentially exert on authentic demand. That is, counterfeits could recruit new customers to purchase the authentic products by increasing the brand awareness and popularity. This relates to another strand of theory that debates the role of advertising. In particular, Becker and Murphy (1993) consider a model where advertising is a complement to the good being advertised. Advertising has also been theorized to reduce consumer search costs and assist in better matching and coordinations between consumers and brands (Grossman and Shapiro, 1984; Bagwell and Ramey, 1994). In the current context, counterfeits could serve as advertisement for the "brand personality"[20] and assist in consumers' searches for their best-fitting brands.

A recent study by Johnson and Myatt (2006) suggests a new taxonomy of advertising, distinguishing between hype, which shifts out demand, and real information, which rotates demand by altering the price elasticity for brands. Unlike the traditional advertising literature, my data depict a potential advertising effect through the entry of counterfeits. Since the authentic branded companies do not internalize such advertising costs in their own optimizations, the advertising hype can lead to heterogeneous sales impacts for authentic products of different quality tiers. I show that it can both shift and rotate demand functions for products of different quality levels. Notably, because counterfeits impose less competitive pressure on

[20]The marketing literature discusses the role of personifying brands as means of product differentiation (Aakar 1999). This involves assigning human personality traits/characteristics to a brand. These characteristics signify brand behaviour through both individuals representing the brand (i.e. its employees) as well as through advertising, packaging, etc. When brand image or brand identity is expressed in terms of human traits, it is called brand personality. Brand personality is the result of all the consumers experiences with the brand. It is unique and long lasting. http://www.managementstudyguide.com/brand-personality.htm, accessed Jan.11,2011

the high-end authentic product with a wider quality gap in between, the equilibrium sale quantity of the high-end authentic product primarily increases when counterfeits enter the market and boost the brand awareness. The equilibrium sale quantity of the low-end authentic product is influenced by the two opposing effects of counterfeits, and will decline when the substitution effect outweighs advertising effect.

5 Experiments

While the heterogeneous sales impacts of counterfeits are well-identified in the field data, it is sometimes difficult to get a clear grasp of actual consumer purchase intent and motivations without disaggregated consumer-level data. I therefore further manipulate the exposure to counterfeits experimentally in order to test the causal effect of counterfeits on purchase intent of authentic branded shoes and to gain initial understandings on the motivations underlying the purchase intent. I conduct experiments on 62 Master students at Northwestern University and University of Illinois at Chicago as part of their course requirements. Data analyses are demonstrated to students as course learnings.

In the first wave of the experiments, I randomly assign these students into two groups, each taking a different survey. The survey for the treatment group exposes the subjects to actual photos of a counterfeit shoe, together with three quality tiers of the authentic shoes of the brand name Muniao, and asks them to rate their purchase intent for each of the authentic and counterfeit shoe stimuli. The respondents therefore rate their purchase intent based on full comparisons of all products, similar to the real-world condition where counterfeits coexist with the authentic products in the market. The survey for the control group differs in the order of the questions and pictures. It first presents only the three quality tiers of authentic shoes for respondents to rate purchase intent for. After they have marked down the purchase intent for the authentic shoes, the survey proceeds to expose respondents to a picture of the

counterfeit shoe and asks them to rate their purchase intent on this counterfeit. I ask the respondents in the control group to rate the counterfeit in the end so that I have data to ascertain whether the two groups differ systematically in their preferences for counterfeits. Respondents have to answer questions in a sequence and cannot look ahead. The ratings on the authentic products in the control condition therefore reflect purchase intent without the presence of counterfeits. This study enables between-subject comparisons of purchase intent across the treatment and control groups. The purchase intent is measured by semantic differential scales in the experimental surveys, following the well-established social psychology literature (Baker and Churchill 1977; Perrien, Dussart, and Paul 1985; Okechuku and Wang 1988; Voss, et al. 2003).

The average purchase intent for the counterfeit stimuli are similar across the treatment and control groups, and so do the ratings on general attitudes toward counterfeits. The demographic information also show that the two groups are rather comparable, thanks to the random assignments. The average purchase intent for the set of stimuli are tabulated in Figure 3. As compared to the control group, the treatment group (for whom the counterfeit is present in the consideration set when rating all products) exhibits higher average purchase intent for the high-end authentic shoes and lower average purchase intent for the low-end authentic shoes. Such differences account for at least half a point on a 5-point Likert scale and are statistically significant at the 6% and 5% levels. The difference in the average purchase intent for the medium-end shoes is not significant either managerially or statistically across the groups.

In the second wave of the experiments, I conduct a follow-up survey four weeks after these respondents took their first wave of the experiments (either the experiment survey or the control one). The follow-up survey is the same for all respondents. They see actual photos of the three quality tiers of authentic Muniao shoes and its counterfeit. They then rate their purchase intent for each of these shoes, and comment on their purchase motivations. The

survey then asks a series of questions on their general attitudes toward counterfeits, using balanced Likert scales. Finally, each respondent copies down the serial number that was uniquely assigned on his/her first survey before exiting this follow-up survey. This number is what I use to match data for the two surveys by the same respondent while allowing respondents to keep their identity anonymous. By observing the purchase intent of respondents in the control group before and after seeing the counterfeit image, I am able to analyze the within-subject changes in purchase intent due to the exposure to counterfeits.

The average purchase intent for the counterfeit stimuli are not statistically different across the two surveys for the treatment and control groups, and neither are the ratings on general attitudes toward counterfeits. This provides useful benchmarking for the consistency of respondent attitudes in the two waves of questionnaires on items under identical conditions. Figure 4 tabulates the average purchase intent among the respondents in the control group (who rated for authentic shoes prior to seeing counterfeits in the first questionnaire while rated after seeing counterfeits in the second wave). Their purchase intent for the high-end authentic product was 0.35 higher on a 5-point Likert scale, on average, in the second survey. Such increase in purchase intent due to having the counterfeit in the consideration set, together with the authentic shoes, is statistically significant at the 3% level based on pair-wise t-tests. Being exposed to the counterfeit, however, reduces the average purchase intent within-subject for the medium-end and low-end authentic shoes, statistically significant at the 1% and 2% levels.[21]

I explicitly ask respondents about their motivations for the purchase intent in the survey. Almost all respondents qoute the price-quality ratio or value of products as an important determinant. A majority of the respondents comment that they would like to purchase a variety of products, including the counterfeits. This aligns with a strand of sociology theory on

[21]It is worth mentioning that respondents in general seem to have lower purchase intent for the medium- and low-end authentic shoes in the second survey than the first, although the decline was more pronounced in the control group as described here.

omnivorism, which predicts that high-status consumers are skilled enough to traverse a broad taste hierarchy by possessing knowledge of a diverse array of objects (Peterson 1992, Erikson 1996, Peterson and Kern 1996, and Richardson 2008). A number of respondents in the treatment group wrote that counterfeits provide indication that the brand must be famous, and they rated high on the high-end authentic shoe stimulus. Quoting one respondent here, "brand is a guarantee for quality. I dont know this brand, but it should [to] be good if it has counterfeit followers". The respondents who lowered their ratings on the low-end authentic shoe stimulus after seeing counterfeits largely commented to the effect of the following sentence, "As long as the product fits my needs, I dont care if it is brandname or counterfeit." Several other respondents expressed that they would buy shoes more for comfort and value.

I perform regression tests on the purchase intent of each of the three types of authentic shoes and the counterfeit shoe, respectively, against the treatment assignment and a series of general attitudinal ratings on counterfeits, controlling for a set of demographic variables. Table 8 reports the results. The regression coefficients on the treatment indicator tell a consistant story with the t-test comparisons reported previously. The exposure to counterfeits significantly increased the respondents' average purchase intent for the high-end authentic shoe but decreased that for the low-end shoe. The control and treatment groups are comparable in their average purchase intent for the counterfeit stimuli. In addition, subjects who think that counterfeits could add to variety of products in the market and who feel that they are experts in distinguishing counterfeits from authentic products had higher purchase intent for counterfeits as well.

6 Conclusion

Sales impacts of counterfeits are urgent concerns for business managers and policy makers. Notably, New York's senior senator, Charles E. Schumer, introduced legislation at the

beginning of August, 2010, that would rewrite copyright law to cover fashion designs (Raustiala and Sprigman, 2010). He may not have had the advertising effect of imitations in mind. This paper collects a product-line level panel data on Chinese shoe companies to investigate the sales impacts of counterfeiting. In particular, I identify an exogenous change in government enforcement efforts in monitoring footwear trademarks, occurring since 1995, and its differential impacts on counterfeit entry for branded companies with varying degrees of closeness with the government. Using the interaction between legislation change and relationship proxy as an IV for the entry by counterfeits, I obtained empirical results robust across various specifications and consistent with theory predictions. In addition, the causal relationship between counterfeiting and purchase intent for authentic products are established in experiments, where the presence of counterfeit shoes was randomly assigned to two comparable samples of respondents.

The study uncovers heterogeneous effects of counterfeit entry on the sales of authentic products of three quality tiers among the existing product lines. In particular, counterfeits have both advertising effects for the brand and substitution effects for authentic products. The advertising effect dominates substitution effect for high-end authentic product sales, and the substitution effect outweighs advertising effect for low-end product sales. The effects last for a few years before leveling off. Such differential effects reinforces incentives for authentic producers to innovate and move upward in the quality portfolio. The market shares for the higher quality products increased post-entry and that of lower end products declined. There is also evidence for product-line proliferation after the entry. Similar heterogeneous effects on the purchase intent of high-end, medium-end, and low-end branded products are replicated in experimental settings. Responses in the experiments suggest that counterfeits signal brand popularity to at least some consumers and a large number of consumers prefer to traverse a variety of quality levels. Counterfeits therefore steals demand for the low-end authentic products while has positive spillover effects for the high-end authentic products. These new

findings substantiate and enrich the discovery in prior research (Qian 2008) that authentic firms' average prices and quality increased after entry by counterfeits. Combining these studies, we gain a deeper understanding of how counterfeit entry under weak intellectual property protection affects innovation incentives of firms and markets.

In sum, this paper identifies the heterogeneous effects of counterfeits on authentic product sales through a combination of field data, theory, and lab experiments. The findings have important policy implications. Since counterfeits hurt primarily low-end authentic products and have even positive net effects on high-end ones, the focus of the enforcement against counterfeits can be directed toward low-quality counterfeits or counterfeits that imitate lower end authentic products. It seems not only socially beneficial to weed out low-quality counterfeits and to keep certain levels of higher-quality competitions, but also privately efficient to the branded companies. In addition, the findings that the positive sales impact of counterfeiting is more pronounced for brands that were not yet well known at the time of infringments could imply that trademarks and IP may be optimally enforced at different stages of brand or product adoption cycles. This is exactly what Microsoft did in China. They started loose and only fiercely enforced against piracy after the majority of the Chinese users adopted their products (in either authentic form or pirated copies). The positive spillover effect of a low-quality entrant on the original brand is also identified elsewhere in Anderson, Qian, and Simester (2011), using the comprehensive scanner database by an American apparel company. The findings here therefore have general applications beyond counterfeiting. Together, this body of research suggests that there appears to be an optimal level of IP protection, and the optimum varies from country to country (Qian 2007,2009), sector to sector (Qian 2008), brand to brand, and even product to product. The optimum could also have a time dimension in light of the dynamic effects discussed in this study.

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Table 1: Summary Statistics Before and After the Policy Change

Variable:	**Pre-1995**	**Post-1995**
Percentage of Government Resources in	.11	.02
Monitoring Footwear Trademarks	(.004)	(.001)
Workdays Authentic Company Took to Pass ISO	142	149
(Relationship Proxy)	(116.5)	(112.6)
Incorporation Year of Authentic Brands	1985	1985
	(11)	(11)
Number of Company Stores	0	684
	(0)	(533.5)
Authentic Brand-Protection Office Personnel	.17	4.0
(Head count)	(.46)	(2.23)
Quantity (in 10,000 pairs)		
Fake Sale Quantity	Median 0	85.71
		(75.85)
Authentic Sale Quantity	309.38	558.28
	(725.76)	(995.82)
Prices, Costs, and other Numerairs (Deflated, in USD)		
Fake Shoe Price	Median 0	7.32
	(8.33 to 10.4)	(4.2)
Fake Shoe Costs	Median 0	2.66
	(2.2 to 3.56)	(1.56)
Average Authentic Price of Existing Product Lines	26.21	32.24
	(13.64)	(20.45)
Average Authentic Costs of Existing Product Lines	22.61	25.18
	(12.90)	(18.43)
Average Authentic Price of New Product Lines		45.37
		(26.06)
Average Authentic Costs of New Product Lines		35.47
		(24.37)
Self-enforcement Costs of Authentic Brands	520	81380
	(1550)	(83140)
Advertising Expenditure	1496700	2381500
	(2724200)	(3329300)
Real GDP per capita PPP	310.25	488.13
	(5.57)	(2.83)
No. of Obs.	62	310

This table presents the summary statistics of the brand-level dataset, slicing it into two parts: data prior to the year 1995, when the Chinese government reallocated enforcement resources away from the footwear sector to fill in the needs of the safety sectors, and data after 1995. Each row reports the means and standard deviations (in parentheses) of a variable in the two time lines. The percentage of government resources devoted to monitoring the shoe sector is obtained from the Quality and Technology Supervision Bureau. Real GDP per capita PPP is obtained from the World Bank *World Development Indicators (WDI)*. Prices and costs are deflated using the Consumer Price Index published in the WDI (Year 1995 was set as the base year in the database).

Table 2: Summary Statistics on Average Percentage of Sales Across Quality Tiers

Quality Tier:	**Pre-entry**	**Post-entry**
1. High-tier	13.9%	23.0%
2. Medium-tier	54.0%	61.5%
3. Low-tier	32.1%	15.5%

This table presents the summary statistics of the product-line level dataset, slicing it into two parts: data prior to the year that the corresponding brand was infringed by its counterfeits and the data after that year. The three quality tiers are categorized by the authentic branded companies. In later analyses, brand-fixed effects will be controlled for.

Table 3: Summary Statistics on Average Percentage of Sales of the Existing and New Quality Tiers

Quality Tier:	**Pre-entry**	**Post-entry**
1. Existing High-end	13.9%	17.0%
2. Existing Medium-end	54.0%	35.8%
3. Existing Low-end	32.1%	5.6%
1. New High-end	0%	6.0%
2. New Medium-end	0%	25.7%
3. New Low-end	0%	9.9%

This table presents the summary statistics of the product-line level dataset, slicing it into two parts: data prior to the year that the corresponding brand was infringed by its counterfeits and the data after that year. The three quality tiers are categorized by the authentic branded companies. Existing product lines refer to those that existed throughout the sample period, while new product lines refer to those that were added one to three years after the brands were infringed by counterfeits. In later analyses, brand-fixed effects will be controlled for.

Table 4: First-stage IV Regression

Dependent Variable:	Fake Entry			log price
	(1)	(2)	(3)	(4)
Loose	.72***	.27***		
	(.04)	(.05)		
Relation		.001	.001	
		(.001)	(.001)	
Loose*relation		.014***	.002***	
		(.002)	(.000)	
Year trend	-.000	.04**		
	(.000)	(.01)		
Log Cost				.704***
				(.009)
Year Fixed Effects	No	No	Yes	Yes
No. of Obs.	372	372	372	10392
p-values	.00	.00	.00	.00

This table reports the first stage of IV estimations. All models use brand fixed effects. The counterfeit entry dummy (equals one if counterfeits are discovered for a brand) and log of deflated authentic product prices are regressed on the set of I.V., with the year trend and company fixed effects, in four separate regressions. Each column reports one regression specification. Heteroskedasticity-consistent standard errors that correct for clustering at the company level appear in parentheses. Statistical significance levels: *-10%; **-5%; ***-1%. Columns 1 to 3 present alternative first-stage IV specifications to show robust significant relationship between the set of IVs and the entry of counterfeits. The variables are: Loose – a dummy indicating enforcement legislation change, which equals 1 in 1995 onwards; Relation – relationship between the brand and the QTSB, as proxied by the number of work days between the application and grant dates of ISO certificate for an authentic company; Loose*relation – interaction between legislation change and a company's relationship with its local government. Column 4 shows the close relationship between authentic product price and its unit production cost, illustrating costs as a relevant IV for prices.

Table 5. IV Regression Results for Log Sale Quantity and Values of Three Fixed Quality Tiers

Notes: Each column reports one regression specification that is executed in the sample of quality tier as specified in the column header. Point estimates are reported in the first row aligning with the corresponding independent variable. Standard Errors are clustered at the product-line level, and are reported in the second row for each corresponding independent variable.

	log sale quantity			log sales		
Variable	**High-end**	**Medium-end**	**Low-end**	**High-end**	**Medium-end**	**Low-end**
	(1)	(2)	(3)	(4)	(5)	(6)
Log deflated price	-0.21	-0.34	-0.36	-0.18	-0.18	-0.84
	0.29	0.37	0.29	0.39	0.43	0.37
Fake entry	**0.51**	-0.28	**-0.58**	**0.41**	-0.08	**-0.75**
	0.21	0.17	0.24	0.20	0.24	0.38
Age	0.00	0.00	0.00	0.01	0.01	0.00
	0.01	0.01	0.00	0.01	0.01	0.01
Employment	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Log GDP per capita	0.61	-6.93	-17.18	1.87	-4.90	-18.49
	2.23	2.59	2.64	3.05	3.36	3.30
Log consumption (deflated)	-0.69	2.54	6.09	-1.22	1.58	6.88
	0.87	1.00	0.98	1.15	1.26	1.22
Economic growth	0.07	-0.03	-0.17	0.07	0.00	-0.23
	0.04	0.04	0.04	0.04	0.05	0.05
Consumption/GDP	0.00	-0.09	-0.20	0.02	-0.06	-0.22
	0.03	0.03	0.03	0.04	0.04	0.04
Gini Coefficient	0.07	0.29	0.57	0.04	0.24	0.61
	0.08	0.09	0.11	0.11	0.12	0.12
Male Shoes	0.08	0.54	0.41	0.15	0.63	0.51
	0.06	0.06	0.06	0.08	0.06	0.05
Tall-leg boots	-1.56	-1.58	-1.59	-1.59	-1.52	-1.76
	0.10	0.12	0.12	0.14	0.14	0.16
Medium-leg boots	-1.01	-1.06	-1.10	-1.06	-1.10	-1.31
	0.03	0.05	0.07	0.04	0.06	0.08
Slippery	-1.52	-1.49	-1.58	-1.54	-1.54	-1.57
	0.08	0.07	0.07	0.11	0.09	0.07
Sport Shoes	0.90	1.47	1.52	1.32	1.89	1.92
	0.23	0.21	0.22	0.28	0.25	0.24
Constant	14.35	-6.47	-14.71	21.66	5.38	-19.43
	7.38	7.46	6.91	7.97	7.91	8.44
Year FE	Y	Y	Y	Y	Y	Y
Firm and Product-line FE	Y	Y	Y	Y	Y	Y
N	1944	1945	1944	1859	1861	1860

Table 6. IV Regression Results for Log Sale Quantity and Values of Three Fixed Quality Tiers for the Women Fashion Boots

Notes: Each column reports one regression specification that is executed in the sample of quality tier as specified in the column header. Point estimates are reported in the first row aligning with the corresponding independent variable. Standard Errors are clustered at the product-line level, and are reported in the second row for each corresponding independent variable.

	log sale quantity			log sales		
Variable	**High-end**	**Medium-end**	**Low-end**	**High-end**	**Medium-end**	**Low-end**
	(1)	(2)	(3)	(4)	(5)	(6)
Log deflated price	-0.29	-0.20	-0.35	-0.02	-0.39	-0.90
	0.45	0.54	0.39	0.59	0.59	0.33
Fake entry	**0.65**	0.10	-0.28	**0.66**	0.19	-0.32
	0.19	0.28	0.33	0.18	0.34	0.47
Age	0.01	0.00	0.00	0.01	0.00	0.00
	0.01	0.01	0.00	0.01	0.01	0.00
Employment	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Log GDP per capita	-0.01	-12.52	-21.72	1.13	-10.91	-21.69
	2.86	2.61	3.41	3.31	2.66	3.94
Log consumption (deflated)	-0.64	5.52	8.52	-1.65	4.18	8.10
	1.37	1.17	1.06	1.78	1.21	1.27
Economic growth	0.06	-0.19	-0.30	0.14	-0.10	-0.26
	0.07	0.06	0.03	0.10	0.07	0.03
Consumption/GDP	-0.01	-0.18	-0.27	0.03	-0.13	-0.25
	0.04	0.04	0.03	0.05	0.04	0.04
Gini Coefficient	0.10	0.42	0.66	0.07	0.38	0.65
	0.11	0.10	0.16	0.12	0.11	0.18
Constant	15.26	-33.56	-36.50	28.44	-16.61	-28.22
	15.46	12.80	6.42	20.78	14.57	6.94
Year FE	Y	Y	Y	Y	Y	Y
Firm and ShoeType FE	Y	Y	Y	Y	Y	Y
N	209	209	209	209	209	209
Adjusted R-sq	0.5248	0.6524	0.6771	0.5299	0.646	0.7559

Table 7. IV Regression Results for Three Fixed Quality Tiers of the Non-Renowned Brands

Notes: Each column reports one regression specification that is executed in the sample of quality tier as specified in the column header. Point estimates are reported in the first row aligning with the corresponding independent variable. Standard Errors are clustered at the product-line level, and are reported in the second row for each corresponding independent variable.

	log sale quantity			log sales		
Variable	**High-end**	**Medium-end**	**Low-end**	**High-end**	**Medium-end**	**Low-end**
	(1)	(2)	(3)	(4)	(5)	(6)
Log deflated price	-0.33	-0.95	-0.66	-0.58	-0.73	-0.59
	0.33	0.41	0.28	0.46	0.52	0.34
Fake entry	**0.56**	0.34	-0.37	**0.65**	**0.52**	**-0.52**
	0.27	0.21	0.20	0.35	0.26	0.21
Age	0.01	0.00	0.00	0.01	0.00	0.00
	0.01	0.01	0.01	0.01	0.01	0.01
Employment	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Log GDP per capita	-4.11	-11.36	-20.63	-2.69	-9.84	-19.54
	2.52	2.88	3.50	3.12	3.61	4.16
Log consumption (deflated)	1.59	4.91	8.02	0.44	3.75	7.23
	1.05	1.14	1.23	1.48	1.56	1.57
Economic growth	-0.03	-0.14	-0.27	0.08	-0.03	-0.20
	0.05	0.05	0.04	0.08	0.07	0.05
Consumption/GDP	-0.07	-0.17	-0.26	-0.03	-0.12	-0.23
	0.03	0.04	0.04	0.04	0.05	0.04
Gini Coefficient	0.20	0.39	0.63	0.18	0.36	0.60
	0.10	0.11	0.15	0.12	0.14	0.18
Male Shoes	0.01	0.50	0.37	-0.03	0.47	0.35
	0.06	0.06	0.06	0.08	0.07	0.07
Tall-leg boots	-1.71	-1.74	-1.85	-1.77	-1.83	-2.06
	0.11	0.14	0.13	0.14	0.18	0.15
Medium-leg boots	-1.01	-1.13	-1.22	-1.01	-1.16	-1.31
	0.03	0.07	0.08	0.04	0.09	0.09
Slippery	-1.37	-1.38	-1.50	-1.31	-1.34	-1.45
	0.10	0.08	0.08	0.13	0.10	0.09
Sport Shoes	1.34	1.89	2.05	1.64	2.18	2.37
	0.31	0.27	0.21	0.41	0.34	0.27
Constant	-4.02	-26.31	-30.81	9.29	-13.11	-21.61
	10.58	9.51	8.58	15.67	13.62	10.82
Year FE	Y	Y	Y	Y	Y	Y
Firm and ShoeType FE	Y	Y	Y	Y	Y	Y
N	1353	1353	1353	1353	1353	1353
Adjusted R-sq	0.7608	0.8207	0.8274	0.7397	0.8026	0.8452

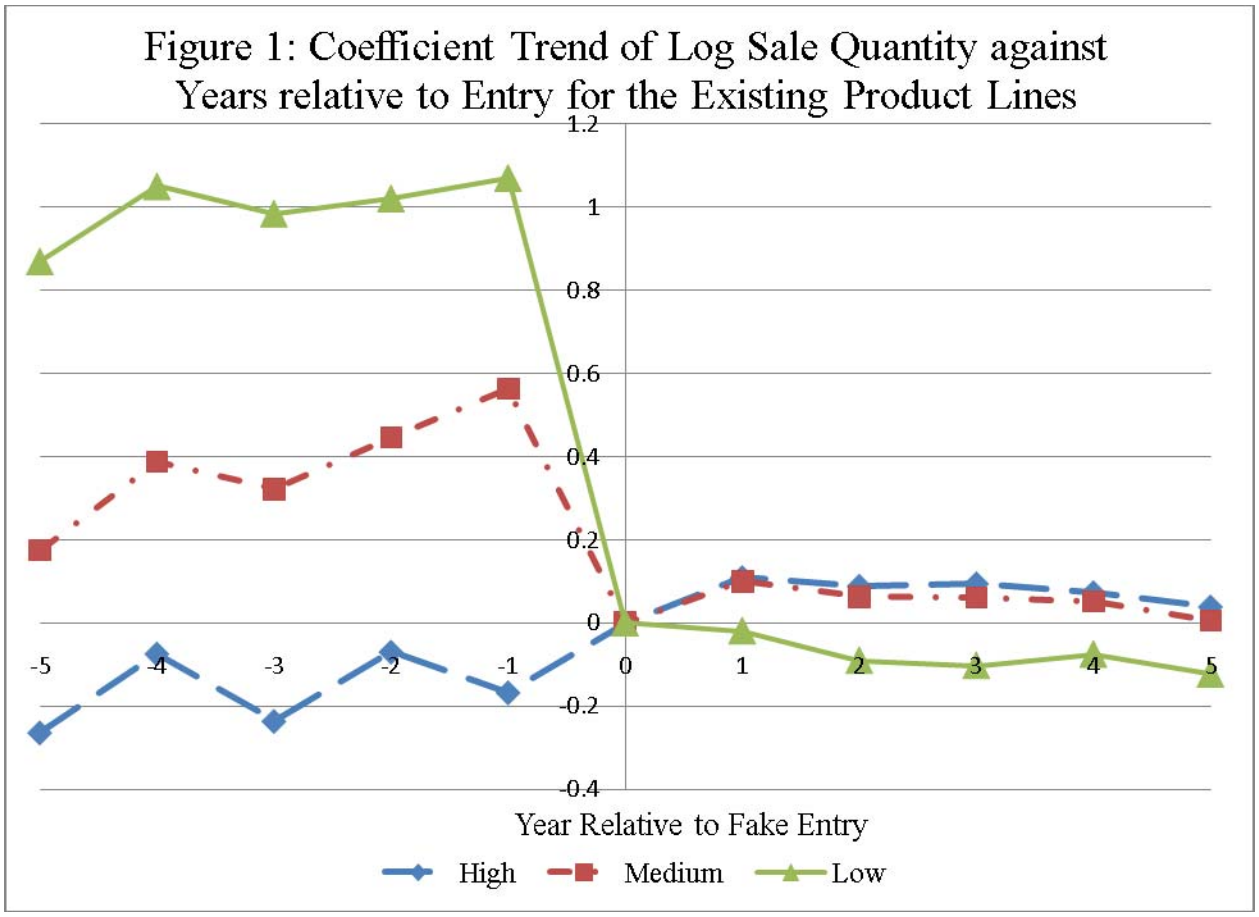


Figure 1: Coefficient Trend of Log Sale Quantity against Years relative to Entry for the Existing Product Lines
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-5
-4
-3
-2
-1
0
1
2
3
4
5
Year Relative to Fake Entry
High
Medium
Low

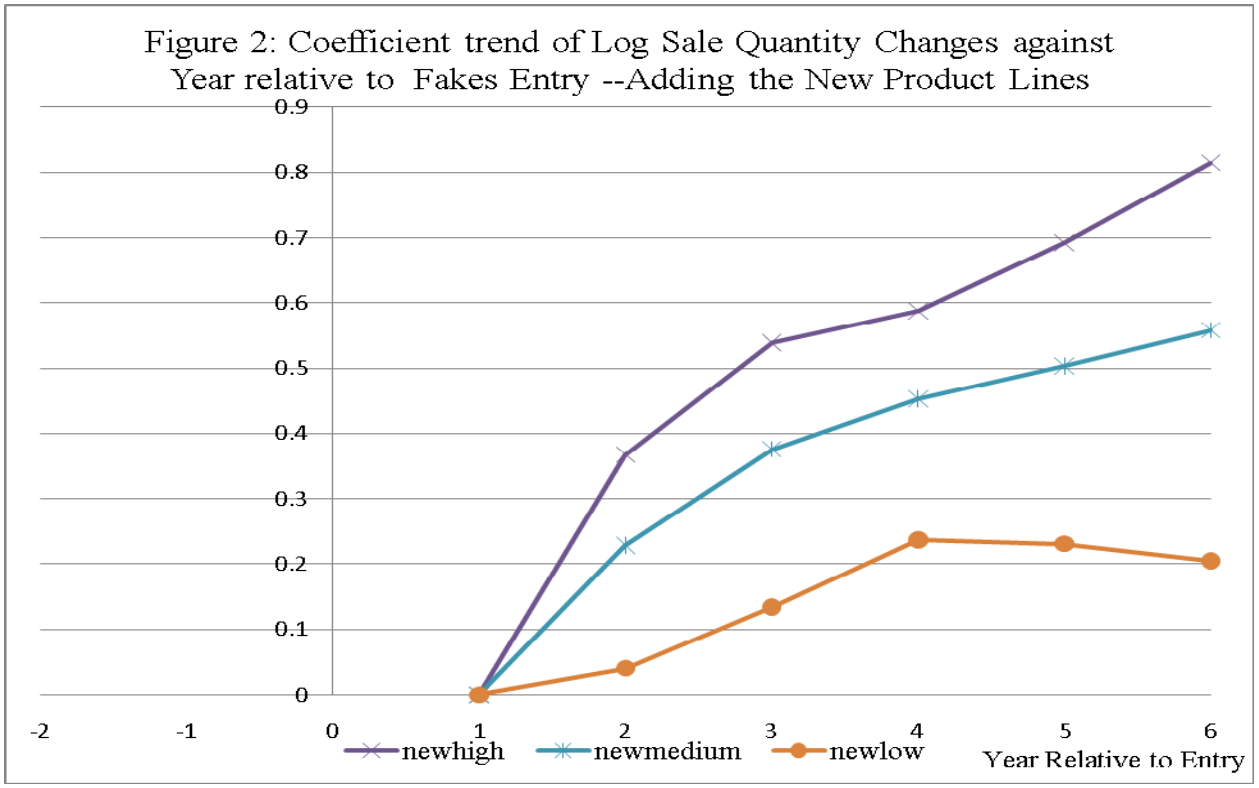
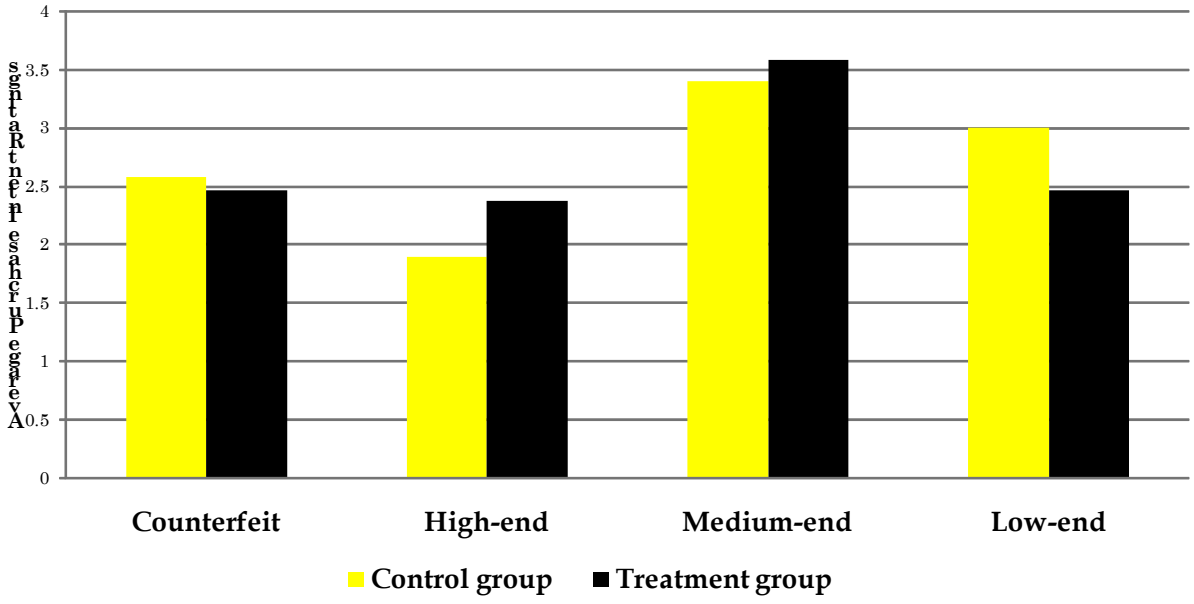


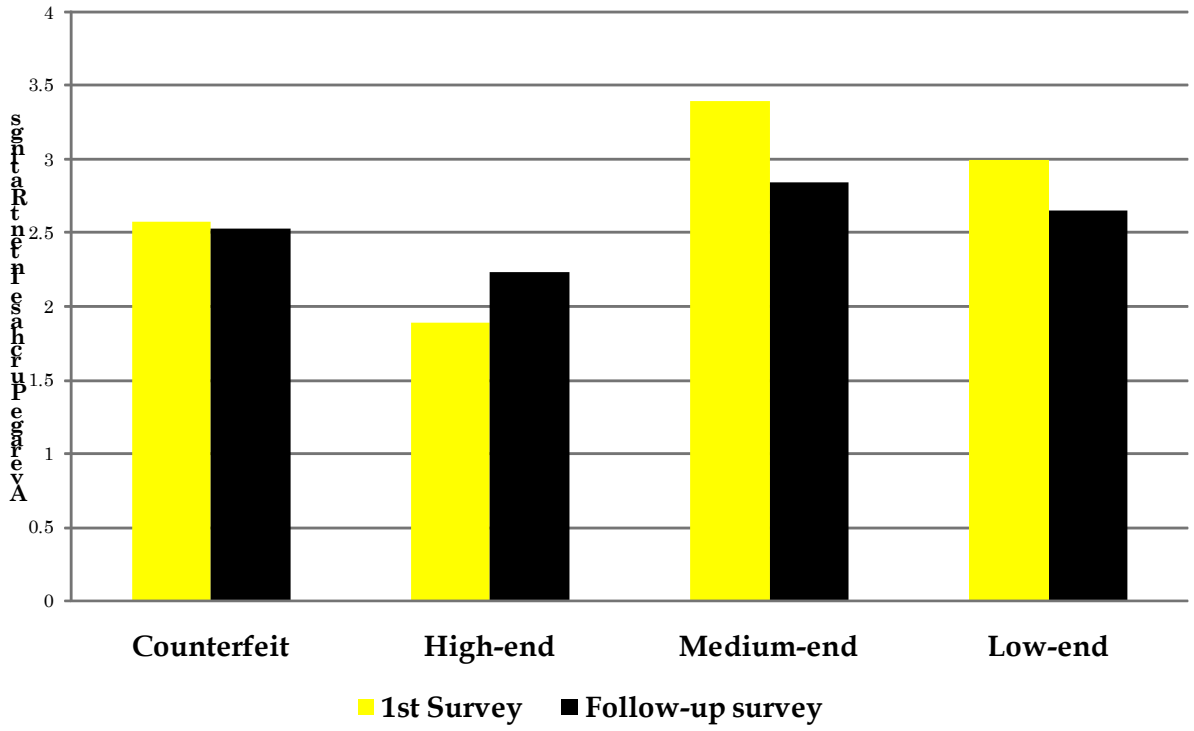
Figure 2: Coefficient trend of Log Sale Quantity Changes against Year relative to Fakes Entry --Adding the New Product Lines
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
-1
0
1
2
3
4
5
6
newhigh
newmedium
newlow
Year Relative to Entry

Figure 3. Purchase Intent Across Treatment and Control Groups



P = 0.72 P = 0.06 P = 0.55 **P = 0.04**

Figure 4. Purchase Intent Within the Control Group



P = 0.16 **P = 0.03** **P = 0.01** **P = 0.02**

Table 8. Regression Results for Purchase Intent of Three Quality Tiers in the Lab

Notes: Each column reports one Seemingly Unrelated Regression equation.
Point estimates are reported in the first row aligning with the corresponding product-line independent variable. Standard Errors are clustered at the level, and are reported in the second row for each corresponding independent variable.

	Purchase Intent			
Variable	**High-end**	**Medium-end**	**Low-end**	**Counterfeit**
Treatment	**0.83**	0.07	**-0.67**	-0.04
	0.35	0.36	0.33	0.36
Counterfeit adds to Variety	0.01	0.03	-0.04	**0.37**
	0.13	0.13	0.13	0.13
Disallow fakes	-0.05	-0.02	-0.03	-0.27
	0.14	0.14	0.15	0.14
Switcher	-0.15	0.21	0.11	0.06
	0.12	0.12	0.13	0.12
Expert	-0.16	0.25	-0.15	**0.49**
	0.14	0.14	0.14	0.14
Negative Association	0.20	0.00	-0.05	0.30
	0.17	0.17	0.17	0.17
Household size	0.10	-0.07	0.06	-0.09
	0.08	0.08	0.08	0.08
Age	-0.19	0.09	-0.02	0.01
	0.18	0.19	0.19	0.19
Gender	-0.27	0.38	0.09	-0.09
	0.31	0.31	0.32	0.32
Income	0.11	0.17	0.04	0.05
	0.13	0.13	0.14	0.14
Race				
Asian	0.10	-0.14	0.24	-0.37
	0.39	0.40	0.41	0.40
Hispanic	0.76	-1.31	1.07	**-3.32**
	1.22	1.24	1.28	1.25
White	0.11	-0.62	0.49	-0.31
	0.47	0.47	0.49	0.48
Others	-1.14	-0.79	0.94	**-1.47**
	0.64	0.65	0.68	0.66
Single	0.48	0.48	-0.14	0.19
	0.33	0.34	0.35	0.34
Constant	2.69	1.09	2.75	0.63
	1.10	1.12	1.16	1.14
N	62	62	62	61

Table A.1. Checking Sample Representatitiveness

	Medium sized Companies		**Small sized companies**	
Variables	My sample (1993-2004)	Census (1998-2001)	Sample (1993-2004)	Census (1998-2001)
Sales (Yuan)	165932.3 (120645)	158935.1 (199806.7)	49634.3 (49069.64)	42772.34 (157319)
Sale costs (Yuan)	94731.26 (88601.51)	95173.22 (249619.4)	38865.35 (37995.72)	36572.63 (141030.1)
#employees (headcount)	1345.04 (340.61)	1472.558 (2204.885)	460.30 (191.81)	230.38 (485.44)
Incorporation Year	1987 (5)	1987 (9)	1988 (3)	1989 (4)
Profits (10,000 Yuan)	9577.12 (8964.71)	9445.821 (14314.34)	1969.54 (3041.73)	1479.57 (11983.2)
Exports (1000 Yuan)	166.06 (134.55)	156.33 (207.46)	77.13 (129.05)	46.87 (136.36)
# obs.	192	95	96	1739

This table compares the summary statistics of the common variables in my sample and those in the Industrial Census conducted by the Chinese Bureau of Statistics for the years 1998-2001.

Table A.2. IV Regression Results for Three Fixed Quality Tiers for the Less-Fashion Shoes

Notes: Each column reports one regression specification that is executed in the sample of quality tier as specified in the column header. Point estimates are reported in the first row aligning with the corresponding independent variable. Standard Errors are clustered at the product-line level, and are reported in the second row for each corresponding independent variable.

	log sale quantity			log sales		
Variable	**High-end**	**Medium-end**	**Low-end**	**High-end**	**Medium-end**	**Low-end**
	(1)	(2)	(3)	(4)	(5)	(6)
Log deflated price	-0.47	-0.77	-0.70	-0.53	-0.77	-0.70
	0.40	0.66	0.48	0.40	0.66	0.48
Fake entry	**0.46**	-0.36	**-0.54**	**0.36**	-0.24	**-0.75**
	0.24	0.20	0.23	0.14	0.32	0.33
Age	0.01	0.00	0.00	0.01	0.00	0.00
	0.01	0.01	0.00	0.01	0.01	0.02
Employment	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Log GDP per capita	0.88	-8.85	-18.10	-3.93	-5.87	-6.58
	2.52	3.35	3.24	3.07	3.06	3.03
Log consumption (deflated)	-0.81	3.63	6.57	2.74	2.67	1.14
	0.99	1.44	1.28	2.02	1.86	1.00
Economic growth	0.07	-0.12	-0.22	0.00	0.07	0.11
	0.04	0.06	0.05	0.12	0.11	0.08
Consumption/GDP	0.01	-0.12	-0.21	-0.09	-0.10	-0.06
	0.03	0.05	0.04	0.07	0.06	0.03
Gini Coefficient	0.06	0.33	0.59	-0.02	0.06	0.16
	0.10	0.12	0.13	0.18	0.19	0.17
Male Shoes	0.05	0.63	0.57	-0.20	0.43	0.49
	0.13	0.07	0.11	0.18	0.12	0.13
Tall-leg boots	-1.80	-1.45	-1.48	-2.10	-1.69	-1.77
	0.18	0.09	0.13	0.25	0.14	0.18
Medium-leg boots	-1.23	-1.18	-1.19	-1.15	-1.20	-1.29
	0.04	0.04	0.08	0.06	0.06	0.11
Slippery	-1.58	-1.49	-1.60	-1.27	-1.28	-1.54
	0.19	0.16	0.20	0.23	0.20	0.21
Sport Shoes	0.12	0.80	0.55	0.59	1.18	0.87
	0.39	0.40	0.41	0.40	0.42	0.39
Constant	-19.52	-9.61	21.72	-22.89	-8.14	26.10
	24.96	23.08	18.09	30.17	27.15	16.43
Year FE	Y	Y	Y	Y	Y	Y
Firm and ShoeType FE	Y	Y	Y	Y	Y	Y
N	1735	1736	1735	1650	1652	1651
Adjusted R-sq	0.727	0.7866	0.78	0.6938	0.7623	0.8124

Table A.3. IV Regression Results for Three Fixed Quality Tiers for the Renowned Brands

Notes: Each column reports one regression specification that is executed in the sample of quality tier as specified in the column header. Point estimates are reported in the first row aligning with the corresponding independent variable. Standard Errors are clustered at the product-line level, and are reported in the second row for each corresponding independent variable.

	log sale quantity			log sales		
Variable	**High-end**	**Medium-end**	**Low-end**	**High-end**	**Medium-end**	**Low-end**
	(1)	(2)	(3)	(4)	(5)	(6)
Log deflated price	-0.43	-0.19	-0.25	-0.44	-0.33	-0.78
	0.61	0.68	0.49	0.81	0.81	0.42
Fake entry	**0.18**	-0.15	**-0.68**	**0.19**	-0.21	**-0.83**
	0.09	0.37	0.22	0.07	0.43	0.33
Age	0.02	0.01	-0.01	0.03	0.02	-0.01
	0.01	0.01	0.01	0.01	0.01	0.01
Employment	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Log GDP per capita	-1.16	-7.05	-12.49	1.43	-5.03	-11.58
	2.67	2.63	4.49	3.40	2.66	4.74
Log consumption (deflated)	0.69	3.65	4.94	-0.91	2.40	4.41
	1.41	1.23	1.55	1.97	1.40	1.71
Economic growth	-0.03	-0.17	-0.24	0.06	-0.10	-0.22
	0.07	0.07	0.07	0.09	0.08	0.07
Consumption/GDP	-0.04	-0.12	-0.17	0.02	-0.08	-0.15
	0.04	0.04	0.05	0.06	0.05	0.05
Gini Coefficient	0.04	0.17	0.29	-0.05	0.09	0.23
	0.08	0.09	0.21	0.10	0.10	0.22
Male Shoes	0.12	0.49	0.29	0.11	0.48	0.28
	0.06	0.09	0.09	0.07	0.11	0.09
Tall-leg boots	-1.50	-1.90	-2.00	-1.50	-1.95	-2.23
	0.14	0.28	0.24	0.20	0.34	0.22
Medium-leg boots	-1.01	-1.17	-1.25	-1.01	-1.19	-1.36
	0.06	0.16	0.15	0.07	0.19	0.16
Slippery	-1.47	-1.46	-1.43	-1.47	-1.44	-1.37
	0.12	0.08	0.11	0.15	0.09	0.11
Sport Shoes	1.34	1.96	2.10	1.96	2.60	2.77
	0.39	0.26	0.18	0.60	0.39	0.22
Constant	-1.88	-23.87	-12.92	15.00	-10.51	-6.94
	16.22	13.34	12.11	22.65	16.91	13.90
Year FE	Y	Y	Y	Y	Y	Y
Firm and ShoeType FE	Y	Y	Y	Y	Y	Y
N	591	592	591	506	508	507
Adjusted R-sq	0.7384	0.8052	0.798	0.7462	0.8094	0.844

Theory Appendix

Consumer preference is a function of the product quality s, brand awareness b, and its price P: $U = V * s * b - P$; where the consumer taste for quality s, as denoted by V, is uniformly distributed between $[V^L, V^H]$. We assume $V^H \geq 2V^L$ to ensure that the market is "covered", and consumer valuations are monotonic in product qualities. Similar to Connor and Rumelt (1991), parameter b here captures brand awareness and network externality, which is an increasing function of the number of users of the product: $b = f(N)$.

There is at first one original producer with products of two qualities: $s^H > s^L$. The unit costs of producing the two types of qualities are c^H and c^L, respectively. The producer attempts to maximize joint profits in the two segments of market: upper segment who purchases s^H, and the lower segment who purchases s^L. The prices of these two products are set accordingly.

In a market with counterfeits, a counterfeiter enters with product of quality s^F and unit cost $c^F < c^L < c^H$. Let P^H, P^L, P^F be the prices for the original high- and low-quality authentic goods and the counterfeit good, respectively.

We first consider the case that the producer simply optimizes its prices. Before counterfeits enter the market, an indifferent consumer with valuation V is equally happy with consuming the high-quality product or the low-quality one if: $Vs^H * b - P^H = Vs^L * b - P^L$ $\Rightarrow V = \frac{P^H - P^L}{(s^H - s^L)b}$; and the lowest valuation among the consumers who would still purchase the low-quality good is: $\underline{V}s^L * b - P^L = 0 \Rightarrow \underline{V} = \frac{P^L}{bs^L}$. Any consumers with an even lower taste will not purchase because she would derive negative utility otherwise. It is then easy to get the demand for each type of products:

$D^H(P^H, P^L) = V^H - V = V^H - \frac{P^H - P^L}{b(s^H - s^L)}$

$D^L(P^H, P^L) = V - \underline{V} = \frac{P^H - P^L}{b(s^H - s^L)} - \frac{P^L}{bs^L}$

The original producer maximizes total profits:

$(P^H - c^H)D^H(P^H, P^L) + (P^L - c^L)D^L(P^H, P^L)$ *w.r.t.* P^H and P^L, and yields:

$$P^{L*} = \frac{bV^H s^L + c^L}{2}, \quad P^{H*} = \frac{bV^H s^H + c^H}{2} \tag{6}$$

$$D^{L*} = \frac{c^H s^L - c^L s^H}{2bs^L(s^H - s^L)}, \quad D^{H*} = \frac{V^H}{2} - \frac{c^H - c^L}{2b(s^H - s^L)} \tag{7}$$

After counterfeits enter the market, the boundary condition becomes: $\underline{V} s^F * b - P^F = 0$ $\Rightarrow \underline{V} = \frac{P^F}{bs^F}$. I introduce another consumer with valuation V^F who is indifferent between purchasing the original and counterfeit products. $V^F s^F b - P^F = V^F s^L b - P^L \Rightarrow V^F = \frac{P^L - P^F}{b(s^L - s^F)}$. Due to assumptions (7) and (10), the market is segmented into the following parts: consumers with the lowest tile valuations $[0, \underline{V}]$ do not purchase anything, consumers with slightly higher valuations $[\underline{V}, V^F]$ will purchase the counterfeits, consumers in the interval $[V^F, V]$ will purchase the low-quality product, and the consumers in the upper segment $[V, V^H]$ will enjoy the high-quality product. I thereby derive the demands for the high- and low-quality original products and that for the counterfeits:

$D^H(P^H, P^L, P^F) = V^H - \frac{P^H - P^L}{b(s^H - s^L)}$

$D^L(P^H, P^L, P^F) = \frac{P^H - P^L}{b(s^H - s^L)} - \frac{P^L - P^F}{b(s^L - s^F)}$

$D^F(P^H, P^L, P^F) = \frac{P^L - P^F}{b(s^L - s^F)} - \frac{P^F}{bs^F}$

The original producer maximizes $(P^H - c^H)D^H + (P^L - c^L)D^L$ *w.r.t.* $P^i (i = H, L)$ and the counterfeit producer maximizes $(P^F - c)D^F$ *w.r.t.* P^F. If the authentic company is the Stackelberg leader in the game, then I could solve the reaction function of the counterfeiter and then plug into the authentic profit function. The equilibrium prices and demand are solved to be:

$P_c^{H*} = \frac{bV^H(2s^L s^H - s^F(s^H + s^L)) + s^L c^F + 2c^H s^L}{4s^L - 2s^F}$

$P_c^{L*} = \frac{s^L(c^L + c^F) + (2bV^H s^L + c^L)(s^L - s^F)}{4s^L - 2s^F}$

$P_c^{F*} = \frac{P^L s^F + c^F s^L}{2s^L} = \frac{2c^L s^L s^F - 3c^F s^L s^F + c^L s^F(s^L - s^F) + 4c^F s^L s^L + 2s^L s^F bV^H(s^L - s^F)}{2s^L(4s^L - 2s^F)}$

$D_c^{H*} = \frac{V^H}{2} - \frac{c^H - c^L}{2b(s^H - s^L)}$

$D_c^{L*} = \frac{s^F V}{2(4s^L - s^F)} + \frac{c^H - c^L}{2b(s^H - s^L)} + \frac{2s^L c^F - 4s^L c^L + 2s^F c^L}{2b(s^L - s^F)(4s^L - s^F)}$

Lemma 1 *b increases after being counterfeited as a result of a larger user base of the brand.*

Proof: The total number of users for the brand under the multiproduct monopoly condition is $N_m = V^H - \frac{P_m^L}{s^L}$, and that under the competitive market with the counterfeits is $N_c = V^H - \frac{P^F}{s^F}$. As derived in the model, the reaction function of the counterfeit price $P^F = \frac{P_c^L s^F + c^F s^L}{2s^L}$. Rearranging the terms, we have $\frac{P^F}{s^F} = \frac{P_c^L}{2s^L} + \frac{c^F}{2s^F} < \frac{P_m^L}{2s^L} + \frac{c^F}{2s^F}$. With very low marginal cost of counterfeit products c^F, the last term is negligible. Hence, $\frac{P^F}{s^F} < \frac{P_m^L}{s^L}$. It follows that $N_c = V^H - \frac{P^F}{s^F} > V^H - \frac{P_m^L}{s^L} = N_m$. Since $b = f(N)$, with $f(.)$ increasing, $b_c > b_m$. The entry of counterfeits enlarges the total number of users of the brand, including authentic or counterfeit products, and increases the brand awareness.

Proposition 1 *When b increases after being counterfeited, equilibrium sales of the high-end product increases. i.e.* $\frac{\partial D^{H*}}{\partial b} > 0$.

Proof: $\frac{\partial D^{H*}}{\partial b} = \frac{c^H - c^L}{2b^2(s^H - s^L)} > 0$. This proposition explains the increased demand and sales for the high-end authentic product due to the advertising effect of the entry of its counterfeits.

Proposition 2 *Monopoly demand of low-end product* $\frac{\partial D^{L*}}{\partial b} > 0$ *iff* $\frac{s^H}{c^H} \geq \frac{s^L}{c^L}$.

Proof: $\frac{\partial D^{L*}}{\partial b} = \frac{c^L s^H - c^H s^L}{2b^2 s^L (s^H - s^L)}$. This is greater than zero if and only if $c^L s^H - c^H s^L > 0$. This is equivalent to $\frac{s^H}{c^H} \geq \frac{s^L}{c^L}$. This suggests that increased brand awareness will raise low-end product demand if and only if the quality-cost ratio of the high-end product is higher than that of the low-end product. When the two types of products are sufficiently differentiated in their quality, then the increased brand awareness could expand market share for both branded products. Otherwise, the demand for low-end product may decline while its optimal price increases.

Proposition 3 *When holding b fixed,* $D^{L*} > D_c^{L*}$ *iff* $\frac{c^F}{s^F} < \frac{c^L}{s^L}$.

When holding b fixed, I can compare the equilibrium demands of the low-end product in markets with and without counterfeits by taking the differences: $D^{L*} - D_c^{L*} = \frac{P_c^L - P^F}{(s^L - s^F)b} -$

$\frac{P^L}{bs^L}$. We substitute in the reaction function of the counterfeiter $P^F = \frac{P_c^L s^F + c^F s^L}{2s^L}$ and the equilibrium prices P_c^L, P^L. After rearranging and canceling terms, I have $D^{L*} - D_c^{L*} = \frac{c^L s^F - c^F s^L}{4bs^L(s^L - s^F)}$. This difference is positive if and only if $c^L s^F - c^F s^L > 0$, which is equivalent to $\frac{c^F}{s^F} < \frac{c^L}{s^L}$. The condition says that the cost-quality ratio of counterfeits is less than that of the low-end authentic product. Since counterfeiters copycat the authentic designs and use very inferior materials to produce their counterfeits, this condition often holds in practice. The proposition formalizes the substitution effects of counterfeits on the authentic products.

The above two propositions outline two opposing effects by the entry of counterfeits on the low-end authentic product: advertising effect to increase brand awareness and substitution effect to steal demand. Since counterfeits impose less competitive pressure on the high-end authentic product due to the wider quality gap, the equilibrium sale quantity of the high-end authentic product increases when counterfeits enter the market and boost the brand awareness. The equilibrium sale quantity of the low-end authentic product is influenced by the two opposing effects of counterfeits, and will decline when the substitution effect outweighs advertising effect.

Data Appendices

Sampling Frame Construction and Firm-Level Data

The sampling frame is a complete list of 987 registered (authentic) leather and sport shoe companies in China, compiled by a consulting company. I ranked them according to their size. To obtain generalizable results, I sampled from domestic and foreign brands, and from companies of different scales. The Chinese National Bureau of Statistics has classified company scales into six categories (extra large, first-class large, second-class large, first-class medium, second-class medium, and small) since the first industrial census and I followed their classification. No shoe company falls into the first three categories. The relevant categories

for my sample are: I. multinational corporations in China; II. Chinese brand-name companies that are classified as first-class medium scale (Chinese National Bureau of Statistics, 1995); III. Chinese branded companies that are classified as second-class medium scale; and IV. Chinese branded companies that are classified as small scale. I randomly drew 10 companies from each of the four categories with random number generators, and then interviewed and surveyed these randomly selected companies. Under agreement that I would keep their data confidential and provide them with results and further analyses at their request, I received data from 31 of the 40 authentic companies, covering the period 1993-2004. There are no observable differences between the respondents and the non-respondents, based on their size, total employment and age.

Ideally, I wanted to have data for these four variables broken down by each type of shoe a company produces. On average, each company produces over 10 different types of shoes: male winter (with fur or cotton), male summer, male regular (with regular leather, suitable for spring or autumn), female winter (including fur- and cotton-made), female summer, female regular, female knee boots, female mid-leg. Each type is produced at three different quality levels (high, medium and low) according to their material and fabrication techniques used. However, most of the companies do not have such detailed data available (either because of limitations in computer storage or because of difficulties in accessing such old and detailed documents or concerns over confidentiality). In the end, detailed price and cost data were made available to me for three levels of product lines (high, medium, and low).

To check the survey data quality, especially firms' cost estimates from their balance sheets, I conducted a set of hedonic regressions as mentioned in Section 3. As Qian (2008) shows, the set of shoe characteristics gathered from the printed product catalogs explains over 90% of the variation in reported costs and over 80% of the price variation. Production costs are also highly correlated with features that require high material and labor costs, such

as using imported crocodile skin and Italian machinery, as one would expect. In addition, a cross-validation of a random sample of these price and cost data based on my calculations from the annual catalogs and companies' responses from their databases were performed to make sure that the cost estimates are in the right ballpark. For instance, knowing that a particular level of shoes is made of top-tier cow leather implies that the material costs would be around 448 Yuan (approximately 56 USD). If the shoe bottom is also made of fine cow leather, then that would cost an additional 17.4 USD.

For the data on counterfeits, I cross-referenced the data from the companies with the available records from the Industrial and Commercial Bureau of China and the QTSB. In addition, the QTSB kindly shared with me the shoe characteristics from their testing reports for a set of counterfeits, together with their product materials, costs, and prices as recorded in the confiscated financial records. Most counterfeit shoes are made of inferior materials, ranging from second-tier leather to imitative leather to plastic cement. The cost differentials reflect the use of different materials, as evidenced by the statistically significant coefficients associated with imitative-leather and plastic-cement variables. It is stunning to note that many materials are invariant across the sample of counterfeits. For instance, the shoe bottoms are all made of TPU. The counterfeit sport shoes are surfaced with PU and net-like materials, and are equipped with no inner-air cushions or non-standard foam cushions to imitate the look of branded shoes. Interestingly still, the quality level of the branded shoe whose appearance the counterfeit product is mimicking does not correlate with the counterfeit costs but correlates highly with the counterfeit product price. This again indicates that counterfeiters use very similar inputs to produce shoes of all imitative levels, and determine their prices largely based on the brand and appearance that they are imitating.

Among the responsive companies, 80% were infringed upon at different levels. These infringed-upon brands range from top-tier household names to low-end producers with small brands. While interviewing the companies, I learned that those infringed upon by counter-

feits invest in enforcement activities by sending their own employees to monitor counterfeits, lobbying at the local government level to outlaw counterfeit localities, and organizing anti-counterfeit conferences. The companies also uniformly tell me that establishing company stores for their brands is a very good strategy to signal their quality and to ward off counterfeits. One company's manager said during the interview: "*Starting from 1996, our company products have exited the wholesale market and we switched the channel to licensed retailing. We established a well-managed retail distribution system nationwide. This is one of the most effective ways to combat counterfeits, and it almost deterred counterfeiting.*" In order to set up a licensed retail store, a company has to get approval from the Industrial and Commercial Bureau. The application requires legal documents about the brands from the company. The formal approval certificate has to be displayed in each licensed store. Therefore, the counterfeiters are not able to mimic this business strategy. In fact, establishing a fake licensed store will only help the authentic company and the local government track down the counterfeits and no counterfeiter has the incentive to do that. I, therefore, obtained data on enforcement expenditures, personnel, and the number of licensed stores to test empirically the effectiveness of these strategies in deterring entry.

I further gathered data on whether the sampled companies and their regional subsidiaries were awarded import licenses to serve as an alternative measure for relationship, or political connectedness of these brands. This was a difficult process again and I was only able to obtain the data for one year (I chose the first ISO year as my priority year in data requests). I identified which of the sampled companies were approved with import licenses as of 1995, as those are likely to be the companies with a better relationship with the government [Mobarak and Purbasari, 2006]. The ISO data correlates with this alternative connectedness measure (correlation coefficient = -0.64). I still used the ISO measure to interact with policy changes as the main instrument because ISO measures the relationship with the QTSB, which is the government agency that directly deals with counterfeits. The Foreign Trade and

Economic Cooperation Bureau (which used to be called the Foreign Trade and Economics Delegation Committee) is in charge of awarding the import licenses. Companies that are not granted import and export rights have to go through intermediate agents such as the Import and Export Companies to carry out import and export. These intermediate agents are professional service companies analogous to law or accounting firms.

In addition, I constructed alternative relationship proxy using the political connectedness of each company's CEO with the government officials, based on each CEO's education and experiences. I coded CEO biography for each company in the sample based on a systematic codebook (Qian and Shih, 2010). This proxy also correlates with the ISO measure (correlation coefficient = -0.68), as they are both driven by political connectedness. Because the relationship with the QTSB is more exogenous to the authentic sales, I opt for the ISO proxy. The alternative proxies serve as robustness validations.

Sample Representativeness

I acquired access to the Chinese Industrial Census database for the years 1995, and 1998-2001. The data for 1995 and the dataset for 1998-2001 contain slightly different lists of variables, and do not match up fully. The database contains firm-level sales, profits, the year of establishment, ownership, and other financial information for all the registered companies in China. I compared the common variables in my sample to those in the Industrial Census database. The mean and standard deviations of sales, profits, and most other common variables are very similar across the two data sources (Table A.1). The alignment in sale costs across data sources again confirms the data reliability. However, my sample of small enterprises has a higher mean value for exports, profits, and size (460 employees) as compared to that of the census (230 employees), which is to be expected as branded companies are usually larger. There are a lot of very small companies in the census database that only produce generic shoes without brands. Any draws of such companies were screened out of the final sample for my research question. There is no shortage of small-scale family businesses

in the countryside. The census data also provide ample evidence that while no shoe company qualifies as large-scale, there is a long tail of small-scale companies. In the census data across four years, 1998-2001, there are only 23 medium-sized companies (including first-class medium-sized and second-class medium-sized). My sample covers 22 of the medium-sized companies. My sample additionally includes some smaller-sized branded companies resulting from the random sampling method. Summing up the market share data provided to me, the total market share of the companies in my sample approaches 90%. A large number of the small companies can be considered as competitive fringe firms. Thus, even though my sample size is limited, the sample of companies highly represents the brand-active part of the market, where the main interests of this paper lie.

In addition, for the common variables of the companies that are found in both my sample and the Industrial Census database, such as sales costs, sales, exports, incorporation year (used to calculate company age), I was able to directly see the one-to-one correspondence between the values provided by the sampled companies and the values recorded in the Industrial Census database. This provides evidences that the sampled companies provided me with data out of their financial records, as I requested specifically in my surveys. While I acknowledge potential limitations in the paper, I am confident about the general quality of the data and responses.

The industrial census does not contain price data, so I gathered price data for shoes of the sampled brands from the Ebay China website, with help from researchers at the University of Chicago. The mean price for the high-end shoes in the Ebay data is 460 Yuan (57.5 USD), which is very similar to the mean of 491.86 Yuan (61.5 USD) in my dataset. The prices for medium- and low-end shoes exhibit a very dispersed pattern in the Ebay dataset possibly due to the mixing-in of counterfeits. When I drop the extremely low prices (e.g., those under 10 USD), the mean prices for medium- and low-end shoes are also similar to those in my sampled data. When taking the mean price of all the non-high-end shoes from

the Ebay data, the result is quite comparable to the mean price of medium-end, low-end, and counterfeit shoes in my dataset. All these corroborations speak to the representativeness and reliability of my sample and data.

Additional Data Diagnostics to Preclude Confounding Explanations

China entered an incredible boom in the late 1980s, which continued through the 1990s. Easy credit conditions prevailed in China primarily in the 1980s.[22] An unsustainable credit expansion drove demand well beyond supply, and prices began to rise rapidly. At the peak, the CPI was growing at around 25% per year, and China was taking in a massive quantity of imports, running a substantial current-account deficit. China had to tighten credit conditions in the early 1990s in the hope of slowing the acceleration of non-performing loans.[23] Zhu Rongji took strong steps to slow down the growth. Investments and growth dropped sharply, as did the rate of price increases. By the late 1990s, there was deflation in China. Given the negative macro trends in the mid- to late-1990s, the positive coefficients on the instrumented counterfeit entry lagged by two to three years (controlling for year and company dummies) provide rather convincing evidence that the higher authentic prices and sales are due to strategies against counterfeits rather than macro factors.

According to the exchange rate data from the IMF International Financial Statistics and the UPenn World Tables, China's foreign exchange regime was reformed in 1993, and a multiple exchange rate system was eliminated and the real exchange rate was substantially devalued. The major devaluation occurred in 1994 (from 576.2 Yuan equaling a hundred dollars in 1993 to 861.87 Yuan equaling that dollar amount in 1994). Those firms purchasing foreign inputs or materials saw the RMB costs of those purchases go up. These authentic

[22]Barry Naughton, "China's Economic Think Tanks: Their Changing Role in the 1990s," The China Quarterly, V.171, Cambridge University Press, Sep., 2002.

[23]Gabriel, Satya J. (1998), "Is Banking Reform in China Still on Track?" Satya Gabriel's Online Papers: China Essay Series http://www.satya.us

companies would then require a lot of incentive to import expensive foreign machinery and materials, as seen in the data. This in fact reinforces my argument that the effects of entry by counterfeiters are quite significant.

I additionally gathered economic data at the regional level on income per capita, growth, prices, and inequality. The data exhibit a drastic widening of inequality in the late 1980s and early 1990s, instead of the late 90s when the authentic quality upgrades and price hikes are most pronounced. In addition, the shoe industry size has been stabilized since the late 1980s, and the national statistics show that the number of employees in the footwear and garment industry has been around 1,750,000 throughout the 1990s (Tables 12-2 and 13-2 in each Yearbook, Chinese National Bureau of Statistics). According to the Basic Unit Census of China [The National Bureau of Statistics, 1996], the massive entry of legal shoe companies took place in the late 1980s. The number of companies increased from 348 in 1984 to 1,058 in 1985, with some further increases in the following years. The 1990s witnessed some declines in the number of shoe companies, but the industry size stabilized at around 1,000 registered firms. Therefore, this study examines a period where the registered companies coexisted relatively peacefully among themselves, and the effects of counterfeit entry can be teased out relatively easily.

To take into account potential ramifications arising from industry differentials in price levels, I also gathered data on CPI specifically for the shoe and garment sector from the Yearbooks, and found this price index to follow the overall CPI quite closely (correlation coefficient =0.89). All these supplemental data diagnostics and research into the macro or regional market conditions in the sampled years yield additional support for the findings and conclusions in this study.