On being competitive

Jorge Padilla*
jpadilla@compasslexecon.com
Economist
Compass Lexecon, Madrid

Salvatore Piccolo
salvapiccolo@gmail.com
Economist
Compass Lexecon, Bergamo

I. Introduction

1. When is a firm competitive? In economic theory, at least in what is commonly known as neoclassical price theory,[1] what characterises a competitive firm is that it is small relative to the size of the market and overall supply (i.e., it is "atomistic") and, therefore, is unable to affect the market price through its choice of output.[2] A competitive firm is therefore a "price taker." Instead, oligopolistic firms and, in the extreme, monopolists can affect the market price by reducing their output. Oligopolists are few and each of them typically represents a significant share of overall supply and, of course, a monopolist controls all supply. Both oligopolists and monopolists are "price makers": by limiting their output choices relative to the competitive benchmark they push the market price and, hence, their margins and profits upwards.

2. The economic theory definition of what constitutes a competitive firm does not seem to correspond to what businesspeople and management gurus seem to consider to be a competitive firm. As explained by Michael E. Porter in his classical book, *Competitive Strategy*,[3] competitive firms seek to secure and retain an advantage over their rivals to escape competition and obtain positive rents. A competitive firm has a "franchise" (i.e., its products are not commoditized) which affords pricing power. It is anything but atomistic or a price taker.

3. The economic theory interpretation of "competitive" does not seem in line with common parlance either. On our side of the pond, "competitive" is defined to mean "*as good as or better than others*" or "*trying hard to be better than others*" by the *Oxford Advanced Learner's Dictionary* 9th Edition (2015). *The Essential Dictionary of the Spanish Language of the Royal Academy of Spain* (2006) defines "competitive" as "*capable of competing*" and "*inclined to compete*."[4] *Le Petit Robert Micro* (2013), a commonly used French dictionary, states that competitive is "*who can compete in the market*"[5] and, finally, *i garzantini* (2007), our preferred Italian dictionary, considers that competitive is "*which allows you to compete with the rivals*."[6]

4. Interestingly, none of these European dictionaries links "success" with being "competitive," as the management literature does. This is different in the US. According to the *Merriam-Webster's Advanced Learner's English Dictionary* (2017), one of the most widely used and respected English dictionaries in the US, "competitive" refers to "*a situation in which people or groups are trying to win a contest or be more successful than others*"; indicates "*having a strong desire to win or be the best at something*"; or the ability to be "*as good as others of the same kind, able to compete successfully with others*." Note the emphasis on the notion of "success" in each of the three definitions of competitive in this US dictionary.

5. Yet, as noted by David George (2008), when "competitive" is interpreted as "successful,"[7] a price maker, even a monopolist, can be considered to be competitive. "*Paradoxically enough, the firm that manages to become the only seller (an economist's 'monopolist') or the firm that manages to be one of just a few sellers (an economist's 'oligopolist') now qualifies for the title of 'very competitive firm' since it's the only one (or one of a few) that managed to survive the competitive struggle. Amazingly, the firm that is least able to be described as 'competitive' by the old definition (a single firm in a sea of many firms) now is most able to be described as 'competitive' by the new definition (a 'victorious' or 'most able' firm). This is a* coup d'état *writ large*."

* Jorge Padilla and Salvatore Piccolo are economists at Compass Lexecon. This paper was prepared to celebrate Maurice Stucke's and Ariel Ezrachi's thought-provoking book Competition Overdose (Harper Business, 2020). The views expressed in this paper are the authors' sole responsibility and cannot be attributed to Compass Lexecon or its clients. Please send your comments to jpadilla@compasslexecon.com.

1 *See* G. Debreu (1959), *Theory of Value*, Yale University Press. *See also* S. Jaffe, R. Minton, C. B. Mulligan and K. M. Murphy (2019), *Chicago Price Theory*, Princeton University Press.

2 *See* H. Hovenkamp (2021), *Principles of Antitrust*, 2nd Edition, Chapter 1.

3 *See* M. E. Porter (1980), *Competitive Strategy*, Free Press.

4 "*Competitivo: 1. Perteneciente o relativo a la competición; 2. Capaz de competir; 3. Inclinado a competir.*" *Diccionario esencial de la lengua española* (Real Academia Española, Espasa, 2006).

5 "*Compétitif : Qui peut supporter la concurrence du marché.*" *Le Petit Robert Micro* (Le Robert, 2003).

6 "*Competitivo: Che permette di competere con la concorrenza.*" *Dizionari i garzantini Italiano* (Garzanti Linguistica, 2007).

7 D. George (2008), On being "competitive": the evolution of a Word, *Real-World Economics Review*, 48, 319–334.

Ce document est protégé au titre du droit d'auteur par les conventions internationales en vigueur et le Code de la propriété intellectuelle du 1er juillet 1992. Toute utilisation non autorisée constitue une contrefaçon, délit pénalement sanctionné jusqu'à 3 ans d'emprisonnement et 300 000 € d'amende (art. L. 335-2 CPI). L'utilisation personnelle est strictement autorisée dans les limites de l'article L. 122 5 CPI et des mesures techniques de protection pouvant accompagner ce document. This document is protected by copyright laws and international copyright treaties. Non-authorised use of this document constitutes a violation of the publisher's rights and may be punished by up to 3 years imprisonment and up to a € 300 000 fine (Art. L. 335-2 Code de la Propriété Intellectuelle). Personal use of this document is authorised within the limits of Art. L 122-5 Code de la Propriété Intellectuelle and DRM protection.

6. The positive attitude towards success may explain why, in the US, firms, irrespective of size or market position, can set prices unconstrained, even if that means setting very high prices. As stated by Justice Scalia in *Trinko*,[8] "*The mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system. The opportunity to charge monopoly prices at least for a short period is what attracts business acumen in the first place; it induces risk taking that produces innovation and economic growth. To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct*."

7. Instead, in Europe, whether in the EU or the UK, a company that is so successful that can influence, let alone set, market prices—i.e., a firm that is able to behave independently of its competitors, customers and, ultimately, its consumers—is not regarded as "competitive." Rather it is considered to hold a "dominant position" or "significant market power" and its prices are subject to scrutiny *ex post*—competition law—and, sometimes, also *ex ante*—regulation.[9] Dominant firms are supposed to behave "as if" they were price takers; that is their so-called special responsibility. While dominance is not a problem per se, European competition agencies regard markets where a dominant position exists as markets where competition is necessarily distorted. That is why any unilateral conduct by a dominant firm that places rivalry at risk is condemned even if it may generate efficiencies and improve consumer welfare. This is also why any merger or agreement that strengthens, albeit minimally, a dominant position is bound to be prohibited and, as the General Court stated in Case T-399/16 *CK Telecoms v. European Commission*, paragraph 90, the merger regulation in the EU "*must be interpreted as allowing the Commission to prohibit, in certain circumstances, on oligopolistic markets concentrations which, although not giving rise to the creation or strengthening of an individual or collective dominant position, are liable to affect the competitive conditions on the market to an extent equivalent to that attributable to such positions, by conferring on the merged entity the power to enable it to determine, by itself, the parameters of competition and, in particular, to become a price maker instead of remaining a price taker*."

8. In this paper we discuss whether it is correct to restrict the qualification of competitive to those firms that act as price takers. That is, whether it is right as a matter of economics to conclude that only firms that, while able to compete with others offering goods that are no less desirable at costs that are not too high, are unable to affect the market price should be considered competitive. We conclude that this narrow interpretation of what a competitive firm is, which is the one adopted by many competition laws around the world, is incorrect. Price takers compete aggressively but they are not the only one to do so. We show that firms run by empire building managers can be very aggressive even when they possess market power, and that the same is true for firms where managers are paid if their firms are the most profitable. That is, we find that firms can be competitive even in concentrated markets where their output decisions determine prices, provided their managers are not just trying to compete but do strive to be the best.

9. What is key is to ensure that markets deliver outcomes that benefit consumers – i.e., efficient or competitive outcomes – is that firms are compelled to compete on the merits, promoting their sales but refraining from undertaking actions that undermine their rivals' sales. Aggressive managers, as well as managers incentivised to act aggressively in the marketplace, deliver competitive outcomes to the ultimate benefit of consumers but only when they are restricted to compete by enhancing the value and appeal of their offers or by expanding their franchises. Managers that seek to prevail by undermining their rivals, e.g., raising their costs and/or blockading their sales, should be shown a red card. Those managers may be regarded as competitive in common parlance, but their competition is nefarious. Competition among such managers, ready to wage an all-out war against their rivals by all means possible, including by infringing on their property rights, may cause the market to collapse, in which case we could say that the market died of a "competition overdose".

II. The Canonical Cournot Model

10. The Cournot model has been extensively used in competition economics and, in particular, in merger control. In its simplest formulation it specifies a market for a homogeneous good, where (a) demand D is inversely related to price according to the following linear relationship: $D = a - P$, where P is the market price; and (b) there are N firms competing for such demand with common marginal costs equal to c, with $a > c$. Each firm i sets it own quantity, q_i, so that overall supply, $Q = \sum_{i=1}^{N} q_i$, equals demand at the market price.

11. When the number of firms is finite, then each firm chooses a quantity so that the marginal cost of producing an extra unit, , equals its marginal return, which is equal to the margin made by selling an extra unit, , minus the reduction in revenue caused by negative impact of the sale of an extra unit on the market price. So, in this model, when there is a finite number of firms, each of them acts as a price maker, i.e., each takes into account the effect on the market price of its output decision. This model predicts that each firm will produce a quantity equal to $(a-c)/(N+1)$ and the market price will equal $(a+Nc)/(N+1)$ which is greater than c.

8 Opinion, *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko*, LLP (02-682) 540 U.S. 398 (2004), 305 F.3d 89, reversed and remanded, p. 7.

9 R. Whish and D. Bailey (2021), *Competition Law*, 10th Edition, Oxford University Press, Chapter 5.

Ce document est protégé au titre du droit d'auteur par les conventions internationales en vigueur et le Code de la propriété intellectuelle du 1er juillet 1992. Toute utilisation non autorisée constitue une contrefaçon, délit pénalement sanctionné jusqu'à 3 ans d'emprisonnement et 300 000 € d'amende (art. L. 335-2 CPI). L'utilisation personnelle est strictement autorisée dans les limites de l'article L. 122 5 CPI et des mesures techniques de protection pouvant accompagner ce document. This document is protected by copyright laws and international copyright treaties. Non-authorised use of this document constitutes a violation of the publisher's rights and may be punished by up to 3 years imprisonment and up to a € 300 000 fine (Art. L. 335-2 Code de la Propriété Intellectuelle). Personal use of this document is authorised within the limits of Art. L 122-5 Code de la Propriété Intellectuelle and DRM protection.

12. Firms only act as price takers when is sufficiently (to be precise, infinitely) large. When the number of firms is so large, each of them contributes a negligible fraction of total supply and, hence, no longer cares about the price impact of expanding its output. Yet, the sum of their contributions is so large that the market price converges to , i.e., all supra-competitive rents disappear. Thus, the Cournot model predicts that firms behave competitively when the market is sufficiently fragmented. The more concentrated the market is, the less competitive firms behave and the more profits they make.

III. The Cournot Model with Empire Building Managers

13. Consider the Cournot model of the previous section with a finite number of firms , so that each of them has market power and, therefore, cannot be regarded as perfectly competitive. Suppose now that each firm is run by a manager who maximises a linear combination of the firm's profits and its output: $v_i = \alpha(\pi_i + \gamma\ q_i)$ where $\pi_i = (P - c)q_i$. The manager's objective function v_i may be the result of (a) an explicit compensation scheme laid out by the firm's shareholders to encourage her to win market share, or (b) her own empire building aspirations – the will to run the largest firm in the market.

14. The manager of firm chooses a level of output equal to $(a - c + \gamma)/\ (N + 1)$ and the market price equals $(a + Nc - N\gamma)/(N + 1)$. Provided $\gamma > 0$ the output chosen by firm $i'\ s$ manager is greater than the one the shareholders chose under the canonical Cournot model. As γ grows, each firm sells more, and the market price goes down. When $\gamma = \gamma^* = (a - c)/N$ then the market price equals c, and therefore all supra-competitive rents are competed away. (Note that γ^* is decreasing in N.

15. This modification of the standard Cournot model has several interesting implications. Firstly, whether a market is competitive depends not only on its market structure but also on the incentives of the managers running the various firms. A market populated by empire builders will be very competitive even if it only features a small number of firms. Secondly, while none of the managers in this model are price takers, they would behave as if they were, provided they cared enough about selling more (e.g., being the market leader, employing lots of people, etc.) Thirdly, the competitive benchmark may obtain even with non-atomistic firms and even if the market is concentrated. In short, firms may behave competitively when their managers are competitive in the sense of "having a strong desire to win or be the best at something". That is, when they are not just trying to compete but to do so successfully.

16. Will shareholders hire empire-building managers if, in the end, they end up reducing profits? The answer is yes.[10] Shareholders face a prisoner's dilemma. Collectively, they would be better off if none of them hired an empire builder to run their firms. But, assuming none of the firms did, it is in the incentive of each of them to deviate and hire one. The firm with the sole empire builder would steal market share at the expense of the others without a major impact on price. The deviant firm would be highly profitable. Given this, its rivals would respond by hiring empire builders too.

IV. Yardstick Competition

17. Consider now a Cournot *duopoly* where demand and costs are as in the previous sections. Unlike in the sections above, however, we now assume that each firm $i(= 1,\ 2)$ is run by a manager maximising the following utility function: $u_i = \alpha(\pi_i - \gamma\pi_j)$, where $\pi_i = (P - c)q_i$. The manager's objective function u_i may be the result of (a) an explicit compensation scheme chosen by the firm's shareholders, linking her compensation to the relative performance of firm i or (b) her own desire to run the most profitable firm in the market.

18. The manager of firm i chooses a level of output equal to $(a - c)/\ (3 - \gamma)$ and the market price equals $(a(1 - \gamma) + 2c)/(3 - \gamma)$. Provided $\gamma > 0$, the output chosen by firm $i'\ s$ manager is greater than the one obtained in the canonical Cournot model. As γ grows, each firm sells more, and the market price goes down. When $\gamma = 1$ the market price equals c, and therefore all supra-competitive rents are competed away.

19. So, in markets where managers care about the relative performance (profits) of their firms – i.e., in markets characterised by yardstick competition – competition can be very intense even if the market is highly concentrated (a duopoly) and, hence, firms are large. As in the previous section, therefore, whether a market is competitive crucially depends on the incentives of the managers running the various firms and not necessarily on the degree of concentration of the market. That is, firms are more likely to behave competitively when their managers are not just trying to compete or capable of competing but when they try to be the best.

10 J. Vickers (1985), Delegation and the Theory of the Firm, *Economic Journal*, 95, 138–147.

Ce document est protégé au titre du droit d'auteur par les conventions internationales en vigueur et le Code de la propriété intellectuelle du 1er juillet 1992. Toute utilisation non autorisée constitue une contrefaçon, délit pénalement sanctionné jusqu'à 3 ans d'emprisonnement et 300 000 € d'amende (art. L. 335-2 CPI). L'utilisation personnelle est strictement autorisée dans les limites de l'article L. 122 5 CPI et des mesures techniques de protection pouvant accompagner ce document. This document is protected by copyright laws and international copyright treaties. Non-authorised use of this document constitutes a violation of the publisher's rights and may be punished by up to 3 years imprisonment and up to a € 300 000 fine (Art. L. 335-2 Code de la Propriété Intellectuelle). Personal use of this document is authorised within the limits of Art. L. 122-5 Code de la Propriété Intellectuelle and DRM protection.

V. From Competition to Conflict

20. Thus far we have assumed that all managers can do to advance their objectives is to expand or contract output. In this section we enrich the strategy space by allowing managers to engage in activities that undermine the competitive position of their rivals. Specifically, we consider that they can undertake actions that limit their rivals' output. A competitive manager will be one that is willing to engage in actions that undermine its rivals' competitive position.

21. To fix ideas, consider a Cournot duopoly with the same demand function as before. The manager of firm $i(=1,\ 2)$ is incentivised to maximise profits. Thus, unlike the models of the last two sections, managers' compensation is perfectly aligned with firm value. So, her choice of output q_i trades off more volume with a lower margin. Yet, the output of firm that finally makes it to the market, i.e., firm i's volume of sales, is not q_i but $q_i - d_j$, where d_j is chosen by firm j's manager.

22. Producing higher output is costly: the cost of producing q_i is $\alpha q_i{}^2/2$. Engaging in destructive activities is also costly, with the costs given by $\beta d_i{}^2/2$ (Both α and β are non-negative but not too large). Thus, the manager of firm i maximises

$$\pi_i = (P - c)\,(q_i - d_j) - \frac{\alpha q_i{}^2}{2} - \frac{\beta d_i{}^2}{2}$$

where $P = a - (q_i - d_j) - (q_j - d_i)$. It is easy to show that firm i will set q_i and d_i so that $(1+\alpha)\,q_i = d_j + (P - c)$ and $(q_i - d_j) = \beta d_i$.

23. That is, for given fundamentals, firm i will produce more but will invest less in destructive activities, the greater the destructive activities of its rivals. So, the output of a company and destructive activity of the other are strategic complements, whereas the output of a company and the output of its rival are strategic substitutes, and the destructive activities of the rivals are also strategic substitutes.

24. In the unique symmetric equilibrium:

$$d^* = {(a-c)}/{\Psi(\alpha,\beta)}$$

$$q^* = (1+\beta)\,d^*$$ and

$$P^* = a - 2\beta\ d,$$

where $\Psi(\alpha,\beta) = \alpha\,(1+\beta) + 3\beta$

25. It follows that the volume of sales for each firm, $q^* - d^*$, is decreasing, and the market price, P^*, is increasing, as β goes down so that, for given d_i, the marginal cost of the destructive activity goes down. When that cost approaches zero (i.e., $\beta \to 0$), $q^* - d^*$ is close to zero and the market price equals a. That is, the market collapses and both consumers and firms are worse off.

26. Furthermore, these outcomes can be compared to those that correspond to an otherwise identical oligopoly model where managers cannot adopt destructive activities. In that alternative scenario, $\hat{d} = 0$, $\hat{q} = (a-c)/(3+\beta)$ and $\hat{P} = (a\,(1+\alpha) + 2c)\,/\,(3+\alpha)$

Then, we have that, for all β, firm's sales are lower and market prices are higher when managers engage in destructive activities: i.e., $q^* - d^* < \hat{q}$, and $\hat{P} < P^*$.

27. The implications of this analysis are quite stark. Unlike in the managerial models of the previous two sections, the presence of aggressive managers (those for whom the marginal cost of destructive activities is low) leads to high prices and low output and, in the extreme, may cause the collapse of the market. So, when assessing the competitiveness of a market we need to go beyond market structure and managerial incentives and consider the ways in which competition materialises. Aggressive managers are good for consumers and, hence, for allocative efficiency, when they compete by expanding their output. When in addition they engage in value destruction activities with the only purpose of undermining their rivals' sales, their contribution to social welfare is negative. Hence, aggressive managers should be restricted to compete on the merits and punished heavily when restricting rivals' output, e.g., by raising their rivals' costs or making it difficult for them to reach out to their customers.

VI. Concluding Remarks

28. In this brief essay we have considered the circumstances under which a firm can be regarded as competitive. In particular, we have investigated whether it would be correct to conclude that only companies operating in fragmented markets and acting as price takers can be regarded as such. We conclude that, while firms are indeed likely to behave competitively in fragmented markets, they will also do so in concentrated markets, even in highly concentrated ones, provided they are run by aggressive managers; i.e., managers geared to build market share at the expense of their rivals, or managers that are paid handsome returns only if their firms at the top of the billboard.

Ce document est protégé au titre du droit d'auteur par les conventions internationales en vigueur et le Code de la propriété intellectuelle du 1er juillet 1992. Toute utilisation non autorisée constitue une contrefaçon, délit pénalement sanctionné jusqu'à 3 ans d'emprisonnement et 300 000 € d'amende (art. L. 335-2 CPI). L'utilisation personnelle est strictement autorisée dans les limites de l'article L. 122 5 CPI et des mesures techniques de protection pouvant accompagner ce document. This document is protected by copyright laws and international copyright treaties. Non-authorised use of this document constitutes a violation of the publisher's rights and may be punished by up to 3 years imprisonment and up to a € 300 000 fine (Art. L. 335-2 Code de la Propriété Intellectuelle). Personal use of this document is authorised within the limits of Art. L 122-5 Code de la Propriété Intellectuelle and DRM protection.

29. We have seen, however, that not all aggressive managers are good for competition and welfare. Society should encourage firms to hire aggressive managers and to incentivise them to behave competitively but should restrict the ways in which they can compete so that they are compelled to compete on the merits. Competition among managers ready to wage an all-out war against their rivals, e.g., infringing on their property rights, may cause the market to collapse as a result of a "competition overdose". Thus, this paper emphasises conduct over structure, incentives over size, and in so doing contradicts those who place the focus on market concentration and *ex-ante* structural intervention and invites readers to reconsider the importance of regulating firm's behaviour *ex-post*. ■

Ce document est protégé au titre du droit d'auteur par les conventions internationales en vigueur et le Code de la propriété intellectuelle du 1er juillet 1992. Toute utilisation non autorisée constitue une contrefaçon, délit pénalement sanctionné jusqu'à 3 ans d'emprisonnement et 300 000 € d'amende (art. L. 335-2 CPI). L'utilisation personnelle est strictement autorisée dans les limites de l'article L. 122 5 CPI et des mesures techniques de protection pouvant accompagner ce document. This document is protected by copyright laws and international copyright treaties. Non-authorised use of this document constitutes a violation of the publisher's rights and may be punished by up to 3 years imprisonment and up to a € 300 000 fine (Art. L. 335-2 Code de la Propriété Intellectuelle). Personal use of this document is authorised within the limits of Art. L 122-5 Code de la Propriété Intellectuelle and DRM protection.