GESIS Spring Seminar 2023

Syllabus for course:
"Decomposition Methods in the Social Sciences"

Lecturers:	Prof. Dr. Johannes Giesecke	Prof. Dr. Ben Jann
Affiliation:	Humboldt University Berlin	University of Bern
Email:	johannes.giesecke@hu-berlin.de	ben.jann@unibe.ch
Homepage:	https://www.sowi.hu-berlin.de/de/lehrbereiche/empisoz/a-z/giesecke	https://www.soz.unibe.ch/ueber_uns/personen/prof_dr_jann_ben/index_ger.html

Date: 06 - 10 March 2023
Time: Mo: 10:00-17:00 | Tu-Fr: 09:00-16:00
Venue: On-site at KOMED, Im MediaPark 7, 50670 Cologne

About the lecturers

Johannes Giesecke is professor of sociology at the Humboldt University in Berlin. His research interests include labor market sociology, social inequality, and quantitative methods. He is head of the department "Labor Market, Migration, and Integration" at the Berlin Institute for Empirical Integration and Migration Research (BIM) and research fellow at the German Institute for Economic Research (DIW).

Ben Jann is professor of sociology at the University of Bern, Switzerland. His research interests include social-science methodology, statistics, social stratification, and labor market sociology. He is principal investigator of TREE, a large-scale multi-cohort panel study in Switzerland on transitions from education to employment (www.tree.unibe.ch). He is author of many Stata packages, among them a widely used package for Oaxaca-Blinder decompositions (Jann 2008).

Selected Publications

- Klüver, H., Hartmann, F., Humphreys, M., Geißler, F., and Giesecke J. (2021). Incentives can spur COVID-19 vaccination uptake. Proceedings of the National Academy of Sciences, 118(36): e2109543118.

- Stoetzer, L., Giesecke J., and Klüver, H. (2021). How does income inequality affect the support for populist parties? Journal of European Public Policy, 30(1): 1-20.

- Giesecke, J., Groß, M., and Stuth, S. (2020). Occupational Closure and Wage Inequality: How Occupational Closure Effects Vary Between Workers. Kölner Zeitschrift für Soziologie und Sozialpsychologie, 72 (1): 157-195.

- Jann, Ben, Kristian Bernt Karlson (2023). Estimation of marginal odds ratios. University of Bern Social Sciences Working Paper No. 44. https://ideas.repec.org/p/bss/wpaper/44.html

- Jann, Ben (2021). Relative distribution analysis in Stata. The Stata Journal 21(4): 885–951. https://doi.org/10.1177/1536867X21106314

- Jann, Ben (2008). The Blinder-Oaxaca decomposition for linear regression models. The Stata Journal 8(4): 453–479. https://doi.org/10.1177/1536867X0800800401

Course description

Is the difference in wages between men and women (the gender wage gap) due to less labor market experience of women compared to men, or is it due to discrimination against women, for example because labor market experience of women is valued less than labor market experience of men? How much of the gender wage gap can be "explained" by differences in endowments such as education, skill, or experience? How much do changes in educational attainment and general trends in earnings inequality contribute to the change in the wage gap over time? How would test scores of pupils with and without migration background compare if there would be no differences in average socio-economic status? How much did de-unionization and the decline in real minimum wages contribute to rising wage inequality? How high would the mortality rate in country A be if it had the demographic composition of country B? Decomposition methods can help finding answers to such and other questions by providing insights into the mechanics of group differentials (such as earnings differences between men and women). Based on methodological developments mostly in labor economics (and some parallel developments in demography), these methods are increasingly popular in various fields of the social sciences. The seminar introduces the statistical concepts of decomposition methods, provides an overview of various approaches, and makes students familiar with the application of the methods and the interpretation of their results. Theoretical inputs and practical exercises (using Stata) will be alternated throughout the course.

Keywords

Counterfactual decomposition, Oaxaca-Blinder decomposition, reweighting, RIF regression, gender wage gap.

Course prerequisites

- Solid basic statistical knowledge (including regression analysis).
- Practical experience in data analysis with a common statistical software (ideally Stata).

Target group

Participants will find the course useful if:

- they are applied quantitative social science researchers from universities, research units in government agencies, or other research institutions;
- they are PhD students or Postdocs in quantitative social sciences;
- they are advanced master students in quantitative social sciences.

Course and learning objectives

By the end of the course participants will:

- have an overview of the most common decomposition methods;
- know the strengths and weaknesses of the different approaches;
- can identify potential areas of application of the different approaches;
- have a good understanding of how the methods work;
- can apply the methods purposefully in the context of their own work;
- can interpret the results correctly.

Organizational structure of the course

On each day, the course will start with about three hours of classroom instruction in the morning and then continue with about three hours of hands-on tutorials and exercises in the afternoon. The morning lectures will introduce and explain the theory and methods and discuss example applications. Students are strongly encouraged to actively participate in these sessions by asking questions or contributing to the discussions based on their own research experience. In the afternoon, students will work on assignments, individually or in small groups, to implement the presented methods in practice using statistical software (Stata). During these sessions, the lecturers will be available to provide help or discuss specific problems. The sessions will also include several inputs by the lecturers, in which they present example solutions to key parts of the assignments and discuss questions that came up during the

exercises. Furthermore, the afternoon sessions will provide opportunity to discuss own research problems on an individual basis with the lecturers.

Software and hardware requirements

We will use Stata for the exercises. Stata short term licenses will be provided by GESIS for the duration of the course if needed. Participants who own a Stata license, should make sure that they have a recent version (14 or higher) of Stata installed. Throughout the course, participants will need to be able to install additional user packages on the fly (this requires an internet connection and appropriate writing rights on the local system).

Recommended literature to look at in advance

None.

Day-to-day schedule and literature

Day 1: Introduction to counterfactual decompositions and the basics of the OB decomposition

- Introduction and course overview
- General idea of decomposition methods; notation and basic statistical concepts
- The Oaxaca-Blinder (OB) or Kitagawa-Oaxaca-Blinder (KOB) decomposition: basic mechanics, estimation and standard errors, overall and detailed decomposition, post-estimation hypothesis tests, transformation of results, presentation of results in tables and graphs

Literature (suggested reading)

1. Blinder, Alan S. (1973). Wage Discrimination: Reduced Form and Structural Estimates. The Journal of Human Resources 8(4):436–455.
2. Fortin, Nicole, Thomas Lemieux, Sergio Firpo (2011). Decomposition Methods in Economics. Pp. 1–102 in: O. Ashenfelter and D. Card (eds.). Handbook of Labor Economics. Amsterdam: Elsevier.
3. Jann, Ben (2008). The Blinder-Oaxaca decomposition for linear regression models. The Stata Journal 8(4):453–479.
4. Kitagawa, Evelyn M. (1955). Components of a Difference Between Two Rates. Journal of the American Statistical Association 50(272): 1168–1194.
5. Oaxaca, Ronald (1973). Male-Female Wage Differentials in Urban Labor Markets. International Economic Review 14(3):693–709.

Day 2: Extensions of the OB decomposition

- The index problem: two- and three-fold variants of the OB decomposition
- The transformation and base category problem: challenges and solutions
- The OB decomposition for nonlinear models

Literature (suggested reading)

1. Sinning, Mathias, Markus Hahn, Thomas K. Bauer (2008). The Blinder-Oaxaca decomposition for nonlinear regression models. The Stata Journal 8(4):480–492.
2. Fairlie, Robert W. (2005). An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. Journal of Economic and Social Measurement 30:305–316.
3. Horrace, William C., Ronald L. Oaxaca (2001). Inter-Industry Wage Differentials and the Gender Wage Gap: An Identification Problem. Industrial and Labor Relations Review 54(3):611–618.
4. Kim, ChangHwan (2013). Detailed Wage Decompositions. Revisiting the Identification Problem. Sociological Methodology 43:346–363.
5. Neumark, David (1988). Employers' Discriminatory Behavior and the Estimation of Wage Discrimination. The Journal of Human Resources 23(3):279–295.

6. Winsborough, H. H., Peter Dickinson (1971). Components of Negro-White Income Differences. Pp. 6–8 in: Proceedings of the Social Statistics Section. Washington, DC: American Statistical Association.
7. Yun, Myeong-Su (2004). Decomposing differences in the first moment. Economics Letters 82(2):275–280.

Day 3: Difference-in-differences decompositions

- Smith-Welch decomposition
- Juhn-Murphy-Pierce decomposition
- The intervention-based approach

Literature (suggested reading)

1. Juhn, C., K.M. Murphy, Brooks Pierce (1991). Accounting for the Slowdown in Black-White Wage Convergence. In Marvin Kosters (Ed.), Workers and Their Wages (pp. 107–143). Washington, DC: AEI Press.
2. Kröger, H., J. Hartmann (2021). Extending the Kitagawa-Oaxaca-Blinder decomposition approach to panel data. The Stata Journal 21(2):360–410.
3. Smith, J.P., F.R. Welch (1989). Black Economic Progress After Myrdal. Journal of Economic Literature 27(2):519–564.

Day 4: Beyond the mean I

- Reweigthing approaches
- Approaches based on RIF regression

Literature:

1. DiNardo, John E., Nicole Fortin, Thomas Lemieux (1996). Labour Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach. Econometrica 64(5):1001–1046.
2. Firpo, Sergio, Nicole M. Fortin, Thomas Lemieux (2009). Unconditional Quantile Regressions. Econometrica 77:953–973.
3. Firpo, Sergio, Nicole M. Fortin, Thomas Lemieux (2018). Decomposing Wage Distributions Using Recentered Influence Function Regressions. Econometrics 6(2): 28.
4. Ñopo, Hugo (2008). Matching as a Tool to Decompose Wage Gaps. The Review of Economics and Statistics 90:290–299.
5. Rios-Avila, Fernando (2020). Recentered influence functions (RIFs) in Stata: RIF regression and RIF decomposition. The Stata Journal 20(1):51–94.

Day 5: Beyond the mean II

- Approaches based on quantile regression
- Approaches based on distribution regression

Literature:

1. Chernozhukov, Victor, Iván Fernández-Val, Blaise Melly (2013). Inference on Counterfactual Distributions. Econometrica 81(6):2205–2268.
2. Juhn, Chinhui, Kevin M. Murphy, Brooks Pierce (1993). Wage Inequality and the Rise in Returns to Skill. Journal of Political Economy 101(3):410–442.
3. Machado, José A. F., José Mata (2005). Counterfactual decomposition of changes in wage distributions using quantile regression. Journal of Applied Econometrics 20(4):445–465.
4. Melly, Blaise (2005). Decomposition of differences in distribution using quantile regression. Labour Economics 12(4):577–590.