

Long-term Neighbourhood Effects on Income, Education and Employment among Adolescents in Oslo.

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Ingar Brattbakk,
Research Fellow / PhD-student at the Department of Sociology and Human Geography,
University of Oslo
Ingar.brattbakk@sgeo.uio.no
www.iss.uio.no

Terje Wessel,
Professor at the Department of Sociology and Human Geography,
University of Oslo
Terje.Wessel@sgeo.uio.no
www.iss.uio.no

NB: This paper is a preliminary draft. We have not yet conducted analyses of employment or examined questions regarding the form of the neighbourhood effects.

Abstract

Like in many other European countries, a lot of the Norwegian policies on welfare, housing and urban development, are based on assumptions that people may be disadvantaged by where they live. A strong geographical concentration by social groups is regularly viewed as undesirable because poverty can be reinforced through intrinsic neighbourhood effects. On this background, it seems rather surprising that the consequences of segregation are hardly studied in the Norwegian context.

Our main *research question* is: To what extent can neighbourhoods influence the life-chances of individuals? More specifically, in this paper we attempt to trace neighbourhood effects in the city of Oslo. We also examine questions regarding the form and strength of these relationships: do the effects appear when the local deprivation exceeds a certain level?

We focus on adolescent development because a number of earlier studies suggest that neighbourhood effects will have the strongest effect on children and young people. The study has a longitudinal approach, focuses on the entire urban space and includes information about the whole population of Oslo. The dataset is register based and contains a large number of

demographic and socioeconomic variables. The city of Oslo is subdivided into neighbourhoods at different geographical scales, and the whole population makes the basis for a classification of the socioeconomic character of the city's neighbourhoods. The paper focuses on a cohort born in 1976/77 who lived in the defined neighbourhoods in Oslo for a 5-year period, from 14 throughout 18 years of age. Our dependent variables capture the status of this cohort at the age of 28 and 29 years. We use three sets of indicators: educational level, income and employment/unemployment. Individual control variables related to gender, ethnicity, family status and family background (parents socioeconomic status) during childhood and adolescent are included. The analysis is based on multi-level modeling.

1. Introduction

Studies of neighbourhood effects often focus on child and adolescent development, and some on long-term outcomes (i.e. poverty, lack of skill, unemployment, social isolation, etc.). The results have been analysed in numerous review articles, and can be summarized as follows: American research has documented an independent but modest effect of area deprivation on individual development and welfare (see reviews by Leventhal and Brooks-Gunn 2000; Sampson et al. 2002; Pebley and Sastre 2004). European research is much more scarce, and fly in different directions. Andersson (2004) investigated three medium-sized Swedish cities (Västerås, Jönköping and Gävle), and found that neighbourhood context during adolescence affects employment status and educational achievements at age 25. Obertwitter (2007) reported significant neighbourhood effects on adolescent delinquency in Cologne and Freiburg, however only among natives, and based on cross-sectional data. A third type of pattern was identified in a UK study of exam results and a Finnish results study of secondary school completion. In these cases, a neighbourhood effect appeared primarily in areas of concentrated advantage (Gordon and Monastiriotis 2006; Kauppinen 2007).

The picture becomes even more puzzling if we include studies of school segregation. The importance of ethnic composition in schools has been confirmed in a German study (Kristen 2008), partly confirmed in a Dutch study (van der Slik et al. 2006) and disconfirmed in a Norwegian study (Fekjær and Birkelund 2007).¹ At least two recent studies have moved a step further by looking at multiple contexts, both schools and neighbourhoods, simultaneously.

¹ The two former studies analyse context effects in elementary school. Fekjær and Birkelund, by contrast, assemble evidence from upper secondary school. This may have some causal relevance.

Both observe larger school effects than neighbourhood effects (Kauppinen 2008; Brännström 2008).

It appears, therefore, that European research exposes a stronger sense of difference than American research. This impression also applies to studies of adult populations. Swedish research has found clear impacts of residential context on labour market participation (Musterd and Andersson 2006) and earnings (Andersson et al. 2007; Galster et al. 2007; Musterd et al. 2008). Dutch research (Musterd et al. 2003; van der Laan Bouma-Doff 2007), German research (Drever 2004, Friedrichs and Blasius 2005) and British research (Buck 2001; McCulloch 2001; Bolster et al. 2007; van Haam and Manley 2009) provide a less consistent picture: some analyses support a ‘neighbourhood effects story’, others do not. There may be some pattern to this diversity, but it is hard to detect.² Sweden seems to be the only European country with a fairly uniform evidence base.

The fact that Sweden stands out is highly relevant for the present paper. Drawing on data from Oslo, we expect to find a certain affinity with Swedish research. Norway and Sweden share a history of universalism and comprehensive redistribution. The social structure in the two countries is very similar, and the cultural discourses tend to revolve around the same issues. Our expectations are also shaped by the local segregation debate, which often relates to peer effects, and by our choice of target population: we trace a set of individuals through two transitional stages, from 14 to 18 and from 20 to 29. The main question can be phrased as follows: Does living in a deprived area during adolescence influence the probability of social exclusion later in life? If such effects exist, are they proportionately greater in the worst areas?

The paper is organized as follows. The next section presents the context, the social landscape of Oslo. Section 3 briefly discusses relevant literature. Section 4 contains a detailed description of data and methods. Section 5 gives the results, and section 6 concludes.

2. Sources of neighbourhood change in Oslo

The social landscape of Oslo has undergone dramatic changes over the course of 30 or 40 years. One type of change concerns the redevelopment of old industrial areas and a

² Galster (2007) draws a similar conclusion for the whole of Europe.

concomitant expansion into previous marginal spaces. A striking example is the ongoing transformation of the seaside, where thousands of new apartments offer panoramic ocean and marina views. As a result, the upper end of the housing market now provides a larger set of options: one can choose from an ecology of romantic forest hills, traditional garden cities, dignified urban quarters and expensive waterfront blocks. For our purpose the most important effect is an increasing number of affluent neighbourhoods: the expansion of affluent Oslo changes the proportions between high-price, middle-price and low-price areas.

A related set of changes unfolds in the inner the city. Oslo inner east was built as a working-class area and went through a classic phase of degradation and filtering in the period of suburban expansion, crudely from the 1950s to the 1980s. A public regeneration programme in the 1980s was liquidated in 1988-89, in the wake of a housing market collapse. This dramatic event coincided with an emergent underclass debate, and left a trace of failure and pessimism in the city hall. Even the Norwegian government engaged in the situation, and passed a white paper (St. meld. 14 1994-95) that pointed towards new strategies and solutions in urban politics. One of the key elements was a joint effort between the central and the local government to improve living conditions, particularly among children and adolescents. What was required, the report insisted, was to acknowledge the devastating impact of concentrated poverty. Consequently, a major aim in the subsequent action programme was to enhance neighbourhood social mixing. This programme ran from 1997 throughout 2006, and although it promoted a number of successful policies, it must in retrospect be judged as an ill-founded initiative. First, it did not rest on a proper analysis of neighbourhood effects. A comprehensive study of living conditions in Oslo (Hagen et al 1994) documented an accumulation of social problems in the area. This was, however, not a new situation, and it could in theory boil down to compositional effects. Second, the mid 1990s was a turning point in terms of housing market demand. House prices in Oslo had been climbing for some years due to economic recovery and job growth. Now, added by media and popular culture, a new 'urbanist' wave swept over the city. Oslo inner east soon emerged with a rescripted image, as a vibrant and attractive place to live. Young academics swarmed to the new urban 'frontier', first to renovated neighbourhoods in a particular district, Grünerløkka, later also to 'edgy' sites in the zone of transition. In other words, the stage was set for gentrification. The transformation of the social structure has proceeded rapidly, and so has the growth of new cultural landscapes.

The aggregate outcome of these changes is indeed a social mix. Oslo inner east has assumed an increasingly variegated character, with middle-class professionals, immigrant families, students and marginalized 'others' living side by side, often in the same quarters. One study (Haslum 2005) emphasizes that 'neighbouring' in this part of the city is inherently partial and reserved: people rub shoulders but don't interact across social and ethnic divisions.

A different dynamic has, unsurprisingly, emerged in the outer city. For decades, migration from the inner city split in two directions, one towards the eastern satellite towns and one towards the low-density western and northern suburbs. The latter flow has changed very little; it is still dominated by Norwegian middle-class households (Bråthen et al. 2007). The former flow, on the other hand, has become increasingly dominated by ethnic minorities.³ The satellite towns offer affordable apartments in green environments, which appear as a favourable alternative for minority families in the child-rearing stage. In general, the new pattern of in-migration follows an older division between stable and unstable neighbourhoods, with a larger influx in the latter case. Some places have seen a rapidly changing demography, driven partly by selective out-migration in the Norwegian population. The changes are remarkable even at a higher scale: in one township, Alna, the proportion of non-western immigrants grew from 20 per cent in 1998 to 38 per cent ten years later.

Partly as a reaction to the changing ethnic composition, and partly for other reasons, there is now an area programme in three suburban townships, covering some 130,000 inhabitants (Groruddalen). The programme replicates many of the initiatives of the inner east programme; free-day care for children, youth activity centres, language training, homework help, family counselling and, not the least, physical renovation of housing and public spaces. However, once again, while all of these initiatives may seem sensible, they do not rest on a tailor-made evidence base. The existence of neighbourhood effects is yet to be proved.

There is one more element in this picture. Going back to the 1960s and 70s, the outer city largely developed along social lines. A monotonous space shot up, with low-rise and high-rise blocks in the east and detached and semi-detached houses in the west/north. A more flexible design in urban policy and planning took root in the late 1970s, just before the construction of the last satellite town. From now on, the relationship between income inequality and socio-

³ This is not primarily a displacement from the gentrifying areas, but rather an adjustment to increasing income (Blom 2006).

economic segregation became more complicated. At least in some places, poor and rich came to live in closer proximity to one another (Wessel 2000).

The central concern here is fragmentation. Both the landscape and the population structure seem to gain diversity at a low geographical scale. This clearly complicates the basis for local action. One might speculate whether Oslo has introduced area-based policies in a context of declining neighbourhood effects.

3. Theoretical perspectives

Social theory emphasizes that children and adolescents are strongly affected by social environments. The neighbourhood is one such environment, but it is not the main focus of attention. It is, rather, an elusive and poorly understood part of the subject-matter (Pebley and Sastry 2004). The root of the problem, to our mind, lies in a combination of a flexible core concept, 'the neighbourhood', and causal complexity. A large number of mechanisms may produce neighbourhood disadvantage, some of which reflect population characteristics and some connections with the world outside the neighbourhood. These causal properties have been discussed in numerous reviews, so we will confine ourselves to a brief presentation. We make use of two main categories, internal social relations and external conditions.

Internal social relations point towards the issue of community and territory. This is a classic theme in urban research, and it draws on a combination of stereotype images and substantiated research. The involved mechanisms include (cf. Galster and Santiago 2006; Andersson et al. 2007):

- *Socialization*: norms, attitudes and behaviours are passed on through primary socialization at home and secondary socialization outside the home - in kindergartens, schools, neighbourhoods and leisure activities and organisations. Learning and socialisation are especially relevant for children and youths. The impact of *peer groups* and *role models* can be seen as versions of this approach. Peer group theory suggests that attitudes to school efforts, higher education and drugs etc. among youths, or a smaller group of youths, affect other youths at the same age. This is, in other words, a mechanism that relies on social requirements and the formations of subjective expectations. A simple association is often assumed: the greater the concentration of

like-minded individuals, the stronger the 'normative climate'. The norms may have a positive or a negative character, and may alleviate or enhance poverty. The basis for positive learning is improved if local people with a successful professional career or with a strong and positive engagement for the local community perform as good examples, i.e. as someone to emulate.

- *Social networks*: socialization takes place inside social networks, which are characterized by communication and exchange of information and resources between individuals. A lack of networks, or marginalized networks, may limit the possibilities to succeed in the competition for jobs, housing and education. There is also a 'monitoring and control' effect involved: dense and overlapping networks among children, adolescents and adults may improve the basis for norm-guided behaviour.
- *Relative deprivation*: The way individuals experience their own living conditions may reflect feelings and expectations that emerge from particular frames of reference, either past experiences or co-existing social groups. This mechanism typically highlights how disadvantaged groups compare themselves with more affluent groups of neighbours. Perceived welfare may be worst for vulnerable groups who live in areas where prosperous groups form the majority.

External conditions are various relationships between deprived neighbourhoods and the surrounding environments (cf. Pebley and Sastry 2004; ; Galster and Santiago 2006; Andersson et al. 2007):

- *Place stigmatization* is a negative label that sustains or reinforces invisible borders between people according to their place of residence. It is an unmanageable mechanism that tends to rest on widespread representations, often related to population characteristics. Its potential effects are twofold: it may influence the self-esteem of the residents and their place attachment, and/or it may shape reactions from the outside world (red-lining from banks and employers). Trickle-down results are decreasing investments, decreasing house prices and increasing social filtering.
- *'Spatial mismatch'*: Some neighbourhoods may have restricted access to appropriate jobs. This situation typically arises when work disappears through closure or relocation.
- *Child and family-related institutions*: schools, child care providers, public libraries and recreational programmes/organisations may differ in quality between different

urban districts, and the actual location within each district may influence access for the residents. These institutions play a vital role in socialization, and, beyond that, in the production of local welfare.

Place stigmatization has been documented for Oslo (Hansen and Brattbakk 2005), and might be relevant for our study. Spatial mismatch, on the other hand, is both unresearched and irrelevant. Oslo is a well-connected city, particularly along the major transport corridors. It is also a city with a high motor vehicle density, which shapes people's activity spaces. Above all, there is no intuitive connection between municipal services and the neighbourhood composition. A progressive redistribution system secures additional budget resources in poor townships. The pro-rata budget for child- and family-related institutions may differ enormously, for instance from 52 per cent below the average in the richest township to 65 per cent above the average in the poorest township (Oslo kommune 2009). This redistribution adds to the general effects of state-based cash benefits and the state's involvement in education, health and housing.

Neighbourhood effects are therefore, as we perceive it, largely dependent on internal social relations. We expect these effects to be quite small.

4. Data and empirical approach

We focus on adolescent development because a number of earlier studies suggest that neighbourhood effects will have the strongest effect on children and young people. The study has a longitudinal approach, focuses on the entire urban space and includes information about the whole population of Oslo. The dataset is register-based and contains a large number of demographic and socioeconomic variables from a range of statistical registers (demography/population, education, income and social benefits). The city of Oslo is subdivided into neighbourhoods at a low geographical scale, and the whole population makes the basis for a classification of the socioeconomic character of the city's neighbourhoods. The paper focuses on a cohort born in 1976 and 1977 who lived in the defined neighbourhoods in Oslo for a 5-year period, from 14 throughout 18 years of age. We use three sets of indicators: educational level, market income and employment/unemployment. Educational level and market income are measured at age 28 and 29 years. Employment/unemployment is measured at age 21, 25, 28 and 29 years. Individual control variables relate to gender, ethnicity, family

status and family background (parents socioeconomic status) during childhood and adolescence. The analysis is based on multi-level modeling.

Geographical levels

The whole municipality of Oslo is subdivided into 92 neighbourhoods. This geographical level has been constructed by expert-bureaucrats in the municipal administration of Oslo, supplemented by the local urban district administrations. The construction is a bi-product of the Groruddalen programme.

The criteria for the subdivision are several: coherent area coverage, common physical characteristics, fairly uniform population size (a threshold of 3 000 persons), distinctive place names and collective images. The final result reflects a compromise between the different single criteria. Most of the defined neighbourhoods also have a small distinct commercial centre, and a lot of them are more or less concurrent with catchment areas for the primary and secondary schools. Important also, the neighbourhoods are based on census enumeration districts (EDs), which is the lowest geographical level for population statistics. The 15 administrative urban districts of Oslo consist of 4 to 8 neighbourhoods, and 23 to 44 EDs. The neighbourhoods, in turn, have 3 to 13 EDs.

Population characteristics

The youth cohorts born in 1976 and 1977 include 8417 persons, as registered in one or more of the following years; 1990/1991, 1992/1993, 1994/1995, 1997/1998, 2001/2002, 2004/2005 and 2005/2006. This number is reduced to 5516 when we focus on the youths who lived in the same neighbourhood over a five year period, from they were 14 to 18 years old (in the years 1990/1991, 1992/1993 and 1994/1995). Broken down, the number varies from seven youths in an inner city neighbourhood to 159 in a western suburban neighbourhood, with 60 as the mean value. This variation is taken into account by the statistical programme we use, MIwIN.⁴

The total workforce (18 to 67 years) amounted to 311 247 persons in 1993, varying from 1177 to 5845 at the neighbourhood level. The mean size was 3 383 persons. This population is the working age neighbours of the youth cohorts born in 1976 and 1977, and it is information

⁴ MIwIN 2.10 is a software package for fitting multilevel models. Takes into account the challenge of varying numbers of youths in the neighbourhoods by the “shrinkage factor” and by confidence intervals sensitive to the the number of youths in the area.

about them and their composition that is the basis of the area variables (level 2 variables) in our study. For some variables the whole group is used and for others more limited sections, based on standard age-spans.

Dependent variables

Our dependent variables reflect different dimensions of socio-economic status, social exclusion and deprivation, measured at the age of 29 years. We use three sets of indicators: educational attainment, income and employment/unemployment.

Educational attainment measures completion of a college or university degree (at least bachelor). The variable is constructed as a binary, and we use a logistic multilevel regression model. 5493 youths born in 1976 and 1977 are included in this analysis. 49 per cent of them had graduated from a college or university.

Market income includes wage, income from self-employment and capital income (property and investments), and is measured as an average for 2004 and 2005. No kinds of transfers (positive or negative) or tax reductions are included, in order to capture pure benefits of education and labour market participation. The dependent variable is continuous, and we have removed a few outliers at the top end of the distribution. 3064 youths born in 1976 and 1977 are included in this analysis. The technique is multilevel OLS regression.

Labour market position relates to employment/unemployment. We use, as noted, four measurement points. Each extension therefore measures an increasing distance to the period when the neighbourhood may have affected the youths. The dependent variable is binary, and we use a logistic multilevel regression model.

Independent variables

The independent variables of special interest in this study are the variables at the neighbourhood level (level 2). The individual level (level 1) variables are only interesting as control variables.

Explanatory Variables: Level 1 – individual characteristics

Socioeconomic status (SES) of the parents includes education (father and mother), income, employment status and reception of welfare benefits (social assistance, disability pension,

rehabilitation benefits and transition benefits for single mothers). Parents' age and civil status are also included.

Demographic characteristics of the youths include sex, ethnic background and number of siblings. 13 percent of the youths are born by non-western immigrants or have immigrated from non-western countries themselves.

Explanatory variables: Level 2 - neighbourhood characteristics

We use six different socio-economic indicators at the neighbourhood level from 1993:

1. share of individuals with a low level of education, defined as primary or lower secondary school (40-49 year), 2. low income, defined as annual market income below 100 000 Norwegian kroner in 1993 (40-59 year, male) 3. reception of unemployment benefit (18 to 66 year), 4. reception of disability pension (18-49 year), 5. reception of transitional single parent benefit (18-39 year), 6. reception of social assistance (i.e. economic aid for adjusting to difficult living conditions) (18-66 year).

These variables are introduced both separately and as an index. The index is constructed by ranking the values of the six indicators separately for the 92 neighbourhoods, and giving them a ranked value (score) from 1 (best) to 92 (worst). The index represents the mean ranking score for all six indicators. The 'best' area with the lowest level of deprivation got a mean score of 4, whilst the 'worst' area with the highest level of deprivation got a mean score of 87,2.

We also introduce reception of rehabilitation benefits and ethnic minority background as additional control variables. Reception rehabilitation benefit might be included in the index at a later stage.

5. Results

Market income

We start by analysing the impact of neighbourhood deprivation on individual income. One set of results, at level 2, explores the amount of variation between neighbourhoods relative to variation within neighbourhoods. Figure 1 shows the distribution of unconditioned residuals and their confidence intervals across all 92 neighbourhoods. We observe here a fairly weak

gradient, which is compressed at the bottom and extended at the top. This crude model is statistically significant and the variation between neighbourhoods explains 2.7 percent of the total variance in market income.

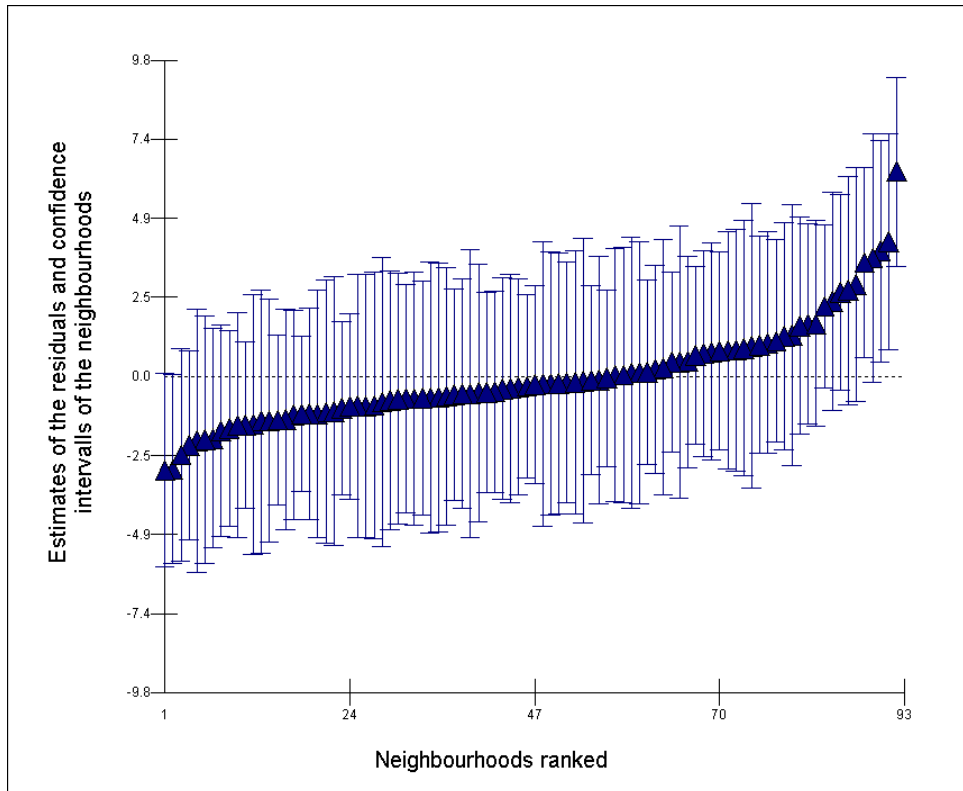


Figure 1. Neighbourhood level residuals for market income. Variance components model

Table 1. Effects of neighbourhood characteristics on market income.

Neighbourhood variables (level 2)	A Models		B Models	
	Coefficients	S.E.	Coefficients	S.E.
Share of people in the neighbourhood:				
low score on neighbourhood disadvantage index	-0.091	0.012	-0,049	0,014
- disability pension (<i>part of index</i>)	-1.375	0.251	-0,659	0,248
- unemployed (<i>part of index</i>)	-1.028	0.155	-0,617	0,177
- social assistance (<i>part of index</i>)	-0.410	0.070	-0,22	0,076
- transitional benefits for single parents (<i>part of index</i>)	-0.665	0.089	-0,347	0,098
- low level of education (<i>part of index</i>)	-0.200	0.027	-0,116	0,031
- low level of income (<i>part of index</i>)	-0.163	0.032	-0,097	0,036
rehabilitation benefits	-1.453	0.219	-0,758	0,226
ethnic minorities (non-western)	-0.235	0.045	-0,111	0,046

“A Models”: nine models where the nine neighbourhood variables are included one at a time.

“B Models”: nine models where individual and family variables (see Appendix) are included, and where the nine neighbourhood variables are introduced one at a time.

Results in bold are significant on a 5 percent level.

Estimation procedures: Marginal quasi-likelihood (MQL) and 1st order.

A follow-up analysis (“A Models” in Table 1) of the six neighbourhood indicators and the ensuing deprivation index yields significant but small effects. Much of the same applies to “B Models” in Table 1, which introduces a control for demographic and social background. Here, the effects are reduced to half, but again, all effects are significant at a 5 per cent level. This confirms our expectation: a high level of disadvantage during adolescence is associated with a low income level when people reach their late twenties. The shares of disability pensioners and jobless people are the two single indicators with the strongest effect; stronger than the deprivation index. We also observe that an indicator for rehabilitation benefits gives a higher value than all six indicators that were included in the index. Thus, we might need to adjust the content of the index. It is comforting, however, that the crude between-neighbourhood effect (Figure 1) is reduced and becomes insignificant after introduction of each and every variable. This suggests that neighbourhood deprivation exerts a real, lagged effect on market income. (references to be added: European comparison).

Educational level

Next, we look at educational level, more specifically the proportion of people with a university or college education (at least a bachelor degree). Figure 2 reveals a much steeper gradient than Figure 1. To reiterate, this is an unconditioned differential between neighbourhoods (level 2 variance) before any explaining variables are introduced. The spread amounts to 15.5 percent of total variance, which is a non-trivial effect (references to be added: European comparison).

Table 2 shows logistic regression results for the neighbourhood variables in nine models where the neighbourhood variables are introduced alone, one at a time (“A Models”), and nine models where a additionally set of individual variables are introduced (“B Models”). All neighbourhood effects are significant, but again, sharply reduced when we utilize the entire dataset. The effects are about divided in half when the individual control variables are included in the model.

The more detailed picture of single indicators is quite similar to the findings in Table 1. We find the strongest effects for reception of disability pension, rehabilitation benefits and unemployment.

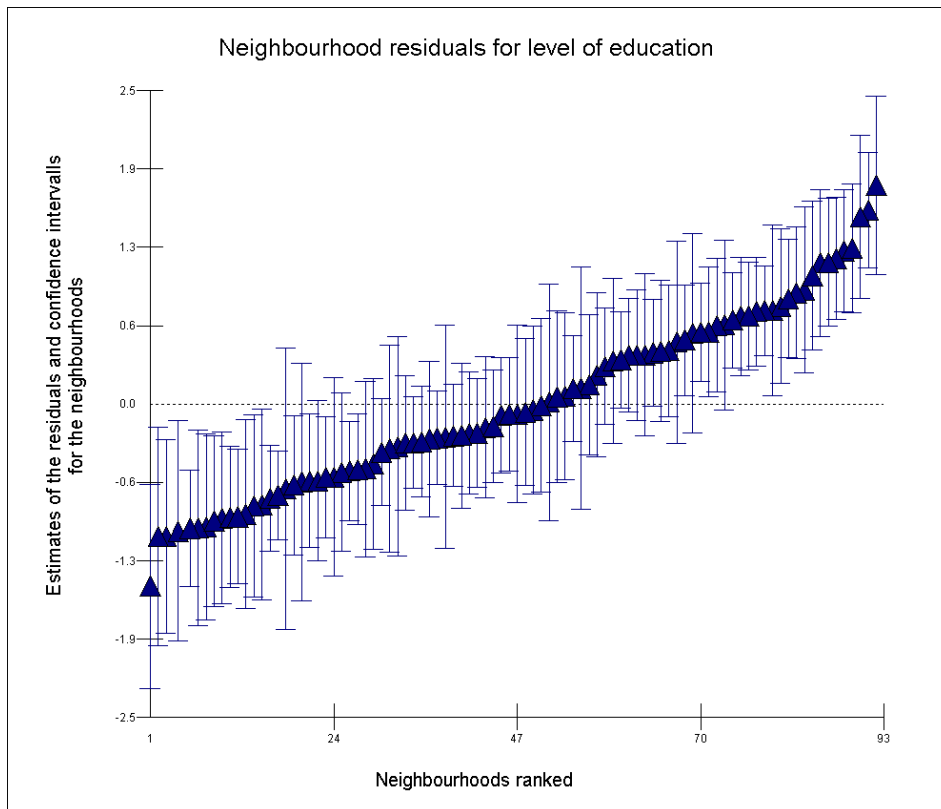


Figure 2. Neighbourhood level residuals for high levels of education. Variance components model

Table 2. Effects of neighbourhood characteristics on high level of education.

Neighbourhood variables (level 2)	A Models		B Models	
	Coefficients	S.E.	Coefficients	S.E.
Share of people in the neighbourhood:				
low score on neighbourhood disadvantage index	-0.030	0.002	-0,013	0,002
- disability pension (<i>part of index</i>)	-0.485	0.047	-0,203	0,032
- unemployed (<i>part of index</i>)	-0.344	0.024	-0,165	0,022
- social assistance (<i>part of index</i>)	-0.143	0.011	-0,069	0,01
- transitional benefits for single parents (<i>part of index</i>)	-0.205	0.018	-0,085	0,013
- low level of education (<i>part of index</i>)	-0.068	0.003	-0,032	0,004
- low level of income (<i>part of index</i>)	-0.056	0.005	-0,026	0,005
rehabilitation benefits	-0.481	0.038	-0,197	0,029
ethnic minorities (non-western)	-0.078	0.009	-0,035	0,006

Note:

“A Models”: nine models where the nine neighbourhood variables are included one at a time.

“B Models”: nine models where individual and family variables (see Appendix) are included, and where the nine neighbourhood variables are introduced one at a time.

Results in bold are significant on a 5 percent level.

Estimation procedures: Penalized quasi-likelihood (PQL) and 2nd order.

(Comments to be added: income and education)

(Unemployment)

(Analysis to be added)

6. Discussion

We have established that differences between neighbourhoods account for a substantial proportion of the variation in educational attainment, and a small proportion of the variation in market income. One plausible reason for this difference is that we measure income at a quite early stage in the lifespan. The income level of young Norwegian adults is much less differentiated than for older ones. Youths with a low level of education start their working career earlier, and many blue collar jobs are quite well-paid. Young academics, by comparison, have studied for several years and are not fully compensated for this in the first years of their career. There is also a certain risk in academic education: the premium for additional competence may vary a lot. The larger variation in educational attainment may reflect the fact that most young people have completed their education in their 29th year.

The extended analyses, conducted at two statistical levels, suggest that neighbourhood deprivation has a small but significant long-term effect on the future life conditions of adolescents.

This study is among the first to investigate and indicate the existence of neighbourhood effects in Oslo. A pertinent question is: how large are these effects? It is a hard task to make direct comparisons between studies in different countries. The national context, the geographical scale, demarcations of neighbourhoods, methods and variables vary immensely, so one cannot compare at a detailed level. At a crude level, however, our preliminary impression is that our results resemble those in the Swedish studies (cf. Andersson 2004, Andersson et al 2007).

Our results further suggest that the ethnic dimension is of some interest, although it is not the most crucial one. Indicators expressing individuals' attachment to the labour market (unemployment or disability, social or health problems) seem to be of greater importance. We need, however, more nuanced analyses to conclude on this matter.

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Appendix

Table 3. Regression results for individual control variables (level 1).

Parameter	Coefficient	S.E.	t
Intercept	24,49	3,248	7,54
Non-Western immigrant	0,916	1,53	0,60
Sex (male)	5,488	0,557	9,85
Fathers education	1,236	0,67	1,84
Mothers education	-0,989	0,679	-1,46
No. of siblings	0,213	0,337	0,63
Fathers income	0,041	0,007	5,86
Mothers income	0	0	0,00
Unemployed father	0,138	1,699	0,08
Unemployed mother	2,036	1,869	1,09
Fathers social assistance	-0,888	1,79	-0,50
Mothers social assistance	-1,914	2,01	-0,95
Disability pension - father	-0,235	1,871	-0,13
Disability pension - mother	0,748	1,593	0,47
Rehabilitation benefits - father	0,377	1,644	0,23
Rehabilitation benefits - mother	2,726	1,389	1,96
Transition benefits - single mothers	-0,182	2,9	-0,06
Single mother	-0,204	1,023	-0,20
Single father	0,586	1,109	0,53
Fathers age	-0,042	0,08	-0,53
Mothers age	0,185	0,092	2,01

Note:

Results shown for model with market income as dependent variable and for disadvantage neighbourhood index as neighbourhood variable (level 2).

Results in bold are significant on a 5 percent level.

Estimation procedures: Marginal quasi-likelihood (MQL) and 1st order.