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MOTIVATION MATTERS: CORPORATE SCOPE AND COMPETITION IN COMPLEMENTARY PRODUCT MARKETS

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Research summary: *We argue that a pure capabilities-based view does not accurately explain the competitive dynamics of increasingly common settings in which firms act as both complementors and competitors. We propose that the Awareness-Motivation-Capability framework is more appropriate for these settings. We derive predictions from both a pure capabilities view and the AMC framework, and test those predictions in the U.S. auto leasing market, in which the leasing subsidiaries of car manufacturers directly compete with the same independent lessors who provide complements to the manufacturers. Although our results are consistent with capabilities playing an important role, motivation appears to be a critical factor explaining the competitive dynamics of the market.*

Managerial summary: *Firms that compete with business units owned by larger corporate parents face additional considerations. Such subsidiary competitors can be motivated by broader corporate considerations, shifting their objectives, and consequently, their strategic actions. Expecting subsidiary competitors to pursue business unit profitability can mislead managers toward pricing, product mix, or market entry errors. We present an important example from consumer finance, where independent auto lessors, such as Bank of America (BoA), compete with captive leasing subsidiaries like Ford Motor Credit (FMC). Since FMC is motivated to subsidize and support vehicle sales for its manufacturer parent, a cost advantage is not enough for BoA to dominate the market. Understanding broader corporate motivations of competitors helps managers anticipate competition levels in potential markets, thereby improving decision-making and performance.*

INTRODUCTION

Firms often integrate into complementary businesses to benefit from synergies with their core business. For example, Apple produces apps for iOS, adding value to the iPhone. At the same time, this scope expansion makes Apple a competitor of Zynga and other firms whose primary business is producing apps—firms that are critical for the success of the Apple business ecosystem. Similarly, General Motors has a financial arm that makes General Motors' vehicles more accessible, but also brings them into direct competition with complementary businesses that are first and foremost financial institutions like Bank of America's auto leasing arm. Although the integrated firms and their independent rivals may produce nearly identical products, the integrated firms have very different motivation. While Zynga's primary goal is to make money from selling its apps, Apple may be

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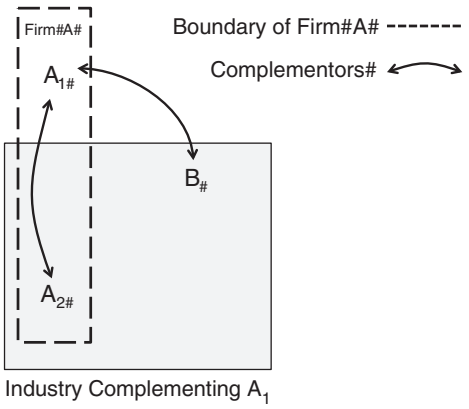

Figure 1. Relations between firms A and B. Firm A is comprised of two business units. A2 complements A3, for example, by providing financing for A1's product. Firm B, which is a competitor of A2 in the same industry, also complements A1's product. Firm B might be, for example, an independent financier

willing to make locally suboptimal decisions in the app market to maximize overall profit through its complementary hardware business. These markets, depicted in Figure 1, reflect a broader trend in retail and technology settings that includes cellular phones, department store store-within-stores (e.g., Louis Vuitton in Bloomingdale's), and homebuilder financing (Gartenberg, 2014).

Because of these differences in motivation, traditional models of competition based on resources or capabilities may have limited ability to predict firm behavior in these settings. In this paper, we apply the Awareness-Motivation-Capability (AMC) framework (Chen, 1996; Livengood and Reger, 2010; Yu and Cannella, 2007) to these markets in which multi-business firms compete with firms that are also complementors. The added contribution of the AMC framework over and above purely resource- or capabilities-based views is that it yields unique predictions regarding competitive dynamics in the market. Specifically, we apply the framework in a particular industrial setting and derive predictions about the division of the market between the types of firms that cannot be derived from a pure capabilities story. We find empirical support for these predictions, which demonstrates the importance of the AMC framework for explaining competitive dynamics in these markets with complementarity and competition.

The AMC framework unifies prior decades of competitive dynamics research by outlining the broad conditions necessary for firms to take competitive actions toward rivals. First, firms must be aware of competitors, a condition that may not be met because managers might either fail to recognize a particular competitor or might instead myopically consider the firm not to be a competitor (Baum and Lant, 2003; Chen, Kuo-Hsien, and Tsai, 2007; Porac *et al.*, 1995; Reger and Huff, 1993; Tsai, Su, and Chen, 2011).

Second, the focal firm must also have the motivation to actively compete. Such motivation may be missing if the firm is currently in a détente with the rival that might be broken by excessive competition, such as in the literature on multimarket contact (MMC) (Bernheim and Whinston, 1990; Gimeno, 1999; Jayachandran and Varadarajan, 1999; McGrath and MacMillan, 1998). Alternatively, such motivation may be missing because competing would require actions, such as lowering prices, that would have broader negative ramifications across the firm's broader business activities, as in the literature on judo strategy (Yoffie and Cusumano, 1999; Gelman and Salop, 1983; Gimeno, 2004; Hambrick, 1995; Más-Ruiz, Nicolau-Gonzálbez, and Ruiz-Moreno, 2005).

Finally, the focal firm must have the capability to undertake competitive action. Limitations on a firm's ability to competitively respond, for example by copying a new and successful product, have been central to strategy literature's explanations of heterogeneous performance (Barney, 1996; Teece, Pisano, and Shuen, 1997).

For concreteness, we introduce our theoretical predictions through our motivating empirical setting—consumer car leasing in the United States. Our results suggest that the market segmentation by captive and independent lessors cannot be explained solely by differences in capabilities, but rather appears to be heavily determined by divergent motivations. These findings, extended to similar settings, suggest that competition will be greatly reduced in markets in which significant market share is held by integrated firms from complementary industries because their unique motivation will help divide the market with stand-alone competitors in the place of direct competition.

EMPIRICAL SETTING

How auto leasing works

A lease is a long-term rental agreement, typically over a year in length, and usually exists as an

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alternative to an outright purchase. Leasing is prevalent in most major durable goods markets, including homes, airplanes, manufacturing equipment, office equipment, trucks, and automobiles. Scholars have suggested several reasons why leases might exist, including price discrimination toward customers who value the newest goods (Hendel and Lizzeri, 2002; Johnson and Lewellen, 1972), a means of addressing adverse selection (Johnson and Waldman, 2003), and as a way to limit the secondary market (Bulow, 1982), which can put downward pressure on prices for some firms (Bennett, Seamans, and Zhu, 2014).

In the American new car market, a lease is initiated as follows. A customer enters a dealership (which are independent of manufacturers by law) and expresses interest in a car. If the customer is interested in a lease, she specifies the length of the lease and provides information necessary for verifying her creditworthiness.

The salesperson will then use a computer to access to a lease bid system. The salesperson will enter details of the vehicle, the customer, and the length of the desired lease and the system will return a set of offers from different lessors with different payment terms. Those offers are the product of what is essentially an auction. Each lessor has specified certain rules governing which types of leases they would be willing to offer and the financial terms at which they would offer them. In a sense, each length of lease, car model, and customer financial score segment is a different "market" in which lessors decide whether or not to participate, and how intensely, by specifying their bidding strategy. To compete intensely, a lessor must offer lower monthly payments in a specific segment of the lease market. To compete less intensely, the lessor may elect not to bid in a particular market at all, or may offer a high price that will rarely win customers. The salesperson, being incentivized to choose the bid with the best terms so that he can potentially mark up the interest rate, then presents the financing option to the customer.

If the customer opts to enter the lease, the lessor purchases the car from the dealership and rents it to the customer at the specified financial terms for the designated term length. At the conclusion of the term, the customer can opt to buy the car from the lessor at a price specified in the lease terms called the "residual value," or return the vehicle to the lessor. If the customer returns the car, the lessor will resell the vehicle as used at whatever price the market will bear.

The lessor's total revenue is comprised of two parts. The first is the sum of payments from the lessee. The second is the amount the lessor will be able to get for the vehicle at the end of the term, which is uncertain at the beginning of the lease. To make a profit, the lessor needs the sum of these two to be greater than the cost of purchasing the vehicle for the lessee plus the cost of capital. The task of the lessor, therefore, is to accurately predict the end-of-lease value of the vehicle so the payment terms can be set to cover the depreciation. Potential lessors who predict the highest end-of-term values will offer the lowest lease payments and suffer the winner's curse of "winning" the auction and potentially losing money on the deal. All else equal, therefore, lessors prefer vehicles where they can be more certain about the lease-end value as this minimizes the risk.

Not all lessors, however, have the same incentives. The incentives described above apply to "independent" lessors—financial institutions like Wells Fargo and Bank of America—that seek to profit from their leasing business by itself. Independents are different from "captives," which are financial subsidiaries, like Toyota Financial and Ford Motor Credit, which are owned by the major manufacturers. This structure, which is common across many durable goods markets, imparts some interesting competitive nuance. The independent lessors, who play the role of B in Figure 1, are direct competitors to the captive lessors (A_2). As Pierce (2009) detailed, because more attractive lease terms can make a customer select one manufacturer's vehicle over another's, the independent lessors are also complementors to the manufacturers (A_1). The captive lessors (A_2), who also complement the manufacturers (A_1), and are owned by them, can be internally incentivized to provide attractive lease terms on unpopular or unreliable vehicles—car-term-credit score markets that might otherwise be viewed as too risky to offer leases on—in order to subsidize those unattractive vehicles.

The automobile leasing market is a special case of the more general phenomenon of a vertically-integrated firm competing against and complementing, through its different divisions, independent firms. For example, the presence of private label brands in supermarkets represents both competition and a complement to food

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product companies. A customer might go out of her way to shop at a particular market that stocks Barbara's Puffins, a brand of cereal she likes. Once there, she'll do the rest of her shopping. In that case, Barbara's Puffins complements the rest of the market's inventory. The market's private label cereal may also be a complement to other products, while simultaneously competing with Barbara's. The same market structure exists with private label clothing at department stores like Nordstrom, hospitals that accept their own health plan in addition to those of private insurers, and many other settings.

The motivations and capabilities of captive and independent lessors

Independent lessors' primary motivation is to maximize profit from issued lease contracts, which depends on the stream of lease payments covering the depreciation, cost of capital to the bank, and the risk of borrower default. As Pierce (2012) details, directly profiting from leases is not the main goal of the captive lessors. Instead, manufacturers use captive leases for several broader corporate purposes. As an executive at a captive lessor directly told us: "Our main goal is to support new car sales." Consistent with those motivations, he noted that his staff is salaried, rather than paid based on the profitability of leases.

One motivation for a captive to implement unprofitable leases is to increase sales and reduce inventory for a poorly selling car, offering lower lease payments primarily by increasing the residual value term (Pierce, 2012). This practice, called "subvention," causes the captive to lose money on the lease in order to support the sale of that car. As Pierce (2012) notes, much of this subvention may be suboptimal, reflecting internal agency issues within the manufacturer. But it may also serve a net beneficial function of providing pricing flexibility toward the subset of customers with strong leasing preferences, since manufacturers almost never lower retail prices during a given model year (Silva-Risso and Zettelmeyer, 2006). Writing inexpensive lease financing lowers the true price of the vehicle without changing the "sticker price," thereby clearing out inventory.

Captives might also be motived to write unprofitable leases because of the poor signal that a low captive residual value would send to the market. Low residual values from a captive lessor, which has superior access to proprietary information on a vehicle, could credibly signal low vehicle quality to consumers, financial institutions, and the press. Only by knowingly maintaining unprofitably high residual values might a manufacturer sustain the illusion of confidence in the quality of its own vehicle.

Captives are motivated to accept lower revenues on lease financing for two other important reasons related to customer retention. First, the captive subsidiary can give manufacturers precise information on when an existing lease customer will be searching for a replacement vehicle, allowing them to target the timing and nature of marketing. Second, customers are certain to return to one of the brand's dealerships to return the vehicle, guaranteeing the manufacturer the opportunity to sell them their next car. In practice, these reasons deliver repeat business for the manufacturers. Maritz Research estimates that while only 39 percent of car buyers become repeat customers, over 63 percent of lessees returned to the same brand (Henry, 2012).

Consider, for example, the Chevrolet Volt. Announced to great fanfare and press, the Volt was the first mass-market plug-in hybrid vehicle in the United States. In its first year, it was named both *Motor Trend*'s 2011 Car of the Year and *Automobile Magazine*'s Automobile of the Year. Despite the press, however, sales of the Volt were much lower than expected, likely due to its high price. At $45K, the Volt was seen as a competitor to high-tier European luxury vehicles. In order to make the Volt more attractive and accessible, GMAC was encouraged to offer very competitive leases on Volts. "No one's expecting you to make money on it," we were told of leases written on Volts by an industry executive.

Just as the motivations of captive and independent lessors are very different, so too are their capabilities. Captive lessors have advantages over independents based on their proprietary knowledge of factors that influence vehicle depreciation, such as timing of new model introduction. For example, a marginally improved model redesign has much less effect on the depreciation of older models than does a dramatically new body style released. Given that, knowing the product roadmap and specific redesign details would allow a lessor to better predict depreciation (Pierce, 2012). This advantage allows them to better predict residual values, and thus, more accurately price leases.

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Although independent lessors such as banks may have worse information on how to price a lease, they have fundamentally lower costs of capital because of their extensive consumer and commercial deposit accounts as well as their diversified portfolios. An executive, who had worked at both captive and independent lessors, we interviewed explained that independent lessors like Wells Fargo might have a cost of capital of 2.25 percent, compared to roughly 2.75 percent for the captives without access to deposit accounts. Furthermore, their higher diversification, both in business lines as well as in their leasing and loan portfolios (across car brands), is almost certain to lower their cost of capital (Hann, Ogneva, and Ozbas, 2013). This combined lower average cost of capital allows captive lessors to offer leases with lower interest rates, thereby decreasing the monthly payments. Indeed, historical measures of the weighted average cost of capital for the banking industry have been on average 1.14 percent lower than that of the automotive industry over the past 15 years (Damodaran, 2015).

These motivation and capability differences provide a clear path to understanding how integrated and independent lessors might divide the market. Because captives' primary motivation is to facilitate car sales, they have little incentive to aggressively compete for leases on cars that independents are likely to finance. Since the independents would provide the leases anyway, there would be few additional vehicle sales from their participation, and the independents' lower cost of capital would prevent the captives from winning the lease at a profitable price unless they had the most extreme value prediction and would then suffer the winner's curse. Likewise, the independents are not motivated to compete against the captives because the leases on which the captives are the most active bidders are those for which the lease needs to be subsidized, and because the captives have proprietary knowledge about residual values, it is difficult to identify whether abnormal residual values reflect subsidization or this depreciation knowledge. Our contacts suggested that captives essentially split the market with independents: "[We] don't really view them as competitors. Our high market share comes from high subvention rates." These high subsidization rates are critical to generating revenue for the manufacturers, but are certainly not locally profit-maximizing for the captives.

PREDICTIONS

Pure capabilities view

To demonstrate the added value of the AMC framework, we first develop the predictions regarding market share of the two classes of firms from a pure capabilities view, and then develop the predictions from the AMC framework.

The primary differences in capabilities between independents and captives are as follows. Independents, because of their integration with financial institutions that have access to deposit accounts, have a lower cost of capital. Captives, because of their relationship with manufacturers, have access to product roadmaps, and therefore, may be better at predicting depreciation. These differences in capabilities yield the following predictions.

First, access to the product roadmap should increase the market share of captives when depreciation is the hardest to predict due to potential product redesigns. When a particular body style has been on sale for a few years, there is a chance that the vehicle will be refreshed within the lease term, dramatically reducing the end-of-term value for the leased vehicle. This uncertainty may dissuade independents. This information asymmetry is least present when a car is leased in the first year of the new body style. Because of the tremendous fixed costs of designing a body style, it will typically be sold for a number of years, meaning that captives' capability advantage will be the weakest on vehicles in the first year after a redesign.

Prediction C1: Independent market share will be higher on vehicles in the first year after a body style refresh.

The second pure capabilities prediction derives from independents' superior cost of capital. Because a lower cost of capital allows them to accept lower lease rates and still be profitable, this would allow independents to outbid captives. This should result in higher market share.

Prediction C2: Independent lessors will, on average, have greater market share than captives.

Although independents' lower costs gives them an advantage in serving all markets, this advantage is particularly likely to allow them to dominate

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in the segments that are the least attractive leasing segments. Customers who are high credit risks, for example, are more likely to default, meaning that the lessor will lose some of the stream of payments. A pure capabilities story would argue that many such customers would be too risky for high-cost captive lessors to serve, while lower-cost independents could still profitably serve such customers. This suggests that independents will have a higher market share among customers with higher credit risks.

Prediction C3a: Independent market share will be increasing in credit risk.

A second dimension that may make a lease less attractive is the reliability of the vehicle. We define reliability as the probability of major problems in a given length of ownership. A car with major mechanical defects is not only very likely to have a post-lease market value lower than the residual value, but it is also the least likely to be bought by the customer at lease termination. Unreliable cars, therefore, have higher variances of their *ex post* realized value. Because independents have a lower cost of capital, their profit is more robust to those errors, and therefore, the pure capability view predicts that they will have higher market share on unreliable vehicles. Furthermore, a pure capabilities argument would also expect captives to avoid unreliable vehicles because of proprietary knowledge about reliability issues in its cars. Although such a capability may be minor, given the widespread dissemination of vehicle reliability data (Pierce, 2012), it may provide some advantage for captives in avoiding low reliability vehicles that have recently been introduced to the market (and for which there is little reliability data). Collectively, these capability differences suggest independents will have substantially higher market share in the most unreliable vehicles.

Prediction C3b: Independent market share will be decreasing in vehicle reliability.

AMC framework

In contrast to a pure capabilities story, the first implication of the AMC analysis of the industry is that captive lessors would be more active on the high-risk unattractive leases. Independents care only about the profitability of the leases themselves,

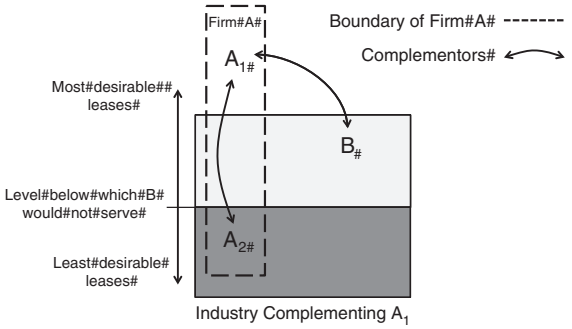

Figure 2. Visual representation of the division of the market. Figure 2 follows Figure 1, but adds vertical differentiation to the industry in which B and A2 operate. Leases toward the top of the industry are the most desirable. They are the leases for which payment is more predictable, for example, because the lessee's credit is better or because the cars are more reliable. We argue that A2 will operate in the portions of the complementing market that B is not willing to enter because their goal is to expand the market. Competing on customers cedes more value to the customer and doesn't expand the market

and will therefore, serve only those leases from which they can profit. Although the independents' capability advantage generally makes it difficult for captives to profit directly on leases that are unprofitable for independents, the motivation of the captives is not one of pure divisional profitability. Captives are optimizing the overall profit of the larger corporation, and therefore, are willing to offer many leases that independents will not to serve several broader corporate goals. First, captives may lose money on leases to make the vehicles more attractive to customers who may be a source of revenue from future repeat purchases or services. Second, captives may serve as a price discrimination tool to adjust prices across time or customer base. Third, captives may write unprofitable leases to manage inventory, using leases to install clearance prices. In stark opposition to the pure capabilities view, therefore, the AMC framework suggests that captives will be most active on the many of the most unattractive leases. Figure 2 depicts this division of the market with independents taking the leases most attractive to them, and captives serving the leases that would otherwise not be served.

In the auto context, as described above, one class of leases that independents would not provide includes those for which the customer's credit score suggests she is at high risk of defaulting. For high-risk customers, the independent is unlikely to

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issue leases that are almost certainly unprofitable, but for the manufacturer, even such high credit-risk leases might be beneficial. For young buyers with cash constraints and limited credit, such leases can serve as loss-leaders to lock the customer into the brand. Also, manufacturers can use captive leases to offer subprime credit only on those vehicles for which there is excessive inventory. Generalized to other settings, that fact would suggest that complementarily integrated firms will create products that create value in their complementary core product, but might not be profitable for an independent firm to produce.

Prediction AMC1a: Captive market share will be increasing in credit risk.

Because much of the information about vehicle reliability is publicly available, any information advantage by captive lessors in avoiding low reliability vehicles is likely to be small. What is instead likely to determine captive market share of low reliability vehicles is the unwillingness of independent lessors to write lease contracts for them. Given that a considerable segment of consumers have strong preferences to lease, car manufacturers must encourage their captive subsidiaries to provide leases at a loss in order to avoid losing customers to competing brands.

Prediction AMC1b: Captive market share will be decreasing in reliability.

An AMC analysis suggests that captives might be motivated to subsidize vehicles that were selling poorly to benefit the manufacturer. One measure of the need to subsidize a vehicle is outstanding inventory. If a vehicle is less demanded than predicted, that will be evidenced independent's lack of interest in writing leases for it and will result in dealers accumulating a large inventory. Because captives' role is to prompt sales where they wouldn't otherwise be, one might expect that the captives would be more active on vehicles for which there is higher standing inventory.

Prediction AMC2: Captive market share will be higher on vehicles with higher existing inventory than on vehicles with lower inventories.

	Theoretical frame	
	Pure capabilities	AMC
First year after body style refresh	+	
Credit risk customer	+	-
Unreliable vehicle	+	-
Higher existing inventory		-

Figure 3. Predictions about independents' market share by theoretical frame

The above-described predictions are all based on the notion that captives are motivated to compete differently to benefit the manufacturer. For example, the motivation argument predicts that while GMAC may bid on leases for unreliable GM vehicles, there is no reason to expect that they would bid on leases for unreliable Ford vehicles. Consequently, we expect each of the AMC predictions to only apply when captives are leasing their own vehicles.

Prediction AMC3a: The share of leases offered by a captive that are its own manufacturer's make is increasing in credit risk.
Prediction AMC3b: The share of leases offered by a captive that are its own manufacturer's make is increasing in inventory.
Prediction AMC3c: The share of leases offered by a captive that are its own manufacturer's make is decreasing in reliability.
Prediction AMC4a: The increase in captive market share on high-credit-risk leases is only present on vehicles from the captive's own manufacturer.
Prediction AMC4b: The increase in captive market share on high inventory leases is only present on vehicles from the captive's own manufacturer.

Figure 3 summarizes the different predictions from the pure capabilities view and the AMC framework.

DATA

Our data come from three sources. Lease information comes from a dataset of 258,936 California lease contracts from a data provider to the

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Table 1. Summary statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Captive [dummy]	179,857	0.591	0.492	0	1
Captive's manufacturer [dummy]	179,857	0.581	0.493	0	1
Capitalized cost	179,857	31,395	12,647	9,652	169,684
Lease term (months)	179,857	45.36	11.26	24	66
Consumer reports average durability [1–5]	179,857	4.246	0.695	1.750	5
Credit risk score	179,857	59.02	2.496	30	72.48
Inventory	27,770	75.81	27.03	13	300

auto industry. Data from this provider have been used extensively in the literature. For more details on collection and representativeness, see Busse, Silva-Risso, and Zettelmeyer (2006) and Bennett (2013). We calculate a credit risk score for each lessee by taking the average interest rate on car loans sold at the same dealership where the lease was originated. This is a rough proxy for the credit risk of a dealership's customers, and assumes that the relative creditworthiness of lessees across dealerships parallels that of borrowers. Reliability data is from Consumer Reports (CR), which assigns overall reliability scores of 1–3 based on the number of major problems reported in owner surveys (with 3 being few problems). Vehicles also receive component reliability scores of 1–5 for the engine, transmission, and electrical and braking systems. Inventory quantities were manually collected from the Automotive News and were available for cars covering 27,770 of the leases. Summary statistics are presented in Table 1.

RESULTS

Our first class of predictions, based on the pure capabilities view, was that independents would have higher market share on vehicles in their first year of a new design (*C1*) and would have a higher market share overall (*C2*). Column 1 of Table 2 presents a linear probability model (LPM) with the dependent variable an indicator for a lease being offered by a captive, controls for credit risk, log inventory, and term length along with nameplate × segment fixed effects and a quadratic running time variable. The coefficient on *First year of body* is negative and significant, suggesting that independents are more represented on vehicles where uncertainty about a model refresh is less problematic. This is consistent with prediction (*C1*) and suggests that capabilities are, indeed, important for explaining market division in this setting. The magnitude of the coefficient suggests that independents are almost five percent more likely to have written a lease on a given vehicle, all else equal, if it is in its first year of a new body style. Given the baseline independent market share of 59 percent, that constitutes an almost 10-percent increase. That overall baseline percentage, however, is not consistent with prediction *C2*, suggesting that capabilities may be insufficient to explain the competitive dynamics in this market. We proceed, therefore, to examine whether the facts are consistent with the predictions of the AMC analysis.

Column 1 of Table 2 also includes regressors for credit riskiness and log of inventory. Our analysis suggested that captives would be more represented in leases that would be less desirable to firms maximizing profit on leases. Specifically, we suggested that captive market share would increase in prospective lessees' credit riskiness (prediction *AMC1a*) and extant inventory (prediction *AMC2*) and decrease in vehicle reliability (prediction *AMC1b*). Returning to column 1 of Table 2, we see positive and significant coefficients on credit risk and log inventory. This suggests that these less profitable leases, which independents were less likely to serve, all else equal, are more likely to be served by captives. A one-standard-deviation increase in credit risk increases the likelihood of a captive lessor by 1.65 percent ($2.5 \times 0.66 = 1.65$). A one-percent increase in inventory is associated with a 6.7-percent increase in the probability of a captive lessor, an 11.3-percent increase over the base rate.

Because inventory and durability are strongly correlated, in column 3, we replace log inventory with *Consumer Reports Overall Reliability*. Consistent with *AMC1b*, the coefficient on reliability is negative and significant, suggesting that independents are more represented on desirable vehicles, where the risk of mis-predicting residual value

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Table 2. Linear probability model of captive market share

	Captive market share				
Variables	(1)	(2)	(3)	(4)	(5)
Credit risk	0.00666 ***	0.00680 ***	0.00690 ***	0.00654 ***	0.00643 ***
	(0.00170)	(0.00144)	(0.00144)	(0.00147)	(0.00166)
First year of body	−0.0487 **	−0.00666	−0.00766		
	(0.0199)	(0.0117)	(0.0114)		
Log inventory	0.0673 ***				0.0521 **
	(0.0191)				(0.0203)
Consumer reports average reliability		−0.0534 ***			
		(0.0124)			
Consumer reports engine reliability			−0.00507		
			(0.0136)		
Consumer reports transmission reliability			−0.0388 ***		
			(0.0105)		
Consumer reports electrical reliability			−0.00382		
			(0.00892)		
Consumer reports brakes reliability			−0.00983		
			(0.00694)		
Lease term	−0.0275 ***	−0.0219 ***	−0.0219 ***	−0.0212 ***	−0.0269 ***
	(0.000586)	(0.000588)	(0.000588)	(0.000619)	(0.000645)
Constant	1.710 ***	1.153 ***	1.191 ***	1.131 ***	1.827 ***
	(0.476)	(0.113)	(0.116)	(0.129)	(0.580)
Observations	27,770	179,857	179,857	179,857	27,770
R-squared	0.559	0.376	0.377	0.411	0.574
Quadratic time trend	Yes	Yes	Yes	Yes	Yes
FE	Nameplate × segment	Nameplate × segment	Nameplate × segment	Car	Car
Sample	Inventory available	All	All	All	Inventory available

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Robust standard errors in parentheses. Errors clustered at Car level.

is lower. A one-unit increase in the CR reliability score is associated with a five-percent decrease in captive market share, a nearly 10-percent decrease from the base rate. In column 3 of Table 2, we disaggregate the durability score into its component scores. We find that all the marginal effects of component scores have the predicted sign, yet the only one strongly identified is the reliability of the transmission, a particularly costly repair.

In columns 3 and 4, we replace the nameplate × segment fixed effects with the more granular car fixed effect. We follow Pierce (2009, 2012) in defining a *car* as a model year, nameplate, model triplet. This absorbs the reliability measure, but allows us to test the robustness of the predictions on credit risk and inventory to all time-invariant car-level effects. Both the credit risk and inventory predictions are qualitatively unchanged.

Finally, our predictions were driven by a difference in motivation between captives and independents. These differences in motivation predict that the differences in competitive intensity by the captives are due to their relationship with their manufacturer and not more general tastes for those classes of leases. That suggests that the share of captives' leases are increasing in credit riskiness (*AMC3a*) and inventory (*AMC3b*), and decreasing in reliability (*AMC3c*). Column 1 of Table 3 shows that the correlations in the data are consistent with

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Table 3. Differences in captive market share are due to behavior toward their manufacturer's vehicles

	Lessor's own make		Captive market share
Variables	(1)	(2)	(3)
Credit risk	0.00637 ***	0.00658 ***	0.000245
	(0.00162)	(0.00145)	(0.000519)
Log inventory	0.0541 ***		−0.000745
	(0.0205)		(0.00599)
Consumer reports average reliability		−0.0477 ***	
		(0.0128)	
Lease term	−0.0272 ***	−0.0223 ***	−3.75*e*-05
	(0.000669)	(0.000629)	(0.000107)
Constant	1.669 ***	1.143 ***	0.485 ***
	(0.587)	(0.113)	(0.130)
Observations	27,770	179,857	12,690
R-squared	0.586	0.391	0.038
Quadratic time trend	Yes	Yes	Yes
FE	Car	Nameplate × segment	Car
Sample	All	All	Not own

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Robust standard errors in parentheses. Errors clustered at Car level.

those predictions. In column 2 of Table 3, we return to nameplate × segment fixed effects and so that we can investigate reliability. Consistent with prediction *AMC3c*, captives' share of their leases of their own manufacturer are decreasing in reliability, suggesting independents compete more intensely for those reliable vehicles. In column 3 of Table 3, we exclude the cars that are of the captive's own manufacturer and estimate market share of the remaining leases. Credit riskiness and inventory have fairly precisely estimated zero effects on market share for non-own-manufacturer vehicles. This is consistent with the notion that those variables only mattered because of the different motivation captives have when issuing leases on vehicles from their own manufacturer.

DISCUSSION

Recent work on ecosystems (e.g., Adner and Kapoor, 2010; Adner, Oxley, and Silverman, 2014; Boudreau, 2010; Pierce, 2009) and value-based strategy (e.g., Brandenburger and Nalebuff, 1995; Brandenburger and Stuart, 1996) has highlighted the importance of complementors to a firm's performance. Properly accounting for firms' interactions with their complementors is critical for understanding competitive dynamics. This becomes even more critical when dealing with multi-business firms that may simultaneously compete with and complement businesses. We have argued that in one particular setting in which corporate scope and complementarities interact, a pure capabilities-based view is insufficient to accurately predict competitive dynamics. We propose that the AMC framework (e.g., Chen *et al.*, 2007) adds significant predictive power to analyses. In one particular industrial setting, we generate predictions about market splits between firms of different scopes and test our predictions. We find that in the American auto leasing market, the AMC analysis captures much of the nuance of the competitive dynamics between captive and independent auto lessors.

This paper also contributes to the literature on how disadvantaged firms can compete with firms with capability advantages. While the literature on judo strategy (e.g., Gelman and Salop, 1983; Más-Ruiz *et al.*, 2005) originally began focused on commitment to keep volumes lower, it can be thought of more broadly as firms with different motivations dividing a market. We suggest, and find evidence, that accounting for different motivations via the AMC framework can significantly improve predictions about competitive dynamics.

While our setting has the major advantage of allowing us to shed light on these particular issues of interest, it also comes with two important limitations. Our analysis is bounded to settings in which there are benefits to the vertically integrated firm from complementarities with competitors. Outside of these settings there may not be differences

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in motivation and a pure capabilities story may satisfactorily predict competitive dynamics. Our analysis also does not reveal much about the third pillar of the AMC model—awareness. Because the industry has well-defined boundaries and structured competition through the bidding terminals, all the participants are well aware of one another. This feature allows us to isolate motivation, our phenomenon of interest, but prevents us from demonstrating the importance of awareness in the framework. We leave it to others to highlight the added value of the AMC model in explaining competitor identification (e.g., Porac *et al.*, 1995).

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