Exercise 4 Increasing Well-Being with Data Analytics

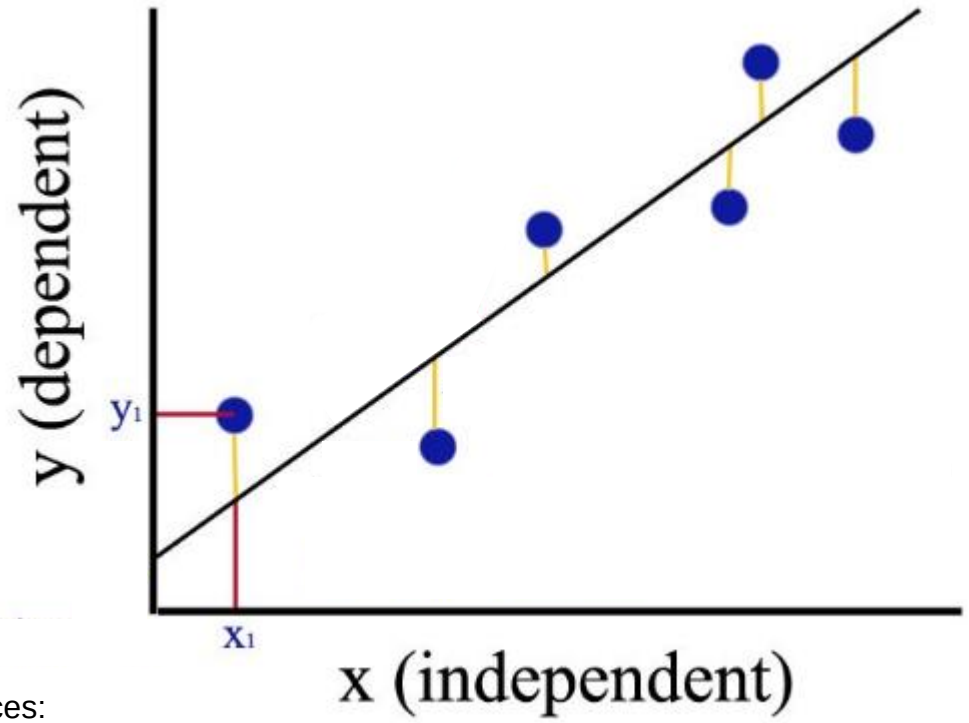
TECHNISCHE UNIVERSITÄT DARMSTADT

Sommerterm 2023

ise. Information Systems and Electronic Services

Fundamental Regression Model: Ordinary Least Squares (OLS)

OLS: method for estimating the unknown parameters in a linear regression model.

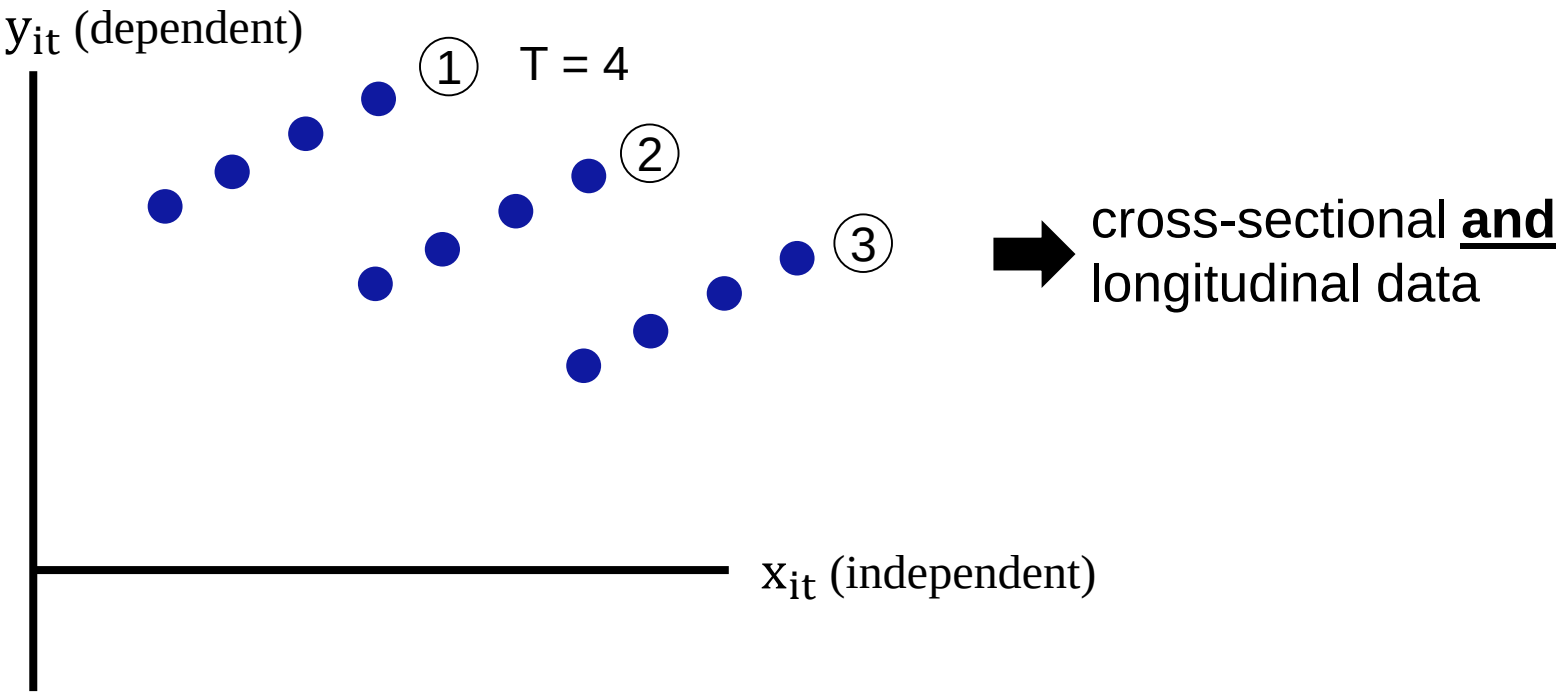


➡ cross-sectional data

Sources:
https://medium.com/analytics-vidhya/ordinary-least-square-ols-method-for-linear-regression-ef8ca10aadfc;
https://en.wikipedia.org/wiki/Ordinary_least_squares

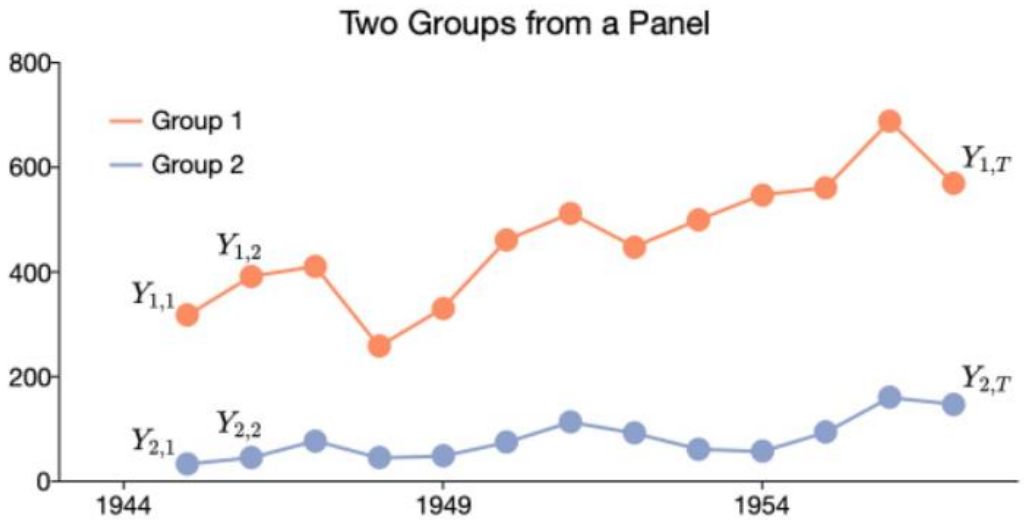
Advanced Regression Analysis: Panel Regression Model

Panel data are collected over more than two dimensions (i.e., time, individuals, and some third dimension).



Sources:
https://en.wikipedia.org/wiki/Panel_analysis#:~:text=Panel%20(data)%20analysis%20is%20a,run%20over%20these%20two%20dimensions.

Example Panel Data



Group	Time Period	Notation
1	1	Y_{11}
1	2	Y_{12}
1	3	Y_{1T}
⋮	⋮	⋮
N	1	Y_{N1}
N	2	Y_{N2}
N	T	Y_{N3}

Sources:
https://www.aptech.com/blog/introduction-to-the-fundamentals-of-panel-data/

Wellbeing Panel Data

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ID	Wellness Activity	Life Satisfaction	Social Media Time	Date
1	0	4	100 min/d	22/05/2021
1	1	6	88 min/d	30/05/2021
1	1	7	88 min/d	07/06/2021
2	0	4	132 min/d	22/05/2021
2	1	4	147 min/d	30/05/2021
2	1	5	121 min/d	07/06/2021
⋮	⋮			⋮
N	0	4	39 min/d	22/05/2021
N	1	6	29 min/d	30/05/2021
N	1	6	32 min/d	07/06/2021

Advanced Regression Analysis: Panel Regression Model

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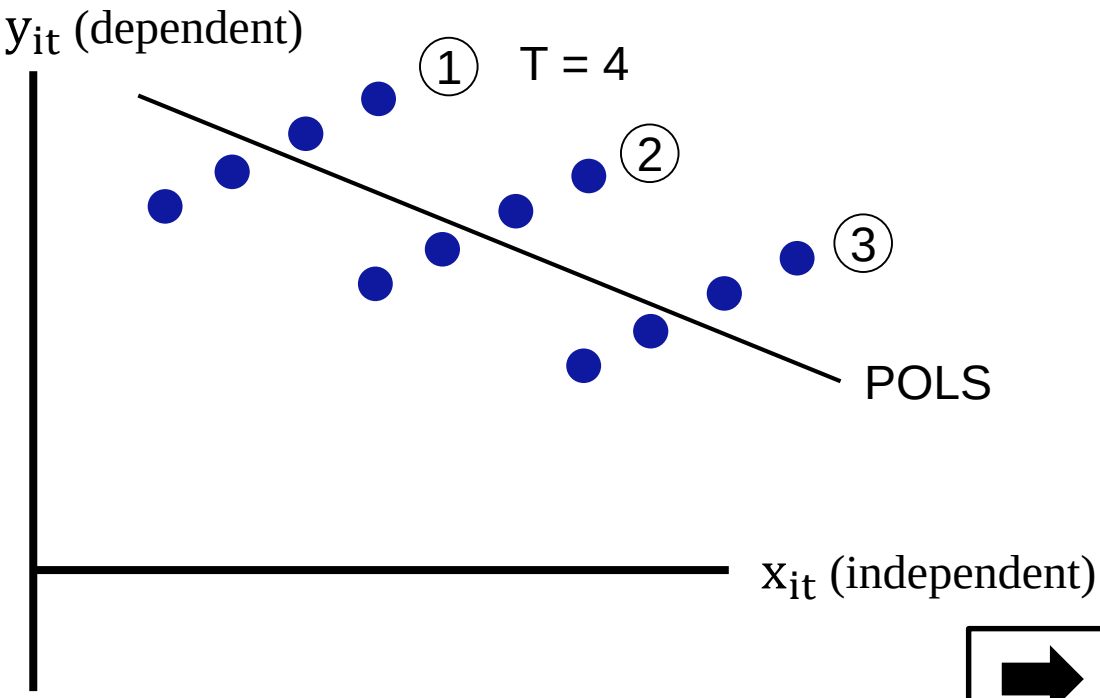

<u>Independently pooled panels</u>
There are **no unique attributes of individuals** within the measurement set, and **no universal effects across time**.

BUT: Actually, different intercepts for every individual necessary

➡ unobserved heterogeneity

Sources:
https://en.wikipedia.org/wiki/Panel_analysis#:~:text=Panel%20(data)%20analysis%20is%20a,run%20over%20these%20two%20dimensions.

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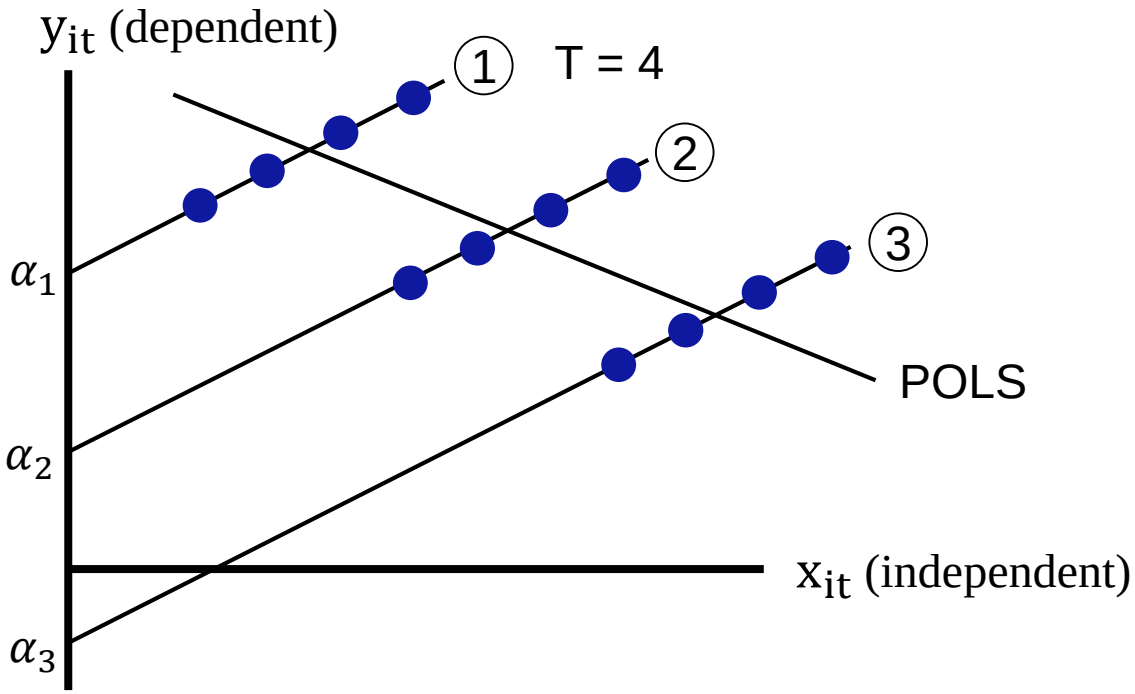

Fixed effects model:
There are **unique attributes of individuals** that **do not vary over time**

Random effects model:
There are **unique, time constant attributes of individuals** that are **not correlated with the individual regressors**.

Sources:
https://en.wikipedia.org/wiki/Panel_analysis#:~:text=Panel%20(data)%20analysis%20is%20a,run%20over%20these%20two%20dimensions.

Thank you!

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