

Negative Attitudes, Network and Education

Preliminary

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Abstract

We consider the impact of negative attitudes against immigrants and immigration on educational choice in a search and wage bargaining model including networking. We consider two cases in terms of the importance of negative attitudes against immigrants for high and low educated individuals and find that more negative attitudes against immigrants has a positive impact on education in one case and a negative impact in the other and has no impact on natives. Immigration improves employment perspectives for immigrants and thereby increases immigrant education whereas endogenous negative attitudes lead to an ambiguous impact. Empirically, we consider immigrants' high school attendance. On the macro-level, we confirm a significant negative correlation between negative attitudes towards immigrants and high school attendance and a positive impact of networking on high school attendance. On the individual level, we use Danish register data to find a significant positive correlation between negative attitudes towards immigrants and high school attendance and find a positive impact of networking on high school attendance. In both the macro and the micro-econometric analysis we run the same regressions for natives and find no significant impact of negative attitudes.

1 Introduction

An OECD report from 2006 reveals that immigrant and immigrant offspring at a very young age express equal or sometimes even higher motivation to learn mathematics than their native counterparts and very positive attitudes towards school and education in general.¹ However, at the age of 15, they under perform

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¹OECD 2006

compared to the natives. More than a third of the first and second generation immigrant children in Austria, Belgium, Denmark, Germany, Norway and the USA, who have spent all their entire schooling in the host country, perform below the baseline PISA benchmark for mathematics performance, a period at which students begin to demonstrate the kind of skills that enable them to actively use mathematics.² Hence, immigrants tend not to perform as well in school as their native peers when taking parental background into account.³

This may influence their choice of further education, and eventually their labour market outcome and performance.

When explaining the educational gap between immigrants and natives, measures which influence immigrants and natives differently, may therefore be important. Our aim is to discover the impacting factors behind the shift of motivation and performance when the decision about education beyond mandatory school is taken. In particular, we will examine the effect of negative attitudes towards immigrants in a region and potential impact of networking through the individuals of the individual's own ethnicity living in a region.

For the educational decision, workers compare the values corresponding to acquiring education to the value of not acquiring education. These values depend on the expected incomes which are influenced by both the employment probability as well as wages. We therefore consider variables which may influence immigrant employment chances, that is unemployment of immigrants, as well as immigrant wages differently for educated workers and uneducated workers, compared to the same variables for natives.

With respect to unemployment, on average, immigrants have unemployment rates often much higher than natives.⁴ Higher unemployment rates facing immigrants may be due to lower educational attainment, language barriers and other integration issues or that negative attitudes in a region diminish the immigrant worker's employment probability.

On the other hand, more immigrants from the immigrant's home country or region may raise the likelihood of getting a job and improve labour market performance. Hence, more well-educated immigrants from the immigrant's home country or region may increase the return of education implying that more immigrants acquire education. This may work in different ways. Social networks may influence employment outcomes: the more employed contacts the individual has, the more likely it is that the individual will learn about new job openings (Calvo-Armengol and Jackson 2004, Hellerstein et al 2009). Similarly, Andersson et al (Andersson et al 2009) find that more immigrants living in areas with a large number of employed neighbours are more likely to have jobs than immigrants living in areas with fewer employed neighbours. This could be due to networking and/or social norm effects. Hence, networking may increase employment probability, and more networking among immigrants may therefore, to some extent, compensate for the decrease in employment perspectives and wage modifications due to discrimination.

²ibid.

³Nielsen and Rangvid

⁴OECD Factbook 2013

This paper examines theoretically and empirically the impact on education for natives and immigrants in an environment where immigrants are subject to discrimination or negative attitudes towards them, and where networking increases workers' employment probability. We are interested in the impact discrimination or negative attitudes have on education as well as the potential positive impact of networking.

We formulate a Becker-style taste discrimination model within a search and wage bargaining setting. We assume that potential negative tastes towards immigrants implies that their separation rate from the job is higher than the separation rate of a native worker. This may be due to both the worker deciding to quit and the employer firing the worker. This assumption allows us to assume that neither job searchers nor employers know whether discrimination will take place in a particular firm. All they know is that immigrants face a higher separation rate than natives. Natives and immigrants decide whether to educate or not. They are aware of the existence of discrimination in the labour market and of the possibility of influencing their chances of getting employed through networking. We consider two different cases. In the first case, negative attitudes are present in both sectors and in the second, they are only present in the low productivity sector.

The paper is structured as follows. In section 2 the model is setup, then the following sections consider the impact of negative attitudes towards immigrants and the fraction of immigrants. Section 6 and 7 provide a macroeconomic and a microeconomic analysis. Section 8 concludes.

2 The model

We consider a search and matching model with natives, N and immigrants, I , which may be educated with productivity y^h or noneducated with productivity, y^l where $y^h > y^l$. The workers search for jobs and firms search for workers and the labour force is normalized at one. For simplicity, we assume that firms may supply vacancies directed towards natives or immigrants.⁵

Immigrants may be harmed by negative attitudes towards them at their workplace, resulting in separation from the job. The reason may be many-fold: negative attitudes against immigrants may imply that a firm needs to deal with unexpected issues in the firm or with clients, and/or the immigrant wants to quit. We therefore assume that the separation rate is increasing in negative attitudes. Negative attitudes may (among other things) themselves be influenced by the fraction of immigrants in an area, an issue we will return to below.

On the other hand, more immigrants may make it easier to obtain em-

⁵In Larsen and Waisman 2012, it is assumed that it is not possible for firms to direct their search to either immigrants or natives. Therefore, any negative impact on immigrants, will through changed vacancy supply also affect natives. As the present paper also include educational choice and networking we for simplicity keep this additional channel out of the present set-up.

ployment through networking. We therefore assume that networking, $\lambda_i^m, i = N, I, m = h, l$ is increasing in the number of people of the same origin as the individual. We assume that $\lambda_I^h = t^h \frac{I(1-\hat{e}_I)}{(N+I)(1-\hat{e}_I)} = t^h I$ and $\lambda_N^h = t^h \frac{N(1-\hat{e}_N)}{(N+I)(1-\hat{e}_N)} = t^h N = t^h (1 - I)$ and $\lambda_I^l = t^l \frac{I\hat{e}_I}{(N+I)\hat{e}_I} = t^l I$ and $\lambda_N^l = t^l \frac{N\hat{e}_N}{(N+I)\hat{e}_N} = t^l N = t^l (1 - I)$ as $N + I = 1$, where $0 < t^m < 1, m = h, l$, and $\hat{e}_i, i = N, I$ is the number of uneducated people and $1 - \hat{e}_i, i = N, I$, is the number of educated workers.

2.1 Matching

We follow Fontaine (2007) setting up a simple search and matching model including social networks. We assume that firms advertise $V_i^m, i = N, I, m = h, l$ vacancies. Unemployment rates are given by $u_i^m, i = N, I, m = h, l$ and there are $L_i^m, i = N, I, m = h, l$ employees. Labour market tightness by the ethnic group is given by $\theta_i^m = (V_i^m + \lambda_i^m L_i^m)/u_i^m$, where the transition rate for an unemployed worker is given by $f(\theta_i^m)$ and for the firm it is $q(\theta_i^m)$. We assume that the worker transition rate is increasing in labour market tightness but at a decreasing rate, $\partial(f(\theta_i^m))/\partial\theta_i^m > 0, \partial^2(f(\theta_i^m))/(\partial\theta_i^m)^2 < 0$ and the firm's transition rate is decreasing in labour market tightness at a decreasing rate, $\partial(q(\theta_i^m))/\partial\theta_i^m < 0$ and $\partial^2(q(\theta_i^m))/(\partial\theta_i^m)^2 > 0$.

2.2 The firm

The firm chooses the number of vacancies so as to maximize profits subject to negative attitudes towards immigrants and networking effects. We assume, for simplicity, that firms can direct their search towards natives or immigrants and that each worker produces $y^m, m = h, l$ and receives the bargained wage, $w_i^m, i = N, I, m = h, l$. We denote the discount rate by ρ and hiring costs are increasing in productivity, $ky^m, m = h, l$. A firm chooses the number of vacancies to advertise, $V_i^m, i = N, I, m = h, l$ and takes into account that its employees also produce applicants through networking. Each firm hiring natives or immigrants solves the following Bellman equation:

$$\rho\Pi_i(L_i^m) = \max((yL_i^m - w_i^m - ky^mV_i^m + \Pi_i(L_i^m)), i = N, I, m = h, l, \quad (1)$$

s.t

$$\dot{L}_N^m = (\lambda_N^m L^m + V_N^m)q(\theta_N^m) - s_N L_N^m, m = h, l, \quad (2)$$

$$\dot{L}_I^m = (\lambda_I^m L^m + V_I^m)q(\theta_I^m) - s_I^m L_I^m, m = h, l. \quad (3)$$

Firms choose their optimal number of employees, using two methods of search: advertising by the firm or networking, which happens at the rate $\lambda_i L_j^m f(\theta_i^m), i = N, I$. The term $s_i^m, i = N, I, m = h, l$ is the rate by which jobs are destroyed where $s_I^m = s_N(1 + a^m)$ and $a^m > 0$ is an indicator of how negative

people in a region are against immigrants. Hence, immigrants face a random negative shock of negative attitudes towards immigrants, denoted by a^m . This shock may take the form of the worker being fired due to discrimination or that the worker experiences discrimination which results in that he or she voluntarily quits. These negative attitudes may differ for low productivity and high productivity workers. Hence, matches between immigrants and the firm are dissolved more often than matches involving natives, implying that, for given networking, the expected profitability of a firm employing natives is higher than the expected profitability of employing an immigrant.

With identical firms, using equations (1)-(3) and Kuhn-Tucker conditions, we obtain the non-trivial solution in the steady state determining labour market tightness, θ_i , $i = N, I, m = h, l$:

$$\frac{ky^m}{q(\theta_N^m)} = \frac{y^m - w_N^m}{\rho + s_N - \lambda_N^m q(\theta_N^m)}, \quad \frac{ky^m}{q(\theta_I^m)} = \frac{y^m - w_I^m}{\rho + s_N(1 + a^m) - \lambda_I^m q(\theta_I^m)}. \quad (4)$$

The partial equilibrium results are the following. More severe negative attitudes, a higher a^m , will tend to reduce labour market tightness and more networking, a higher λ_i^m , will raise labour market tightness for the firm hiring the specific type, either immigrants or natives.

2.3 The worker

Let U_i^m be the value of being an unemployed worker and E_i^m , $m = h, l$, $i = N, I$ be the value of an employed worker. The values are determined by

$$\rho U_i^m = f(\theta_i^m)(E_i^m - U_i^m) - \Gamma(m) c(e_i), \quad i = N, I \quad m = h, l, \quad (5)$$

$$\rho E_I^m = w_I^m + s_I(1 + a^m)(U_I^m - E_I^m) - \Gamma(m) c(e_i), \quad m = h, l \quad (6)$$

$$\rho E_N^m = w_N^m + s_N(U_N^m - E_N^m) - \Gamma(m) c(e_i) \quad , \quad m = h, l, \quad (7)$$

We assume that workers have different abilities, e_i , and therefore different costs of obtaining education, $c(e_i)$. e_i is uniformly distributed, $e_i \in [0, 1]$ where educational costs are decreasing in ability at a decreasing rate, $c'(e_i) < 0$, $c''(e_i) > 0$. In order to guarantee a non-trivial solution where some, but not all, individuals choose to acquire education, the individual with the highest ability faces a very low cost of education, $c(1) = 0$, and the individual with the lowest ability level face very high costs of education, i.e. $\lim_{e_i \rightarrow 0} c(e_i) = \infty$. $\Gamma(m)$, $m = h, l$, is an indicator function, taking the value zero if the worker does not acquire education and one, if the worker acquires education. Hence, $\Gamma(h) = 1$ and $\Gamma(l) = 0$.⁶

⁶We assume that the educational cost is a cost to acquire and maintain education or skills. This is a simplifying assumption and is not important for the results. The assumption enables us to use a model without having workers continuously being born and dying. Such a model would deliver similar qualitative expressions.

2.4 Wages

We assume that wages are determined by Nash bargaining and that the bargaining power is a half, so that $X_i^m = E_i^m - U_i^m$, $i = N, I$, $m = h, l$, where $X_i^m = \frac{ky^m}{q(\theta_i^m)} = \frac{y^m - w_i^m}{\rho + s_i - \lambda_i^m q(\theta_i^m)}$. We assume that the hiring cost parameter, k , is equal across firms, but that productivity and therefore actual hiring costs are higher for firms employing educated workers. This gives that $ky^m = X_i^m q(\theta_i^m)$ and thereby

$$X_i^m = \frac{y^m - w_i^m + \lambda_i^m ky^m}{(\rho + s_i^m)}, \quad m = h, l. \quad (8)$$

Subtracting equation (5) from equation (6) or (7) and then using $X_i^m = E_i^m - U_i^m$ and (8) gives

$$0.5 \cdot y^m (1 + (\lambda_N^m + \theta_N^m) k) = w_N^m, \quad (9)$$

$$0.5 \cdot y^m (1 + (\lambda_I^m + \theta_I^m) k) = w_I^m. \quad (10)$$

We note that wages are increasing in labour market tightness, networking and productivity. Substituting for wages into the equation determining labour market tightness, we obtain the equations for labour market tightness (8) as a function of parameter values:

$$k(\rho + s_I^m)2 = (1 - \theta_I^m k + \lambda_I^m k) q(\theta_I^m), \quad (11)$$

$$k(\rho + s_N)2 = (1 - \theta_N^m k + \lambda_N^m k) q(\theta_N^m). \quad (12)$$

Labour market tightness is independent of productivity. As $s_I^m > s_N$, then the left hand side of (11) is larger than the left hand side of (12) tending to reduce labour market tightness for firms employing immigrants and thereby the transition rate for immigrants. Furthermore, labour market tightness is increasing in labour networking:

$$\frac{d\theta_i^m}{d\lambda_i^m} = \frac{-kq(\theta_i^m)}{((1 - \theta_i^m k + \lambda_i^m k) q'(\theta_i^m) - \theta_i^m k q(\theta_i^m))} > 0.$$

We observe the following. If $\lambda_I^m > \lambda_N^m$, this tends to increase θ_I^m relatively to θ_N^m . However, if $s_I^m > s_N$ this tends to increase θ_N^m relatively to θ_I^m . Therefore, if $s_I^m > s_N$ and $\lambda_I^m \leq \lambda_N^m$ then $\theta_I^m < \theta_N^m$ whereas the relative size is ambiguous if $\lambda_I^m > \lambda_N^m$.

For the rest of the theoretical analysis we assume that educated and uneducated workers face the same networking effect, hence $\lambda_i^h = \lambda_i^l = \lambda_i$, $i = N, I$. Then we obtain $\theta_N^h = \theta_N^l = \theta_N$ for natives and we have two scenarios for immigrants. In the first case, negative attitudes is present for both high and low productivity workers and hence $s_I^h = s_I^l = s_I$ resulting in $\theta_I^h = \theta_I^l = \theta_I$. In the second case, negative attitudes exists for low productivity workers only and hence $s = s_I^h < s_I^l$ resulting in $\theta_I^h > \theta_I^l$. This assumption allows us to consider

the impact of a change in attitudes and immigration on labour market tightness, education and unemployment, without making any assumptions about the relative importance of networking about educated or uneducated workers. We will discuss how the results are modified in the case of heterogeneous networking effects. We have the following result.

Result: If negative attitudes is present in both the high and low productivity sector, $a^h = a^l > 0$, and networking associated with natives is larger than or equal to networking associated with immigrants, $\lambda_N \geq \lambda_I$ then labour market tightness facing natives is higher than labour market tightness facing immigrants, $\theta_N > \theta_I$, and natives' wages are thus higher than immigrants' wages, $w_N^m > w_I^m$. When negative attitudes is present in the low productivity sector only, $a^h = 0, a^l > 0$, and networking associated with natives is larger than or equal to networking associated with immigrants, $\lambda_N \geq \lambda_I$ then for low productivity workers, labour market tightness for natives is higher than labour market tightness facing immigrants, $\theta_N^l > \theta_I^l$, and low productivity natives' wages are thus higher than wages for low productivity immigrants, $w_N^l > w_I^l$ whereas for high productivity workers, $\theta_N^h = \theta_I^h$ and $w_N^h = w_I^h$. When $\lambda_N < \lambda_I$ then the relative sizes of labour market tightness and immigrants, θ_N^m and θ_I^m , and wages, w_N^m and w_I^m , are indeterminate.

Notice that given the assumption above that $\lambda_I = tI$ and $\lambda_N = t(1 - I)$, where $0 < t < 1$ we have that $\lambda_N > \lambda_I$ given $1/2 > I$, which seems to be the most realistic case.

2.5 Education

When individuals decide on whether to educate or not, they compare the value of acquiring education to the value of remaining uneducated. That is, at each point in time, as an unemployed worker, they compare the value of being unemployed as a educated worker to the value of being unemployed as an uneducated worker. Workers with high educational costs find it too costly to obtain education, whereas high ability workers and low educational costs individuals find it more than worthwhile to do so. The marginal worker has the ability level, $\hat{e}_i, i = N, I$, which makes the worker just indifferent between acquiring high education or remaining unskilled. For simplicity, we assume that natives and immigrants are identical with respect to the distribution of educational costs. We write the condition determining the educational costs of the marginal worker as

$$\rho U_i^h(\hat{e}_i) = \rho U_i^l, \quad i = N, I. \quad (13)$$

The higher \hat{e}_i is, the higher is the ability level of the marginal worker acquiring education. Hence, fewer workers acquire education, and a smaller fraction of the workers will be educated. Use equations (5)-(7) and (13), the bargaining condition together with the free entry condition, to obtain the following simplified condition in the first case where $a^h = a^l$ for immigrants and $a = 0$ for natives:

$$(y^h - y^l) \theta_i k = c(\hat{e}_i), \quad i = N, I. \quad (14)$$

Equation (14) give $\hat{e}_i, i = N, I$ as a function of the endogenous variables, $\theta_i, i = N, I, m = h, l$. The higher the productivity difference is, the higher is labour market tightness, and thereby wages and transition into employment, then the more people will acquire higher education. For equal networking rate, labour market tightness facing natives is higher than labour market tightness facing immigrants, which results in that natives acquire more education than immigrants, that is, $\hat{e}_I > \hat{e}_N$.

In the second case the result changes for immigrants whereas the natives' educational decision is still given by equation (14), i.e. when $a^h = 0$ and $a^l > 0$ then we obtain:

$$(y^h \theta_I^h - y^l \theta_I^l) k = c(\hat{e}_I). \quad (15)$$

In this case, with equal networking rate for all workers, we now obtain that $\hat{e}_N > \hat{e}_I$ as low productivity immigrants are worse of than natives in terms of a lower transition rate into a job, $\theta_I^l < \theta_N^l$ and lower wages and high productivity immigrants have the same wages and employment probability as natives, $\theta_I^h = \theta_N^h$. Hence, due to that the low productivity immigrants being relative worse of compared to natives, immigrants in this case experience stronger incentives for acquiring education than natives. This is summarized in the following result.

Result: If negative attitudes are present in both the high and low productivity sector, $a^h = a^l > 0$, and networking associated with natives is equal to networking associated with immigrants, $\lambda_N = \lambda_I$, natives acquire more education than immigrants, that is, $\hat{e}_I > \hat{e}_N$. When negative attitudes is present in the low productivity sector only, $a^h = 0, a^l > 0$, and networking associated with natives is equal to networking associated with immigrants, $\lambda_N = \lambda_I$, then immigrants acquire more education than natives $\hat{e}_I < \hat{e}_N$.

2.6 Unemployment

In equilibrium, inflows are equal to outflows. The equilibrium flows characterizing the labour market for workers are then:

$$f(\theta_i^m) \mu_i^m = s_i^m n_i^m, i = N, I, m = h, l,$$

$$n_i^h + \mu_i^h = (1 - \hat{e}_i) i, i = N, I, n_i^l + \mu_i^l = \hat{e}_i i, i = N, I,$$

where $n_i^m, i = N, I, m = h, l$, is employment, and $\mu_i^m, i = N, I, m = h, l$, is unemployment. The labour force is normalised at one, $N + I = 1$, giving the following expression for natives' unemployment rates, $u_N^m, m = h, l$:

$$u_N^h = u_N^l = u_N = \frac{s}{(f(\theta_N) + s)},$$

as $\theta_N^h = \theta_N^l$. For immigrants we have the unemployment rate

$$u_i^m = \frac{s_i^m}{(f(\theta_i^m) + s_i^m)}, i = N, I, m = h, l.$$

In the first case, $s_I^h = s_I^l$ and hence $\theta_i^h = \theta_i^l$ we obtain.

$$u_i^h = u_i^l = u_i = \frac{s_i}{(f(\theta_i) + s_i)}, \quad i = N, I. \quad (16)$$

Unemployment rates for educated workers are equal to unemployment rates of uneducated workers. This results stems from the assumption that hiring costs are proportional to productivity. In the second case, where $s_I^h < s_I^l$ as $a^h = 0$ and $a^l > 0$ then $s_I^l = s(1 + a^l) > s_I^h = s = s_N$ and therefore $f(\theta_I^l) < f(\theta_I^h) = f(\theta_N)$ which results in the following unemployment rates

$$u_N = u_I^h < u_I^l = \frac{s_I}{(f(\theta_I^l) + s_I)}, \quad i = N, I. \quad (17)$$

The result is the following.

Result: When networking associated with natives is larger than or equal to networking associated with immigrants, $\lambda_N \geq \lambda_I$ and in the presence of negative attitudes for both high productivity and low productivity immigrants, $a^h = a^l > 0$, the unemployment rate of natives is smaller than the immigrants' unemployment rate, $u_N < u_I$ and when only low productivity workers face negative attitudes, $a^l > a^h = 0$, then $u_I^l > u_I^h = u_N$. When $\lambda_N < \lambda_I$ then the relative sizes of the unemployment rates facing natives and immigrants, u_N and u_I are indeterminate.

3 Negative Attitudes

In this section, we examine what happens to labour market tightness, wages, education and unemployment when immigrants face more severe negative attitudes. For simplicity, we consider the case where $\lambda_N = \lambda_I$. The impact on labour market tightness, wages and unemployment as well as education will differ dependent on whether negative attitudes towards immigrants exists in both sectors or in the low productivity sector only. We have the following proposition.

Proposition: In the presence of negative attitudes for both high productivity and low productivity immigrants, $a^h = a^l > 0$, then when negative attitudes increase, labour market tightness facing immigrants falls, causing their wages to fall and their unemployment rate to increase. Lower labour market tightness reduces education of immigrants. When only low productivity workers face negative attitudes, $a^l > a^h = 0$, then labour market tightness and wages for low productivity immigrants falls and their unemployment rate increases whereas high productivity immigrants are not affected, which increases education for immigrants. There is no impact on natives.

Proof: *First case: Differentiating equations (11), (12), (10) and (9) with respect to $a^h = a^l = a$ shows that there is a negative impact on labour market tightness facing immigrants but no impact for natives:*

$$\frac{d\theta_I}{da} = \frac{k \frac{ds_I}{da} 2}{\left((1 - \theta_i^j k + \lambda_I^j k) dq'(\theta_I^j) - kq(\theta_I^j) \right)} < 0, \quad \frac{d\theta_N}{da} = 0, \quad \frac{dw_I^m}{da} = 0.5y^m \frac{d\theta_I}{da} k < 0, \quad \frac{dw_N}{da} = 0.$$

Differentiating equations (16) with respect to a to obtain:

$$\frac{du_I}{da} = \frac{-s_I f'(\theta_I)}{(f(\theta_I) + s_I)^2} \frac{d\theta_I}{da} > 0, \quad \frac{du_N}{da} = 0.$$

We differentiate equation (14) to find that the number of immigrants acquiring education falls:

$$\frac{d\hat{e}_I}{da} = \frac{(y^h - y^l) \frac{d\theta_I}{da}}{c'(\hat{e}_I)} > 0, \quad \frac{d\hat{e}_N}{da} = 0.$$

In the second case, the results for immigrants changes to

$$\frac{d\theta_I^l}{da^l} = \frac{k \frac{ds_I^l}{da} 2}{\left((1 - \theta_i^l k + \lambda_I^l k) dq'(\theta_I^l) - kq(\theta_I^l) \right)} < 0, \quad \frac{d\theta_I^h}{da^l} = \frac{d\theta_N}{da^l} = 0,$$

$$\frac{dw_I^l}{da} = 0.5y^m \frac{d\theta_I^l}{da^l} k < 0, \quad \frac{dw_I^h}{da^l} = \frac{dw_N}{da^l} = 0.$$

Next, we differentiate equation (17) to obtain

$$\frac{du_I^l}{da} = \frac{-s_I f'(\theta_I^l)}{(f(\theta_I^l) + s_I^l)^2} \frac{d\theta_I^l}{da^l} > 0, \quad \frac{du_I^h}{da^l} = \frac{du_N}{da^l} = 0.$$

Finally, for education, differentiating equation (15) gives

$$\frac{d\hat{e}_I}{da^l} = \frac{-y^l \frac{d\theta_I^l}{da^l}}{c'(\hat{e}_I)} < 0, \quad \frac{d\hat{e}_N}{da^l} = 0.$$

Q.E.D.

In the first case, where $a^h = a^l = a$, an increase in negative attitudes increases the separation of immigrants and therefore makes it less profitable to open a vacancy. The reduction in labour market tightness for immigrants reduces their bargaining power and thereby their wages. Immigrants' transition rate falls which together with their higher separation rate increases their unemployment rate.

Concerning educational choice, the impact depend on the impact on employment perspectives for high productivity workers relatively to the impact on low productivity workers. The reduced employment perspectives, through lower employment chances and lower wages, affect both high productivity and low productivity workers. However, due to higher productivity, the reduction in wages is going to be larger for high productivity workers than for low productivity workers and therefore the incentives to acquire education falls. The result is that fewer immigrants acquire education. As negative attitudes have no impact on the separation rate of natives, they are not affected.

For the second case, that is, where $a^h = 0$, $a^l > 0$, an increase in negative attitudes only increases the separation of low productivity workers and only for the low productivity firms hiring immigrants, there is a reduction in the profitability of opening a vacancy. The resulting reduced labour market tightness for low productivity firms hiring immigrants increases uneducated immigrants' unemployment rate. High productivity immigrants are not affected as their separation rate is not affected.

When we turn to educational choice, the result changes compared to in case 1. The employment perspectives for high productivity workers are not affected and as the employment perspectives of low productivity workers worsens, the incentives to acquire education increase. In this case we therefore obtain the opposite result compared to in case 1, namely that more immigrants acquire education. Again, as negative attitudes have no impact on the separation rate of natives, they are not affected.

4 Immigration

In this section, we examine the impact on labour market tightness, wages, education and unemployment from more immigration. Notice that $\lambda_I = tI$ and $\lambda_N = tN = t(1 - I)$. The impact on labour market tightness, wages and unemployment as well as education will differ dependent on whether negative attitudes towards immigrants exists in both sectors or in the low productivity sector only. We have the following proposition.

Proposition: When the fraction of immigrants increases, labour market tightness facing immigrants increases, causing their unemployment rate to fall and their wages to increase. The improved labour market prospects of immigrants raise their level of education in the first case where all immigrants face a higher separation rate than natives, $a^h = a^l = a$ whereas the impact on education is ambiguous in the sector case where only low productivity workers experience negative attitudes, $a^h = 0$, $a^l > 0$. Comparing to the first case, the opposite holds for natives.

Proof: For both cases: Differentiating equations (11), (12), (10) and (9) with respect to I delivers a positive impact on labour market tightness for immigrants and a negative impact on natives.

$$\frac{d\theta_I^m}{dI} = \frac{-tkq(\theta_I^m)}{((1 - \theta_I^m k + \lambda_I k) q'(\theta_I^m) - \theta_I^m k q(\theta_I^m))} > 0,$$

$$\frac{d\theta_N}{dI} = \frac{ktq(\theta_N)}{((1 - \theta_N k + \lambda_N k) q'(\theta_N) - \theta_N k q(\theta_N))} < 0.$$

$$\frac{dw_I^m}{dI} = 0.5y^m \left(t + \frac{d\theta_I^m}{dI} \right) k > 0, \quad \frac{dw_N^m}{dI} = 0.5y^m \left(-t + \frac{d\theta_N^m}{dI} \right) k < 0.$$

Again for both case 1 and 2, we differentiate equations (16) and (17) with respect to I to obtain:

$$\frac{du_I}{dI} = \frac{-s_I f'(\theta_I)}{(f(\theta_I) + s_I)^2} \frac{d\theta_I}{dI} < 0, \quad \frac{du_I^m}{dI} = \frac{-s_I^m f'(\theta_I^m)}{(f(\theta_I^m) + s_I^m)^2} \frac{d\theta_I^m}{dI} < 0, \quad \frac{du_N}{dI} = \frac{-s_N f'(\theta_N)}{(f(\theta_N) + s_N)^2} \frac{d\theta_N}{dI} > 0.$$

Concerning education, for case 1, we differentiate equation (14) with respect to I to obtain:

$$\frac{d\hat{e}_I}{dI} = \frac{(y^h - y^l) \frac{d\theta_I}{dI}}{c'(\hat{e}_I)} < 0, \quad \frac{d\hat{e}_N}{dI} = \frac{(y^h - y^l) \frac{d\theta_N}{dI}}{c'(\hat{e}_N)} > 0.$$

In the second case, the result for education for immigrants is:

$$\frac{d\hat{e}_I}{dI} = \frac{\left(y^h \frac{d\theta_I^h}{dI} - y^l \frac{d\theta_I^l}{dI} \right)}{c'(\hat{e}_I)} < 0,$$

which is negative as $\frac{d\theta_I^h}{dI} > \frac{d\theta_I^l}{dI}$.
Q.E.D.

In this section we consider the situation where negative attitudes do not depend on immigration. More immigrants will induce the fraction of immigrants to increase, improving networking and thus labour market tightness for firms hiring immigrants and therefore immigrants' transition rate. Similarly, networking among natives fall, and thereby labour market tightness for natives falls. As networking both directly and indirectly has a positive impact on immigrants' wages, their wages increase whereas natives' wages fall. Furthermore, the increase in immigrant's transition rate reduces their unemployment rate and the corresponding reduction in natives' transition rate raise their unemployment rate. Finally, concerning education for immigrants, improved labour market conditions due to more networking are higher for high productivity workers than low productivity workers, wherefore education increases.

As an illustration, consider the situation where $a = 0$ and hence $s_I = s_N$

and initially $N = I$. In this case, labour market tightness facing immigrants is equal to labour market tightness facing natives. The fraction of educated immigrants and natives are also identical, $\hat{e}_I = \hat{e}_N$ and thereby $c'(\hat{e}_I) = c'(\hat{e}_N)$. The increase in educated natives is therefore equal to the fall in the fraction of educated immigrants. However, a more realistic setup is where $N > I$ so that $\theta_N > \theta_I$ and thus $\hat{e}_I > \hat{e}_N$ (the fraction of natives acquiring skills is higher than the fraction of immigrants acquiring skills). In this case, $c(\hat{e}_I) < c(\hat{e}_N)$, and $|c'(\hat{e}_I)| > c'(\hat{e}_N)$, the impact through the lower educational costs will increase the impact on education. However, substituting from equation (11) and (12) we obtain that the positive impact of networking is smaller for immigrants than the negative impact from networking for the natives, $|d\theta_I/dI| < d\theta_N/dI$. Hence, given $N > I$ initially, the impact from an increase in the number of immigrants on their educational level may be smaller or larger than the negative impact on the educational level facing natives.

5 Immigration and negative attitudes

In this section we expand the model by allowing for the possibility that a higher fraction of immigrants increases negative attitudes, giving for case 1, $s_I^h = s_I^l = s_N(1 + a(I))$ and for case 2, $s_I^h = s_N$ and $s_I^m = s_N(1 + a(I))$. More immigrants around increases the possibility of a multiethnic society, which for some people is a negative development. The impact on natives is identical to the impacts above.

Proposition: When the fraction of immigrants increases, negative attitudes increases as well as networking, implying an ambiguous impact on labour market tightness, wages, unemployment and education for immigrants. The impact on natives is identical to the impact above.

Proof: Natives are affected as above. For immigrants we have the following. In the first case, differentiating equations (11), including the matching function, $X_I^m = \sqrt{v_I^m u_I^m}$ with respect to I where now $a(I)$ we obtain

$$\frac{d\theta_I^m}{dI} \Big|_{a(I)} = \frac{-k (s_N a'(I) \sqrt{\theta_I^m} - t)}{(k(\rho + s_I^m)1/\sqrt{\theta_I^m} + k)}.$$

Substituting for the solution for labour market tightness we obtain the condition for $a'(I) = 1$:

$$\frac{d\theta_I^m}{dI} \Big|_{a(I)} \leq 0 \Leftrightarrow z \geq I,$$

where $z = \frac{s_N(2\rho tk + s_N(1-2tk)) - t^2 k}{s_N^2 tk}$.

This implies that for case 1 we obtain

$$\frac{dw_I^m}{dI} \Big|_{a(I)} \leq 0 \text{ and } \frac{d\hat{e}_I}{dI} \Big|_{a(I)} \Leftrightarrow z \geq I,$$

and that $\frac{du_I^m}{dI} \Big|_{a(I)} > 0$ for $z \geq I$.

In the second case, we obtain where $da^l/dI = 1$

$$\frac{d\theta_I^l}{dI} \Big|_{a^l(I)} = \frac{-k (s_N \sqrt{\theta_I^l} - t)}{(k(\rho + s_I^l)1/\sqrt{\theta_I^l} + k)}, \quad \frac{d\theta_I^h}{dI} \Big|_{a^l(I)} = \frac{tk}{(k(\rho + s_I^l)1/\sqrt{\theta_I^l} + k)} > 0.$$

$$\frac{dw_I^l}{dI} \Big|_{a^l(I)} \leq 0 \text{ } z \geq I, \quad \frac{dw_I^h}{dI} \Big|_{a^l(I)} > 0 \text{ and } \frac{d\hat{e}_I}{dI} \Big|_{a^l(I)} < 0,$$

and that $\frac{du_I^l}{dI} \Big|_{a(I)} > 0$ for $z \geq I$, and $\frac{du_I^h}{dI} \Big|_{a(I)} < 0$.

Q.E.D.

The impact of immigration on labour market performance for immigrants now changes and becomes more ambiguous. The reason is that more immigration improves networking and thereby employment chances and wages, but at the same time, negative attitudes may become more severe and therefore reduce labour market tightness again. In the first case, where $a^h = a^l = a(I) > 0$, the positive impact through networking on labour market tightness is more important than the negative impact through increased negative attitudes if the fraction of immigrants is sufficiently high. The condition for a positive sign for labour market tightness is dependent on the separation rate and the networking effect, so that in this case, the separation rate has to be low, low s , relatively to the networking effect, high t . In the second case, $a^h = 0$, $a^l = a(I) > 0$, high productivity workers are not affected and low productivity workers are effected as in case 1, implying that education unambiguously increases, as the relative gain of acquiring education increases.

6 Macro-econometric Analysis

In this section, we test the model predictions regarding the impact of networking and negative attitudes on education. We consider macroeconomic data for Denmark in 2002 and explore the variation between municipalities. In 2002, there are 275 municipalities in Denmark. The year 2002 is chosen as there is a general election in 2001 and it is well prior to the year 2007 where the 275 municipalities are merged into 98 municipalities.

In order to disregard mobility issues we examine the high school decision as a function of immigration and attitudes as well as other explanatory variables. For example, we want to avoid the possibility that lack of networking possibilities or negative attitudes causes the student to move, High school students are most likely to stay at home during their high school graduation and we consider the possibility that parents move as a reaction to the networking variable or negative attitude variable to be tiny. Hence, our dependent variable is the fraction of immigrants in a municipality at age 16 attending high school in year 2002.

As the negative attitude variable we consider two different measures. The first variable is the fraction of votes for two parties, Fremskridtspartiet and Dansk Folkeparti due to their emphasis on reducing immigration.⁷ The second variable is taken from a survey and is the fraction of surveyed persons in a municipality who answers that they agree that immigrants should be sent back to their home country if there is no more work for them in Denmark. There are 1500 respondents to the survey.

For the networking variable, we include the fraction of immigrants and descendants relative to the total population in the municipality. Throughout the results section, we use the terms immigrants and descendants and immigrants interchangeably.

We want to disregard mobility taken by the individual due to different labour market conditions or attitudes. We therefore consider the high school decision by examining the following model.

$$(1 - \hat{\epsilon}_r) = \beta_0 + \beta_1 a + \beta_2 \lambda_r + \sum_{\eta} \beta_{r\eta} \text{Controls}_{r\eta} + \epsilon_r, r = 1, \dots, 266. \quad (18)$$

⁷Fremskridtspartiet's webpage: <http://www.fremskridtspartiet.dk/page9.html> (all in Danish: main idea: immigrants may stay for shorter or longer periods).

Dansk Folkeparti's webpage (http://www.danskfolkeparti.dk/The_Party_Program_of_the_Danish_Peoples_Party): *Denmark is not an immigrant-country and never has been. Thus we will not accept transformation to a multiethnic society.*

Denmark belongs to the Danes and its citizens must be able to live in a secure community founded on the rule of law, which develops along the lines of Danish culture.

It ought to be possible to absorb foreigners into Danish society provided however, that this does not put security and democratic government at risk. To a limited extent and according to special rules and in conformity with the stipulations of the Constitution, foreign nationals should be able to obtain Danish citizenship.

Other Danish parties may also be interested in limiting immigration but not to such an extent that it is on their official webpage.

The left hand side variable, $(1 - \hat{e}_r)$, is the fraction of young 16 years old immigrants/descendants attending high school in year 2002. In Denmark youngsters' first year in high school will be when they are 15-16 years old. Only the first 9 years of schooling are obligatory in Denmark (only recently a grade zero has become obligatory). High school is optional and most of the youth beginning high school will graduate with a high school degree. Moreover, in this paper we aim to evaluate whether negative attitudes and immigration and thereby the potential labour market impact of being skilled relatively to nonskilled will influence the decision to begin high school.

We examine whether negative attitudes, a , and the fraction of immigrants through a potential networking effect, $\lambda_r = tI$ have any impact on the fraction of young immigrants (16 years old) attending high school. The fundamental idea behind using macro data is to potentially show some correlation between the general prevalence of negative attitudes in a municipality and the expected return to education, through employment perspectives and the fraction of immigrants attending high school. The impact may thus be both direct and indirect, and in this sense we may capture something different than if we only consider micro data. Furthermore, the theoretical model being a macroeconomic model, makes the macro-econometric analysis a natural starting point. As controls, we include cross income per capita in the municipality, population density and the percentage of the labour force (LF) with short, medium and long tertiary education. Throughout the macro section, we examine the fraction of both immigrants and descendants attending high school.

Table 1 presents descriptive statistics of the municipal data. While the total number of municipalities in Denmark during the time period is 275, we drop 9 municipalities as there were no 16 year old immigrants residing in them.⁸ From Table 1, it is seen that the average share of 16 year old immigrants in high school is about 12% while it is slightly larger for natives, 14.9%. It is worth noting that while this number may seem small, it reflects only the fraction of individuals who attend "regular" high school, and not all high school types available in Denmark.

For immigrants, the minimum share is 0 and the maximum share is 1, so there are municipalities with no 16 year old immigrants in high school and we also have municipalities with 100%. These extreme numbers likely are a consequence of the size of the municipality and the total number of 16 year old immigrants in such municipalities and therefore describe the behavior of only a very limited set of individuals. For the natives, the 0 shares also correspond with small municipalities, but in much fewer cases. In the estimation, we will present regression results weighting by the municipal population to better try to take such features of the data into account.

The two measures used for negative attitudes have average values of 13% (election data) and 20 % (survey data) respectively. The network measure for immigrants is on average 4.9%, while the pseudo-network variable for natives has

⁸The municipalities we drop are: Fuglebjerg, Holeby, Højreby, Rudbjerg, Sydlangeland, Nørhald, Fjends, Læsø and Åbybro.

an average of 95%. The average values of the different unemployment measures range from 3.6% to 11%, with the maximum average value for the immigrants from non-Western countries. The average (of average) gross income level per capita is 173000 DKK and the average population density is 0.271 people per square kilometer. Population density is included to account for the degree of urbanization of a municipality. The average shares of the population with a short, medium and long education respectively are 40%, 11% and 3%. Comparing the mean values and the median values of all variables we see that in some cases – especially for variables involving immigrants – the distributions are quite skewed.

Table 2 presents estimation results of equation 18, where columns (1) and (2) use the voting measure of negative attitudes for natives and immigrants respectively, while columns (3) and (4) use the survey measure of negative attitudes for natives and immigrants respectively. Consistent with expectations, the negative attitudes voting measure is negative and significant at the 5% level for immigrants, with a coefficient of -1.014. This implies that a 1 percentage point increase in the share of votes for the two parties leads to a decrease of approximately 1 percentage point in the fraction of 16 years old immigrants who chooses high school.⁹ The negative effect of negative attitudes on immigrants' educational attainment is consistent with case 1 of the model, where negative attitudes are present in both the low and high productivity sectors. The fraction of 15-64 year olds with either short, medium or long education is compared to the base category of no more than primary school or a high school type of school. For the immigrant estimation, both the income and population density controls are imprecisely estimated. In fact, the only variables which are significantly estimated are the immigrant networking variable and the fraction of non-western immigrants unemployed, which is negative and opposite of what would be expected.

For the natives regression, we expect to find no significance for the negative attitude and network variables, for the attitude variable, this expectation is fulfilled. Strictly speaking we would not expect any networking effect at this level of aggregation for natives, as the share of natives is always at least 74% and in most cases above 90%. On the contrary, we find strong significance for the native network variable, where an increase in the fraction of natives residing in a municipality decreases the fraction of natives enrolled in high school. One potential explanation of this negative effect could be that larger shares of natives reside in more rural municipalities, and these rural municipalities are also less educated. For natives, both gross income per capita and the fraction of natives unemployed increase the share of natives enrolled in high school.

Examining the results based on the survey measure of negative attitudes, we get somewhat different results for immigrants. The negative attitudes variable for immigrants is still significant and negative, although only at the 10% level, and the size of the coefficient has almost halved. The network variable is no

⁹For example, comparing Hørsholm with 8.7% votes for the two parties to Hillerød with 9.7% and assuming that all other variables for these two municipalities were the same.

longer significant, although the sign is still the expected one. Again, the coefficient of the unemployment rate among non-Western immigrants is significant and negative and of similar magnitude as estimation using the voting data. As before, none of the other control variables are significant. The results for the natives equations are almost unchanged. It is worth noting that the number of observations is much lower when using the survey variable for negative attitudes; this is due to the rather limited number of replies to the survey in certain municipalities, as those municipalities are dropped from the estimation. Hence, the different results for the two attitude measures may relate to the measures being different or to the differences in the samples on which the estimations are based.

Table 3 explores the possibility that small municipalities are driving the previous results, by estimating the same regressions as in Table 2, but weighting by the total population of the municipality. When doing so, all significance in the negative attitude measures disappears for the immigrant estimation, while the estimation for natives is basically unchanged. Hence, the overall picture after having performed these weighted regressions is that the regressions for immigrants are somewhat fragile, while we find quite a large amount of robustness for the natives regressions. These findings seem to indicate that to a large extent, small municipalities with few 16 year old immigrants drive the earlier results. On the one hand this is perhaps unsurprising, as one may expect that the negative attitude effects may be stronger in small and less urban municipalities, while on the other hand, it also points to the desirability of moving towards to an analysis using individual level data. Hence, despite that we find some support for our theoretical prediction, it seems natural to also estimate similar regressions at the micro level, where individual educational choices of the 16 years old immigrants and natives are modeled.

7 Microeconomic Analysis

7.1 Data

In order to examine the relationship between immigrant high school attendance and negative attitudes towards immigrants and networks, we use detailed Danish Register Data made available by Statistics Denmark. Danish Register Data is a database containing detailed information on every resident of Denmark from 1980-present. The data is interlinked across various government and administrative sources by an anonymous personal identification number, so individuals are also observed overtime. As with the macroeconomic analysis, we consider only an immigrant's high school decision in 2002. The data used is composed of: education history (information such as where an individual attends school and what qualification they are studying towards and have already achieved); demographic information such as gender, age, and municipality of residence; immigration history (including an individual's nationality, exact date of immigration, and whether an individual is a 1st or 2nd generation immigrant; and

household characteristics such as family composition and parental information. As individuals are linked to their parents, it is possible to include factors such as parental education, employment history, and marital status, all of which will likely affect an immigrant’s high school decision.

By using individuals’ municipality of residence, we are also able to construct exact sums of immigrants from a certain nation residing in every Danish municipality. By interacting these sums with an immigrant’s own nationality, we are able to recreate an individual’s potential network based on the fraction of the population living in his municipality from his homeland (excluding the immigrant him or herself). For 16 year old immigrants deciding whether to attend high school, the presence of other immigrants from their homeland may significantly impact this decision. Using education and employment data, we are able to construct the education and employment levels of immigrants by nationality for each municipality, which is likely to also be of importance in an immigrant’s high school decision.

To capture negative attitudes, we merge the 2001 voting data discussed in the macroeconomic analysis into Danish Register Data. As such, we have the fraction of total votes for Fremskridtspartiet and Dansk Folkeparti, the two political parties which emphasize reducing immigration, at the municipal level. In this way, we are able to include the fractions of votes for these two parties as a measure of negative attitudes towards immigrants. In the micro section we consider the high school choice of both immigrants and descendants, however the results obtained are quantitatively similar using only immigrants. Summary statistics can be seen in Table 2 in the appendix.

7.2 Results

We estimate the following equation separately for natives and immigrants/descendants:

$$\begin{aligned}
 (1 - \hat{e}_i) = & \beta_0 + \beta_1 \text{FracOwnNatEduc}_r + \beta_2 \text{FracOwnNatEmp}_r \\
 & + \beta_3 \text{FracOwnNat}_r + \beta_4 a_r + \beta_5 \text{ParentEdu}_p + \\
 & \sum_{\mu} \beta_{r\mu} \text{MuncControls}_{r\mu} + \sum_{\eta} \beta_{i\eta} \text{HHControls}_{i\eta} + \varepsilon_i, \quad (19)
 \end{aligned}$$

where $(1 - \hat{e}_i)$ is the educational decision of individual i represented by a dummy variable if an individual is attending high school or not, which is determined by: FracOwnNatEduc_r , the fraction of individuals of the same nationality residing in the same municipality r who have (at least) a high school education; FracOwnNatEmp_r , the fraction of individuals of the same nationality residing in the same municipality r who are employed; FracOwnNat_r , the fraction of individuals of the same nationality residing in the same municipality r ; a_r , the measure of negative attitudes towards immigrants in municipality r ; Male_i , a dummy variable for if an individual is male; ParentEdu_p , the education of parent p where $p = \text{mother, father}$, MuncControls_r ; municipal factors such as population density and the fraction of immigrants/natives unemployed which

may affect an individual's education decision; $HHControls_i$, additional household controls such as parental employment status, total household income, and parental marital status; and ε_i , the individual error term. In order to identify the effects for immigrants, we separately estimate equation 19 for natives and for immigrants and descendants.

As we now use individual level data, we analyze separately males and females in order to see if their educational decisions are affected differently by negative attitudes. Tables 5 and 6 present results for males and females respectively. Similar to the municipality estimation, odd columns present results for natives, while even columns present results for immigrants. In columns (1) and (2) the sample consists of only those individuals in regular education, while columns (3) and (4) present results where the sample includes, in addition to individuals in regular education, also those in business education and vocational training.¹⁰ Throughout Tables 5 and 6, negative attitudes are captured by the fraction of votes in a municipality for both Fremskridtspartiet and Dansk Folkeparti.

Examining first males in Table 5, the fraction of own nationality individuals employed significantly increases the propensity of an immigrant to attend high school, where a one percentage point increase in the fraction of own nationality immigrants employed residing in the municipality would lead to a 0.62 percentage point increase in the probability of attending regular high school and a 0.72 percentage point increase for any high school. No equivalent significant effects are seen for natives, a finding which is consistent with networking amongst immigrants. The other networking variables, the fraction of own nationality individuals residing in the same municipality and the fraction of own nationality individuals with at least a high school education, are imprecisely estimated for both natives and immigrants. The negative attitudes measure significantly increases an immigrant's probability of attending high school, where a 1 percentage point increase in the fraction of votes for either political party increases the probability of attending high school by 1.25 percentage points for regular high school and 1.4 percentage points for any high school, while no effects are seen for natives. For both natives and immigrants, household controls matter a lot for an individual's propensity to attend high school, with education, employment, and marital status of both parents significantly increasing the probability of attending high school in nearly all specifications. On the whole, results are very similar for both natives and immigrants whether we define education as an individual enrolled only in regular high school or in any type of high school.

For females, in Table 6, a different picture is seen. While both the fraction of own nationality immigrants and the fraction of own nationality immigrants employed lead to a significant and positive increase in the probability of attending high school for immigrants, a significant negative effect is seen for natives for the fraction of own nationality natives with education to high school or beyond. Likewise, the negative attitudes measure decreases the probability of attending high school for natives, an effect which is significant only at the 10% level, while for immigrants there are positive, but insignificant effects seen for negative at-

¹⁰All individuals irrespective of educational program.

titudes. Similar to the male estimation, parental education, employment, and marital status significantly increase the probability of attending high school for both natives and immigrants.

Contrary to the macroeconometric analysis we find evidence that for males, negative attitudes towards immigrants (as measured by the fraction of votes for both Dansk Folkeparti and Fremskridtspartiet) increase the propensity of an immigrant/descendant to attend high school. For females, this effect is positive, but imprecisely estimated. For natives, no significant effects are seen for males, while negative attitudes decrease the probability of female natives attending high school, an effect which is marginally significant. The positive effect of negative attitudes on male immigrant education supports the second case of the theoretical model, where negative attitudes may have differential effects on immigrants/descendants' propensity to attend high school depending on their productivity levels. In the case where high productivity workers are comparable to natives, as outlined in Section 3, negative attitudes only affect low productivity workers. This leads to lower employment perspectives for these low productivity workers, lowering the future wages that young immigrants expect to receive and increasing the incentives of young immigrants/descendants to acquire education.

8 Conclusion

We considered the impact of negative attitudes and immigration on educational choice of immigrants and natives. We did this theoretically and empirically.

Theoretically, we formulated a Becker-style taste discrimination model within a search and wage bargaining setting. We assumed that potential negative tastes towards immigrants implied that their separation rate from the job was higher than the separation rate of a native worker. Furthermore, we allowed for networking effects, which increased the probability of obtaining employment. We considered two different cases. In the first case, discrimination existed for all immigrants, whereas it was only present in the sector employing uneducated workers in the second case. We found that an increase in negative attitudes reduces education for immigrants in the first case, increases education in the second case, whereas there was no impact on natives in the two cases. We also found that more immigration improved employment perspectives for immigrants and thereby increases the fraction of educated immigrants due to increased networking. Finally, we considered endogenous negative attitudes in the sense that more immigration increased negative attitudes. In this case, the impact of more immigration on the educational level of immigrants was ambiguous.

Empirically, we considered an immigrant's high school attendance as a function of the variables in the theoretical model. Considering high school attendance allowed us to disregard mobility issues for the individual acquiring education. On the macro-level, we confirmed the result from the first case of the model, namely an existence of a negative correlation between negative attitudes towards immigrants and high school attendance by exploring the variation be-

tween 275 municipalities in Denmark. As identification, we ran the regression for natives, and found no significant correlation. Weighting this regression by the total population of the municipality reveals that smaller municipalities with few 16 year old immigrants may be driving these results. On the individual level, we used Danish register data to find a positive impact of networking on high school attendance, whereas the impact of negative attitudes has a positive and significant effect on male immigrants, and a positive but insignificant effect for female immigrants. This is consistent with the second case of the theoretical model, where negative attitudes mainly are prevalent in the sector hiring low skilled workers and therefore more severe negative attitudes increase the incentives to acquire education.

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9 Appendix

Table 1: Summary Statistics at the Municipal Level

	(1)	(2)	(3)	(4)	(5)
	Mean	Median	Std Dev	Min	Max
Share of 16 year old immigrants in high school	0.122	0.064	0.167	0.000	1.000
Share of 16 year old natives in high school	0.149	0.135	0.085	0.000	0.548
Negative attitude variable based on 2001 election data	0.132	0.130	0.023	0.071	0.210
Fraction with negative attitudes, survey	0.196	0.128	0.258	0.000	1.000
Network for immigrants (share of immigrants/descendants)	0.049	0.037	0.032	0.020	0.252
'Network' for natives (share of natives)	0.951	0.963	0.032	0.748	0.980
Unemployment rate, immigrants, western countries	0.051	0.046	0.032	0.000	0.182
Unemployment rate, immigrants non-Western countries	0.110	0.091	0.094	0.000	0.727
Unemployment rate, natives	0.036	0.033	0.013	0.015	0.096
Gross income per capita in 100000 DKK	1.726	1.671	0.192	1.448	2.771
Population density	0.271	0.071	0.819	0.019	10.413
Share with short education	0.401	0.402	0.034	0.271	0.503
Share with medium education	0.106	0.102	0.028	0.063	0.242
Share with long education	0.031	0.023	0.028	0.007	0.204
Observations	266				

Table 2: High School Participation for Immigrants and Natives at the Municipal Level

	(1)	(2)	(3)	(4)
	Frac Native Enrolled HS	Frac Imm Enrolled HS	Frac Native Enrolled HS	Frac Imm Enrolled HS
% Fremskridtspartiet and Dansk Folkeparti GE 2001	0.257 (0.158)	-1.014** (0.470)		
% Munc. Pop with Neg. Attitudes			0.003 (0.011)	-0.066* (0.035)
% Native	-0.569*** (0.113)		-0.598*** (0.114)	
% Immigrants/Descendants		0.614*** (0.217)		0.333 (0.226)
% Natives Unemployed	0.587** (0.229)		0.710*** (0.243)	
% Western Imm Unemp.		-0.367 (0.360)		0.450 (0.351)
% Non-Western Imm Unemp.		-0.204** (0.092)		-0.282** (0.115)
Gross Income Per Capita/100000	0.177*** (0.043)	0.108 (0.143)	0.175*** (0.049)	0.142 (0.159)
Population Density (per 1000)	-0.003 (0.003)	0.011 (0.009)	-0.003 (0.003)	0.010 (0.008)
% of LF with Short Tertiary Educ.	0.078 (0.122)	-0.390 (0.438)	0.036 (0.148)	-0.755 (0.509)
% of LF with Medium Tertiary Educ.	0.090 (0.146)	-0.108 (0.632)	-0.073 (0.146)	0.129 (0.564)
% of LF with Long Tertiary Educ.	1.320*** (0.360)	-0.659 (1.239)	1.267*** (0.405)	-0.648 (1.213)
R ²	0.704	0.027	0.683	0.044
N	266	266	220	220

Standard errors in parentheses are robust to heteroscedasticity. Neg. Att. is the negative attitude variable which is either measured as the share of votes for the Fremskridtspartiet or Dansk Folkeparti or as the share of people with a negative attitude from the survey. Network of the immigrants and descendants is measured as the fraction of immigrants and descendants in the municipalities. For the natives we include the same type of share-variable. Vocational education is included in the base group. Medium education also includes bachelor degrees.. * p<0.10, ** p<0.05, *** p<0.01.

Table 3: High School Participation for Immigrants and Natives at the Municipal Level

	(1)	(2)	(3)	(4)
	Frac Native Enrolled HS	Frac Imm Enrolled HS	Frac Native Enrolled HS	Frac Imm Enrolled HS
% Fremskridtspartiet and Dansk Folkeparti GE 2001	0.205 (0.174)	0.341 (0.449)		
% Munc. Pop with Neg. Attitudes			-0.008 (0.012)	-0.023 (0.012)
% Native	-0.538*** (0.113)		-0.559*** (0.109)	
% Immigrants/Descendants		0.240 (0.368)		0.313** (0.139)
% Natives Unemployed	0.518** (0.210)		0.567** (0.222)	
% Western Imm Unemp.		0.137 (0.271)		0.191 (0.307)
% Non-Western Imm Unemp.		-0.067 (0.091)		-0.091 (0.115)
Gross Income Per Capita/100000	0.211*** (0.053)	0.110 (0.099)	0.214*** (0.058)	0.166 (0.119)
Population Density (per 1000)	0.000 (0.003)	0.005 (0.004)	0.000 (0.004)	0.005 (0.004)
% of LF with Short Tertiary Educ.	0.118 (0.136)	0.067 (0.357)	0.117 (0.162)	-0.026 (0.432)
% of LF with Medium Tertiary Educ.	-0.026 (0.189)	-0.667 (0.447)	-0.198 (0.218)	-0.855* (0.475)
% of LF with Long Tertiary Educ.	1.139** (0.488)	0.920 (0.826)	1.105** (0.532)	-0.545 (0.890)
R ²	0.804	0.251	0.790	0.280
N	266	266	220	220

Standard errors in parentheses are robust to heteroscedasticity. Neg. Att. is the negative attitude variable which is either measured as the share of votes for the Fremskridtspartiet or Dansk Folkeparti or as the share of people with a negative attitude from the survey. Network of the immigrants and descendants is measured as the fraction of immigrants and descendants in the municipalities. For the natives we include the same type of share-variable. Vocational education is included in the base group. Medium education also includes bachelor degrees.. * p<0.10, ** p<0.05, *** p<0.01.

Table 4: Summary Statistics

	(1)
% Fremskridtspartiet and Dansk Folkeparti GE 2001	0.1274 (0.0241)
Munc. Unemployment Rate	0.0521 (0.0150)
Munc. Population Density	709.8157 (1507.2081)
Munc. Gross Income Per Cap/10000	17.5920 (2.0569)
Native	0.9399 (0.2377)
Immigrant	0.0382 (0.1918)
Descendant	0.0219 (0.1463)
% of Natives Aged 16 in Regular HS	0.6981 (0.0000)
% of Imm./Desc. Aged 16 in Regular HS	0.5046 (0.0000)
% of Natives Aged 16 in Any HS	0.7424 (0.0000)
% of Imm./Desc. Aged 16 in Any HS	0.5265 (0.0000)
Male	0.5106 (0.4999)
Dad's Education	12.3335 (3.0405)
Mom's Education	12.5465 (2.9230)
Parents Married	0.6853 (0.4644)
Mother Emp Prev Dec.	0.8299 (0.3757)
Father Emp Prev Dec.	0.8485 (0.3586)
Household Income/10000DKK	62.0223 (50.7021)
Observations	53256

Mean values shown for 16 year old individuals residing in Denmark in 2002 unless otherwise indicated. Standard deviations in parentheses.

Table 5: Detailed Immigrant Homeland Interactions with General Election Voting Measures for Male 16 Year Olds

	(1) Native - Regular HS Ongoing	(2) Imm/Desc - Regular HS Ongoing	(3) Native - Any HS Ongoing	(4) Imm/Desc - Any HS Ongoing
% Both Parties GE 2001	-0.057 (0.173000)	1.249** (0.513)	-0.041 (0.140)	1.396*** (0.464)
Frac of Own Nat. >= HS	0.078 (0.092)	0.083 (0.107)	-0.043 (0.073)	-0.014 (0.099)
Frac of Own Nat. Emp	-0.177 (0.166)	0.616*** (0.114)	0.039 (0.133)	0.720*** (0.104)
Frac of Munc Pop Own Nat.	-0.078 (0.132)	-0.310 (0.859)	-0.040 (0.108)	-0.653 (0.784)
Mother's Education	0.019*** (0.001)	0.011*** (0.004)	0.014*** (0.001)	0.011*** (0.003)
Father's Education	0.019*** (0.001)	0.006* (0.004)	0.016*** (0.001)	0.004 (0.003)
Parents Married	0.061*** (0.008)	0.161*** (0.031)	0.064*** (0.007)	0.166*** (0.030)
Father Emp Prev Dec.	0.045*** (0.011)	0.063** (0.031)	0.064*** (0.009)	0.166*** (0.028)
Mother Emp Prev Dec.	0.084*** (0.010)	0.087*** (0.033)	0.102*** (0.009)	0.080*** (0.029)
Household Income/100000DKK	0.005** (0.002)	0.006 (0.007)	0.003** (0.001)	0.006 (0.006)
% Natives Unemp.	-0.700* (0.368)		-0.260 (0.294)	
% Western Imm Unemp.		-0.308 (0.598)		0.020 (0.557)
% Non Western Imm Unemp.		0.310 (0.215)		0.196 (0.207)
Population Density (per 1000)	-0.002 (0.003)	0.011* (0.006)	-0.005* (0.003)	0.009* (0.005)
R ²	0.081	0.130	0.064	0.137
N	19127	1398	25526	1669

Standard errors reported in parentheses. Interaction terms with dummy whether individual is immigrant/descendant or native (Dane) * p<0.10, ** p<0.05, *** p<0.01. Any HS Ongoing corresponds to either enrollment in regular high school, business high school, or vocational training programs (apprenticeships).

Table 6: Detailed Immigrant Homeland Interactions with General Election Voting Measures for Female 16 Year Olds

	(1)	(2)	(3)	(4)
	Native - Regular HS Ongoing	Imm/Desc - Regular HS Ongoing	Native - Any HS Ongoing	Imm/Desc - Any HS Ongoing
% Both Parties GE 2001	-0.278* (0.152)	0.593 (0.486)	-0.223* (0.133)	0.620 (0.455)
Frac of Own Nat. >= HS	-0.222*** (0.082)	-0.004 (0.116)	-0.202*** (0.071)	-0.032 (0.109)
Frac of Own Nat. Emp	0.040 (0.148)	0.614*** (0.124)	0.106 (0.131)	0.681*** (0.1116)
Frac of Munc Pop Own Nat.	0.207* (0.116)	2.294*** (0.816)	0.248** (0.106)	1.998** (0.769)
Mother's Education	0.018*** (0.001)	0.016*** (0.004)	0.014*** (0.001)	0.014*** (0.004)
Father's Education	0.017*** (0.001)	0.006 (0.004)	0.014*** (0.001)	0.005 (0.004)
Parents Married	0.071*** (0.009)	0.092*** (0.033)	0.066*** (0.008)	0.091*** (0.032)
Father Emp Prev Dec.	0.071*** (0.010)	0.099*** (0.030)	0.076*** (0.010)	0.089*** (0.028)
Mother Emp Prev Dec.	0.104*** (0.010)	0.070*** (0.031)	0.111*** (0.009)	0.072*** (0.028)
Household Income/100000DKK	0.006** (0.003)	0.006 (0.005)	0.006** (0.003)	0.006 (0.005)
% Natives Unemp.	-0.987*** (0.329)		-0.823*** (0.289)	
% Western Imm Unemp.		-0.878 (0.636)		-0.601 (0.593)
% Non Western Imm Unemp.		0.243 (0.230)		0.325* (0.196)
Population Density (per 1000)	0.005* (0.003)	0.008 (0.006)	0.002 (0.002)	0.005 (0.005)
R ²	0.096	0.146	0.081	0.140
N	20708	1388	24528	1533

Standard errors reported in parentheses. Interaction terms with dummy whether individual is immigrant/descendant or native (Dane) * p<0.10, ** p<0.05, *** p<0.01. Any HS Ongoing corresponds to either enrollment in regular high school, business high school, or vocational training programs (apprenticeships).