

Measuring employment precarity in a cross-national framework: Assessment of the Cross-National Precarity Index (CNPI) in the German and U.S. context

CNB-Young team



Dynamics of youth employment precarity: Drivers, trajectories, and outcomes in a cross-national perspective
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Our motivation for harmonization

The desire to study labor market precarity

- In a **cross country** comparative way, to understand how institutional and policy context affects precarity and avoid pitfalls of „harmonized” job insecurity indicators
- Using **objective** indicators of labor market situation of individuals and not their subjective evaluations
- **Longitudinally**, following the understanding that precarity pertains to a career, not a single time point

In a cross country comparative way... - solution to differences in institutional contexts

Focus on **basic indicators** of labor market situation of individuals, which are meaningful independently of legal and institutional frameworks of national labor markets

Three dimensions present in many definitions of precarious or insecure employment:

- low level of labor market attachment: staying out of employment,
- employment instability: frequent job terminations,
- achieving low earnings (inability of a person to generate enough income from work to maintain their livelihood)

Longitudinally... - need to analyze precarity as a dynamic, career related concept

Two approaches to analyze career sequences

- **(multichannel) sequence analysis** using the optimal matching/ hidden Markov modelling + cluster analysis on the obtained distance matrix (Mattijsen & Pavlopoulos, 2019)
Limitation: exploratory - classification of distinct careers into several types, hence, a discrete variable with a possibly substantial variability within each type
- **composite sequence-based indices**, designed to capture multiple characteristics of a sequence in one continuous measure

Quantification of sequences through composite indices

Indices focused on **sequence complexity**. Commonly based on Shannon's entropy measure, which accounts for the variability of states within a sequence and the cumulative duration in each state (Ritschard et al., 2018) (life courses becoming less predictable)

Indices reflecting **sequence quality** with respect to elements of a sequence defined as desired/undesired, and their timing (Brzinsky-Fay, 2007; Busetta et al., 2019; Manzoni & Mooi-Reci, 2018)

The objective is to capture the long-term economic hardship and/ or accumulation of disadvantage.

Four axioms: the level of hardship rises: **a)** with the rising **incidence** of an adverse experience, **b)** with the accumulation of the negative experience in time, because there is no room for recovery (**persistence**), **c)** with the proximity of adverse experience to the present (**recency**), and **d)** with its **intensity**

Harmonized Employment Precarity Measure – the Cross National Precarity Index (CNPI)

A (weighted) average of three elements:

- Employment instability/ job terminations (AE_{jobtrm})
- Low earnings (AE_{earnlo})
- Non-employment (AE_{nonwrk})

$$CNPI^{S(T,Y)} = \beta * AE_{jobtrm}^{S(T,Y)} + \gamma * AE_{nonwrk}^{S(T,Y)} + \delta * AE_{earnlo}^{S(T,Y)}; \quad \beta + \gamma + \delta = 1; \quad \beta, \gamma, \delta > 0$$

Where:

$CNPI^{S(T,Y)}$ - CNPI value for a sequence S of length T ending in year Y $AE_{nonwrk}^{S(T,Y)}$ - severity of adverse experience: non-work

$AE_{jobtrm}^{S(T,Y)}$ - severity of adverse experience: job terminations $AE_{earnlo}^{S(T,Y)}$ - severity of adverse experience: low earnings

β, γ, δ - weights

CNPI Components: longitudinal measures of adverse experiences

General formula for the longitudinal severity of an adverse experience

$$AE^{S(T,Y)} = \alpha \frac{\sum_{i,j \in S(T,Y)} d_{ji}^{-1}}{\sum_{k=1}^{T-1} \frac{k}{T-k}} + (1 - \alpha) \frac{\sum_{j \in S(T,Y)} j * I_j}{\frac{T(T+1)}{2}} \quad 0 \leq \alpha \leq 1$$

Where

α - weight attached to the persistence component

d - distance between years j and i with a non-zero value of adverse experience

i, j - position indexes of years in an ordered sequence

T - length of a sequence S

I_j - intensity of an adverse conditio (see next slide for details)

CNPI Components: longitudinal measures of adverse experiences

Experience-specific measures of intensity (I_j)

- $$I_{jobtrm} = \begin{cases} \frac{n_{jobtrm}}{max_{jobtrm}} & \text{if } n_{jobtrm} \leq max_{jobtrm} \\ 1 & \text{if } n_{jobtrm} > max_{jobtrm} \end{cases},$$

where n_{jobtrm} – number of job terminations experienced by an individual in a given year,
 max_{jobtrm} – severity threshold

- $$I_{nonwrk} = \frac{mths_{nonwrk}}{12},$$

where $mths_{nonwrk}$ – number of months out of employment of an individual in a given year

- $$I_{earnlo} = 1 - \frac{earn}{earnlo},$$

where $earn$ – yearly individual earnings, $earnlo$ – low earnings threshold

Evaluation of CNPI performance in Germany and USA

These two countries represent contrasting institutional environments, which reflect their comparative advantage

Germany is a coordinated economy with high skill manufacturing as the dominant type of production. Long-term employment, on-the-job training made possible by seniority rights, internal labor markets

USA is a liberal market economy creating the environment facilitating rapid innovation and product diversification. Labor force adjustment, project-based work

Evaluation of CNPI performance in Germany and USA

We analyze employment sequences

- lasting five consecutive calendar years
- for individuals aged 33 to 37 in the last year of the sequence (due to NLSY-97 cohort design)
- at least one month in employment

G-SOEP: waves 2009-2017, N= 3709

NLSY-97 waves 2013-2017, N= 4650

Data weighted using cross-sectional weights for the last year of the sequence

Evaluation of CNPI performance in Germany and USA

Defining non-employment:

we assign working status to all months during which the respondents had reported working (in any kind of job, including active military duty) for 2 or more weeks

all the remaining months are classified as joblessness

all periods of paid leave (including parental leave) are treated as work

Defining job terminations:

SOEP: we combine calendar data with a direct question on job termination (reason parental leave excluded!) In this way we capture at least partly also job changes without employment gap – seamless transitions between jobs.

NLSY-97: each job termination as recorded + within job gaps - only gaps longer than 5 weeks (for firm related reasons) and longer than 6 months (for private/family reasons) are counted as separations

Very rarely yearly N of terminations is greater than 3, so this is our threshold value

Evaluation of CNPI performance in Germany and USA

Obtaining annual earnings

In G-SOEP „easy” because asked directly, we sum all earning sources

In NLSY-97 we estimate annual earnings by

- taking total hourly pay in each job multiplied by the working hours and weeks worked
- and adding up

Gross earnings

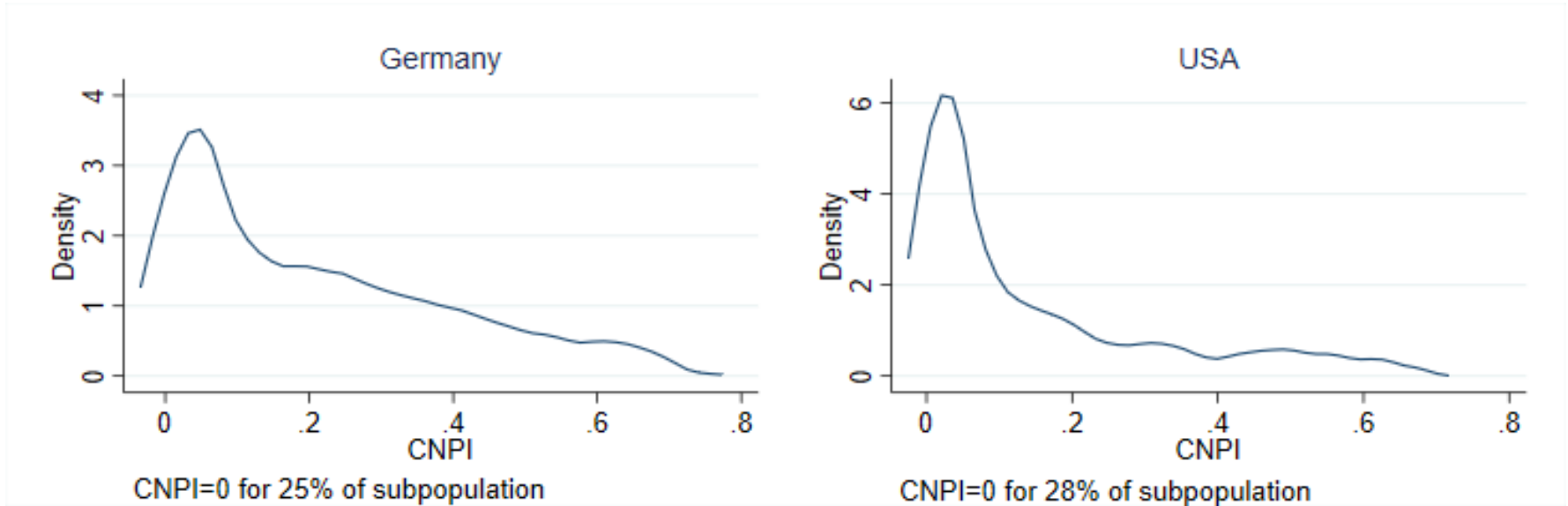
The low earnings threshold is 50% of the average annual gross earnings for full time employees in a given year, taken from official data

Evaluation of CNPI performance in Germany and USA

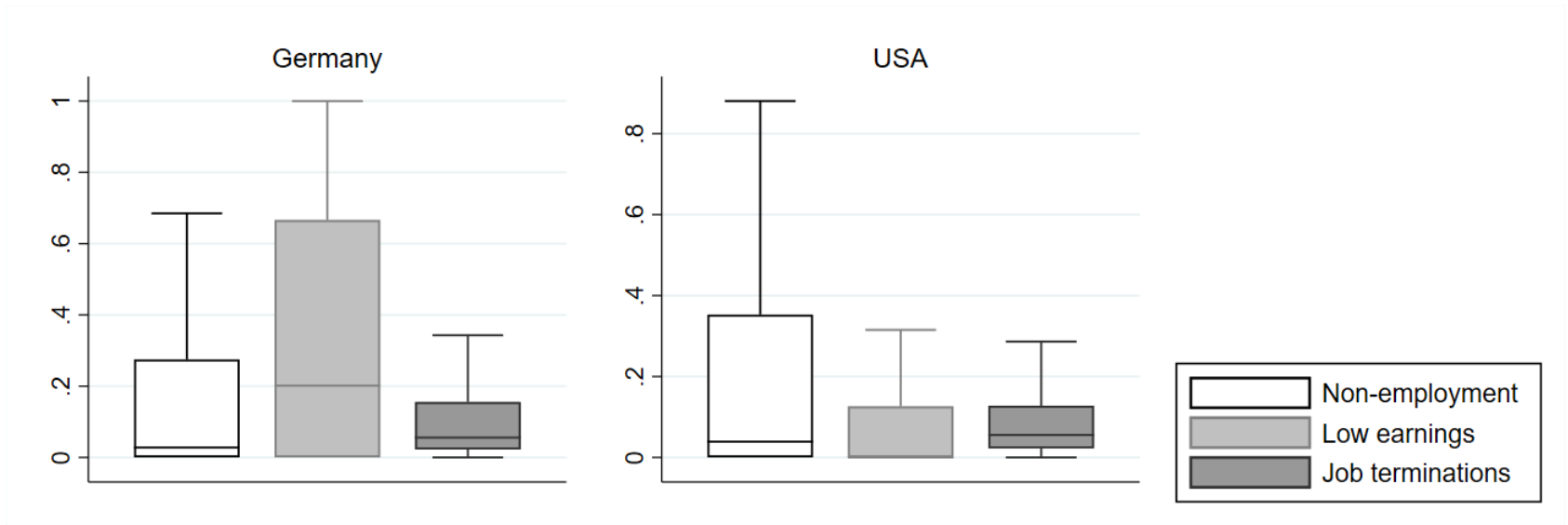
Analytical steps:

1. Investigation of the distribution of the CNPI and its components
2. Examination of the relationships between the components of the index and assessment of their impact on the overall value of the CNPI in each country – by means of cluster and correlation analysis
3. Assessment of the robustness of CNPI by manipulating the weighting parameters present in the formula of the index
4. Investigation of criterion validity of CNPI by assessing the correlation with country-specific indicators of precarity and observing CNPI dynamic over the life course

Distribution of CNPI in Germany and the USA



Distribution of CNPI components in Germany and the USA



Unconditional correlation coefficients between components of the CNPI and the composite index in Germany and USA

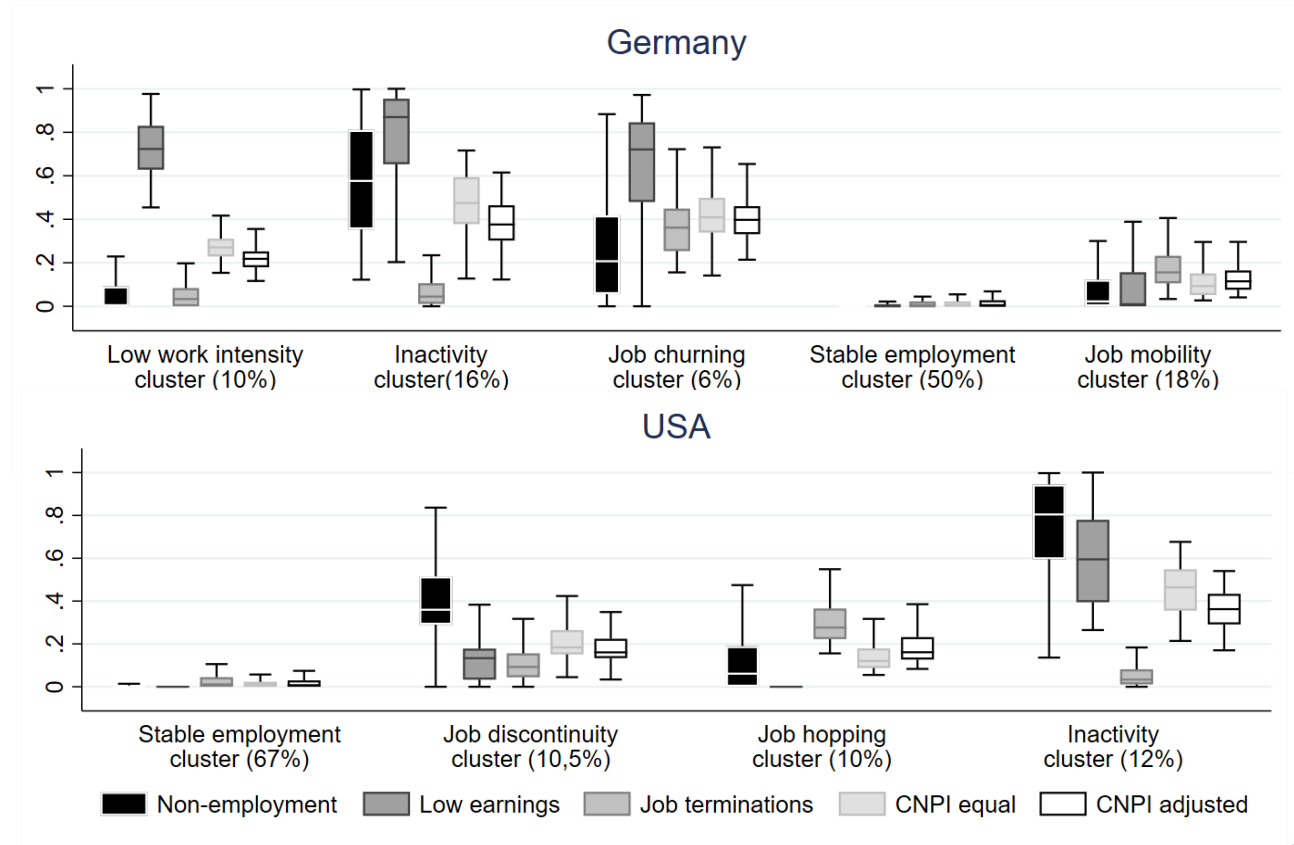
	Job terminations	Non-employment	Low earnings
Germany			
Non-employment	0.15		
Low earnings	0.16	0.67	
CNPI	0.36	0.86	0.92
USA			
Non-employment	0.15		
Low earnings	-0.05	0.86	
CNPI	0.28	0.97	0.91

Longitudinal precarity profiles in Germany and USA

Cluster solution
obtained with Ward's
linkage method

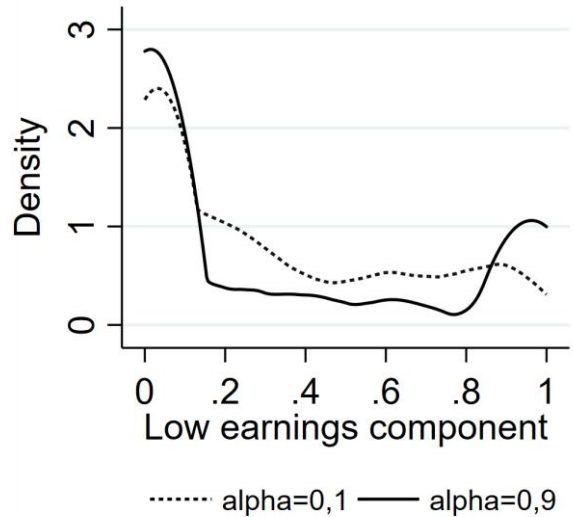
Unweighted data

Oversample of Blacks
& Hispanics in
NLSY97 dropped



Testing for different values of alpha – weighting recency-intensity against persistence

Distributions of CNPI low earnings component values with alternative specifications, Germany

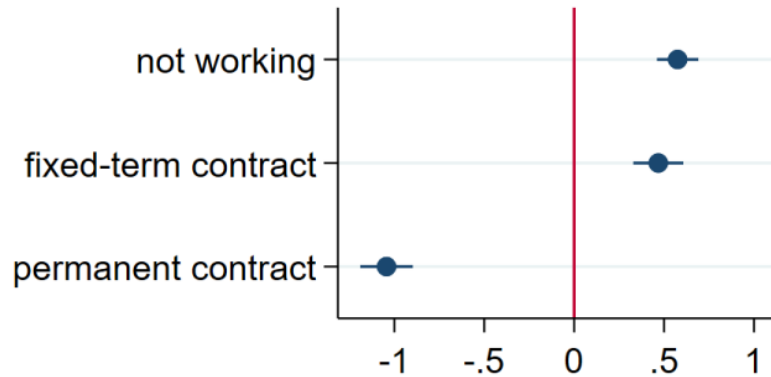


Correlations of component values with extreme alpha weights

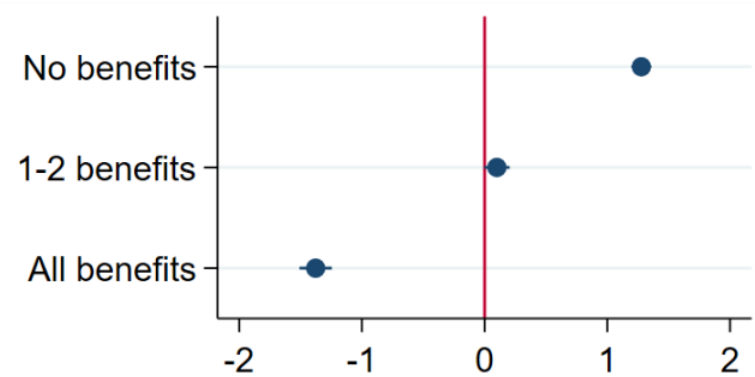
Component	Correlation between $\alpha=0.1$ and $\alpha=0.9$	
	Germany	USA
Job terminations	0.82	0.84
Non-employment	0.94	0.93
Low earnings	0.86	0.92

Average marginal effects of 5-year adjusted CNPI on employment status (Germany) and access to employee benefits (USA) in year 6

Germany



USA



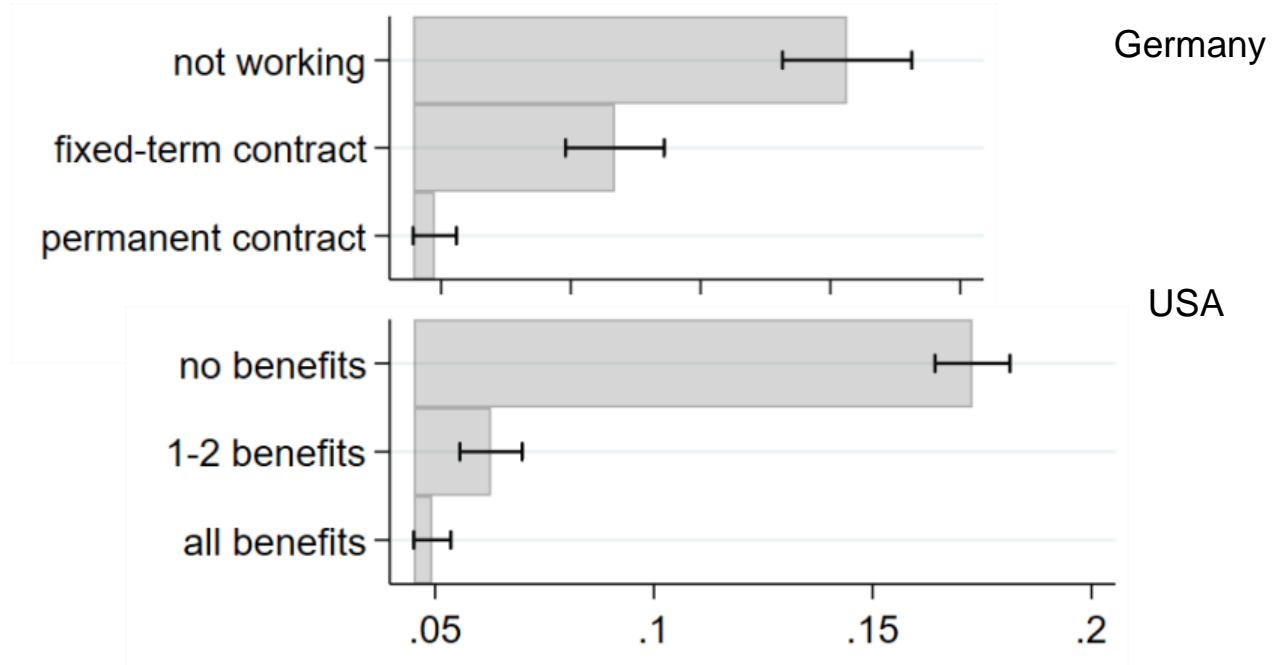
Multinomial logit. Models control for education, marital status, age and gender (and race in USA)

Predicted values of 5-year adjusted CNPI by employment status and access to employee benefits in year 1

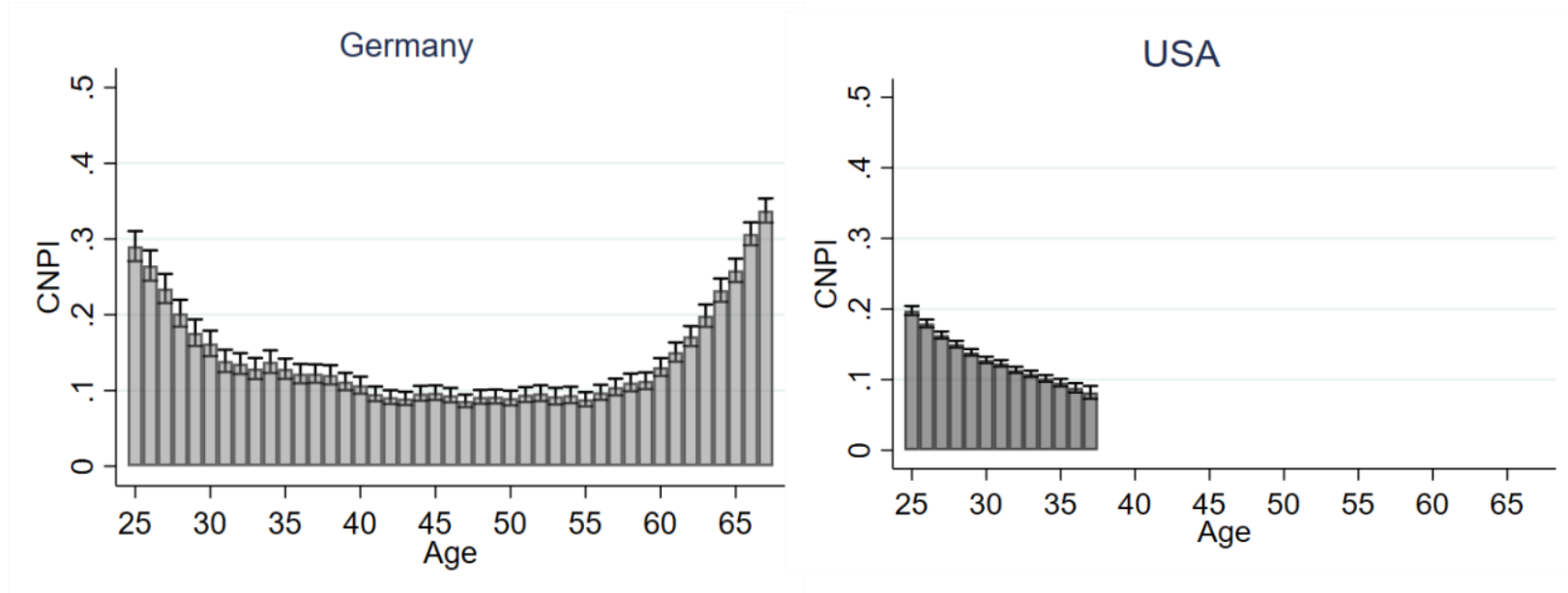
OLS regression

dependent variable:
CNPI adjusted.

Models control for
education, marital
status, age and
gender (and race in
USA)



Estimated average 5-year CNPI values and 95% confidence intervals by age in Germany and the U.S.



Conclusions

CNPI facilitates cross-country analyses of precarity by focusing on universal employment-related conditions and events which bear a similar meaning across various institutional contexts

CNPI reflects the dynamic and longitudinal character of precarity by relating to sequences of states and events

CNPI is a valuable indicator also in national research, displaying high discriminatory power, esp. where employment relations are less codified

CNPI can be calculated using data from existing national panel surveys

Confirmatory analysis showed a good construct validity of CNPI

Conclusions

Components of CNPI representing separate dimensions of precarity can be analyzed also as independent indicators, revealing different faces of the complex phenomenon (combinations, main drivers)

CNPI is an open formula. Thanks to its additive character it allows an incorporation of other dimensions of precarity (i.e. employee voice) depending on data availability

CNPI is flexible. Researchers can set adversity thresholds and weights according to the nature of their research question and specific context of performed analysis

Due to differences in survey methodology, absolute values of CNPI should not be compared across countries. Rather, explanatory power and association patterns!

Thank you for your attention!

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