The importance of replications in the social sciences have been underscored recently. In psychology, the "Many Labs" and Open Science Collaboration (2015) projects involved 270 researchers attempting to replicate 100 studies published in the top three journals. In economics, Camerer et al. (2016) attempt to replicate 18 papers in experimental economics. To aid these important efforts to replicate, most top journals in economics have adopted a Data Access Policy, requiring authors to make available data and code to all researchers for the purpose of replication.

Economists have various working definitions of replications. For example, Clemens (2015) separates replications from robustness tests, classifying "*verification*" (replication) as those using the same sample, population, and empirical specification; "*reproduction*" (replication) as those using different samples from the same population but using the same specification; "*reanalysis*" (robustness) using the same sample and population but different specifications; and "*ex-tension*" (robustness) using different samples and populations but the same specification. Hamermesh (2007) separates "*pure replications*" (same methods, same data) from "*statistical replications*" (alternative data or methods) and *"scientific"* replications (alternative theoretical or conceptual approaches). Apart from *"scientific"* replications as defined by Hamermesh (2007), you are expected to cover all these definitions of replication in your final project for this course.

References

Camerer, Colin F., Anna Dreber, Eskil Forsell, Teck-Hua Ho, Jurgen Huber, Magnus Johannesson, Michael Kirchler, Johan Almenberg, Adam Altmejd, Taizan Chan, Emma Heikensten, Felix Holzmeister, Taisuke Imai, Siri Isaksson, Gideon Nave, Thomas Pfeiffer, Michael Razen, and Hang Wu (2016). "Evaluating replicability of laboratory experiments in economics." *Science*.

Clemens, Michael A. (2015). "The Meaning of Failed Replications: A Review and Proposal." *Journal of Economic Surveys*.

Hamermesh, Daniel S. (2007). "Viewpoint: Replication in economics." *Canadian Journal of Economics*, 40(3): 715-733.

Open Science Collaboration (2015). "Estimating the reproducibility of psychological science." *Science*, 349(6251).

In many cases, replications have detected some significant limitations and outright errors in work. However, most of the time replications simply reveal that the empirical results are not robust to alternative samples, variable definitions, or model specification. Some of the more famous recent examples in our profession are listed below:

Albouy, D. (2012), "The Colonial Origins of Comparative Development: An Empirical Investigation: Comment" *American Economic Review*. 102(6): 3059-76. Reply to comment.

Foote, C.L. and C. F. Goetz (2008), "The Impact of Legalized Abortion on Crime: Comment" *Quarterly Journal of Economics*, 123(1): 407-423. Reply to comment.

Herndon, T., M. Ash and R. Pollin (2013) "Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff", *Cambridge Journal of Economics*, 38(2): 257-279. Reply in NYTimes to critique.

Kahn and Udry (1986), "Marital Coital Frequency: Unnoticed Outliers and Unspecified Interactions Lead to Erroneous Conclusions", *American Sociological Review*, 51(5): 734-737. Reply to comment.

McCrary (2002), "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime: Comment", *American Economic Review*, 92(4): 1236-1243. Reply to comment.

Minarik (1984), "The Effects of Taxation on the Selling of Corporate Stock and the Realization of Capital Gains: Comment", *Quarterly Journal of Economics*; 99(1): 93-110. Reply to comment.

Rothstein (2007), "Does Competition Among Public Schools Benefit Students and Taxpayers? Comment", *American Economic Review*, 97(5): 2026-2037. Reply to comment.

All replications carefully cite the original paper, which you are also encouraged to read. The authors of the original articles usually reply to the comments. These replies can also be enlightening to read as they illustrate many trade-offs that empirical researchers face and the importance of seemingly innocuous choices. They also illustrate how you can argue for or against many of these choices.

You can find more examples of replication studies at these three links:

1. http://replication.uni-goettingen.de/wiki/index.php/Main_Page this website allows you to search by JEL code, so you can search for replications on the topics you are most interested in. For example, search for the "J" classification if you want to find a paper in labor economics.
2. https://replicationnetwork.com/
3. http://www.3ieimpact.org/our-expertise/replication