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Published in:
Cambridge Journal of Regions, Economy and Society

DOI:
[10.1093/cjres/rsw008](https://doi.org/10.1093/cjres/rsw008)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Ponds, R., Marlet, G., van Woerkens, C., & Garretsen, H. (2016). Taxi drivers with a PhD: trickle down or crowding-out for lower educated workers in Dutch cities? *Cambridge Journal of Regions, Economy and Society*, 9(2), 405-422. <https://doi.org/10.1093/cjres/rsw008>

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Taxi drivers with a PhD: trickle down or crowding-out for lower educated workers in Dutch cities?

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Received on August 3, 2015; accepted on April 5, 2016

Attracting higher educated workers is often seen as a means to stimulate employment in cities in general, leading to lower unemployment for the lower educated, the ‘trickle-down’ effect. However, lower educated workers may also experience crowding-out effects if these higher educated inhabitants accept jobs below their educational level. Based on an empirical analysis of a cross-section of Dutch cities, we find that these crowding-out effects indeed seem to occur. This implies that a trickle-down strategy cannot be seen as a panacea by urban policymakers for the problem of high unemployment amongst lower educated workers.

Keywords: unemployment, labour market, trickle down, crowding-out, lower educated workers, urban economics

JEL Classifications: J21, J24, J64, R23

Introduction

Many cities and regions across Europe struggle with the issue of relatively high and persistent unemployment among lower educated workers (Kline and Moretti, 2013; López-Bazo and Motellón, 2013; Niebuhr et al., 2012; Overman and Puga, 2002). As large differences in labour market outcomes are often considered economically as well as socially undesirable, policies have been introduced in many countries to reduce unemployment differences (Criscuolo et al., 2012). Human capital is increasingly considered to be one of the key factors for employment

growth in cities and regions (Glaeser et al., 1992, 2004; Marlet and van Woerkens, 2007; Shapiro, 2006). Consequently, attracting higher educated people to a city or region is one of the major policy options that has been widely adopted to decrease unemployment among the low-skilled.

The (assumed) mechanism behind this policy consists of two subsequent steps: (i) attracting more higher educated workers leads to an additional demand for labour in jobs requiring lower education, and (ii) this employment growth in jobs requiring lower education leads to a decline of unemployment among the lower

educated. If this ‘trickle down’ effect is strong enough, attracting higher educated people can be considered as a policy measure that would address the issue of high levels of unemployed of lower educated in a structural way. Indeed, several studies show that an increase in the share and number of higher educated inhabitants leads to a (higher) growth of jobs requiring a lower level of education (Mazzolari and Ragusa, 2013; Moretti 2012). Consequently, the first step of this mechanism seems to be observed in many countries, including The Netherlands (Marlet et al., 2015). However, the second step has been less well investigated, but seems to be at least of equal importance as the first step to be able to draw conclusions on the usefulness of such a policy.

Figure 1 shows the correlation between higher educated and the share of unemployment of lower educated for Dutch cities and (larger) municipalities. If the trickle-down effect occurs a negative correlation is to be expected—the higher the share of higher educated, the lower the unemployment of lower educated. However, this is clearly not the case. This is worrisome, as many cities in the

Netherlands try to tackle high unemployment of the lower educated, considering attracting the higher educated as one of the key elements—besides, for example, investment in additional schooling—of their strategy.

One of the reasons that an increasing number of the higher educated does not lead to a lower level of unemployment of the lower educated might be the presence of ‘crowding-out’ effects. Crowding-out refers in this context to the phenomenon that the higher educated inhabitants in a city accept jobs below their educational level, thereby reducing the number of jobs ‘left’ for lower educated.

The key issue is therefore whether having more higher educated workers in a city has a mainly complementary effect (trickle down) or a substitution effect (crowding-out) on the job opportunities for, and unemployment rate of, the lower educated. Whereas the impact on employment in jobs requiring a lower level of education is well researched, less is known about the possible crowding-out on unemployment for lower educated. As this might be an important reason why the relation between the higher educated and unemployment of

Figure 1. Share of the higher educated (15–64 years) and unemployment of the lower educated in Dutch municipalities in 2013.

Source: own calculations, based on CBS.

the lower educated is less clear-cut than often assumed, this study adds to the existing literature by testing the possible presence of such substitution effects in cities and municipalities in the Netherlands. As this in fact turns out to be the case, an interesting additional research question is the question what then drives local and regional differences in the level of over-education.

This article is structured as follows: in the next section, there is a short overview of the literature on the impact of higher educated workers on the (un)employment of the lower educated, and local and regional differences in over-education. In the following section, the empirical strategy and the data is discussed. In the next session, the results of the empirical analyses on the relationship between over-education and crowding-out effects are presented. The next session provides an initial analysis of the determinants of local differences in crowding-out and the last section concludes.

Higher educated workers, over-education and unemployment of lower educated workers

An increase in the number and share of the higher educated provides, at least theoretically, two main types of positive effects for the lower educated: productivity gains for lower educated people and employment growth in industries with a large share of jobs that require no or a low level of education. The productivity effects are typically related to the human capital externalities of higher educated workers: by working in a firm or in the same city, knowledge and skills might be (partly) transferred to lower educated people leading to a higher productivity (see [Acemoglu, 1996](#); [Ciccone and Peri, 2006](#); [Canton, 2009](#); [Moretti, 2004](#)).

The employment effects are often found to be the result from consumption effects of higher educated inhabitants.¹ A larger share of the higher educated may lead to an increase in the demand for workers with no or a low level

of education, due to a higher demand for local consumer services such as restaurants, bars, retail and personal services (e.g. hairdressers, household services). Since a large part of the jobs in these industries require no or a low level of education, cities with a larger share of the higher educated may experience, *ceteris paribus*, a higher growth of jobs for the lower educated. Indeed, several studies have found empirical evidence for this relation ([Kaplanis, 2010](#); [Manning, 2004](#); [Mazzolari and Ragusa, 2013](#); and for the Netherlands: [Marlet et al., 2015](#)). As a consequence, regions and cities that are able to attract higher educated inhabitants and workers are likely to have more labour market opportunities for the lower educated (see also [Moretti, 2012](#)), leading to lower unemployment among the lower educated. Due to these trickle-down effects, attracting higher educated inhabitants could be a way to decrease the level of unemployment among lower educated workers in a structural way. As a result, migration patterns of the higher educated may lead to increasing disparities of employment growth and unemployment between cities and regions in a country ([Granato et al., 2015](#)).

However, at the same time, an increase of the number of low skilled *jobs* does not automatically have to lead to an equally lower level of unemployment, for a number of reasons. One reason, and this is the focus of this study, is the possibility that an increase in the number of the higher educated may lead to the crowding-out of low skilled workers. Crowding-out refers in this context to over-educated workers—workers with a higher or medium level of education working in jobs requiring no or a low level of education. If higher (and medium level) educated workers face relatively a small number of job opportunities at their own ‘educational level’ they might apply for jobs requiring no or a low level education. If, from an employer perspective, these applicants are more attractive employees it is more likely that higher (and medium) educated will be preferred to applicants with no or a lower level of education.

Besides a ‘direct’ crowding-out effect, higher educated workers may also cause an ‘indirect’ crowding-out effect if they accept a job requiring a ‘medium’ level of education, pushing medium educated workers towards jobs requiring no or a low level of education. This could be one of the reasons why the correlation between the share of the higher educated and the unemployment of the lower educated as shown in Figure 1 is weak at best.

The issue of over-education has been given much attention in relation to the job satisfaction or wages of over-educated workers (McGuinness, 2006 for an overview) or national labour market outcomes (Åberg, 2003). It is often concluded that over-education has potential negative effects for the over-educated themselves, for firms employing over-educated employees and for the (national) economy in general (see for an overview Groot and Maassen van den Brink, 2000; Leuven and Oosterbeek, 2011; McGuinness, 2006). Much less is known about the possible role of regional differences in over-education in relation to local and regional differences in labour market outcomes for lower educated.

This is remarkable, as Büchel and van Ham (2003) show, for example, that the risk of being over-educated is related (amongst other factors) to regional differences in employment opportunities. Besides job opportunities, the age structure of the labour force is relevant as well, as several studies show that younger people are more likely to accept (temporarily) a job with a required educational level below their educational level (Hensen et al., 2009). Several studies show that lower levels of job opportunities (at one’s own educational level) may form an important driver for the migration of the higher (and to a lesser extent, medium) educated (Iammarino and Marinelli, 2011; Quinn and Rubb, 2005; Venhorst, 2012). Despite this fact, a spatial mismatch between the educational level of workers and the available jobs by required educational levels remains present in most countries. One of the

underlying reasons for such a mismatch might be found in local and regional differences in the supply of amenities. Cities and regions that are characterized by a broad supply of amenities grow, *ceteris paribus*, faster and attract a higher share of the higher educated (Glaeser et al., 2001, 2004). Amenity-rich cities and regions with few job opportunities may attract (or keep) higher and/or medium educated workers who choose to enjoy the presence of a high level of amenities at the cost of working in a job below their educational level.² So several reasons may exist why there are local and regional differences in the level of over-education.

The presence of (a large number) of over-educated workers does not in itself automatically have to lead to negative labour market outcomes for the lower educated. In cities and regions with abundant employment opportunities for the lower educated, a higher share of the over-educated does not have to lead to a crowding-out effect. Empirically, this would imply that the number of over-educated workers may bear no relation with unemployment rates of the lower educated. If over-education does lead to crowding-out-effects, a (positive) relation between a higher level of the over-educated and the unemployment rate of the lower educated would be expected.

Besides the (possible) effects of crowding-out, several other factors influence the significance of possible trickle-down effects of higher educated inhabitants in a city. First, labour markets are not bounded by city or municipality borders but are regional rather than local. As a result, it is not so much the number of jobs requiring no or a low level of education within a city, but the total number of jobs that can be accessed from a specific place, that is relevant from the perspective of somebody looking for a job. Empirical studies that seek to explain local and regional differences in unemployment (in general, or for the lower educated in particular) model the demand side often therefore by job accessibility: the number of jobs (and/or

vacancies) that can be accessed from a specific place of residence (see for example [Åslund et al., 2010](#); [Brueckner and Zenou, 2003](#)). Empirically, job accessibility is typically specified using a distance decay function that discounts jobs further away to take into account commuting costs and a declining search efficiency with distance.

Second, the chance for lower educated workers getting employed does not only depend on the number of jobs (or vacancies) that require no or a low level of education but also on the level of *competition* for these jobs from other of the lower educated. In empirical studies, competition for these jobs is often included by dividing the number of accessible jobs by the number of potential workers that are in the market for the same jobs (or this is added as an additional variable), leading to an indicator for job opportunities. Third, the *composition* of the labour force matters. Typically variables like age, educational level and household characteristics are therefore used in empirical studies ([Elhorst, 2003](#)). Age can matter, since for a large number of industries wages are set in national ‘collective’ labour agreements. The minimum salary to be paid varies with age, and older people have a relatively higher minimum salary. Although older people might also be more productive as they benefit from acquired skills due to their work experience, employers in specific industries might favour younger people as their minimum wages are lower, depending on the specific job. Household characteristics are relevant, as single parents are for example more likely to be unemployed than other type of households due to difficulties of combining work with the care for children.

Empirical strategy and data

In order to test if over-educated workers might indeed cause crowding-out effects, cross-sectional regression models are estimated at the

level of municipalities in the Netherlands for the year 2013. These models aim to explain local differences in the unemployment levels of the lower educated, out of the level of over-education and control variables, to take into account the above-mentioned factors.

The data is from the Dutch Labour Force Survey³ (EBB) of the National Bureau of Statistics of the Netherlands (CBS). This survey is performed annually, and includes each year around 90,000 individuals, using sample stratification with municipalities as strata. Information is gathered about, amongst other things, education level, job status (employed, unemployed or not able/willing to work), current occupation (if employed) and the location of work and the residential location. Within this survey five levels of education are distinguished, ranging from elementary to academic.⁴ Based on this survey, the National Bureau of Statistics publishes several aggregated indicators at the level of municipalities, such as the share of the higher educated in the labour force and the unemployment of the lower educated, which are considered to be representative for the labour force population as whole.⁵ Three-year averages are often used to take into account possible measurement errors due to small sample sizes in smaller municipalities. Moreover, the five different educational levels are typically condensed into three (low, medium, high).

Using the microdata from this survey, it is also possible to construct additional variables at the level of municipalities. For this study, the following variables have been constructed: unemployment of the lower educated, job opportunities for the lower educated, the crowding-out indicator and the specific characteristics of the lower educated labour force. In order to minimize possible measurement errors, 3 and 5-year averages were used. Below we will discuss the different variables and pay specific attention to the indicator that measures over-education.

Unemployment of the lower educated

Using information for the place of residence, employment status and education level, the unemployment levels of the lower educated labour force (all those aged between 15 and 64 years and willing and able to work⁶) at the level of municipalities have been calculated

for 2013. Three-year averages are used to minimize the effect of small-sample sizes in smaller municipalities. Figure 2 shows a map with regional differences in the level of unemployment of the lower educated in 2013. Data is shown for the 50 largest Dutch cities (demarcated by thick black lines) and their surrounding

Figure 2. Regional differences in unemployment of the lower educated.
Source: own calculations, based on CBS.

labour market regions⁷ in order to reflect the general regional patterns. Figure 2 shows that there are large differences in unemployment levels of the lower educated between cities and regions. The 50 largest cities, the region around Rotterdam, and the Northern regions have the largest unemployment amongst the lower educated.

Job opportunities for the lower educated

The labour market survey distinguishes between 1,211 occupations. Each occupation is classified by the National Bureau of Statistics according to its specific educational requirements, reflected by the minimum required educational level.⁸ Jobs that consist of occupations that require no or a low educational level are considered ‘jobs for lower educated’. Using information on the specific occupation of respondents and the place of work, the share of jobs requiring a low, medium or high level of education at the level of municipalities is calculated (three-year averages). The absolute number of jobs by required educational level at the level of municipalities is calculated by multiplying these shares with the total number of jobs.

As a next step, this data is used to calculate the market potential of all jobs requiring no or a low level of education for each municipality. Market potentials take into account the fact that labour markets are regional rather than local. For each municipality, the total numbers of jobs that are ‘accessible’ is calculated using a function reflecting the ‘willingness to travel for a job’ for the lower educated. Figure 3 shows the assumed willingness to spend time on travelling to work for the lower educated, which is monotonically decreasing with travel time⁹ and based on insights from Geurs and Ritsema van Eck (2001).

The number of accessible jobs is calculated as the total sum of jobs that can be reached from a municipality, using the function in Figure 3 to discount jobs further away. More formally, this is done with the following formula:

$$\tilde{J}_i = \sum_j w(0.5 \times t_{ij}^{\text{morning}} + 0.5 \times t_{ji}^{\text{evening}}) \times J_j.$$

In this formula t_{ij} is the travel time from location i to j , $w(t)$ is the share of lower educated workers that is willing to accept t as the time needed to get to work and J_j is the number of jobs in location j . As travel time is measured including congestion, the travel time in the morning (from i to j) may differ in the evening (from j to i), which is taken into account by taking the average travel time of both moments.

To take competition for these jobs into account as well, the number of potential competitors (lower educated workers) is calculated in a similar way and used as a denominator. The resulting variable is the ratio of accessible jobs and the potential competitors for these jobs and gives an indication for the job opportunities for the lower educated in each municipality and region. This indicator reflects the relevant regional labour market conditions for lower educated. Figure 4 shows a map of regional differences of job opportunities for the lower educated.

Indicator for over-education

The indicator for over-education is constructed using the ‘formal’ educational requirements of each type of job and the actual levels of education of those occupied in each type of job. If the level of education required for a job is lower than the actual educational level of the person having this job, this person is considered over-educated. By aggregating the number of workers (at the place of work) with a high or medium level of education that have a job that (formally) requires no or a low level of education, the level of over-education for each municipality is derived.¹⁰

As the sample size to construct indicators at the level of municipalities becomes rather small, there is a risk that observed differences between cities and municipalities in the level of over-education may reflect measurement errors rather than actual differences, even if

Figure 3. *Willingness to travel to work times, in minutes (share of the lower educated labour force).*

three-year averages are used. Rather than using an average over a larger number of years, a more reliable indicator of over-education is calculated using trend-estimations using ‘raw’ data from the year 1999 onwards. For each municipality, the indicator has been calculated for each year between 1999 and 2013, leading to time-series for each municipality. In the next step, the trend in this value has been estimated using the average values for each year for each municipality.¹¹ Based on the trend estimation, the estimated value for 2013 has been used (rather than the actual value of 2013) as the indicator for over-education. By doing so, the effect of measurement errors in a specific year is dampened, and in our opinion this provides a more reliable estimation of the number of jobs in each municipality requiring no or low education that are fulfilled by workers with a high or medium level of education. This number is divided by the total number of the lower educated living within a municipality. The indicator for over-education that is used to test for crowding-out effects is therefore the number of jobs requiring no or a low level of education fulfilled by the medium and higher educated as a percentage of all lower educated workers. Figure 5 shows that the level of the indicator

varies between different cities and is correlated with the share of the higher educated (see also Section 5).

In order to test empirically for the presence of crowding-out effects, it is necessary to take into account the fact that possible crowding-out effects are not limited to the level of municipalities. Crowding-out in a neighbouring municipality influences the labour market situation for the lower educated in a similar way as crowding-out in his or her own municipality. In order to take this into account, the above-mentioned distance decay function is used to calculate the total number of accessible jobs requiring no or a low level of education that are fulfilled by the higher or medium level educated for each municipality. This has the additional advantage of ‘smoothing out’ remaining measurement errors in the levels of over-education.¹² This number is divided by the total number of the lower educated that are (potentially) in the market for these jobs. As a result, the indicator for over-education for a given location that is used in our estimations to test for crowding-out measures the total number of accessible jobs requiring a low education level that are fulfilled by over-educated workers relative to the total number of the lower educated that could potentially fulfill these jobs.

Job opportunities lower educated, 2013

Figure 4. Job opportunities for the lower educated.
Source: own calculations, based on CBS.

Controlling for heterogeneity of the labour force

Besides job opportunities and crowding-out, supply side characteristics are likely to influence unemployment levels of the lower educated as well. As we are interested in the unemployment of the lower educated, these variables reflect

spatial differences in the ‘supply’ of the lower educated, and control for the heterogeneity of the lower educated workforce between cities. All these variables are from the Dutch Labour Force Survey from the National Bureau of Statistics as well. First the share of the lowest educated (having finished elementary school

Figure 5. Crowding-out and the share of the higher educated.
Source: own calculations, based on CBS.

only) in the total number of lower educated is included, to control for possible differences in the composition of the lower educated labour force. Second, *age* is controlled for by including the share of different age cohorts in the lower educated labour force. Third, the *share of non-western non-natives* (in the lower educated labour force) is included, as is the *share of single parent families* (as % of all households). Both variables are expected to have a positive relation with levels of unemployment of the lower educated.

Finally, the share of *university and polytechnic students*, the share of *high school students* (aged 15 year or older) and the *share of social housing* is included. The share of university and polytechnic students and the share of high school students are used as additional control variables. Many students (who are formally medium or low educated but not yet part of the labour force) have a side-job (that might require no or a low level of education), often for less than 12 hours a week. As a job is defined as working at least 12 hours a week, this does not show up in the data of the Labour Force Survey

(EBB). However, three or more students can collectively fulfill one ‘full time’ job for a lower educated person and consequently lead to additional crowding-out effects. The share of social housing reflects the possible impact of relatively low housing cost (as opposed to living in a house with a mortgage) which might lower the financial incentive to work. Table 1 shows the descriptive statistics.

Estimation results

To summarize, the observed differences in unemployment of the lower educated between cities are modelled as a function of the (municipality-specific) ratio between the regional demand for and regional supply of labour (‘job opportunities’ indicator), the (municipality-specific) regional level of over-education and various characteristics of the (lower educated) labour force at the municipality level. A set of four OLS models has been estimated on a cross-section of 243 Dutch municipalities with data for 2013. The first model includes indicators for job opportunities, crowding-out, the

Table 1. Descriptive statistics (unemployment 2013, all other variables 2012).

	Mean	Median	Maximum	Minimum	Std. Dev.
Unemployment, lower educated	0.08	0.08	0.18	0.001	0.03
Job opportunities, lower educated	1.20	1.20	1.31	1.07	0.04
Crowding-out	0.56	0.56	0.70	0.48	0.03
Share of lowest educated (% of all lower educated)	0.20	0.20	0.33	0.08	0.05
% Non-western foreigners in lower educated labour force	0.10	0.08	0.47	0.01	0.08
% 15–24 years in lower educated labour force	0.18	0.18	0.32	0.09	0.03
% 25–34 years in lower educated labour force	0.14	0.14	0.25	0.06	0.03
% 35–44 years in lower educated labour force	0.23	0.23	0.34	0.11	0.04
% 55–64 years in lower educated labour force	0.17	0.17	0.30	0.06	0.04
% Single-parent family (as share of households)	0.06	0.06	0.12	0.04	0.01
% Social housing	0.29	0.28	0.50	0.12	0.07
High school students (15 years or older) as % of lower educated labour force	0.27	0.25	1.29	0.13	0.10
College, university and polytech students as % of lower educated labour force	0.59	0.52	3.31	0.28	0.33
Share of higher educated (% labour force)	0.30	0.28	0.66	0.14	0.09

share of the lowest educated within the lower educated and variables that control for age and non-western background. In models 2 and 3, additional control variables are included. Model 4 includes as an additional robustness test the share of the higher educated—to check for a direct relation between the share of the higher educated and unemployment of lower educated. Table 2 shows the results.

Model 1 shows that there is a significant relation between unemployment rates between the lower educated on the one hand and job opportunities for lower educated and the main variable of interest, the indicator measuring over-education, on the other hand. The negative relation of coefficient of the number of accessible jobs requesting no or low education relative to the size of the lower educated workforce indicates a negative impact on the level of unemployment of the lower educated. The positive and significant relation between the indicator for over-education and unemployment of the lower educated indicates that over-education can lead to crowding-out effects. After controlling for the general labour market situation for the lower educated, a higher level of over-education leads to higher unemployment of the

lower educated. This implies that crowding-out effects seem to occur, and forms an additional factor for explaining local and regional differences in unemployment of the lower educated.

These results remain (and become even more) robust in models 2 and 3, where more control variables are added: the share of single parents and social housing (models 2 and 3 onwards) and the share of college students (model 3). The control variables are either insignificant or have the ‘expected’ sign, with the exception of the share of high school students, which has a negative relation with the unemployment levels of the lower educated. The share of single parents seems to have the most robust relation of the different control variables. Including the share of the higher educated as an additional control in model 4 does not change the sign of the coefficients. The share of college students becomes insignificant. In line with Figure 1, the share of the higher educated itself has no significant relation with the unemployment of the lower educated.

Several control variables bear the issue of potential endogeneity within them. The share of social housing, for example, might not only limit the financial incentives for the (unemployed)

Table 2. OLS estimations on unemployment rates of the lower educated in municipalities in the Netherlands (cross-section on data of 2013).

	1	2	3	4
Job opportunities, lower educated	-0.174*** (0.064)	-0.127** (0.063)	-0.122** (0.061)	-0.119* (0.066)
Crowding-out	0.231** (0.091)	0.219** (0.085)	0.209** (0.088)	0.207** (0.090)
Share of lowest educated (% of all lower educated)	0.088* (0.050)	0.074 (0.051)	0.071 (0.051)	0.071 (0.054)
% Non-western foreigners in lower educated labour force	0.162*** (0.026)	0.071** (0.030)	0.070** (0.030)	0.072** (0.034)
% 15–24 years in lower educated labour force	-0.118 (0.074)	-0.102 (0.069)	-0.077 (0.071)	-0.078 (0.071)
% 25–34 years in lower educated labour force	0.016 (0.077)	-0.036 (0.077)	-0.052 (0.077)	-0.052 (0.077)
% 35–44 years in lower educated labour force	0.039 (0.081)	0.015 (0.078)	0.003 (0.079)	0.003 (0.079)
% 55–64 years in lower educated labour force	-0.057 (0.079)	-0.045 (0.075)	-0.038 (0.074)	-0.038 (0.074)
% Single-parent family (as share of households)		0.618*** (0.216)	0.757*** (0.232)	0.759*** (0.233)
% Social housing		0.111*** (0.036)	0.078** (0.039)	0.078** (0.039)
High school students (15 year or older) as % of lower educated labour force			-0.056 (0.025)**	-0.054 (0.028)*
College and polytech students as % of lower educated labour force			0.009 (0.005)*	0.010 (0.008)
Share of higher educated (% labour force)				-0.005 (0.041)
Constant	0.145 (0.070)	0.045 (0.75)	0.054 (0.07)	0.051 (0.08)
N	243	243	243	243
R2	0.25	0.33	0.35	0.35

White Heteroskedasticity Consistent Standard Errors between brackets.

***Significant at 0.99 level, **significant at 0.95 level, *significant at 0.90 level.

lower educated (and might also attract unemployed the lower educated from other municipalities) but also be the result of (historical) decisions on housing supply that reflects a relatively high share of the (structural unemployed) lower educated. All these variables are used as controls to take into account the heterogeneity of the lower educated workforce between cities. Nonetheless, it might be the case that not all relevant heterogeneity is taken into account. For example, differences in the average length of unemployment of the unemployment might form an important additional variable.

Moreover, as this is a cross-section analysis, the results cannot be interpreted as direct causal relations. Ideally, a panel data analysis is used to limit the risk of endogeneity.¹³ However, due to the use of multiple-year averages and trend-estimations to construct reliable indicators at the municipality level, this is not possible with this dataset. On the positive side, these (necessary) data treatments do limit the chance that year-specific trends (such as employment shocks) are driving the results in Table 2.

For these reasons, it is important to interpret the results with some care. Having said that,

the results presented in Table 2 do imply that at least a part of the regional differences in unemployment regarding the lower educated is related to the presence of regional crowding-out effects by the higher and medium educated. This suggests that crowding-out effects seem to occur within the context of local and regional labour markets in the Netherlands. As such, this explains at least partly why a relatively high share of higher educated inhabitants (and its positive effects on employment growth in jobs requiring a low level of education) does not automatically ‘trickle down’ and lead to lower levels of unemployment of the lower educated.

Local differences in the level of over-education: employment opportunities and the role of amenities

The related question is why certain cities and regions experience a higher level of crowding-out than other locations. This section provides some first insights into the factors that are related to higher levels of crowding-out by estimating a regression model. This model seeks to explain the level of crowding-out at the level of city and municipalities (see also Figure 5), for a similar cross section as used in the section above.

As discussed in Section 2, following the study of Büchel and van Ham (2003) and others, local and regional differences in job opportunities are found to be a crucial factor in explaining the likelihood of over-education at the individual level. Municipalities and regions that have relatively few job opportunities for higher and medium educated workers are consequently likely to exhibit higher levels of crowding-out. In order to test the effect of job opportunities on the level of crowding-out in cities and municipalities, a similar indicator of job opportunities for the higher and medium educated¹⁴ has

been calculated as the one for the lower educated described in the section below. In addition, the age structure of the labour force is included as control variable.

In order to test if amenity-rich cities and municipalities are likely to have a higher level of over-educated workers, an amenity index is used. This index is based on a hedonic price analyses of square metre housing prices.¹⁵ This is done in two steps. First, a model is estimated using housing characteristics (e.g. type of house, size of the lot and so on) and labour market characteristics (number of accessible jobs). Second, the residuals of these regressions are calculated. Following the work of Rosen (1974) it can be derived that any difference between cities and municipalities in the residuals reflects differences in the willingness to pay to live in specific cities and municipalities—other than being the labour market and housing characteristics. These differences can be interpreted as the ‘net’ result of differences in the supply of amenities (nature, culture, history and so on) and disamenities (criminality, traffic jams and so on). As such, these residuals form an indicator for the ‘attractiveness’ of cities and municipalities and might form an additional explanation for local differences in the level of crowding-out. If people are willing to accept a job below their educational level in exchange for a high level of amenities, one would expect a positive correlation between this indicator and the level of over-education.

In addition, the share of students (university, polytechnic and college) is included in the regression model to take into account that after graduation, former students may take a temporary job below their educational level. Finally, the share of privately owned or privately rented housing is included. Having a mortgage or paying private rents may generate a higher financial incentive to accept a job below one’s educational level. Table 3 shows the descriptive statistics of all variables described above.

Table 3. Descriptive statistics (all variables 2013).

	Mean	Median	Maximum	Minimum	Std Dev
Crowding-out	0.566	0.528	1.877	0.138	0.244
Job opportunities, higher and medium educated	0.885	0.890	0.943	0.781	0.033
Amenity index	-6.552	-12.527	941.279	-607.553	215.374
Share of medium educated	0.446	0.455	0.567	0.244	0.056
Share of higher educated	0.317	0.300	0.616	0.151	0.092
% 25–34 years in labour force	0.165	0.162	0.289	0.102	0.030
% 35–44 years in labour force	0.207	0.208	0.267	0.157	0.015
% 45–54 years in labour force	0.240	0.241	0.285	0.150	0.022
% 55–64 years in labour force	0.209	0.213	0.278	0.113	0.026
% Privately owned and or private rental houses in total housing stock	0.720	0.724	0.885	0.499	0.072
% College and polytech students	0.047	0.041	0.234	0.014	0.028

Table 4 provides the results of the OLS (model 1) and WLS (model 2) estimations on the level of crowding-out by the higher and medium educated. The WLS (weighted least squares) estimation puts more emphasis on larger cities, as the observations are weighed by the size of their labour force. Possible differences in the significance level and/or the sign of a coefficient between the OLS and the WLS estimation are an indication that the effect differs with the size of the city.

From Table 4, it can be concluded that—in line with previous studies—job opportunities (at high and medium level) have a negative relation with crowding-out. Crowding-out by over-education is more likely to occur in those cities and municipalities with fewer job opportunities for the higher and medium educated. The ‘amenity index’ is significant in the WLS estimation of crowding-out. This implies that—after controlling for job opportunities, age structure and other variables—cities with a high amenity value (as proxied by housing price residuals) seem to have a higher level of crowding-out. The fact that this relation only becomes significant in the WLS estimation suggest that this effect is higher or restricted to the larger cities. This might imply that in larger cities with a high level of amenities in regions with few job opportunities, the higher and medium

educated are willing to work below their educational level in exchange for a broad supply of amenities. Although having a high share of the higher educated is likely to be beneficial for these cities in general, it does have the indirect side effect of lowering the opportunities of lower educated at the local labour market. Consequently, the (structural) unemployment of lower educated is likely to be higher in these cities.

Conclusion and discussion

Many cities aim for a ‘trickle down’ strategy in order to decrease the unemployment of lower educated workers. The basic idea behind this strategy is to attract more of the higher educated towards a city, which would then lead to a growth of jobs requiring no or a low level of education, with this increase in the demand for lower educated leading to a lower unemployment of lower educated workers. Many studies (Mazzolari and Ragusa, 2013; Moretti, 2012) find that there is indeed a positive impact of an increase of the higher educated on the growth of jobs that require no or a low level of education. However, a growth of jobs that require no or a low level of education does not automatically lead to decreased unemployment of the lower educated. This may be the case when

Table 4. OLS and WLS estimation on the level of crowding-out by the higher educated and medium educated (cross-section on data of 2013).

	Higher and medium educated in a job requiring no or a low level of education as % of lower educated labour force	
	OLS	WLS
Constant	-1.25 (1.19)	-0.33 (1.46)
Job opportunities, higher and medium educated	-0.94 (0.45)**	-1.43 (0.57)**
Amenity index	3.76E-05 (6.06E-05)	1.63E-04 (5.25E-05)***
Share of medium educated	3.02 (0.43)	4.03 (0.63)***
Share of higher educated	2.63 (0.35)	2.70 (0.47)***
% 25-34 years in labour force	2.34 (1.52)	-1.04 (1.71)
% 35-44 years in labour force	-0.43 (1.41)	3.07 (1.75)
% 45-54 years in labour force	1.44 (1.73)	-5.12 (2.22)***
% 55-64 years in labour force	-1.43 (1.24)	0.72 (1.56)
% Privately owned and or private rental houses in total housing stock	0.12 (0.24)	0.01 (0.21)
% College and polytechnic students	0.76 (1.27)	2.49 (1.48)*
N	222	222
R2	0.41	0.97
Unweighted R2		0.27

White Heteroskedasticity Consistent Standard errors between brackets.

***Significant at 0.99 level, **significant at 0.95 level, *significant at 0.90 level.

lower educated workers experience crowding-out effects if higher educated workers accept jobs below their educational level. Based on an empirical analysis using a cross-section of Dutch cities, this study shows that the crowding-out effects may indeed occur and form an additional variable in explaining (persistent) regional differences in unemployment of the lower educated.

In addition, regressions have been estimated relating the level of crowding-out of the lower educated by the higher and medium educated to job opportunities (requiring a higher or medium level of education), an index measuring

the supply of amenities and other variables. It was found that the level of crowding-out by over-educated workers seems to be higher in those cities with a high supply of amenities and low levels of job opportunities requiring a high and medium level of education. This suggests that within attractive cities in regions with few job opportunities, a relatively large share of the higher and medium educated are willing to accept a job below their educational level in exchange for the joy of a broad supply of amenities. A good example might be the city of Groningen in the northern part of the country: a historical city with a large university and

polytechnic that draws thousands of students each year. Moreover, the city functions as a 'central city' in its region, leading to a relatively broad supply of shops, bars and restaurants and cultural amenities. The city can be considered as an attractive city to live in from an amenity perspective, but it lacks the level of career opportunities (especially for the higher educated) that can be found in the western, more urbanized part of the country. The share of the higher educated is relatively high, but so is the level of over-education (Figure 5).

Altogether these results suggest that the lower educated are most likely to benefit from employment growth stemming from a higher share of higher (and medium) educated inhabitants if cities provide enough jobs for these higher (and medium) educated. If the growth of the share of the higher educated is driven by amenities rather than by employment opportunities, the positive employment effects of these higher educated are not likely to 'trickle down'—at least not fully—to the lower educated. As such, the labour market outcomes of urban policies aiming to attract a larger share of the high educated are likely to differ between individual cities. Such a policy can certainly not be seen as a panacea for lower unemployment levels of the lower educated. Additional policies that focus on the supply side might be needed in some cities as the trickle down strategy aims to increase the demand for lower educated workers. This could range from policies that lower the costs of hiring lower educated workers for employers or policies that increase the skills of lower educated workers. The right policy mix to tackle the issue of high and persistent unemployment of the lower educated seems to be city-specific and should be based on a thorough understanding of the regional labour market.

Some caveats of this study have to be taken into account. First, the analysis is based on a cross-section of cities and larger municipalities. As such, no hard conclusions on causality can be drawn from the analysis. A similar study using

panel data analysis and/or a multilevel analysis could offer better insights on the causality. Second, besides crowding-out, the presence of a structural mismatch in skills of the unemployed lower educated and jobs requiring lower levels of education could form an additional explanation which was not included in this study. Third, over-education (and crowding-out) is measured using existing classification schemes of the National Bureau of Statistics on the educational level required for different type of jobs. It could be the case that for specific jobs these classification schemes do not match the reality of the requirements of employers. Fourth, and related to this last point, it could be that in specific industries, employers have a strong preference for over-educated employees for reasons other than the specific tasks formally related to a job. For example, one could think of an owner of a bar or restaurant visited by higher educated/higher income clients who has a strong preference for employees of a similar educational level as the clients.

End Notes

¹ Positive employment effects of higher educated workers on the lower educated have also been found (Blien et al., 2006; Poelhekke, 2013; Südekum, 2004, 2008; Schlitte, 2012).

² Anecdotal evidence suggest, for example, that this is the case for the city of Portland (Oregon) in the USA.

³ The so-called 'enquête beroepsbevolking', which is the Dutch version of (and also input for) the European Labour Force Survey.

⁴ The level of education is based on the Dutch SOI classification which is comparable to the international ISCED classification.

⁵ The National Statistical Office considers indicators based a sample from this data representative if the population has a size of 30.000 for indicators based on data from one year, 10.000 for 3-year averages and 7.500 for a trend analysis or average over multiple years.

⁶ Excluding full-time students, impaired people and so on.

⁷ Which are administrative regions in which the local branches of national social security organization and municipalities work together on regional labour market issues.

⁸ Following the so-called Nationale Standaard Beroepenclassificatie, which is being replaced from 2014 onwards by the International Standard Classification of Occupations 2008 (ISCO 2008).

⁹ Travel time data are from ESRI and congestion information is used from AVV, a part of the Ministry of Infrastructure and Environment.

¹⁰ Alternatively, over-education could be measured by looking at the realized matches between workers and jobs rather than using the formal educational requirements. The level of education required for a specific job would be based on the median educational level of workers having that similar job. Those workers having a higher (or lower) educational level than the most frequent occurring educational level is considered over- (or under-) educated. See [Leuven and Oosterbeek, 2011](#) for a discussion.

¹¹ For each municipality, we have 15 values for each year from 1999 to 2013 that are used in a simple regression with a constant and an indicator for the time trend.

¹² In combination with the trend estimation based in the respondents between 1999 and 2013, possible measurements errors due to small sample sizes are limited. The number of respondents in the original data (that are considered to be over-educated) used to construct this indicator measuring the spatial average of over-education with a distance decay is 21,451 for the smallest municipality (defined by the size of lower-educated workforce) for the whole period (on average 1,430 per year) and 25,931 for the largest municipality (on average 1,729 per year).

¹³ Alternatively to a panel data analysis at the level of cities, a multi-level analysis using individual data in combination with local and regional characteristics could form an interesting additional research avenue. As the data in the Labour Force Survey are not based on a fixed panel of individuals, a panel data analysis at the level of individuals for several years is not possible.

¹⁴ Using different distance decay functions reflecting the fact that the higher and medium educated have a higher willingness to travel for a job than the lower educated.

¹⁵ Data are used from the national real estate brokers association (NVM).

Acknowledgements

We would like to thank the CJRES editors and two anonymous referees for their comments and suggestions. This article builds on research funded by NWO and Platform 31 in the Knowledge for Strong Cities (KKS) research programme.

References

- Åberg, R. (2003) Unemployment persistency, over-education and the employment chances of the less educated, *European Sociological Review*, **19**: 199–216.
- Acemoglu, D. (1996) A microfoundation for social increasing returns in human capital accumulation, *The Quarterly Journal of Economics*, **111**: 779–804.
- Åslund, O., Östh, J., and Zenou, Y. (2010) How important is access to jobs? Old question-improved answer, *Journal of Economic Geography*, **10**: 389–422.
- Blien, U., Suedekum, J., & Wolf, K. (2006) Local employment growth in West Germany: A dynamic panel approach, *Labour Economics*, **13**: 445–458.
- Brueckner, J. and Zenou, Y. (2003) Space and unemployment: the labour market effects of spatial mismatch, *Journal of Labour Economics*, **21**: 242–266.
- Büchel, F. and van Ham, M. (2003) Over-education, regional labour markets, and spatial Vflexibility, *Journal of Urban Economics*, **53**: 482–493.
- Elhorst, J. P. (2003) The mystery of regional unemployment differentials: theoretical and empirical explanations, *Journal of Economic Surveys*, **17**: 709–748.
- Canton, E. (2009) Human capital externalities and proximity: Evidence from repeated cross-sectional data, *De Economist*, **157**: 79–105.
- Ciccone, A. and Peri, G. (2006) Identifying human-capital externalities: Theory with applications, *Review of Economic Studies*, **73**: 381–412.
- Criscuolo, C., Martin, R., Overman, H., and Van Reenen, J. (2012) *The causal effects of an industrial policy*. NBER working paper 17842. Cambridge: National Bureau of Economic Research.
- Geurs, K. T. and Ritsema van Eck, J. R. (2001) *Accessibility measures: review and applications*. RIVM report 408505.006. Bilthoven, The Netherlands: National Institute of Public Health and the Environment.
- Glaeser, E. L., Scheinkman, J., and Shleifer, A. (1992) Economic growth in a cross-section of cities, *Journal of Monetary Economics*, **36**: 117–143.
- Glaeser, E. L., Kolko, J., and Saiz, A. (2001) Consumer city, *Journal of economic Geography*, **1**: 27–50.

- Glaeser, E. L., Saiz, A., Burtless, G., and Strange, W. C. (2004) The rise of the skilled city [with comments], *Brookings-Wharton Papers on Urban Affairs*, 47–105.
- Granato, N., Haas, A., Hamann, S., and Niebuhr, A. (2015) The impact of skill-specific migration on regional unemployment disparities in Germany, *Journal of Regional Science*, 55: 513–539.
- Groot, W. and Maassen Van Den Brink, H. (2000) Over-education in the labour market: a meta-analysis, *Economics of Education Review*, 19: 149–158.
- Hensen, M. M., De Vries, M. R., and Cörvers, F. (2009) The role of geographic mobility in reducing education job mismatches in the Netherlands, *Papers in Regional Science*, 88: 667–682.
- Iammarino, S. and Marinelli, E. (2011) Is the grass greener on the other side of the fence? Graduate mobility and job satisfaction in Italy, *Environment and Planning A*, 43: 2761–2777.
- Kline, P. and Moretti, E. (2013) Place based policies with unemployment, *American Economic Review*, 103: 238–243.
- Leuven, E. and Oosterbeek, H. (2011) Over-education and mismatch in the labour market, *Handbook of the Economics of Education*, 4: 283–326.
- López-Bazo, E. and Motellón, E. (2013) The regional distribution of unemployment: What do micro-data tell us?, *Papers in Regional Science*, 92: 383–340.
- Kaplanis, I. (2010) Local human capital and its impact on local employment chances in Britain. *SERC Discussion Papers, SERCDP0040*. London: Spatial Economics Research Centre (SERC), London School of Economics and Political Science.
- Manning, A. (2004) We can work it out: the impact of technological change on the demand for low skill workers, *Scottish Journal of Political Economy*, 51: 581–608.
- Marlet, G. and Van Woerkens, C. (2007) The Dutch creative class and how it fosters urban employment growth, *Urban Studies*, 44: 2605–2626.
- Marlet, G., Ponds, R., and van Woerkens, C. (2015) *Trickle down in Attractive Cities* Working Paper, Rijksuniversiteit Groningen.
- Mazzolari, F. and Ragusa, G. (2013) Spillovers from high-skill consumption to low-skill labour markets, *Review of Economics and Statistics*, 95: 74–86.
- McGuinness, S. (2006) Over-education in the labour market, *Journal of economic surveys*, 20: 387–418.
- Moretti, E. (2004) Human capital externalities in cities. In V. Henderson, J.-F. Thisse (ed). *Handbook of Urban and Regional Economics 4*. Amsterdam: Elsevier–North Holland.
- Moretti, E. (2012) *The New Geography of Jobs*. New York: Houghton Mifflin Harcourt.
- Niebuhr, A., Granato, N., Haas, A., and Hamann, S. (2012) Does labour mobility reduce disparities between regional labour markets in Germany? *Regional Studies*, 46: 841–858.
- Overman, H. G. and Puga, D. (2002) Unemployment clusters across Europe's regions and countries, *Economic Policy*, 34: 115–147.
- Poelhekke, S. (2013) Human capital and employment growth in German metropolitan areas: new evidence, *Regional Studies*, 47: 245–263.
- Quinn, M. A. and Rubb, S. (2005) The importance of education-occupation matching in migration decisions, *Demography*, 42: 153–167.
- Rosen, S. (1974) Hedonic prices and implicit markets: product differentiation in pure competition, *The Journal of Political Economy*, 82: 34–55.
- Schlitte, F. (2012) Local human capital, segregation by skill, and skill-specific employment growth, *Papers in Regional Science*, 91: 85–106.
- Shapiro, J. M. (2006) Smart cities: quality of life, productivity, and the growth effects of human capital, *The Review of Economics and Statistics*, 88: 324–335.
- Südekum, J. (2008) Convergence of the skill composition across German regions, *Regional Science and Urban Economics*, 38: 148–159.
- Südekum, J. (2004) Selective migration, union wage setting and unemployment disparities in West Germany, *International Economic Journal*, 18: 33–48.
- Venhorst, V. (2012) 'Smart move?' The spatial mobility of higher education graduates. PhD thesis, Groningen University.