

ECONS 594 – PH.D. INDUSTRIAL ORGANIZATION

FALL 2021

<https://felixmunozgarcia.com/econs-594/>

Instructor: Felix Munoz-Garcia

Lectures: Hulbert 27, Tuesdays and Thursday. 9:10-10:25am.

Office: Hulbert Hall 103H

Phone: 509-335-8402

e-mail: fmunoz@wsu.edu

Office hours: Wednesdays, 9:00–10:00a.m., and by appointment.

Course Rationale

Theory of market structure and firm behavior, including price and non-price competition, strategic behavior under complete and incomplete information environments, and technological change. (Cross-listed course offered as EconS 594 and FIN 594.)

Course Objectives and Learning Outcomes

Provide a graduate-level introduction to industrial organization. It is designed to offer a broad introduction to topics. It will start the process of preparing PhD students to conduct dissertation research in the area. The course presumes that students are familiar with microeconomic theory, game theory, and some econometrics.

Prerequisites:

EconS 501, EconS 503, and EconS 511.

Required Textbooks:

- *Industrial Organization. Markets and Strategies.* Paul Belleflamme and Martin Peitz. Cambridge University Press. 2015. (2nd edition.) Available at the WSU Bookie.

Recommended readings in industrial organization:

- *Industrial Organization, Practice Exercises with Answer Keys,* Pak-Sing Choi, Eric Dunaway, and Felix Munoz-Garcia, Springer, 2021.
- *Competition Policy: Theory and Practice.* Massimo Motta, Cambridge University Press, 2004.
- *Handbook of Game theory and Industrial Organization, volume II.* Luis Corchon and Marco Marini (editors). Edward Elgar Publishing. 2018.
- *The Theory of Industrial Organization.* Jean Tirole. MIT Press. 1988.
- *Advanced Industrial Economics.* Stephen Martin. Blackwell Publishers. 2001.

Other recommended readings for specific topics:

- *Industrial Organization and the Digital Economy*, Illing and Peitz (editors), The MIT Press, 2006.
- *The Economics of Network Industries*, Oz Shy, Cambridge University Press. 2001.
- *The Theory of Collusion and Competition Policy*, Joseph Harrington, The MIT Press, 2017.
- *Bounded Rationality and Industrial Organization*, Ran Spiegler, Cambridge University Press. 2011.
- *Econometric Models for Industrial Organization*, Matthew Shum, World Scientific Lecture Notes in Economics.
- *Estimating Market Power and Strategies*, Perloff, Karp, and Golan. Cambridge University Press, 2007.
- *Environmental Policy and Market Structure*. Carlo Carraro, Yiannis Katsoulacos, and Anastasios Xepapadeas, Kluwer Academic Publishers, 1996.

At the undergraduate level, I strongly recommend *Introduction to Industrial Organization*, Luis Cabral, The MIT Press, 2017 (second edition), or *Industrial Organization, Theory and Applications*, by Oz Shy, The MIT Press. They can help clarify some topics before reading them with a more formal approach in the above graduate-level books.

Lectures:

Lectures will be in Hulbert 27. Attendance is very important to your success in this class.

Class materials:

All class materials (handouts, additional readings, homework assignments, answer keys, etc.) will be posted on the website: <https://felixmunozgarcia.com/econs-594/>.

Grading:

Your grade for the course will be based on:

- Problem sets (24%),
- Presentation of two published articles (36%, 18% each article), and
- Research paper (5% for the first draft, 25% for the final draft, 10% for its presentation).

Important dates:

Presentations of published articles: Start on October 8th (tentatively), more information on the course website.

Research proposal:

1. **First draft:** Tuesday, October 12th. Maximum 5 pages.
2. **Final draft:** The day of your presentation. Maximum 25 pages.

Make-up exams will only be given if you have a note from a doctor indicating that you were unable to take the exam at the scheduled time.

Grading scale:

A	88-100	C	55-59
A-	80-87	C-	50-54
B+	74-79	D+	45-49

B	70-75	D	40-44
B-	65-69	F	0-39
C+	60-64		

Note: Grades will not be curved.

Attendance and Participation:

Students are expected to attend all scheduled class times, as attendance and participation contribute significantly to learning in this course. If you feel miss a class, it is your responsibility to find out from an informed student what occurred in class, what assignments may have been given, etc. Assignments are due at the beginning of class (as described below). Late work is subject to significant grade reduction, depending upon the assignment.

Students with Disabilities:

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center at <http://www.drc.wsu.edu/>, stop by their office at the Admin Annex Building, Room 205; or call 509-335-3417. All accommodations must be approved through the Disability Resource Center.

Academic Integrity:

Academic integrity will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions: <http://conduct.wsu.edu/default.asp?PageID=338>.

WSU Safety:

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/emergencies> to become familiar with the information provided.

Lauren's Promise:

I will listen and believe you if someone is threatening you.

Lauren McCluskey, a 21-year-old honors student athlete, was murdered on Oct. 22, 2018, by a man she briefly dated on the University of Utah campus. We must all take actions to ensure that this never happens again.

- If you are in immediate danger, call 911.
- If you are experiencing sexual assault, domestic violence, and stalking, please report it to me and I will connect you to resources or call Alternatives to Violence of the Palouse at 877-334-2887 (24-hour crisis hotline).

Any form of sexual harassment or violence will not be excused or tolerated at Washington State University. WSU has instituted procedures to respond to violations of these laws and standards, programs aimed at the prevention of such conduct, and intervention on behalf of the victims.

WSU Police officers will treat victims of sexual assault, domestic violence, and stalking with respect and dignity. Confidentiality is of the utmost importance and WSU Police will assist by providing resources to victims. In addition to its law enforcement efforts regarding sexual assault, domestic violence and stalking, WSU Police refer victims to the appropriate university and/or local community counseling and other resources devoted to assisting victims.

Advocates help survivors determine their own needs in regard to their physical and emotional health, reporting options, and academic concerns. They connect survivors to campus and community services, and provide accompaniment to important appointments (court, hospital, and police) and support throughout the process. WSUPD can also connect you with advocacy services, if desired. The local advocacy group is Alternatives to Violence of the Palouse, whose services are free, immediate, and confidential.

Other confidential resources include WSU Counseling and Psychological Services. If you would like to speak with a counselor after business hours, WSUPD can contact the on-call counselor and have them call you directly or a crisis telephone number is provided. Information shared with the counselor will not be provided to WSUPD without expressed permission from you.

WSU Counseling and Psychological Services 509-335-2159 (crisis services line).

TENTATIVE SCHEDULE

1. **Static oligopoly models – Price competition**
 - a. Price competition with homogeneous goods and symmetric costs (Section 8.2 in FMG).
 - b. Price competition with homogeneous goods and asymmetric costs (top of page 47 in BP).
 - c. Price competition with homogeneous goods and cost uncertainty (Section 3.1.2 in BP).
 - d. Price competition with heterogeneous goods (exogenous product differentiation), Section 8.4.1 in FMG and 3.1.3 to 3.1.4 in BP.
2. **Static oligopoly models – Quantity competition**
 - a. Quantity competition with homogeneous goods and symmetric costs (Section 8.3 in FMG)
 - b. Quantity competition with homogeneous goods and asymmetric costs (Exercises 5.6 and 5.7 in my Springer’s book).
 - c. Quantity competition with heterogeneous goods (exogenous product differentiation), Section 8.4.2 in FMG.
3. **More topics on static oligopoly models**
 - a. Reconciling Cournot and Bertrand using capacity constraints, Section 8.6 in FMG.
 - b. Choosing between different models, Section 3.3.3 in BP.
 - c. Strategic substitutes and complements, Section 3.4 in BP and Vives, Xavier (2016) “Strategic Complementarities in Oligopoly” IESE Working Paper.
4. **Dynamic oligopoly models**
 - a. Stackelberg model with quantity competition, Section 8.5 in FMG.
 - b. Stackelberg model with price competition, Pages 78-79 in BP.
 - c. Commitment issues, Section 4.1.3 in BP.
5. **Endogenous entry**
 - a. With quantity competition after entry, Section 8.7 in FMG.
 - b. With price competition after entry, Section 4.2.3 in BP.
 - c. With monopolistic competition after entry, Section 4.2.4 in BP (optional).
 - d. For a nice literature review of points 1-5 above, see “Theories of Oligopoly Behavior” by Carl Shapiro, Handbook of Industrial Organization, volume 1, chapter 6.
6. **Endogenous product differentiation**
 - a. Motivation, pages 107-113 in BP.
 - b. Horizontal product differentiation, Section 5.2 in BP.
 - c. Vertical product differentiation, Section 5.3 in BP.
 - d. Empirical analysis of product differentiation, Section 5.4 in BP (optional).
7. **Advertising**
 - a. Motivation, Section 6.1 in BP.
 - b. Advertising in monopoly, equilibrium analysis, Section 6.2 in BP.
 - c. Advertising in monopoly, welfare analysis, Section 6.3 in BP.
 - d. Advertising in oligopolies, Section 6.4 in BP.
 - e. For a literature review on advertising, see “The Economic Analysis of Advertising” by Kyle Bagwell, Handbook of Industrial Organization, volume 1, chapter 28.
8. **First- and third-degree price discrimination.**
 - a. Chapter 8 in BP (recall that the authors refer to first-degree price discrimination as “personalized pricing” and to third-degree as “group pricing”).
9. **Second-degree price discrimination (Menu pricing).**
 - a. Chapter 9 in BP.
10. **Cartels and tacit collusion.**
 - a. Section 8.8 in FMG.
 - b. Chapter 14 in BP.

II. Horizontal mergers.

- a. Chapter 15 in BP.

ARTICLES TO PRESENT IN CLASS

Each student must choose two choose two articles from the same topic in the following list to present in class. You can also suggest a different article you may be interested in reading and presenting that is not in the list. Please contact me as soon as possible via email with the two papers you would like to present. They will be assigned on a first-come first-serve basis.

Before reading the two articles, I strongly recommend you read about the topic in Belleflamme and Peitz's book, and then in the corresponding chapter of the *Handbook of Industrial Organization* (Elsevier) as they provide a readable introduction to the topic and a nice literature review, respectively.

1. Signaling and limit pricing:

- a. Schultz, C. (1999) Limit pricing when incumbents have conflicting incentives, *International Journal of Industrial Organization*, pp. 801-25.
- b. Daughety, A. and J. Reinganum (2008) Imperfect Competition and quality signaling, *RAND Journal of Economics*, 163-83.
- c. Daughety, A. and J. Reinganum (2007) Competition and confidentiality: signaling quality in a duopoly when there is universal private information, *Games and Economic Behavior*, 94-120.
- d. Kim, J. (2003) Signal jamming in games with multiple senders, *Contributions to Theoretical Economics*, vol. 3, issue 1, article 7.
- e. Martin, S. (1995) Oligopoly limit pricing: strategic substitutes, strategic complements, *International Journal of Industrial Organization*, pp. 41-65.
- f. Bagwell, K. and G. Ramey (1991) Oligopoly limit pricing, *RAND Journal of Economics*, pp. 155-172.
- g. Harrington, J. (1987) Oligopolistic entry deterrence under incomplete information, *RAND Journal of Economics*, pp. 211-231.
- h. Gertner, R., R. Gibbons, and D. Scharfstein (1988) Simultaneous signaling to the capital and product markets, *RAND Journal of Economics*, pp. 173-190.

2. Other signaling topics:

- a. Berigozzi, F. and B. Villeneuve (2006) The signaling effect of tax policy, *Journal of Public Economic Theory*, pp. 611-630.
- b. Gertner, R., R. Gibbons, and D. Scharfstein (1988) Simultaneous signaling to the capital and product markets, *RAND Journal of Economics*, pp. 173-190.
- c. Fluet, C. and P. Garella (2002) Advertising and prices as signals of quality in a regime of price rivalry, *International Journal of Industrial Organization*, pp. 907-30.
- d. Levin, D., J. Peck, and L. Ye. (2009). Quality Disclosure and Competition. *Journal of Industrial Economics*, 167-96.

3. Advertising:

- a. Becker, G. and K. Murphy (1993) A simple theory of advertising as a good or bad, *Quarterly Journal of Economics*, 941-65.
- b. Milgrom, P. and J. Roberts (1986) Price and advertising signals of product quality, *Journal of Political Economy*, 796-721.
- c. Johnson, J.P. and D.P. Myatt (2006) On the simple economics of advertising, marketing, and product design, *American Economic Review*, 756-84.

4. Product differentiation, price, and non-price competition:

- a. Baye, M. and J. Morgan, "Information Gatekeepers on the Internet and the Competitiveness of Homogenous Product Markets," 2001, *American Economic Review*, 454-474.
- b. Church, J. and N. Gandal, "Complementary Network Externalities and Technological Adoption," *International Journal of Industrial Organization*, 1993, pp. 239-260.
- c. Economides, N., "Desirability of Compatibility in the Absence of Network Externalities," *American Economic Review*, 1989, pp. 1165-1181.

- d. Gabszewicz, J.J. and I. Grilo, "Price Competition when Consumers are Uncertain About Which Firm Sells Which Quality," *Journal of Economics and Management Strategy*, 1992, pp. 629-650.
- e. Gal-Or, E. and A. Dukes, "Minimum Differentiation in Commercial Media Markets," *Journal of Economics & Management Strategy*, 2003, 291-325
- f. Grossman, G., and C. Shapiro, "Informative Advertising with Differentiated Products," *Review of Economic Studies* 51, 1984, pp. 63-82.
- g. Matutes, C. and P. Regibeau, "Mix and Match: Product Compatibility without Network Externalities," *Rand Journal of Economics*, 1988, pp. 221-234.

You may read this literature review on product differentiation: Eaton, B. and R. Lipsey "Product Differentiation" in R. Schmalensee and R.D. Willig (eds.) *Handbook of Industrial Organization*, Elsevier, pp. 723-68.

5. Price discrimination:

- a. Aguirre, I., S. Cowan, and J. Vickers (2010) "Monopoly Price Discrimination and Demand Curvature," *American Economic Review*, vol. 100, no. 4, pp. 1601-15.
- b. Caminal, R. and C. Matutes, "Endogenous Switching Costs in a Duopoly Model," *International Journal of Industrial Organization*, 1990, pp. 353-373.
- c. Che, Y. "Customer Return Policies for Experience Goods," *Journal of Industrial Economics*, 1996, pp. 17-24.
- d. Chen, Y., "Oligopoly Price Discrimination and Resale Price Maintenance," *Rand Journal of Economics* 30, 1999, pp. 441-455.
- e. Chen, Y., "Paying Customers to Switch," *Journal of Economics and Management Strategy* 6, 1997, pp. 877-897.
- f. DeGraba, P., "Why Lever into a Zero-Profit Industry: Tying, Foreclosure, and Exclusion," *Journal of Economics and Management Strategy* 5, 1996, pp. 433-447.
- g. Deneckere, R.J. and P.R. McAfee, "Damaged Goods," *Journal of Economics and Management Strategy*, 1996, pp. 149-174.
- h. Gal-Or, E., "Evaluating the 'Leverage Theory' of Product Bundling in the Context of negotiations," *Journal of Business*, 2004, 639-674.
- i. Liu, Q. and K. Serfes. (2004) "Quality of information and oligopolistic price discrimination," *Journal of Economics and Management Strategy*.
- j. Liu, Q. and K. Serfes (2006) "Customer information sharing among rival firms," *European Economic Review*.
- k. Liu, Q. and K. Serfes (2005) "Imperfect price discrimination, market structure and efficiency," *Canadian Journal of Economics*.
- l. Shaffer, G. and Zhang, Z., "Pay to Switch or Pay to Stay: Preference-Based Price Discrimination in Markets with Switching Costs," *Journal of Economics & Management Strategy* 9, 2000, pp. 397-424.
- m. Varian, H., "A Model of Sales," *American Economic Review* 70, 1980, pp. 651-659.
- n. Winston, M., "Tying, Foreclosure, and Exclusion," *American Economic Review* 80, 1990, pp. 837-859.

6. Vertical control and the theory of the firm:

- a. Baron, D.P. and R.B. Myerson, "Regulating a Monopolist with Unknown Costs," *Econometrica*, 1982, pp. 911-930.
- b. Brander, J.A. and T.R. Lewis, "Oligopoly and Financial Structure: The Limited Liability Effect," *American Economic Review*, 1986, pp. 956-970.
- c. Fershtman, C. and K.L. Judd, "Equilibrium Incentives in Oligopoly," *American Economic Review*, 1987, pp.927-940.
- d. Gal-Or, E., "A Common Agency with Incomplete Information," *Rand Journal of Economics* 22, 1991, pp. 274-286.
- e. Hart, O., and J. Moore "Property Rights and the Nature of the Firm," *Journal of Political Economy* 98, 1990, pp. 1119-1158.
- f. Holmstrom, B. and P.R. Milgrom, "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership and Job Design," *Journal of Law, Economics, and Organization*, 1991, pp.24-52.

- g. Itoh, H., "Cooperation in Hierarchical Organization: An Incentive Perspective," *The Journal of Law, Economics, and Organization*, 1992, pp. 321-345.
 - h. Khalil, F., "Auditing Without Commitment," *Rand Journal of Economics* 28, 1997, pp. 629-640.
 - i. Kranton, R. and Minehart, D., "Network Versus Vertical Integration," *Rand Journal of Economics* 31, 2000, pp. 570-601.
 - j. Levitt, S. and Snyder, C., "Is No News Bad News? Information Transmission and the Role Of "Early Warning" in the Principal-Agent Model," *Rand Journal of Economics* 28, 1997, pp. 641-661.
 - k. Predergast, "A Theory of 'Yes Men'," *American Economic Review* 83, 1993, pp. 757-770.
 - l. Rey, P. and J. Tirole, "The Logic of Vertical Restraints," *American Economic Review* 76, 1986, pp. 921-939.
 - m. Spiegel, Y., "The Role of Debt in Procurement Contracts," *Journal of Economics & Management Strategy* 5, 1996, pp. 379-407.
 - n. Wang, G., "Regulating an Oligopoly with Unknown Costs," *International Journal of Industrial Organization* 18, 2000, pp. 813-825.
 - o. Zábojník, J., "Sales Maximization and Specific Human Capital," *Rand Journal of Economics* 29, 1998, pp. 790-802.
7. **R&D, technology diffusion and patents:**
- a. Green, J. and S. Scotchmer (1995) On the division of profit in sequential innovation, *RAND Journal of Economics*, 131-46.
 - b. Barcena-Ruiz, J. and M. Garzon (2006) Mixed oligopoly and environmental policy, *Spanish Economic Review*, 139-60.
 - c. Aghion, P., M. Dewatripont, and J. Stein (2008) Academic freedom, private-sector focus, and the process of innovation, *RAND Journal of Economics*, 617-35.
 - d. Fudenberg, D. and J. Tirole (1998) Upgrades, trade-ins and buy-backs, *RAND Journal of Economics*, 235-58.
 - e. Ellison, G. and D. Fudenberg (2000) The neo-luddite's lament: excessive upgrades in the software industry" *RAND Journal of Economics*, 253-72.
 - f. Farrell, J. and G. Saloner (1985) Standardization, compatibility, and innovation, *RAND Journal of Economics*, 617-35., 70-83.
 - g. Delbono, F. and V. Denicolo (1990) R&D investment in a symmetric and homogeneous oligopoly: Bertrand vs. Cournot. *International Journal of Industrial Organization*, 279-313.
 - h. Kamien, M., E. Muller, and I. Zang (1992) Research joint ventures and R&D cartels, *American Economic Review*, 1293-1306.
8. **Signaling and environmental certification:**
- a. Baksi, S., and P. Bose (2007) "Credence Goods, Efficient Labelling Policies, and Regulatory Enforcement." *Environmental and Resource Economics*, 37(2):411-430.
 - b. Daughety, A. F., and J. F. Reinganum (2008) "Communicating Quality: A Unified Model of Disclosure and Signalling." *RAND Journal of Economics*, 39:973-989.
 - c. Harbaugh, R., Maxwell, J.W., and Roussillon, B. (2011) "Label Confusion: The Groucho Effect of Uncertain Standards." *Management Science*, 57(9):1512-1527.
 - d. Hamilton, S.F. and Zilberman, D. (2006) "Green markets, eco-certification, and equilibrium fraud." *Journal of Environmental Economics and Management*, 52:627-644.
 - e. Mahenc, P. (2008) "Signaling the environmental performance of polluting products to green consumers." *International Journal of Industrial Organization*, 26:59-68.
 - f. Mahenc, P. (2017) "Honest versus misleading certification." *Journal of Economics & Management Strategy*, 26(2):454-483.
 - g. Mason, C.F. (2011) "Eco-Labeling and Market Equilibrium with Noisy Certification Tests." *Environmental Resource Economics*, 48:537-560.
9. **Antitrust:**
- a. Einav, L. and L. Jonathan (2010), "Empirical Industrial Organization: A Progress Report," *Journal of Economic Perspectives*, 145-162.
 - b. Bresnahan, Timothy and Reiss, Peter C. (1991) "Entry and Competition in Concentrated Markets," *Journal of Political Economy*, 977-1009.

- c. Asker, John, "A Study of the Internal Organization of a Bidding Cartel," *American Economic Review*, (June 2010), 724-762.
- d. Holmstrom, Bengt and Kaplan, Steven. "Corporate Governance and Merger Activity in the United States," *Journal of Economic Perspectives* (Spring 2001): 121-149.
- e. Klein, Benjamin and Leffler, Keith. "The Role of Market Forces in Assuring Contractual Performance." *Journal of Political Economy* 89 (1981): 615-641.
- f. Cooper, James C., Luke Froeb, Dan O'Brien, and Michael Vita, "Vertical Antitrust Policy as a Problem of Inference," *International Journal of Industrial Organization*, 23 (2005), 639-664.
- g. Winter, Ralph A. "Vertical Control and Price versus Nonprice Competition," *Quarterly Journal of Economics*, (February 1993), 61-76.
- h. Sproul, Michael. "Antitrust and Prices." *Journal of Political Economy* (August 1993): 741-754.
- i. Andrade, Gregor, et. al. "New Evidence and Perspective on Mergers." *Journal of Economic Perspectives* (Spring 2001): 103-120.
- j. McCutcheon, Barbara. "Do Meetings in Smoke-Filled Rooms Facilitate Collusion?" *Journal of Political Economy* (April 1997): 336-350.
- k. Crandall, Robert and Whinston, Clifford, "Does Antitrust Improve Consumer Welfare?: Assessing the Evidence," *Journal of Economic Perspectives* (Fall 2003), 3-26, available at <http://www.brookings.org/views/articles/2003crandallwinston.htm>.

Book chapters about antitrust that can help you before reading the above articles:

- a. Berry, Steven and Reiss, Peter, "Empirical Models of Entry and Market Structure," *Handbook of Industrial Organization*, vol. III, chapter 29.
- b. Kaplow, Louis and Shapiro, Carl. "Antitrust," in *Handbook of Law and Economics*, vol.II, edited by Polinsky and Shavell, 2007, pp. 1073-1225.
- c. Whinston, Michael D., "Antitrust Policy Toward Horizontal Mergers," *Handbook of Industrial Organization*, vol.III, chapter 36, see also chapter 35 by John Sutton.
- d. Rey, Patrick and Tirole, Jean, "A Primer on Foreclosure," *Handbook of Industrial Organization*, vol.III, chapter 33.

10. Other topics:

- a. Athey, S. and Bagwell, K. (2008) Collusion with persistent cost shocks. *Econometrica*, 76: 493-540.
- b. Arora, S. and S. Gangopadhyay (1995) Toward a theoretical model of voluntary overcompliance, *Journal of Economic Behavior and Organization*, 289-309.
- c. Boom, A. (1995) Asymmetric international minimum quality standards and vertical differentiation, *Journal of Industrial Economics*, 101-119.
- d. Dobson, P. and M. Waterson (2005) "Chain-Store Pricing Across Local Markets," *Journal of Economics and Management Strategy*, vol. 14(1), pp. 93-119.
- e. Tirole, J. (2012) Overcoming adverse selection: how public intervention can restore market functioning, *American Economic Review*, 29-59.