

Product Markets, Competition and Corporate Finance: A Review and Directions for Future Research

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Abstract

We review the literature that examines how product markets and competition interact with corporate finance, and provide some ideas for future research. The main takeaway from more than forty years of research is that product market considerations have first-order effects on our understanding of firms' decisions. The nature and intensity of firms' interactions in the product market influence their ability to obtain financing, impacts their investment, acquisition, and innovation decisions, as well as affects their organizational and governance structure. Firms' decisions are not only influenced by their product market environment, but their decisions also directly shape the structure of product markets and the resulting competition. The academic literature in this area is now mature, rich, and complex. It spans multiple areas in finance and economics, builds upon various fundamental economic forces, studies a large array of corporate decisions, and highlights that conclusions are often nuanced and depend heavily on the type and extent of competition. We also discuss practical issues related to the measurement of markets and competition that are relevant for future researchers, as well as recent changes in the nature of competition and markets' boundaries. Overall, the literature delivers many important lessons to better understand the determinants and consequences of firms' decisions.

Keywords: corporate finance, industry product markets, competition and concentration, industrial organization, financing decisions

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1 Introduction

The nature of product market competition and its influence on firms have a long history in economics. Competition was already discussed by Adam Smith in the *Wealth of Nations*. George Stigler won the Nobel prize in 1982 for his “*seminal studies of industrial structures, functioning of markets and causes and effects of public regulation*”. Firms do not operate in isolation but interact within product markets. These interactions and the resulting competition (or the lack of it) receive an important policy focus as society wishes to ensure that the contest or game is “fair”. One of the chief parts of competition enforcement in business is to ensure companies do not take actions that restrain competition and result in harm to consumers (or firms) through prices that are systematically higher (or lower) than the cost of production.

The central point highlighted in this review is that firms’ interactions in product markets influence *all* financial and real decisions studied by corporate finance scholars. A vast research effort over the last forty years unambiguously concludes that product market considerations have first-order effects on firms’ decisions, and accounting for these effects can alter conclusions made on other attributes. The main conclusion of this research is that the nature of product market interactions influences firms’ ability to get financing, impacts their investment, acquisition, and innovation decisions, and affects their organizational and governance structure. Firms’ decisions are not only shaped by their product market environment, but also directly impact the structure of product markets they operate within.

Despite the far-reaching conclusion that product markets “matter” for corporate finance research, the literature connecting firms’ decisions to product markets is rich and complex. It builds upon various fundamental economic forces, focuses on a wide range of corporate decisions, and highlights that conclusions are often nuanced and depend on contexts. This is hardly surprising given the genuine multifaceted nature of product market interactions and the multiplicity of potential forces at play. In addition, identifying the relevant mechanisms in the data has been challenging given the natural endogeneity between firms’ financial and product market decisions. Researchers have responded to this challenge by using a large variety of techniques, approaches, and samples to deal with this complexity.

To distill the key insights from this vast literature and simplify their exposition, our review

is organized around three broad corporate finance research themes: financing, real decisions, and governance, as illustrated in Figure 1. For each theme, we discuss the main economic channels suggested by researchers, present the theoretical predictions, and underline the sources of potential divergences. We then present empirical tests and results, emphasize the approaches employed by researchers, and explain how the findings support (or invalidate) specific mechanisms. The last part of this chapter discusses practical issues related to the delineation of markets, measurements of competition, and their evolution over time.

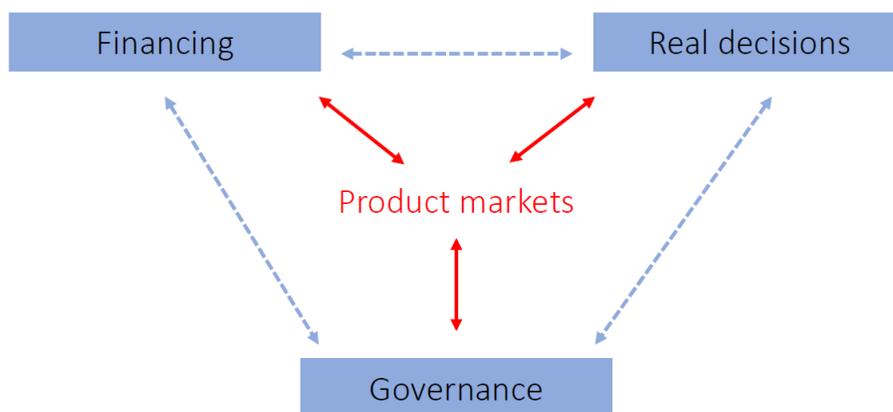


Figure 1: Main research themes on the interactions between corporate finance and product markets

First, consider a firm’s financing decisions (the top left box in the figure). A firm’s financing choices can have strategic implications on its rivals that it competes with, as early literature we discuss has shown. A firm’s financing choices can also impact the risk a firm has and via that risk can impact competitors, suppliers and other stakeholders of the firm - including customers.

Second, consider the real decisions it makes (the right hand top box). These include the size of the firm, its optimal scope which includes M&A and vertical integration, and its investment decisions. The product market impacts all of these as this review will discuss and of course these decisions impact product markets.

Next, consider a firm’s corporate governance (the bottom box). The product market impacts the firm’s optimal governance system. Competition around the firm can impact the optimal governance system through changing the need to offer incentives managers to perform as the product market

may provide those incentives.

Specifically, the chapter is organized as follows. Section 2 starts with the research studying the interactions between firms' financing and product market decisions. This is where the interest of corporate finance scholars for product market environments first emerged forty years ago. Next, we concentrate on studies investigating firms' real decisions: investment, mergers and acquisitions, and innovation. Thus, Section 3 covers papers examining the interplay between product markets and firms' physical investment. Section 4 discusses the literature connecting product market forces to mergers and acquisitions (M&A). Section 5 reviews the literature studying how competition influences firms' innovation decisions. Section 6 covers the research investigating the connections between product markets and various aspects of corporate governance. In Section 7, we review the definitions of markets and measures of competition used by researchers, and discuss their limitations. We then present in Section 8 recent time series evidence on how product market and competition have changed. We conclude by discussing possible directions and ideas for future research.

A few caveats are in order. First, some studies reviewed in this chapter examine questions that span multiple research themes, and we made judgment calls as to where they fit best. Second, the topics covered in this chapter are also intensively researched in tangent fields of economics, in particular in industrial organization and organizational economics. We deliberately focus on corporate finance contributions, to the greatest extent possible. Third, the vast majority of empirical evidence covered in this chapter concerns the United States. This asymmetric focus only reflects the geographical distribution of existing evidence and data availability. Fourth, to keep the length of this review under control, we had to exclude certain topics, such as the role of product markets on the interactions between firms and the labor force, the formation of asset prices, or the internal organization of firms. Finally, similar to any review article, this one reflects our views, knowledge, and interpretations. We thus apologize to the authors whose work we may have forgotten or misrepresented.

2 Financial structure, financing, and product markets

In this section, we review the extensive literature studying the interactions between firms' financing structures and their product market strategies and performance. This area of research incarnates the genesis of corporate finance scholars' interest in the role of product markets. This area has also received the most research attention in the last decades.

This literature started in the eighties, motivated by the absence of product market considerations in capital structure models. Until the mid-eighties, theories of optimal capital structure mostly considered a single firm in isolation, thereby ignoring the influence of other firms in the product market, as well as the effects of capital structure decisions on product market environments. A series of studies then emerged, developing analyses of capital structure that integrate product market environments (i.e., rivals) together with classical frictions (e.g., conflicts between various stakeholders), and highlighting important new economic mechanisms. These seminal contributions demonstrate that some standard results may be reversed by accounting for product market considerations.

We describe below the main theoretical contributions in this area, focusing primarily on the key underlying mechanisms linking financing to product market decisions. We then present the empirical evidence. Existing results largely supports the importance of product market considerations in firms' financial strategies, but also underline a large heterogeneity across firms and product market structures.

2.1 Main theories on the interactions between financing and product markets

The question of how a firm's financial decisions interact with its product market decisions has no unique answer. The answer depends on which feature of a firm's market activity we focus on and which product market environment we consider. For that reason, we focus on the specific theoretical mechanisms developed in the literature, and present the pioneering contributions highlighting these mechanisms. We can broadly distinguish between two strands of theories. The first strand considers situations in which firms act strategically in the product market (i.e., imperfect competition) and studies the strategic roles of financing in different contexts. The second strand consists of models analyzing financial and product market equilibrium simultaneously, in competitive markets. Both

approaches have produced a wide variety of economic mechanisms and provides hints on the specific situations in which they should be empirically relevant.¹

2.1.1 Models with strategic financing

The first strand of models considers settings where competition is imperfect and firms choose their financing structure strategically, i.e., with the intention to alter the decisions of rivals. Similar to standard theories of financing choices (i.e., ignoring the role of product markets), models of strategic debt build on the existence (and consequences) of potential conflicts of interests among the diverse stakeholders in the firm. In this context, debt serves as a commitment device. One approach contends that the chosen financing structure alters a firm's incentives ex post and affects its competitive behaviors. Another approach posits that a levered firm has an ex ante incentives to mitigate its risk of bankruptcy through adequate competitive behaviors.

The first group focuses on the “strategic commitment” effect of debt. Because of the conflicts of interest because shareholders and debtholders, a firm's decision to finance its activities with debt works as an ex post commitment to more aggressive behavior in the product market. This commitment is credible because of the option-like payoffs associated with debt under limited liability, and induces a favourable output reduction by the rival. This strategic effect is best illustrated by the model of Brander and Lewis (1986). In their model, two firms compete by choosing output (in a Cournot model), after first choosing their capital structure. Profits are influenced by a random shock that increases them with good realizations and decreases them with bad realizations. More debt leads to a strategic expansion of output at the expense of the rival firm following good realizations and lower output following bad ones. As shareholders are residual claimants to the profits, by increasing the variance of the profits through the choice of output, they increase the value of their option-like claims on profits.

The model of Brander and Lewis (1986) can be seen as a version of the traditional risk-seeking problem when firms play a Cournot game in the product market. The key message is that debt financing and the commitment it implies, can induce aggressive product market strategies. Another related interpretation is that, because of the implied incentives to be aggressive ex post, shareholders

¹See also the excellent surveys of Maksimovic (1995), Parsons and Titman (2008), and more recently Sertsios (2020).

will choose debt strategically depending on specific product market environments. For instance, Maksimovic (1988) shows that debt affects the incentive of firms in a cartel to deviate from their collusion agreements. Whereas the threat of losing future collusion profits keeps cartel firms from deviating, sufficiently large debt can make deviations attractive. As in Brander and Lewis (1986), this happens because shareholders reap the rewards of a deviation, while the lenders share the cost of a deviation. Since high leverage may destabilize the cartel, colluding firms may choose low debt to credibly commit to their collusive agreement.

As is frequently the case in game-theoretic settings, the equilibrium in Brander and Lewis (1986) depends on the assumptions about firms' competitive environment. For example, Showalter (1995) considers Bertrand price competition between firms and shows that the predictions of Brander and Lewis are reversed when firms compete in price with differentiated products. He shows that debt makes firms raise prices relative to an oligopoly model with differentiated price competition without debt. As in Brander and Lewis, both firms will use debt but the market will be less competitive than when firms do not have debt. As we will often see in this chapter, the divergence of results (here with Brander and Lewis (1986)) highlights the importance of the underlying product market settings to deliver specific predictions.

The second group of models formalize the “strategic bankruptcy” or “long purse” story of Telser (1966). The central idea is that a financially-strong rival (i.e., with a long purse) might increase its output *ex ante* to increase the probability of driving a financially weak firm (e.g., a high-debt firm) into insolvency. Dependence on outside financing and capital market imperfections can hinder a firm's ability to fight competition, which in turn prompts financially-strong rivals to pursue predatory market strategies. A classic illustration of this line of models is Bolton and Scharfstein (1990). In their model, a firm is financially constrained *ex ante* because future financing is contingent upon current profits. This contingency is set to prevent managers from diverting resources at the expense of the fund providers (e.g., debtholders). The main argument is that the commitment to terminate funding can better align the incentives of both parties if performance is poor. This contingency solution, however, can be costly in a competitive environment: it provides a financially-strong competitor with an opportunity to drive down the financially-weak firm's profits, in anticipation that the fund provider might not extend future financing.

The difference between models of “strategic commitment” is that in the “long purse” models, it

is the financially-strong firm that has the incentive to increase output to prey upon the financially-weak firm. The central message of this line of models is that debt financing, through its ex ante role of aligning internal incentives, can increase the risk of predation and hinder firms' ability to fight competition through aggressive product market strategies.

Developing an alternative "strategic investment" model, Phillips (1991) relies on the idea that debt constrains firms' managers to invest, and thus high debt may cause managers to behave more passively. A high level of debt therefore acts as a commitment to a higher cost of investment, making firms less aggressive competitors, decreasing output and increasing prices. Povel and Raith (2004) endogenize debt as an optimal financial contract, and consider the ex ante and ex post incentives that debt has on firms' product market decisions. The main result is that, ex ante, debt raises firms' marginal cost and makes them less aggressive competitors. Ex post, debt does not make firms more aggressive because the optimally designed financial contract eliminates risk-shifting incentives. The result of these two forces is that, on net, debt makes firms less aggressive competitors.

Overall, strategic debt models shed light on possible linkages between the product market consequences of firms' financing decisions and various economic channels, firms' characteristics, and product market environments. In addition, these models offer hints at various potential determinants of financing choices in imperfectly competitive product markets. Whether a specific mechanism is important for any individual market or firm depends on contexts.

2.1.2 Models without strategic financing

The second strand of models study how real and financial decisions are jointly determined within competitive markets (i.e., where firms do not behave strategically). In this context, firms make their own real and financial decisions in reference to the collective decisions of market peers, and equilibrium outcomes imply diversity of decisions within product markets. The optimal set of financial decisions for each firm is jointly determined with various product market characteristics.

The pioneering model of Maksimovic and Zechner (1991) is a prime example of this line of research. They incorporate conflicts of interest between shareholders and debtholders, and assume that firms can choose between a "safe" production technology with a certain marginal cost, and a "risky" technology with an uncertain cost. In partial equilibrium, no debt is issued since

shareholders would expropriate bondholders' wealth by picking the risky technology (i.e., the asset substitution effect). However, each firm has an incentive to use debt and adopt the risky technology because, by allowing firms to raise (lower) output in good (bad) states, the risky technology initially has greater expected profits and is riskier than the safe technology. As more firms pick the risky technology, the price of output more closely tracks that technology's marginal cost. The risky technology becomes less risky and less profitable. The equilibrium is obtained when the expected value of the safe and risky technologies is equal and firms are indifferent between using high levels of debt and the risky technology or low debt levels and the safe technology.

The key insight from Maksimovic and Zechner (1991) is that in equilibrium, firms' financial structure is irrelevant because the risk and profitability of a technology depend not only on ex-ante characteristics but also on how many firms adopt that technology. The model predicts the equilibrium distribution of debt *and* firms' characteristics and thus seeks to explain firms' heterogeneity. For instance, an interesting implication is that firms near the technological core of their market (i.e., using the technology also used by the majority of other firms) benefit from a risk-reducing "natural hedge" compared to firms at the technological fringe. These firms use less financial leverage than firms whose technology departs from the product market norm.

Various extensions of Maksimovic and Zechner (1991) have enriched the list of firms' and markets' characteristics that are relevant to explaining the distribution of debt within markets. For instance, the model of Williams (1995) considers entry and exit and adds perks consumption by managers. Similar to Maksimovic and Zechner (1991), Williams (1995) characterizes the equilibrium distribution of debt and firms' characteristics. By allowing entry, the model predicts an asymmetric equilibrium market structure characterized by a core of large, stable, profitable, capital-intensive, levered firms flanked by a competitive fringe of small, risky, non-profitable, labor-intensive firms. Overall, these (and many others) equilibrium models offer precise characterizations (and rationalizations) of the heterogeneity of financing choices within markets, and link them to various traits of firms and markets.

2.2 Evidence on the interaction between financial contracts and product markets

Based on the mechanisms put forth by the theories, researchers have studied the links between financing and product markets using a large variety of empirical methodologies, measures of “financing”, in various circumstances, using a variety of measures to characterize the competitive nature of markets, and focusing on several product market decisions and outcomes. This large research effort has resulted in an impressive collection of findings. This collection unambiguously confirms the importance of firms’ product market environments to explain their financing choices, as well as the impact on firms’ product market decisions and outcomes. To simplify exposition, we divide the empirical studies into two groups. The first includes studies examining the effects of firms’ financing decisions on their product market strategies, rivals’ reactions, and the resulting product market outcomes. The second group comprises studies assessing the influence of product market characteristics on firms’ financing choices.

2.2.1 The effect of financing on product markets

The first important empirical results on the influence of debt financing on product market behaviors are provided by Phillips (1995), Chevalier (1995b), Chevalier (1995a), and Kovenock and Phillips (1997). These pioneering papers exploit large changes in the capital structure of some firms in specific industries (i.e., recapitalizations or leverage buyouts (LBOs)) and analyze their product market consequences.

Phillips (1995) uses detailed data on output, price, and quantity in four industries (fiberglass insulation, tractor trailer, polyethylene, and gypsum) in which large firms experience increases in their debt ratios (more than 25 percentage points) between 1980 and 1990 through recapitalizations. He estimates structural industry supply and demand functions, and uses the intra-industry identification methods of Schmalensee (1989) to identify changes in competition. He hypothesizes that agency costs combined with free cash flow may make firms overinvest prior to the large increases in debt. Industry investment and competition might decrease post-increases in debt if debt decreases the free cash flow which is necessary to invest and advertise, as in Jensen (1986). In the first three industries, increased average debt ratio is negatively related to output but positively related to the

product price. Moreover, firms that increase their leverage experience lower sales and loose market shares (or fail to gain market shares when smaller rivals exit), suggesting that leverage renders firms less aggressive competitors. In the gypsum industry, there are few barriers to entry and the product is undifferentiated, thus it behaved more like a setting envisioned by Brander and Lewis industry in which firms that increased their debt ratio are more aggressive. In this industry, the average debt ratio is positively associated with output and negatively related to the product price.

Chevalier (1995a) focuses on the supermarket industry in which three large national chains undertook LBOs and one chain went through a leveraged recapitalizations in the late 1980's. An event-study analysis of the stock market reactions of 13 publicly-listed rivals indicates that these debt-increasing events increased the market value of chain's local rivals. In addition, Chevalier (1995a) collected detailed data on 13,515 supermarkets operating across 85 geographical markets (based on Metropolitan Statistical Areas (MSA)), 633 of which undertook an LBO (or recapitalization) between 1981 and 1990. She reports that supermarket chains were more likely to enter and expand in a local market if a large share of incumbent firms in that market undertook an LBO (or leveraged recapitalizations). Both sets of results indicate that leverage reduces the firm's aggressiveness in the product market, i.e., it reduces the intensity of competition.

Still relying on the supermarket industry, Chevalier (1995b) investigates how LBOs (between 1981 and 1990) affect the pricing behavior of firms and their rivals in local markets. She uses a local "grocery price index" to track the evolution of prices across 85 distinct locations (i.e., MSAs), allowing her to link price changes to the leverage of LBO firms and their local rivals. She reports that these changes in prices following LBOs depends on firms' and local markets' characteristics. In particular, prices decrease when rivals of the firms undertaking the LBO have low leverage, and one of the low-leverage rivals has a very large market share. These price drops are associated with LBO firms exiting the local market, suggesting that rivals attempt to "prey" on LBO chains. In contrast, prices increase when rivals are highly leveraged, and no single one with low debt has a large market share. These higher price increases the probability of witnessing entry in these local markets.

Overall, these studies show that debt influences product prices, market shares, as well as market entry and exit. Subsequent studies have been expanding these results in various directions, addressing the endogeneity of firms' financing choices, considering a wider cross-section of markets

and longer periods, investigating the importance of markets' and firms' characteristics, and using diverse measurements of firms' financing, competitive decisions, and outcomes.

Phillips (1995), Chevalier (1995b), Chevalier (1995a) express concerns about the potential endogeneity of firms' financing decisions (i.e., LBOs and recapitalization), and attempt to address part of them. They recognize that endogeneity concerns may arise if firms modify their financing *anticipating* the competitive effects of their decisions, or if omitted variables correlate with both financing and product market decisions. Follow-on studies have used different approaches to better isolate the competitive effect of firms' financing. One approach is to use instrumental variables to tackle the endogeneity of corporate financing decisions. For instance, Kovenock and Phillips (1997) add to Phillips (1995) by studying the impact of sharp debt increases using detailed plant-level data from the Longitudinal Research Database at the Bureau of the Census. They examine the plant closing and investment behavior of leverage increasing firms and their rivals in ten manufacturing industries between 1979 and 1990 (in which at least one of the top four firms recapitalizes). They reason the potential for simultaneity between capital structure decisions and product market performance stems largely from time-varying factors that affect all firms in a market, such as capacity utilization, market concentration, or demand conditions. Thus, Kovenock and Phillips (1997) instrument firms' recapitalization decisions using these lagged exogenous industry factors.² They then assess how firms' instrumented recapitalization affects investment and plant closures. They report that recapitalizing firms in concentrated markets are more likely to close plants and less likely to invest. The behavior of firms in more competitive markets appear unaffected by the changes in leverage.

Another approach has been to study firms' competitive decisions and performance following events which affects the incentives of product market participants' incentives (or ability) to compete under *existing* financing arrangements. To the extent that the exact timing, magnitude, and consequences of the recession are not fully anticipated by product market participants, looking at how existing financing conditions affect firms' responses goes a long way to circumvent endogeneity concerns. For instance, using firm-level pricing data, Chevalier and Scharfstein (1996a) show that firms entering an economic downturn with high levels of debt (many of which undertook LBOs during the late 1980s) raise prices more than their less indebted rivals. They interpret their finding

²They recognize that this approach does not solve all endogeneity problems (see their footnote 4).

in light of a model in which debt, and the possibility of liquidation it embeds, creates an incentive to take actions to boost immediate profits when liquidation becomes more likely (e.g., in a recession), potentially at the expense of long-term market shares.

Zingales (1998) exploits the deregulation of the trucking industry between 1978 and 1979, during which price-setting practices were liberalized. Trucking firms started to compete more aggressively on prices, resulting in lower market values after the deregulation, and hence exogenous increases in their leveraged ratios. Zingales (1998) uses this quasi-natural experiment to study the influence of debt financing on product market outcomes. He shows that highly levered firms are less likely to survive after the deregulation compared to their less levered rivals. These firms also decrease investment and start charging lower prices, suggesting that high levels of debt hamper their ability to compete (and survive).

Khanna and Tice (2000) focus on the rapid expansion of the discount department store Wal-Mart into many new markets between 1976 and 1996. They ask whether and how the debt levels of incumbents affects their response to Wal-Mart's expansion into their market. Importantly, Khanna and Tice (2000) indicate that the decision of Wal-Mart to enter a specific market is mostly driven by its distributional efficiencies and not by the traits of incumbents (e.g., their inability to compete with Wal-Mart in case of entry). They report that highly indebted incumbents respond less aggressively to Wal-Mart's entry. They are less likely to expand (e.g., add stores) and more likely to retrench. Khanna and Tice (2005) extend their earlier study and investigate whether and how the link between the average prices charged by discounters in various areas and their leverage varies across business cycle. They report that areas with highly indebted firms display higher prices during non-recession years. Yet, during recessions, prices decrease in areas with a mix of high and low debt firms, suggesting predation by financially-strong rivals as a explanation for the pro-cyclicality of prices. They confirm this intuition by showing that high debt firms are more likely to exit areas with lower prices during recessions.

Studying the casino industry, Cookson (2017) examines how incumbents' casinos respond to the threat of entry by rivals. He captures entry threats based on 109 pre-construction entry plans announced between 2003 and 2012, potentially affecting 17 firms operating casinos in various locations. Armed with this measure of entry threats, he documents that high leverage prevents incumbent casinos from responding to entry threats. In particular, facing the same set of entry

plans, low-leverage incumbents expand (capacity) whereas highly indebted incumbents do not.

Campello (2003) compares the competitive response of high and low-debt firms to economic downturns in 71 manufacturing markets between 1976 and 1996. Departing from existing studies (and the foundational theories), he proposes to measure firms' competitive response by looking at changes in firms' share of their industry sales. The idea is that firms can implement a number of alternative policies that significantly affect product market outcomes but that may not be reflected in how they price their products (e.g., the use of promotions, customer service, or varying product quality). On that ground, changes in market shares captures the combined effects of pricing and these other relevant non-pricing market strategies. Campello (2003) estimates the sensitivity of firms' market share growth to (lagged) leverage across industries, and then analyzes whether the sensitivity in low-debt and high-debt industries responds differently to macroeconomic shocks. Generalizing the results of Chevalier and Scharfstein (1996b), he finds that debt financing has a negative impact on market share growth in industries in which rivals are relatively unlevered as economic conditions worsen, but not during booms. In contrast, no such effect is observed for firms competing in high-debt industries.

Campello (2006) examines the relationship between firms' financing decisions and their product market performance using data from 115 markets between 1971 and 2000. Similar to Campello (2003), he focuses on firms' market share growth and on firms' leverage ratio *relative* to that of rivals. This industry adjustment implies that the average rival's leverage is the metric used to measure a firm's indebtedness. He relies on the tangibility of firms' asset as an instrument for debt financing, positing that the amount of financing that can be supported by contracts with creditors depends on creditors' valuation of the firm's hard, transferable assets in liquidation ("asset tangibility"). The main identifying assumption is that while a firm's asset tangibility correlates with its debt financing, the tangible attributes of a firm's assets should not determine performance in the product market (other than through the association with financing). Using an empirical proxy for the expected resale value of a firm's assets in liquidation, Campello (2006) documents a non-monotonic effect of debt on competitive performance: moderate debt-taking is associated with market share gains, but high indebtedness leads to significant losses of market shares.

A common feature of all the above studies is their focus on the competitive effect of *debt* financing, directly mapping the underlying theoretical models. A series of recent studies have broadened

the scope of investigation by considering the competitive effect of firms' "financial strength". For instance, Fresard (2010) investigates the competitive effects of firms' cash reserves in 105 industries between 1973 and 2006, taken as a measure of their financial strength. Following the approach initiated by Chevalier and Scharfstein (1996b), he studies how pre-existing cash reserves affect firms' product market performance following unexpectedly shocks to their competitive environment. He exploits exogenous variation in industry-level import tariffs, arguing that the softening of trade barriers unexpectedly increases the competitive pressure from foreign rivals. Fresard (2010) reports that large cash reserves lead to systematic future market share gains at the expense of rivals. This competitive effect of cash is stronger when rivals face tighter financing constraints, suggesting that cash reserves can be effectively used to finance predatory behaviors or represent as a credible threat of predation affecting rivals' actions, in line with Bolton and Scharfstein (1990).

Boutin et al. (2013) complement Fresard (2010) by specifically investigating whether the firms' cash reserves influence their and rivals' entry decisions. They rely on detailed data on the structure and decisions of business groups in France, and show that entry of new firms into manufacturing industries is negatively related to the cash reserves of incumbent affiliated groups, that is, cash deters entry. Moreover, they find that entry by business groups is facilitated when entrant groups have piled up large cash reserves in their originating markets. The impact of group cash holdings on entry is more important in environments where financial constraints are pronounced. Notably, Boutin et al. (2013) also report that firms entering markets in which incumbents are affiliated with cash-richer groups are more likely to exit in the three to five years that follows their entry. In contrast, entrants that are affiliated with cash-richer groups are less likely to exit after entry, broadly confirming that financial strength enhances firms' competitive strength.

Further dissecting the channels through which financial strength provides firms with a competitive advantage, Barrot (2016) shows that one dimension operates through the facilitated provision of long payment terms to customers by financially-strong firms. This form of predation might expose their financially-weaker rivals to liquidity shocks, limiting their ability to pass this excess liquidity risk on to prices. Long payment terms by stronger firms might thus prevent their constrained rivals from entering, expanding, and surviving. Barrot (2016) confirms this channel using a 2006 regulatory reform in France that prevented trucking firms from extending payment terms in excess of 30 days, curbing the advantage of financially-strong firms. The results indicate that

entry increased following the reform, especially the entry of small trucking firms.

The papers discussed so far focus on firms' decisions about output, prices, investment, entry and exit, as well as the resulting changes in market shares. From that point of view, they are close in spirit to the underlying theories. A distinct and more recent branch of literature considers another important product market dimension: product quality. Matsa (2011) asks whether and how debt financing affects firms' incentives to provide quality products. He examines the impact of leverage on retail product availability in the supermarket industry, since availability is an important measure of a retailer's quality. Using detailed data on product availability (at the item-store level) between 1988 and 2004, he documents that increases in leverage that were undertaken for reasons unrelated to consumer demand or retail inventories (through leverage recapitalizations and LBOs) leads to degraded quality. Further evidence indicates that highly levered firms degrade their products' quality in order to preserve current cash-flow for servicing their debt.

Phillips and Sertsios (2013) confirm the significant interplay between debt financing and product quality by studying 21 airline companies between 1997 and 2008. They measure airlines' quality based on how they mishandled baggage and on-time flight performance. Instead of focusing on the effect of debt on quality as in Matsa (2011), they directly examine the effect of the financial distress resulting from excessive debt. They measure firms' financial distress based their probability of default, and estimate its effects on quality (and pricing) decisions using a simultaneous equation approach that controls for the endogeneity of these decisions (using various plausible instruments). They find that product quality decreases when airlines are in financial distress, suggesting that excessive leverage lowers firms' incentive to invest in quality.³

Kini, Shenoy, and Subramaniam (2017) generalize these results by measuring quality based on product recalls in 97 industries between 2006 and 2010. They focus on the quality consequences of both firms' leverage and the probability of financial distress, and document a positive relationship between both variables and the probability of subsequent product recalls. Various additional evidence suggests that the relation between financing and quality is likely causal. In particular, using the empirical strategy developed by Fresard (2010), they show that the impact of leverage (and financial distress) on the propensity to recall products is significantly stronger when firms

³Phillips and Sertsios (2013) also report that financial distress renders airlines more likely to start price wars, echoing the results of Busse (2002).

experience increased competitive pressure.

Looking at other financial contracts other than the amount of debt, a recent study by Giambona, Kumar, and Phillips (2021) examines how the use of derivative contracts used for hedging can impact competition in the insurance industry. There was staggered adoption of safe-harbor provisions that allowed derivative contracts to be granted super-priority. Previously risky insurers increased their use of derivative contracts to hedge and thus reduced their deadweight costs of financial distress, which in the end increased the demand for their insurance products by consumers. The decreased risk allowed these previously riskier insurers to invest in gaining market share through decreased prices and increased quantities of policies sold.

Overall, existing studies indicate that firms' financial choices have a non-trivial effect on their product market conduct and performance. The picture emerging from the evidence is that indebtedness and financial weakness generally render firms weaker competitors. Increases in leverage and weaker financial positions lead to higher prices, less expansions, and more predation and entry by rivals, especially financially-strong ones. These effects result in lower market shares, weaker competitive positions, and lower survival rates. The detrimental competitive effect of debt varies across markets and firms, but when economic conditions worsen, access to financing deteriorates, and competition increases, this effect appears to be magnified and realized through a series of different (and non-mutually exclusive) margins.

2.2.2 The effects of product market characteristics on financing decisions

Complementing the above studies, another approach to understand the mechanisms underlying the interactions between financing and product market characteristics has been to examine the product market determinants of firms' financial decisions. Indeed, a long-standing literature has documented the importance of product markets as a capital structure determinant. Bradley, Jarell, and Kim (1984) show that 54% of the cross-sectional variance in firms' leverage ratios is explained by industrial classifications and Graham and Harvey (2001) show that almost one-quarter of surveyed CFOs identify the behavior of competitors as an important input into their financial decisions. In addition, industry average leverage ratios have been found to be important determinants of firms' financing decisions (e.g., Welch (2004)). However, most research in this area has not interpreted these effects in light of the possible interactions between financing and product markets, but

typically control for them through the use of industry fixed effects (or industry averages).

In contrast, MacKay and Phillips (2005) study how important are product market characteristics to firms' financing structures within markets. Using a large sample of public firms operating in 315 competitive and 46 concentrated industries between 1981 and 2000, they confirm that firms' position in their market matters for their financing decisions. In competitive markets, firms near the industry median capital-labor ratio use less financial leverage than firms that deviate from the industry median capital-labor ratio, consistent with the idea of a natural hedge predicted by Maksimovic and Zechner (1991). Firms' leverage is also inversely related to that of rivals, and that this dependency is stronger in concentrated markets, underlying the importance of strategic interactions in these markets. The work of MacKay and Phillips (2005) is important as it highlights that, as predicted by equilibrium models, firms' financial structure, technology, and risk are jointly determined. MacKay and Phillips (2005) account for this simultaneity by estimating simultaneous-equation regression models for financial leverage, capital-labor ratios, and cash-flow volatility.

Other researchers study how firms adjust their financing decisions in response to changes in their competitive environment or develop new a measure of predation threats and study their association with firms' financing. The main conclusion of this line of research is that firms respond to increased competitive pressure in ways that preserve their financing flexibility. This response is overall consistent with models implying that (excessive) debt makes firms softer competitors and vulnerable to predation by financially-strong rivals. For instance, Xu (2012) investigates how firms adjust financing when competition intensifies following drops of import tariffs. Relying on a sample of public manufacturing firms between 1989 and 2004, she reports that firms experiencing increases in import competition significantly reduce their leverage ratios by issuing equity and selling assets to repay debt. Klasa et al. (2018) uncover that firms choose lower debt when they face greater competitive threats stemming from the potential loss of trade secrets to rivals, consistent with higher competitive risk pushing firms to strategically maintain unused debt capacity. Relatedly, Parise (2018) studies how firms alter the maturity of their debt when facing more competitive threats. Reminiscent of the approach of Khanna and Tice (2000), he examines how the threat of entry by low-cost competitors affects public incumbents' financing decisions in the domestic airline industry between 1990 and 2014. Although the threat of entry by low-cost carriers has no effect on airlines' leverage, it pushes airlines to lengthen the maturity of their debt, thereby reducing the

risk of predation (following the logic of Bolton and Scharfstein (1990)).

Instead of focusing on the effect of competition on the *quantity* of debt, Valta (2012) examines its effect on the *cost* of debt. He measures the cost of debt based on a large sample of bank loans contracted by public firms over the years 1992–2007. He reports that debt is more expensive for firms operating in competitive markets. Consistent with the idea that competition increases the risk of financially-weak firms, the effect of competition on the cost of debt is greater in markets in which small firms face financially-strong rivals, and markets featuring more intense strategic interactions.

Other researchers have developed empirical measures to capture variation in competitive threats. Haushalter, Klasa, and Maxwell (2007) argue that predation is more likely when rivals share investment opportunities. They propose to measure this overlap using market concentration, firms' similarity of operation (based on firms' capital-to-labor ratios) and stock return co-variation. For a sample of manufacturing firms between 1993 and 2001 they report that firms facing more predation risk hold significantly more cash, consistent with the importance of maintaining financial strength when predation risk is higher.

In a similar vein, Hoberg, Phillips, and Prabhala (2014) use the text of business descriptions in firms' 10-Ks to measure the structure and evolution of firms' product space. In particular, they measure the competitive threat faced by a firm from changes in rivals' products relative to the firm, named product fluidity. The central idea is that when a firm operates in a market that is changing rapidly due to rivals' actions (i.e., a fluid market), it faces more competitive threats. They compute product fluidity for every public firm and year between 1997 and 2008, and show that firms facing higher threats hold more cash. They further document that the positive association between fluidity and cash is stronger for firms with less access to financial markets, for which predation by rivals is more likely. Consistent with firms' willingness to preserve financial flexibility when competitive threats are high, fluidity reduces firms' propensity to make payouts.

2.2.3 Collusion, cartels, and financing decisions

A related area of investigation examines empirically the financing structure of firms that collude by forming cartels. Ferrés et al. (2021) analyze the financing decisions of 90 firms that participated in 56 cartels between 1990 and 2012. They rely on the Private International Cartels (PIC) database,

which contains information on virtually all international cartels detected by antitrust authorities between 1990 and 2012. They report that cartel firms have lower leverage during collusion periods. They reduce leverage when collusion starts, or soon thereafter, consistent with the prediction of Maksimovic (1988) that cartel firms strategically reduce leverage to make their cartels more stable.

Dasgupta and Žaldokas (2018) take a distinct angle and consider intensification of competition that comes from stronger antitrust enforcement around the world. They specifically focus on variation in the cost of collusion coming from the staggered passage of leniency legislation in 63 countries from 1993 to 2011 to study how more aggressive cartel enforcement affects firms' leverage. They report that, as the market equilibrium switches from collusion to oligopolistic competition, firms increase equity issuance, resulting in lower debt ratios when cartels are harder to maintain.

While the two studies above report opposite results, differences in sample might explain the difference. First, Ferrés et al. (2021) focus on U.S. firms while Dasgupta and Žaldokas (2018) consider international firms. Second, it is possible that the behavior of firms that recognize that collusion is no longer feasible could be dissimilar from that of firms prior to entering a period of collusion. Regardless of the explanation for the difference in results, these studies highlight that collusion is related to firms' financing choices.

2.2.4 Peer effects, learning, and capital structure

A recent stream of research investigates other possible explanations for the important commonality in financing decisions among firms in the same markets. In particular, Leary and Roberts (2014) posit that product market interactions are relevant because firms respond to the financing decisions of other firms in their market (i.e., their peers). Using a large sample of public firms between 1965 and 2008, they regress a firm's leverage on the average leverage of its product market peers, and rely on an instrumental variable to identify peer effects. They show that, in large part, firms' financing are responses to the financing of peer firms. Furthermore, they report that smaller, less successful firms are highly sensitive to their larger, more successful peers, but not vice versa. They interpret their results as consistent with the idea that firms have imperfect information about their fundamentals, and learn from observing what they peers do. Grieser et al. (2022) refine the identification strategy of Leary and Roberts (2014) using a spatial econometrics framework, and confirm that firms do respond to the financing decisions of their rivals. They report however

markedly smaller effects. To date, it is fair to say that the presence of peer effects in capital structure has been convincingly established. Yet, the economic mechanisms underlying these effects and the role of market structures are poorly understood.

Rauh and Sufi (2012) propose a different explanation for the commonality of firms' financing decisions. They contend that it is tied to the similarity of the assets used in the production process by firms operating in the same market. They show that firms operating in the same market show remarkable homogeneity in observable measures of the factors used in production. They also report that among all the main capital structure determinants of competitors, their average asset tangibility is the strongest predictor. They conclude that financing decisions are linked to the nature of the assets that the capital is backing, which is specific to product markets.

2.2.5 Financing and customer-supplier relationships

All the papers reviewed above concentrate on the interactions between firms' financing and *horizontal* product market relations. Another branch of the literature considers market relationships arising along the supply chain, i.e., customers-suppliers. This branch starts with Titman (1984) who analyzes theoretically how customer-supplier relations interact with capital structure decisions. He argues that a firms' liquidation can impose costs on customers and suppliers (as well as workers). Although these stakeholders do not control financing and liquidation decision, firms can nevertheless choose lower debt ex ante to make them less subject to costs arising from liquidation ex post. This choice intends to strengthen product market relationships and should be more likely when these relationships are important.⁴

Kale and Shahrur (2007) propose an empirical test, examining how firms' leverage depends on customers-suppliers relationships, and the specificity of these relationships. Using a large sample of public firms between 1984 and 2003, they show that firms have lower leverage if their suppliers and customers (identified at the industry level) have assets that are more relationship-specific (proxied by their R&D intensity) and operate in more concentrated markets. The results are consistent with firms taking into account the specificity of their product market relations when choosing their debt, and using less of it as a commitment to induce suppliers and customers to undertake

⁴Firms may deviate and increase leverage later if this increases its profits in later periods. Repeated interactions with high enough costs for deviation ensures that firms will not change to an excessive amount of debt later as has been modeled by Maksimovic and Titman (1991) in a repeated game.

relationship-specific investments.

The model of Titman (1984) considers a firm selling to a large number of customers. When a firm sells to a few big customers, it depends on the big customers for a large proportion of its sales, which makes its assets specific. In this case, suppliers are likely to be worried about the customers' survival and thus adopt more conservative debt ratios. Banerjee, Dasgupta, and Kim (2008) examines whether this prediction holds in the data. They exploit information about firms' principal customers and measure if the product is unique to that market relationship. They confirm that leverage is lower in these cases, but as predicted, it is much less significant in markets in which firms produce non-durable products.

Moon and Phillips (2021) examine the impact of outsourcing via long-term purchase contracts on leverage. They build a firm-level sample of outsourcing contracts extracting the information from the text of firm 10-Ks between 2004 and 2017. Inspired by the logic of Titman (1984), they predict that firms that contract and outsource more with suppliers using long-term purchase contracts should maintain lower debt to avoid imposing losses on suppliers as contracts can be broken in bankruptcy. The central premise they test is if contracting parties invest in relation-specific assets, they are more likely to be concerned about financial distress of counterparty firms that would result in failure to use those assets. The results, using multiple techniques to control for endogeneity and simultaneity of leverage and purchase contracts, are consistent with firms with more purchase contracts and having higher cash flow volatility using less leverage to maintain the incentives of contracting parties to invest in relation-specific assets.

3 Physical investment, Capacity, and Product Markets

The competitive and strategic interactions of firms in their product market not only matter for their financing decisions, but also for their *real* decisions. In this section, we focus on the literature studying the relationships between product market interactions and physical investment. The importance of firms' product-market interactions for investment is the subject of a large and disparate literature in finance and economics since the late seventies. Existing theoretical and empirical research indicates that firms can utilize physical investment "strategically" to affect rivals' decisions, equilibrium profits, and product market structures. The nature of such strategic investment de-

depends on various dimensions of firms' competitive environments. Even when firms cannot directly influence rivals' actions through their decisions, investment remains intrinsically related to the characteristics of product markets through various channels. Competitive environment affects the level, timing, and efficiency of investments. Further highlighting the relevance of product markets for investment, a recent stream of research documents and quantifies the costs of neglecting product market realities, and such neglects trigger real distortions and lead to value destruction. While existing research confirms the importance of markets interactions for understanding investment, it has provided so far a wide range of evidence: some firms appears overly strategic but others display a costly lack of strategic considerations.

3.1 Investment as a strategic commitment device

Spence (1977) and Dixit (1979) formalize the long-standing idea that strategic considerations may provide firms with an incentive to choose physical capital to deter the entry or expansion of rivals, and thus retain higher profits.⁵ In these seminal models, firms invest strategically, and accounts for the fact that their investment decisions affect rivals' actions and thereby modify the equilibrium distribution of expected profits in the market. Because profits are determined in equilibrium, the marginal contribution of a firm's new capital to its future profit – the marginal productivity of its capital – is endogenous to the chosen level of investment.

The deterrence effect is realized by building “excess” capacity. To the extent that part of this excess capacity is irrevocable, it can serve as a commitment to expand output and reduce price (ex post), thereby reducing the expected profits of potential entrants. This posturing can keep out aspiring entrants, induce rivals to relinquish market share or forgo expansion, and cause marginal players to exit. Intuitively, the viability of this type of deterrence is more likely when products are strategic substitutes (i.e., when firms' investment negatively affects rivals' profits), entry (or expansion) entails non-negligible fixed costs, and commitment is credible because investment is irreversible (at least on the short-run). In some situations, however, entry deterrence is too costly or infeasible. Firms can still invest strategically to best accommodate rivals' entry (or expansion). This is because investment affects rivals' (post-entry) equilibrium production decisions.

⁵These models typically feature an incumbent and a potential entrant. The incumbent choose a level of capital (i.e., capacity) which is then fixed. The entrant observes it, and then choose its capital, also fixed. The profits of both firms are then realized, as a (decreasing) function of the total capital.

Although stylized, these models underline clear linkages between firms' competitive environments and their investment decisions.⁶ In particular, they predict specific investment patterns in response to changes in (equilibrium) market environments. As is customary in game-theoretic settings, the optimal (investment) decisions depend on specific product market characteristics. Fudenberg and Tirole (1984) and Bulow, Geanakoplos, and Klemperer (1985) offer a useful taxonomy of possible scenarios and point out three key drivers of strategic investment. First, the nature of strategic investment depends on whether firms find it advantageous to deter rivals' entry or strategically accommodate it. Second, it depends on the type of competition (i.e., Cournot or Bertrand), which determines whether actions are strategic substitutes or complements. Finally, it depends on whether investment makes firms look like tough or soft competitors. Investment makes firms look tough if, for instance, excess capacity credibly signals higher future quantity (or lower prices). Investment could make firms look soft in situations in which lower capacity credibly signals greater future flexibility and faster competitive responses. Indeed, Fudenberg and Tirole (1984) suggest that, in some circumstances, investment may be a strategic handicap, because it may reduce the incentive to respond aggressively to competitors.

If firms' actions are strategic substitutes and investment makes them look tough, investment triggers a softer action by rivals. Firms want to signal themselves as "top dogs" and invest in excess capacity to both deter and accommodate entry. If instead investment makes firms look soft, investment induces a more aggressive response by rivals, and it is optimal to under-invest and take a "lean and hungry look" for both entry deterrence and accommodation. In contrast, if firms' actions are strategic complements and investment makes them look tough, being a top dog and over-investing is optimal to deter entry, but under-investment and posturing as a "puppy dog" is best to accommodate entry. If investment makes firms look soft, firms should under-invest to deter entry, but over-invest and look like "fat cats" to accommodate entry.

Although these theoretical predictions are clear, testing them is complicated because investment is jointly determined with product market structures in equilibrium. In addition, investment might be related to market structures for a number of non-strategic reasons. For instance, firms could hold excess capacity to satisfy variable future demand. Therefore, to properly isolate the strategic

⁶Besides strategic investment, an extensive literature suggests other strategic actions to deter entry and expansion, such as pricing, product variety, reputation, loyalty, information, or contracting.

investment motive empirically, researchers need to study how firms modify their investment patterns (moving from one equilibrium to the next) in response to exogenous changes in dimensions of their product market environments featured in the theory.

Finding such changes is challenging, which might explain why early empirical work examines whether excess capacity is systematically related to market structures. These early studies generally found limited supporting evidence. A prominent example of this line of work is Lieberman (1987), who examines the role of excess capacity as an entry deterrent in 38 chemical product markets between 1953 and 1982. He focuses primarily on markets in which excess capacity should have its most potent effects, that is, markets with high fixed costs, sizeable economies of scale, and a relatively small number of firms. Although he documents that firms hold significant excess capacity, most is maintained to accommodate demand variability. In fact, he find no evidence that firms expand to deter entry. Nevertheless, detailed case studies reveal some markets where excess capacity seems to have offered at least partial success as an entry deterrent. In line with the theory, these markets feature high concentration and capital intensity. Lieberman (1987) concludes that the excess capacity entry barriers suggested by the theory are not very common.

Using a different approach, Smiley (1988) surveys firms to investigate the prevalence of strategic behaviors. Respondents were asked to indicate which kind of entry deterring strategies they use (if any). Based on 293 responses from various industries, the practice of entry deterrence appears prevalent, as more than half the respondents report that attempts to deter entry are comparable in importance to other strategic marketing and production decisions. Firms indicate that they attempt to limit entry mainly through product loyalty. Smiley (1988) also finds limited support for the strategic investment motive, as less than 7% of respondents indicated using excess capacity as a deterring strategy.

More recent work relies on specific settings to identify the *threat* of entry separately from actual entry. Researchers typically use the structure of a market to infer when entry is possible, and thus, the threat to enter is higher. For instance, Goolsbee and Syverson (2008) exploit discrete shifts in entry threat in the passenger airline industry between 1993 and 2004 by using the expansion patterns of Southwest Airlines. They look at situations where Southwest begins or even announces it will begin operating in the second endpoint airport of a route (having already been operating out of the first endpoint), but *before* it starts flying the route itself. Incumbents in the airline industry

do respond by cutting fares when Southwest threatens a route (before Southwest actually starts flying the route). They report only weak evidence that airlines add capacity in response to entry threats.

Frésard and Valta (2015) use reductions of import tariffs to capture shifts in entry threats, positing that by lowering the cost of entry for foreign rivals, these events generate plausibly exogenous variation in the likelihood of entry faced by domestic firms. Based on 91 significant reductions of import tariffs between 1974 and 2005 in 74 manufacturing industries, they report that (public) firms reduce investment in response to higher entry threats. To understand whether this reduction contains a strategic dimension, they analyze how incumbents' response vary across market structures. The investment reduction is only observed in markets featuring competition in strategic substitutes, in which the costs of entry are low, and where entry deterrence is likely ineffective, broadly consistent with incumbents under-investing and taking a "lean and hungry" to accommodate foreign entrants.

Cookson (2018) measures entry threats based on detailed data on entry *plans* in the casino industry between 2003 and 2012 and reports that incumbents expand capacity in response to nearby entry plans. In turn, greater capacity decreases the likelihood of successful entry. This result is important because it speaks to the plausibility of a strategic motive behind incumbents' expansions. Indeed, one alternative interpretation is that entry plans signal high future demand, and thus explain capacity expansions. Yet, Cookson (2018) reasons that, in that scenario, entry plans should be *more* likely to succeed because demand is high, contrary to what he finds. Another interesting result is that, in contrast to what is observed during the planning stage, incumbents do *not* expand when entry is determined, suggesting that capacity investments are intended to deter new entry. This interpretation is credible because capacity installations in the casino industry are costly to reverse, and thus provides a commitment to compete aggressively.

3.2 Non-strategic investment and product market environments

Even when firms ignore the strategic effects of investment on rivals' actions, firms' interactions and product market characteristics can still influence their decisions. This is because market characteristics affect firms' marginal productivity of capital. For instance because investment adds capacity to a market, it may modify equilibrium prices, profits, and return to capital. Hence,

the relation between product market traits and investment is dictated by how product market environments and firms' interactions influence their expectation and uncertainty about future profits. Researchers have considered different approaches to study this question and highlight distinct economic channels.

3.2.1 Q-models with market power

One approach is to integrate firms' competitive position into the q theory of investment. This theory posits that marginal q (i.e., the marginal value of capital) is a sufficient statistic for investment (when firms face convex costs of adjusting their capital stock). Because the marginal value of capital is not directly observable, researchers use the ratio of market value of capital to its replacement cost – average q – to study investment. In an important paper, Hayashi (1982) establishes that marginal q is equal (or proportional) to average q for a competitive firm with production function featuring constant return to scale. A voluminous literature has adopted the (convenient) assumption of perfect competition (and constant returns to scale) to take advantage of the equality between marginal and average q .⁷

Understanding the role of product markets in this framework requires relaxing the assumption of perfect competition. This has been done by endowing firms with some degree of market power, typically by modifying the nature of firms' production function. In that case, marginal and average q are no longer equal. As highlighted by Hayashi (1982), with market power, an increase in output depresses the price. The market value of additional units of capital (marginal q) is therefore less than the average market value of the existing capital stock (average q). This intuition has been developed and extended in various directions (e.g., Abel and Eberly (1994), Cooper and Ejarque (2003) or Abel and Eberly (2011)). The central implication is that, in the presence of market power, average q is no longer a sufficient statistic, creating a gap between average q and investment. This gap implies that firms with market power “under-invest” compared to what would be predicted based on their average q (or absent market power).

Empirical studies find support for this prediction. For instance, Akdoğru and MacKay (2008) analyze whether and how market concentration affects the strength of the relation between invest-

⁷This equality is very appealing because it rationalises the intuition by Keynes (1936) and later by Tobin (1969) that the relationship between market valuation and replacement cost of the capital stock is the crucial variable in determining firms' investment decisions.

ment and average q . Using a large sample of manufacturing firms between 1981 and 2000, they report that investment by firms in less competitive markets is less sensitive to average q than that by firms in more competitive markets. Gutierrez and Philippon (2017) analyze in detail the reasons explaining the increasing gap between investment and average q since the early 2000s (i.e., weak investment despite high average q). They report that a significant portion of the recent gap is tied to increased market power in many product markets.

3.2.2 Real options, contestable opportunities, and competition

Another approach has been to analyze how firms' competitive interactions affects the value of real options associated with investment projects. The real options approach posits that, due to irreversibility and uncertainty, the opportunity to invest is analogous to an American call option on the investment opportunity. Because the future value of the asset is uncertain, there is an opportunity cost to investing today, often referred to as an "option to wait". Thus, the optimal decision is to invest when the asset value exceeds the investment cost by a potentially large option premium. When the value of this option is higher than the net present value of a project, firms should delay investment. This approach has been useful to understand (and explain) investment in settings in which projects are costly to reverse and featuring a high degree of uncertainty.

Recent research analyzes how strategic interactions and product market structures affect the value of the option to wait, and hence investment. A series of papers contend that competition may affect the durability of opportunities. Indeed, in many circumstances, investment opportunities are contestable and can therefore be preempted by rivals, potentially leading to an erosion of the value of certain real options. For instance, Grenadier (2002) and Back and Paulsen (2009) reach this conclusion by analyzing real option models with imperfect competition, where the payoffs from investment are fundamentally affected by the investment strategies (i.e., option exercise) of its competitors. The central prediction linking product market characteristics and investment is that if rivals can "steal" opportunities, firms may have a greater incentive to immediately pursue projects as opposed to delay them.

Akdoğan and MacKay (2008) provide evidence supporting this real options channel. In addition to analyze whether and how market concentration affects the strength of the relation between investment and average q , they also test whether firms in competitive markets invest sooner than

firms in concentrated markets. Using instances of large investment episodes, they confirm that this is the case. Notably, their result that investment is less sensitive to average q in concentrated markets is also consistent with the real options channel. Indeed if competition erodes the value of the option to wait, investment should be less sensitive to average q when firms are shielded from competition, because the value of delaying investment is higher .

3.2.3 Imperfect information, investment, and product markets

Other researchers have investigated the role of imperfect information. This line of work starts with the premise that firms have imperfect information about their investment opportunities (unlike in the q theory), and rely on various external signals (e.g., about customer demand, production costs, technology) to decide on investment. The quality of these signals (i.e., their informativeness) depends on product market characteristics. The literature has mainly considered two types of external sources of information: stock market prices and the investment of rivals.

The characteristics of product market can affect investment because their influence the informational content (and efficiency) of stock prices. Peress (2010) develops a rational expectation model with firms selling goods in an imperfectly competitive market and shows (theoretically and empirically) that market power renders stock prices more informative. The profits of firms with more market power are less risky, which induces investors to trade their stock in larger quantities (even with similar information). These larger trades, in turn, expedite the incorporation of investors' private information into prices. Because firms rely on their stock price to make their investment decisions (see Bond, Edmans, and Goldstein (2012) for a survey), market structures influence investment through the informational efficiency of financial markets.⁸

A related informational channel is put forth by Foucault and Frésard (2014). They posit that because firms interacting in a product market have overlapping opportunities (e.g., the face similar demand for their products), the stock price of rivals could be a valuable complementary source of external information (in addition to their private information and their own stock price). They develop a simple model of investment under imperfect information to isolate predictions that are

⁸In a closely related paper Stoughton, Wong, and Yi (2017) reach similar conclusions, but without considering the stock market. They analyze firms' incentive to gather information relevant for their investment decisions and show that it decreases with competition, leading to less efficient investment in competitive markets. They show empirically that investment is more efficient in concentrated markets.

unique to this channel, and provide supporting evidence based on a large sample of public firms between 1996 and 2008. In particular, they show that firms' investment is more sensitive to the stock price of rivals when these prices are more informative, and when the demand for products is more likely to be correlated within markets.

Bustamante and Frésard (2021) propose that the informational relevance of product markets structures also materializes because firms can obtain information by observing the investment of rivals. They develop a model of investment in which firms strategically compete but have imperfect information about their investment opportunities. In equilibrium, firms' investment depends on their private information as well as the investment of rivals. Notably, the influence of rivals' investment can be either positive or negative, depending on the relative importance of the (positive) effects of learning from peers' investments versus the (negative) strategic effect of peers' investments. Using a sample of public firms between 1996 to 2011 they show that the learning effect dominates, i.e., firms' investment positively responds to that of rivals. Further highlighting an informational channel, the learning effect is stronger in concentrated markets and markets with heterogenous firms.

3.3 Over-investment and the competition neglect

While the above studies highlight the many ways firms take account for their product market environment when investing, other studies suggest that firms do not pay enough attention to strategic considerations. This work starts with the well-known observation that investment goes through booms and busts cycles, and that firms over-invest in booms (and under-invest in busts). A series of recent studies suggest that this inefficient behavior arises partly because firms fail to internalize the effect of product market competition on their future cash flows – the competition neglect.

Firms tend to neglect the possible entry or expansion by competitors during boom periods, when demand is abnormally high and/or prices abnormally attractive. They have a “competitive blind spot”. Because more competition typically hurts profits, neglecting the consequences of rivals' actions on equilibrium outcomes leads firms to over-estimate the expected profitability of investment and invest too much. This neglect can be particularly dramatic when investment involves significant time-to-build delays because firms only receive delayed feedback about the consequences of their investment decisions. When investment is hard to adjust in the short-term, excess investment hurts

future performance. Such neglect may occur if firms base their decisions on noisy but easily available information about future demand, if they fail to coordinate, or if managers are overconfident.⁹

Hoberg and Phillips (2010b) provide large-scale evidence supporting the competition neglect. They examine how competition affects firms' cash flows and stock returns in industry booms and busts. Using a large cross-section of industries between 1972 to 2005, they report that, in competitive markets, high levels of valuation, investment, and financing (indicative of booms) are followed by lower cash flows and returns. Underlining the importance of competition in booms-busts cycles, these patterns are generally insignificant in concentrated markets, suggesting that participants in competitive markets partly neglect the negative effect of competition on future performance.¹⁰ To further support this interpretation, they analyze the earnings' forecasts of equity analysts as proxies for the expectations of market participants and report that expectations are indeed positively biased (i.e., optimistic), but only in competitive markets.

Greenwood and Hanson (2014) offer more granular evidence. They study the link between investment boom-bust cycles and returns on capital in the dry bulk shipping industry between 1976 and 2011. This industry is appealing because it is highly competitive (so the returns to investing depend critically on rivals), products are quite homogeneous (ships differ mainly in terms of size and age), and it involves significant time-to-build delays (building a new ship takes 18–36 months). They show that high current ship earnings are associated with higher ship prices and higher industry investment, but predict low future returns on capital. Greenwood and Hanson (2014) posit that over-investment in booms occurs either because firms over-estimate the persistence of demand shocks or because they neglect the consequences of rivals' competitive response to those shocks. Fitting a model featuring both types of errors to actual data, they estimate that the competition neglect is significant in dry bulk shipping industry.¹¹

⁹Experimental evidence supports the existence of competition neglect. For instance, Camerer and Lovo (1999) individuals overestimate their own skill and speed in responding to common observable shocks and underestimate the skill and speed of their competitors.

¹⁰Importantly, they show that return predictability related to over-investment in booms persists after accounting for these changes risk, revealing that the results are not explained by variation in risk premia.

¹¹Part of the over-investment is also due to the over-estimation of future demand. Analyzing the hotel industry at the project level, Povel et al. (2016) also report that over-investment in industry booms arise because firms imitate each others, i.e., they herd.

4 Product Markets, M&A, and Vertical Boundaries

Merging with other firms or acquiring their assets represents other important real decisions that are closely related with product market interactions. A large literature in both finance and industrial organization investigates the multifaceted links between competitive environments and firms' activity in the market for mergers and acquisitions (M&A). This interest is directly fueled by antitrust considerations, whereby analyses and approvals (or blockages) of M&A is one important tool used by various government agencies to implement competition policies and protect consumers.

In this section, we review four different (but related) research streams that connects M&A to product markets. These have been the main focus of corporate finance scholars. The first consists of studies highlighting various product market characteristics shaping the evolution of the M&A market. The second asks specifically whether M&A are motivated by the desire to increase market power and stifle competition. Third, we present research examining how the sources of potential synergies (or the lack thereof) in M&A transactions depend on product market characteristics. Lastly, we discuss the literature focusing on how product market is related to firms' vertical boundaries and vertical acquisitions.¹² We focus on the corporate finance literature in this chapter and do not cover the extensive industrial organization literature that examines M&A and potential collusion as this has been covered recently by a survey by Asker and Nocke (2021).

4.1 Product market factors as drivers of M&A activity

An extensive literature indicates that product market characteristics are key drivers of M&A activity. This connection starts with the empirical regularity that M&A occur in waves, and that within a wave they strongly cluster by industry. A series of papers argue that these features suggest that firms use M&A to respond to various types of unexpected economic shocks affecting their product markets. These shocks could be driven by technological changes, government interventions (e.g., deregulations) or shifts in demand or supply conditions.

Pioneering this line of research, Mitchell and Mulherin (1996) study the patterns of M&A activity across 51 industries during the 1982–1989 period and document considerable clustering. They report that more than 49% of publicly-listed firms were involved in M&A transactions during that

¹²Andrade, Mitchell, and Stafford (2001a) and Betton, Eckbo, and Thorburn (2008) provide excellent surveys of the early finance literature on M&A.

period, and that in 31 industries more than 50% of firms were taken over. They confirm that M&A arise as a response to changes in product market environments. Industries experiencing sharp increases (or decreases) in economic growth feature more transactions. Considering specific industry shocks, they report that deregulation, changes in energy prices, foreign competition, and technological changes all lead to increased M&A activity, with deregulation being the most important.

Andrade, Mitchell, and Stafford (2001b) confirm these results using a larger sample covering the period 1973 to 1998. Unexpected shocks to product market structures explain the majority of M&A activity in their sample. They also show that, during the 1990s, deregulations became a dominant drivers of M&A, explaining for nearly half of the M&A activity since the late 1980s. Similar results are reported by Harford (2005) based transactions between 1981 and 2000. He analyzes a larger set of market-specific shocks and confirms that unexpected economic, regulatory, and technological shocks all explain patterns of M&A within product markets, and can collectively explain the pattern of aggregate M&A activity. Yet he reports that the impact of shocks to product markets only conducts to M&A waves in periods of abundant liquidity (to finance the transactions). Maksimovic and Phillips (2001) examine the link between product market shocks and M&A activity using granular plant-level data for manufacturing firms from the U.S. Census. Their analysis confirms that plants are significantly more likely to change hands when markets are undergoing positive demand shocks. In addition, they highlight that the majority of transactions involve productive buyers purchasing less productive firms (and assets), suggesting that the M&A response to shocks increases overall economic efficiency.

Collectively, this strand of research unambiguously indicates that changes in product markets characteristics play a central role in explaining M&A activity. Yet, they remain largely silent on the economic forces underlying these results. Later research has expanded in several dimensions to better understand these forces. One of this direction consists of analyzing product life cycles. Maksimovic and Phillips (2008) conjecture that product markets go through life-cycle stages, and that periods of transitions are associated with changes in competitive environment, and thus lead to specific and predictable M&A activity. They classify product markets into four stages: growth, consolidating, technological change, and declining. Using detailed data for manufacturing firms from the U.S. Census between 1974 and 2000, they show that these broad stages can explain difference in acquisitions and restructuring activity across markets. Hoberg and Maksimovic (2022)

confirm the importance of life-cycles using a novel firm-level measure based on the text in their 10-K filings. They show that acquisitions arise as firms' products mature and growth options are exhausted.

Another direction consists of analyzing whether (and how) the nature of strategic interactions affect firms' incentives to engage M&A and explain the patterns of M&A activity. Lambrecht (2004), for instance, considers a real-option model in which transactions are motivated by economies of scale, and shows that gains are higher in markets experiencing positive demand shocks, causing M&A to cluster in market experiencing rising demand. Using a similar approach, Hackbarth and Miao (2012) study the dynamics of M&A in an oligopolistic market, and show that transactions are more likely in markets more exposed to shocks and concentrated markets. Extending this line of inquiry, Bernile, Lyandres, and Zhdanov (2012) study a real option model that endogenizes firms' M&A and entry decisions in an oligopolistic market. The strategic benefit of M&A occurs via increased coordination and profits, whereas the strategic cost arises as reduced competition from the merger incentives entry. The model predicts that firms' propensity to merge is highest in markets experiencing large positive and negative demands shocks. Using a large sample of horizontal transactions between 1981 and 2004, they provide empirical support for this prediction. They report a U-shaped relation between M&A intensity and the state of industry demand in concentrated markets and in markets with high degree of competitive interactions among firms.

Phillips and Zhdanov (2013) focus on the positive incentive effects of acquisitions on entry and R&D. Small firms may engage in R&D that is close to the product market of a larger firm and then sell out to the larger firm. If the downstream market has multiple potential bidders then the small firm will capture part of the surplus of the larger firm. Large firms optimally then optimally do not invest as much in R&D as the smaller firm as they know that the small firm will invest and then they will optimally buy the smaller firm. Thus, an active acquisition market can provide incentives for smaller firms to engage in more R&D. R&D of the post acquisition firm will optimally fall as the larger firm commercializes the innovation of the smaller firm. Thus, acquisitions can be beneficial through providing incentives for entry and innovation and providing resources for new product development that small firms do not have.

4.2 Anti-competitive M&A?

Focusing more specifically on the motivations underlying M&A, a large literature asks whether M&A transactions are driven by anti-competitive motives, that is, acquiring other firms to increase market power or facilitate collusion. This question is central and long-standing in industrial organization and is one of the key focus of antitrust authorities, grounded on the idea that horizontal acquisitions can reduce competition and harm customers (e.g., Stigler (1950)).¹³ Answering it has been challenging because of the genuine difficulty to observe (and measure) firms' motives. To tackle this question, researchers typically study the *consequences* of M&A transactions to indirectly infer whether they seek to reduce competition. The main logic is to detect whether changes in asset ownership through M&A lead to an increase in competitive performance. Yet, although evidence of improved performance post-transaction (e.g., increased revenues) might indicate increased market power (i.e., an anti-competitive motive), it could also reflect increased economic efficiency (e.g., achieved through cost reductions or operating synergies).¹⁴ The debate regarding the anti-competitive motive for M&A is still open, but existing research indicates that although anti-competitive mergers exist in some contexts, they do not seem to be widespread.

4.2.1 Evidence from stock market reactions

Starting with Eckbo (1983) and Stillman (1983), finance scholars have relied on wealth effects obtained from changes in stock prices around M&A announcements to investigate their potential anti-competitive implications. Stock prices being forward-looking, relying on them is well-suited to assess the potential efficiencies and anti-competitive effects of M&A that may take time to be realized. These two scholars reason that the combined wealth effect for acquirer and target firms (which are positive on average, see Betton, Eckbo, and Thorburn (2008)) cannot be used to discriminate between the efficiency and anti-competitive hypotheses, since these returns reflect the net effect of expected cost reductions and revenue increases. Instead, they propose to look at the wealth effects of rivals, since any change in expected product prices (and competitive environment)

¹³There is a large literature in economics on M&A and antitrust policy beginning with Farrell and Shapiro (1990) and McAfee and Williams (1992). It has been reviewed recently by Whinston (2007) and Asker and Nocke (2021)

¹⁴Several researchers have studied the possible anti-competitive effects of M&A by examining product prices and output data in specific markets (e.g., microfilm, airlines, or banking). For instance, Ashenfelter, Hosken, and Weinberg (2014) document and review 49 such studies, most of which use a case study approach. We focus instead on studies that cover broad samples.

triggered by the transactions should translate into abnormal rivals' stock returns.

Relying on this logic, Eckbo (1983) posits that if mergers increase the probability of successful collusion among producers, rivals should benefit since successful collusion limits output and raises product prices (and/or lower factor prices). He analyzes rivals' wealth effects of 191 horizontal transactions between 1963 and 1978, 65 of which were challenged by the government with violating antitrust laws. Rivals of the 65 challenged transactions earn a small positive abnormal return, and a zero or positive returns when the antitrust complaints are announced. This pattern is inconsistent with the collusion hypothesis, since collusion should generate positive returns for rivals upon transaction announcements followed by negative returns when antitrust complaints are announced.

Stillman (1983) studies 11 horizontal mergers attempted between 1964 and 1972 and identifies rivals from antitrust litigation reports. He also reports zero abnormal returns to rivals. Eckbo (1985) augments his original sample to analyze 266 merger proposals between 1963 and 1981 and assesses whether the wealth effects of rivals are associated with the resulting changes in market concentration, grounded on the simple idea that if M&A limit competition, rivals should benefits more when transactions lead to increased concentration. Yet, Eckbo (1985) reports that rivals' wealth effects are *negatively* related to transaction-induced increases in market concentration, and that they experience negative abnormal stock returns around horizontal transactions in a sample 205 Canadian merger proposals between 1963 and 1982 (in which antitrust challenges were absent), inconsistent with M&A facilitating collusion.

Other researchers have moved beyond rivals, and analyze the effect of M&A transactions on the stock returns of customers and suppliers. If M&A really generate anti-competitive effects, customers should be hurt (e.g., face higher prices). Fee and Thomas (2004) and Shahrur (2005) use large samples of horizontal transactions (554 and 463 transactions respectively) to study this question. Identifying customers and suppliers information using Compustat' industry segment files, both papers reject the claim that horizontal deals facilitate collusion and foster market power. They do not find systematic evidence of customer losses (i.e., negative customers' wealth effects). Both studies report negative wealth effects for the suppliers of the merging firms, suggesting that horizontal transactions increase buying power. The observed increased buying power is however likely to reflect the enhanced efficiency of upstream markets triggered by horizontal concentration.

The above studies mostly report positive rivals' stock returns, and provide several pieces of

evidence that rivals' revaluation do not reflect increased collusion and market power. Follow-on research has attempted to explain the sources of these positive wealth effects. Three channels have been put forth. First, Song and Walkling (2000) show that rivals' wealth effects reflect investors' updated anticipation that they will become targets in the future. Second, Servaes and Tamayo (2014) suggest that rivals' revaluation arises because horizontal transactions increase incumbents' takeover threats, and therefore discipline managers operating in the same market and reducing agency costs. Third, Derrien et al. (2021) show that horizontal acquisitions of public firms (the focus on most existing studies in this area) signal that other public firms operating in the same market are undervalued, triggering a positive revaluation. Although these studies confirm the importance of product market interactions in M&A, they do not support an anti-competitive motive. Several recent papers propose to re-assess this conclusion by looking more closely at the role of product markets' and transactions' characteristics. After all, maybe only some types of M&A are anti-competitive. Fathollahi, Harford, and Klasa (2022) suggest that this is indeed the case. They focus on the similarity of firms' products within a market, and conjecture that anti-competitive M&A should be prevalent in markets that are concentrated and featuring homogeneous products. Based upon a large sample of horizontal acquisitions between 1996 and 2015, they validate this prediction empirically, and further document that in these markets, horizontal transactions lead to increased product prices, and trigger negative wealth effects for suppliers and customers. Departing from earlier research, they conclude that some horizontal M&A are motivated by the expected reduction of rivalry.

Relatedly, Bernile and Lyandres (2018) concentrate on the role of efficiency gains. They posit that if M&A fosters efficiency, horizontal transactions may create "stronger" competitors, and trigger negative consequences for rivals (e.g., predatory pricing), without necessarily harming consumers. They conjecture that revaluations of rivals around M&A transactions should be negatively related to the resulting efficiency gains. To overcome the notorious difficulty of measuring expected efficiency gains, they assemble a (hand-collected) sample of forecasts of operating efficiency gains disclosed by merging firms' managers (gathered from news stories and press releases). They analyze a sample of 480 transactions between 1996 and 2005, and confirm that predicted efficiency gains are negatively related to announcement returns of merging firms' rivals. They further show that efficiency gains have a positive effect on the valuation of customers (and suppliers), suggesting that

the reallocation of competitive strength through M&A alters competitive environments, without necessarily harming customers.

4.2.2 Other approaches to study anti-competitive M&A

In the more recent period, new approaches to examine the possible anti-competitive consequences of M&A have emerged. This new line of research is perhaps a response to the inconclusive evidence emanating from rivals' revaluations. One avenue has been to use improved measurements to better isolate the effects of market power from that of efficiency. Another avenue has been to investigate new channels through which M&A could alter competitive environments.

To separate efficiency from market power, Blonigen and Pierce (2016) apply techniques recently developed by De Loecker and Warzynski (2012) to separately estimate efficiency (i.e., productivity) and market power (i.e., markups). They rely on granular plant-level data from the U.S. Census Bureau covering the entire manufacturing sector over the 1997 to 2007 period. Comparing acquired plants to similar plants that do not experience changes in ownership, they report that M&A significantly increase plants' markups, but have no statistically significant effect on plants' productivity.

Dong, Massa, and Žaldokas (2019) use an original approach based on the premise that market power could be obtained (and maintained) through collusion and the formation of cartels. They then posit that if firms use M&A to gain market power, increased M&A activities should occur when collusion and cartels are detected and broken by law enforcers. They test this prediction exploiting the staggered passage of leniency programs around the world as a proxy for strengthening antitrust enforcement against cartel activities. Based on a large sample covering firms from 63 countries between 1990 and 2012, they find that firms respond to increased barriers to cartel formation by participating in the M&A market. Transactions act as a substitute for now harder-to-form explicit cartels. These acquisitions have a negative effect on customer firms' stock prices, suggesting customers are expected to lose from the transaction initiated in the wake of new leniency laws.

Another channel through which M&A could alter competition is if incumbents acquire targets to preempt *future* competition. This type of acquisitions does not intend to increase market power *per se*, but to eliminate the risk of being displaced by innovation in the future. Cunningham, Ederer, and Ma (2021) study the prevalence of such "killer acquisitions" in the pharmaceutical

market, where innovation is a central determinant of competitive position. Using detailed data on drug projects initiated between 1989 and 2010, they find that acquired drug projects are less likely to be further developed when they overlap with acquirers' existing products' portfolio. The effect of acquisitions on the incidence of project discontinuation is stronger when acquirers currently have more market power. Although the findings support an anti-competitive motive for acquisitions, Cunningham, Ederer, and Ma (2021) estimate that such killer acquisitions are not widespread, representing only between 5% and 7% of all acquisitions in their sample. Consumer welfare is not clear as there may be additional products that are brought to market by larger firms with more resources in the other sets of deals that do not result in drug developments being canceled.

Kamepalli, Rajan, and Zingales (2020) examine a related channel, conjecturing that in markets featuring strong network externalities and in which customers face switching costs, acquisitions can deter entry and stifle competition. They use the market for digital platforms as a case study. They contend that the possibility of acquiring entrants by incumbents induces potential early consumers to wait for the entrant's product to be integrated into the incumbents' instead of switching to the entrant. This waiting reduces payoffs of the entrants, creating a "kill zone" (as described by venture capitalists) where entry is hard to finance. They provide illustrative evidence by looking at the effects of Facebook and Google's acquisitions of large software companies from the beginning of 2006 to the end of 2018.

While Phillips and Zhdanov (2013) focus on the positive incentive effects of acquisitions on entry and R&D, Phillips and Zhdanov (2013) do emphasize that if a downstream firm is not competitive, and large firms capture all of the surplus from the acquisition, the incentives from the acquisition market will not be there and small firms will not conduct innovation. Many acquisitions can be beneficial through providing incentives for entry and innovation and providing resources for new products that small firms do not have. As Kamepalli, Rajan, and Zingales (2020) have demonstrated, in cases with strong network externalities without sufficient competitors, acquisitions can reduce entry and consumer welfare.

4.3 Product market synergies in M&A

The nature of product market interactions also explains firms' acquisition decisions because product market considerations are directly linked to expected synergy gains, and considered to be the root

force driving most transactions. The idea is that bringing assets under the same roof allows product market synergies to bloom (e.g., Rhodes-Kropf and Robinson (2008) for a formalization of this idea). While intuitive, identifying the sources of expected synergies is a daunting task, and as we discussed above, evidence from stock price reactions does not allow to cleanly isolate these sources. Several studies therefore propose to investigate the product market sources of synergies more directly.

Hoberg and Phillips (2010a) use the product description text of firms' 10-Ks between 1997 and 2006 to measure their product market "similarity" and their overall location in the product market space. Confirming the importance of synergies related to product market complementarity, transaction incidence is higher among firms that are more broadly similar to other firms in the economy. These firms have more opportunities for pairings that can generate product market synergies. Transaction incidence is lower for firms that are more similar to their rivals, possibly reflecting increasing rivalry for restructuring opportunities. Exploring transactions' outcomes, they report better long-term outcomes (higher profitability and sales) for transactions involving firms displaying higher product market similarity. Transactions between more similar firms lead to the introduction of new products, consistent with these firms having more potential for new product synergies.

In a similar vein, Sheen (2014) meticulously gathers data from *Consumer Reports* magazine on the quality (i.e., features, designs, and reliability) and price of over 9,000 brand-name products in 20 categories sold by 372 firms from 1980 to 2009. In this sample, he further identifies 88 M&A transactions and analyzes their product market consequences. He reports that when two firms selling a common product merge, the quality of their related brands converges. Yet, prices for both acquiring and target brands fall relative to the competition, suggesting that product market synergies materialize as firms exploit complementary assets to reduce costs.

Continuing this line of investigation, Frésard, Hege, and Phillips (2017) focus on product market specialization. They predict that firms can create value through acquisitions by internalizing markets for some of their proprietary assets and expanding their use within firm boundaries rather than at arm's length. By doing so, firms acquire control of tangible assets to profitably expand the scale of intangible advantage. Frésard, Hege, and Phillips (2017) argue that such intangible advantages is encapsulated in the specialization of their product market, reflecting specific intangible assets (e.g., knowhow or management skills). They study the patterns of cross-border acquisitions

using a large sample of international transactions covering 56 countries between 1990 and 2000, and report that more than 60% of all transactions involve acquirers that are more specialized than targets. Moreover, the economic gains realized in cross-border transactions are positively related to firms' ability to deploy mobile intangible advantages abroad, as reflected in difference in product market specialization.

4.4 Vertical boundaries, M&A, and the theory of the firm

Because of our primary focus on product markets and competition, we have so far concentrated on the determinants and consequences of *horizontal* transactions. However, a large number of M&A are inherently vertical, and involve firms operating in distinct markets but related through supply chain relationships. A extensive literature indicates that product market characteristics also play a central role in explaining vertical M&A. We review below the main economic forces underlying firms' vertical boundaries, and present empirical studies connecting product market characteristics to these forces, and thereby to vertical M&A.¹⁵

4.4.1 Vertical boundaries: Theoretical foundations

Theoretical work in the last fifty years emphasizes that due to incomplete contracting and the inalienability of human capital, the boundaries of the firm (i.e., vertical integration and acquisitions) are determined by trading off ex ante investment incentives and ex post opportunistic behaviors. This trade-off is regulated by both transaction costs economics formalized by Williamson (1971) and the property rights theory pioneered by Grossman and Hart (1986).¹⁶

Transaction costs are important as they determine if transactions are best left to the market (through customer-supplier relationships) or centralized within firms. In this context, firms choose the vertical boundary that minimizes both transaction costs (i.e., the costs of using market relations) and ex post holdup. Ex post holdup occurs when one party threatens to withdraw assets from the relationship and then extracts more ex post surplus from the other party (e.g., Williamson (1979) and Klein, Crawford, and Alchian (1978)). Such opportunistic threats are more credible when assets

¹⁵Lafontaine and Slade (2007) and Slade (2021) provide comprehensive reviews of the literature of firms vertical boundaries and acquisitions.

¹⁶Another literature argues that vertical acquisitions can be motivated by (and lead to) anti-competitive strategies such as foreclosure or collusion.

are *specific*, that is, when they are more valuable inside the relationship than outside. The vertical acquisition of one party by the other is beneficial as it mitigates holdup. Changes in ownership and control should thus occur in a manner to reduce the overall costs of production. The nature of product markets matters as it directly influences both the costs of transacting with other firms and asset specificity (i.e., the risk of holdup).

The property rights theory of the firm considers both the costs and benefits of vertical integration. Because of contract incompleteness, control rights (or who makes decisions) are key to understanding firm vertical boundaries and acquisitions. Grossman and Hart (1986) and Hart and Moore (1990) highlight that firms ex ante incentives to invest in relationship-specific assets (that benefit the overall relation) depends on asset ownership. Control rights can cause contracting parties to invest differently ex ante. The central intuition is that control rights (which frequently, but not always correspond to ownership rights) can cause contracting parties to invest differently ex ante. These control rights thus should be vested in the party whose value is the highest to the relationship.

The biggest difference between the transaction costs theory of the firm and the incomplete contracts property rights theory of the firm is that in the incomplete contracts property rights theory, outcomes can be observed but may not be verifiable in a court of law, and hence, this non-contractility gives rise to the importance of control rights which emphasize who makes the decisions about the asset. The property rights theory of the firms emphasizes that control rights or decision rights then feed back into earlier decisions on the amount of ex ante investment that is made by each party.

The vertical boundaries between firms (separation or integration) are determined by trading off their ex ante investment incentives and ex post opportunistic behaviors. This trade-off depends on the allocation of control rights over the assets that are specific to firms' vertical relationships, as the firms that formally control them have more incentives to invest ex ante due to increased bargaining power ex post. Therefore, vertical acquisitions (change in control) should occur when the relative importance of each party's incentives to add value to the overall relationship shifts. This shift can be precipitated by changes in firms' product market environment.

4.4.2 Vertical M&A and product market factors: empirical evidence

Researchers typically classify transactions as vertical if they involve firms in existing customer-supplier relationships, or firms operating in product markets that are linked through supply-chain relations.¹⁷ Existing research largely confirms the relevance of the above economic forces and their links to product markets to understand the occurrence and consequences of vertical M&A.

Characterizing the properties of vertical M&A using a large sample of transactions between 1986 and 2010, Ahern and Harford (2014) report that vertical transactions are common and highly clustered in a relatively small set of vertically-linked markets. They show that the incidence of vertical transactions is higher in markets characterized by more holdup problems. In addition, when an acquirer is an important customer or supplier to the target, greater holdup problems are associated with more M&A on the margin. Their analysis also reveals that M&A waves travel across vertical links. Economic consolidation through M&A activity in one market predicts future consolidation in vertically-related markets (both upstream and downstream).

Shenoy (2012) investigates in detail the reasons for vertical M&A, examining the wealth effects of the merging firms, rivals, and customers, as well as changes operating performance. He relies on a sample of 225 successful vertical transactions between 1981 and 2004. The combined wealth effect of the firms involved in vertical transactions is positive, confirming the earlier results of Fan and Goyal (2006). This increase in value is positively related to proxies for the prevalence of relationship-specific assets among the involved parties, consistent with vertical integration reducing transaction costs and improving efficiency. When vertical deals create value for the involved parties, rivals and customers also experience positive wealth effects, thereby rejecting the idea that vertical transactions foster market power and foreclosures.

Jain, Kini, and Shenoy (2011) take a different angle and investigate firms' decision to vertically *disintegrate* through vertical divestitures. Examining 46 vertical spin-offs and 65 vertical carve-outs between between 1986 and 2005, they report that vertical divestitures are more likely following positive industry demand shocks and less likely when the potential for contracting problems is high. Their examination of the wealth effects to parent rivals, subsidiary rivals, suppliers, and

¹⁷This type of transactions are widespread. Using data from input-output tables to identify vertically-related markets, Fan and Goyal (2006) reports that a third of all M&A transactions (between public firms) are vertical between 1962 and 1996.

customers suggests that vertical divestitures are motivated by efficiency considerations, as they do not find evidence suggesting that anti-competitive forces such as foreclosure or collusion existed in the vertically integrated structure.

Frésard, Hoberg, and Phillips (2020) posits that the stage of development of innovative assets is important to understand vertical acquisitions. They predict that when innovative assets require further investment and development, it is optimal to leave control to the firms that perform the innovation, as their incentives are most important for the value of the vertical relationship. On the contrary, when innovation is realized, and protected by legally enforceable patents, incentives to invest in innovation by one party decline in importance, and vertical acquisitions optimally reallocate control to the other firm, thereby limiting holdup risk. They combine the text of firms' product descriptions with that of from input-output tables to measure vertical relatedness between firm pairs at a granular level.¹⁸

Using this new measurement and considering a large sample of transactions between 1996 and 2013, they confirm that firms with unrealized innovation (i.e., R&D intensive firms) are less likely to become targets of vertical acquisitions as these firms. They show that the negative link between firms' R&D intensity and vertical acquisitions is significantly stronger when potential vertical buyers likely find it difficult to maintain the innovation incentives of the target and keep its key employees post-acquisition, as measured using inventor mobility and the intensity of each firm's 10-K disclosures relating to employee incentives. In contrast, firms with realized and patented innovation are more likely to sell to vertically related buyers.

Ahern (2012) also studies the importance of product market factors in vertical M&A, but focuses on their role in shaping the allocation of transaction gains. He claims that the division of gains is determined by customer–supplier relations, and building on the intuition from transaction cost economics. He predicts that when one party depends heavily on the assets from the other, it faces higher holdup risk, and thus have a weaker bargaining position. This firm should capture a smaller share of the transaction gains. Based on a large sample of vertical transactions between 1980 and 2008, he reports that targets' relative scarcity (proxied by their market power) and product market dependence (proxied by customer–supplier relations) are positively related to their share of the total transaction gains.

¹⁸See <http://hobergphillips.tuck.dartmouth.edu/> for downloadable data.

4.4.3 Partial ownership and equity stakes

Another related group of studies concentrates on *partial* acquisitions through block equity stakes. Allen and Phillips (2000) assemble a sample of 402 ownership stakes in other firms between 1980 and 1991 (minimum stakes of 5%), including firms with and without formal product market agreements through joint ventures and alliances. Examining the determinants and consequences of block equity purchases, they show that purchases by partnering firms in a business alliance or joint venture can reduce contracting or monitoring costs, especially when assets are specialized as Klein, Crawford, and Alchian (1978) predicts.

Extending these results, Fee, Hadlock, and Thomas (2006) examine the role of equity stakes in a broad sample of over 10,000 customer-supplier relationships between 1988 and 2001 identified from Compustat industry segment files. Equity stakes are relatively rare as they are present in only 3% of relationships. However, echoing the results of Allen and Phillips (2000), stakes are larger (and more likely) when suppliers' assets are specific or are part of a formal product market alliance, suggesting that asset ownership, albeit partial, is used to mitigate transaction costs and contractual frictions.

5 Innovation, competition, and product market environments

Firms' investments in innovative activities are also closely related to their product market environment. Notably, because of the genuine intangible nature of innovation outcomes, the literature studying the interactions between innovation (i.e., investment to develop intangible assets) and product market structures is distinct from that studying tangible investments (reviewed above). This large literature builds on different models and highlights distinct economic forces. The majority of the research in this area examines the effect of product market competition on firms' incentives to innovate, and shows that this effect depends on the nature of product markets as well as the specificities of innovation. This section reviews the central economic mechanisms, and discusses the empirical evidence. We also present recent research focusing on the influence of innovation on product market outcomes, and the role of competition on the financing of innovation.

5.1 Competition and innovation: The theoretical building blocks

The theoretical relationship between competition and innovation builds on two central economic ideas. The first was advanced by Schumpeter (1942) who posited that competition is inimical to innovative activity. He argued that larger firms with market power have greater incentives and ability to innovate, because intense competition reduces the economic rents arising from innovation. Therefore, the prospect of market power and large scale spurs innovation. In contrast, the second idea was put forth by Arrow (1962) who argued that a monopolist's incentive to innovate is less than that of a competitive firm, because of the monopolist's financial interest in the status quo. A firm earning large profits has an interest in protecting the status quo and is thus less likely to innovate.

Building on these two seminal ideas, a voluminous literature in economics (surveyed by Gilbert (2006) and Cohen (2010)) has recognized the absence of a “general” prediction about the relationship between competition and innovation, and has instead investigated the conditions under which one specific force is likely to dominate.¹⁹ Although the topic is still debated (e.g., Shapiro (2012)), the literature recognizes that the sign of the competition-innovation relationship should depend on whether (i) the market is “contestable” (i.e., innovators can gain sales from rivals and “escape” competition), and (ii) the innovation is “appropriable” (i.e., successful innovators can capture the benefit from their innovation).

An influential example of this line of research is Aghion et al. (2005). They develop a model integrating these principles, assuming that competition takes the form of imitation (and thus reduces “appropriability”). They predict that the relationship between competition and innovation (across markets) follows an inverted U-shape.²⁰ Innovation is low in markets in which firms are dissimilar such that laggards are unable to overtake leaders (i.e., when “contestability” is low), or in markets in which competition is close to perfect and there is almost no room for rent capture (i.e., when “appropriability” is low). In markets featuring intermediate levels of competition, rents from innovation (i.e., escaping competition) may exceed rents from the status quo, resulting in

¹⁹The theoretical literature has taken two main modelling approaches. One considers that the returns to innovation are deterministic (e.g., Dasgupta and Stiglitz (1980)). The other approach – the patent race literature – considers a stochastic link in which greater innovative activities lead to greater returns (e.g., Reinganum (1985)).

²⁰The idea of inverted U-shaped relationship between competition and innovation goes at least as far back as Scherer (1967), who found such a relationship between market concentration and employment of scientists and engineers.

higher levels of innovation.

5.2 Evidence on the effects of competition on innovation

As highlighted by Cohen (2010), testing the effect of competition on innovation has been challenging for various reasons.²¹ Besides the ubiquitous difficulty of identifying exogenous sources of variation in market structures, common empirical proxies for competition (e.g., industry concentration or markups) might not accurately capture the “contestability” of markets or the “appropriability” of innovation’s returns underlined in the theory. In addition, unlike other decisions (such as financing, physical investment or acquisitions), measuring innovation is difficult. Researchers typically rely on research and development (R&D) expenditures or patenting. Both have shortcomings. R&D expenditures may include outlays that are unrelated to innovation activities, and there could be substantial cross-sectional (and temporal) variation in the proportion of such outlays due to differences in tax treatment. Firms’ choice to protect their innovation with patents is driven by the expected benefits of the granted legal protection and the costs of disseminating sensitive information to rivals. Association between patenting and competition might thus reflect changes in this trade-off, and not changes in firms’ incentives to innovate.

Notwithstanding these challenges and conforming with the theoretical predictions the sign of the relationship between competition and innovation has been found to vary greatly across markets (and periods). Surveying the early empirical studies, Gilbert (2006) reports overall mixed evidence and attributes such disparity to the heterogeneity across markets highlighted by the theory.

Recent research focuses more specifically on understanding the heterogeneity of the competition-innovation relationship across market structures. For instance, Aghion et al. (2005) provide empirical evidence supporting the inverted U-shaped relation predicted by their theory in a sample of firms listed on the London stock exchange between 1973 and 1994. They use the average price-cost margin in each market to measure the intensity of competition, and the average number of (citation-weighted) patents to measure the intensity of innovation. They report a significant non-linear relationship, with lower innovation in markets characterized by either low or high competition, and higher innovation in markets in which competition is at an intermediate level. They obtain similar results after instrumenting changes in competition using a set of policy instruments

²¹Gilbert (2006) discuss additional empirical challenges.

that exogenously shifted the intensity of competition (e.g., the Thatcher era privatizations). Underlining the importance of markets' contestability, the results are stronger in industries featuring a higher degree of "neck-and-neckness".²²

In a similar spirit, Aghion et al. (2009) study incumbents' innovation response to foreign firm entry. Using firm-level data from the U.K. between 1987 and 1993 and measuring innovation based on patenting activity, they document systematic variation of incumbents' innovation responses, in line with theoretical predictions. In particular, entry encourages incumbents' innovation in markets in which the threat of technologically advanced entry is elevated (i.e., high degree of contestability). In contrast, entry appears to discourages innovation when incumbents are technological laggards and the threat erodes incumbents' expected rents from innovating.²³

Hoberg, Li, and Phillips (2020) studies the competitive impact of Chinese innovation on U.S. innovation using direct measures of Chinese firms' ability to access information about U.S. innovation over the internet. They examine how differential industry agglomeration and internet penetration at the province level in China can be used to generate variation in the capacity of Chinese firms to access information cheaply and challenge U.S. firm innovation. Indeed, a wealth of information on intellectual property, product market strategies, and the performance of U.S. firms is available from firm websites, patent filings, and required EDGAR filings. Thus, as regional Chinese firms gain greater access to the internet, they have access to information at a much lower cost that allows them to more effectively compete in innovation with rival U.S. firms. They examine how U.S. firms change their innovative investment in the face of changes in intellectual property competition from China. They find that impacted U.S. firms significantly reduce spending in R&D and patenting over a three-year period after treatment. This crowding-out effect is linked to Chinese firms competing with U.S. firms as required under the exclusion requirement.

Thakor and Lo (2022) study the interaction between competition and innovation, recognizing the interplay between competition and financing (discussed in Section 2). Doing so, they attempt to bring together two strands of literature that are typically studied separately. They develop a model about an R&D-intensive firm's decision regarding how much to innovate and to finance the

²²Consistent with this result, Hashmi (2013) report that for a sample of U.S. manufacturing firms, the relation between competition and innovation is not inverted U-shaped but mildly negative, and argues that this is due to difference in contestability ("neck-and-neckness") across the two countries.

²³Aghion et al. (2018) report similar conclusions based on lab experiments.

innovation, and study how these decisions are affected by the mediating influence of the competitive environment. Mirroring the “escape competition” channel, greater competition induces a reduction of investments in assets-in-place and increased R&D expenditures. Interestingly, they predict a reduction of debt in response to greater competition, because the induced lower investments in assets-in-place shrinks the collateral base that generates debt capacity. They provide evidence supporting the model’s prediction using data on publicly-traded biopharmaceutical companies, and exploiting the Hatch-Waxman Act of 1984, which relaxed barriers to entry for generic drugs. Confirming their prediction, firms increase R&D in response to greater competition.

5.3 Intellectual property rights, market power, and innovation

Another stream of research examines the relation between competitive environment and firms’ innovation incentives through variation in the legal protection of innovation. As legal protection (e.g., through patents or trademarks) directly affects innovators’ expected rents and markets’ contestability, changes in protection can be used to tease out on specific theoretical predictions. This line of research reveals that the strength of legal protection shapes the nature of product market interactions, and in turn, influences firms’ innovation incentives.

For instance, in an influential study, Galasso and Schankerman (2015) investigate the effect of the removal of patent rights by court invalidation decisions (of the U.S. Federal Circuit Court of Appeals). The invalidation removes expected rents for the owner of the invalidated patents, and increases the market’s contestability for technological rivals. Using 1,357 Federal Circuit patent validity decisions (covering 1,258 distinct patents) between 1982 and 2008, they document an increase in innovation by rivals (in the form of more citations to the invalidated patents), consistent with increased market contestability spurring innovation. Similar conclusions are presented by Murray and Stern (2007) and Williams (2013) focusing on variation in patent protection in the biomedical field.

More recently, Acikalin et al. (2022) look at firms that lost protection after a significant Supreme Court decision ruling (*Alice vs. CLS Bank International* in 2014) that patents that were in the broad category of business methods are ineligible for protection. These patents spanned multiple large industry groups, including business methods, software, and bioinformatics. Using the over 30,000 patents that have been ruled ineligible to train a machine learning model, they analyze over 600,000

existing granted patents to identify firms' existing patent portfolios' potential exposure to the Alice decision. They show that small firms with exposure to the Alice decision experience an erosion of their market power, and consistent with competition encouraging innovation, they respond by increasing their R&D expenditures. Larger firms with high market share firms benefit from area-wide invalidations as their sales and market values increase while their acquisitions decrease. They also litigate less and face less litigation targeting large firms following losses in IP protection. These results are consistent with high market share firms having more resources - technological, financial and managerial - to protect their product market position.

Heath and Mace (2020) study the effect the legal protection granted by trademarks. They isolate variation in protection by exploiting the Federal Trademark Dilution Act of 1996, which granted additional legal protection to "famous" trademarks, until its key provision was nullified in 2003 by a U.S. Supreme Court decision. They document lower entry and exit in markets in which firms benefit from stronger legal protection (i.e., 729 firms in 170 distinct markets). Corroborating the idea that market power reduces innovation incentives, they report that better protected firms innovate less: they reduce R&D expenditures and produce fewer patents following the Federal Trademark Dilution Act.

5.4 The effects of innovation on product market outcomes

Innovative activities (and their outcomes) can also influence product market structures. While this influence can materialize in different ways, a common theme in the literature is that innovation can contribute to create (endogenous) barriers to entry (or expansion), and help firms to protect (or strengthen) their competitive position. These barriers may be erected, for instance, because innovation helps firms to vertically differentiate their products and escape competition (e.g., Sutton (1991)), lowers production costs and makes firms stronger competitors (e.g., Aghion and Howitt (1992)), and provides a strategic commitment to compete more aggressively (e.g., Fudenberg and Tirole (1984)).

Recent empirical evidence provides support for this channel.²⁴ Hombert and Matray (2018) study whether innovative firms are more resilient than less innovative firms to increasing competi-

²⁴Note that evidence reporting increased innovation following an intensification of competition (e.g., Aghion et al. (2009)) can be interpreted through the lens of a revealed preference argument, whereby firms' innovation decisions "reveal" their expectations as to whether innovation protects their competitive position.

tion. They follow a common empirical approach and exploit rising imports from China to capture plausibly exogenous variation in competition. Focusing on the response of manufacturing firms between 1982 and 2006, they document that firms are less adversely affected by increased competition (in terms of growth and profitability) when they have spent more on R&D before the change in competition. They further show that the mitigating effect of innovation is stronger in markets in which product differentiation is more prevalent, consistent with Sutton (1991)'s argument that vertical differentiation enables firms to cope with heightened competition.

6 Incentives, Corporate Governance, and Competition

The nature of product market environment also interacts with firms' governance structure, primarily because of the long-standing idea that competition influences managerial agency conflicts. Adam Smith famously claimed that "*monopoly... is a great enemy to good management*" (Smith (1776)). Building on this idea, economists have long argued that managerial slack is first and foremost an issue for firms lacking competitive pressure. This view is however not universal. In this section, we review the literature studying the different economic channels through which competition interacts with the prevalence of agency costs and managerial incentives. The theory indicates that the predictions regarding the relationship between competition and managerial incentives are more nuanced than what was envisioned by Adam Smith, and depends on the relative strength of distinct forces. Empirical studies largely confirm these nuances. We review this work below.

6.1 Channels linking competition to managerial incentives

A number of theoretical papers examine whether and how competition changes the provision of effort by managers to improve efficiency and create value. This line of research indicates that competition can affect incentives in several ways: providing additional market information, altering the dis-utility of managerial effort, and affecting the marginal value of cost reduction initiatives. Theory predicts that the relationship between competition and incentives depends on the nature of product market environments. Some studies contend that competition can substitute for managerial incentives, while others suggest that it can act as a complement.

For example, Hart (1983) posits that competition influences incentives through an "information"

channel. Competition increases the availability of information about market conditions and thus helps firms' owners to better infer the contribution of managers' actions on profits and value. An implication is that competition acts as a disciplinary mechanism that reduces managerial shirking by making it easier (i.e., cheaper) to detect. Owners may thus provide managers with weaker incentives. Scharfstein (1988) shows that Hart (1983)'s conclusion depends on the specification of managerial preferences. In some cases (e.g., when managers' marginal utility from income is strictly positive), competition, and the informations it generates, may actually increase managerial shirking. In this case, owners may provide their managers with stronger incentives.

Taking a different perspective, Schmidt (1997) argues that competition affects managerial incentives through the "threat" of liquidation. As competition increases the risk of bankruptcy and liquidation, it induces managers to exert more effort to avoid losing their jobs. This threat therefore reduces the need to provide explicit incentives (e.g., through compensation contracts).

Other researchers contends that competition affects incentives through the marginal value of cost reduction initiatives. Raith (2003) puts forth the idea that competition increases the need to provide explicit incentives. This larger need arises because competition raises the marginal reward associated with "business-stealing" and cost-reducing activities. As it implies a higher marginal return to managerial effort, competition leads owners to provide more explicit incentives to managers.

Another stream of research shows that owners can commit for their firm to compete more or less aggressively in the product market through the compensation packages they provide to managers. Sklivas (1987) models a situation in which manager's incentive contracts induce particular type of behavior that will affect his own as well as his rival manager's product market actions. Owners thus choose managerial incentives anticipating their effects on product market equilibrium. Fershtman and Judd (1987) examine the incentive contracts that owners choose in an oligopoly, focusing on how competing owners may strategically manipulate contracts and the resulting impact on product market outcome. They show that profit-maximizing owners will almost never tell their managers to maximize profits, and that the optimal contracts depends on the nature of competition. With Cournot competition, owners should give a positive incentive for sale. In contrast, if firms sell differentiated products and compete in price, owners want their managers to set a high price, thereby encouraging competing managers to raise their prices as well. With price competition,

owners should pay managers to keep sales low.

6.2 Competition and Incentives: empirical evidence

The above theories focus on managerial incentives and effort provision. Because these incentives are hard to measure directly, researchers have tested the theoretical predictions indirectly by focusing on the effect of competition on (i) outcomes directly linked to effort provision (e.g., efficiency or performance), (ii) the explicit provision of incentives through managerial compensation contracts, or (iii) the existence of other governance mechanisms. We review the insights obtained from each of these approaches below.

6.2.1 Competition, governance, and firm performance

The first stream of empirical studies does not look directly at managerial incentives, but focus on firms' performance. Anchored on Adam Smith's view that managerial slack results from the lack of competition, this line of work reasons that if competition is a substitute for managerial incentives, it should be associated with more efficiency. The influential study of Nickell (1996) illustrates this approach, investigating whether competition is positively related to efficiency. Based on an analysis of 670 U.K. manufacturing companies over the period 1972-86, he reports that market power, as captured by market share, is associated with reduced levels of productivity. Furthermore, competition (measured either by increased numbers of competitors or by lower levels of rents) is associated with higher rates of total factor productivity growth.

While these results confirm the idea that competition improves efficiency by reducing managerial slack, Nickell (1996)'s results are also consistent with alternative explanations unrelated to managerial incentives. For instance, firms in competitive markets might be more efficient because they benefit from more peers whose successes and failures they can learn from. To better attribute the positive link between competition and efficiency to managerial incentives, Giroud and Mueller (2010) exploit variation in the threat of hostile takeovers. They build on the long-standing idea that a weakening of takeover threats increases the opportunity for managerial slack, because of the decreased risk for managers to lose their job (e.g., Manne (1965) and Jensen (1986)). Giroud and Mueller (2010) posits that if competition limits managerial slacks, a diminution of the threat of hostile takeovers should only lead to lower efficiency in *non*-competitive markets.

They test this prediction empirically using the staggered passage of state-level business combination (BC) laws between 1985 and 1991 that restricted hostile takeovers. Consistent with the notion that BC laws increase the opportunity for managerial slack, they estimate drops in firms' performance (i.e., return on assets) when takeover threats soften. Notably, the drop in performance is larger for firms in non-competitive markets. In fact, they find that BC laws have no effect on firms' performance in competitive markets, suggesting that competitive pressure enforces discipline on managers and limit the scope for slack.

In a follow-on study, Giroud and Mueller (2011) examine how the effect of good internal governance practices on firms' performance depends on competition. They conjecture that if competition reduces slack, the need to provide managers with incentives through good governance mechanisms should be smaller in competitive markets. They test this prediction using the firm-specific governance index developed by Gompers, Ishii, and Metrick (2003), which summarizes 24 anti-takeover and shareholder rights provisions. Analyzing the stock market performance of a large sample of firms between 1990 and 2006, they show that weakly-governed firms have lower performance (i.e., equity returns, return on assets, and valuation), but only in concentrated markets, as predicted.

Chhaochharia et al. (2017) rely on the passage the Sarbanes Oxley Act (SOX) to capture variation in firms' governance practices. Because SOX requires enhanced governance standards from public firms (e.g., increased penalties on officers who forge financial documents, independence of audit committee, or new procedures to evaluate the effectiveness of firms' internal controls), its enactment in 2002 suddenly impose tighter practices on many firms. Echoing Giroud and Mueller (2011), they posit that, if competition limits managerial slack, the enhanced governance mechanisms required by SOX should have a lower effect for firms already facing competitive pressure. These firms should thus experience lower efficiency gains after SOX compared to firms not exposed to the disciplining force of competition. They confirm this conjecture empirically: SOX led to a larger improvement in the return on assets of firms in concentrated markets than in non-concentrated markets.

6.2.2 The effect of competition on the provision of managerial incentives

A second line of research, closer in spirit to the theoretical predictions, looks at the effects of competition on various aspects of managers' compensation contracts. Hubbard and Palia (1995)

provides one of the first empirical investigation in this area. They focus on the banking sector and use the deregulation of the commercial banking industry in the 1980s to capture changes in competition. Based on a sample of 147 banks, they report that overall pay of banks' managers (i.e., CEOs) rises following increased competition, together with a stronger relationship between pay and performance in deregulated banking markets. They report, however, no significant effect on the slope of the contract (a common measure of managerial incentive provision).

Follow-on research has focused more directly on the *structure* of managerial pay. For instance, Cuñat and Guadalupe (2005) examine the effect of competition on managers' compensation contracts (CEOs, executives and workers) using a large sample of private and public U.K. firms between 1992 and 2000. They exploit the differential effect of the sudden appreciation of the British pound in 1996 across markets with different degrees of openness to capture changes in competition that are unrelated to existing compensation practices. They report that firms in markets more exposed to foreign competition increased the slope of their performance-related pay contracts post-appreciation substantially more than other firms. They conclude that competition lead owners to provide more explicit managerial incentives to induce more managerial effort, potentially due to the larger marginal reward associated with "business-stealing" activities.

Cuñat and Guadalupe (2009), Karuna (2007), and Dasgupta, Li, and Wang (2018) provide further corroborating evidence. Cuñat and Guadalupe (2009) use variation in competition triggered by import penetration (instrumented by exchange rates and tariffs) in manufacturing industries between 1992 and 2000 and show that increased foreign competition substantially tilts the structure of compensation towards more incentive provision: more competition reduces the level of non-performance-related pay and increases the sensitivity of pay to performance. Karuna (2007) uses various proxies to measure competition and studies the relation with firms' pay-performance sensitivity, computed as the change in the dollar value of the manager's stock and options for a 1% change in the stock price. Based on a large sample of firms between 1992 and 2003, he reports positive associations between managerial incentives and competition. Specifically, incentives are positively related to product substitutability and market size, and negatively related to entry costs. Also relying on variation in competition triggered by tariff reductions, Dasgupta, Li, and Wang (2018) further report that increase foreign competition is associated with higher pay-performance sensitivity for managers. They show, however, that their results only hold for well-governed firms

(based on diverse proxies).

Although most of the existing empirical literature indicates that competition leads to the provision of more explicit incentives, Lie and Yang (2022) recently reach opposite conclusions. They revisit the effect of competition on the provision of managerial incentives using variation in import penetration from China between 1992 to 2005 (instrumented using Chinese trade penetration in other developed countries as in Hombert and Matray (2018)). They report that increased Chinese import penetration lowers the value of stock grants and thus contributes to a decrease in managers' wealth-performance sensitivity.

Focusing on a different dimensions of managerial contracts, Aggarwal and Samwick (1999) study the relationship between competition and the use of relative performance evaluation (i.e., performance-based incentives in which compensation decreases with rivals' performance). They theoretically study the optimal compensation contracts for managers allowing for strategic interactions in the product market. They posit that a compensation contract that filters out shocks common to all firms in a market (i.e., relative evaluation) necessarily alters a manager's optimal strategic product market choices. The use of relative performance evaluation may be limited by the need to soften competition. Hence, there should be less relative performance evaluation in more competitive industries, which they confirm empirically by comparing the sensitivity of managers pay to rivals' performance in concentrated and non-concentrated manufacturing markets.

A related series of papers concentrate on managerial turnover. For instance DeFond and Park (1999) examine its relationship with competition. They argue that competition should make it easier for owners to identify and replace poorly performing CEOs, in line with Hart (1983). Using a sample of 301 firms that change CEOs from 1988 through 1992 (and 621 firms that do not), they report a negative association between the incidence of CEO turnover and market concentration.²⁵ This result echoes that in Hubbard and Palia (1995). More recently, Dasgupta, Li, and Wang (2018) analyze firms' CEO retention decisions in response to increased foreign competition. Using cuts of import tariffs in manufacturing sectors between 1974 and 2005, they find that both the likelihood of forced turnover and its sensitivity to performance increase when foreign competition intensifies. These effects are stronger for firms exposed to greater predation risk and with products

²⁵Ali, Klasa, and Yeung (2009) show that the negative correlation disappears when market concentration is instead based on Census data that contains both publicly listed and private firms.

more similar to those of other firms.

Overall, existing research indicates that competition induces owners to provide more explicit managerial incentives, consistent with the idea that competition acts as a complement to such incentives. Yet, although the evidence aligns with the idea that competition raises the marginal reward associated with “business-stealing”, we still lack a clear understanding of the economic forces underlying these results.

6.2.3 Competition as a substitute for other governance mechanisms

As an alternative route to understand how competition shapes managerial incentives, other researchers study whether competition influences the prevalence (and intensity) of alternative governance mechanisms. This line of research asserts that if competition mitigates managerial slack, other mechanisms designed and used to achieve the same goal should be less required.

Bena and Xu (2017) considers firms’ ownership structure as one such mechanism. They build on the long-standing idea that agency problems between owners and managers are lessened when managers have an ownership stake, i.e., are “inside” owners. If competition reduces managerial agency conflicts, firms operating in competitive industries should display lower levels of inside ownership. They test this prediction using a large sample of closely-held manufacturing firms in 18 European countries between 2002 and 2011 for which they know the identity and stake of shareholders, as well as whether a shareholder holds a managerial position. They confirm that firms exposed to more intense competition (from import penetration) have lower inside ownership. Additional evidence indicates that their results are (partly) obtained because competition reduces the amount of private benefits that insiders can extract (i.e., one dimension of managerial slack).

Guadalupe and Wulf (2010) concentrate on the internal organization of firms, and investigate the effect of competition on corporate hierarchies. Hierarchies represents a form on internal governance through which managers supervise their subordinates. Agency problems could lead firms to put in place strict hierarchies, limiting the decision authority of the CEO (or other top executives). Guadalupe and Wulf (2010) measure hierarchies based on the number of management levels and CEOs’ span of control, using a large sample of manufacturing firms between 1986 and 1999. Focusing on the elimination of import tariffs (and other trade barriers) following the Canada-United States Free Trade Agreement of 1989 (FTA), they report that greater competition causes firms

to flatten: they reduce the number of management levels and broaden the span of control for the CEO. This flattening could occur because competition lowers the need for hierarchies to address agency problems, or because “flatter” firms can respond faster to market changes (e.g., Thesmar and Thoenig (2000))

Cremers, Nair, and Peyer (2008) focus instead on internal takeover defenses. Mirroring the intuition of Giroud and Mueller (2010), they argue that if competition acts as a substitute for the pressure exerted by an active market for corporate control, limiting the incidence of takeovers through various defenses should be more prevalent in competitive markets. Validating this thesis, they demonstrate that firms in more competitive markets have more takeover defenses. Hence, greater competition leads to less exposure to the market for corporate control. They further show that the positive effect of competition on takeover defenses concentrates on markets in which monitoring (by stakeholders) is already high, and in which managerial slack is already constrained.

6.3 A recent debate: common ownership and competition

Research on the interactions between governance and product markets typically studies the effect of competition on managerial incentives, and the resulting efficiency. A recent line of research conjectures that firms’ ownership structure – one central dimension of firms’ governance – could alter their competitive behavior. The rise of institutional investment in the last decades implies that it has become common for institutional investors to have ownership stakes in competing firms. Several recent studies contend that such “common ownership” could stifle competition if rivals sharing an owner have reduced incentives to compete or if common ownership facilitates collusion.

To date, evidence on whether this effect is present in the data remains contradictory. Early studies established an effect whereby common ownership reduces competition (He and Huang (2017), and Azar, Schmalz, and Tecu (2018)). However, later studies have found either no impact once other confounding events are taken into account (Dennis, Gerardi, and Schenone (2020), Lewellen and Lowry (2021)) or low incentives for institutional owners to be involved for competition considerations (Lewellen and Lewellen (2022)). Given that the jury is still out and new evidence is being produced and debated, we do not review the details of this literature.

7 Measurement of product markets and competition

When reviewing the large empirical literature on the interactions between corporate finance and product markets, we have so far abstracted from the definition of “markets” used by researchers. Yet, defining the relevant market for a given firm (i.e., in what markets firms operate) is of paramount importance to measure, identify, and examine its interaction with rivals and the extent of competition between them (see for instance the discussion in Phillips (2013)).

An examination of competition, its determinants and its effects, typically begins by determining the product market or location in which firms are competing. Then, the researcher (e.g., a regulator) needs to identify current or potential firms competing in the product space, determine the type of competition, and assess whether it is uni-dimensional or multi-dimensions: competition through prices (i.e., Bertrand competition), quantities (i.e., Cournot competition), or whether competition might also involve multiple dimensions such as product variety or differentiation (e.g., Chamberlin (1933)) or quality (e.g., Spence (1975)). Following these steps, the researcher needs to measure the extent of competition (potentially using various measures) in order to analyze its potential effects.

The studies reviewed in this Chapter differ substantially in their definition of markets, the measurement of their nature, and the intensity and type of competition. In this section, we present the main measures and definitions used in corporate finance research. We discuss some of the issues associated with these measurements, and present recent work proposing improvements along various dimensions.

7.1 Measures of competition and definitions of markets

Although researchers have used plethora of variables to capture “competition”, four measures stand out: the Herfindahl-Hirschman (HHI) index, price-cost margin (or Lerner index), the number of competitors, and the cross-price elasticity of demand. HHI is obtained as the sum of squared market shares across all firms operating in a given product market. It is primarily a measure of market concentration but is routinely used as a indicator of the degree of competition. Price-cost margin is typically measured as sales relative to costs and captures firms’ ability to price above their cost. Since pressure from rivals should lead firms to set prices that reflect costs, price-cost margin is commonly used to capture market power (e.g., De Loecker, Eeckhout, and Unger (2020)). The

number of firms competing in a market is also often used, on the ground that more firms reflect lower entry barriers, and hence, more competition. Lastly, the cross-price elasticity of demand measures the change in a firm's demand with respect to the price change of a rival product. It is the primary measure of competition used in economics today. It is less frequently used in corporate finance because it requires detailed data on product prices.²⁶

In all cases, constructing these measures necessitates a clear definition of markets and the identification of rivals.²⁷ Indeed, by their nature, these measures are only applicable (and hence precise) if markets can be clearly identified and well delimited. To do so, researchers have traditionally relied on industry definitions used by government agencies to classify firms into industry areas. In the U.S., these are the Standard Industrial Classification (SIC), established in 1937, or the North American Industry Classification System (NAICS) released in 1997. The SIC system assigns a code (usually 4 digit but can be coarser for multiple product firms) to each firm, determined by the industry appropriate for the overall largest product lines of each firm. The NAICS system assigns a (five-digit) code to each firm, whereby firms are classified to industries according to their primary business activity (i.e., their process of production). The vast majority of studies reviewed in the previous sections define markets based on these classifications, which are usefully provided in standard financial databases (e.g., Compustat or CRSP). In addition, they offer the flexibility for researchers to define markets at different levels of granularity by considering various layers of industry aggregation (e.g., three-digit SIC codes as opposed to four-digit codes). Overall, firms assigned the same four-digit SIC code (or five-digit NAICS) are believed to have fairly homogeneous products (processes). Firms whose codes agree only in fewer digits are believed to have less homogeneous products.

These classifications are ubiquitous in corporate finance research. Nevertheless, despite their widespread usage, researchers have identified multiple limitations, offered practical warnings, and proposed improvements. In particular, Clarke (1989) examines whether SIC codes succeed in com-

²⁶Thus in economics, the tradition has been to study well-defined specific markets that have detailed price and quantity data, that can come from such sources as supermarket scanner data and industry associations. In contrast, most corporate finance scholars are interested in larger panel data studies that cover many different markets. In addition, there is a burgeoning interest in high technology markets where detailed price and product data are hard to come by.

²⁷Price-cost margin is an exception as it can be measured at the firm-level, without specifying in which market firms compete (see Nickell (1996)) but the industry benchmark with which to compare these price-cost margins still requires a definition of the relevant industry market.

binning firms into homogeneous economic markets. Using data from Compustat on firms classified into SIC industries between 1000 and 3999, he studies how well industries explain firms' product market outcomes (e.g., sales) and reports that the SIC system is not especially helpful at identifying groups of firms with similar characteristics. Kahle and Walkling (1996) find substantial differences in the SIC codes assigned to firms by Compustat and CRSP. They report that several empirical results in the literature are sensitive to these differences (e.g., the determinants and performance of "horizontal" acquisitions). They also draw attention on the fact that SIC codes assigned can sometimes change over time, but notice that researchers tend to use the latest ones (e.g., reported in Compustat). In the more recent period, researchers attempt to mitigate this concern by using firms' "historical" SIC (or NAICS) codes, the better track firms' industry affiliation over time. Concomitantly Fama and French (1997) create new industry classifications based on a new way of grouping existing four-digit SIC codes. Using the set of competitors identified by Capital IQ from companies' filings, Rauh and Sufi (2012) also point to the inadequacy of SIC classifications, as they identify many declared competitors belonging to *other* SIC industries.

Another limitation is that, in many studies, HHI or the number of rivals are solely based on domestic publicly-listed firms in each SIC or NAICS industry. This limitation reflects the lack of comprehensive and reliable data on private and foreign firms. The resulting measures of competition thus ignore the impact of private and foreign rivals. Ali, Klasa, and Yeung (2009) show that this omission can be problematic. They uncover that concentration measures calculated with Compustat, which cover (almost only) domestic public firms, are poor proxies for actual concentration that includes private firms (obtained from the U.S. Census). They further show that the significant empirical relations found between Compustat-based concentration measures and dependent variables of several important studies are not robust when private firms are part of the measurement. Aware of this limitation, later research has increasingly relied on concentration measures that include private firms (e.g., Hoberg and Phillips (2010b))

7.2 New text-based measurements

Hoberg and Phillips (2016) employ computational linguistics methods applied to the text in firms' 10-K filings to assign them into product markets, instead of using pre-defined SIC or NAICS codes that are based on production processes (see Clarke (1989)). The logic of their approach is that

firms selling similar products are likely competing in the same market. They use the words in the product description section of firms' 10-Ks and determine the relationship between these words and those used by all other publicly-traded firms to produce a relatedness (or similarity) score between each pair of firms.²⁸ They then identify rivals for each firm by grouping firms into markets based on minimum similarity scores.

Hoberg and Phillips (2016) provide two different classification systems.²⁹ The first, "fixed industry classifications" (FIC) is analogous to SIC and NAICS systems. Firms are grouped into a set of markets (called "industries") that are fixed over time and membership in an industry is required to be transitive. If firms B and C are in firm A's industry, then firms B and C are also in the same industry. Furthermore, although the FIC industries adhere to the same transitivity restrictions as SIC and NAICS, they differ because they use clustering algorithms that maximize total within-industry similarity based on product market word usage in 10-K product descriptions. The second classification system, "Text-based Network Industry Classifications" (TNIC), is more general, and allows firms' competitors to change every year, better reflecting markets' dynamics. In addition, it relaxes the membership transitivity requirements and views industries like flexible networks. In the TNIC system, each firm can have its own set of distinct competitors, with competitors of one firm not necessarily being competitors of each other.

These new classification systems produce several measures of competition that allow a more precise determination of rivals. For instance, Hoberg and Phillips (2016) compute new HHIs based on both systems. Hoberg and Phillips (2010a) also use the average similarity of the ten closest competitors, and Hoberg, Phillips, and Prabhala (2014) develop a product-fluidity measure that captures product market threats from potential entrants.³⁰ Price-cost margin can also be calculated based on both FIC and TNIC systems. Relative to existing classifications, these new text-based classifications offer economically large improvements in their ability to explain managerial discussions of competition as compared to SIC or NAICS, and to identify the specific firms mentioned by managers as being competitors. They also offer econometric gains in identifying groups of firms with

²⁸Their analysis thus produces an symmetric matrix of similarity scores. Given that there are approximately 5,000 firms in each year, their analysis produces approximately a 5,000 x 5,000 matrix in each year.

²⁹See <http://hobergphillips.tuck.dartmouth.edu/> for downloadable data.

³⁰Also exploiting the text of firms' 10-Ks, Li, Lundholm, and Minnis (2013) propose to measure firms' exposure to competition by simply counting the number of references to competition scaled by the total number of words firms' documents. They report that their measure is related to future operating performance in ways that suggest it is a valid measure of competition.

similar characteristics. For these reasons, many researchers have started to rely on FIC or TNIC to define markets, measure competition, and identify rivals (e.g., Foucault and Frésard (2014), Grieser et al. (2022), Bernile and Lyandres (2018), or Fathollahi, Harford, and Klasa (2022)).

Although they offer various advantages over the traditional classifications, the new classifications of Hoberg and Phillips (2016) also have practical limitations. First, they only cover publicly-listed U.S. firms. Second, they are so far available only since 1989 as they require 10-Ks to be scanned or available in a digital form, limiting the time series dimension that is necessary in certain settings.³¹

8 How are markets and competition changing?

In this last section, we discuss the recent literature examining the aggregate evolution of markets and competition. A series of recent articles conclude that the level of markets' concentration has increased significantly in the past decades, reflecting fundamental changes in product market environments. One central concern is that competition has decreased in many markets and that this trend has severely harmed consumers.

Analyzing data for public firms since 2000, Gutiérrez and Philippon (2017) show that concentration measures (e.g., HHI) have increased. Prior to 2000, concentration declined as there were a significant number of newly listed public firms. After 2000, as the number of listed firms declined with the decrease in initial public offerings (IPOs), concentration measures increased. Separating firms into leaders (top 33% of firms by market value in each market) and laggards (bottom 33%) they show that margins increased more for leading firms, suggesting increased market power. They further report that the increased concentration since 2000 coincides with an increasing disconnect between investment and average q since the early 2000s (i.e., weak investment despite high average q). They investigate the potential sources of this disconnect using various approaches (e.g., exploiting trade or regulatory shocks to isolate variation in entry) and conclude that decreased entry and lower competition in many markets drives the growing investment- q disconnect, reflecting rising market power in these markets (as highlighted in Section 3).

Grullon, Larkin, and Michaely (2019) also examine the evolution of markets' concentration and analyze its connection with firm performance over the 1972-2014 period. They confirm increased

³¹The authors are currently working on both issues to extend coverage to private firms, and longer time-series.

concentration between 2001 and 2014 in approximately 75% of markets (and 60% using concentration based on markets defined by Hoberg and Phillips (2016)). This increase is also present when they use Census-based measures which includes private firms. Analyzing the link between market concentration and public firms' performance, they find a positive correlation with return-on-assets (ROA). Further decomposing ROA into operating margins (profits over sales) and operating efficiency (sales over assets), they uncover that the correlation between various measures of concentration and ROA is mainly driven by increased operating margins. They also find a positive correlation between the wealth effects in mergers and concentration. They note that none of these effects are present during the periods 1972-1986 and 1987-2000, highlighting a fundamental break after 2000.

Following a similar approach, Covarrubias, Gutiérrez, and Philippon (2020) break down the arguments about the impact of concentration into "good" and "bad" concentration'. Good concentration reflects market shares achieved through efficiency and innovation, whereby the more innovative and efficient firms gains market share. In contrast, bad concentration reflects market power and barriers to entry that leading firms exploit to raise prices for consumers.³² Overall, they argue that the observed increase in concentration results from decreased competition and lower entry, and its effects have been detrimental to the economy. It leads to less investment, higher margins, and lower labor share of value. They conclude that "bad" concentration has increased. They examine the role of innovation, and technology and find that it indeed plays a role. However, they find no evidence that similar patterns occur in Europe, Japan, and South Korea, casting doubt on the technology argument (which should be global). Interestingly, they show that the turnover of market leaders has decreased post-2000 and that market shares have become more persistent, going back to pre-1995 levels.

One large caveat when interpreting the above results is that market concentration is measured using static measures of industry classifications. Yet, markets evolve dynamically as shown by Hoberg and Phillips (2016). Firms now also produce multiple products that span multiple industry classifications. Hoberg and Phillips (2020) examine how firms' *scope* has changed over time, and whether change in scope can explain some of the trends noted above. Using different text-

³²They do recognize that in fact these can be blended where firms gain their market share through innovation and efficiency but subsequently due to the lack of entry exploit it and stop innovating.

based methods to assign firms' products to multiple markets and measure scope, they show that firms increase their scope from increasing production in related markets, mostly through R&D and mergers. Higher scope results in higher sales and market values but not higher operating margins.

Similar to the above studies, Hoberg and Phillips (2020) also examine the evolution of market concentration. The key difference is that firms operating in multiple markets are properly assigned to multiple markets. They estimate that an important fraction of the observed increase in concentration is due to firms' expanding their scope across markets. Traditional measures of concentration, once adjusted from the correct assignment of firms to multiple markets, have *not* increased. They acknowledge that product bundling across markets may indeed reduce competition. Therefore, the fact that concentration in the average market have not increased (account for increased scope) does not rule out increased market power, but changes its potential underlying mechanism.

Overall, these studies reveals fundamental changes in the nature and structure of product markets. The exact forces underlying these changes are still unclear, and more research is needed on this front. Yet, given the central role of product markets in corporate finance highlighted in this chapter, one can build on a vast and solid academic research to understand and anticipate the potential implications of these fundamental changes.

9 Conclusions and avenues for future research

This chapter has reviewed the large and growing literature studying the role of product markets in corporate finance. The main takeaway from more than forty years of research is that product market considerations have first order effects on our understanding of firms' decisions. The nature and intensity of interactions in the product market influence their ability to obtain financing, impacts their investment, acquisition, and innovation decisions, and affect their organizational and governance structure. Firms' decisions are not only influenced by their product market environment, but their decisions also directly shape the structure of product markets and the resulting competition. The academic literature in this area is now mature, rich, and complex.³³ It is genuinely transversal. It builds upon various fundamental economic forces, studies a large array of corporate decisions,

³³A research group of scholars interested in this area has formed under the name of the "Finance, Organization, and Markets Research Group" (see <https://sites.google.com/site/uscfom/finance-organizations-and-markets-fom-research-group>).

and highlights that conclusions are often nuanced and depend heavily on contexts.

Overall, while the literature delivers many important lessons to better understand the determinants and consequences of firms' decisions, we identify four avenues in which more research would be beneficial. First, given the large heterogeneity of conclusions presented in this chapter and the relevance of contexts, it appears important to expand and consolidate existing evidence. In particular, more research in non-U.S. settings would considerably solidify the existing body of knowledge.

Second, the multiplicity of possible economic forces and the paucity of data have made it challenging to cleanly isolate the economic channels through which product market matters. The expansion of data availability and the emergence of new techniques may create interesting research opportunities to better test specific channels and measure their practical relevance.

Third, despite recent improvements (presented in Section 7), the delineation of markets and their dynamics, the identification of rivals, and the measurements of competition remain largely imperfect. Given that these represent the foundations supporting the whole literature, we hope that researchers will continue to use their ingenuity to improve, expand, and refine existing measures.

Last, the changing nature of markets and competition illustrated in Section 8 raise many novel questions. These changes undeniably reflect new forms of competition and interactions within markets, as well as new technological developments. Research is needed to better understand how these new developments interact with firms' decisions. The recent papers of Cunningham, Ederer, and Ma (2021) on “killer acquisitions” in the pharmaceuticals industry, Kamepalli, Rajan, and Zingales (2020) on the existence of a “kill zone” created by internet platforms, and by Acikalin et al. (2022) on shocks to intellectual property protection are examples taking this direction.

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