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Cooperative Innovation in Stochastic Markets

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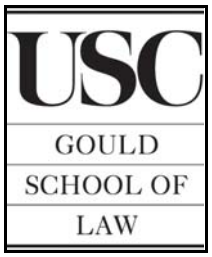

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ABSTRACT

The fashion market is an anomaly: innovation is vigorous but original producers are substantially unprotected against imitation, which proliferates under an incomplete property regime consisting of strong trademark protections and weak design protections. We account for this anomaly through a "cooperative innovation" model where producers prefer an incomplete property regime that permits some imitation to alternative regimes that permit no imitation or all imitation, independent of budget constraints. A property regime that permits positive but limited levels of imitation operates as a form of group insurance that alleviates the risk of recoupment failure in a market characterized by demand uncertainty, long lead times, skewed returns and rapid product obsolescence. This risk-based model is compatible with producers' selective enforcement of intellectual-property protections, privately-administered quasi-copyright schemes, and institutional mechanisms that facilitate seasonal coordination of design outcomes. This model potentially generalizes to other markets that operate under demand uncertainty and other aggravating conditions.

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"Fashion is, by its nature, a perilous way of life."[1]

– Emanuel Ungaro, leading fashion designer

1. INTRODUCTION

Fashion may be glamorous but, from an economic perspective, it is a tough business. Apparel producers suffer from a fundamental timing problem: an extended sequence of design, marketing and production expenditures must be incurred well in advance of any reliable indication as to the trends that will prevail in the target season. To make things worse, fashion only crowns a few winners each season. Designs that fail to make the seasonal popularity contest are consigned to the remainders bin at clearance prices while even popular designs are usually cast aside at the end of the season. Extended production lead times, together with stochastic demand conditions, skewed investment returns, and accelerated product obsolescence, exposes any fashion house to a high risk of being unable to recoup its seasonal investment in a new collection, repeated occurrences of which can and do translate into financial distress up to and including insolvency. This "fashion risk" provides the key to unlocking the "fashion anomaly": namely, the curious coexistence of vigorous innovation with incomplete intellectual-property protections and widespread imitation of popular designs. Original producers[2] are sometimes ambivalent towards imitation and tend to implement selective enforcement strategies, consisting of: (i) strong enforcement of legal protections against trademark and, to a lesser extent, literal design imitation and (ii) weak enforcement of legal protections against substantially non-literal design imitation. The result is evident: while names and logos are widely respected (other than by illegitimate counterfeiters), popular styles are disseminated in various permutations throughout the market.

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[1] Quoted in Jacobs (1995) (inside front cover).

[2] As used herein, "original producers" (or, equivalently, "producers", "designers" or "fashion houses") refers to firms that produce garments whose design is substantially original relative to existing products in the market, as contrasted with firms that produce garments whose design is substantially imitative of other existing products in the market. Given the inherent subjectivity of any such determination, this is admittedly an imperfect definition although in most cases the distinction between largely original and largely imitative producers can probably be uncontroversially applied by observers familiar with the industry.

The fashion market defies conventional expectations: incomplete intellectual-property protections, and widespread imitation, do not result in depressed innovative output. We account for this anomaly through a "cooperative innovation" model where, under reasonable conditions, original producers rationally prefer an incomplete property regime that, whether as a formal or effective matter, permits some imitation to alternative regimes that permit no or all imitation, independent of budget constraints. This thesis is grounded in the premise that "fashion risk" (or more generically, demand uncertainty) constitutes the underlying economic problem faced by any fashion house: it must generate sufficient profits in the few "hit" designs to offset losses on all other designs in its portfolio, taking into account the aggravating conditions that whether any new product will be widely adopted is unforeseeable and even a successful product has a short shelf life in which to accrue rents. To ameliorate this risk, original producers participate in a cooperative regime where tolerated imitation at limited levels operates as a form of collective insurance that mitigates losses from seasonal product failure and the attendant risk of firm insolvency, thereby maximizing the discounted stream of expected long-term payoffs. This incomplete property regime effectively allocates smaller prizes to "losing" firms each season, thereby generating an "insurance effect" that mitigates recoupment risk, but still preserves a large prize for the winning firm, thereby preserving an "incentive effect" that induces firms to re-enter designs in the "fashion lottery" each season. To construct this model, we exploit concepts borrowed from the extensive literature on risk and insurance, which has received little application to date in legal and economic scholarship on intellectual property.[3]

Turning from theory to empirics, this cooperative innovation model exhibits close explanatory fit with two sets of practices that support innovative output in the fashion market. First, the model anticipates original producers' selective enforcement and lobbying strategies, which tolerate some, but not all, unauthorized imitation of fashion apparel. Contrary to romantic characterizations of the fashion market as an unregulated zone of free appropriation, we emphasize that the cooperative model requires that fashion

[3] To our knowledge, the sole exceptions are Richard Watt and co-authors, who have primarily focused on the risk-sharing benefits of collective mechanisms for copyright enforcement. See Snow & Watt (2005); Alonso & Watt (2003); Watt (2000). For a more general exploration of insurance applications in the economic analysis of intellectual property, see Watt (2007).

houses can impose some meaningful limits on unauthorized imitation: that is, constraining "design spillovers" *to* non-contributing firms is a logical prerequisite for tolerating design spillovers *among* contributing firms. This "imitation club" model is most closely realized in two private design-protection regimes: (i) a long-standing French institution, the *Chambre Syndicale de la Couture Parisienne,* which reserves the *haute couture* label for member firms that comply with detailed design and production regulations, and (ii) a now-defunct U.S. trade group, the Fashion Originators' Guild of America, which in the 1930s instituted a quasi-copyright scheme that achieved substantial coverage of the women's apparel market. Second, the cooperative model is compatible with a remarkable array of institutional mechanisms—previously undocumented in legal and economic scholarship—that coordinate market selection of seasonal trends among competing firms at every level of the complex design process preceding product releases each season. These coordination mechanisms include: "color committees" that designate seasonal palettes; forecasting services that disseminate color, fabric and style trends; and a graduated schedule of textile and fashion shows over an approximate 12 to 18-month cycle. Grounded in an intellectual-property regime that immunizes limited reuse of garment designs, each mechanism supplies informational inputs to a fashion house as it makes nonsalvageable investments in the design and production of a seasonal collection, thereby providing some protection against forecast errors under demand uncertainty.

The discussion is organized as follows. In Section 2, we describe imitation strategies in the fashion market and applicable legal protections. In Section 3, we identify the fashion risk dilemma and present the cooperative innovation model as a possible solution. In Section 4, we apply the model to account for typical enforcement behavior by original producers as well as institutional mechanisms for industry coordination on seasonal trends. In Section 5, we discuss preliminarily other strategies for hedging demand uncertainty and the extent to which the cooperative innovation model generalizes to other cultural or technology markets. Finally, Section 6 concludes.

2. Market and Legal Background.

In this Section, we review the imitation practices that characterize the fashion market and the legal entitlements that formally constrain these practices.

2.1. Imitation Taxonomy

Imitation of popular styles is endemic in the fashion industry. But it is important to distinguish between different imitation strategies, which result in a highly segmented variety of more and less perfect imitations of any successful garment design. For this purpose, we assume that an imitative sequence consists of an initial product (the "original"), which can be viewed as a "characteristics bundle" (following terminology in Lancaster (1966)) that is then followed in time by various derivative products ("imitations"), each of which exhibits a certain degree of imitative perfection (which we denote as i) relative to the initial characteristics bundle, where $0 \leq i \leq 1$ (assuming that 1 designates exact replication of all characteristics and 0 designates no replication of any characteristic). To measure i, we distinguish among three vectors, which correspond to three components of the characteristics bundle constituted by an original product. These vectors are as follows: (i) "mark perfection" (m) – that is, the degree to which the imitation replicates the name and logo of the original, (ii) "design perfection" (d) – that is, the degree to which the imitation replicates the design attributes of the original (other than name and logo), and (iii) "quality perfection" (q) – that is, the degree to which the imitation replicates the quality attributes of the original. In the aggregate, the total degree of perfection attributed to any given imitation is a positive function of mark perfection, design perfection and quality perfection, as measured in each case relative to the corresponding components in the original characteristics bundle. This can be expressed formally as follows: $i = f(m, d, q)$, where $0 \leq m, d, q \leq 1$.[4]

Using this three-vector index of imitative perfection, we can generate a simple taxonomy of imitation strategies in the fashion market. Broadly speaking, there exist three principal strategies, each of which exhibits different vector characteristics and

[4] We assume for simplicity that these vectors are weighted equally. In a more complex model that distinguished between sophisticated and unsophisticated observers, these vectors might be assigned different weights (e.g., high weight to mark perfection in the case of an unsophisticated observer; high weight to quality perfection in the case of a sophisticated observer).

typically targets different portions of the market demand curve. First, following a *horizontal imitation* strategy, original producers supply imitations of each other's successful products to the "high-end" market corresponding approximately to the upper portion of the market demand curve. It is widely observed that original designers commonly copy—or, in industry jargon, "reference", "quote", "borrow" or "pay homage to"—each other's successful styles in varying (but less-than-identical) degrees and, subject to some exceptions, usually settle each season (or over a few consecutive seasons) on a common set of trends, which then circulate in multiple permutations based on the dominant design, under different brand names, and at substantially equivalent quality grades. These designer imitations typically exhibit the following vector characteristics: (i) zero mark perfection, (ii) moderate design perfection and (iii) high quality perfection. Second, following a *legitimate vertical imitation* strategy, "mass-market" firms supply close imitations of successful originals to the broad middle of the market demand curve under different brand names and at various quality grades. These imitations (known colloquially as "knockoffs") typically exhibit the following vector characteristics: (i) zero mark perfection, (ii) moderate to high design perfection and (iii) low to moderate quality perfection. Third, following an *illegitimate vertical imitation* strategy, informal vendors supply imitations to the "low-end" market under the same (or obviously derivative) brand name and logo, approximately corresponding, respectively, to the lower portions of the market demand curve. These imitations (also known as "fakes" or "counterfeits") exhibit the following vector characteristics: (i) high to complete mark perfection, (ii) high design perfection and (iii) low quality perfection. All three imitation strategies are illustrated in the Figure below.

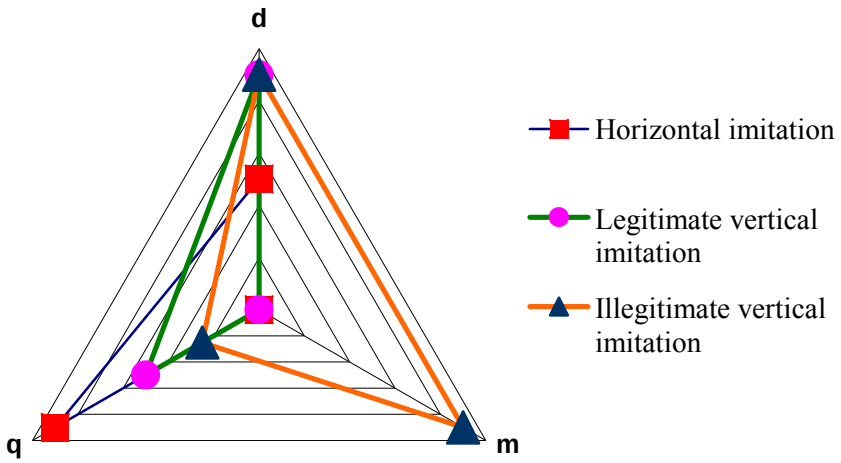

Figure 1. Imitation Strategies

As a practical matter, this imitation taxonomy broadly translates in the fashion industry (with special attention paid to the U.S. market) as shown in the Figure below.[5] We distinguish between two principal "imitation flows": (i) a horizontal "trickle-across" flow of designs among a limited group of elite fashion houses that have substantially equivalent brand prestige and product quality and sell at comparable prices, and (ii) a vertical "trickle-down" flow of designs from the elite fashion houses to a broader pool of legitimate and illegitimate firms[6]—roughly in declining order of prestige, quality and price, these include "diffusion" lines, "aspirational" labels, department-store private labels, national specialty brands, "fast fashion" and other discount retailers, and counterfeiters.[7] Additionally, commentators observe a reverse "trickle-up" flow of

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[5] *Appendix A* provides an indicative list of major firms in each segment.

[6] Some commentators believe the conventional "trickle-down" analogy is now partially inapt given faster diffusion and enhanced replication of fashion styles, due to improved communication, production and distribution technologies (Thomas 2007; Agins 1999). While this argument may have some merit, the basic sequence of designer originals followed by diffusion of designer and non-designer imitations appears to still be a substantially accurate and widely-used characterization of the market.

[7] Some clarification of terms used above: (i) "diffusion" (also known as a "bridge") line refers to moderately-priced product lines released in high volumes by elite fashion houses, which usually use a slightly different brand name, (ii) "aspirational" labels refer to high-end brands that fall somewhat below the elite designer (or "fashion house") segment; (iii) "private labels" refer to in-house designs produced by department stores; (iv) "specialty brand" refers to national chains (or nationally-distributed brands) that offer moderately-priced fashion apparel; and (v) "fast fashion" refers to a growing market segment characterized by short production times, accelerated inventory turnover, discounted prices and imitation of designer apparel. Other classifications of the industry are plausible and some firms may straddle multiple categories.

designs from independent boutiques or "street fashion" to elite fashion houses (Brannon 2005; Stone 2004; Crane 1999)).

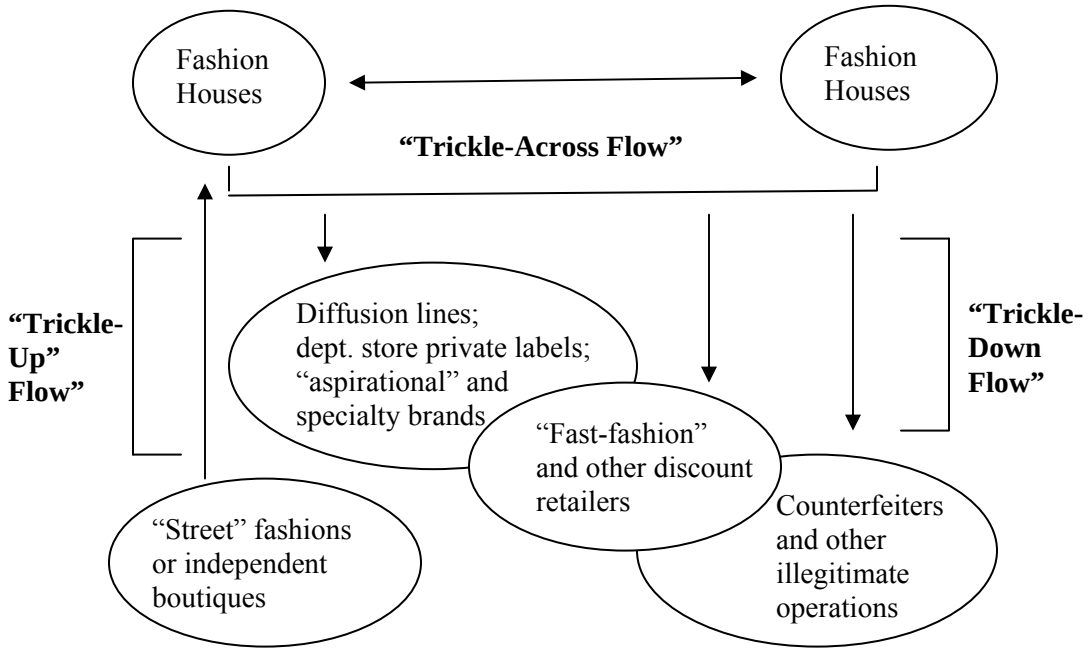

Figure 2. Imitation Flows

2.2. Legal Protections

Firms that wish to take legal action to restrain imitation of fashion apparel can only rely with confidence on trademark protection, which covers name and logo but generally does not extend to the design of a garment. Other than trademark, U.S. law[8] provides the following intellectual-property protections that may theoretically extend to certain features of a garment design: (i) copyright protection for primarily non-functional articles; (ii) trade-dress protection for non-functional product design or appearance; and

[8] For sake of brevity, this discussion is confined to U.S. legal protections. While European jurisdictions offer formally more robust protections against design protection, it is generally noted that these protections are burdensome to enforce and have limited effectiveness. Subject to further inquiry, this observation, together with widespread counterfeiting operations and the rapid spread of "fast fashion" retailing in Europe, suggest that the practical level of legal protections against design imitation are not meaningfully higher in Europe than the U.S. This is not a novel state of affairs: an earlier commentator observed that "the French law, while technically providing protection [against imitation of garment designs] . . . does not stop the clever imitator from carrying on his profession industriously" (Nystrom 1928, p.191).

(iii) design patents for ornamental features of a functional article. As a practical matter, any claim grounded in these entitlements is generally insecure given doctrinal complications, procedural obstacles, and uncertain or hostile case-law applications. In particular, the "useful articles" doctrine generally withholds copyright protection from garment design (but not fabric patterns)[9] while trade-dress claims—the most promising legal instrument—are challenged by a 2000 Supreme Court decision, which clarified (in a case involving copying of children's apparel) that trade-dress claims must show that the typical consumer associates the contested design "distinctively" with the plaintiff's product (so-called "secondary meaning", which then supports a claim of consumer confusion as a result of the alleged infringement)[10], a difficult requirement to satisfy in practice.[11] Hence, at least from the perspective of formal law, firms can be deemed to operate under an incomplete property regime consisting of three elements: (i) strong protection against trademark infringement (i.e., counterfeits where $m = 1$, $d \approx 1$ and $q << 1$), (ii) weak protection against literal or near-literal design infringement that might be captured by a trade-dress claim (i.e., close knockoffs where $m = 0$, $d \approx 1$ and $q << 1$), and (iii) no protection against non-literal design infringement (i.e., not-so-close knockoffs and other "inspired" derivative products where $m = 0$, $d << 1$ and $q \approx 1$). Some additional details follow in the Table below.

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[9] U.S. Copyright Act §101 denies protection to any article that has "an intrinsic utilitarian function" (including any article that cannot be identified separately from, and is not capable of existing independently of, the utilitarian aspects of the article), and further establishes a presumption that "[a]n article that is normally a part of a useful article is considered a useful article".

[10] *Wal-Mart Stores v. Samara Bros., Inc.*, 529 U.S. 205 (2000). The statutory basis is Section 43(a) of the Lanham Act, 15 U.S.C. §1125(a), which provides a cause of action for infringement of unregistered trade marks or trade dress.

[11] A recently-concluded four-year litigation in which Louis Vuitton Malletier Hennessy ("LVMH"), the world's largest luxury apparel company, failed to prevail over Dooney & Burke, a medium-size American producer of high-end handbags and accessories, confirms this view: aggressive applications of trademark infringement claims to prosecute non-literal style imitation necessitate costly expenditures on legal representation and are still likely to founder on probative obstacles. The case involved alleged imitation of a logo used on LVMH's "Murakami" handbag. *Louis Vuitton Malletier v. Dooney & Burke Inc*., Opinion and Order, 04 Civ. 2990 (SAS) (S.D.N.Y., May 30, 2008), *affirming Louis Vuitton Malletier v. Dooney & Burke Inc.*, 340 F.Supp. 415 (S.D.N.Y. 2004). For appeals court ruling, see *Louis Vuitton Malletier v. Dooney & Burke Inc.*, 454 F.3d 108 (2d Cir. 2006).

Table 1. Legal Protections for Garment Design (U.S.)

Entitlement	Protected Subject Matter	Effectiveness; Use
Trade dress	Primarily non-functional product design	Difficult to show secondary meaning and consumer confusion. Occasionally used.
Copyright	Primarily non-functional article	Other than original fabric patterns, garment design usually deemed a "useful article" ineligible for copyright protection. Largely unused other than for fabric patterns.
Design patent	Ornamental features of a functional article	Impractical due to application costs and delays. Difficult to show nonobviousness. Largely unused.

3. Fashion Risk and Cooperative Innovation

The fashion market has recently attracted scholarly interest in identifying the mechanisms by which it reconciles weak intellectual-property protections and strong innovative output.[12] We provide a novel explanation that identifies conditions under which original producers will rationally tolerate *some but not all* forms of imitation, grounded in the premise that the fundamental economic problem faced by original producers is extreme demand uncertainty and the associated risk of recoupment failure and firm insolvency. From a restricted set of assumptions that correspond approximately to typical conditions in the fashion market, and preserving the conventional expectation that imitation always diverts revenues from the original, we derive a cooperative innovation model where, independent of budget constraints, original producers rationally prefer an incomplete property regime, where some imitation is permitted, to a complete property regime,

[12] Barnett (2005) argues that, so long as imitations can be distinguished from the original, there may exist a "flattery effect" whereby imitations enhance value of the original, or a "sampling effect" whereby imitations induce subsequent purchases of the original). Raustiala & Sprigman (2006) argue that imitations drive the "fashion cycle" by eroding prestige value of the original, which then generates consumer demand for the next season's items. Additionally, the authors raise (but do not seem to elaborate further) the argument that, under a "veil of ignorance", fashion designers may prefer no property-rights protections against design imitation given the roughly equal probability of being a copyist or being copied in any given fashion season, Raustiala & Sprigman (2006, pp. 1727-28). As we argue, uncertainty as to "copying/being copied" will only drive designers to rationally tolerate *some*, not *all,* forms of copying, a result that is further subject to substantial satisfaction of certain additional supporting conditions.

where no imitation is permitted, or a zero property regime, where all imitation is permitted.

3.1 Fashion Risk

Writing in 1895, Alfred Marshall referred caustically in *Principles of Economics* to the "evil dominion of the wanton vagaries of fashion" (Marshall 1895, p. 164 n.1). Trade associations (American Apparel Manufacturers Association 1982, p.54)[13], financial-market analysts (IBIS 2008), economists and business scholars (Balestri & Richetti 1998, pp. 161-66; Fisher & Raman 1999), and apparel firms (as attested by the warnings included in the "Risk Factors" section in almost any such firm's periodic filing under the securities laws) widely agree with the tenor of this expression: luxury apparel is an unpredictable market where the success or failure of any new product is a matter of chance largely immune to predictive analysis, with the resulting possibility of major losses in the event of an unexpected shift in consumer tastes. The costs of forecast errors are compounded by the fact that seasonal trends heavily reward winners and heavily punish losers: out of thousands of new designs, the market tends to select only a limited number of new products as "hit" items each season, compelling all other designs to be sold at markdown prices. Moreover, even if a firm releases a popular product, its capacity to recoup costs and enjoy supracompetitive returns is constrained by: (i) rapid product obsolescence (i.e., even the most popular product will usually go "out of fashion" by the end of the season) and (ii) due to production and transportation constraints (exacerbated by offshore production), limited in-season ability to replenish inventory in response to favorable demand conditions (Fisher & Raman 1999).[14] Rapid depreciation of even successful products means that a fashion house (unlike a movie studio or Broadway producer) rarely can "milk a hit" for years of lucrative income.

Extreme demand uncertainty, combined with short product longevity, presents the fashion market with a basic challenge: at the mercy of consumer whims, producers that

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[13] The association observed that "the world of fashion is fraught with uncertainty and risk", noting further that determination of sizes, colors and styles is "far from an exact science".

[14] Doeringer & Cream (2006) note in particular that mid-season replenishment is generally infeasible in mass apparel production, which uses a "bundle system" that achieves fine specialization of labor at the cost of long lead times.

wish to remain in business must accrue sufficient gains on a few successful products (or seasons) to defray losses on a far larger number of failed products (or seasons). This difficulty is compounded further by product complexity and long production lead times. Consider that any product release by a fashion house consists (in simplified terms) of the following constituent components: *fabric*; *color*; and *style*. Roughly speaking, each fashion house must purchase "piece goods" (i.e., finished cloth) from a textile mill (to which it provides color, print and other specifications), and then cut and sew the fabric (or, as is typical, contract with a third-party manufacturer to do so) into "finished goods" for distribution to the consumer (directly and/or through a third-party retailer). Given hundreds to thousands of possible fabrics (or technically, yarns, in the case of knitwear), colors and styles at its disposal, each fashion house is faced with the combinatorial task of assembling the winning design from an immense set of possible constituent elements. While the final garment production order is placed two to six months prior to the date on which the goods are shipped to market, technological and logistical constraints dictate that the entire design and production process at an elite fashion house is approximately a 12 to 18-month process[15] beginning with selection of the color palette, then the fabric (which must be ordered in advance of garment production), and then the style component (including any prints or other finishes applied to the fabric). At each stage, the fashion house must irreversibly invest in a particular color, fabric and style when the dominant design outcome is still largely stochastic (that is, there is almost no information available as to whether any *possible* design combination can be placed outside the *feasible* set of winning design combinations). If the fashion house "guesses wrong" with respect to any element of the winning design combination, then it will likely be saddled with excess inventory (either at the "piece goods" or "finished goods" stage), resulting in losses offset (if at all) by markdown revenues net of inventory carrying costs.[16]

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[15] This range aggregates timeline descriptions found in multiple sources. For further detail, see *infra* Section 4.2.a and Figure 5. For a similar range, see BUREAU OF LABOR STATISTICS (2008).

[16] As a practical matter, the portion of the fashion risk borne by the producer is dependent on the risk-allocation between the producer and retailer, either as a matter of contract or, under long-term relationship pressures, as a matter of negotiation over "markdown money" (rebates paid by producers to retailers in the case of a "bad" season), or indirectly, in the form of lost orders in future seasons in the event a retailer loses confidence in a producer's forecasting abilities. *See* Rozhon (2005). Note that fashion risk with respect to finished goods is entirely borne by producers in the case of vertically integrated firms that

Recoupment risk properly underlies any potential underinnovation result in the fashion market: in the absence of any legal or extralegal constraint on third-party imitation and the resulting impossibility of earning supracompetitive profits on the small pool of successful products to cover losses on the large pool of failed products, original producers would rationally withhold or contract investment in favor of alternative opportunities. That recoupment risk can translate into market exit is illustrated by high rates of firm distress commonly observed in the fashion market, including the periodic insolvency or near-insolvency of even the most successful fashion houses after an intervening series of disappointing seasons (Olive (2008); Gallini et al. (2003) and, for historical observations to the same effect, Marcketti & Parsons (2006)). Severe financial difficulties affect even prestigious design houses: threatened closure of the Bill Blass fashion label in 2008, closure of the Rochas fashion house in 2006, closure of the Isaac Mizrahi fashion house in 1998, closure of Anne Klein in the early 1990s, financial distress of Gucci and Calvin Klein in the early 1990s, financial distress of Christian Dior in the early 1980s, and so on. Consider the meteoric (and not atypical) rise and fall of L.A. Gear, a fashion footwear designer that achieved great success in the 1980s but failed to adapt to 1990s styles: its revenues grew from $11 million in 1985 to $820 million in 1990, and then fell to $430 million by 1992 as a result of an abrupt shift in consumer tastes, following which the firm failed to recover and declared bankruptcy by 1998 (DeAngelo et al. 2002). Elevated insolvency risk, coupled with the underlying variability in cash flow and the lack of a fixed-asset pool to post as collateral, makes the fashion industry an unattractive proposition for investors and lenders, who rationally demand a discount to reflect the anticipated fluctuations in seasonal returns and associated financial risk. This may in turn explain why even the most well-established fashion companies generally have not attracted substantial interest from outside financial investors (Strom 1994)[17], apparel stocks are discounted relative to non-apparel stocks (Berman 2002), and an elite fashion house such as Prada has failed to implement public stock offerings on at least three occasions in recent years (Michaels 2007). For small and mid-size apparel

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directly operate retail boutiques, an increasingly common phenomenon. The precise allocation of fashion risk across various segments in the apparel supply chain offers a fruitful avenue for future research.

[17] There are some exceptions to this general trend. On recent (and short-lived) interest by private equity firms in luxury fashion, see O'Connell (2007, p. C.1)

operations, fashion risk limits access to external bank credit, which then compels those firms to obtain financing from "factoring" firms (which purchase, at a percentage discount, a firm's accounts receivable from retail buyers, which the factor is then authorized to collect directly) (Comptroller of the Currency 2000, pp.33-34).

3.2 Payoff-Maximization Under Incomplete Property

We have now identified fashion risk as the economic problem that must be solved to induce innovation investment in the fashion market. Based on vigorous output in the fashion market, we already know two things with reasonable certainty: (i) the market has at least partially solved this problem (we say partially because we do not know if output would be even more vigorous under an alternative regime) and (ii) the solution does not lie entirely (or, at least, does not lie exclusively) in robust intellectual-property protections (given that these do not exist in substantial form outside of trademark). To identify the mechanism by which the market has apparently avoided underinnovation failure even in the face of fashion risk (or, put differently: how the market has apparently reconciled innovation incentives with substantial imitation), we will now restate the problem in more formal terms and then propose a potential solution under reasonable assumptions.

3.2.a Basic Structure

We construe the fashion market as a repeated standard-setting contest where original producers, each endowed with the same amount of initial capital, K, incur identical nonrefundable costs, $c = \mu K$ (where $0<\mu<1$), to prepare and submit "design bids" (which incorporates all design, marketing, distribution, production and other "bringing to market" costs) in each round of the contest. The market then awards a "prize" to the first design to cross a certain adoption threshold in the consumer population, which then becomes the standard (what we will call the "design outcome") for that round.[18] Subject to the initial assumption of zero imitation, per-round payoffs are as follows: (i) the winner accrues a payoff denoted by R, resulting in a net gain equal to $R - c$, and (ii) the

[18] For simplicity, we assume that at least one bid crosses the adoption threshold. This appears to be the case, with a handful of historical exceptions. For further discussion, see *infra* note 50.

losers accrue no positive payoff, resulting in a net loss equal to - c.[19] The anticipated distribution of contest awards in any round is therefore extremely-negatively skewed: a single firm enjoys a high positive net payoff and all other firms earn a negative net payoff, which in turn implies a high variance in a firm's revenue streams over time. The likelihood of a firm winning any round is a function of its bid-related expenditures, c, and a stochastic factor, p, that corresponds practically to novelty or creativity; assuming that competing firms all incur an identical "bid fee" equal to c[20], each firm's likelihood of winning any round reduces to p, which is immune to predictive analysis. Hence, any firm's expected wealth after a single round is equal to $K + pR - c$. To reflect (with some exaggeration) a fashion house's limited ability to access external funding in imperfect capital markets, we further assume that firms cannot borrow to fund the bid fee and must therefore rely exclusively on its accumulated capital endowment. This implies in turn that any firm that experiences a certain number of losing rounds in close succession likely exhausts its available capital, in which case it must permanently exit the contest and thereby forfeit the remaining portion of its discounted stream of contest revenues. Precisely, a firm cannot play any additional round unless it is then the case that $K - ac + bR \geq c$, where a = number of rounds played and b = number of rounds won (not taking into account accumulated interest on K and R). Hence, consistent with the actual operation of the fashion market, our stylized framework anticipates that recoupment failure is a strong likelihood in any given round and insolvency is a serious threat over any series of rounds.

Given these borrowing, insolvency and single-elimination constraints, hedging practices to smooth revenue variance, avoid recoupment failure and preclude exhaustion of accumulated capital are compatible by construction with risk-neutral maximization of

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[19] In practice, this loss would be offset to some extent by markdown revenues net of inventory carrying costs, thereby providing a loser firm with a small positive payoff. For simplicity, we omit this contingency. Note additionally that we assume, again for simplicity, that a winning producer does not incur any additional production or distribution costs after its design has been adopted.

[20] This is an artificial construction; however, it would be implemented practically so long as firms can observe and match competitors' "bringing to market" expenditures. This does not strongly diverge from actual market behavior where the most elite fashion houses tend to advertise in the same venues, employ similarly qualified design personnel, present similarly extravagant fashion shows, and maintain similarly glamorous design boutiques.

a firm's discounted stream of expected payoffs over time.[21] The simplest risk-management solution is obvious: wait until the winner of the current round has been selected and then release imitation products into the market, thereby avoiding the downside risk of product failure and sharing in a portion of the upside of product success.[22] But this response would obviously generate underinnovation failure (to which a complete property regime is the standard solution): in anticipation of imitation by non-contributor firms that bear no "bid costs", any contributor firm rationally ceases or constrains output. That prediction is inconsistent with observed behavior: fashion houses maintain vigorous investment even in the face of widespread imitation and do not consistently take efforts to deter all forms of imitation. We will now propose an alternative solution.

3.2.b Insurance by Imitation

Our basic intuition is straightforward: To avoid recoupment failure and the associated insolvency risk that otherwise endangers the discounted stream of expected payoffs, an original producer rationally prefers an incomplete property regime that tolerates some positive (but constrained) level of imitation. Complete property protection obviously maximizes a producer's anticipated gains in the event it "wins" any round (since no revenues are diverted to imitators); however, it fails to mitigate a producer's anticipated losses in the event it "loses" any round (since it cannot divert revenues *from* the winner), which in turn can result in insolvency and termination of the remaining stream of expected payoffs. This is a "winner-take-all" contest that provides incentives to win but

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[21] Note that we could reach the same outcome by attributing risk-management to (i) owner risk-aversion in privately owned fashion houses (as is still true of some leading fashion houses), (ii) managerial risk-aversion in private and public fashion firms, and/or (iii) risk-neutral profit-maximization taking into account the costs of external finance and financial distress, including reorganization costs and the inability to finance net-present-value investment opportunities. Note that the costs of financial distress and the costs of external finance are especially high in the case of a fashion house given, respectively, (i) the lack of tangible fixed assets (which implies that reorganization is unlikely to preserve substantial value in the firm), and (ii) information asymmetries in light of the stochastic nature of investment returns in the fashion market. On rational hedging by profit-maximizing firms as a result of anticipated costs of financial distress or external finance, see, respectively, Greenwald & Stiglitz (1993) and Froot et al. (1993). For a general review of economically-compatible rationales for corporate risk-management, see Cummins et al. (2000).

[22] As a practical matter given production lead times, this would most likely require waiting until the next season to release imitative styles or, as is the case among "fast fashion" manufacturers, release in the same season using fabric construction of substantially inferior quality. For further discussion, see *infra* Figure 6 and accompanying text.

no insurance against losing. An incomplete property regime operates as a "winner-take-most" contest that provides insurance against recoupment failure, in the form of smaller payoffs accrued by losers on imitations of the original, while still preserving *some* incentives to win, in the form of a still-larger payoff for winners.[23] While a producer suffers some diversion of revenues to imitations in the rounds where it wins (meaning: in that case, it would have been better off under a complete property regime), it earns a positive payoff that mitigates the risk of recoupment failure in every other round (meaning: in that case, it is better off under an incomplete property regime), which in turn reduces the variance of returns over time and decreases the insolvency risk that otherwise endangers the discounted stream of expected payoffs.[24]

We can characterize this alternative regime more formally by modifying the contest structure presented at the outset and in particular, by relaxing its zero-imitation assumption ($i = 0$), which in turn implies a reduced payoff for the winner and a positive payoff for the losers. Assuming winning design outcomes are now subject to some positive but imperfect level of imitation ($0 < i < 1$) the winning firm receives a per-round payoff equal to R_W, where $R_W = R - L_w(i)$; $R > R_W$; and $L_w(i)$ denotes the "winner's loss" as a result of revenues diverted to imitative substitutes. The winner therefore accrues a net payoff equal to $R_W - c$. All losing firms now receive an aggregate per-round payoff equal to R_L (where $R > R_W > R_L$), which reflects revenue on sales of imperfect imitations of the winning original. Loser firms therefore accrue a collective net payoff equal to R_L –

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[23] This basic tradeoff between insuring against recoupment failure and sustaining contribution incentives applies on a local level in the context of copyright collectives, where Snow & Watt (2005, pp.33-34) observe that the optimal distribution rule must balance between sustaining production incentives, by partially tying royalty payments to an individual composition's success, and offering insurance against failure, by partially tying royalty payments to the success of the collective as a whole.

[24] A negative and a positive qualification, in respective order. First, if the standard-setting game was *not* repeated (i.e., the game was only played once or infrequently), then a stochastic distribution of returns with a "heavy" right-hand tail might discourage rational tolerance of imitation since, as Eaton & Eswaran (2001) observe, there would be a low expectation that revenues forfeited in a winning round would be reciprocated by other firms in the near to medium term. Second, we assume throughout that implementing legal protections under a complete property regime is costless (or no more costly relative to implementing legal protections under an incomplete property regime), in order to demonstrate profit-maximizing producers' rational preference for an incomplete property regime even if enforcement costs were zero. But this is obviously unrealistic (to the *dis*advantage of our argument): adding back the costs of implementing incremental legal protections would reduce the net payoff available under a complete property regime, thereby reducing the revenue that must be forfeited to enjoy the lower-variance returns of an incomplete property regime, which in turn further enhances producers' rational preference for an incomplete over a complete property regime.

$c(n - 1)$, less a "co-payment" in the form of additional imitation expenditures (which we will henceforth ignore for sake of simplicity), where n = the number of contest participants. Each losing firm receives an individual net payoff equal to $R_{IL} - c$, where $R_{IL} = \frac{R_L}{n-1}$. Following the conventional expectation that imitations deplete the value of the original, this construction assumes that (i) R_W is decreasing (and L_W is increasing) in the value of i, the average perfection of imitative goods (that is, the winner's original loses value the closer imitations resemble it), and (ii) R_L is increasing in the value of i, the average perfection of imitative goods (that is, the losers' imitations gain value the closer they resemble the winner's original). Note the critical role played by the value of i (as determined by the then-effective property regime): it sets both the amount lost by the winner and the amount gained by losers, which in turn caps a firm's revenues when it submits a winning design bid *and* mitigates its losses when it does not.

We set forth below the expected payoffs under: (i) an incomplete property regime that permits some imitation (equivalent to our modified "winner-take-most" contest structure) and (ii) a complete property regime that permits none (equivalent to our initial "winner-take-all" contest structure). (We disregard a zero property regime as practically irrelevant given that unconstrained imitation drives price down to marginal cost, thereby eliminating any positive net payoff for the original producer and restoring the standard underinnovation result.) For analytical convenience, we use an extensive-form representation that depicts expected gains for the game played over two periods.[25]

[25] We indicate gains only because the costs incurred (=2c) are identical for all firms.

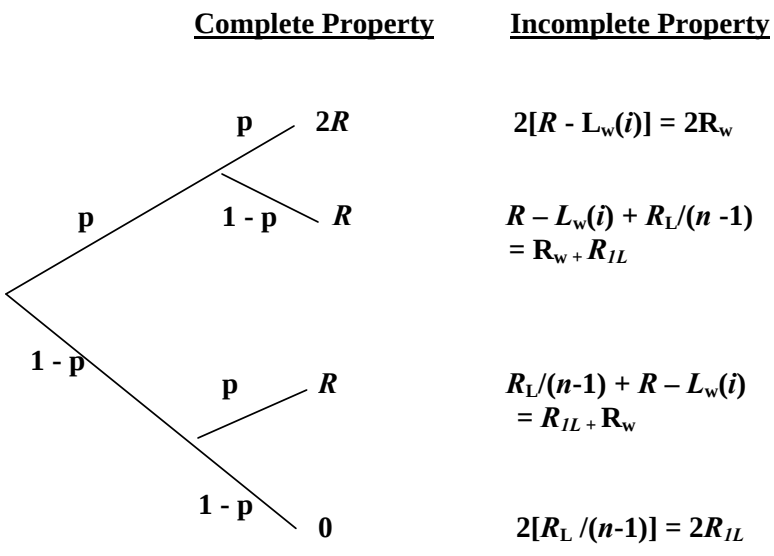

Figure 3. Expected Gains Under Alternative Property Regimes

For each alternative property regime, we can now calculate the expected value at the end of two periods of each firm's respective final wealth, E(*W)* (equal to each firm's initial capital endowment, *K,* plus accrued gains less incurred costs) and corresponding variances of final wealth (*V*(*W*)). Each firm's remaining portion of its initial capital endowment after two rounds is denoted below as $A = K - 2c$, which, together with accrued gains, must exceed the bid fee required to play the third round and accrue any further expected gains. More precisely: a firm's future stream of expected gains will be terminated unless: (i) assuming a complete property regime, $A + 2pR > c$, or (ii) assuming an incomplete property regime, $A + 2p(R\text{-}L_w(\text{i})) + 2(1\text{-}p)*[R_L/(n\text{-}1)] > c$ ($= A + 2pR_w + 2(1\text{-}p)R_{1L} > \text{c}$).

Under a *complete* property regime, the values of $E(W_c)$ and $V(W_c)$ for each firm for the two rounds played are as follows:

$$\mathbf{E(W_c)} = A + 2pR \tag{1}$$

$$\mathbf{V(W_c)} = p^2(2R+A)^2 + 2p(1\text{-}p)(A+R)^2 + (1\text{-}p)A^2 - (A+2pR)^2 \tag{2}$$

Under an *incomplete* property regime, the values of $E(W_i)$ and $V(W_i)$ for each firm for the two rounds played are as follows:

$$\boldsymbol{E(W_i)} = A + 2p(R\text{-}L_w(i)) + 2(1\text{-}p)*[R_L/(n\text{-}1)] = A + 2pR_w + 2(1\text{-}p)R_{1L} \quad (3)$$

$$\boldsymbol{V(W_i)} = \quad (4)$$

$$p^2[2R - 2L_w + A]^2 + 2p(1-p)[R - L_w + \frac{R_L}{n-1} + A]^2 + (1-p)^2(2\frac{R_L}{n-1} + A)^2$$

$$-[A + 2p(R - L_w) + 2(1-p)\frac{R_L}{n-1}]^2$$

Using expressions (1) – (4), we can now identify the conditions under which, relative to a complete property regime, (i) expected final wealth under an incomplete property regime is *higher* (i.e., $E(W_i) > E(W_c)$) and (ii) the variance of expected final wealth under an incomplete property regime is *lower* (i.e., $V(W_i) < V(W_c)$). The respective differences in expected final wealth (ΔW) and variances in expected final wealth (ΔV) under each alternative regime are as follows below. Appendix B provides the supporting calculus for the differences in variances in final wealth (equation (6)).

$$\Delta\boldsymbol{W} = \boldsymbol{E(W_i)} - \mathbf{E(W_c)} = 2\,[(1\text{-}p)/(n\text{-}1)]\,R_L - 2pL_w(i) \quad (5)$$

$$\Delta\boldsymbol{V} = \boldsymbol{V(W_i)} - \boldsymbol{V(W_c)} = \quad (6)$$

$$-[4A(1-p)\frac{R_L}{n-1} - 4A(1-p)^2\frac{R_L}{n-1}] - 2(1-p)\frac{R_L}{n-1}[2pR - (2A + 3pL_w + \frac{R_L}{n-1})] -$$

$$[2p(1-p)(2R - L_w + \frac{R_L}{n-1})] < 0$$

Note that the expression for ΔW simply trades off the expected amount "gained" when losing (the first term) against the expected amount "lost" when winning (the second term): hence $\Delta W > 0$ so long as the following inequality is satisfied: $2\,[(1\text{-}p)/(n\text{-}1)]\,R_L >$

$2pL_w(i)$, which reduces to: $[(1\text{-}p)/p(n\text{-}1)]\ R_L > L_w(i)$.[26] If this condition is met, and it is also the case that $\Delta V < 0$ (as shown above), then a repeat-player firm rationally prefers an incomplete over a complete property regime (provided, consistent with our initial assumptions, it seeks to maximize final wealth and minimize the variance of final wealth).

Recall that a firm must exit the design contest if its accumulated capital falls below the bid fee in any subsequent round. Reduction in the variance of final wealth obviously reduces the insolvency risk that would otherwise endanger a firm's ability to meet this condition (which, of course, would endanger realization of the remaining stream of long-term payoffs). This can be shown in the extreme case where a firm never "wins" any round. Then the firm reaches insolvency (and its future payoff stream is terminated): (i) under a complete property regime, after $\frac{1}{\mu}$ rounds, and (ii) under an incomplete property regime, after $\frac{K}{\frac{R_L}{n-1} - \mu K} = g$ rounds. Let us define the random variable $x = 0$, which denotes the case where a producer never wins after $\frac{1}{\mu}$ rounds (respectively, g rounds under an incomplete property regime). This variable then follows the well-known binomial distribution. Consequently, the probability of "zero wins" under a complete property regime is:

$$P(X = O) = C_{\frac{1}{\mu}}^{0} p^{0} (1-p)^{\frac{1}{\mu}-0} = (1-p)^{\frac{1}{\mu}} \tag{7}$$

Under an incomplete property regime, the probability becomes:

$$P(X = O) = C_{g}^{0} p^{0} (1-p)^{g} = (1-p)^{g} \tag{8}$$

Since $\frac{1}{\mu} > g$, the probability of insolvency in this extreme "zero wins" case is greater under a complete property regime relative to an incomplete property regime.

[26] Note that, if we assume that $R_L = L_w$, then this condition is equivalent to $p < [(1\text{-}p)/(n\text{-}1)]$, which is most likely to be the case when n is small.

3.2.c Equilibrium Analysis

We can now derive an equilibrium value of *i* that maximizes firms' expected long-term payoffs and hence rational incentives to place bids in the design contest. Recall the inverse relationship stated above: the winner's payoff, R_w (= R - $L_w(i)$), is decreasing in the value of *i* (that is, imitative perfection) while the loser's payoff, $R_{IL,}$ is increasing in the value of *i* (that is, imitative perfection). We can reflect the variation of R_W and R_L as a function of the permitted level of imitative perfection by calculating the partial derivative of $\Delta(W)$ (= $E(W_i)$ - $E(W_c)$) with respect to *i*, as follows.

$$\frac{\partial \Delta(W)}{\partial i} = \frac{2(1-p)}{(n-1)} \frac{\partial R_L(i)}{\partial i} - 2p \frac{\partial L_w(i)}{\partial i} \qquad (9)$$

Note that both functions, R_L (the amount "gained" by the loser) and $L_w(i)$ (the amount "lost" by the winner), are increasing in the value of *i.* These functions are critical as they determine the value of *i* that trades off (i) the "insurance effect", which drives up the value of *i* in order to enhance the loser's payoff and thereby limit recoupment risk, against (ii) the "incentive effect", which drives down the value of *i* in order to enhance the winner's payoff and thereby induce firm contributions. We assume that R_L is a concave function (i.e., the loser's payoff rises at a decreasing rate relative to the value of *i*)—meaning, gains from imitation rise sharply as a substitute good achieves some approximate similarity to the original and increase more slowly thereafter—and $L_w(i)$ is a convex function (i.e., the winner's loss rises at an increasing rate relative to the value of *i*)—meaning, revenue loss due to imitation rises slowly and then accelerates as the imitation achieves increasing similarity to the original.[27] Under these assumptions, the

[27] Put differently: the marginal gains accrued by a loser firm through imperfect imitation are *greater* than the marginal gain accrued by a loser firm through more perfect forms of imitation; and conversely, the marginal loss incurred by the winner due to imperfect imitation is *smaller* than the marginal loss incurred by the winner due to more perfect forms of imitation. Both assumptions correspond approximately to the following impressions: (i) it is relatively inexpensive to achieve some approximate similarity with the original but then increasingly costly to replicate all remaining attributes, thereby resulting in *diminishing* marginal returns to further imitative perfection, and (ii) imperfect forms of imitation target lower portions of the demand curve and therefore do not substantially divert existing consumers from high-end producers whereas more perfect forms of imitation do, thereby resulting in *increasing* marginal losses from further imitative perfection. Other assumptions may of course be reasonable, which would yield higher or lower maximum values for *i.* In particular, we note that if L_w increases sufficiently faster than R_{IL}, then original producers will prefer a property regime that sets a low value for *i,* such that $i \rightarrow 0$ (i.e, a complete property regime).

second derivative of $\Delta(W)$ with respect to i is negative, thereby yielding an equilibrium value for i (= i*). Precisely, a repeat-player firm that seeks to maximize expected long-term gains will "select" (that is, will prefer a regime that sets) a value for i* such that:

$$\frac{\partial \Delta(W)}{\partial i} = 0 \text{ or equivalently } \frac{(1-p)}{(n-1)} \frac{\partial R_L(i)}{\partial i} = p \frac{\partial L_w(i)}{\partial i} \tag{10}$$

At the equilibrium value of i*, the expected marginal amount forfeited by the firm as a winner (equivalent to L_w) is equal to the expected marginal amount received by it as a loser (equivalent to R_{IL}). This can be interpreted graphically as follows:

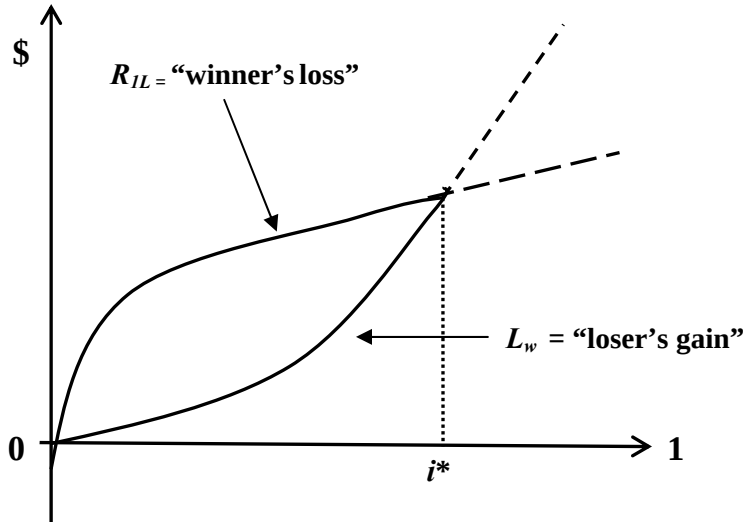

Figure 4. Equilibrium Value of Imitative Perfection[28]

[28] The value of i (effectively-permitted degree of imitative perfection) is normalized on a scale of 0 to 1, where i = 0 denotes a complete property regime (no imitation permitted) and i = 1 denotes a zero property regime (all imitation permitted). Note that all values are marginal as per immediately preceding discussion.

The critical observation is that both insufficient *and* excessive constraints on imitation will fail to maximize a firm's expected net payoffs and thereby rational incentives to place bids in the design contest. Given the assumptions stated above, this implies that *design contributions are maximized at incomplete levels of property-rights protection*. The optimal value of i (= i*) maximizes rational incentives to place design bids by perfectly trading off (i) the incentive effect, which requires reducing the value of i and thereby reducing the value of L_w (which, in turn, increases the value of R_W relative to R_{IL}) and (ii) the insurance effect, which requires increasing the value of i and thereby increasing the value of R_{IL} relative to the value of R_W. If i is too strong (i.e., $i > i$*), the incentive effect is too weak, the winner's revenues are too small relative to the losers' revenues, in which case the firm withholds investment, yielding an under-innovation result. If i is too weak ($i < i$*), the insurance effect is too weak, the losers' revenues are too small relative to the winner's revenues, in which case the risk of insolvency is too high, *again* yielding an underinnovation result. Where $i = i$*, then the difference between winner's and loser's prizes is both sufficiently large *and* sufficiently small so as to induce any firm rationally to submit a design bid rather than rationally shift recoupment risk to others by waiting to imitate (either due to expropriation risk in the event it is successful *or* recoupment failure in the event it is unsuccessful), thereby avoiding market failure in the form of collective underinnovation. To the extent that legal or extralegal constraints are insufficient (permitting too much imitation) *or* excessive (permitting too little imitation), then we anticipate that original producers will constrain innovation investment in favor of alternative opportunities or, as we will explore subsequently, deploy alternative methods for shielding innovation returns against the threats posed *both* by imitation risk and recoupment failure.

4. Applications

The cooperative innovation model accounts for two prominent features of the fashion market, each of which limits fashion risk and the associated losses from recoupment failure. First, the model—in particular, the critical notion that, in a repeat-play framework, the payoff-maximizing value of *i (=i*)* occupies an intermediate point between complete and zero propertization—substantially accounts for the fact that

original producers selectively enforce, and lobby for, legal protections to preserve a meaningful but substantially incomplete constraint on imitation, which in turn deters some, but effectively permits all other, forms of imitation following determination of the seasonal design outcome. Second, the risk-based intuition behind the model is compatible with a wide array of institutional mechanisms—trade shows, trade publications and forecasting services—that facilitate constrained imitation among apparel firms through the trade-show circuit, trade-press communications and other mechanisms that *precede* determination of the seasonal design outcome. "Pre-launch" imitation interacts with "post-launch" imitation both to limit the magnitude of, and cover losses from, forecast errors under extreme demand uncertainty.

4.1 Constraining Imitation

Some observers contend that fashion houses are generally indifferent to (or secretly welcome) imitation; others contend that, but for budget constraints, fashion houses would take action to eliminate it entirely. Neither assertion is fully compatible with the selective strategies historically and currently undertaken by fashion houses, who vigorously prosecute (and consistently seek laws with which to prosecute) mark imitation, periodically prosecute (and sometimes seek laws with which to prosecute) literal and near-literal design imitation (mostly by lower-end competitors) and almost entirely ignore (and almost never seek laws with which to prosecute) non-literal design imitation. The cooperative innovation model anticipates directly this selective enforcement and lobbying pattern. This middling support for, and partial implementation of, intellectual-property entitlements reflects the underlying intuition of our model: given demand uncertainty, some imitation supports design innovation while too much imitation undermines it. Even assuming zero budget constraints, the cooperative model anticipates that fashion houses would *still* tolerate sufficiently imperfect forms of imitation by contributing firms, *would* target excessively perfect forms of imitation by contributing firms, and would *not* tolerate (or may be entirely indifferent to) imitation by non-contributing firms. Given the obvious failure of fashion houses to substantially restrain imitation among non-contributing firms (principally, discount firms and counterfeiters), we recognize that actual levels of imitation in the market are "excessive" relative to our

model, which preserves explanatory capacity for (and our account is therefore consistent with) certain other alternative explanations for observed underenforcement outcomes.[29]

4.1.a Private Copyright

The cooperative innovation model assumes that all participating firms make identical expenditures to submit a design bid each season. Hence, as a practical matter, this model is inherently exposed to free-riding by non-contributing firms that, subject to production lags, imitate design outcomes generated by original producers at substantial cost, which in turn yields the standard underinnovation dilemma and restores a complete property regime as the unique solution. To address this free-riding threat, fashion producers have periodically implemented a somewhat unusual solution: an "imitation club" in the form of privately-administered quasi-copyright regimes that constrain (albeit imperfectly) leakage of design information from contributor to non-contributor firms.

4.1.a(1) Fashion Originators' Guild Association

From 1932 to 1941, U.S. apparel firms administered the Fashion Originators' Guild Association ("FOGA"), which, through a group-boycott mechanism (backed up by a design registry and policing and sanctioning apparatus), caused large sectors of the high-end and mid-market U.S. retail women's apparel market to agree exclusively to sell guild-certified "original" designs, thereby creating the economic equivalent of an imperfect copyright that substantially limited retail outlets for imitator firms. The FOGA design registry did not cross-reference new against old registrations, which therefore effectively allowed for some positive level of imitation among guild participants—a view supported by the President of the Guild, who observed that "derivation through inspiration" was an acceptable practice (cited by Marcketti & Parsons 2006). Until the

[29] Alternative non-exclusive explanations compatible with the cooperative innovation model include: (i) budget constraints (in particular, low infraction costs and high detection costs), (ii) indifference (firms do not anticipate profit-diversion as a result of imitation in the low-end market, in which case enforcement costs are not warranted), (iii) price-discrimination (meaning, "abandoning" the lower end of the market allows firms to credibly commit to supracompetitive prices in the higher end of the market) (Takeyama 1997), or (iv) flattery or sampling effects whereby obviously inferior imitations enhance the "status value" of the original (Barnett 2005).

Supreme Court in 1941 determined the scheme to be an antitrust violation[30], FOGA achieved broad market penetration by various measures: (i) members and affiliates registered 40,000 to 50,000 styles a year in the FOGA design registry, (ii) 12,000 to 12,500 individual and corporations cooperated with guild requirements, and (iii) guild members reportedly sold more than 36% of all women's garments in the "middle market" segment (wholesaling from $6.75 to $10.75) and 60% of all women's garments in the "higher-end" segment (wholesaling at $10.75 and above).[31] To our knowledge, this is the largest-scale private intellectual-property scheme ever implemented.

4.1.a(2) Chambre Syndicale de la Couture Parisienne

In France, a selected group of elite fashion houses are members in a unique trade organization, the *Chambre Syndicale de la Couture Parisienne*. Founded in 1868, the *Chambre* has by law the exclusive right to use the *haute couture* label, which is reserved for firms that meet detailed membership requirements that mimic the design of our stylized contest: each firm must make substantially equivalent investments in certain design, marketing and production activities (equivalent to a mandatory "bid fee"), which in turn generate a collective stock of design bids presented each season at biannual fashion shows.[32] Compliance with membership rules is reviewed at a session held annually before a commission assembled by the French Ministry of Industry, which confirms that all members are in compliance with the *Chambre*'s requirements. Even this elaborate apparatus, however, is far from a perfect solution to free-riding threats posed by non-contributors, as evidenced in part by the historical decline in membership in the

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30 *Fashion Originators' Guild of America v. Federal Trade Commission*, 312 U.S. 457 (1941).

31 These figures are as determined by the Supreme Court in its decision. Marcketti & Parsons (2006, p.225) note some confusion over the accuracy of the market shares determined by the Supreme Court, suggesting that these figures may be overestimates.

32 *Chambre* members must (among other things): (i) employ a certain minimum number of technical personnel in a studio located in Paris, (ii) produce annually two collections consisting of a certain minimum number of new designs and (iii) show the collections at the spring and fall fashion shows organized by the *Chambre* (to which access is generally restricted to trade press and store buyers who pay a *caution* fee). Mass production is prohibited, as implemented by requirements that all apparel be "made to measure" for personal clients. This description is based on "La haute couture: art et savoir faire traditionnel" (document provided to authors by representative of the *Chambre Syndicale*); STONE (2004, p.353); Diamond & Diamond (2002, pp.119-20).

Chambre (currently consisting of only 11 firms, relative to 39 in 1966 and 106 in 1946[33]), largely coincident with the rise of the "ready to wear" market. The *Chambre* has repeatedly undertaken efforts to limit third-party imitation, albeit with often (and, given improvements in communication technologies, increasingly) limited success. In its 1950s heyday, the organization operated a mandatory registry for all designs shown at the biannual fashion shows in order to facilitate legal actions under French law against alleged copyists (Palmer 2001, pp.14-16, Jacobs 1995, p.13), and, until widespread disobedience by the fashion trade press, prohibited attendees from distributing photographs of designs shown at the fashion shows until a "release date" several months after the show, thereby allowing a window of time for member firms to earn a premium on newly-released items (Stone 2004, pp.390-91; Diamond & Diamond 2002, pp.389-90; Palmer 2001, pp.76-78). Following the cooperative innovation model, we anticipate that the decline in the organization's ability to control the leakage of seasonal designs will induce (and has induced) fashion houses to engage in increased lobbying for, and enforcement of, legal protections (or other strategies) against unauthorized imitation by non-contributing firms.

4.1.b Enforcement

Fashion producers largely follow a two-tier strategy in enforcing intellectual-property protections: most resources are devoted to regularly prosecuting trademark infringement and the remainder is devoted to intermittently prosecuting literal or near-literal design infringement. Large luxury-goods firms devote substantial resources to employing internal staff and external advisors dedicated to monitoring and prosecuting trademark infringement or contributing to national trade associations that pressure relevant government agencies (especially customs services) to do so (OECD 1998, Lane-Rowley 1997).[34] Design-infringement litigation pales by contrast: fashion houses bring few

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[33] There are also four "correspondent" (foreign) fashion houses. Commentators note, however, that members of the *Chambre* still exert considerable influence over seasonal trends due to the media and industry attention lavished on the Paris fashion shows (Stone 2004, p.353; Breward 2003, pp.109-10).

[34] LVMH reportedly spends an estimated $10-15 million annually to detect and prosecute counterfeiting operations around the world and lobby government agencies for assistance in doing so (Okonkwo 2007, pp.175-76). For further discussion, see Barnett (2005, pp.1394-95). LVMH and other

actions and in a selective manner that targets discount firms engaged in near-literal design imitation and virtually exempts peer competitors engaged in non-literal design imitation.[35] To assess preliminarily the actual scope of enforcement activities by original producers, we reviewed infringement suits (excluding trademark-only suits) brought in the U.S. during 2002-2007 relating to women's fashion apparel designs, as reported in the leading U.S. trade publication, *Women's Wear Daily*.[36] Somewhat surprisingly, these reported actions, which tend to involve a suit brought by a high-end fashion firm against a discount retailer and usually rely on doctrinally infirm trade-dress claims, often result in settlement and withdrawal of the imitative product by the alleged infringer, indicating an *in terrorem* effect on the basis of even minimally credible legal protections.[37] This enhanced level of enforcement activity appears to have triggered a recommendation issued in 2007 by the California Fashion Association, a trade organization consisting principally of sportswear fashion firms (usually potential targets of design-infringement litigation), advising its members to undertake greater diligence in documenting the design process or purchasing insurance to cover litigation and settlement costs (California Fashion Association 2007). A mild deterrent effect among "mid-market" and lower-end retailers is consistent with a selective enforcement model: original producers preserve a

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luxury firms have recently taken action against internet and discount retailers that allegedly sold counterfeit merchandise. For a review of some of these suits, see Stone (2008).

[35] A literal handful of known infringement litigations involve elite fashion houses, all under French law, of which the best-known example is Yves St-Laurent's successful suit against Ralph Lauren in a French court in 1994 for copying his designs. Yves St-Laurent had himself been found by a French court in 1984 to have copied another designer.

[36] We identified 16 reported lawsuits, based on information obtained from Women's Wear Daily ("WWD") archives, for the subject period. (Internal appendix detailing lawsuits is available from authors upon request.) This obviously understates litigation activity insofar as it omits suits not reported in WWD and threatened suits, which would not be captured by any source. We note that preliminary searches on the Westlaw database for all suits filed in federal district courts alleging infringement of trade dress or copyright in connection with apparel design during the subject period identified several hundred possibly relevant actions, which appear to be principally filed by textile firms alleging copyright infringement with respect to fabric patterns. Further research would be required to assess more precisely the extent to which the smaller number of suits by apparel firms (apparently principally alleging trademark and, to a lesser extent, trade-dress violations) and the larger number of suits by textile firms (apparently principally alleging copyright claims with respect to fabric patterns) interact to govern imitation practices in the fashion industry.

[37] For an example, consider the public apology by Steve & Barry's, a "fast fashion" retailer, after the New York Times reported that it was selling a cheap imitation of a handbag designed by an elite designer, Anna Corrina. The retailer immediately withdrew the alleged imitation from its stores. *See* "Once Bitten, Twice Shy" (Aug. 13, 2007), at http://www.counterfeitchic.com/designs_designers/

positive but limited level of third-party imitation by allocating enforcement resources to legal actions against lower-end vertical imitators, who produce excessively close design imitations, while taking almost no action against non-literal horizontal imitators, who are direct competitors in the high-end market.

4.1.c Lobbying

Selective enforcement of design protections is matched by selective lobbying for design protections. While fashion houses have sought robust protection against mark imitation and, in some jurisdictions, limited protection against design imitation, they have not sought consistently to extend robust protections to the full range of design imitation. Certain portions of the industry have periodically supported passage of federal design protection legislation, dating from bills proposed as early as 1914, including the so-called "Vestal" design legislation proposed in the 1920s and 1930s (Weikart 1944) and various statutory proposals re-appearing periodically in various forms in subsequent decades.[38] Consistent with a selective enforcement strategy, these proposed protections are often modest in scope or duration when compared to copyright or patent protection. The latest proposed (and currently pending) incarnation, the Design Piracy Prohibition Act (H.R. 2033), is indicative of these limited aspirations: subject to a registration requirement, it would provide protection against "substantially similar" imitations but only for three years, a very poor cousin to copyright, which has no registration requirement and provides a term equal to life of the author plus 70 years. This positive but lukewarm support for moderately enhanced design protections among a portion of the fashion industry, both historically and currently, is consistent with the theoretical expectations of the cooperative innovation model. Elite firms (which support the proposed legislation[39]) may view some positive but still weak level of legal protection as a necessary tool to

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[38] Reportedly 73 design bills have been proposed during 1914-1983 (Note 1983). It is unclear whether all these design bills would have covered fashion apparel. Measured from 1980 through 2006, there have been 10 design bills proposed in Congress, most of which included an express exemption for apparel (Raustiala & Sprigman 2006, p.1756).

[39] Elite firms are represented by the Council of Fashion Designers. Based on statements posted on each organization's website, the American Apparel and Footwear Association opposes the legislation, the National Retail Federation, the retailers' lobby, expresses neutrality, while the California Design Association, which generally represents smaller and/or "sportswear" designers, opposes it. For further discussion, see Wilson (2006).

deter firms that engage in excessively close forms of vertical imitation (and therefore do not make contributions to the seasonal determination of winning style outcomes), thereby sustaining the differential value of the winner's prize required to induce repeated entry into the fashion contest, while still permitting imitation flows among original producers.

4.2 Facilitating Imitation

The cooperative innovation model correctly anticipates that original producers rationally tolerate *ex post* imitation after determination of the winning design outcome in order to yield positive payoffs to "losing" firms, which in turn mitigates the recoupment risk that otherwise discourages entry into the market. The cooperative innovation model is compatible with a complementary mechanism for alleviating fashion risk: namely, a well-developed set of institutional arrangements whereby fashion firms preemptively reduce the expected magnitude of forecast errors in designing seasonal collections. This loss-prevention mechanism takes the form of institutional devices that circulate design information *in advance* of the target season, thereby facilitating *ex ante* imitation of competitors' ongoing design selections prior to determination of the winning design outcome. Rational toleration of "pre-launch" imitation follows the same risk-based rationale as rational toleration of "post-launch" imitation: coordination mechanisms that circulate design information reduce each firm's recoupment risk by fixing the set of feasible design combinations, thereby enabling each firm to submit a bid within a close distance of the yet-to-be-determined design outcome and assuring that it can collect a "loser's" prize in the event it does not submit the "winning" design.[40]

4.2.a Informational Intermediaries

The fashion industry is replete with informational intermediaries that circulate design information among competing firms in advance of the target season. These include: (i)

[40] Raustiala & Sprigman (2006, pp.1728-33) advance an alternative understanding of style convergence in the fashion market, describing it as an "anchoring" process whereby imitation among designers, as promoted by trade-press coverage and other mechanisms, assists consumers in identifying and establishing dominant seasonal trends, which in turn propel the "fashion cycle". By contrast, we principally view the various means of circulating design information as a "supply-side" mechanism for assisting *producers* in anticipating imminent design trends, which in turn mitigates the fashion risk that may otherwise yield an underinnovation outcome.

periodic trade and fashion shows in major apparel centers that cover a broad and highly specialized variety of market segments and sometimes cater specifically to the constituent component of any design bid (e.g., textiles), (ii) the fashion trade press, including periodicals targeted at professional audiences and distributed at high subscription cost and the leading fashion magazines destined for general audiences and distributed at low subscription cost, and, perhaps most uniquely, (iii) for-profit and not-for-profit forecasting services, which supply subscribing designers, retailers, and apparel, textile and fabric manufacturers with "trend books", bulletins and other periodic reports that provide information on observed trends in colors, textiles and designs (that is, the constituent components of any seasonal design bid) as much as 24 months in advance of an upcoming fashion season, based both on designs released by designer firms and incipient styles as observed "on the street" or in independent boutiques (Brannon 2005, pp.185-89, 254-59; Diamond & Diamond 2002, pp. 379-87; Goworek 2001, Ch.4; Hines & Bruce 2007, Ch.3).[41] Interestingly, these intermediary services thrive on the *absence* of property-rights protection for garment designs and the resulting patterns of widespread imitation, thereby enhancing the value of these entities' color, fabric and design repositories (as illustrated by the fact that fashion magazine publishers were one of the strongest opponents to design-protection legislation in the 1920s and 1930s (Weikart 1944, p.40) and a leading forecasting service spoke at U.S. congressional hearings in 2006 to oppose a proposed design protection bill (Testimony of David Wolfe, 2006). An indicative list is provided below.

By disseminating information concerning design selections, these intermediaries effectively operate in conjunction with textile companies, designers and retailers to determine color, fabric and style trends for the upcoming season as well as providing a repository of previously or simultaneously released colors, styles and textiles to be used as "inspiration" by designers in generating new fashion items (Brannon 2005, pp.219-20; Diamond & Diamond 2002, pp.508-10). This is sometimes almost literally the case. Consider the widely-attended *Première Vision* fabric and textile show held bi-annually in

[41] At the most sophisticated retailers that produce "private label" garments and therefore maintain internal design departments (i.e., vertically integrate backwards into design and production), some forecasting analysis is done in-house, which in turn generates color, fabric and style ranges for the retailer's design team. (Source: Brannon 2005, pp.33-34; personal conversation with fashion-industry professional.)

Paris: it is preceded by meetings of textile designers and forecasters, who develop a forecast distributed to exhibitors at the show, which is then followed by press coverage identifying the trends on display, which in turn operates as an input into the design process at the fashion house (Brannon 2005, pp.219-20). Illustrative of a collective loss-prevention function, these intermediaries are usually funded by subscribing fiber, yarn, textile and apparel manufacturers through a trade or non-profit organization, such as an umbrella entity for managing a fashion or trade show, operating a geographic "garment district" or maintaining forecasting services for identifying color, textile or style trends and disseminating information to subscribing members.

The order in which these various coordinating mechanisms come into operation approximately tracks the times at which, given technological and logistical constraints, producers must irreversibly commit to the relevant constituent components—color, fabric or style—in any seasonal design and production sequence. First, "color committees" meet to discuss color ranges for the target season about 20-24 months in advance of the target season (after which palettes are distributed to subscribing members).[42] These organizations invite representatives of member firms (which include textile companies, apparel manufacturers, color consultants and fashion designers) to collectively exchange information concerning the predicted color trends in the target fashion season (usually about 24 months thereafter), which results in "palettes" (or color ranges) that are distributed to subscribing members or distributed independently by for-profit forecasting services.[43] Second, a variety of trade shows are held that display yarn, fabric and print selections about 10-15 months in advance of the target season. Finally, the well-known fashion shows take place about six months prior to the target season.

As shown in the Figure below, each of these "coordination actions", together with the trade press and forecasting services that "shadow" the trade show circuit, supplies a

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[42] Color usually involves an extended production lead time of several months (mostly due to the dyeing and testing process involved) and must be determined prior to yarn and fabric selections (Brannon 2005, pp. 189, 193).

[43] Leading organizations include: Color Association of the United States, a trade association of corporations in fashion and other industries, see http://www.colorassociation.com/site/aboutus.html; Color Marketing Group, a trade association of color designers in various industries, see http://www.colormarketing.org (select "Visitors; About CMG"); and International Colour Authority, which assembles textile firm representatives and independent color consultants biannually in London, see http://www.internationalcolourauthority.org (select "About ICA").

common pool of informational inputs that guide the designers' "commitment actions" in the corresponding design sequence. These principally include: (i) the fabric or yarn order, which involves specification of color and/or print[44] and is necessarily made on the basis of anticipated buyers' orders; and (ii) the final garment production order (placed during the pre-launch "selling season"), which must usually be made in part on anticipated buyers' orders due to long lead production times (Richardson 1996, pp.405-06; Fray 1998; Balestri & Richetti 1998). Note that the Figure below is based on the actual timeline for the Spring 2009 season for luxury apparel.[45]

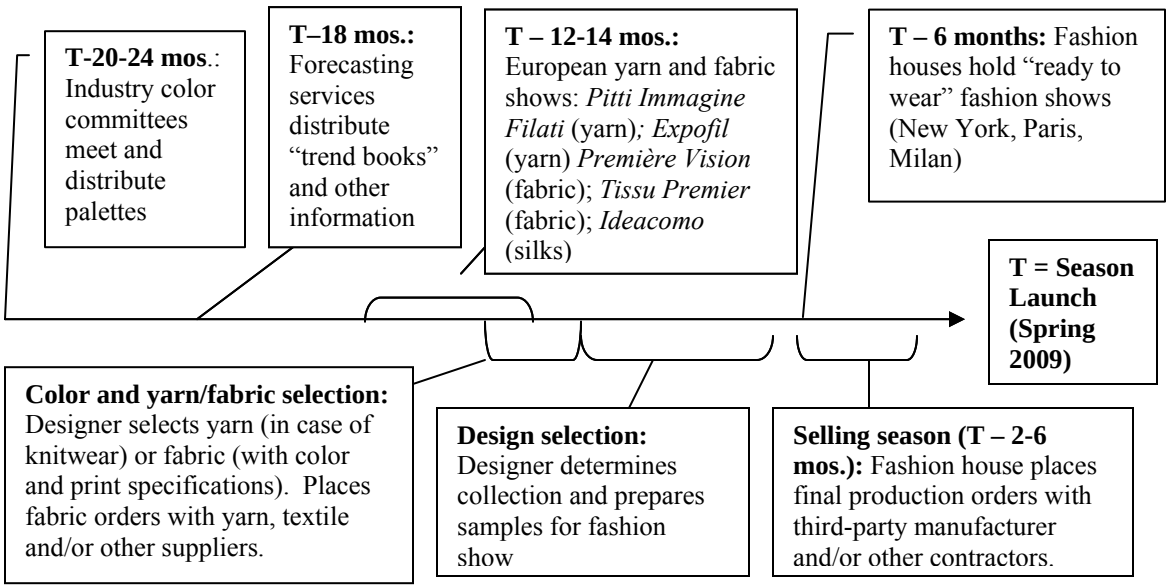

Figure 5. Typical Design/Production Timeline for Luxury Apparel

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[44] Note that the timing of a fabric order depends on multiple factors, including the type of fiber used, the dye specification, the geographic location of the textile mill and use of single or multiple providers (Brannon 2005, p.195; Abernathy et al. 1995). Generally, yarn orders must be placed prior to fabric orders due to extended lead time; for this reason, historically yarn shows have been held before fabric shows.

[45] Not to scale; all times are approximate based primarily on scheduled times for listed trade shows for 2009 North America/Europe spring season (as set forth on http://www.infomat.com/calendar) and additional information found in: Hines & Bruce 2007, Ch.3, Tbl. 9.2; American Association of Apparel Manufacturers, Exh. IV; Jones 2005, pp.128-36; Diamond & Diamond 2002, Ch.15; Stone 2004, pp.350-51; Brannon 2005, pp.32-33, 157, 217-21; Fray 1998, pp.122-26. Note that the timeline depicted above is a representative simplification of the complex production schedule behind each product launch and is inherently subject to case-specific variation depending on particular seasons, geographic location or market segments. In particular, production lead times may be accelerated in the case of (i) middle-market fashion producers or retailers with "in house" labels, which may release products more frequently or "work closer" to the selling season, and (ii) "fast fashion" firms, which operate on production lead times of as little as one month.

This secondary market in trend information is part of a generalized mechanism that operates to limit demand uncertainty across the apparel supply chain from color selection to textile selection to style selection, with respect to each of which the designer is liable to make a forecast error.[46] The market settles in advance on the general range of feasible components of the winning design outcome in the target fashion season, which in turn limits the potential downside of any losing firm (given that it will be able to accrue a positive return by distributing a close imitation of the "original"), at the price of limiting the potential upside of any firm that "happens" to submit the winning design outcome (given that it will be compelled to share a portion of its revenues in the form of "loser's" prizes allocated to other firms). Disclosure in a securities filing by a large fashion apparel company envisions just such a loss-prevention strategy, practiced on a firm-level scale: "We believe that we are able to minimize design risks because we often will not have started cutting fabrics until the first few weeks of a major selling season. Since different styles within a group often use the same fabric, we can redistribute styles and, in some cases, colors, to fit current market demand."[47] By limiting and disseminating parameters for each of the constituent components of any garment design, market intermediaries limit the downside risk borne by each individual firm, each of which is then able to make design selections (or is sometimes able to make last-minute design modifications) that are likely to fall within the neighborhood of the ultimate seasonal outcome. Hence, the fashion business may be a lottery but it is at least partly "rigged" so as to limit the risk of drastic seasonal losses for any individual firm, thereby smoothing the variability of returns and associated insolvency risk that might otherwise discourage entry into the market.

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[46] Even more generally, trade shows and related forecasting activities guide investments made at higher levels in the supply chain pipeline, which face the same timing problems as the fashion house. Working backwards from apparel producers, textile manufacturers (who deliver "finished piece goods" to apparel manufacturers) must place orders with fiber suppliers and, depending on the extent of vertical integration, with "dye houses" and/or chemical supplies (for dyes). Each level in the chain faces extended production lead times and uncertain demand outcomes and at least some portion of production is usually commenced prior to orders being placed by the next step in the chain. For further discussion, see Brannon 2005, Ch. 3, pp. 32, 189-95; Balestri & Ricchetti 1998, pp. 161-67.

[47] Jones Apparel Group, Inc., Form 10-K, filed Feb 28, 2006, avail. at http://www.sec.gov (select "Search for Company Filings").

4.2.b Fashion Shows

Pre-season imitation to reduce the magnitude of potential forecast errors and post-season imitation to mitigate losses from realized forecast errors converge in the seasonal fashion shows for which the industry is so well-known—in particular, the *haute couture* shows held in Paris and the ready-to-wear fashion shows held in Paris, New York and Milan, with the latter usually being held in February/March for the fall season and September/October for the spring season. Following the incremental narrowing of the range of feasible color and textile components through the extended trade show circuit, the fashion show is the final stage at which rival designers submit differentiated style bids, which fall within certain color, fabric and style parameters already determined through preceding stages in the standard-setting process.[48] Expert intermediaries (principally, the fashion trade press and large retail buyers) then "filter" the final set of style bids to select the winning design for retail consumption. This graduated process of style convergence is consistent with the cooperative innovation model, extended to cover both pre-season and post-season imitation. While competing firms pursue the winner's prize by submitting differentiated style bids at the bidding stage, once the winning style is selected by the intermediary cohort, runner-up firms accrue "loser's payoffs" either in the same season through existing submissions that are sufficiently close to the winning "original" or in following seasons through subsequently-released imitations (Weller 2003, Ch. 5.2.1-.2; Goworek 2001, Ch.4; Crane 1999, pp.13-24).[49]

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[48] Observers commonly note that a certain color, fabric and/or look tend to characterize the collections submitted by competing designers. Baudot (2006, pp. 320-21) observes that fashion designers at major firms "all know what each other is doing, use the same research and have the same style, marketing and PR consultants"). For specific examples, see Betts 2008, pp. 53-54 (noting multiple designers releasing designs in black for fall 2008 fashion collections); Glass 2008 (noting that at designer fashion shows, a "common look" often unites all the collections), Horn 2007 (noting multiple designers incorporating blue shades for the spring 2008 collections, as determined initially by a color committee).

[49] Note that in some instances, the pre-selected style fails where consumers do not "agree" with the intermediaries' selection. This apparently occurred in the early 1970s when the public rejected a designer-mandated shift to long skirts and in the late 1980s, when consumers rejected miniskirts being promoted by the industry (Brannon 2005, pp. 21-22). Hence, more realistically, it might be said that the bidding process allocates a "winning prize", which is then monetized with less than perfect certainty.

This extended design and imitation process can be represented graphically as follows (note that stages *T1-T3* correspond to *Figure 5* above):

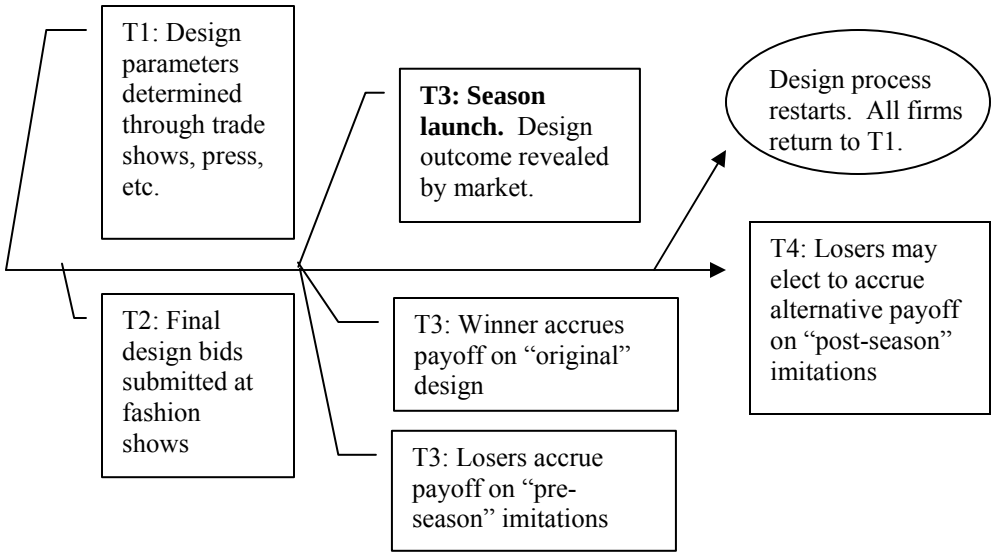

Figure 6. Pre-Season and Post-Season Imitation

The following excerpt from the fashion press describes this process of convergent imitation (following the "post-season" alternative) with respect to a Chanel original "fringed pastel tweed jacket", which was a "surprise hit" and then imitated the following season by another high-end designer, triggering successive horizontal and vertical imitations along a declining price and quality range extending from higher-end to lower-end fashion producers:

"Ms. Lapore [(*fashion designer)*] swiftly translated the Chanel original into a version that bore her own stamp: grosgrain ribbon trim and fringed edging . . . At almost the same instant, much of Seventh Avenue [*(i.e., other New York fashion designers)*] picked up the trend, and near universal endorsement of pastel tweeds resulted in an outpouring of similar looks from makers as diverse as Marc Jacobs, BCBG Max Azria and St. John Knits. Generic versions, too, sprang up like paperwhites at stores from Bergdorf Goodman and Lord & Taylor, to Mexx and even H&M . . ." (La Ferla 2004).[50]

[50] Italicized notes added by authors for clarification.

Set within the framework of the cooperative innovation model, Chanel earns a winner's premium on a differentiated winning design bid submitted in the then-current fashion season while all other designers then elect to earn runner's-up premia on convergent imitations in various degrees of design and quality perfection in the immediately following fashion season. (Interestingly, the "original" in this case was apparently a revival by Chanel of styles that *it* had released several decades earlier but which had gained popularity among vintage store customers, which had then "trickled back up" to the fashion house.) The dissemination process described in the excerpt above can be rendered graphically as follows with declining prices corresponding to decreasing design and quality perfection, brand value and style differentiation relative to the original.[51]

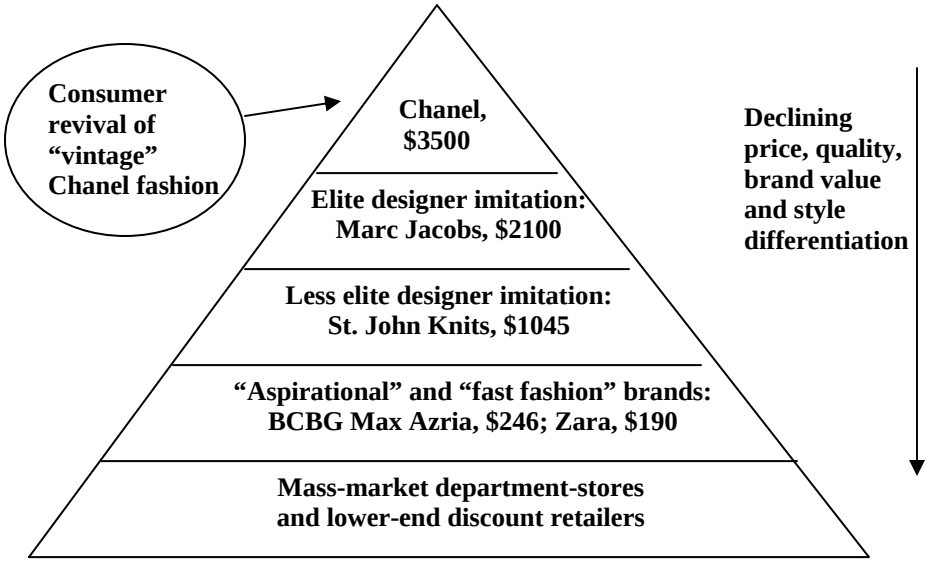

Figure 7. Style Convergence (Fringed Tweed Jackets, New York, c. Spring 2004)

[51] For sources of dollar figures, see La Ferla (2004).

5. Alternatives and Extensions

In this Section, we address two additional points raised by a risk-based model of tolerated imitation in the fashion market. First, we show how original producers may (and do) shift to alternative strategies for hedging fashion risk; to the extent these alternative strategies can hedge fashion risk at a lower cost, we correctly anticipate that the cooperative innovation model recedes in usage. Hence, contrary to idealized characterizations of the fashion market as being intrinsically incompatible with property-rights protections, we anticipate changes in enforcement behavior over time: as the relative cost of alternative hedging strategies falls, so too does producers' rational tolerance of third-party imitation under a cooperative innovation model. Second, we address preliminarily the extent to which the cooperative innovation model as implemented in the fashion market provides a risk-hedging paradigm that may extend to other cultural or technology markets that suffer from the economic challenge posed by demand uncertainty, long lead times, short product life and skewed investment returns.

5.1 Alternative Hedging Strategies

Cooperative innovation in the form of tolerated imitation requires that original producers incur a cost in the form of lost revenues diverted to third-party imitators. This follows basic insurance logic: the costs of a "losing" round are reduced by paying a premium that cuts back on the gains of a "winning" round. All else being equal, we should therefore expect that original producers will seek alternative strategies that achieve an equivalent risk-reduction outcome but demand a lower effective premium payment. Where these alternative strategies are available, original producers can then be expected rationally to curtail use of the cooperative innovation model. Again, this follows basic insurance logic: firms rationally curtail the purchase of insurance from third-party carriers to the extent they can "self-insure" any given liability at a lower cost. Below we identify two principal alternative strategies whereby producers can (and often do) hedge against fashion risk.

5.1.a Handbag Economics (a.k.a. Collateral Revenue Streams)

To hedge against recoupment risk on seasonal products, original producers can allocate resources to the development and marketing of *non*-seasonal product lines with respect to which there is less demand uncertainty, slower product obsolescence and, as a result, a lower-variance revenue stream. By diverting resources from the development and marketing of a risky asset with an uncertain and short-lived cash stream to a less risky asset with a certain and long-lived cash stream, the original producer may achieve equivalent risk-management gains but without the cost of forfeiting its winner's revenues to third-party imitators (albeit at the alternative cost of forfeiting the potentially higher margins on a seasonal fashion hit). These low-risk asset categories cover a number of standard items that together often generate the bulk of a fashion firm's revenue, including: (i) accessories such as the handbag, which generally have less volatile revenue flows, (ii) "classic" fashions or basic wardrobe staples, which last beyond a single fashion cycle, and (iii) perfumes, which tend to have longer fashion cycles, engender strong brand loyalty and are often the most lucrative division of a high-end fashion house (Goworek 2001, pp.32-33). Risk-management concerns easily explain why fashion houses appear to devote inordinate marketing resources to the handbag and perfumes: for our purposes, these are simply alternative self-insurance instruments that hedge against probabilistic losses on seasonal apparel items. This might cast doubt on the rational persistence of the cooperative innovation model. To the extent that a fashion house can extract lower-variance but still substantial revenue streams from a less risky product, it reduces the total variance of its aggregate product portfolio, which in turn should reduce its rational tolerance of third-party imitation in the event of a "big hit", thereby driving the fashion house to increase enforcement of, and lobbying for enhanced, intellectual-property protections against imitation. But that is an unlikely outcome. Assuming that the value of the "risk-free" product line (i.e., the handbag or perfume) depends on the brand awareness generated by the risky product line (i.e., apparel), a profit-maximizing producer cannot simply shut down its couture operation and expect to maintain its low-volatility revenue stream from accessory sales. To the contrary: a fashion company maximizes long-term payoffs (subject to firm survival) by optimally allocating resources between fashion apparel, which suffers from high variance, delivers prestige value and

can potentially deliver a "big hit", and accessory sales, which provide a steady cash-flow stream to insure against the large pool of failed apparel designs.

5.1.b Portfolio by Acquisition

The group insurance model is functionally equivalent to allocating to each participant a partial ownership interest in the discounted cash stream generated by the aggregate stock of design bids submitted each fashion season coupled with a larger (but still partial) ownership interest in the discounted cash stream generated by a single member of that aggregate stock submitted by the relevant participant. But original producers can independently (albeit partially) replicate this result by incurring the cost of acquiring a portfolio of firms that partially mimics the market portfolio, thereby effectively "self-insuring" against recoupment failure. This strategy is widely applied in the music, publishing and film markets, where demand outcomes are uncertain as in the fashion industry but entitlement holders actively enforce, and lobby for strengthened, intellectual property rights, in substantial part because strong property rights are necessary in order to recover supracompetitive returns on hits, which in turn can defray the losses on the flops in each holder's portfolio. These industries use a "proprietary" winner-take-all model, where no or little imitation is permitted, to hedge against recoupment failure under stochastic demand conditions, in contrast to the fashion industry that uses a "cooperative" winner-take-most model, where some imitation is permitted, to achieve the same objective. In the former case, each entitlement holder maintains an internal pool of released products (that is, a portfolio of books, authors, movies and/or musical groups), where gains on the few winners defray losses on the many losers, thereby generating a stable *firm* cash flow that reduces per-period variance; in the latter case, each entitlement holder contributes to a collective pool of released products, where gains on the few winners are distributed among competing firms in order to defray losses on the many losers, thereby generating a stable *market* cash flow that reduces per-period variance. While the group insurance model inherently achieves greater risk-diversification for participating firms (i.e., each firm can partially diversify away the risk associated with a particular design bid), this comes at the price of forfeited winner's revenues in the case of a "big hit"; by contrast, while the self-insurance model preserve revenues in the case of a

winning design, this comes at the inevitable price of elevated losses in the case of a "total flop".

This analysis generates a predictive thesis that can be easily tested, at least preliminarily. To the extent that original producers acquire a broad portfolio of fashion brands, we anticipate that producers will have reduced tolerance for imitation and will therefore re-allocate resources to enforcement of, and lobbying for, intellectual-property protections against copying. Any firm that holds a sufficiently diversified portfolio of fashion brands at least partially self-insures against fashion risk and consequently has reduced incentives to tolerate imitation by any competing firm, which now simply diverts revenues without conferring added-value in the form of insurance against recoupment failure. It may therefore be no accident that LVMH, which initiated in the 1990s the relatively novel strategy of acquiring a broad portfolio of fashion brands, is purported to pursue an especially aggressive enforcement strategy against imitators. If true, this is not because LVMH management is intrinsically more aggressive; rather, it is *rationally* less tolerant of imitation since it extracts little added-value in the form of risk-diversification under an incomplete property regime. To the extent that industry consolidation continues in substantial segments of the fashion market (which results in an increasingly small number of entities or corporate groups holding collections of the most popular brands, in contrast to the historical industry structure consisting of a large number of relatively small fashion houses (Breward 2003, p.109; Rovetta 2001)), we anticipate that firms will rationally increase resource allocations to lobbying for increased legal protections and targeting unauthorized third-party imitation. Both expectations are satisfied preliminarily by, respectively, recent lobbying in the European Union and the U.S. Congress by high-end designers for increased intellectual-property protections and reportedly enhanced enforcement action by fashion houses against discount retailers that engage in literal design imitation.

5.2 Fashion as Paradigm

Do lessons learned in the fashion market generalize to other cultural or technology markets? Presumptively, this is a strong possibility: the cooperative innovation model is logically generalizable to other economically significant markets that satisfy the

identified set of supporting conditions, thereby potentially providing a powerful tool to account for, and anticipate changes in, knowledge-sharing practices in intangible-goods markets in response to changes in a defined set of economic variables. In particular, our theoretical model may be applicable to *any* seasonal market that periodically selects a dominant product, permits "losers" to share in a portion of the winner's proceeds, and is populated by competing firms that have roughly equivalent production, marketing and innovation capacities, such that the likelihood of winning the prize in any seasonal contest is effectively determined by a quasi-lottery mechanism. This would seem to characterize at least partially a large number of creative and technology markets given that skewed distributions of returns characterize multiple innovation markets (Scherer 2001), as evidenced in the technology setting by highly skewed distributions of patent values, returns on venture-capital investments in technology start-ups and post-IPO performance of high-technology companies (Scherer & Harhoff 2000) and in the cultural setting by highly skewed distributions of CD sales, rock concert revenues[52], ticket sales to Broadway production, and Hollywood box-office revenues[53]. In short: most innovation projects are losers and only a handful delivers big winners. It therefore appears that "fashion risk"—or more generally, demand uncertainty or project risk—is endemic in innovation markets well beyond fashion. Given a lightly populated high-value distribution tail and a heavily populated low-value distribution tail with respect to investment returns on innovation projects, the core economic problem faced by producers in these markets is the potent combination of a stochastic failure/success rate and a deferred production timeline, which (especially if combined with rapid product obsolescence) in turn generates enhanced insolvency risk, thereby discouraging entry relative to alternative investment opportunities.

Outside the fashion market, cultural markets have historically tended to address this risk through a winner-take-all regime supported by strong property-rights protections that permit no or little imitation, which in turn generates portfolio acquisition strategies

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[52] In 2003, the top 1% of artists took in 56% of concert revenue and the top 5% took in 62% of concert revenues (Connolly & Krueger 2006).

[53] In the film business, this property is summarized by "Murphy's Law", which states (roughly correctly) that 20% of the movies generally account for 80% of the gross revenues (de Navy 2006). More generally, cultural economists speak of a "nobody knows" property that imposes stochastic risks on the success or failure of cultural production (Caves 2006; de Navy 2006).

that necessitate large capital investment and result in heavy market concentration. Take Hollywood or the record industry: at considerable overhead cost, these enterprises generate a large portfolio of releases each year in order to spread the risk that most releases fail to recoup costs. By contrast, the fashion market addresses this same risk through a winner-take-most market supported by incomplete property-rights protections that permit a constrained level of positive imitation. The difference between these two strategies essentially reduces to an aggregated (i.e., single-firm) *versus* a disaggregated (i.e., multi-firm) portfolio strategy to diversify the stochastic risk of seasonal failure. Positive analysis of the extent to (and the circumstances under) which product innovation in cultural and technology markets follow (or, in certain historical periods, have followed) a cooperative as opposed to a proprietary model for bearing innovation risk offers a rich field for further research. And normative analysis of the circumstances under which certain property, contract or other legal regimes can and do facilitate (or alternatively, can and do inhibit), or simply have no effect on, the formation and maintenance of risk-spreading mechanisms and thereby encourage, discourage, or have no impact on, entry into innovation markets offers another rich field for further inquiry.

6. Conclusion

Fashion apparel is an inherently volatile market subject to severe seasonal variation in investment returns. Understanding fashion risk is the key to reconciling the fashion market's vigorous innovative output with the lack of robust intellectual-property protections. Original producers rationally tolerate positive (but constrained) levels of imitation so as to protect against seasonal market failure, and preserve firm survival, given the stochastic nature, skewed returns and rapid obsolescence characteristic of a trend-driven market. This risk-based rationale for incomplete protection against imitation displays a close fit with two cardinal social facts: (i) differentiated enforcement and lobbying behavior by original producers, who vigorously prosecute mark imitation, sometimes prosecute literal design imitation, and generally do *not* prosecute (or lobby for protections against) substantially non-literal design imitation, and (ii) an extensive array of coordination mechanisms that reduce potential losses attendant to fashion risk by progressively constraining the range of feasible color, textile and style outcomes each

season. This selective enforcement strategy, together with intermediary mechanisms that coordinate the graduated sequence of design selections by firm participants, collectively determine the value of *i:* i.e., the average degree of imitative perfection relative to the original in any given imitation sequence, which in turn determines in each season (or sequence of seasons) the "insurance payout" accrued by losing firms and the "insurance premium" paid by winning firms. Critically, the optimal value of *i* is strictly bounded: if it is "too high", then winning designs are underprotected, winning returns are too low, and underinvestment results; if it is "too low", then winning designs are overprotected, losing returns are too low, and, again, underinvestment results. Under conditions of demand uncertainty, skewed investment returns, short product life and long lead times, repeat-player firms that seek to maximize long-term payoffs rationally prefer less property over more and some property over none.

Appendix A: Fashion Apparel Segments (Indicative List)[54]

Luxury Labels	**"Aspirational" Labels**	**Dept. Store "Private Labels"**	**Specialty Brands**	**"Fast Fashion"; Discount Retail**
Declining price, quality, brand value →				
LVMH ($25.65B, of which $8.76B relates to apparel) (incl. Louis Vuitton, Céline, Fendi, Givenchy, Donna Karan) Gucci Group[55] (incl. Gucci, Balenciaga, Yves Saint Laurent) ($6.02B) Prada Group ($2.19B)* Chanel (est. >$2B)* Ermenegildo Zegna ($1.31B) Armani ($1.35B) Hermès ($2.53B)	Polo Ralph Lauren ($4.3B) Benetton ($3.24B) Coach ($2.61B) Phillips-Van Heusen ($2.09B) (incl. Calvin Klein, Kenneth Cole, BCBG MaxAzria) Burberry ($1.3B) "Diffusion lines" released by luxury designers (e.g, Armani Exchange)	Saks Fifth Avenue Nordstrom Federated Dept. Stores (incl. Macy's, Bloomingdale's) Neiman Marcus Barney's Bergdorf Goodman	Gap ($15.8B) (incl. Gap, Banana Republic, Old Navy) Limited Brands (incl. Victoria's Secret, The Limited, Abercrombie & Fitch) ($10.1B) Liz Claiborne (incl. Kate Spade, Mexx, Dana Buchman) ($4.6B) Jones Apparel (incl. Nine West, Anne Klein) ($3.8B)	Hennes & Mauritz (H&M) ($15.2B) Inditex (incl. Zara) ($14.7B) Top Shop (Arcadia) (UK) Mango ($2.1B) Forever 21 ($1.05B)* Target Wal-Mart Kohl's

[54] This principally refers to leading firms in the U.S. market. All figures in parentheses represent net sales on a worldwide basis for fiscal year 2007 or calendar year 2007, unless otherwise noted. Representative brands controlled by each entity listed in parentheses. Headings provided for various market segments to be understood as set forth in text above, see *supra* note 7. Unless otherwise indicated, all information based on U.S. securities filings, annual reports or equivalent information available on company website or company press release, financial press reports, IBISWorld industry reports, or Hoover company reports available on Westlaw database. Euro values converted into dollar values at current exchange rates. Note some large manufacturers are omitted because the relevant firms are either principally non-luxury manufacturers (e.g., V.F. Corporation, Warnaco, Kellwood) or manufacturers that principally sell non-apparel luxury goods (e.g., Richemont Group).

[55] Subsidiary of Pinault Printemps Redoute.

* Represents reported net sales on a worldwide basis for fiscal year 2006 or calendar year 2006.

Appendix B: Variance of Final Wealth

Following Figure 3 (see *supra* Section 3.2.b), these calculations assume a two-period game under, respectively, complete and incomplete property regimes. As used below:

$E(W_c)$ refers to expected final wealth under a complete property regime (i.e., $i = 0$);

$E(W_i)$ refers to expected final wealth under an incomplete property regime (i.e., $0 > i < 1$);

$V(W_c)$ refers to expected variance of final wealth under a complete property regime; and

$V(W_i)$ refers to expected variance of final wealth under an incomplete property regime.

All other terms have the meanings assigned in Section 3.2.

$E(W_c) =$

$$p^2(2R + A) + 2p(1 - p)(R + A) + (1 - p)^2 A =$$

$$2Rp^2 + p^2 A + (2p - 2p^2)(R + A) + (1 + p^2 - 2p)A = 2pR + A$$

$E(W_c^2) =$

$$p^2(2R + A)^2 + 2p(1 - p)(R + A)^2 + (1 - p)^2 A^2 =$$

$$P^2(4R^2 + A^2 + 4RA) + (2p - 2p^2)(R^2 + A^2 + 2RA) - (1 + p^2 - 2p)A^2$$

$$2p^2R^2 + 4RAp + A^2 + 2pR^2$$

$$E(W_c)^2 = (2pR + A)^2 = 4p^2R^2 + A^2 + 4pRA$$

$$V(W_c) = E(W_c^2) - E(W_c)^2 = 2pR^2 - 2p^2R^2$$

E(W_i)=

$$p^2[2R-2L_w+A]+2p(1-p)[R-L_w+\frac{R_L}{n-1}+A]+(1-p)^2(2\frac{R_L}{n-1}+A)=$$

$$p^2[2R-2L_w+A]+2p[R-L_w+\frac{R_L}{n-1}+A]-2p^2[R-L_w+\frac{R_L}{n-1}+A]+$$

$$(1-p)^2(2\frac{R_L}{n-1}+A)=$$

$$A+P^2(2R-2L_w)+2p(R-L_w)-2p^2(R-L_w)-2p\frac{R_L}{n-1}+2\frac{R_L}{n-1}=$$

$$A+2p(R-L_w)+2(1-p)\frac{R_L}{n-1}$$

E(W_i^2)=

$$p^2[2R-2L_w+A]^2+2p(1-p)[R-L_w+\frac{R_L}{n-1}+A]^2+(1-p)^2(2\frac{R_L}{n-1}+A)^2$$

V(W_i) =

$$p^2[2R-2L_w+A]^2+2p(1-p)[R-L_w+\frac{R_L}{n-1}+A]^2+(1-p)^2(2\frac{R_L}{n-1}+A)^2$$

$$-[A+2p(R-L_w)+2(1-p)\frac{R_L}{n-1}]^2$$

The difference between the two variances, V(W_c) - V(W_i), can be calculated as follows:

$$\{p^2(2R+A)^2+2p(1-p)(R+A)^2+(1-p)^2A^2-(2pR+A)^2\}-\{$$

$$p^2[2R-2L_w+A]^2+2p(1-p)[R-L_w+\frac{R_L}{n-1}+A]^2+(1-p)^2(2\frac{R_L}{n-1}+A)^2$$

$$-[A+2p(R-L_w)+2(1-p)\frac{R_L}{n-1}]^2 \quad \} =$$

$$p^2[(2R+A)^2-(A+2R-2L_w)^2]+2p(1-p)[(R+A)^2-(A+R-L_w+\frac{R_L}{n-1})^2]+$$

$$(1-p)^2[A^2-(2\frac{R_L}{n-1}+A)^2]-(A+2pR)^2+[A+2p(R-L_w)+2\frac{R_L}{n-1}(1-p)]^2$$

Let us define:

$$I=p^2[(2R+A)^2-(A+2R-2L_w)^2]=p^2(2L_W)(4R+2A-L_W)$$

$$II = 2p(1-p)[(R+A)^2 - (A+R-L_w+\frac{R_L}{n-1})^2 =$$

$$2p(1-p)(L_w - \frac{R_L}{n-1})(2R+2A-L_w+\frac{R_L}{n-1})$$

$$III = (1-p)^2[A^2 - (2\frac{R_L}{n-1}+A)^2] = (1-p)^2(-2\frac{R_L}{n-1})(2A+2\frac{R_L}{n-1}) =$$

$$-4(1-p)^2\frac{R_L}{n-1}A - 4(1-P)^2(\frac{R_L}{n-1})^2$$

$$IV = -(A+2pR)^2 + [A+2p(R-L_w)+2\frac{R_L}{n-1}(1-p)]^2 =$$

$$(2\frac{R_L}{n-1}(1-p) - 2pL_w)(2A+4pR-2pL_w+2p(1-p)\frac{R_L}{n-1}) =$$

$$2\frac{R_L}{n-1}(1-p)[2A+4pR-2pL_w] + 4(\frac{R_L}{n-1})^2(1-p)^2 -$$

$$2pL_w(2A+4pR-2pL_w+2p(1-p)\frac{R_L}{n-1})$$

We calculate III + IV, as follows:

$$III + IV = -4(1-p)^2\frac{R_L}{n-1}A + 2(1-p)\frac{R_L}{n-1}[2A+4pR-2pL_w] - 4pL_w(1-p)\frac{R_L}{n-1}$$

$$-2pL_w(2A+4pR-2pL_w) =$$

$$-4(1-p)^2\frac{R_L}{n-1}A + 2(1-p)\frac{R_L}{n-1}[2A+4pR-2pL_w-2pL_w] -$$

$$2pL_w[2A+4pR-2pL_w) =$$

$$-4(1-p)^2\frac{R_L}{n-1}A + 2(1-p)\frac{R_L}{n-1}[2A+4pR-4pL_w] - 4pL_wA - 8p^2RL_w + 4p^2{L_w}^2$$

We calculate I + II, as follows:

$$I + II = 8p^2RL_w - 4p^2(L_w)^2 + 4pAL_w + 2p(1-p)(2R-L_w+\frac{R}{n-1}) - 2p(1-p)\frac{R}{n-1}$$

$$(2A+2R-L_w+\frac{R}{n-1})$$

Finally, we calculate III + IV + I + II, as follows:

$$III + IV + I + II =$$
$$-4(1-p)^2 \frac{R_L}{n-1} A + 2(1-p)\frac{R_L}{n-1}[2A + 4pR - 4pL_w] + 2p(1-p)(2R - L_w + \frac{R_L}{n-1})$$
$$-2p(1-p)\frac{R_L}{n-1}(2A + 2R - L_w + \frac{R_L}{n-1}) =$$
$$4A(1-p)\frac{R_L}{n-1} + 8(1-p)\frac{R_L}{n-1} pR - 8(1-p)\frac{R_L}{n-1} pL_w - 4(1-p)^2 \frac{R_L}{n-1} A +$$
$$2p(1-p)(2R - L_w + \frac{R_L}{n-1}) - 4p(1-p)\frac{R_L}{n-1} A - 4p(1-p)\frac{R_L}{n-1} R + 2p(1-p)\frac{R_L}{n-1} L_w$$
$$-2p(1-p)(\frac{R_L}{n-1})^2 =$$
$$[4A(1-p)\frac{R_L}{n-1} - 4A(1-p)^2 \frac{R_L}{n-1}] + 2(1-p)\frac{R_L}{n-1}[2pR - (2A + 3pL_w + \frac{R_L}{n-1})] +$$
$$[2p(1-p)(2R - L_w + \frac{R_L}{n-1})]$$

The first term of the above expression is positive. When the winner's revenue, R, is very high, as we have assumed, then the second term is positive. Since R exceeds the winner's loss from permitting imitation (L_w), the third term is also positive. Finally, when R is sufficiently high, then $V(W_c) - V(W_i) > 0$. Consequently $\Delta V = V(W_i) - V(W_c)$ is negative, which implies that $V(W_i) < V(W_c)$.

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