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**Working Paper**

## Do welfare dependent neighbors matter for individual welfare dependency

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# Do Welfare Dependent Neighbors Matter for Individual Welfare Dependency?

Thomas K. Bauer and Rui Dang

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# Do Welfare Dependent Neighbors Matter for Individual Welfare Dependency? \*

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## **Abstract**

This paper investigates neighborhood peer effects on individual welfare using a combined IV and control function approach. The empirical analysis is based on panel data for the years 2007-2010 constructed by enriching the geo-referenced version of the German Socio-Economic Panel (SOEP) with aggregated zip code level-information. The results suggest that individual welfare use is positively correlated with neighborhood social benefit recipient rates, i.e. an increase in the share of neighborhood peers on social benefit by 1 percentage point raises the individual probability of welfare use by 0.97 percentage points.

## 1 Introduction

People with similar backgrounds or same interests tend to make similar decisions, including their choice of neighborhood and neighbors. This raises the concerns of policy makers, since a concentration of individuals dependent on social welfare in specific regions of cities can often be observed. This concentration of poverty may be associated with potential external effects on other neighborhood residents. It has been argued, for example, that the interdependence of group and individual behavior may lead to multiple equilibria which are all consistent with individual rationality and can include low-level equilibria (see, e.g. [Lindbeck et al., 1999, 2003](#)). In addition, social interactions may have important effects on the effectiveness of policy interventions, since some interventions may create social multipliers, i.e. they may affect the behavior on non-treated individuals via social interactions with treated individuals.

Empirical studies indicate that the neighborhood has important effects on individual behavior. For example, [van der Klaauw and van Ours \(2003\)](#) and [Bauer et al. \(2011\)](#) find a positive relationship between the unemployment rate in a neighborhood and the individual probability to be unemployed. This is line with empirical studies documenting the impact of the neighborhood amenities on employment outcomes via social interactions or neighborhood quality (see, e.g. [Bayer et al., 2008](#); [Topa, 2001](#); [Weinberg et al., 2004](#); [Kling et al., 2007](#)). However, the extent to which the association between individual behavior and/or outcome and behavior and/or outcome of a given reference group is causal, is still debated heavily.

This paper investigates whether the share of welfare recipients in a neighborhood has a causal impact on the individual probability to receive social benefits. For the causal identification one has to distinguish between endogenous interactions, exogenous interactions, and correlated effects, which could not be differentiated empirically without strong identification assumptions.<sup>1</sup> Only endogenous interactions are able to create “social multipliers” and, hence, are in the focus of this analysis. In order to identify endogenous interactions, we follow a strategy developed by [Bayer and Ross \(2009\)](#), that combines an instrumental variable with a control function approach in a fixed effects environment, using a novel panel data set that combines a geo-referenced individual survey with aggregated information on the neighborhood level.

## 2 Identification Strategy and Data

In order to analyze the effects of a neighborhood’s prevalence of social benefit dependency on the individual probability to receive social benefits, we start with the stan-

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<sup>1</sup>[Manski \(1993\)](#) defines that endogenous interactions refer to the possibility that an individuals behavior varies with the behavior of the respective reference group, while exogenous interactions refer to the possibility that the behavior of individuals is affected by the exogenous characteristics of the reference group. Correlated effects subsume the possibility that the behavior of different individuals belonging to the same reference group is similar just because they have the same characteristics or face the same institutional settings.

standard linear-in-means model of neighborhood peer effects (Manski, 1993):

$$Y_{ijt} = \alpha + \beta' X_{ijt} + \delta \bar{S}_{jt} + \eta' Z_{jt} + \psi_i + \omega_j + \tau_t + \epsilon_{ijt}, \quad (1)$$

where  $Y_{ijt}$  is a discrete variable taking the value 1 if an individual  $i$ , living in the neighborhood  $j$  receive social benefits at time  $t$ , and 0 otherwise.<sup>2</sup>  $X_{ijt}$  is a vector of observable individual, and  $Z_{jt}$  a vector of observable neighborhood characteristics.  $\bar{S}_{jt}$  is the average social benefit recipient rate in neighborhood  $j$ . The fixed effects  $\psi_i$ ,  $\omega_j$ , and  $\tau_t$  are assumed to capture time-invariant unobserved individual and neighborhood characteristics as well as unobserved shocks to the neighborhood, respectively.  $\epsilon_{ijt}$  is an error term.

The coefficient of interest is  $\delta$ , that captures the endogenous effect of social security dependency in the neighborhood on the individual probability to receive social benefits (Manski, 1993). Despite the fact that we control for a number of individual and neighborhood characteristics, our estimates of  $\delta$  may be biased because of unobserved time-variant individual and neighborhood characteristics that may be correlated with  $\bar{S}_{jt}$ . Such a correlation may result from individuals sorting themselves non-randomly over neighborhoods, generating a correlation between the average social benefits recipients rate in a neighborhood and unobservable individual characteristics. Furthermore, unobserved neighborhood characteristics, such as the prevalence of social housing, may be correlated with  $\bar{S}_{jt}$ . To correct for these potential sources of biased estimates of  $\delta$ , we follow the identification strategy proposed by Bayer and Ross (2009), which employs an instrumental variable (IV) approach to control for non-random individual sorting into neighborhoods, and a control function approach to control for potential unobserved neighborhood characteristics that may be correlated with our variable of interest.

We first use the number job centers (per 1,000 people) in each postcode area as an instrumental variable to correct for the bias that may arise from the comovements of neighborhood social benefit recipient rate and individual welfare participation. The identification assumption is that the job centers per thousand inhabitants in neighborhood might be correlated to the share of welfare recipients but has no direct effect on an individual's welfare participation. In addition, the IV approach is implemented as a cell-based approach, following (Bayer and Ross, 2009). In a first step, we define cells of groups of households with similar observable individual and household characteristics, i.e. age (aggregated to five-year brackets), gender, marital status, nationality and three categories for the educational level of an individual. The cell means of the neighborhood characteristics are then used as instruments for the neighborhood char-

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<sup>2</sup>We assume that the relevant neighborhood for an individual is the postal code area she is living in, as postal code areas are smaller than most official boundaries, are often bounded by distinct landmarks, and are both visible to an individual as well as the outside world, thus allowing for the presence of stigma or status effects.

acteristics captured by  $\bar{S}_{jt}$  and  $Z_{jt}$  in equation (1). These instruments are predictive location choice, under the assumption that observationally identical individuals are exposed to similar neighborhood characteristics. This IV strategy use the predicted location choice to instrument for the actual location choice of individuals, and eliminates the variation in neighborhood characteristics that is due to the sorting individual unobservables and employs solely the variation that is explained by unobservable individual characteristics.

The control function approach is implemented by estimating a hedonic price equation for all observed rental prices of apartments:

$$P_{kjt} = \zeta + \chi' H_{kjt} + \varphi' Z_{jt} + \kappa_{kit}, \quad (2)$$

where  $P_{kjt}$  is the logarithm of the monthly rent of the apartment unit  $k$  in the postal area  $j$  at time  $t$ . The vector  $H_{mjt}$  controls for the physical attributes of each unit,<sup>3</sup>  $Z_{jt}$  summarizes the neighborhood characteristics of apartment  $k$ , including the neighborhoods' percentage of benefit recipients, unemployment rate, percentage of highly skilled, percentage of foreigners, and the population size.<sup>4</sup> We use the average residual  $\bar{\kappa}_{jt}$  calculated over each postal area from equation (2) as an additional control variable in equation (1), assuming that these average residuals capture all unobserved neighborhood characteristics influencing the sorting of individuals across neighborhoods. This assumption appears to be reasonable, as long as individuals sort into neighborhoods with regard to income, housing quality or neighborhood amenities. Note that  $\bar{\kappa}_{jt}$  may be correlated with  $\epsilon_{ijt}$  if individuals have unobservable different preferences for these neighborhood amenities. We tackle this problem by using an IV approach similar to the one described above, i.e. by using the cell means of  $\bar{\kappa}_{jt}$  for observationally identical individuals as instruments.

We employ a longitudinal data set, which has been constructed by merging three data sources at the zip-code-level. The primary data source is the restricted-use version of the German Socio-Economic Panel (GSEOP) for the years 2007-2010.<sup>5</sup> In order to obtain information on the social context in a particular neighborhood, we use the national administrative employment registers<sup>6</sup> of the German Federal Employment Agency. As a third data source we employ the real estate market data provided by *ImmobilienScout24*, which is the largest online real estate selling and renting platform in

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<sup>3</sup>The physical attributes includes the logarithm of the size of the apartment, house type, house status, and a cubic function of the age of the unit

<sup>4</sup>The results of estimating equation (2) are available upon request and will not be discussed in detail since all variables appear to have the expected effect.

<sup>5</sup>Wagner et al. (2007) provide a comprehensive description of the German Socio-Economic Panel Study (SOEP), and Peter and Lakes (2009) of the geographically referenced information in the German socio-economic panel.

<sup>6</sup>The German administrative employment database, i.e. the Integrated Employment Biographies (IEB), covers all individuals subject to German social insurance system.



Germany. This data is used in our identification strategy to control for local amenities via a hedonic price regression.

The individual controls subsumed in the vector  $X_{ijt}$  in equation (1) obtained from the SOEP<sup>7</sup> include age and age squared, the number of children in the household, indicator variables for the marital status, gender, whether the individual is a migrant<sup>8</sup>, and whether the individual has higher education (ISCED-level 5 and 6). Based on the administrative employment register, we construct peer-level variables in each zip-code area during the years 2007- 2010, including the share of people receiving social benefits, the share of workers with higher education, the share of foreigners, and the population size.

Our empirical analysis concentrates on persons aged between 15 and 65 years. Excluding persons with missing values, our data set consist of 37,074 person-year observations of 11,670 individuals. Table I reports descriptive statistics on all individuals in our data set, and Table II shows descriptive statistics of our neighborhood variables, which have been obtained after merging the longitudinal data extracted from the German Socio-Economic Panel with the administrative data from the social security records<sup>9</sup>. For the empirical analysis, we use information on 6,874 zip code-year observations of 2,164 zip code areas.

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<sup>7</sup>The SOEP data used in this paper were extracted using the Add-On package PanelWhiz for Stata. PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). Any data or computational errors in this paper are our own. [Haisken-Denew and Hahn \(2010\)](#) describes PanelWhiz in detail.

<sup>8</sup>We categorize both first and second immigrants together. A first-generation immigrant is defined as a person who migrated to Germany regardless of his/her nationality. Second generation immigrants include (i) persons who have been born in Germany but do not have German nationality; (ii) persons who have been born in Germany with German nationality whose parents have a foreign nationality or are both migrants; and (iii) persons who migrated to Germany before the age of 6

<sup>9</sup>It appears that the average recipient rate in the individual data (see Table I) is much higher than the recipient rate we obtain from the regional data. Several factors may be responsible for this difference: (i) the SOEP is neither representative for the German population nor for those who have paid social security contributions; (ii) the data from the SOEP is usually collected in the first three months of a year, while the data from the employment register have been calculated using information on the status of the individuals at 30th June of the respective year, (iii) the individual information on being recipient of social transfers is self-reported and is not necessarily identical to the official definition of benefit recipients.

**Table I: Descriptive Statistics: Individual Characteristics**

Variables	Germany	
	<i>Mean</i>	<i>Std.Dev.</i>
Benefit receipt(Dummy)	0.10	0.30
Age	41.03	13.46
$Age^2(1,000)$	1.87	1.10
Female(Dummy)	0.51	0.50
No. Children in HH	0.02	0.21
Migrants(Dummy)	0.24	0.42
Married(Dummy)	0.51	0.50
Higher Education(Dummy)	0.25	0.43
Living in Urban Regions(Dummy)	0.62	0.49
Individual-Year Observations	37074	
Individuals	11670	

NOTE.—Means and standard deviations are weighted using the SOEP weight.  
SOURCE.—SOEP v29, own calculation.

**Table II: Descriptive Statistics: Neighborhoods**

Variables	Germany		West Germany		East Germany	
	<i>Mean</i>	<i>Std.Dev.</i>	<i>Mean</i>	<i>Std.Dev.</i>	<i>Mean</i>	<i>Std.Dev.</i>
% Benefit Recipients rate	1.28	1.16	1.22	1.12	1.79	1.39
% Local Unemployment Rate	11.75	5.31	11.09	5.01	16.85	4.69
% Higher Educated Residents	8.81	5.12	8.70	5.09	9.64	5.22
% Foreigners	10.68	7.32	11.69	7.14	2.93	2.37
Population Size(1000)	9.71	3.82	9.59	3.85	10.63	3.50
Zip-code-year obs.	6874		6082		792	
Zip-codes	1909		1729		180	

SOURCE.—The neighborhood data from IAB, own calculations.

### 3 Estimation results

The results of different specifications of equation (1) are reported in Table III. Column (1) of Table III shows the pooled OLS estimates where we treat neighborhood characteristics as exogenous and do not consider a potential bias of the estimation results due to unobserved heterogeneity and the endogenous regional sorting of individuals. In column (2) of Table III we add individual, neighborhood and time fixed effects to the specification. For both specifications we find a positive correlation between the share of benefit recipients in a neighborhood and the individual probability to claim social benefits. In column (3) of Table III we further add  $\bar{\kappa}_{jt}$ , which have been obtained by estimating the hedonic rent equation (2), in order to control for unobserved amenities of a neighborhood. Even though the coefficient of this hedonic residual appears to be statistically significant, the inclusion of this variable does not affect the estimated coefficient of the regional share of social benefit recipients. The estimated coefficient of the latter suggests that the individual probability of receiving social benefit increases by 1.25 percentage point if the neighborhood welfare recipients rate increase by 1 percentage point.

Table III: Individual welfare participation and neighborhood welfare use

	(1)	(2)	(3)	(4)	(5)
	POLS	FE	FE	Pooled IV	IV FE
<b>Neighborhood Attributes:</b>					
Social benefit recipients rate	0.0092*** (0.0033)	0.0124*** (0.0043)	0.0125*** (0.0043)	0.0098*** (0.0034)	0.0097** (0.0048)
Population size(1,000)	-0.0012 (0.0007)	0.0027* (0.0014)	0.0027* (0.0014)	-0.0008 (0.0008)	0.0095*** (0.0041)
Foreigners	-0.0000 (0.0006)	-0.0013 (0.0010)	-0.0013 (0.0010)	0.0004 (0.0007)	0.0054* (0.0029)
College graduates	-0.002*** (0.0007)	-0.0013 (0.0010)	-0.0013 (0.0010)	-0.0016** (0.0008)	0.0025 (0.0024)
Hedonic residual	-	-	0.0697** (0.0344)	0.0305 (0.0430)	0.0714** (0.0344)
Fixed Effects	No	Yes	Yes	No	Yes
Individual Characteristics	Yes	Yes	Yes	Yes	Yes
<i>N</i>	37094	37094	37094	37094	37094
<i>R</i> <sup>2</sup>	0.0245	0.0097	0.0100	0.0246	0.7058
Individual Controls	No	Yes	Yes	Yes	Yes
Hedonic Controls	No	No	Yes	Yes	Yes
Individual fixed effects	No	Yes	Yes	No	Yes
Kleibergen-Paap rk Wald F statistic:	N/A	N/A	N/A	8051.57	214.757
Kleibergen-Paap rk LM statistic :	N/A	N/A	N/A	257.95	697.66
Hansen J statistic :	N/A	N/A	N/A	3.282	21.601

NOTE.—Standard errors in parentheses are robust and clustered at zip code level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$  SOURCE.—SOEP v29,–SOEP v29, the neighborhood data from IAB and *Immobilien Scout24*, own calculation.

Columns (4) and (5) of Table III show the results when we instrument the neighborhood characteristics captured by  $\bar{S}_{jt}$  and  $Z_{jt}$  in equation (1). Note first, that the

estimated effect of the share of social benefit recipients on the individual probability to claim social benefits in the pooled IV-estimates(see column (4)) does not differ significantly from the pooled OLS estimates shown in column (1), indicating that a potential bias because of time-invariant unobserved individual and neighborhood characteristics is negligible. When adding the various fixed effects to specification, the estimated effect is somewhat smaller and only statistically significant at the 10%-level. Overall, the results shown in Table III appear to be fairly robust, indicating that the individual probability of receiving social benefit increases by about 1 percentage point if the neighborhood welfare recipients rate increase by 1 percentage point.

#### 4 Concluding remarks

In many countries, welfare recipients cluster in certain neighborhoods. This clustering raises concerns that poverty traps may develop, because individual behavior may be affected by the behavior of peers in the neighborhood resulting in being dependent on social welfare to become the social norm. Against this background we investigate whether the individual probability is affected by the share of welfare recipients in the neighborhood using data for Germany. We rely on an identification strategy that follows the suggestion by Bayer and Ross (2009) which combines fixed effects estimates with an instrumental and a control function approach to control for unobservable individual and regional characteristics as well as endogenous individual sorting.

Our results indicate that the share of welfare recipients in a neighborhood affects individual welfare participation. In particular, an increase in the share of neighborhood peers on social benefit by 1 percentage point raises the individual probability of welfare use by about 0.97 percentage points.

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