

Panel Econometrics

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Kick-off

- 1 More data are better
- 2 The course
- 3 Further details
- 4 Up next

Outline

- 1 More data are better
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Motivation: Omitted variables problem

Consider the following prototypical situation

- You are interested in the partial effects of the K regressors \mathbf{x} on y .
- You have (only) a cross-sectional sample of \mathbf{x} and y .
- You know there is an unobservable variable c that affects y and is correlated with \mathbf{x} .

Adding linearity, this means your population model is

$$E(y|\mathbf{x}, c) = \beta_0 + \mathbf{x}\boldsymbol{\beta} + c.$$

Delegating c to the disturbance u and estimating

$$y = \beta_0 + \mathbf{x}\boldsymbol{\beta} + v, \quad v = c + u, \quad E(v|\mathbf{x}) \neq 0,$$

gives rise to the well-known omitted variables bias.

Problem: It is difficult to find good proxy variables or instruments for c ...

Panel data to the rescue?

Suppose

- you have **two** observations per individual, sampled at t and $t - 1$, and
- the omitted variable c is time-invariant.

The difference between periods t and $t - 1$ is

$$y_t - y_{t-1} = \beta_0 - \beta_0 + (\mathbf{x}_t - \mathbf{x}_{t-1})\boldsymbol{\beta} + v_t - v_{t-1}$$

or, using the first difference operator, Δ ,

$$\Delta y_t = \Delta \mathbf{x}_t \boldsymbol{\beta} + \Delta v_t.$$

But $\Delta c = 0$, so

$$\Delta v_t = \Delta c + \Delta u_t = \Delta u_t.$$

The omitted variable vanishes from the equation in differences!

(Regularity conditions provided, the OLS estimator in differences will then be consistent.)

Why panel data?

More generally:

- Controlling for individual heterogeneity
- Using more information, more degrees of freedom
- Modeling dynamics
- Identifying otherwise non-detectable effects
- Avoiding aggregation biases

Limitations of panel data

- Data collection problems (coverage, collection costs, interview spacing etc.)
- Measurement errors (is a general survey problem, i.e., applies also to single cross sectional surveys)
- Selectivity (self-selectivity, nonresponse, attrition)
- Micro panels: often short time series dimension
- Macro panels: cross-section dependence
- Lengthy discussions on required exogeneity conditions

Types of panel data

Panels come in different sizes:

- Longitudinal data: 'short panels' (large- N)
- Cross section time series: 'long panels' (large- T)
- Firm data sets: 'huge panels' (large- N , large- T)

Longitudinal data I

University of Essex



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British Household Panel Survey

BHPS

The British Household Panel Survey began in 1991 and is a multi-purpose study whose unique value resides in the fact that:



- it follows the same representative sample of individuals – the panel – over a period of years;
- it is household-based, interviewing every adult member of sampled households;
- it contains sufficient cases for meaningful analysis of certain groups such as the elderly or lone parent families.

The wave 1 panel consists of some 5,500 households and 10,300 individuals drawn from 250 areas of Great Britain. Additional samples of 1,500 households in each of Scotland and Wales were added to the main sample in 1999, and in 2001 a sample of 2,000 households was added in Northern Ireland, making the panel suitable for UK-wide research.

- [BHPS wave 18 data and documentation](#) are available from the UK Data Archive.

Longitudinal data II

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National Longitudinal Surveys

The **National Longitudinal Surveys (NLS)** are a set of surveys designed to gather information at multiple points in time on the labor market activities and other significant life events of several groups of men and women. For more than 4 decades, NLS data have served as an important tool for economists, sociologists, and other researchers.

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NLS General Overviews

- [National Longitudinal Survey of Youth 1997 \(NLSY97\)](#)-- Survey of young men and women born in the years 1980-84; respondents were ages 12-17 when first interviewed in 1997.
- [National Longitudinal Survey of Youth 1979 \(NLSY79\)](#)-- Survey of men and women born in the years 1957-64; respondents were ages 14-22 when first interviewed in 1979.
- [NLSY79 Children and Young Adults](#)-- Survey of the biological children of women in the NLSY79.
- [National Longitudinal Surveys of Young Women and Mature Women \(NLSW\)](#)-- The Young Women's survey includes women who were ages 14-24 when first interviewed in 1968. The Mature Women's survey includes women who were ages 30-44 when first interviewed in 1967. These surveys were discontinued in 2003.
- [National Longitudinal Surveys of Young Men and Older Men](#)-- The Young Men's survey, which was discontinued in 1981, includes men who were ages 14-24 when first interviewed in 1966. The Older Men's survey, which was discontinued in 1990, includes men who were ages 45-59 when first interviewed in 1966.

Longitudinal data III

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↓ Short Description

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Short Description

The German Socio-Economic Panel Study (SOEP) is a wide-ranging representative longitudinal study of private households, located at the German Institute for Economic Research, DIW Berlin. Every year, there were nearly 11,000 households, and more than 20,000 persons sampled by the fieldwork organization TNS Infratest Sozialforschung.

The data provide information on all household members, consisting of Germans living in the Old and New German States, Foreigners, and recent Immigrants to Germany. The Panel was started in 1984.

Some of the many topics include household composition, occupational biographies, employment, earnings, health and satisfaction indicators.

Longitudinal data IV

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European Community Household Panel (ECHP)

[ECHP microdata for scientific purposes: how to obtain them?](#)

Description of dataset

The European Community Household Panel (ECHP) is a panel survey in which a sample of households and persons have been interviewed year after year.

These interviews cover a wide range of topics concerning living conditions. They include detailed income information, financial situation in a wider sense, working life, housing situation, social relations, health and biographical information of the interviewed.

The total duration of the ECHP was 8 years, running from 1994-2001 (8 waves).

ECHP based data in the database

99% of the "income and living conditions" domain under theme "Population and social conditions" is derived from ECHP. This includes many indicators of relative monetary poverty and of income inequality, analysed in different ways (eg. different cut-off thresholds, by age, gender, activity status, tenure status...).

It also includes a selection of indicators of social exclusion and non-monetary deprivation derived from ECHP, notably on housing.

Of these, 4 have been chosen as structural indicators, namely the at-risk-of-poverty rate before cash social transfers, the persistent at-risk-of-poverty rate and the s80/s20 income quintile share ratio. The at-risk-of-poverty rate after social transfers is a headline indicator.

A selection of indicators in the "health status" and "health care" collections of the "public health" domain also under the above-mentioned same theme are derived from ECHP as well.

See Also

[Additional information on ECHP](#)

[Income, Social Inclusion and Living Conditions](#)

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Huge panels I



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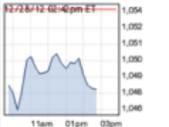
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CRSP Total Market

1,047.96
-6.00 | -0.57%



TODAY
1W
1M
1Y
5Y
↻

15-minute reporting delay. CRSP Indexes recalculated every second. Index values can be refreshed, upon request, every 15 seconds.

NEW FROM CRSP - DECEMBER 2012

WEBINAR REPLAY

On December 18, Index Universe hosted a webinar to discuss Vanguard's transition to the CRSP Indexes. [Click here to watch and listen to the replay.](#)

CRSP INDEXES - OUR KEY CONCEPTS

Development of the CRSP Indexes has been driven by rigorous academic research, practitioner insights, and industry best practices. Some of the underpinnings for the CRSP Indexes will be familiar to many and some new aspects require an introduction.

To help readers and investors better understand these drivers, we have created a new series — Our Key Concepts. For the next several weeks, CRSP will publish quick-reference modules on the several of the concepts found in the CRSP Indexes, including:

- New cap-based indexes
- Multi-factor Value and Growth Model
- Banding and Migration with "Packaging"
- Reconstitution Frequency and Benefits

CRSP welcomes your feedback as well as requests for additional topics for discussion. Please email us at Indexes@crsp.chicagobooth.edu

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2012 ^{the} BIG Picture™

Our November 2012 Chart illustrates the durations of market declines and market recoveries by quarter from 1926.

Huge panels II

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LMU-ifo Economics & Business Data Center (EBDC)



Das Economics & Business Data Center (EBDC) ist eine gemeinsame Plattform der Ludwig-Maximilians Universität München (LMU) und des Ifo Instituts und macht sich zum Ziel, neue Felder für die empirische volks- und betriebswirtschaftliche Forschung zu erschließen.

In diesem Sinne stellt es innovative Datensätze deutscher Unternehmen bereit die sowohl Umfragedaten des Ifo Instituts als auch externe Bilanzdaten der Firmendatenbanken Amadeus und

Hoppenstedt enthalten. Zu den Aufgaben des EBDC zählen weiterhin die Beschaffung und Verwaltung wichtiger Datenquellen für Forschung und Lehre, die zentrale Bereitstellung, Aktualisierung und Dokumentation von Datenbanken externer Anbieter, sowie der Erwerb von entsprechenden Support-Tools.

Ab 2014 besteht außerdem die Möglichkeit in den Räumlichkeiten des EBDC auf die Daten des Bayerischen Landesamts für Statistik und Datenverarbeitung zu zugreifen, was die Angebotsvielfalt und die Forschungsmöglichkeiten im Forschungsdatenzentrum des Ifo Instituts noch einmal erheblich erweitert.

Darüber hinaus ist das Center zentrale Ansprech- und Koordinationsstelle für wissenschaftliche Unternehmensdatenbanken der BWL- und VWL-Fakultäten der LMU und betreut als Dienstleister vor Ort Forscher und Gastforscher der LMU und des Ifo Instituts. Zukünftig wird es sich außerdem auf die Ausrichtung akademischer Konferenzen zur Forschung mit Unternehmensdaten konzentrieren.

Das Economics and Business Data Center wird von der Exzellenzinitiative des Bundes und der Länder im Rahmen von LMUExcellent gefördert und wurde Anfang 2008 gegründet und ist seit Frühjahr 2011 als Forschungsdatenzentrum des Rats für Sozial- und Wirtschaftsdaten akkreditiert.

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Aim of the course

This part of the course introduces you to the econometric analysis of panel data.

After successfully participating, you will become ...

- ... quite familiar with advantages and disadvantages of panel data, and, in particular,
- ... able to work with panels (and evaluate other people's work...).

Outline

- 1 Estimation of linear panel data models
- 2 Specification tests for panel data models
- 3 Estimation of autocorrelated panel data models
- 4 Instrumental variables estimation and Hausman-Taylor models
- 5 Dynamic panel data models

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Textbooks

Main textbook:

- J. M. Wooldridge (2010), *Econometric Analysis of Cross Section and Panel Data*, MIT Press, 2nd edition.

Good supplementary textbook:

- B. H. Baltagi (2008), *Econometric Analysis of Panel Data*, Wiley, 4th edition.

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Coming up

Estimation of linear panel data models