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Local Unemployment and the Earnings Assimilation of Immigrants in Norway

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Local Unemployment and the Earnings Assimilation of Immigrants in Norway

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Abstract

Labour market outcomes of immigrants and natives are affected differently by macroeconomic conditions. In particular, we show that earnings of immigrants in Norway from outside the OECD area are more sensitive to local labour market conditions than are earnings of natives. Failure to account for such differences may bias estimates when periods of rising or declining unemployment are important to identify assimilation effects on immigrant earnings. We show that this is the case for Norway: An observed drop in relative earnings of non-OECD immigrants after about 10 years in the host country disappears when we account for differential business cycle effects on immigrant and native earnings. The empirical evidence also reveals that local labour market conditions impact the rate of the earnings assimilation. We interpret the effect of unemployment on the assimilation rate in terms of a combined "wage curve effect" and a "learning effect" on the rate at which immigrants acquire country-specific human capital.

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1. Introduction

The labour market assimilation of immigrants forms a central topic in the economics of immigration and is of major interest for public policy (Chiswick, 1978; Borjas, 1994; 1999; Bauer et al., 2000). Whether immigrants adapt easily to conditions in the host-country labour market; whether labour market success follows time in the host country; and whether labour market outcomes of immigrants eventually reach parity with those of natives are all critical for the economic impact of immigration policies. It is therefore of disconcert that the empirical literature studying labour market outcomes of immigrants reveals serious methodological challenges that complicate the assessment of immigrant assimilation.

In particular, studies of immigrants both in Europe and North America indicate that the relative labour market performance of immigrants has declined across arrival cohorts (Borjas, 1985; Baker and Benjamin, 1994; Bauer et al., 2000). Any negative correlation between labour market outcomes and date of arrival invalidates cross-sectional analyses of immigrant assimilation as such data fail to discriminate between improvements caused by time in the host country and the positive outcomes merely associated with older arrival cohorts. The standard approach around this challenge is the *synthetic panel methodology*, in which one combines multiple cross-sections and track labour market outcomes of arrival cohorts over time (Borjas, 1995). Unfortunately, even this methodology cannot overcome the problem of untangling aging-, cohort-, and period effects. Researchers therefore typically rely on the assumption that period effects are equal for immigrants and natives in order to identify assimilation effects on immigrant labour market outcomes. In the present paper, we build on the synthetic panel methodology but relax the equal-period effects assumption by allowing macroeconomic conditions to affect immigrant and native labour market outcomes differently.

Surprisingly, although prior studies suggest that immigrants and natives are affected differently by macroeconomic conditions, such linkages are largely ignored in the empirical literature on immigrant labour market assimilation. In the United States, tentative evidence in Chiswick, Cohen, and Zach (1997) shows that employment of immigrants is more adversely affected by macroeconomic downturns than employment of natives. Similarly, McDonald and Worswick (1997) find that the unemployment incidence of immigrant men in Canada

increases more during a recession than that of natives.[1] Further, studies of empirical wage curves, linking earnings of individuals to unemployment in their local labour market, show that earnings of less-established workers tend to be more responsive to local labour market conditions than are earnings of established workers (Blanchflower and Oswald, 1994). A central hypothesis of the present paper is that such differences also characterise the local labour market responsiveness of earnings of immigrants and natives. Indeed, using data from 1980 and 1990, Longva and Raaum (2002) conclude that the annual earnings of immigrant men in Norway are more sensitive to local unemployment than are earnings of native men.

The basic premise behind our empirical strategy is to augment the synthetic panel methodology with wage curve effects, extending the analysis of Longva and Raaum (2002). By allowing the linkages between individual earnings and unemployment in the local labour market to differ for immigrant and native workers, we estimate assimilation effects on immigrant earnings accounting for differential responses to macroeconomic conditions. The empirical strategy further permits the rate of immigrant earnings assimilation to depend on macroeconomic conditions. A simple theoretical model is discussed in order to clarify the relationship between the wage curve effect and the human capital growth effect of unemployment.

Recent empirical evidence from the Scandinavian countries indicates significant assimilation effects on immigrant earnings, but also that the assimilation process is tied to arrival cohort, country of origin, and immigrant status. Based on large panels of immigrant and native men in Denmark, and jointly estimating assimilation effects on employment and wages, Husted *et al*. (2001) conclude that immigrants assimilate partially to natives, but that the assimilation process depends on immigrant status. In particular, the Danish study shows that labour market outcomes of those initially admitted as refugees fall significantly short of other immigrant groups and natives. Using longitudinal data on immigrants in Sweden, Edin *et al*. (2000) find significant earnings assimilation effects only for non-OECD immigrants, with any relative earnings growth of immigrants confined to the first few years after arrival. The Swedish study further concludes that neither immigrants from OECD countries

[1] Both the Chiswick, Cohen, and Zack and the McDonald and Worswick studies link employment experiences of immigrant to the national unemployment rate. One problem affecting the statistical evidence of these studies is that of short time series. In fact, the U.S. study is based on only four and the Canadian study on eleven unemployment observations.

(including Nordic immigrants) nor non-OECD immigrants reach earnings parity with natives.[2]

Hayfron (1998) and Longva and Raaum (2001) employ the synthetic panel approach and estimate assimilation effects on the earnings of immigrant men in Norway. Although quantitative estimates differ between the two studies, both uncover significant assimilation effect on immigrant relative earnings. The authors also show that estimates based on cross-sectional data exceed those of the synthetic panel approach and attribute this to declining cohort effects across arrival cohorts. Longva and Raaum estimate assimilation effects separately for immigrants from OECD and non-OECD countries and find that such effects are greater for the latter group. For OECD immigrants, they conclude that earnings profiles are comparable to those of native workers. Despite their higher assimilation rates, the study finds that earnings of immigrants from non-OECD countries do not converge to the earnings of natives.

Previewing results below, we find that earnings of non-OECD immigrants show significantly greater responsiveness to local labour market conditions then do earnings of OECD immigrants and natives. We obtain this finding for both male and female immigrants. Next we show that, for non-OECD immigrants in Norway, empirical estimates of assimilation effects are sensitive to whether or not we account for macroeconomic conditions. For this group, failure to control for the impact of unemployment in the local labour market leads to severe underestimates of assimilation effects on earnings. Furthermore, we find that the rate at which non-OECD immigrant men close the earnings gap with native men depends on macroeconomic conditions. For the first ten years after arrival, earnings growth relative to that of natives is significantly greater during low unemployment regimes than during periods of high unemployment. Finally, we find that estimates of cohort effects—the permanent earnings potential tied to the arrival cohort—are significant for non-OECD immigrants. Paralleling our findings for earnings assimilation, estimated cohort effects are sensitive to whether or not we account for local labour market.

[2] Edin *et al*. also conclude that selective return migration creates an upward bias in estimates that ignore return migration. Unfortunately, we are unable to study the impact of selective return migration in our data.

2. Earnings assimilation among immigrants—empirical model

The empirical model builds on the formulation in Borjas (1987; 1995). Suppose the earnings equation of immigrants observed in calendar year t is given by[3]

$$y_{jt} = X_{jt}\phi_i + \delta_i A_{jt} + \alpha YSM_{jt} + \sum_m \beta_m C_{jm} + \sum_s \gamma_{is}\Pi_{js} + \varepsilon_{jt} \quad (1)$$

and the earnings equation of natives by

$$y_{jt} = X_{jt}\phi_n + \delta_n A_{jt} + \sum_s \gamma_{ns}\Pi_{js} + \varepsilon_{jt}, \quad (2)$$

where y_{jt} is the log earnings of person j in year t; X is a vector of socio-economic characteristics such as schooling and marital status; A gives the age of the individual at the time of observation; C_{jm} is an indicator variable for the calendar year in which the immigrant arrived in the host country; YSM_{jt} is the number of years the immigrant has resided in the host country; and $\Pi_{j.}$ denotes a set of indicator variables set to unity if the observation is made in calendar year t.

The rate of earnings convergence between immigrants and natives is given by

$$\frac{\partial y_j}{\partial t}_{Immigrant} - \frac{\partial y_j}{\partial t}_{Native} = (\delta_i + \alpha) - \delta_n = \alpha^* \quad (3)$$

Typically, immigrants earn less than natives at the time of arrival. Thus, immigrants reduce the earnings gap over time if the sum of *YSM* and age effects exceeds the aging effect for natives. The β-vector captures any time-invariant differences in earnings potential across immigrant arrival cohorts and the vectors $\gamma_{i.}$ and $\gamma_{n.}$ measure the period effects, i.e., the impact of changing macroeconomic conditions, for immigrants and natives, respectively.

One key parameter of interest is α^*. However, the coefficients $\alpha, \beta,$ and γ are not identified in the immigrant wage equation because years since migration is the difference between the calendar year of observation and the year of arrival, which induces perfect collinearity among the variables $YSM, C,$ and Π (Borjas, 1985; 1999). To overcome the identification problem, some identifying restriction must be imposed on equations (1) and (2). The "equal cohorts" assumption, $\beta = 0$, is unlikely to hold, because immigration policies change, political conflicts generate a mix of potential immigrants that change over time, etc. For example, Bauer *et al.* (2000) summarise studies of immigrant earnings assimilation in Europe and conclude that nearly all European host countries have experienced a widening of the upon-arrival immigrant-native wage gap. In the case of Norway, Hayfron (1998) and

Longva and Raaum (2001) conclude that recent immigrant cohorts tend to have lower earnings potential than earlier cohorts.

An alternative identifying assumption, commonly used in recent studies following Borjas (1985), is that period effects are equal for immigrants and natives, i.e., $\gamma_{it} = \gamma_{nt}$. In other words, trends and transitory changes in aggregate macroeconomic and labour market conditions are assumed to have the same relative impact on native and immigrant earnings. This restriction basically cleans out the immigrant period effect, by using the calculated effect of macroeconomic conditions on earnings of the native-born comparison group when computing the coefficients of *YSM* and the cohort effects. As we show below, when the sample period covers years with highly different macroeconomic conditions the equal period effect assumption is unlikely to hold.

In order to allow for differences in responsiveness to business cycles, we extend the framework by drawing on the empirical wage-curve literature (Blanchflower and Oswald, 1994; Card, 1995). This literature has identified a negative relationship between transitory, regional effects on wages and the unemployment rate in the local labour market. Accordingly, we model the period effect as proportional to the natural logarithm of the local unemployment rate (u_{rt}) and allow for separate transitory wage effects for immigrants and natives:

$$\gamma_{rt}^{I} = \gamma_{t}^{0} + k^{I} \ln u_{rt}, \text{ and}$$

$$\gamma_{rt}^{N} = \gamma_{t}^{0} + k^{N} \ln u_{rt}, \qquad (4)$$

where the coefficients k^I and k^N denote the wage-curve elasticities of immigrants and natives, respectively.[4] It follows from (4) that the period effect is different for immigrants and natives if local labour market conditions have different effects on immigrant and native earnings. Below we outline a theoretical model that predicts that immigrant earnings are more responsive to changes in local unemployment than are native earnings, i.e., $k^I < k^N (\leq 0)$.

Equation (4) is restrictive in the sense that the impact of local labour market conditions on immigrant earnings is independent of their years of residence in the host country. As we discuss in the following section, this restriction is not likely to be valid. As immigrants accumulate human capital such as work experience, seniority, union membership,

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[3] To simplify notation, higher-order polynomials for age and YSM are ignored in the presentation of the model.
[4] Blanchflower and Oswald (1994) show that proper identification of the wage-curve elasticity requires inclusion of a fixed regional effect in the wage equation. Accordingly, the empirical specification includes a set of regional indicator variables. Also, to capture macroeconomic conditions common to all regions, the empirical specification contains a set of indicator variables for year of observation.

and interpersonal networks in the host country, we expect the influence of local labour market conditions on immigrant earnings to become more similar to that of natives. In other words, k^I is expected to depend on time spent in the host country and may perhaps eventually approach k^N. Furthermore, the process of accumulation of human capital may itself be influenced by the unemployment rate. We therefore extend the empirical specification and let the effect of regional unemployment interact with years since (im)migration. This allows us to discuss the impact of local labour market conditions on both the relative level of earnings as well as on the assimilation rate of immigrants.

3. Unemployment and the labour market performance of immigrants

In this section we sketch a simple theoretical framework in order to sort out the various mechanisms behind the relationship between local labour market conditions and immigrant earnings, see Barth et al (2002b) for more details. We first discuss the direct, mechanical effect of local unemployment on annual earnings through individual (un)employment experience. Next, we separate a wage-curve effect on the level of immigrant earnings from business-cycle impacts on assimilation through the acquisition of host-country specific human capital.

To begin, we assume that the employment probability of an immigrant is given by $\pi = 1 - u\varphi$, where u is the unemployment rate in the local labor market and $\varphi \geq 1$ is a factor measuring an immigrant's relative disadvantage in obtaining a job in the host country. At the time of entry, immigrants often lack the language skills, informal networks, and knowledge of the functioning of the labor market necessary for successful job search. In other words, immigrants face an initial disadvantage in search behaviour or even employment discrimination.[5] Such disadvantages diminish as the immigrant spends time in the host

[5] Unemployment levels are high among immigrants in Norway. Røed and Zhang (2000, p.18) find that "Immigrants from non-OECD countries are known to be much more unemployed than observationally equal natives. The estimates indicate that this is attributed to both incidence and duration. For example, male immigrants have roughly a 30 per cent higher transition rate from employment to unemployment, and a 23 per cent lower transition rate from unemployment to employment (cet. par.)."

The high levels of unemployment among immigrants can be attributed to large number of factors; from standard human capital explanations, via information or signalling problems to prejudice. Accordingly, regional unemployment is likely to have a stronger impact on job prospects of immigrants than of natives. First, seniority and LIFO dismissals will generally favour natives and make immigrants more exposed to spells of non-employment. Second, when immigrants are less able to signal their productivity accurately, non-immigrant

country. We therefore assume that φ is a declining function in years since migration and approaches unity as the immigrant assimilates into the labor market, i.e., $\varphi' \leq 0$ and $\varphi'' \geq 0$. For natives, φ=1 and the employment probability equals (1-*u*).

Let *Y* denote the annual earnings of an individual. We have

$$Y = \pi W + (1-\pi)Z, \tag{5}$$

where π is the fraction of the year the worker is employed, *W* is the (annual) wage rate and Z denotes unemployment benefits. Defining ρ as the earnings replacement ratio of unemployment workers, i.e., ρ=*Z*/*W*, we have $Y = WH = W(1-(1-\rho)u\varphi)$ or in natural logs $y = w + h$, where $h = \ln(1-(1-\rho)\varphi u)$ captures (expected) employment duration.

Consider next the wage rate, *W*, which we write as the multiplicative of two terms, individual productivity and a share factor which captures how the value from production is divided between workers and employers,

$$W = BP, \tag{6}$$

where *P* denotes individual productivity and $B \in (0,1]$ is the share factor reflecting the fraction of productivity that accrues to the worker. In a simple bargaining framework, such as Barth *et al.* (2002), the equilibrium share factor will relate to job prospects outside the firm, $1-u\varphi$. Weaker outside job prospects reduce the worker's share factor and bargained wage, and more so for recently arrived immigrants. Next, the productivity level of an immigrant will depend on the accumulated (country-specific) human capital. Letting lower case denote the natural logarithm, log annual earnings can then simply be expressed as the sum of three components that each depend on years since migration and local unemployment, $y = h + b + p$. Our focus is on how immigrant earnings evolve with time in the host country (*YSM* effects), the impact of business cycles (local unemployment effects), and the possible interaction between *YSM* and business cycle effects.

Consider first the effects on annual earnings *levels*. Years since migration is expected to have a positive impact on all three components. An increase in *YSM* adds to employment duration (*h*), raises productivity (*p*) due to accumulation of language skills and work experience, and, finally, improves outside job prospects that enable the immigrant to collect a higher share of her productivity through bargaining (*b*). Next, higher local unemployment reduces the relative earnings of immigrants through each of the three components—

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employers will tend to prefer native workers and the hiring probability for immigrant job seekers tends to fall considerably when the number of applicants for a vacancy increases, see Cornell and Welch (1996) and Larsen, Riis and Raaum (2000).

mechanically through shorter annual employment duration (*h*), because accumulation of skills through work (*p*) is hampered, and because worsened job prospects outside the firm reduce the immigrants' bargained share of productivity (*b*). Consequently, the annual earnings of immigrants relative to those of natives is increasing in *YSM* and decreasing in local unemployment.

The next question is how the assimilation rate, i.e., the *slope* of the immigrant earnings profile, is affected by (local) labour market conditions. First, it follows from the employment probability specification that the *marginal* effect of spending time in the host country on employment is stronger the higher is local unemployment, implying a positive impact of unemployment on the slope. Second, from a wage-curve perspective, an additional year in the host country reduces the sensitivity of wages with respect to local unemployment because the immigrant's likelihood of re-employment outside the firm increases (i.e., the employment disadvantage, φ, declines). With poorer outside employment opportunities, recently arrived immigrants are more willing than established immigrants to accept sizeable wage cuts if labour market conditions were to deteriorate. As φ approaches unity, the wage curve effect of immigrants approaches that of natives. From an *YSM* perspective, the implied assimilation rate operating through the bargaining share is higher the greater is local unemployment, again resulting in a steeper slope of the wage profile. Lastly, the marginal *YSM*-effect associated with accumulation of human capital is likely to be negatively affected by the local unemployment rate. The intuition is that higher unemployment lowers the probability of obtaining a job, which is necessary for learning to take place in the first place.[6]

The predictions from the theoretical framework can be summarised as follows. First, the earnings gap between immigrants and natives is larger the higher is unemployment. Less favourable job opportunities affect immigrant more severely than natives through the mechanical effect on annual earnings (i.e. duration of paid work), but also via a stronger effect on immigrants' outside opportunity wage and, thus, their bargained wage. Moreover, the relative productivity of immigrants is lower during periods of high unemployment because their accumulated human capital through work experience is hampered.

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[6] Actually, decreasing marginal learning effects (i.e., a concave learning function) make the impact of local unemployment indeterminate, as higher unemployment implies less overall work experience, which by assumption means that the marginal learning effect is larger. At low *YSM*, however, the (negative) first-order effect is likely to dominate.

In addition to the direct impact on wages, unemployment also affects the rate of earnings assimilation, or the slope of the earnings profile, of immigrants. On the one hand, because the bargaining position of recently arrived immigrants is more sensitive to labor market conditions than is the position of established immigrants, an increase in the unemployment rate reduces wages more for recently arrived immigrants than older immigrants—which in turn results in a steeper earnings profile. On the other hand, the impact of an increase in unemployment on human capital accumulation is, at least initially, a flatter earnings profile because of reduced learning effects. After some years in the host country, however, the effect of unemployment on learning switches from being negative to positive, implying a steeper profile in high unemployment regimes. Whether increases in unemployment raise or flatten the slope of the immigrant earnings profile depends of which of the two mechanisms—bargaining or human capital accumulation—dominates. Further, any negative impact of unemployment on the slope of the earnings profile should only be observed during the early years in the host country.

3.4. Wage curve estimates for immigrants and natives

Then, what do the data tell us? Table 3-1 displays the estimated unemployment elasticities for natives and six groups of immigrants by gender. Like Albæk *et al.* (2000), we find no significant effect of local unemployment for natives. For immigrants from the Nordic countries, Eastern Europe, and OECD countries we find small unemployment elasticities, significantly less than zero only for males from the Nordic countries. For all three groups of non-OECD immigrants from outside Europe, however, we uncover strong and highly significant wage curve effects. The last row gives the estimated elasticity of earnings with respect to unemployment for the pooled sample of non-OECD immigrants from outside Europe. The highly significant point estimates are -.176 for males and -.10 for females. According to these estimates, a ten percent increase in the local unemployment rate will lead to a 17.6 percent reduction in the earnings of non-OECD men and a 10.0 percent reduction for non-OECD females, while leaving the earnings of natives unaffected.

Table 3-1: Unemployment elasticities by country of birth and gender

	Males			Females		
Country of birth:	Point estimate (std.err) [# obs]	*p*-value, constant versus no wage curve model	*p*-value, *YSM*-interaction versus constant wage curve model	Point estimate (std.err) [# obs]	*p*-value, constant versus no wage curve model	*p*-value, *YSM*-interaction versus constant wage curve model
Norway (natives)	.0073 (.0093) [490568]	.4352	na	.0161 (.0100) [404653]	0.108	na
Nordic Countries	-.0310 (.0157) [62418]	0.048	0.069	.0282 (.0119) [70775]	0.016	0.427
Other OECD	-.0544 (.0336) [63545]	0.106	0.432	.0087 (.0139) [48139]	0.544	0.000
Eastern Europe	-.0477 (.0255) [23379]	0.062	0.137	.0037 (.0356) [18176]	0.918	0.172
Asia	-.1754 (.0292) [83068]	0.000	0.000	-.1061 (.0194) [44302]	0.000	0.000
Africa	-.1021 (.0472) [20578]	0.031	0.019	-.0904 (.0383) [6650]	0.019	0.095
Latin America	-.2150 (.04670) [12266]	0.000	0.047	-.0821 (.03609) [7864]	0.024	0.217
Asia+ Africa+ Latin America	-.1760 (.02701) [115912]	0.000	0.000	-.1000 (.01814) [58816]	0.000	0.000

Note: Point estimates of the unemployment elasticity are based on separate regression models (one for each table row) of the type presented in Table A-3, columns (2) and (5). Standard errors are reported in parentheses and are computed allowing for municipality-by-year clustering. The "constant wage curve" model restricts the wage curve elasticity to be independent of years since migration (*YSM*), while the "*YSM*-interaction" model includes interaction terms between the quartic polynomial of *YSM* and the local unemployment rate.

Columns (3) and (6) report p-values of F-tests of inclusion of interaction terms between the quartic polynomial of *YSM* and the local unemployment rate. We find significant interaction effects for males from all non-OECD regions outside Europe and for women from Asia. With the exception of females from non-Nordic OECD countries there appears to be no significant effects of the interaction terms between years since migration and local unemployment for immigrants from Europe or OECD countries.

3.5 Biased estimates of immigrant assimilation and cohort effects?

Before we proceed to the empirical analysis, we briefly discuss the conditions under which failure to account for differential responsiveness of immigrant and native wages to changes in local unemployment will lead to bias in the standard synthetic panel methodology. Consider first the coefficient of *YSM*, α, in equation (1). Let $\widehat{\alpha}$ be the OLS estimator, based on the assumption of equal period effects and estimated *without* local unemployment among the right-hand side variables. Standard omitted variable discussion yields the following expression for the bias in $\widehat{\alpha}$:

$$E(\widehat{\alpha}) - \alpha = \eta k \,, \qquad (7)$$

where η is the coefficient of *YSM* from a multiple regression in which the local unemployment rate is regressed on *YSM* and the other right-hand side variables of the model, and k is the difference between the immigrant and native wage-curve elasticities in equation (4). Because the standard framework through the inclusion of period effects captures average sensitivity of native wages to changes in unemployment, bias in $\hat{\alpha}$ will arise only if k^I differs from k^N.

As equation (7) reveals, the sign and size of the bias depend on two factors. The first factor relates to the conditional covariance between unemployment and *YSM* in the data at hand. Recall that the empirical specification conditions on the year of immigration, so, within immigrant cohorts, *YSM* is perfectly correlated with calendar time. This implies that if there is *a trend in unemployment* during the period of observation, η will be significant and failure to account for unemployment effects may lead to biased estimates of assimilation rates. On the other hand, if there is no trend in unemployment over the period of observation, excluding unemployment from the empirical model does not introduce any bias in the estimated effect of years since migration.

The theoretical model in section 2 suggests that immigrant wages on average are more responsive to changes in unemployment than are native wages. Accordingly, the sign of the second factor, k, is expected to be negative. Thus, if there is a negative trend in unemployment over the period of observation, estimated assimilation rates will be contaminated by an upward bias. Conversely, if the trend is positive, estimated assimilation rates based on the standard empirical framework will be downward biased.

Consider next cohort effects. The omitted variable bias formula is similar to that in equation (7), with α interchanged with β, and where η now reflects on the conditional

covariance between year of immigration and the unemployment rate. If all immigrant cohorts are observed in equal proportions each sample year, there will be no correlation between the (contemporary) unemployment rate and immigrant cohort in the data. Entry and exit of cohorts over time will, however, introduce covariance between calendar time and cohorts in the data, resulting in biased coefficient estimates if unemployment is rising or falling over the sample period.

In sum, if immigrant and native earnings respond differently to changes in unemployment and if there is a trend in unemployment over the sample period, the coefficient of *YSM* will be biased when the empirical model fails to account for unemployment effects on wages. We have established a significant difference in unemployment sensitivity for non-OECD immigrants compared to native Norwegians and we expect the coefficient of *YSM* to be biased since the data contain a negative trend in unemployment.

Similarly, if immigrant cohorts are observed with varying proportions over the sample period, trends in unemployment may induce bias in estimated cohort effects on wages when estimates are based on the standard synthetic panel framework. Consider the following example. Assume a positive trend in unemployment during the period of observation. The oldest cohorts are observed in both early and recent periods, while younger cohorts are observed in recent periods only. Because early periods are characterised by low unemployment and recent periods by high unemployment, the correlation between cohorts and calendar time will appear mechanically in the data and will produce a bias towards overestimating the labour market success of earlier cohorts and underestimate the success of more recent cohorts of immigrants.

In the next two sections, we give a brief description of the development of unemployment and patterns of immigration in our data.

3.6. Trends in Unemployment

Figure 3-1. Unemployment rates.

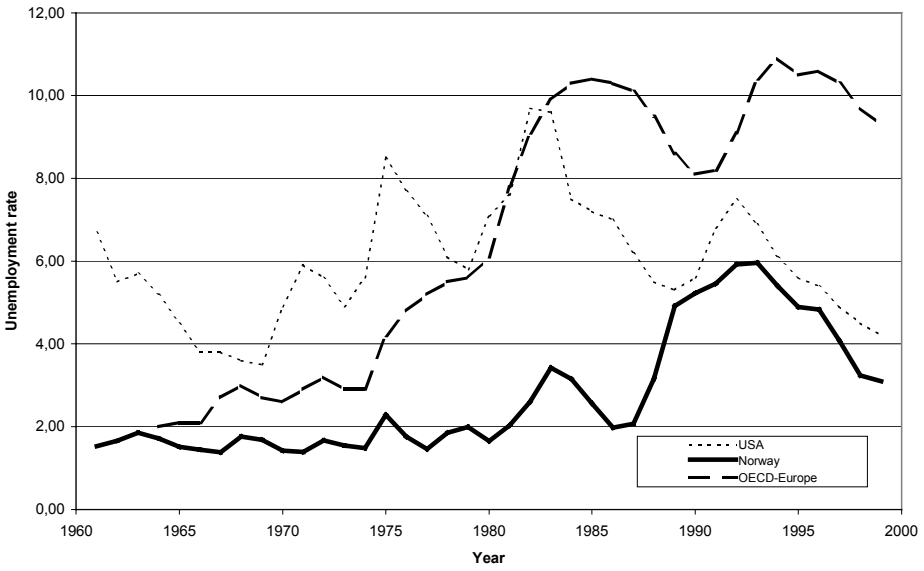

Figure 3-1 shows the trends in unemployment between 1960 and 2000 separately for Norway, OECD-Europe, and the United States. Until 1983-84, unemployment in Norway fluctuated around 1.5 – 2.0 per cent. After a few years of moderately high unemployment during the early 1980s, unemployment returned to a historically normal level during 1985-87, before rising rapidly from 1988 onwards. The unemployment rate then peaked in 1993 and fell gradually but remained relatively high throughout the mid 1990s. Our Norwegian data are from the years 1980, 1990 and 1992-1996, which basically represents a period of low unemployment and a period of high unemployment.

4. The data

Before describing the data we use in the study, we briefly summarize the key elements of immigration policy and review the recent patterns of immigrant arrivals in Norway.[7] Until the 1960s, net immigration in Norway was negative as emigration of Norwegians exceeded arrivals of foreign nationals. In 1970, there were 59 thousand immigrants living in the

[7] Excellent, detailed description of present immigration legislation and characteristics of contemporary immigrants is available at the internet site of the immigration authorities in Norway, UDI (www.udi.no).

country, making up only 1.5 percent of the total population (see Table 4-1). Immigration policy was liberal with few restrictions on admissions until 1975, at which time the parliament imposed a temporary moratorium on immigration (the "innvandringstopp"). Since 1975 new legislation has favoured admissions on the basis of family reunification, humanitarian grounds (political asylum), and, in some limited cases, skills (e.g., workers in the offshore oil industry). To illustrate, in 1999 UDI issued 15,480 residence permits and 19,290 work permits to foreign-borns admitted that year. Of the new permits, 26 percent were granted on the grounds of family reunification, 14 percent were given to individuals from membership countries of the European Economic Area—who in principle do not face any restrictions with respect to seeking employment in Norway, and 8,552 (25 percent) were temporary permits extended to seasonal workers in agriculture, the majority going to Polish nationals engaged in harvesting berry crops (UDI, 2000).

Despite enactment of strict immigration legislation in 1975, Table 4-1 shows that the immigrant population of Norway has grown steadily since 1970. By 1999, the 261 thousand immigrants residing in Norway accounted for almost six percent of the total population. A succinct pattern of Norwegian immigration is the change in mix of source countries over time. Early immigrants predominantly originated in the other Nordic countries or in Western Europe. For example, in 1970 45 percent of immigrants in Norway were born in a neighbouring Nordic country and another 38 percent in a Western European country. By the 1990s the fraction Nordic immigrants had declined to less than 20 percent, being replaced by

Table 4-1: Immigrant Population of Norway

			Percent of Foreign-born from:			
Year	Foreign born	Percent of Population	Nordic Countries (OECD countries)	W Europe, Can, US, Aus, NZ (OECD countries)	E Europe (Non-OECD countries)	Asia, C+S America, Africa (Non-OECD countries)
1970	59,196	1.5	44.8	38.0	9.8	6.0
1980	95,202	2.3	32.8	36.2	7.5	23.5
1990	168,298	4.0	22.6	23.7	8.1	45.6
1995	215,048	4.9	18.9	18.1	14.1	48.9
1999	260,742	5.9	20.1	16.0	14.4	49.6

Source: Statistics Norway (1999)

immigrants from Asia and Africa whose share grew to almost 50 percent. An important observation is that such developments are not the result of declines in Nordic or Western European immigration (in fact, there were twice as many Nordic immigrants in Norway in 1999 as in 1970), but instead the consequence of substantial increases in Asian and African immigration to Norway.

In sum, Norway, like most other European countries, has experienced an increase in its immigrant population since 1970. At the same time, we have also seen important changes in the national origin mix of immigrants away from first-world countries and toward third-world countries.

Our empirical analyses are based on a database assembled from register data by the Frisch Centre for Economic Research.[8] The data extract used in the present study contains the complete immigrant populations of Norway in 1980, 1990, 1992, 1993, 1994, 1995 and 1996. The immigrant micro data are supplemented with 8.3 percent random samples of the native-born population in each year. Because the analysis requires information on time of residence in Norway and because the register data did not include such information prior to 1992, the immigrant samples from the early years are restricted to those still residing in Norway as of 1992. Immigrant status is defined by country of origin. Foreign-borns with Norwegian parents and Norwegian-borns with immigrant parents are excluded from the samples. We are not able to exclude students or self-employed. Persons in college or university will be included if their earnings exceed the threshold. Our measure of earnings includes taxable income from work, sickness pay, unemployment benefits and income when in labour market programs. Unfortunately, we are unable to study wage earnings only for all years, as the detailed information is only available for 1992-96. Earnings are measured in 1990-unit, deflated by the CPI. Persons with annual earnings below 15 000 NOK and above 2 000 000 NOK are excluded.[9]

The analyses are limited to those aged 25 to 64. The regression samples consist of 755,822 (year individual) observations of males and 600,559 females. Tables A-1 and A-2 list sample means of key variables, by gender and nativity.

[8] All the data are supplied by Statistics Norway.

[9] The lower threshold corresponds to the monthly fulltime wage of the lowest paid public sector employee in 1990. The upper cut-off is motivated by the existence of extremely high self-employment earnings.

4.1. Grouping of immigrants by country of birth

Previous studies show that earnings levels as well as earnings-age profiles differ between immigrants from different regions of origin. We therefore conduct separate analyses for immigrants from six different groups of countries. The first group consists the Nordic countries, which are quite similar to Norway with respect to most relevant aspects. The next group is the rest of OECD countries. The third group is immigrants from Eastern Europe. Immigrants from non-OECD countries outside Europe are split into three groups: Asian countries (including some of Oceania), African countries, and Latin American countries.

Separate analyses by region of origin is motivated by an expected difference between immigrants from wealthy western countries and from third-world countries. Immigrants from other European countries and North America are typically labour migrants, while, at least in Norway, refugees constitute a large part of immigrants from countries outside the OECD area. The level as well as the transferability of human capital, and the frequency of return migration differ across immigrant groups.[10] Therefore, earnings at the time of arrival and the growth trajectory of earnings with time spent in the host country are likely to vary across groups. Whether the assimilation process differs across immigrant groups is highly relevant for policy as the expected earnings assimilation of new immigrants is important for evaluating costs and benefits of policy changes. The Norwegian labour market is part of the common European labour market. Consequently, relaxing immigration restrictions would generate an inflow dominated by immigrants from third-world countries. Hence, the average labour market success measured across all immigrant groups of the past will be of limited interest for such policy evaluation.

Research from the United States, for example, indicate that earnings of immigrants can be linked to the level of development of their source country (Jasso and Rosenzweig, 1987; Bratsberg and Ragan, 2002). A positive relationship between development of the source country and earnings may result from differences in transferability of human capital (Greenwood and McDowell, 1991) or from differences in quality of educational institutions (Bratsberg and Terrell, 2002).

[10] Tysse and Keilman (1997) find that only 25 percent of OECD immigrants were still living in Norway after a period of 6 to 10 years, compared to more than 80 percent of the immigrants from Asia, Africa and Latin-America.

4.2. Controls and summary statistics

Educational attainment and marital status are the only earnings determinants included as controls in empirical specifications. We deliberately exclude other important wage determinants such as industry affiliation, union membership, occupation, seniority and actual work experience as these are highly affects by the assimilation process itself; see discussion on "over-controlling" in Borjas (1999). Similarly, citizenship of the host country is not included because acquisition of citizenship can be interpreted as a part of the assimilation process and its inclusion may therefore bias estimates of assimilation effects if naturalization is correlated with earnings potential. Educational skills are largely obtained at the time of immigration, but it may contain qualifications obtained in the host country. Even marital status can be affected by labour market success. On the other hand, marital status is highly correlated with working hours, particularly for women and we do not want too strong effects of labour supply.

Summary statistics for the control variables are given in Tables A-1 and A-2. In Norway, non-OECD immigrants are on average younger than natives, while OECD immigrants are slightly older. Immigrants are more likely to be married. Non-OECD immigrants tend to live in communities with somewhat higher local unemployment, while no noticeable difference exists between OECD immigrants and natives. OECD immigrants have on average spent more time in Norway than non-OECD immigrants. More than half of the non-OECD immigrants in the sample arrived after 1983 and just about 25-30 per cent are included in the low unemployment year of 1980. Information on educational attainment is missing for about 25 per cent of the immigrants, due to incomplete coverage in the education register (recent cohorts in particular).

5. Earnings assimilation and unemployment

Failure to account for differences in the sensitivity of native and immigrant earnings to changes in macroeconomic conditions may bias estimated relative earnings profiles. In Table 3-1, we uncovered significant differences between the unemployment elasticities of natives and immigrants from non-OECD countries outside Europe. Furthermore, the patterns of immigration and unemployment over time in Norway suggest that for these immigrant groups, years since migration and levels of unemployment will be positively correlated in the data. Taken together, the two empirical regularities suggest a negative bias in estimates of

earnings assimilation for non-OECD immigrants based on methods that assume equal period effects for immigrants and natives. For this reason, we begin the empirical analysis by displaying predicted earnings profiles based on two alternative specifications of the empirical model—one based on traditional methodology and one that introduces differential period effects for natives and immigrants. We then proceed by examining the process of earnings assimilation over time under different local labour market conditions. The section concludes with an examination of the sensitivity of estimates of cohort effects to relaxing the assumption of equal period effects.

5.1. Predicted earnings profiles with and without accounting for differential wage curve effects

Figures 5-1 and 5-2 display predicted earnings profiles and their 95 percent confidence intervals for natives and immigrants based on two versions of the empirical model.[11] The first profile—which for immigrants is depicted by a thin, solid line—is based on a standard synthetic panel specification that restricts period effects to be equal for natives and immigrants (as in columns (1) and (4) of Table A-3). The second specification—shown as bold, solid lines—allows for differential effects of local unemployment for natives and immigrants and lets the unemployment effect for immigrants vary with time since migration (as in columns (3) and (6) of Table A-3). Earnings profiles for natives are drawn as single dashed lines.[12] In all figures, the predicted earnings profile is computed using mean values of all other variables than age and year since migration for the relevant immigrant group.[13] The immigrant profiles are drawn for someone who entered Norway at 25 years of age, but because immigrants with less than two years of residence are excluded from the regression sample we limit the profiles to ages beyond 26 years.

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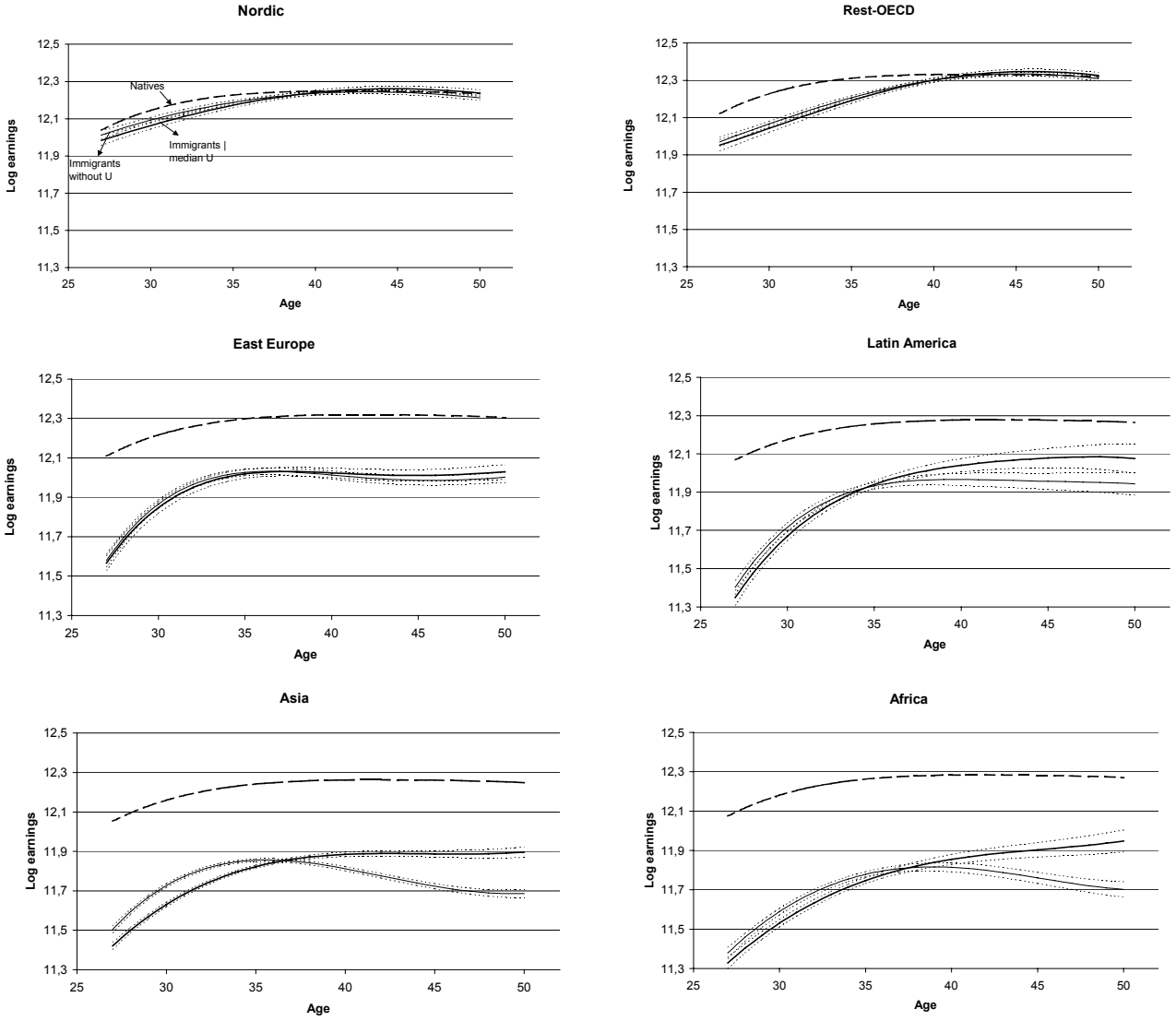
[11] Few studies of immigrant earnings assimilation pay attention to the sampling error associated with estimates of assimilation effects. Typically, conclusions are drawn from predicted wage profiles, based on estimated parameters and evaluated at mean values of other variables taken from the immigrant sample; see, e.g., Borjas (1995) and Schoeni (1997). With high-order polynomials of age and YSM, the assimilation measure, α^*, is a linear combination of regression coefficients. An estimate of the confidence interval around $\widehat{\alpha^*}$ must therefore be based on the (complete) covariance matrix of coefficient estimates.

[12] Confidence intervals for natives are extremely small and we have chosen not to add them to the figures, as they would appear as one single bold line together with the line for predicted earnings. Also, because wage curve elasticities are small for natives, differences between profiles based on the two specifications are negligible. Accordingly, for natives only the profile based on the most extensive specification (that accounts for wage curve effects) is included in the figures.

[13] In the models that allow for differential unemployment effects, predicted earnings are evaluated at the median unemployment rate over the sample period.

Figure 5-1: Predicted Earnings Profiles of Native and Immigrant Men by Region of Birth



Notes: Native profiles, depicted by dashed lines, are based on the wage curve specification of the empirical model and are evaluated at median unemployment in the sample. Immigrant profiles are based on either traditional synthetic panel specifications (thin, solid lines) or wage curve specifications (thick, solid lines) evaluated at median unemployment. Intercepts of both native and immigrant profiles are computed at sample mean values of non-age and YSM variables for the relevant immigrant group; immigrant profiles are further evaluated at the weighted average cohort effect for the group.

Consider first the profiles for males (Figure 5-1). The upper left panel illustrates predicted earnings profiles for immigrants from the Nordic countries compared to the earnings profile of a native with the same characteristics as the average male Nordic immigrant. We find that there is a small earnings differential of less than 10 percent between immigrants and natives

during the first 10-15 years since migration. After about 15 years the gap is closed and the earnings of a Nordic immigrant is indistinguishable from the earnings of a native. A similar description applies to immigrants from other OECD countries. The earnings gap is larger, about 20 percent after 5 years since migration, but the learning curve is steeper and the gap is closed after approximately 15 years. Consistent with the observation in the previous section that the wage curve effect for these two immigrant groups is similar to that of natives, the model based on equal period effects performs as well as the model that includes differential wage curve effects. This latter point also applies to Eastern European immigrants. Eastern European immigrants do, however, display a larger earnings gap with natives, and their earnings appear not to converge to the earnings level of natives.

Turn next to the earnings profiles of immigrants from non-OECD countries outside Europe, illustrated in separate panels for immigrants from Latin America, Asia, and Africa. For all three groups, there is a substantial initial earnings gap followed by a period of significantly faster earnings growth for immigrants compared to that of natives. Estimates of the extent of earnings assimilation depend, however, dramatically on whether or not the methodology allows for differential period effects for immigrants and natives. According to the standard synthetic panel method (which restricts period effects to be equal for natives and immigrants), earnings growth of non-OECD immigrants stalls after about 12 years in the country. Further, for male immigrants from Asia and Africa, the standard method predicts a 10-15 percent *decline* in earnings—and a *negative* assimilation rate—between the peak at 12-14 years and 25 years of residence. In stark contrast, when estimates are based on the methodology that allows for separate effects of local unemployment, the earnings profile continues to rise until 15-20 years after arrival and there is no indication of any decline in earnings with age. In other words, *holding unemployment constant*, the predicted earnings of non-OECD immigrants *do not fall* when they reach their late thirties as indicated by the standard specification. Instead, the process of earnings assimilation lasts well into their forties.

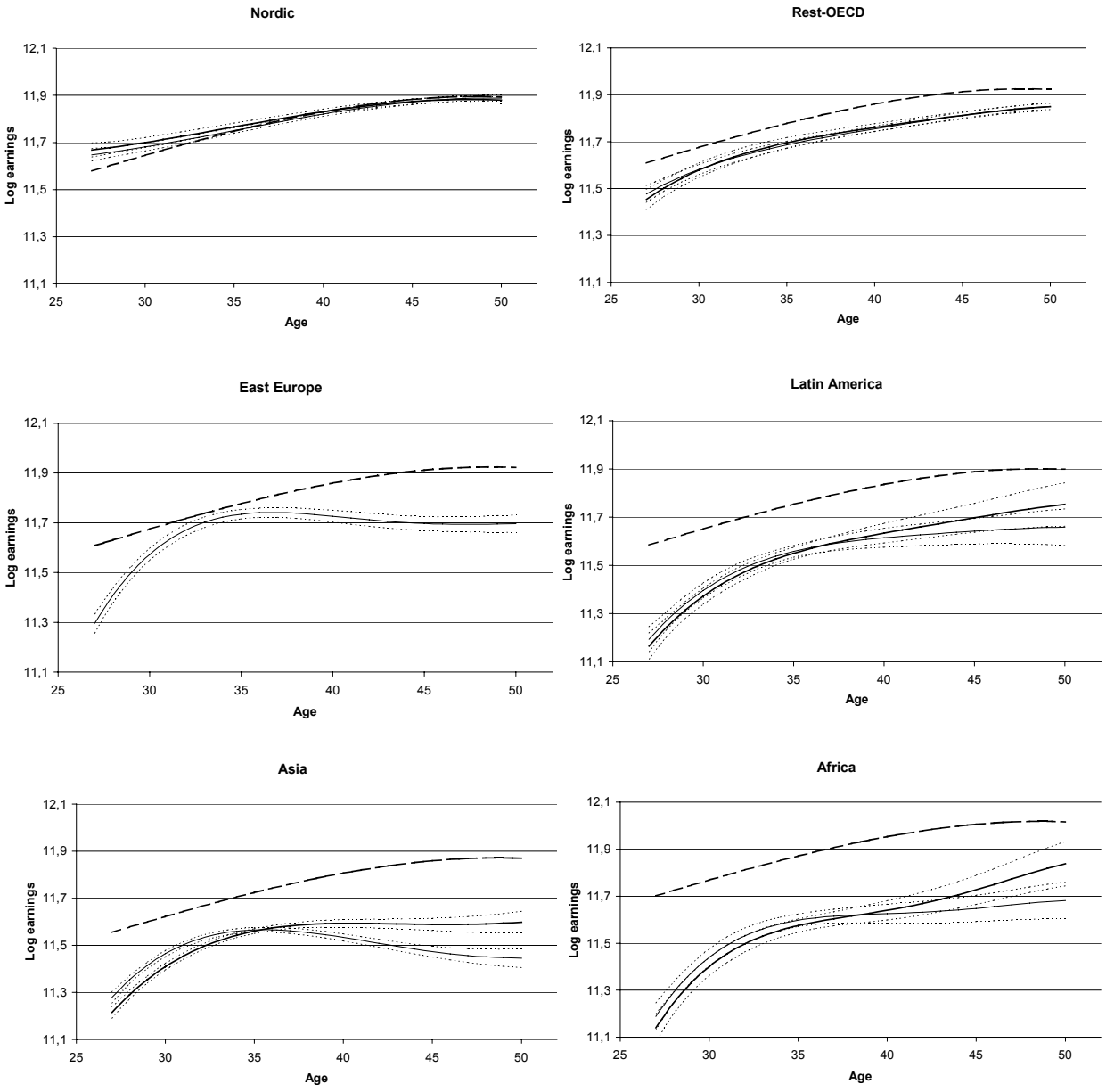
The interpretation of this result is as follows. Because there was little immigration to Norway from non-OECD countries prior to the 1970s, immigrants from these countries with high values of years since migration are typically observed in the data in the 1990s and are consequently observed only during times of high unemployment. This implies a strong, positive correlation between years since migration and unemployment in the sample. Because the earnings of immigrants from non-OECD countries are affected more adversely by high unemployment (or put differently, gain more from lower unemployment) than earnings of

natives, imposing equal period effects leads to a downward bias in estimated earnings for immigrants with many years since migration. If immigrants with different values of years since migration had a more even mix of sample periods with high and low unemployment, what we would observe on average is the profile depicted by the thicker line. Netting out the impact of the higher levels of unemployment during the 1990s, we disclose a continuous assimilation process with an earnings differential between natives and non-OECD immigrant men declining from almost 0.7 log points two years after migration to 0.35 log points after 25 years in Norway.

Consider next the earnings profiles of non-OECD females; see Figure 5-2. The same pattern is observed for women as for men—the observed dip in the earnings profile disappears once we allow for group-specific effects of local unemployment. Female immigrants do, however, have a positive assimilation rate only for the first eight to ten years. Because the profiles of native women indicate substantial earnings growth until their late forties, while the profiles of immigrant women from non-OECD countries indicate only moderate earnings growth during their late thirties and early forties, predicted earnings profiles of natives and immigrants tend to diverge even when we control for unemployment effects. The overall difference in earnings between immigrants and natives is, however, smaller for women than for men. After two years in Norway, the native/non-OECD immigrant differential for women is about 0.35 log points and after 25 years it has decreased to slightly less than 0.20 log points. Female OECD immigrants have very similar earnings profiles as their native counterparts and controlling for unemployment effects has little effect on predicted earnings. But while there are only minor differences between the level of earnings of natives and female immigrants from the Nordic countries, OECD women from outside the Nordic countries do not reach earnings parity with natives. Instead, their earnings profile remains approximately ten percent below that of natives.

In sum, the empirical study of earnings assimilation shows that for both male and female immigrants from the non-OECD countries of Latin America, Asia, and Africa are estimates of assimilation highly sensitive to whether or not the methodology accounts for differential period effects for natives and immigrants. Because earnings of these immigrant groups are more responsive to downturns in the local labour market, and because economic fluctuations and the pattern immigration of these groups induce a positive correlation between years since migration and unemployment in the data, the standard methodology understates their earnings assimilation by 10-20 percent. But, even when the methodology accounts for differential period effects, the empirical evidence shows that non-OECD

Figure 5-2: Predicted Earnings Profiles of Native and Immigrant Women by Region of Birth



immigrants do not fully assimilate in the Norwegian labour market—despite substantial growth do their earnings not reach parity with those of natives. Only for male immigrants from OECD countries and female immigrants from the Nordic countries do earnings converge to the level of natives.

5.2. Earnings assimilation of non-OECD immigrants at different levels of unemployment

In section 3 we argued that local unemployment impacts both the *level* of immigrant earnings and the *rate* at which they converge to the earnings of natives (assimilation). When changes in unemployment affect employment prospects of immigrants more than natives, their relative annual earnings fall because (i) employment is lower (direct effect), (ii) the share of revenues going to the worker falls (wage curve effect) and (iii) less work experience slow the accumulation of human capital specific to the host country. Assimilation defined as the rate of change in relative immigrant earnings may, however, either rise or decline with higher local unemployment. First, increases in unemployment reduce the *yearly* accumulation of labour market experience through work.[14] Second, because job opportunities for immigrants are more sensitive to changes in host country human capital (arising from another year of residence) when unemployment is high, the earnings profile of immigrants is steeper at high unemployment.

In this section, we discuss in greater detail results from the empirical model, in which we study the net of these three effects of unemployment on the rate of earnings assimilation. We limit the analysis in this section to the sample of non-OECD immigrants from outside of Europe, since this is the group for which we have found significant interaction effects between years since migration and local unemployment (Table 3-1).

Columns (3) and (6) of Table A-3 list coefficients of interaction terms between the log unemployment rate and the polynomial of years since migration. In other words, the specification allows the assimilation rate to vary with conditions in the local labour market.

We first display the earnings profiles of natives and the complete non-European OECD group in Figure 5-3 and the immigrant-native earnings differentials in Figure 5-4. The earnings differential is substantially larger for males than for females and the assimilation process lasts longer for men. While female immigrants after less than 10 years reach a level where their earnings are approximately 20 per cent below the earnings of natives, male immigrants gradually approach the level of natives, but fail to close gap. After 25 years of residence, the earnings of immigrant men remain more than 30 percent below the earnings of native men.

[14] The concavity of the learning function may turn this effect around, as higher unemployment means less accumulated experience so that the assimilation rate through learning is actually higher. Or, put differently, if an immigrant has experienced little unemployment, a lot of learning is already done, and the potential for new learning diminishes. However, the "first-order" effect is likely to dominate.

Figure 5-3 : Predicted Earnings Profiles of Natives and Immigrants from Africa, Asia and Latin America. By gender.

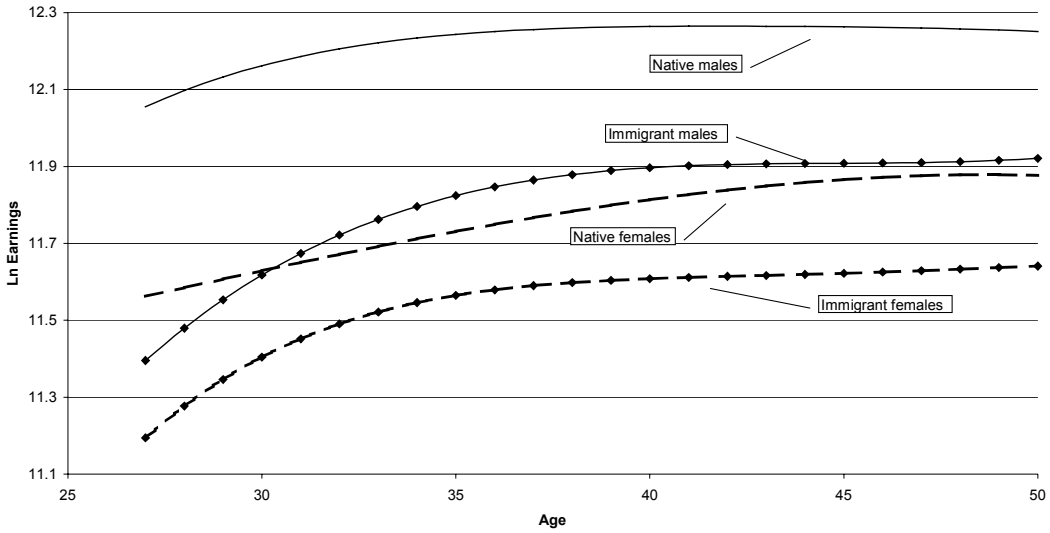
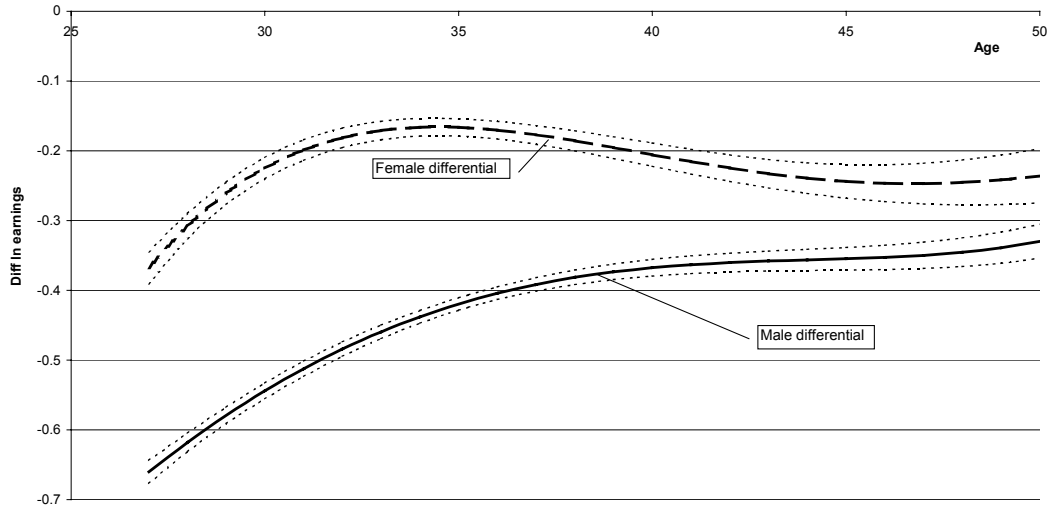


Figure 5-4 : Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. By gender.



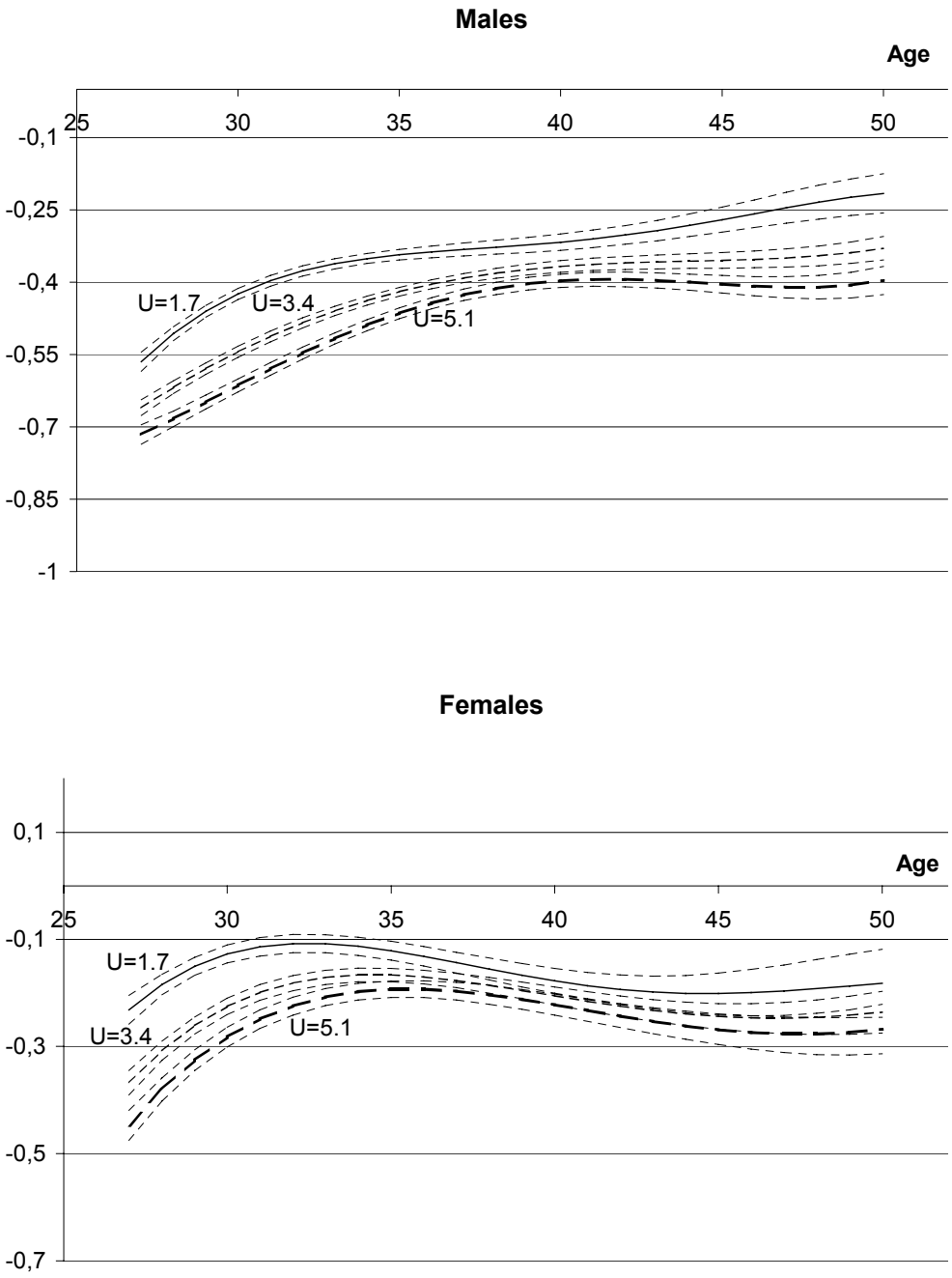
Note: Profiles are based on parameter estimates reported in Table A-3, columns (3) and (6). Native intercepts are evaluated at mean values of covariates taken from the immigrant sample. Immigrant intercepts are in addition computed as the weighted mean of cohort effects. All profiles are evaluated at the median unemployment rate in the sample (3.4 percent).

To focus on how unemployment affects the earnings assimilation process, we next draw the predicted immigrant-native earnings differentials of non-OECD immigrants for three different levels of unemployment, determined by the 10^{th}, 50^{th}, and 90^{th} percentiles of the local unemployment distribution in the sample. The differentials appear in Figure 5-5. Consider first males. After 5 years in Norway, immigrants in the "low unemployment regime" earn about .4 log points less than their native counterparts. In the "high unemployment regime", the difference is .6 log points. Earnings assimilation from 2 to 5 years is clearly faster under low unemployment conditions.[15] According to the theoretical model in section 3, this faster assimilation rate indicates that the impact on learning dominates. However, from about 5 years on, assimilation rates are slower under the low unemployment regime. The faster initial catching up under favourable employment conditions leaves less to be gained per year after 5 years since migration. After about 15 years in Norway, the earnings gap levels off under higher unemployment, while positive assimilation rates persist under better labour market conditions. Note, however, that the precision of the estimated earnings differential is low in the later part of the career. The overall picture is that of faster earnings assimilation early in the new country when labour market conditions are favourable. After about 15 years, however, the effect of different labour market conditions seems to diminish as the earnings growth in the low unemployment regime levels out.

The picture is fairly similar for females. We note that for women the earnings differential is actually lowest at about 6-7 years beyond which it drops again. The reason is that immigrant women do not keep up with the steeper earnings path of native women after the age of 35, see Figure 5-3. The predicted earnings path of immigrant women levels off at about 35 (about in the same manner as for native men), while the earnings of native women keep growing. Another difference, which arises from visual inspection of the curves, is that labour market conditions affect the entry level earnings for women more strongly than what we observe for men. Favourable conditions seem to set women on a higher level from the start on, rather than by improving the assimilation rates over the first 5 years that much.

[15] In order to avoid out-of-sample predictions in the figures, we start the drawings at two years since migration. However, visual inspection suggests that initial assimilation rates during the first two years upon entry are even more strongly affected by the level of local unemployment.

Figure 5-5: Earnings Differentials between Natives and Immigrants from Africa, Asia and Latin America. By Gender and Level of Unemployment



5.3 Cohort fixed effects

The debate on whether the skills of immigrants have been declining over time has been lively in the United States for more than a decade; see, e.g., Borjas (1985; 1999), LaLonde and Topel (1992). One specific dimension of the discussion has been whether more recent cohorts have lower earnings capacity than those who arrived prior to 1970. Bauer *et al*. (2000) report that similar patterns are found in European studies as well. For Norway, Hayfron (1998) and Longva and Raaum (2001) conclude that cross-sectional estimates of immigrant assimilation are upwardly biased because the average earnings capacity of pre-1970 cohorts is higher than that of immigrants who arrived during the 1970s. Changes in immigration policies and the national origin mix are possible explanations for why this may have happened. In Norway, the gradual change to immigration based on family ties and political asylum could explain why cohorts differ with respect to their potential of succeeding in the Norwegian labour market. As in the prior section, we limit the analysis of cohort effects to non-OECD immigrants from outside Europe. The samples of Asian, African and Latin American immigrants are pooled into one non-OECD sample.

The cohort-effects listed in Table 5-1, c_j^* $(j = 1,...J)$ are calculated as deviations from their weighted mean;

$$c_j^* = \hat{c}_j - \sum_{j=1}^{J} w_j \hat{c}_j$$

where w_j *(j=1, ..J)* is the number of observations in cohort *j* divided by the total for the immigrant group and $\hat{c}_j$ $(j = 1,...J)$ is the estimated cohort coefficient (reported in Table A-3). A cohort effect can be interpreted as the (average) time invariant earnings capacity of an immigrant of that cohort, relative to the average immigrant in the group, holding age, educational attainment, marital status, region of residence, country of origin, *and* years since immigration constant.

Table 5-1: Estimated cohort effects for immigrants from non-OECD countries in Africa, Latin-America, and Asia

	I. Standard earnings profiles	II. With wage curve	III. With interaction unemployment and YSM
Males, cohort:			
Pre-1965	.537 (.018)	.242 (.021)	.306 (.023)
1965-68	.337 (.015)	.089 (.018)	.136 (.019)
1969-73	.167 (.007)	-.015 (.009)	-.008 (.009)
1974-78	.133 (.007)	.029 (.007)	.010 (.009)
1979-83	.044 (.008)	.051 (.009)	.036 (.010)
1984-88	-.099 (.020)	-.025 (.025)	-.020 (.026)
1989-93	-.147 (.008)	-.054 (.010)	-.046 (.010)
1994[1)]	.052 (.029)	.136 (.029)	.137 (.029)
Females, cohort:			
Pre-1965	.353 (.023)	.130 (.027)	.211 (.029)
1965-68	.231 (.027)	.045 (.030)	.099 (.031)
1969-73	.235 (.015)	.112 (.016)	.120 (.017)
1974-78	.144 (.010)	.077 (.010)	.050 (.011)
1979-83	.056 (.014)	.055 (.015)	.037 (.016)
1984-88	-.069 (.027)	.031 (0.03)	-.026 (.032)
1989-93	-.161 (.014)	-.110 (.016)	-.093 (.016)
1994[1)]	-.069 (.027)	-.130 (.031)	-.124 (.031)

Note: Standard errors are reported in parentheses and are calculated based on DeNew and Schmidt (1997).
1) These recent cohorts contain very few observations, see Table A-1, and are only observed in 1996.

Consider first male immigrants; see Table 5-1. Consistent with prior studies, the table shows that early cohorts generally have higher earnings than the more recent cohorts. The implication is that the earnings capacity of non-OECD immigrants to Norway has fallen over time. The cohort differentials shrink considerably, however, when we control for local labour market conditions. As a dramatic illustration, consider the cohort differences between male immigrants who arrived around 1970 and 1990. According to the traditional methodology (col. I), the difference in earnings capacity between the two cohorts is .314 (.167+.147) log points. When the methodology accounts for differential native and immigrant responsiveness to local unemployment (col. III), the difference is reduced to .038 log points. A similar pattern is found for female non-OECD immigrants. As we found for years since migration in section 5.1, the patterns of rising unemployment and immigration have lead to a positive correlation between unemployment and more recent immigrant cohorts in the sample. Because earnings of non-OECD immigrants are more sensitive to local labour market conditions than are earnings of natives, imposing equal period effects induces a negative bias in estimates of fixed cohort effects for the recent cohorts. We thus note that controlling for

local labour market conditions reduces the pattern of falling earnings capacity of non-OECD immigrants in Norway.

The significant cohort effects among non-OECD immigrants in Norway imply that the earnings differential between immigrants and natives differ across cohorts. As the individual cohort effects listed in Table 5-1 are computed relative to the weighted mean cohort effect, they can be added to the profiles in Figure 5-3 and 5-4 to see how the earnings profile of each immigrant cohort differs from the earnings of the native reference group. This experiment shows that the earnings of the oldest non-OECD cohorts nearly catch up with earnings of natives after 25 years in Norway, while the profiles of immigrants who arrived during the late 1980s and early 1990s sit slightly below those included in the figures.

6. Earnings assimilation by level of education

The earnings profile, i.e., the relationship between experience and pay, varies with educational attainment of the worker. Typically, wages of highly educated workers are higher and continue to rise for a longer period than for less educated workers, see, e.g., Hægeland, Klette and Salvanes (1999) and Figure 6-3 below for Norwegian evidence. Such differences might be expected to be even more pronounced for immigrants. Educational skills acquired abroad and host-country specific skills such as language proficiency are likely to be complementary, see, e.g., Schoeni (1997), Berman, Lang and Siniver (2000). The productivity of foreign skills is expected to be lower when the immigrant does not master the host-country language. Interpersonal networks and knowledge of social institutions may also be particularly important for highly educated immigrants, partly because they improve the precision of signals immigrants provide potential employers. Basically, the return to skills acquired abroad, such as educational attainment, is likely to increase as immigrants spend time in the host country. One may also argue that individuals with high education posses the capacity to learn, and this ability carries over to the Norwegian labour market. In other words, the marginal effect of years of residence is likely to be higher for skilled immigrants.

The impact of unemployment on relative earnings of immigrants, both in terms of level and slope, may also differ by educational attainment. For example, if accumulation of host-country specific capital through work experience is of greater relevance for highly educated immigrants, unemployment may have a stronger impact on their earnings profile than on that of less educated immigrants.

We therefore proceed by examining the relationship between local unemployment and immigrant earnings assimilation separately for immigrants with low and high educational attainment. For this purpose, the samples are split in two according to educational attainment—with low education meaning less than three-years of upper secondary education, and the high education group consisting of those who have completed at least three years of upper secondary school (which includes those with college and university exams).[16] Again we focus on non-OECD immigrants from Asia, Africa and Latin America. In the next section we consider the earnings profiles and differentials by gender and educational attainment, while section 6.2 focuses on the extent to which unemployment affects the assimilation process differently for the two education groups.

6.1. Earnings profiles and differentials by educational attainment

The following figures, 6-1 through 6-4, display earnings profiles and immigrant-native earnings differentials by gender and educational attainment. The male profiles in Figure 6-1 confirm the expected differences in experience, or age, profiles between workers with high and low education. While the profiles indicate little or no earnings growth for low-education native workers after their early thirties, earnings continue to increase for high-education workers for another ten years. The difference is even more striking for immigrants.[17] Earnings of low and high education immigrants are very similar during the first five years, but for the low-education group the profile flattens out by ten years while it continues to rise for highly educated immigrants. The patterns translate into the earnings differentials shown in Figure 6-2. The assimilation process among low-education immigrants halts after about ten years at an earnings differential of about .35 log points. Highly educated immigrants start out with a larger differential, but the assimilation continues throughout the 25-year period. After 20 years in Norway, the earnings gap between natives and immigrants are not significantly different for low and high education groups.

For Norwegian-born females, earnings profiles of the two education groups are strikingly parallel, revealing prolonged earnings growth lasting well into their late forties; see Figure 6-3. Among female immigrants, however, the pattern is more similar to that of men. During the first few years after arrival, earnings of high and low educated workers are not

[16] Unfortunately we cannot distinguish between education taken before and after arriving in Norway.
[17] Note that the profiles of high and low education workers are based on separate regressions.

Figure 6-1: Male Earnings Profiles of Natives and Immigrants from Africa, Asia and Latin America. By Educational Attainment.

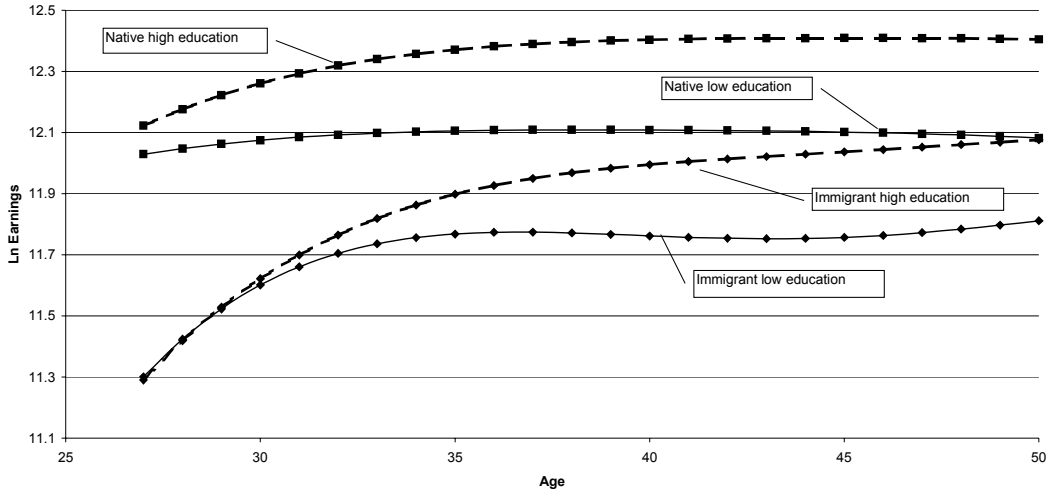
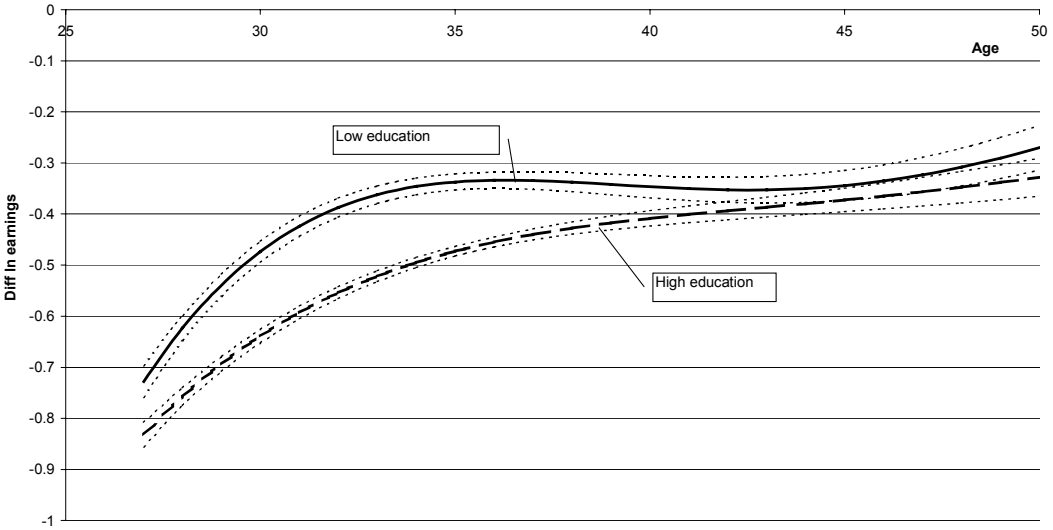


Figure 6-2: Male Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. By Educational Attainment.



very different. As immigrants spend time in Norway, earnings among low-education females grow for about ten years, while earnings of those with higher education continue to increase throughout the 25 years after immigration. This translates into the female earnings differentials displayed in Figure 6-4. During the first fifteen years, female immigrants with low education have higher earnings relative to Norwegian-borns than immigrants with high education. The high-education immigrants close the gap over time and after fifteen years of residence both groups end up with earnings around 20 per cent below those of natives.

Figure 6-3: Female Earnings Profiles of Natives and Immigrants from Africa, Asia and Latin America. By Educational Attainment.

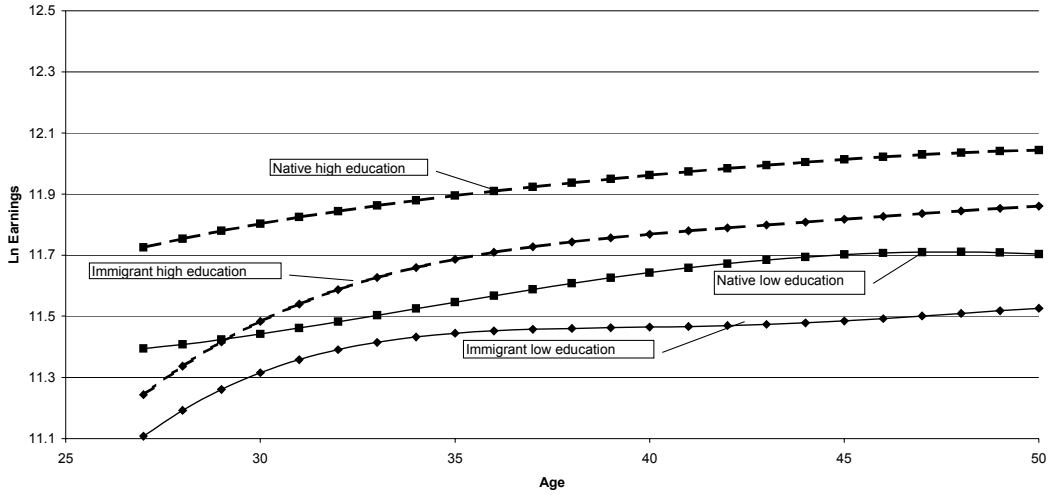
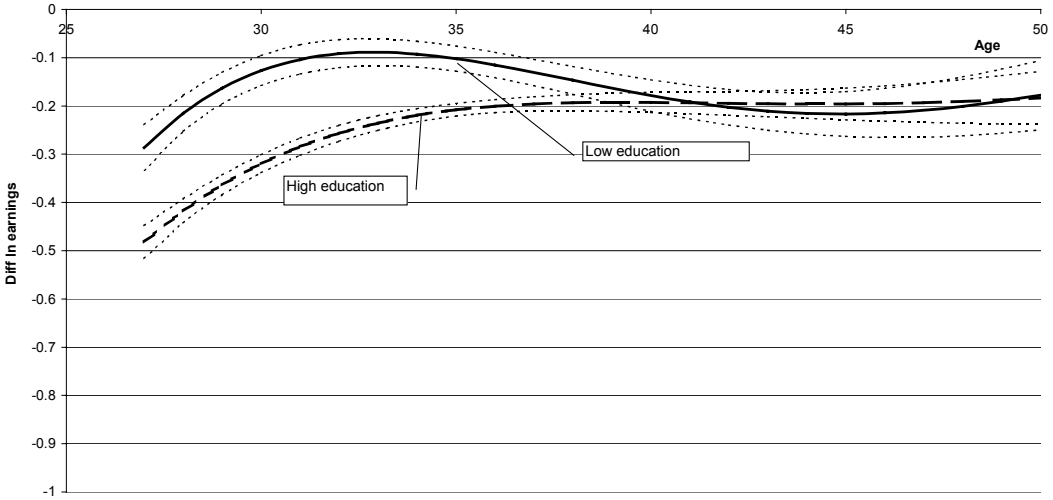


Figure 6-4 : Female Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. By Educational Attainment.



6.2. Unemployment effects on earnings assimilation

In Figures 6-5 through 6-8 we address the impact of local unemployment on the assimilation process, allowing unemployment effects to differ by educational attainment. We focus directly on the earnings differentials, calculated for three alternative values of the local unemployment rate. Figures 6-5 and 6-6 display the results for males. The constant vertical distance between the curves in Figure 6-5 implies that unemployment affects the *level* of

Figure 6-5: Male Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. Low Education. By level of Unemployment.

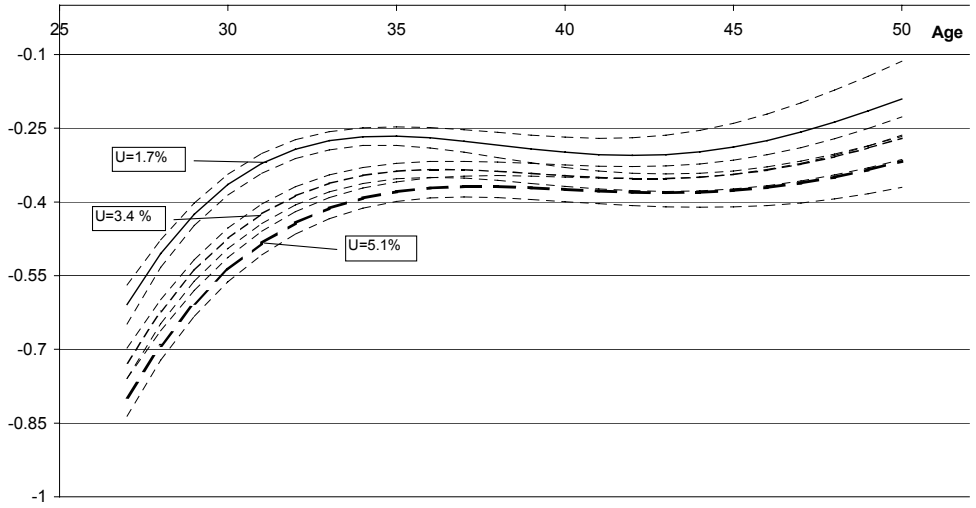
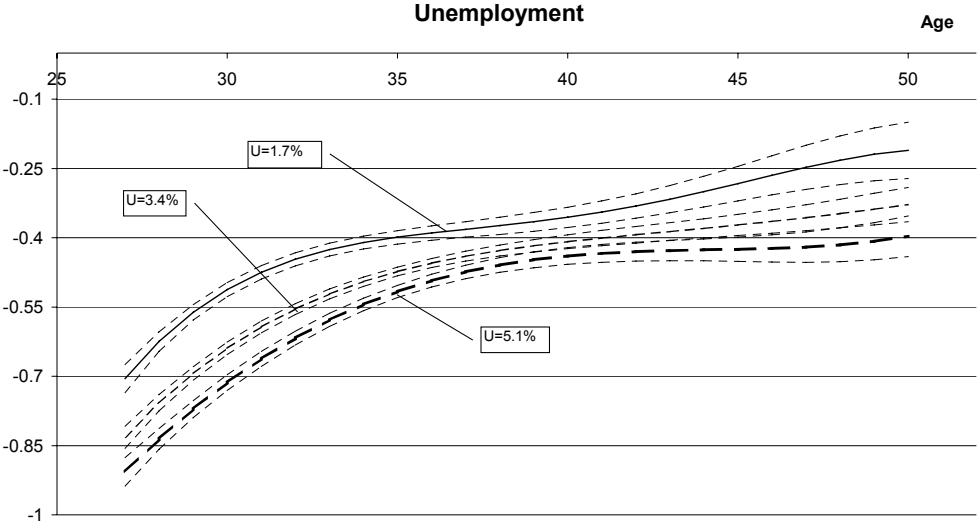


Figure 6-6: Male Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. High education. By level of Unemployment



immigrant earnings, and that the *assimilation rate* among the less educated is insensitive to unemployment. In contrast, for the high-education group the figure shows that the assimilation rate depends on unemployment and that the slope of the earnings differential during the first years is higher under low unemployment. However, the main impact is again on levels. After 25 years, the log earnings differential is about 0.2 in the low-unemployment regime compared to 0.4 when unemployment is high.

For female immigrants, results appear slightly more mixed and confidence intervals are too wide to make strong statements; see Figure 6-7 and 6-8. As for low-education males,

Figure 6-7: Female Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. Low education. By level of Unemployment

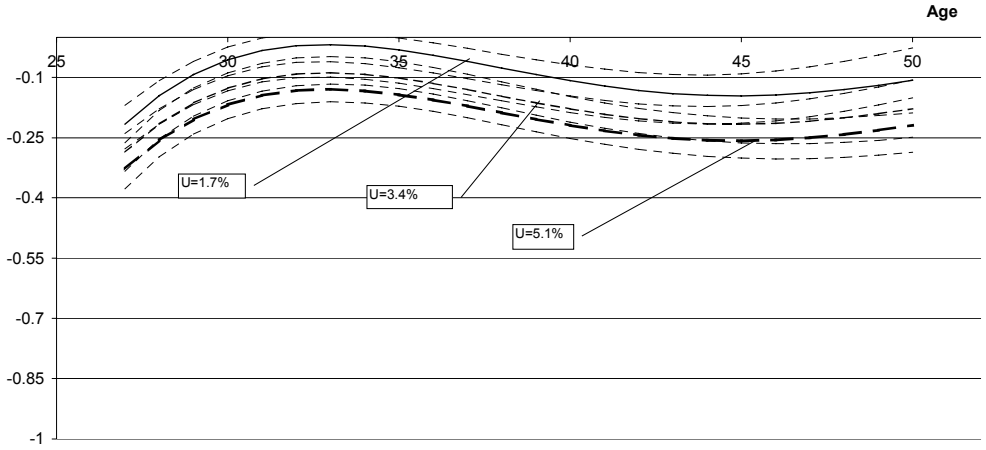
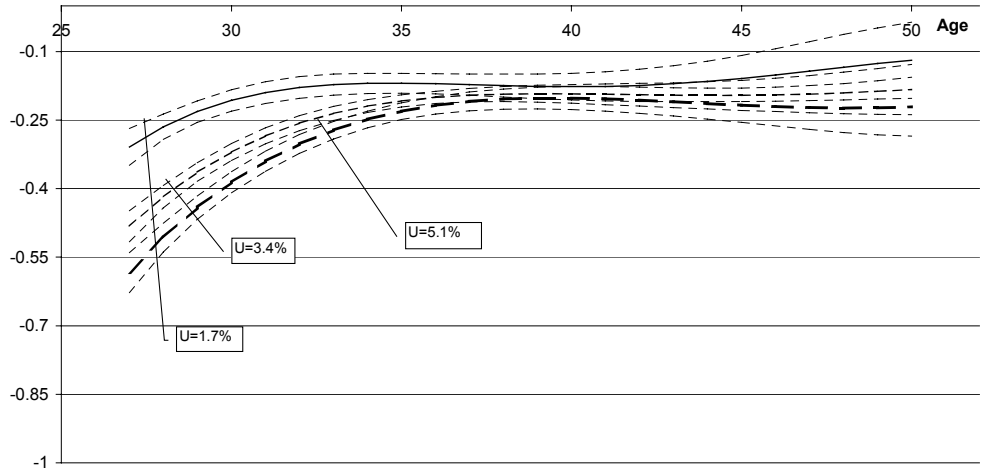


Figure 6-8: Female Earnings Differential between Natives and Immigrants from Africa, Asia and Latin America. High education. By level of Unemployment



differentials of low-education females indicate no interaction effects between unemployment and years since migration while the level is affected by the unemployment rate. There is no clear pattern of assimilation effects as relative earnings of low-education female immigrants increase over the first seven years and then fall slightly. Also consistent with the findings for males, highly educated female immigrants start with a substantial earnings difference compared to native women, but the earnings gap is reduced significantly over the first ten to twelve years of residence. When unemployment is low, however, earnings during the early years are much higher and the YSM effects are considerably lower.

7. Conclusions

The present study extends the synthetic panel methodology for the study of immigrant earnings assimilation of Borjas (1985; 1999) by taking into account that business cycles affect immigrants and natives differently. A shortcoming of the standard methodology is the assumption of "equal period effects"—an assumption that produces biased estimates of assimilation rates and cohort effects if (i) immigrant and native earnings differ in their sensitivity to local unemployment and (ii) years since migration or the observation span for any one immigrant cohort is correlated with the level of unemployment. Both of these conditions are met for immigrants to Norway from Asia, Africa and Latin America.

In the empirical study, we first document that the earnings of immigrants from countries outside the OECD area are much more sensitive to local unemployment than are the earnings of natives and OECD immigrants. Furthermore, the rising unemployment over the observation period induces a correlation between years since migration and the level of unemployment for several immigrant cohorts. When we control for differential sensitivity to local unemployment an apparent and significant drop in the assimilation profiles of non-OECD immigrants after 15 years in the country disappears. The tendency of declining cohort levels persists but is less important than that predicted by the standard model.

Compared to non-OECD immigrants, our findings indicate that immigrants from OECD countries have earnings profiles that are much more similar to those of natives. And for both OECD and other European immigrants, there is no added sensitivity of earnings with respect to local labour market conditions compared to natives.

The higher sensitivity to local unemployment for non-OECD immigrants suggests that relative earnings of immigrants vary over the business cycle. Our estimates indicate that the earnings gap between natives and immigrants is significantly greater during periods of high unemployment. We also find that assimilation rates for non-OECD immigrants are sensitive to local unemployment. Earnings of male immigrants, particularly the highly educated, tend to grow faster during the first years of residence when unemployment is low. On the other hand, we find no interaction between unemployment and the rate of earnings assimilation among immigrants with low education, even though there is a strong linkage between the level of earnings and the unemployment rate. We interpret this finding in terms of a model of earnings assimilation that incorporates unemployment effects (i) via employment prospects of immigrants (i.e., a direct and a standard wage curve effect) and (ii) through on on-the-job learning leading to acquisition of country-specific human capital.

Consistent with prior studies, we find that early cohorts from non-OECD countries generally have higher earnings than the more recent cohorts, holding years of residence in Norway and other observed characteristics constant. The implication is that the earnings capacity of non-OECD immigrants to Norway has fallen over time. However, the cohort differentials shrink and the negative trend is far less dramatic when we control for local labour market conditions. The patterns of rising unemployment and immigration have lead to a positive correlation between unemployment and more recent immigrant cohorts in the sample. Because earnings of non-OECD immigrants are more sensitive to local labour market conditions than are earnings of natives, imposing equal period effects induces a negative bias in estimates of fixed cohort effects for the recent cohorts.

In a companion paper, Barth, Bratsberg and Raaum (2002b), CPS data from 1979-2001 are used to examine the relationships between local labor market unemployment rate and immigrant and native wages in the United States. In line with our results for Norway, immigrant wages are more responsive than native wages to changes in local labor market conditions. Consequently, the native-immigrant wage gap widens during economic downturns and contracts when economic conditions improve. The implications for assimilation and cohort effects are the opposite, due to the negative trend in US unemployment during the 1980s and 1990s. The standard synthetic panel methodology—which assumes that changes in aggregate macroeconomic and labor market conditions have the same relative impact on native and immigrant wages—yields upwardly biased estimates of immigrant wage growth. The negative trend in US unemployment also induces a positive bias in estimated cohort effects of recent immigrant arrivals when estimates are based on the standard methodology.

Given the increase in European unemployment between the 1970s and the 1990s, together with a pattern of growing immigrant populations, our conjecture is that controlling for differential unemployment effects is important in order to obtain unbiased estimates of assimilation rates in most Western European countries.

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Appendix

Table A-1: Summary Statistics, Male Samples

	Asia		Africa		Latin America	
Variable	Mean	StdDev	Mean	StdDev	Mean	StdDev
ln(Annual Earnings)	11.755	0.667	11.674	0.692	11.818	0.610
ln(Unempl Rate)	1.237	0.550	1.231	0.563	1.251	0.518
Years Since Migr	10.903	6.336	10.051	6.768	9.699	6.477
Pre-1964 Cohort	0.011	0.104	0.026	0.159	0.031	0.172
1964-68 Cohort	0.010	0.098	0.032	0.177	0.028	0.166
1969-73 Cohort	0.110	0.313	0.099	0.299	0.041	0.198
1974-78 Cohort	0.179	0.383	0.110	0.313	0.141	0.348
1979-83 Cohort	0.183	0.387	0.128	0.335	0.111	0.314
1984-88 Cohort	0.376	0.484	0.400	0.490	0.569	0.495
1989-93 Cohort	0.128	0.334	0.200	0.400	0.077	0.266
1994 Cohort	0.003	0.055	0.004	0.062	0.003	0.050
Age	36.484	8.308	36.244	7.984	38.371	8.544
Educ1	0.052	0.221	0.043	0.203	0.034	0.182
Educ2	0.083	0.276	0.081	0.272	0.064	0.245
Educ4	0.210	0.407	0.223	0.416	0.277	0.447
Educ5	0.141	0.348	0.184	0.387	0.191	0.393
Educ6	0.055	0.228	0.068	0.252	0.072	0.258
Educ Missing	0.284	0.451	0.252	0.434	0.201	0.401
Married	0.699	0.459	0.581	0.493	0.574	0.494
Divorced/Separated	0.070	0.256	0.207	0.405	0.195	0.396
1980 Observation	0.046	0.210	0.051	0.220	0.040	0.197
1990	0.131	0.338	0.131	0.337	0.141	0.348
1992	0.154	0.361	0.157	0.364	0.164	0.370
1993	0.163	0.370	0.167	0.373	0.166	0.372
1994	0.158	0.365	0.149	0.356	0.156	0.363
1995	0.168	0.374	0.165	0.372	0.163	0.369
1996	0.179	0.383	0.180	0.384	0.170	0.376
Region 1	0.597	0.490	0.676	0.468	0.412	0.492
Region 2	0.135	0.342	0.090	0.287	0.123	0.329
Region 3	0.032	0.175	0.027	0.162	0.038	0.191
Region 4	0.094	0.292	0.091	0.288	0.158	0.365
Region 5	0.081	0.273	0.068	0.252	0.220	0.414
Region 6	0.060	0.238	0.047	0.212	0.048	0.215
Region 7	0.048	0.213	0.044	0.205	0.027	0.161
Observations	83080		20580		12277	

Table A-1, Continued

	Eastern Europe		Nordic Countries		Other OECD		Natives	
Variable	Mean	StdDev	Mean	StdDev	Mean	StdDev	Mean	StdDev
ln(Annual Earnings)	11.915	0.681	12.160	0.597	12.234	0.662	12.164	0.551
ln(Unempl Rate)	1.108	0.700	1.087	0.706	1.051	0.747	1.061	0.727
Years Since Migr	13.083	9.300	15.208	9.043	15.764	8.679		
Pre-1964 Cohort	0.172	0.378	0.239	0.426	0.192	0.394		
1964-68 Cohort	0.049	0.215	0.062	0.242	0.087	0.282		
1969-73 Cohort	0.137	0.344	0.094	0.291	0.149	0.356		
1974-78 Cohort	0.077	0.267	0.139	0.346	0.163	0.370		
1979-83 Cohort	0.100	0.299	0.147	0.354	0.146	0.353		
1984-88 Cohort	0.223	0.416	0.201	0.401	0.165	0.371		
1989-93 Cohort	0.220	0.414	0.109	0.312	0.090	0.286		
1994 Cohort	0.022	0.146	0.009	0.097	0.007	0.086		
Age	41.468	9.898	43.629	9.952	43.675	9.342	41.945	10.776
Educ1	0.011	0.105	0.019	0.138	0.014	0.117	0.001	0.025
Educ2	0.096	0.294	0.149	0.356	0.086	0.280	0.200	0.400
Educ4	0.224	0.417	0.244	0.429	0.222	0.416	0.333	0.471
Educ5	0.147	0.354	0.146	0.354	0.210	0.407	0.173	0.379
Educ6	0.126	0.331	0.076	0.264	0.141	0.348	0.073	0.259
Educ Missing	0.293	0.455	0.261	0.439	0.237	0.425	0.007	0.082
Married	0.723	0.447	0.607	0.488	0.721	0.449	0.638	0.481
Divorced/Separated	0.146	0.354	0.150	0.357	0.156	0.363	0.096	0.295
1980 Observation	0.092	0.290	0.108	0.311	0.116	0.320	0.137	0.344
1990	0.118	0.322	0.151	0.358	0.158	0.365	0.146	0.354
1992	0.132	0.339	0.147	0.354	0.145	0.352	0.144	0.351
1993	0.137	0.343	0.146	0.353	0.144	0.351	0.145	0.352
1994	0.138	0.345	0.145	0.352	0.142	0.349	0.141	0.348
1995	0.172	0.378	0.148	0.355	0.146	0.353	0.143	0.350
1996	0.211	0.408	0.154	0.361	0.150	0.357	0.144	0.351
Region 1	0.512	0.500	0.452	0.498	0.421	0.494	0.346	0.476
Region 2	0.208	0.406	0.233	0.423	0.170	0.375	0.189	0.392
Region 3	0.050	0.218	0.061	0.239	0.040	0.195	0.087	0.282
Region 4	0.114	0.317	0.136	0.343	0.198	0.398	0.133	0.340
Region 5	0.059	0.235	0.066	0.248	0.111	0.314	0.125	0.331
Region 6	0.057	0.232	0.052	0.221	0.061	0.239	0.119	0.324
Region 7	0.048	0.213	0.094	0.292	0.055	0.228	0.142	0.349
Observations	23382		62437		63556		490596	

Table A-2: Summary Statistics, Female Samples

	Asia		Africa		Latin America	
Variable	Mean	StdDev	Mean	StdDev	Mean	StdDev
ln(Annual Earnings)	11.494	0.665	11.519	0.661	11.516	0.638
ln(Unempl Rate)	1.258	0.460	1.260	0.495	1.248	0.494
Years Since Migr	10.053	5.831	11.060	7.261	10.219	6.668
Pre-1964 Cohort	0.016	0.127	0.069	0.253	0.038	0.192
1964-68 Cohort	0.008	0.089	0.022	0.148	0.016	0.124
1969-73 Cohort	0.038	0.190	0.061	0.240	0.057	0.233
1974-78 Cohort	0.161	0.367	0.135	0.341	0.162	0.369
1979-83 Cohort	0.227	0.419	0.173	0.378	0.119	0.324
1984-88 Cohort	0.358	0.479	0.331	0.471	0.468	0.499
1989-93 Cohort	0.187	0.390	0.202	0.402	0.134	0.341
1994 Cohort	0.006	0.077	0.007	0.085	0.005	0.071
Age	36.610	7.926	36.115	8.838	38.643	8.508
Educ1	0.079	0.270	0.060	0.237	0.038	0.191
Educ2	0.088	0.283	0.080	0.271	0.072	0.259
Educ4	0.173	0.378	0.226	0.418	0.255	0.436
Educ5	0.201	0.401	0.180	0.384	0.198	0.398
Educ6	0.055	0.227	0.037	0.189	0.079	0.270
Educ Missing	0.272	0.445	0.262	0.440	0.214	0.410
Married	0.799	0.401	0.669	0.470	0.642	0.479
Divorced/Separated	0.113	0.317	0.181	0.385	0.232	0.422
1980 Observation	0.028	0.166	0.035	0.185	0.037	0.189
1990	0.119	0.324	0.121	0.326	0.127	0.333
1992	0.148	0.355	0.157	0.364	0.157	0.364
1993	0.160	0.367	0.162	0.369	0.167	0.373
1994	0.163	0.369	0.156	0.363	0.161	0.367
1995	0.181	0.385	0.172	0.377	0.170	0.376
1996	0.201	0.401	0.196	0.397	0.182	0.386
Region 1	0.551	0.497	0.666	0.472	0.414	0.493
Region 2	0.154	0.361	0.115	0.319	0.159	0.365
Region 3	0.039	0.193	0.021	0.144	0.039	0.193
Region 4	0.107	0.309	0.101	0.302	0.134	0.341
Region 5	0.085	0.279	0.067	0.250	0.202	0.401
Region 6	0.064	0.245	0.030	0.170	0.053	0.223
Region 7	0.058	0.234	0.032	0.176	0.035	0.185
Observations	44306		6652		7867	

Table A-2, Continued

	Eastern Europe		Nordic Countries		Other OECD		Natives	
Variable	Mean	StdDev	Mean	StdDev	Mean	StdDev	Mean	StdDev
ln(Annual Earnings)	11.638	0.677	11.792	0.590	11.742	0.665	11.687	0.583
ln(Unempl Rate)	1.155	0.624	1.079	0.711	1.030	0.763	1.104	0.684
Years Since Migr	12.237	8.679	17.236	9.322	18.116	8.854		
Pre-1964 Cohort	0.108	0.310	0.289	0.453	0.304	0.460		
1964-68 Cohort	0.051	0.220	0.089	0.284	0.095	0.293		
1969-73 Cohort	0.117	0.321	0.123	0.329	0.152	0.359		
1974-78 Cohort	0.112	0.316	0.123	0.329	0.141	0.348		
1979-83 Cohort	0.131	0.338	0.115	0.319	0.112	0.316		
1984-88 Cohort	0.223	0.417	0.162	0.369	0.124	0.329		
1989-93 Cohort	0.233	0.423	0.090	0.286	0.068	0.252		
1994 Cohort	0.024	0.155	0.008	0.088	0.005	0.071		
Age	40.316	9.027	43.367	10.346	44.628	9.847	41.657	10.480
Educ1	0.013	0.113	0.010	0.101	0.007	0.084	0.000	0.021
Educ2	0.094	0.292	0.123	0.328	0.081	0.273	0.196	0.397
Educ4	0.185	0.388	0.173	0.378	0.160	0.366	0.207	0.405
Educ5	0.216	0.411	0.285	0.451	0.333	0.471	0.227	0.419
Educ6	0.130	0.337	0.059	0.235	0.123	0.328	0.026	0.159
Educ Missing	0.260	0.438	0.174	0.379	0.149	0.356	0.006	0.078
Married	0.751	0.432	0.647	0.478	0.731	0.444	0.664	0.472
Divorced/Separated	0.184	0.388	0.158	0.365	0.175	0.380	0.138	0.345
1980 Observation	0.066	0.248	0.100	0.300	0.120	0.325	0.109	0.312
1990	0.114	0.318	0.148	0.355	0.161	0.368	0.145	0.352
1992	0.132	0.338	0.149	0.356	0.148	0.355	0.149	0.356
1993	0.140	0.347	0.150	0.357	0.147	0.354	0.151	0.358
1994	0.144	0.351	0.147	0.354	0.139	0.346	0.146	0.353
1995	0.180	0.384	0.150	0.358	0.141	0.348	0.149	0.356
1996	0.224	0.417	0.156	0.363	0.144	0.351	0.151	0.358
Region 1	0.538	0.499	0.523	0.499	0.450	0.498	0.362	0.481
Region 2	0.187	0.390	0.202	0.401	0.175	0.380	0.183	0.387
Region 3	0.043	0.203	0.071	0.258	0.049	0.215	0.087	0.282
Region 4	0.103	0.304	0.097	0.295	0.158	0.365	0.129	0.335
Region 5	0.064	0.244	0.055	0.227	0.104	0.305	0.122	0.328
Region 6	0.065	0.247	0.052	0.223	0.063	0.243	0.117	0.321
Region 7	0.064	0.244	0.111	0.314	0.064	0.245	0.139	0.346
Observations	18176		70800		48150		404673	

Table A-3: Log Earnings Regressions (Synthetic Panel Method), African, Asian, and Latin American Immigrants in Norway

	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Unempl Rate)		-.0026	-.0026		.0133	.0127
		(.0020)	(.0020)		(.0024)	(.0024)
Imm*ln(UR)		-.1367	-.0417		-.1111	-.2285
		(.0044)	(.0259)		(.0062)	(.0364)
YSM	.1177	.1034	.1781	.1179	.1176	.0925
	(.0060)	(.0060)	(.0142)	(.0086)	(.0086)	(.0206)
$YSM^2/10$	-.0835	-.0609	-.1836	-.1089	-.1048	-.1065
	(.0078)	(.0078)	(.0196)	(.0111)	(.0111)	(.0286)
$YSM^3/100$	.0197	.0138	.0814	.0380	.0383	.0483
	(.0038)	(.0039)	(.0104)	(.0054)	(.0054)	(.0151)
$YSM^4/1000$	-.0011	-.0007	-.0125	-.0045	-.0047	-.0073
	(.0006)	(.0006)	(.0018)	(.0009)	(.0009)	(.0026)
ln(UR)*YSM			-.0677			.0138
			(.0110)			(.0161)
$ln(UR)*YSM^2/10$			.1105			.0137
			(.0154)			(.0225)
$ln(UR)*YSM^3/100$			-.0600			-.0142
			(.0082)			(.0120)
$ln(UR)*YSM^4/1000$			.0104			.0030
			(.0014)			(.0021)
Immigrant	4.0752	4.4153	4.3581	-.3290	-.1121	-.0228
	(.5380)	(.5377)	(.5382)	(.7600)	(.7598)	(.7607)
Pre-1964 Cohort	.6356	.2671	.3258	.4222	.1601	.2367
	(.0186)	(.0219)	(.0236)	(.0241)	(.0283)	(.0309)
1964-68 Cohort	.4362	.1142	.1564	.2997	.0756	.1253
	(.0157)	(.0187)	(.0196)	(.0276)	(.0304)	(.0314)
1969-73 Cohort	.2662	.0100	.0118	.3040	.1423	.1458
	(.0086)	(.0118)	(.0123)	(.0166)	(.0189)	(.0193)
1974-78 Cohort	.2319	.0536	.0303	.2126	.1072	.0757
	(.0074)	(.0093)	(.0097)	(.0109)	(.0125)	(.0130)
1979-83 Cohort	.1432	.0761	.0563	.1250	.0857	.0633
	(.0062)	(.0065)	(.0068)	(.0084)	(.0087)	(.0091)
1989-93 Cohort	-.0483	-.0287	-.0258	-.0915	-.0793	-.0669
	(.0056)	(.0056)	(.0057)	(.0077)	(.0077)	(.0079)
1994 Cohort	.1510	.1605	.1574	-.1064	-.0996	-.0982
	(.0287)	(.0287)	(.0287)	(.0309)	(.0309)	(.0309)
Africa	-.0580	-.0558	-.0549	.0071	.0100	.0105
	(.0042)	(.0042)	(.0042)	(.0073)	(.0073)	(.0073)
Latin America	.0948	.0979	.0990	.0115	.0138	.0143
	(.0052)	(.0052)	(.0052)	(.0068)	(.0068)	(.0068)
Age	.6937	.6983	.6982	.0105	.0138	.0141
	(.0206)	(.0206)	(.0206)	(.0239)	(.0239)	(.0239)
Age^2	-.2319	-.2336	-.2336	.0046	.0034	.0033
	(.0074)	(.0074)	(.0074)	(.0086)	(.0086)	(.0086)
Age^3	.3467	.3493	.3493	-.0032	-.0012	-.0011
	(.0115)	(.0115)	(.0115)	(.0134)	(.0134)	(.0134)
Age^4	-.1957	-.1972	-.1972	-.0071	-.0082	-.0083
	(.0065)	(.0065)	(.0065)	(.0077)	(.0077)	(.0077)
Imm*Age	-.4372	-.4517	-.4562	-.0218	-.0320	-.0262
	(.0545)	(.0544)	(.0544)	(.0771)	(.0771)	(.0771)

Imm*Age^2	.1404	.1455	.1471	.0063	.0105	.0083
	(.0201)	(.0201)	(.0201)	(.0286)	(.0286)	(.0286)
Imm*Age^3	-.1995	-.2074	-.2100	-.0156	-.0232	-.0195
	(.0323)	(.0322)	(.0322)	(.0459)	(.0459)	(.0459)
Imm*Age^4	.1060	.1106	.1121	.0146	.0194	.0172
	(.0189)	(.0189)	(.0189)	(.0270)	(.0270)	(.0270)
Educ1	-.2938	-.2951	-.2951	-.1166	-.1176	-.1177
	(.0298)	(.0298)	(.0298)	(.0401)	(.0401)	(.0401)
Educ2	-.0680	-.0677	-.0676	-.1170	-.1173	-.1173
	(.0024)	(.0024)	(.0024)	(.0024)	(.0024)	(.0024)
Educ4	.1127	.1125	.1125	.1326	.1326	.1326
	(.0021)	(.0021)	(.0021)	(.0025)	(.0025)	(.0025)
Educ5	.2573	.2574	.2573	.3312	.3312	.3311
	(.0024)	(.0024)	(.0024)	(.0024)	(.0024)	(.0024)
Educ6	.4750	.4754	.4753	.5992	.5992	.5991
	(.0032)	(.0032)	(.0032)	(.0056)	(.0055)	(.0055)
Educ Missing	.0144	.0168	.0168	.0313	.0347	.0346
	(.0093)	(.0094)	(.0093)	(.0110)	(.0111)	(.0111)
Imm*Educ1	.3302	.3349	.3357	.1650	.1663	.1671
	(.0309)	(.0308)	(.0308)	(.0414)	(.0414)	(.0414)
Imm*Educ2	.1258	.1223	.1248	.1380	.1399	.1403
	(.0070)	(.0070)	(.0070)	(.0101)	(.0101)	(.0101)
Imm*Educ4	-.0231	-.0231	-.0227	.0080	.0087	.0102
	(.0054)	(.0054)	(.0054)	(.0084)	(.0084)	(.0084)
Imm*Educ5	-.1337	-.1320	-.1313	-.0580	-.0563	-.0553
	(.0060)	(.0060)	(.0060)	(.0083)	(.0083)	(.0083)
Imm*Educ6	-.0814	-.0798	-.0790	-.1012	-.1016	-.0998
	(.0082)	(.0082)	(.0082)	(.0126)	(.0126)	(.0126)
Imm*Educ Missing	.0665	.0645	.0643	.0302	.0272	.0272
	(.0105)	(.0106)	(.0106)	(.0134)	(.0134)	(.0134)
Married	.2050	.2050	.2050	-.1749	-.1747	-.1747
	(.0021)	(.0021)	(.0021)	(.0025)	(.0025)	(.0025)
Prev Married	.0868	.0868	.0868	-.0583	-.0584	-.0584
	(.0031)	(.0030)	(.0030)	(.0033)	(.0033)	(.0033)
Imm*Married	-.0519	-.0533	-.0536	.1271	.1233	.1229
	(.0046)	(.0046)	(.0046)	(.0082)	(.0082)	(.0082)
Imm*Prev Married	-.0644	-.0606	-.0610	.0171	.0145	.0143
	(.0067)	(.0067)	(.0067)	(.0102)	(.0102)	(.0102)
Constant	4.2302	4.188	4.1889	11.1006	11.055	11.0542
	(.2095)	(.2093)	(.2093)	(.2419)	(.2418)	(.2418)
R^2	.2280	.2293	.2294	.1762	.1768	.1769
Root MSE	.5253	.5248	.5247	.5418	.5416	.5416
Observations		606,533			463,498	

Note: Standard errors are reported in parentheses. Dependent variable is ln(annual earnings, 1990 NOK). Regressions also include six regional indicator variables and a complete set of year indicators. Omitted immigrant group is Asia and omitted arrival cohort is 1984-88.