

FACTOR-MARKET RIVALRY

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With its focus on product-market rivalry, competitive dynamics research fails to tell the whole story. We develop a theory of factor-market rivalry to shed light on atypical rivals and competitive blind spots. Focusing on resource versatility and mobility, the theory introduces dynamic constructs—resource discontinuities, leapfrogging, and captivity—and explains their role in triggering cascading effects. To illustrate the theory's conceptual utility, we apply the concepts of factor-market rivalry to mutual forbearance in multimarket competition.

Rivalry research is fundamentally about why, how, when, where, and over what firms compete. Such research is important because firms yield asymmetric competitive threats that change across external contexts and internal circumstances (Baum & Korn, 1999; Chen, 1996). Despite this asymmetry, researchers have assumed a high degree of commonality, depicting rivalry in terms of firms operating in the same industry segment, using comparable assets, and providing similar or substitutable offerings to shared customers in related product markets (Chen, 1996; Ketchen, Snow, & Hoover, 2004; Yu & Cannella, 2007). It is not surprising, then, that rivalry theory is bounded by strategic groups (Caves & Porter, 1977; Peteraf, 1993a; Porter, 1979, 1985), market clusters (Gimeno, Hoskisson, Beal, & Wan, 2005), and product and geographic markets or industry-related designations (Yu & Cannella, 2007). In fact, even the concept of resource similarity is linked to, and ensues from, commonality in product markets (Chen, 1996).

Our thesis is that rivalry is not confined solely to similar firms competing over customers in

overlapping product markets. Rivalry can flare up at any level or link within a firm's value chain—from upstream and primary activities to downstream and support activities (Porter, 1985). Wherever firms overlap, coexist, or co-occupy the same space, rivalry will follow. If competition is indeed a "multilevel" phenomenon (Chen, 1996: 124), then some rivalry in product markets is traceable to early value-chain activity and some rivalry might linger only in factor markets, where inputs or resources are bought or sold (Ricardo, 1817).¹ Further, if each link or activity in a firm's value chain can trigger rivalry with a unique set of competitors, then an incumbent's rivals in factor markets might not always resemble competitors in product markets. We define factor-market rivalry as competition over resource positions. Our theory builds on and extends earlier research on product-market rivalry (e.g., Chen, 1996), and other references to factor markets also provide invaluable stepping-stones for our theoretical departure (cf. Barney, 1986; Bergen & Peteraf, 2002; Peteraf, 1993b).

To better understand our thesis, consider the following example of four organizations operating in different product markets but competing over the same resource. In 2001 Motorola, Nano-

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¹ We use the terms *resources*, *factors*, *inputs*, and *factors of production* as synonyms (cf. Barney, 1986; Porter, 1985; Ricardo, 1817).

gen, MIT, and Genometrix fought to access or control a technology related to molecular detection. The conflict between these four *atypical* rivals not only expands dyadic conceptions of interfirm rivalry but also extends a strong boundary condition—namely, the assumption that competitive dynamics entail shared product markets. In fact, the absence of product-market commonality and limited (if any) firm interdependence explain why the attack, which was lodged by the biotechnology firm (Nanogen), blindsided the telecommunication firm (Motorola) and a research institution (MIT). This example also demonstrates how factor-market rivalry for one firm might be seen as product-market rivalry for another; the patented technology for detecting molecular structures is a “resource” for Motorola and Nanogen but a “quasi-product” for MIT. Paying attention to such nuances helps us anticipate rivalry among unexpected players operating in nonoverlapping product markets. The example also challenges the strategic group view of intraindustry rivalry, but it is not an isolated anomaly; firms compete over other resources, including but not limited to proprietary systems; real estate parcels; advertising venues; unique asset bundling; human skills, knowledge, and talent; and organizational processes and competencies.

Factor-market rivalry adds theoretical precision to competitive dynamics in the following ways. First, factor-market rivalry explains why firms compete over resources in factor markets, even in the absence of product-market commonality and regardless of the utility of said resources to attacking firms. Second, the framework explains how and why firms that follow different resource paths can become competitors in product markets. Third, the theory explains under what circumstances competition in factor markets antecedes or even exacerbates rivalry in product markets. Factor-market rivalry, then, expands the boundaries of research on product-market commonality and resource similarity (Chen, 1996). Fourth, the theory translates high-level abstraction on the subject of resource endowments into specific roles that resources play in rivalry. For instance, the concept of resource discontinuities explains how *resource leapfrogging* and *resource captivity* can subvert a disproportionately wide range of activities, jeopardizing a firm's product-market position. Finally, factor-market rivalry advocates a

more systematic assessment of resources as latent indicators of would-be rivals that operate in nonoverlapping product markets but use or have access to overlapping resources. All in all, then, a theory of factor-market rivalry makes competition more specifiable, predictable, and verifiable.

Broadening the conceptual space of rivalry is important because it helps to explain why firms are unequally aware of threats and asymmetrically motivated to respond to rivals in product and factor markets (Chen, 1996; Smith, Ferrier, & Ndofor, 2001). Such idiosyncrasies lead to hazardous blind spots; indeed, the most formidable threats are often the least recognized (Miller & Chen, 1994; Peteraf & Bergen, 2003; Zajac & Bazerman, 1991). Overlooked resource attributes are important as well. Unlike the resource-based view (RBV), with its focus on valuable, rare, inimitable, and nonsubstitutable resources, factor-market rivalry explains why *versatile* and *mobile* resources affect competition—irrespective of players' positions, capabilities, or relative advantages in factor and product markets.

We elaborate on these points and constructs below, but we begin with a brief discussion of factor-market rivalry and its boundary conditions. We then demonstrate how competitive blind spots evolve in factor markets and why versatile and mobile resources are susceptible to rivalry. We also discuss the concept of resource discontinuities. Finally, we demonstrate the utility of factor-market rivalry by applying the theory to multimarket competition.

RIVALRY OVER RESOURCES

Industries, strategic groups, clusters, and particularly product markets are central to rivalry studies because downstream activities and the output side of a firm's value chain are where rivalry is well-defined. Competitive dynamics research draws extensively from industrial organization (IO) economics (Porter, 1980), which tends to classify firms within the same industry as rivals. The strategic group literature adds greater theoretical precision; it implies that industries are made of heterogeneous groups of firms, while firms within groups are relatively homogeneous in terms of their strategic attributes (cf. Caves & Porter, 1977; Porter, 1979, 1985). In this view rivalry is determined by the

structure and scope of product markets within industries.

Rivalry theory has also been enhanced by research on multimarket competition, which stresses the notion of product-market overlap as a prelude to firm interdependence (Baum & Korn, 1996; Gimeno & Woo, 1996, 1999; Karnani & Wernerfelt, 1985). Chen (1996) broadened prevailing theory by advancing the concepts of *market commonality* and *resource similarity*, thus illustrating how competitive actions and responses are asymmetrical, due in part to different levels of awareness, motivation, and capability (AMC). Others have used the AMC perspective to illustrate how *operating capacity* (Baum & Korn, 1999), *attack volume* (Ferrier, 2001), and *contest capability* exacerbate interfirm tension (Chen, Su, & Tsai, 2007). Similarly, Yu and Cannella (2007) used the AMC perspective to show how resource-related and market-related factors influence a multinational enterprise's speed of response to a rival's attack.

The above outline is brief, but even a detailed review of this literature shows that resources occupy only marginal consideration in theories of competitive dynamics (Ketchen et al., 2004). Even in paradigms that expressly combine product-market commonality and resource similarity, competition in factor markets is of interest to the extent that rivals overlap in product markets (Yu & Cannella, 2007). Consequently, commonality in product markets has become essentially a prerequisite for the study of rivalry: it is a quasi-boundary condition in both the conceptual elaboration of competitive dynamics and the empirical execution of rivalry studies. However, applying existing theory to explain rivalry in factor markets is problematic because upstream value-chain activities, such as administrative infrastructure, human resources, research and development (R&D), and procurement entail conditions sharply different from downstream activities or those at the end of the pipeline.

An expansion of competitive dynamics theory to include rivalrous behaviors in factor markets aims to remove the confines of product-market commonality, industry designations, and firm attributes as boundary conditions for interfirm rivalry. For example, recognizing that some firms compete in factor markets *without* overlapping in product markets helps to offset the tendency to examine only the usual suspects—players with similar product-market profiles. A

theory of factor-market rivalry also focuses on competition over resources as a possible prelude to gaining stronger positions in other markets. Naturally, the recognition that resources contribute to interfirm rivalry is not new (Barney, 1986, 1989; Chen, 1996; Chen et al., 2007; Dierickx & Cool, 1989; Wernerfelt, 1984), but RBV is largely a theory of defense rather than offense; it stipulates *what* resources yield sustainable advantage and seeks *ex ante* and *ex post limits* to competition. In contrast, competitive dynamics holds that because actions evoke responses, competition is unremitting, making competitive advantage sporadic at best (Ilinitich, D'Aveni, & Lewin, 1996; Wiggins & Ruefli, 2005). More important, a central premise of factor-market rivalry is that resources need not be simultaneously and/or categorically valuable, rare, inimitable, and nonsubstitutable (VRIN) to trigger interfirm rivalry. Hence, factor-market rivalry centers on resources as axes of competition rather than on their ultimate tie to sustainable competitive advantage in product markets.

Factor-market rivalry explains several categories of competition. One type of rivalry is restricted to factor markets and is essentially independent of product-market rivalry. This is where the framework differentiates between rivalry based on upstream activities (i.e., factor market) and downstream activities (i.e., product market). A second type of rivalry occurs when unrelated resources motivate firms to compete with each other in the same product market—that is, when firms follow different resource paths that then lead them into similar or overlapping product markets. Under other circumstances rivalry in factor markets is a precursor to rivalry in product markets. Finally, rivalry can migrate: competitive engagements in factor markets might escalate into downstream activities, including product markets, and vice versa.

Boundary Conditions

To compete effectively in product markets, firms must first establish a strong presence in factor markets (Barney, 1986; Chen, 1996; Miller, 2003; Nelson & Winter, 1982; Pfeffer & Salancik, 1978). Resource-based logic maintains that access to or ownership of VRIN resources is at the heart of sustainable advantage (Barney, 1991; Lieberman & Montgomery, 1988; Miller, 2003; Teece, Pisano, & Shuen, 1997; Wernerfelt, 1984).

In contrast to RBV's focus on VRIN resources as predictors of sustainable competitive advantage and the theory's quest to limit competition (Peteraf, 1993b), our framework focuses on non-VRIN resources as predictors of rivalry in factor markets, particularly among firms from unrelated product markets. As noted earlier, resources need not be VRIN to instigate competition.

Some resources are idiosyncratic—they are either tied exclusively to their holder or embedded deeply in routines, assets, or capabilities (Miller, 2003). While clearly vital to their owners, such resource combinations are less likely to be co-opted by competitors (Peteraf, 1993b) and, thus, are outside the scope of the current exposition. High-order interactions among resources or variations in the extent to which resources are universally VRIN are important too, but the increase in conceptual complexity is disproportionately high, with limited augmentation to the theoretical insights sought here. We therefore assume such issues to remain constant and redirect attention to conditions that yield unexpected interfirm competition—mainly, rivalry under conditions of *resource similarity* and *product-market uncommonality*. Some of the examples we use rely on lawsuits as surrogates for rivalrous actions because litigation provides unambiguous depictions of who attacks whom, where, when, and over what issue. These examples do not imply, however, that factor-market rivalry is bound to a court of law (although lawsuit data might prove useful in initiating empirical work in this area).

Resource Dissimilarity and Product-Market Commonality

Firms mobilize different types of resources that yield substitutable or even identical offerings (e.g., photo images obtained via chemical or digital technologies). The risk of rivalry intensifies when firms deploy versatile and mobile resources to exploit new opportunities. For example, novel resource deployment, including disruptive innovations, allows firms to depart from legacy offerings in main markets and motivates their entry into peripheral markets (Christensen & Bower, 1996). When feedback from such resource deployment is positive, firms increase their resource commitment in hope of product-market expansion. The risk is that in-

cumbents' leadership in product markets and entrants' advantage in factor markets might motivate the two parties to compete.

Asymmetric awareness is another issue. When DuPont introduced polyester fiber into the apparel market, it blindsided cotton spinners, who at the time dominated the textile industry (Christensen & Bower, 1996). Likewise, eBay's disruption of the auction market displaced dominant players such as live auctioneers and garage sellers *not* through differentiated offerings but by leveraging differentiated resources. Similarly, Wal-Mart displaced scores of incumbents, but its price advantage on undifferentiated products stemmed not from a cost leadership strategy per se but, rather, from differentiated processes—namely, operations and logistics. Highly differentiated resources, processes, and business models give their owners opportunities to attack diverse incumbents, including those in nonoverlapping product markets.

The use of dissimilar resources to surprise dominant players is a particularly effective strategy when executives adhere to normative product-market and socially constructed industry precincts (Bazerman, 2002; Zajac & Bazerman, 1991). Small firms and former employees can surprise formidable incumbents, because the former are rarely seen as posing a credible threat, let alone becoming a serious rival. For example, Ole Nilssen blindsided his former employer, Motorola, as well as Magnetek, Inc., when his small venture attacked the two incumbents for using an overlapping resource: technology critical to electronic ballasts.

The element of surprise is particularly acute under asymmetric awareness—that is, when incumbents and entrants approach the same product market but from very different positions in factor markets. Familiar with their customer base, incumbents take a product-market position; they leverage on their established ties with consumers and complementary assets honed specifically for that product market. In contrast, entrants mount their attack from a factor-market base; they recognize how their dissimilar resources can reduce traditional cost structures, simplify operations, or enhance processes to displace legacy offerings. Hence, employing dissimilar resources motivates entrants to compete with incumbents that are largely unaware of how such resources can be deployed in their product markets (Hill & Rothaermel, 2003; Roth-

aermel & Hill, 2005). The risk of blind spots also increases as firms use novel resources to extend the periphery of their product markets and thereby stand a greater chance of competing with new or unsuspecting rivals.

Resource Similarity and Product-Market Uncommonality

Rivalry under conditions of resource similarity and product-market uncommonality occurs when firms use the same resource to produce very different offerings in unrelated product markets. While rivalry is typical under conditions of resource similarity and product-market commonality (Chen, 1996), attacks are more difficult to discern when similar resources motivate rivalry among firms from increasingly unrelated product markets. For example, Amazon caught Wal-Mart off guard by poaching their logistics personnel, and Nanogen blindsided Motorola, MIT, and Genometrix when it turned its scientific discovery into a contestable theater.

Naturally, exclusive rights to resources give their owners a substantial advantage in factor markets (Markman, Espina, & Phan, 2004). Any interruption of the procurement of resources subsequent to their deployment commitment—particularly after offerings are purchased in product markets—poses continuity problems that undermine the ability of firms to effectively partake in product markets. It is common for firms to improve their position to the detriment of rivals by luring key personnel (Gardner, 2005), signing exclusive agreements with suppliers, or lodging lawsuits and other injunctions that halt production and escalate sunk costs. For example, the incremental and cumulative nature of R&D may render the option of designing around rivals' blocking patents substantially more expensive *ex post* (Schilling, 1998) than luring R&D personnel or acquiring a company in a factor market (Barney, 1986). An important nuance to note here is that some forms of rivalry are limited to resources in factor markets; they are independent of and unrelated to product-market rivalry.

The patent thicket theorem illustrates why factor-market rivalry is at times unavoidable—even in the absence of product-market commonality. In the United States alone, a patent is issued every three minutes, which indicates that

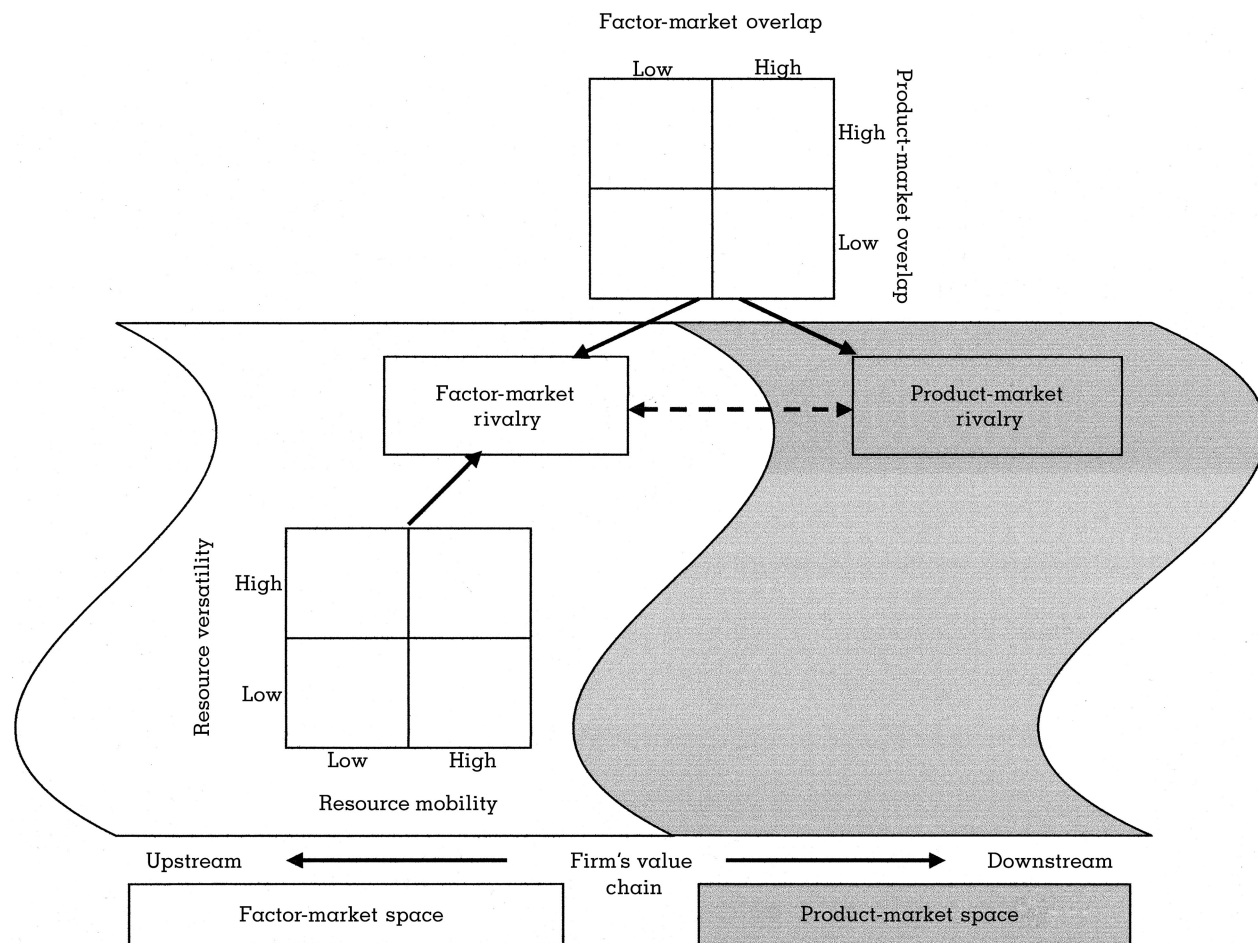
the number of other nonpatentable discoveries is higher. This rate of innovation as a source of *resource creation* suggests that it is quite difficult to know *ex ante*, and occasionally even years after production ensues, whether a new development or offering will infringe on existing technology embedded in products, services, and processes upstream and downstream players' value chain. Because rivalry in factor markets is not always limited to combatants who overlap in product markets, such rivalry can catch incumbents in diverse markets and industries severely off guard. Figure 1, which we explain gradually in subsequent sections, depicts the theoretical theater in which factor-market rivalry and product-market rivalry overlap.

We discuss additional implications stemming from the degree of overlap between factor markets and product markets in subsequent sections, but first we focus on the intrinsic nature of factors—specifically, *versatility* and *mobility*—because these attributes explain why non-VRIN resources can motivate rivalry, including among firms that operate in unrelated product markets. We begin with some clarifying comments (see the "factor-market space" in Figure 1). Briefly, resource versatility refers to pliable or fungible resources that are multifunctional; they can fulfill very diverse missions and should not be confused with *substitutability*, which involves exchangeability of one resource for another to achieve the same end. Resource mobility refers to a resource's relative maneuverability, transferability, and tradability and should not be confused with *imitation*, which is the act of replication, duplication, or reproduction of a resource into multiples (e.g., copying). Although non-VRIN, versatile and mobile resources are still important because they pull firms into new factor and product markets and spark competition even under conditions of product-market uncommonality.

Resource Versatility

Like modularity in product architecture, which proffers greater opportunities in product markets (Pil & Cohen, 2006), versatile resources are malleable and can fulfill a range of applications. The greater their versatility, the more they render strategic flexibility in initiating actions or reacting to unforeseen circumstances. Strategic flexibility based on resource versatility is

FIGURE 1
A Schematic Depiction of Factor-Market Rivalry and Its Relationship to Product-Market Rivalry^{a,b}



^a It is difficult to offer a fully specified depiction of the borders between factor markets and product markets—hence the curved lines, which also indicate permeability. It is also the reason we place the matrix of factor-market overlap and product-market overlap “outside” the main image. We discuss this matrix in greater detail in Figure 3.

^b We thank an anonymous reviewer for suggesting the development of this model.

instrumental in maintaining environmental fit. That is, it allows firms to redirect and even reverse ineffective pursuits or explore opportunities in unfamiliar markets—an advantage that nonversatile resources clearly lack. Indeed, when a resource is tied only to a particular use, managers have less discretion in deploying excess amounts of the resource to alternative missions (e.g., Mishina, Pollock, & Porac, 2004; Wernerfelt & Montgomery, 1988). Versatile resources that render strategic flexibility also have the advantage of providing a greater response repertoire to industry decline and unexpected shifts in product demand. Penrose (1959), for example, noted that resource slack is a stronger driver of growth than the total quantity of

resources in a firm’s possession. In this context versatile resources are akin to slack magnifiers because they offer room to adapt, change, and react to environmental turbulence (Bourgeois, 1981). Given that versatile resources fulfill diverse deployment missions, they also attract dissimilar rivals, including contenders from nonoverlapping product markets.

Versatile resources can also spark rivalry among firms from unrelated product markets because of their utility in learning and extending firm boundaries. Admittedly, even with explicit attention and resource surplus, organizational learning and the broadening of firm boundaries do not happen automatically. However, because versatile resources interlink with more varied

organizational capabilities than less versatile resources, the former are more conducive to learning, which is important for expanding a firm's boundary. Similarly, because transaction costs and product-market uncertainty limit a firm's boundary, versatile resources can support more boundary-spanning forays than what would be possible with less versatile resources.

An extension of the above logic is that when a resource is highly versatile, it not only fulfills different functions but also helps firms in different markets to execute diverse missions. For instance, nanotechnology—the science of manipulating matter on the atomic level—enables precise and inexpensive molecular manufacturing of matter, thus altering the resource-capability mix needed to make products in many industries (e.g., medicine, automobiles, microprocessors, aircrafts, and law enforcement, to name a few). Because nanotechnology spans a wide spectrum of applications, such input attracts combatants from unrelated product markets and industries (Foss & Foss, 2005). All told, resource versatility boosts strategic flexibility and opportunities to widen a firm's boundary, but this versatility triggers rivalry among diverse contestants, including incumbents who operate in unrelated product markets.

Resource Mobility

Any resource allocation must factor the cost of its own procurement and deployment commitment. This point is important because firms are composed of bundles of tangible and intangible resources, processes, and resource-capability mixes that are often difficult to disentangle, let alone mobilize. Whereas a price increase or decrease can be rescinded quickly, reversing resource deployment is costly and time consuming. Rarely are resources conveniently located within a single person or activity; rather, they are often spread across multiple individuals, functions, divisions, and organizations (Teece, 2007). In other words, most resources are diffused and embedded; their extractability from operating units is disruptive, and their transportability to or tradability with other users is costly (Barney, 1986; Mishina et al., 2004; Peteraf, 1993b). Naturally, when resources are context dependent and routine embedded, they are less likely to be contested (e.g., Dierickx & Cool, 1989). Idiosyncratic resources, for example, are

usually immobile and may have little utility outside their firm (Peteraf, 1993b). Immobile resources are specialized and firm specific to such an extent that mobilizing them would entail prohibitive switching costs. These include specialized and cospecialized resources, which cannot be deployed by others or for which the transaction costs are exceedingly high, and when immobile resources are less tradable, they are less poachable.

Not all resources, however, are equally immobile; some resources are imperfectly mobile, whereas others exhibit reasonable levels of mobility. Certain technologies, financial resources, and human talent—engineers, consultants, analysts, and executives, for example—come to mind because of their tradable properties. Mobile resources that develop and accumulate within a firm can be particularly contestable when they have a weak tacit dimension, are socially simple, or lack cospecialization (Peteraf, 1993b). Hence, mobile resources can be marshaled precisely because of their weak embeddedness in idiosyncratic routines and processes (Szulanski, 2003), albeit this convenience is bound to attract more contestants. For instance, when a discovery is perfectly mobile, innovators might fare better by licensing the technology as opposed to investing in costly isolating mechanisms to avoid resource erosion (Peteraf, 1993b). The important point is that mobile resources, including certain personnel, knowledge, technology, and process innovation, that yield valuable economic gains tend to attract rivals' attention.

Mobile resources motivate competition among rivals from unrelated product markets primarily because of their transferability or tradability properties but also because they augment strategic flexibility and contribute to the formation of capabilities (Eisenhardt & Martin, 2000; Teece, 2007). Specifically, expanding existing product markets or diversifying into new ones is unpredictable because the risks associated with developing new routines and capabilities (or decoupling old ones) are rarely known in advance (Leonard-Barton, 1995; Winter & Szulanski, 2002). Mobile resources can attenuate this unpredictability, however, since their deployment is relatively swift, with more immediate feedback and limited causal ambiguity (Lippman & Rumelt, 1982). It is critical for firms to be able to jettison resource combinations during an exit strategy

or when resources no longer support their objectives; this can be done in less time and at less cost when resources are mobile rather than sticky or irreversible. Naturally, as more time is needed to overturn unproductive resource utilization, returns shrink.

A less appreciated fact is the difficulty and cost associated with resource reversal and deployment turnaround, particularly when resources are immobile. Because the transfer cost of highly mobile resources is lower than that of immobile resources, the commitment of mobile resources to strategic pursuits decreases the cost of the advantage that is attributable to such resources. All else being equal, then, sticky resources are unlikely to motivate rivalry because they are difficult to muster and marshal quickly enough to match changes in market conditions.

In contrast, mobile resources are instrumental in capitalizing on opportunities, and their accelerated deployment property is useful in curtailing the actions of others. However, these same attributes also motivate more rivals from diverse industries and product markets (Eisenhardt & Martin, 2000). Also, the maneuverability of mobile resources motivates players to challenge historical resource positions and alter path-constrained routines and capabilities—a desired objective when competitive circumstances change. Therefore, *ceteris paribus*, mobile resources offer greater strategic flexibility (e.g., more discretion and swifter action at lower cost), which motivates rivalry irrespective of product- or factor-market overlap.

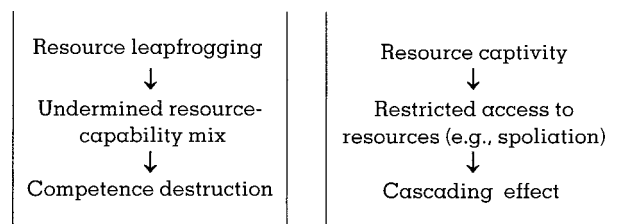
The aforementioned points regarding the contestability of resource versatility and mobility are not meant to imply that resource versatility and mobility are entirely independent of one another, since in fact they are related (see the matrix embedded in the “factor-market space” in Figure 1). Carrying this logic a step further, when a resource is concomitantly versatile and mobile, it is probably more vulnerable to a competitive attack than a resource that is neither versatile nor mobile, all else being equal. A related implication is that the ensuing competition is particularly surprising when combatants operate in unrelated product markets. As noted above, in the absence of product-market commonality, factor-market rivalry is usually peripheral or even outside the boundary of most models and mental conceptions of competition.

Resource Discontinuity

Resource movement can enhance a firm's position by compelling its rivals to redirect resources in a way that is idiosyncratically disadvantageous to them. Multinational corporations attack rivals in one country as a strategy to trigger resource diversion from another country. The AMC perspective uses the concept of resource diversion to illustrate how *thrusts*, *feints*, and *gambits* affect rivals' resource allocation and reshape spheres of influence (Chen & Miller, 1994; McGrath, Chen, & MacMillan, 1998). A firm is forced to misallocate or divert resources from high- to low-yielding activities when rivals disrupt its path-dependent resource flows, interrupt its routine processes, or dislocate its competencies.

While resource diversion theory illustrates how rivals force repartition or division of market stakes, a related process—*resource discontinuity*—brings about a shift in resource merit, either by necessitating substitution of resources or by mounting barriers to resources (see Figure 2). This suggests that resource discontinuity follows two main paths. The first path, termed *resource leapfrogging*, occurs when focal firms exploit novel resource positions to advance beyond rivals' positions, rendering an earlier resource-capability mix obsolete. Resource leapfrogging is consistent with economist Joseph Schumpeter's shocks of *creative destruction* (1942) and with empirical research on technological discontinuity that results in competence destruction (Rothaermel & Hill, 2005; Tushman & Anderson, 1986). The second path, termed *resource captivity*, occurs when a firm captures or “holds up” resources deemed critical to rivals' effective participation in product markets, making these resources fully or partially inaccessible or unusable to the firm's rivals. Resource captivity might trigger cascading

FIGURE 2
Paths of Resource Discontinuity



ing effects—system-wide disruptions that ripple through rivals' value chains, spreading into and undermining downstream activities and destabilizing fundamental functions and outcomes.

Resource leapfrogging. Schumpeter noted that the process of creative destruction "strikes not at the margins of profits of existing firms but at their foundations" (1942: 84). Extant research has validated and extended Schumpeter's theory by illustrating how entrants' disruptive innovation—usually targeting incumbents' least-desired customers—can eventually bring about disorder in product markets, with crippling effects on incumbents (cf. Christensen & Bower, 1996; Rothaermel & Hill, 2005; Tushman & Anderson, 1986). Such research has direct implications for factor-market rivalry: it shows that players who exploit more efficient resources and processes—including scientific breakthroughs, new business models, and disruptive innovations—leapfrog their counterparts.

Many insurgencies begin with entrants who use resource discontinuities to displace dominant incumbents. Naturally, gradual, incremental shifts in inputs, processes, operations, and capabilities reinforce established product-market order and legacy offerings; however, abrupt resource discontinuities, such as breakthroughs that yield considerable increases in scale, efficiency, or productivity, disrupt resource-capability mixes (Christensen & Bower, 1996; Leonard-Barton, 1995; Tushman & Anderson, 1986). As resource leapfroggers gain momentum, earlier resources and even capabilities may gradually become obsolete. Examples of resource leapfrogging that toppled product-market leaders include the shifts from vacuum tube technology to transistors in radios and TVs, ice blocks and iceboxes to mechanical and then electrical-based refrigeration, steam to diesel to hydrogen engines in locomotives, chemical photofinishing to digital imaging in photography, typewriters to PCs in word processing, and newspaper to internet ads in garage sales. These order-of-magnitude shifts and the introduction of new resources supersede and undermine existing competencies, particularly when said resources also call for new skills, capabilities, and knowledge (Eisenhardt & Martin, 2000; Teece, 2007).

As stated above, when resource discontinuities render old value-chain activities ineffective or even obsolete, they bring about competence

destruction. For example, even De Beers, the largest rough-diamond supplier in the world, may fall victim to resource leapfrogging. De Beers has erected high barriers to entry by controlling, in effect, the entire diamond pipeline, from mining to jewelry sales (e.g., exploration, mining, recovery, valuation, trading, cutting, polishing, marketing, and sales). Despite such isolating mechanisms and well-honed core competencies in mining capabilities, applied technology that utilizes carbon as raw material, sterilized laboratories, and principles of high energy can now create a human-made diamond. A new resource-capability mix that supports novel diamond-making processes allows entrants to leapfrog formidable entry barriers and gain a position in this lucrative product market.

The disruption of resource discontinuity brings disorder that accelerates the shift from a core competence to core rigidity among incumbents (Leonard-Barton, 1995). The fact that product-market offerings may remain relatively unchanged—as evidenced by the human-made diamonds—suggests that the focus of rivalry and its manifestation migrate upstream, from product markets to factor markets. This is not surprising, since action during factor-market rivalry affects the way firms combine resources, competencies, and processes to generate offerings. For instance, the emergence of electronic calculators displaced manufacturers of electro-mechanical calculators, just as steamboats devalued core competencies related to sailing technology, which dislodged oar-propelled galleys. In sum, factor-market rivalry ensues when firms leapfrog their rivals' resource base and introduce a displacing resource-capability mix that renders older resource endowments and operations uncompetitive. This is shown in the left column of Figure 2.

Resource captivity. Resource captivity is another resource discontinuity path that firms use to undermine rivals' productive participation in market activity. Resource captivity, which is the rendering of rivals' resources partially or completely inoperable or inaccessible, can have devastating effects even when resources have no clear operational utility to the attacking firms. For example, in 2006 Research in Motion paid \$612.5 million in licensing fees and other penalties to a small firm (NTP, Inc.) to avert a shutdown of its BlackBerry network in North America. Also, Amazon undermined scores of

online retailers who relied on its one-click internet technology—including players external to its product market (e.g., Orbitz, Budget, and Avis). Nontechnology examples include personnel poaching, seizure of real estate parcels, and takeover of advertising venues.

The ability to subvert, hold up, spoil, or destroy resources vital to rivals' ongoing operations can surge downstream, render routine functions extraneous, and ultimately undermine competitiveness in product markets. Because firms combine factors with other inputs through unidirectional, incrementally sequential, and well-synchronized procedures, even minimal impairments or disruptions to resource flow in early value-chain activities can trigger cascading effects that bring an otherwise smooth-running operation to a grinding halt. Because cascading effects tend to escalate and expand in scope and impact, and to exert disproportionately large and complex effects on operations, even small attacks on critical value-chain activities can undermine incumbents' ability to compete effectively in product markets.

Compelling rivals to abruptly redirect or redeploy resources across divisions, operations, or markets destroys ongoing synergies (Leonard-Barton, 1995; McGrath et al., 1998), which confirms that the ability to cut off resources—as NTP did to Research in Motion—or even to partially despoil resources poses a clear and present danger. Polaroid, for instance, brought about resource spoliation in instant photography when it forced Kodak to shut down its \$1.5 billion manufacturing plant, lay off hundreds of employees, buy back 16 million instant cameras, and abandon a decade-long R&D effort in instant photography. The introduction of novel resources and resource-capability mixes challenges the usefulness of earlier architectural knowledge, and because resources are embedded in the structure and processes of organizations, the destruction is difficult for firms to anticipate and mitigate. Persistent resource captivity triggers negative internalities, which undermine a firm's competitiveness.

Firms are certainly weakened when they are assaulted in factor markets, but, occasionally, attackers also annex the disputed resources and quickly repurpose and redeploy them, and by doing so the latter fortify their ranks and toughen their position in factor markets and product markets. This happened when Microsoft

hired thirty-four of Borland's key personnel, including Borland's vice president of R&D, who then became vice president of Microsoft's Developer Tools Division (Wong, 1997). This resource captivity had two outcomes: (1) it removed productive capacity from Borland, undermining its competitiveness, and (2) it increased the competitive gap between the two rivals, because Microsoft was able to absorb and redeploy these (human) resources. Therefore, resource captivity can simultaneously weaken the encroached firm while solidifying the position of the attacking firm.

To recap, rivalrous actions that yield resource discontinuity in factor markets follow two distinct paths. One is resource leapfrogging, wherein insurgents introduce disruptive resources and competencies that erode old resource positions and render existing competencies ineffective. The other path is resource captivity, which undermines rivals' access to critical resources. Firms are particularly motivated to cut off rivals' resource flow when resource captivity triggers cascading effects—shocks that ripple downstream through rivals' value chains, disrupt activities, and undermine competitiveness. Naturally, the competitive balance shifts in favor of those who are aware of and motivated to capture rivals' resources, and to absorb and redeploy these resources to advance their own position vis-à-vis rivals.

Factor-Market Rivalry Applied to Mutual Forbearance Theory

Thus far, we have advanced several points. First, competition is not limited to product markets but can erupt at any point along firms' entire value chains; wherever firms co-occupy the same space, rivalry can follow. Second, the framework of factor-market rivalry uncovers blind spots, particularly when competition ensues under conditions of either resource dissimilarity or product-market uncommonality. Third, holding constant rivals' relative positions in product markets (including capabilities and other firm-specific advantages), versatile and mobile resources are highly vulnerable to inter-firm competition. Finally, the concept of resource discontinuity helps to explain resource leapfrogging, resource captivity, and cascading effects. Recognizing that competitive dynamics models should jointly consider product-market

rivalry and factor-market rivalry, this section illustrates the theoretical utility of factor-market rivalry in the context of forbearing markets.

Mutual forbearance theory explains that when firms compete in several product markets, they gradually quell rivalry (Edwards, 1955). The theory assumes *sphere criticality* (i.e., that market domains are vital to the firms in question) and relative *market inaccessibility* (i.e., that barriers render markets impenetrable to new entrants). Suppose, for instance, that Firm A and Firm B compete in overlapping markets. Firm A can outcompete Firm B in Market X, where the former is the dominant player, but Firm B can prevail over Firm A in Market Y, where Firm B is dominant. The theory stipulates that when firms learn to appreciate their codependence and the risk of escalating rivalry from one market to another, they gradually seek mutual forbearance (Gimeno & Woo, 1996, 1999; Karnani & Wernerfelt, 1985). Compared with nonforbearing markets, forbearing markets are associated with higher prices, greater profits, lower production volume, and lower incumbent failure rates (Baum & Korn, 1996, 1999).

Mutual forbearance theory has advanced our understanding of rivalrous behavior, but the emphasis on product-market commonality has overshadowed firm overlap in factor markets. This oversight is understandable; when theory refers to "the market," it usually yields an abstraction that inadvertently hides considerable differences in types of markets and rivalrous

action. Factor-market rivalry suggests that firms may forbear in product markets—even when they face serious attacks—because they hope to maintain forbearance in factor markets, perhaps along critical areas of their value chain. Such consideration refines our understanding of rivalry because the added specificity explains why and how competition in product markets could motivate either forbearance or aggressive action in factor markets, and vice versa.

Figure 3, which is the top matrix in Figure 1, illustrates the impact of factor-market rivalry on multimarket competition. The NE quadrant refers to traditional contexts for rivalry entailing resource similarity and product-market commonality. Our framework stipulates that awareness of rivals and motivation to forbear in this quadrant are highest because the vast overlap in *both* product and factor markets makes rivals easily recognizable. Because rivalry in such environments is already covered extensively in the extant literature (Chen, 1996), we focus on the remaining quadrants—SW, NW, and SE.

Mutual forbearance theory suggests that rivalry reaches its zenith in the SW quadrant because firms that overlap in only a single market space or segment rarely recognize areas of possible codependence, let alone the need to build forbearing relationships. When onslaughts ensue in the SW quadrant, the losing party withdraws and the winner absorbs the surplus and strengthens its position. Rarely, however, is the losing party forced to exit a market completely;

FIGURE 3
Product-Market and Factor-Market Overlap (PFO Matrix)^a

Product-market overlap	High	<p><u>Predictions</u></p> <p>NW</p> <p>Awareness: Moderate Motivation to forbear: High Competition: Shifting</p>	<p><u>Predictions</u></p> <p>NE</p> <p>Awareness: Highest Motivation to forbear: Highest Competition: Shifting</p>
	Low	<p><u>Predictions</u></p> <p>SW</p> <p>Awareness: Lowest Motivation to forbear: Lowest Competition: Localized</p>	<p><u>Predictions</u></p> <p>SE</p> <p>Awareness: Low Motivation to forbear: Moderate Competition: Mostly localized</p>
		Low	High
		Factor-market overlap	

^a The matrix shows the influence of product- and factor-market rivalry on awareness, motivation to forbear, and competitive shifts (adapted from Chen's [1996] matrix).

even after a pronounced retreat, the losing firm might fight vigorously to maintain a foothold in markets vital to its existence. Some withdrawers are even willing to pay hefty fees in exchange for a continued presence in factor markets. In 2004, after a ten-year legal battle over a proprietary technology that improves iron absorption in prenatal supplements, a U.S. court ordered American Cyanamid to pay \$58 million dollars to the University of Colorado and two of its professors. Because American Cyanamid and the University of Colorado hardly overlap in product and factor markets, mutual awareness and motivation to forbear were minimal. Blindsided, American Cyanamid fought its atypical rival for ten years. But, in the end, because the resource is critical for its presence in the iron absorption product market, the firm opted to pay hefty "rent" to maintain "residency" in this market rather than to exit.

This is one example of how inadequate awareness coupled with insufficient motivation to forbear intensifies rivalry. In many competitive contexts (cf. other quadrants), high market overlap brings awareness that motivates combatants to fight more cautiously; however, when firms compete against each other only once and only in a single market space—as is usually the case in the SW quadrant—they tend to attack with exceptional force. Examples of aggressive acts include resource captivity that triggers cascading effects, which force the losing party to withdraw or to pay for its continued presence (e.g., the NTP and BlackBerry conflict). Finally, unlike most depictions of rivalry as repeat interactions characterized by action-response and attack-counterattack, the SW quadrant shows that rivalry may be restricted to a solitary yet intense competitive encounter (e.g., the Nanogen, MIT, Motorola, and Genometrix example).

The NW quadrant shows instances where firms overlap extensively in product markets but only modestly in factor markets—that is, market commonality yet resource dissimilarity. For example, both Kodak and Canon operate in the photography and imagery markets, with a variety of applications including but not limited to medicine, science, copiers, entertainment, and leisure, but the firms leverage on divergent factors of production and competencies. Kodak has a long heritage and strong competencies in chemistry, so it comes as no surprise that its films are still used on most of the world's movie

sets (e.g., all Oscar-winning "Best Pictures" have been shot on Kodak film) and for copies shown in theaters. Kodak is also a strong player in the digital photography arena; it operates in the info-imaging industry that fuses images and information technology. Whereas Kodak entered the photography market by leveraging its chemistry-based competencies to produce film, Canon entered the market from the direction of optics and camera manufacturing. Started in 1933 as an optical instruments laboratory, Canon became a camera maker by replicating strong German brands at the time (Leica and Contax). Like Kodak, Canon also entered the X-ray, printer, cinematography, microcomputer-embedded camera, and copy machine markets, but its factors of production have hinged largely on competencies in optics.

The NW quadrant raises important questions: Under conditions of product-market commonality and resource dissimilarity, do firms challenge each other more frequently in product or in factor markets? In which of the two arenas—product or factor markets—are incumbents more vulnerable? Does competition shift from product markets to factor markets? Such questions await empirical research, but the high overlap in product markets and increased awareness suggest that firms in the NW quadrant are less motivated to compete than are firms in the SW quadrant. Naturally, mutual forbearance in this quadrant is unlikely to be as robust as that seen among firms that overlap in both types of markets (i.e., the NE quadrant). Because players in the NW quadrant interact more regularly in product markets than in factor markets, awareness is higher in product markets, but vulnerability and the motivation to take action lie predominantly in factor markets. As resource dependence theory postulates and resource diversion strategies show, attackers thrive when they protect their vital resources and constrain rivals' access to their own critical resources (McGrath et al., 1998; Nelson & Winter, 1982; Pfeffer & Salancik, 1978). This suggests that combatants take resource discontinuity actions in factor markets, including resource captivity, in order to jeopardize rivals' position in product markets. Most interactions in the NW quadrant are in product markets, but firms wishing to inflict the greatest damage impose new *rules of engagement* by shifting the competition to factor markets. They assault rivals' most vulnera-

ble spots—critical resources in factor markets—even without improving their own position.

Finally, the SE quadrant depicts product-market uncommonality and resource similarity. This is where firms make or sell different offerings to different buyers but use similar resources or factors. For example, research organizations (e.g., NASA, LANL, NIH) compete over grants and scientists, but because these institutions' missions vary, they occupy different "product" markets. Similarly, business schools frequently fight with humanities or arts and sciences schools over "lines" for hiring professors, and the various branches of the U.S. Armed Forces—Navy, Army, Air Force, Marines, and Coast Guard—rely on personnel with similar backgrounds, but each branch fulfills different tactical and strategic functions.

Mutual forbearance is stronger in the SE quadrant than in the SW quadrant because a greater number of interactions in factor markets bring greater awareness and added motivation to quell competition. Rivalry in the SE quadrant should not be underestimated, but unlike the competitive shifts between product and factor markets, rivalry is less likely to migrate or take root in product markets precisely because of the linear and unidirectional nature of value chains. It is not easy for firms in any quadrant to attack, weaken, or capture rivals' resources, but in the absence of product-market commonality and when it is impractical to oscillate rivalry from factor markets to product markets, combatants do attack each other's resources. Thus, the SE quadrant depicts rivalry in factor markets that could be independent and unrelated to rivalry in product markets. Finally, product-market uncommonality and resource similarity contexts suggest that rivals are less aware of each other than players in either the NW or NE quadrants, although such awareness is probably greater than among players in the SW quadrant.

DISCUSSION

We began this article by noting that traditional paradigms of rivalry tend to take an industry or product-market view. According to these perspectives, rivalry is normally limited to firms within the same industry that operate in overlapping product markets with the same or substitutable offerings catering to similar customers. Although resource similarity is one ex-

planation for rivalrous action, the theoretical emphasis is overwhelmingly on the effect of product-market commonality. Despite the explanatory power of such perspectives, we have argued that they do not reveal the entire story. To this end, Table 1 summarizes some of the key areas where factor-market rivalry complements product-market rivalry.

We acknowledge that the most observed rivalry takes place under conditions of resource similarity and product-market commonality, but evidence suggests that factor-market rivalry spills over industry boundaries and may include product-market uncommonality. First, rivalry can migrate or even oscillate; rivalrous engagements in factor markets might escalate downstream into product markets, and vice versa. Second, factor-market rivalry for one firm might be product-market rivalry for another. Finally, there are sets of versatile and mobile resources, such as the rapidly expanding nanotechnology, biotechnologies, and new business models, where incumbents and new entrants "ignore" industry and product-market precincts. Blind obedience to socially constructed categories such as industries, products, and customers is one of the reasons that firms, including some formidable incumbents, are being blindsided.

Factor-market rivalry adds specificity to already useful product-market paradigms; it affords richer insights by expanding and refining existing theories of competitive dynamics (e.g., AMC perspectives and mutual forbearance theory). Because of its attention to a wider range of competitive spaces that firms co-occupy and to the underlying structure of markets, factor-market rivalry explains and predicts why and where organizations are most vulnerable. Factor-market rivalry raises awareness of contestable resources, such as versatile and mobile resources, and of entrants who disrupt industry norms and depose incumbents through resource discontinuities. As we noted, some undermine established resource-capability mixes through resource leapfrogging, and others stockpile, block, spoil, or destroy resources that are critical to their opponents, thus triggering cascading effects. Because factor-market rivalry explains and predicts competition even under conditions of product-market uncommonality, it counteracts the tendency to search for and analyze only the usual suspects—contenders with similar

TABLE 1
Product-Market and Factor-Market Rivalry Along a Set of Dimensions

Theoretical Lenses	Product-Market Rivalry	Factor-Market Rivalry
Key premises	Symmetry: Competition among similar firms, from a similar industry or strategic group Theoretical space: Product-market commonality and resource similarity Proportionality: Small actions cause small harm; major actions cause major harm (e.g., tit for tat) Localization: Action and reaction are bound to the same or similar market space or competitive theater	Asymmetry: Competition among dissimilar firms, from dissimilar industries or strategic groups Theoretical space: Product-market commonality and resource similarity as well as product-market uncommonality and resource dissimilarity Disproportionality: Even small actions cause disproportionately large harm Localization: Action and reaction can shift from one market space to another
Competitive space	Location: Downstream a firm's value chain (e.g., customer-facing activities) Focus: Competition hinges on access to customers in product markets (e.g., products, services, offerings) Stable: Competitive action taken in product markets remains mostly within product markets	Location: Within a firm's entire value chain Focus: Competition hinges on access to resources in factor markets (e.g., patents, technology, human resources, real estate) Unstable: Competitive action taken in factor markets can affect rivalry in product markets, and vice versa
Action and response strategies	Business level: Price cuts, new product/service introduction, product bundling, ad campaigns Corporate level: Product-market entry/exit, alliances, joint ventures, forward integration, merger and acquisition	Business level: Litigation, radical and disruptive innovation, personnel poaching, real estate purchasing, contracts, supply chain disruptions Corporate level: Factor-market entry/exit, alliances, joint ventures, backward integration, merger and acquisition
Action and response constructs	Action-response likelihood, speed, irreversibility, aggressiveness, spheres of influence, dethronement, tension	Resource discontinuity, resource leapfrogging, resource captivity (including resource spoliation, erosion, subversion, and obliteration), and cascading effects
Unit of analysis	Occurrence of attacks/counterattacks bounded by industry, strategic group, or product market Perceived competitive tension	Occurrence, trajectory, and space of attacks/counterattacks, regardless of industry, strategic group, or product market
Relative transparency of AMC	High	Low

profiles who occupy a familiar industry or product market.

The factor-market rivalry theory helps to counteract strong inertial forces and heightens the probability that disruptive resource-based actions will be detected early. For example, pharmaceutical firms capitalize on early warning signs and specialized competencies in order to craft favorable alliances with entrants from the biotechnology and biomedical industries (Rothaermel & Hill, 2005). In other words, awareness of resources with long gestation periods and the ability to anticipate resource discontinuity (either through leapfrogging or captivity) give incumbents greater bargaining positions with entrants, customers, suppliers, and stakeholders.

Factor-market rivalry also explains and predicts why incumbents, who previously leveraged on different resources, may eventually compete in similar product markets (e.g., Kodak and Canon). Such rivalries are especially acute during shifts in standards, changes in dominant product platforms, or industry oscillation between integration and modularity (Schilling, 1998).

The contribution of factor-market rivalry rests in several areas. First, past arguments focus on product-market commonality with reference to resource similarity (Chen, 1996), but systematic, theoretical scrutiny of rivalry under conditions of resource dissimilarity or product-market uncommonality is generally limited (cf. Bergen &

Peteraf, 2002; Peteraf & Bergen, 2003; Somaya, 2003). Factor-market rivalry explains why, when, and how rivalry in factor markets shifts into product markets, and vice versa, as well as why and when versatile and mobile resources attract atypical combatants—rivals from very different industries, who offer unrelated products to dissimilar buyers.

Second, factor-market rivalry explains how entrants use resource discontinuities to leapfrog incumbents and devastate established competencies. The framework applies resource discontinuity logic to explain how firms use resource captivity and spoliation to choke or at the very least deprive rivals of critical resources, which can then trigger cascading effects.

Third, we present a corpus of arguments that serves to expand, not replace, other useful models of rivalry (Capron & Chatain, 2008). For example, factor-market rivalry acknowledges the roles entrants typically play in rivalry and explains why versatile and mobile resources might motivate players from very different markets to compete. This topic is both theoretically interesting and practically useful because the creation of novel resources suggests that rivalry under conditions of resource dissimilarity and/or product-market uncommonality is bound to increase.

Finally, factor-market rivalry explains why forbearance reaches its zenith when firms overlap in factor and product markets, why forbearance persists despite marginal interfirm overlap in product markets, and why rivalry ensues (with blindsiding consequences) despite product-market uncommonality. While research on the role of resources is not new, the conceptual links among factor-market rivalry, non-VRIN resources, mutual forbearance theory, and the AMC perspective are largely unique and useful. Not only does factor-market rivalry tell a cohesive story, but it actually injects a dynamic impetus into existing theory and provides a more holistic and nuanced view of competition.

FUTURE RESEARCH

Factor-market rivalry embraces dynamic constructs, including resource discontinuities, leapfrogging, resource captivity and spoliation, and cascading effects. Given that a single empirical study may not suffice, we present several suggestions for testing tenets and point out oppor-

tunities for future research. According to factor-market rivalry's logic, the intensity of interfirm competition is at its highest levels under resource dissimilarity and product-market uncommonality (SW quadrant) because, without codependence, there is neither competitive awareness nor motivation to forbear. Future research could compare the intensity of rivalry and prevalence of forbearance in the SW quadrant to those in other quadrants. Such research might also document the fluctuating nature of rivalry and how initial engagements in factor markets progress into downstream activities and product markets, or vice versa.

To date, research lacks cost-benefit analysis of competition because the stakes tend to be incommensurable and the probabilities of expected utility incalculable. In addition, cost-benefit analyses depend on accurate predictions of rivals' reactions, but such forecasts are dauntingly volatile in competitive engagements. Despite these uncertainties, factor-market rivalry suggests that cascading effects are highly disruptive, particularly when assaults target early value-chain activities. Confirmation of this conjecture lies with resource rigidity and the linear, unidirectional, and synchronous nature of value chains, which together render firms highly vulnerable to abrupt, involuntary spasms in upstream activities. Extant research focuses on product-market actions and responses, and such effort should continue. However, given that some of the least expensive yet most devastating actions originate in factor markets, future research should try to monetize the costs and benefits of triggering cascading effects, perhaps by assessing their effect on the combinative nature of resources and capabilities within early and late value-chain activities. Case studies and qualitative research could also compare the two types of rivalries; evidence that rivalry over resources expands negatively into downstream activities whereas rivalry over products tends to remain within the bounds of product markets would be consistent with the logic of factor-market rivalry.

Advances in RBV research offer immeasurable benefits to theory and practice, but they have overshadowed the strategic role that non-VRIN resources play. We noted that firms compete over versatile and mobile resources, but research should consider other non-VRIN resources, including tangible, intangible, and

even generic factors, and it should assess the role such resources play in competition. Also, earlier research tended to treat patents as VRIN resources (Markman et al., 2004), but as some of our examples and a growing field of technology transfer and commercialization show, patents can be versatile and mobile. The investigation of patent-based conflicts to study factor-market rivalry is a natural direction for empirical scrutiny (Somaya, 2003), but we urge studying the role of other factors too. Another research opportunity is in paying attention to these facts: (1) many competitive actions impact rivals differently (e.g., price cuts, capacity shifts, ad campaigns, product bundling, resource captivity, etc.), (2) fighting capabilities are idiosyncratic, and (3) many markets are occupied by more than two firms. The combination of these facts, along with some of our examples, suggests that dyadic views of rivalry may need expansion. We advocate abandoning neither dyadic game theory nor the lessons learned from matched-pair research designs, but to advance the utility of theory, future research should increase scrutiny of competition involving more than two firms.

Managers rely on analytical instruments in order to increase their awareness of and readiness for rivalrous events, whereas researchers and consultants use conceptual tools to study competitive contexts. These analytics include industry analysis, product-market research, competitor profiling, and benchmarking, all of which aim to enhance the process of gathering and analyzing information about a firm's "competitive landscape." Surprisingly, conceptualization and parameterization of resources remain largely unstructured and disorganized. At the normative level, the development of resource analysis instruments, comparable to industry and market analysis tools, is highly desirable (cf. Wernerfelt, 1984). Such analytics should provide practical and systematic processes for collecting, filtering, interpreting, and sharing disaggregated data about resources. Perhaps the development of *objective* measures of resource utility and vulnerability is unlikely, however, without better and more systematic protocols for understanding resources; no amount of industry or product-market analysis will forestall potential threats and inevitable onslaughts. Again, idiosyncrasies related to industries, product markets, and factor markets suggest that resource analysis would increase

awareness and motivation to forbear. Inventorying and ranking valuable resources on various axes—such as versatility, mobility, and vulnerability—could be a good place to start, even in the absence of clear theory (Hambrick, 2007).

The evolution of competitive dynamics research began with product-market rivalry, moved to multipoint competition, and now includes factor-market rivalry. Competition in factor markets awaits empirical validation and further theoretical refinement, but we expect that the next frontier is nonmarket rivalry. Consider how incumbents wage *proxy rivalry* against smaller players and entrants; the former use nonmarket channels to (indirectly) compel the latter to divert resources. In the \$19 billion dietary supplement industry, for instance, large incumbents used nonmarket players such as trade groups and lobbyists to lodge stricter FDA standards on the manufacturing, packaging, and labeling of dietary supplements. If successful, the new standards would impose a significant burden on a slew of niche players and new entrants, forcing many to change product lines or go out of business.

The ranks of nonmarket players have swelled beyond employees, unions, and government agencies. They include women's rights and human rights activists; environmentalists; community organizers; bloggers; and passionate advocates of consumer, social, or political causes. For example, nonmarket players attack Wal-Mart for allegedly destroying jobs, forcing family businesses to close, increasing traffic, tolerating sweatshop conditions, and consuming too much energy. Whether any of these allegations are true is extraneous; what matters is that nonmarket players can tarnish a company's reputation—a type of resource spoliation. Nonmarket rivalry, then, is not limited to traditional players, and it can undermine a firm's resource-capability mix, damage value-chain flow, impede access to product markets, and, hence, weaken a firm's competitiveness. Explaining how nonmarket rivalry unfolds and explaining how competitive interactions of firms and nonmarket players span market and nonmarket arenas are exciting opportunities for future research.

CONCLUSION

Past research has classified firms as rivals based on membership in populations (Nelson &

Winter, 1982), industries (Porter, 1980), strategic groups (Caves & Porter, 1977; Peteraf, 1993a; Porter, 1979, 1985; Smith, Grimm, Wally, & Young, 1997), niches (Lawless & Anderson, 1996), and leader-follower dyads (Ferrier, Smith, & Grimm, 1999). It is not surprising, then, that extant rivalry research has focused on the most observable arena—product markets. In reality, however, rivalry is unhindered by socially constructed boundaries; instead, it spans and shifts across product and factor markets. Firms that adopt either a product-market or factor-market view of rivalry risk unforeseen attacks on their positions.

Factor-market rivalry broadens the boundaries of and adds nuances to theory because it details why, where, how, and when players compete for resources even in the absence of product-market commonality. The theory recognizes that certain resources motivate rivalry even among firms that rarely or never overlap in product markets; incumbents who serve dissimilar customers in unrelated markets can still compete, based on overlapping resources. Rivalry in factor markets is less predictable than in product markets. This is because the endogenous value of inputs is rarely known prior to their deployment in value-creating activities, which can take place in product markets far afield from a firm's resource position. The concept of factor-market rivalry is relevant to all entities (not only firms), but it is particularly useful in explaining competition among "unusual suspects," when resources trigger rivalry between firms that provide unrelated offerings in different product markets.

In closing, the theory of factor-market rivalry is neither an invitation for scholars to discount earlier paradigms nor a suggestion for managers to escalate rivalry indiscriminately. Instead, it is a call to broaden the explanatory scope of competitive dynamics research and to make rivalry causally more specifiable, predictable, and verifiable. This is a worthy objective because despite the importance of resources and early value-chain activities, factor-market rivalry remains a relatively unexplored yet potentially fruitful area for theory development. Our hope is that our foray into factor-market rivalry will prompt a broader view of competition. In the words of Frederick the Great, "It is pardonable to be defeated, but never to be surprised."

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