# New Perspectives
# on the
# Integration of Immigrants

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# Personal Acknowledgements

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# Introduction

Norway has only recently started to experience firsthand the challenges, difficulties, and benefits associated with a large and expanding immigrant population. In facing these issues today, Norway has some huge advantages over traditional immigrant countries, such as the US. Firstly, Norway can try to glean valuable insights from decades of social science research on the topic of immigration and can thus hope to learn from the previous experiences of other countries with a longer tradition of immigration. Secondly, Norway is itself in many ways in an unprecedented position to document, monitor and analyze the challenges, difficulties and benefits of immigration while they are taking place. This is largely due to a vast infrastructure of high-quality micro-data available on many aspects of economic and social life generally deemed relevant and valuable in the social sciences and for policymaking, both in Norway and elsewhere. Thus, the relatively new experiences with immigration and immigrants in Norway provide unique opportunities both for the re-evaluation of previous research and for suggesting new avenues of inquiry. In this sense, Norwegian social science and the Norwegian experience with immigration can also provide knowledge and insights of potential value for many other countries, even those with much longer histories of immigration.

## 1 A Brief Overview over Recent Immigration to Norway

Immigration from non-Western countries is a relatively new phenomenon in Norway. Net annual immigration to Norway was, in fact, still more often negative than positive up until about the late 1960s[1], and it was only after substantial positive net immigration persisted for several years that restrictions were placed on immigration in 1975. The moratorium on immigration implemented on 1 February 1975 was intended as an interim measure. It was, however, renewed for several years and then adopted as a measure in 1981. A new immigration law was adopted in 1988 and implemented in 1991; this new law was in many ways simply a formal declaration of *ad hoc* practices that were established in the wake of the immigration restrictions of 1975, see Brochman (2003). Thus, the temporary policies implemented in 1975 actually ended up formulating the main principles of immigration policy still in place today. Current immigration policy thus allows for immigration to Norway based on three main criteria: the demand for specific skilled labor, family ties and political asylum.

Brochmann (2003) provides a more extensive historical account and analysis of the events and discussions leading up to the adoption of restrictions on immigration in 1975. Interestingly, she does suggest that the change in policy was a

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[1]Statistics Norway's statistical database "Statbank Norway" is the source for the population statistics presented in this section. See http://statbank.ssb.no//statistikkbanken/ for details.

response to union worries *both* about immigrants accepting lower wages and thus undermining the progress made in improving conditions for workers *and* sincere concerns about poor living standards among–and exploitation of–the immigrants themselves. Thus, even at the very start of the modern era of immigration to Norway, concerns were being voiced about the well-being and standard of living for immigrants in Norway.

Since the early 1970s, Norway has experienced more than a seven-fold increase in its population of immigrant origin, as can be seen in Figure 1. As of 1 January 2008, immigrants made up 9.7 percent of the population in Norway. Furthermore, the composition of the immigrant population has changed dramatically in the past few decades. Whereas the vast majority of immigrants to Norway were of Western origin in 1970 and 1980, dramatic growth in the numbers of immigrants from non-Western countries has lead to Western immigrants now comprising less than half of the immigrants to Norway.

Table 1 provides some further insights on the substantial changes that have taken place with respect to the composition of the immigrant population in Norway. In 1970, immigrants from neighboring nations and large Western countries were by far the largest groups in Norway; there were no non-Western countries among the top ten countries of origin for immigrants to Norway in 1970. By 1980, immigrants from Pakistan and Turkey were two of the 10 largest groups; these immigrants consisted largely of labor migrants and their family members, many of whom entered the country before the change in immigration legislation in 1975. By the year 2000 five of the top ten immigrant groups in Norway were from non-Western countries; those major non-Western groups will also be given special attention in several of the papers presented in this dissertation.

The number of immigrants to Norway has continued to grow dramatically in the new millennium; most notably, two new groups–refugees from Iraq and Somalia–have taken their place among the largest groups in Norway; the performance and well-being of those two groups are therefore also of considerable interest for migration experts and policy-makers in Norway. However, given the relatively recent arrival of those groups and the data available for this study, i.e. from 1993-2001, we were unable to include them in this current study.

**Figure 1. Number of Immigrants in Norway by Region of Origin, 1970, 1980 and 1986-2007**



■ Europe, North America, Oceania *　　□ Africa
▨ Asia **　　▨ South and Central America

\* Immigrants from Turkey are included in the category of immigrants from Asia.
\*\*Immigrants from Australia and New Zealand make up 97 % of the immigrants from Oceania.
*Source*: Statistics Norway

**Table 1. Top Ten Immigrant Groups to Norway by Country of Origin in 1970, 1980, 1990, 2000 and 2007.**

| | 1970 | | 1980 | | 1990 | | 2000 | | 2007 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Country | Persons | Country | Persons | Country | Persons | Country | Persons | Country | Persons |
| 1 | Denmark | 12306 | Denmark | 14571 | Denmark | 18543 | Sweden | 23240 | Pakistan | 28278 |
| 2 | Sweden | 11198 | Sweden | 11018 | Pakistan | 15488 | Pakistan | 22831 | Sweden | 24527 |
| 3 | USA | 7069 | USA | 10289 | Sweden | 12732 | Denmark | 18863 | Irak | 21418 |
| 4 | Germany | 5295 | UK | 8658 | UK | 11830 | Serbia | 15466 | Somalia | 19656 |
| 5 | UK | 4738 | Pakistan | 6828 | USA | 8999 | Vietnam | 15390 | Denmark | 19090 |
| 6 | Finland | 1993 | Germany | 5891 | Vietnam | 8757 | Bosnia | 12614 | Poland | 18834 |
| 7 | Hungary | 1481 | Finland | 3590 | Germany | 6718 | UK | 11161 | Vietnam | 18783 |
| 8 | Netherlands | 1465 | Turkey | 2384 | Turkey | 6155 | Turkey | 10481 | Bosnia | 15667 |
| 9 | Serbia | 1222 | Netherlands | 2222 | Chile | 5901 | Iran | 10354 | Iran | 14662 |
| 10 | Poland | 1198 | Serbia | 2117 | Iran | 5381 | Sri Lanka | 9826 | Turkey | 14546 |

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# 2 Previous Studies on the Economic Integration of Immigrants

The seminal work on the earnings of immigrant men in Chiswick (1978) led to a revival of interest for the topic of immigrant adjustment within the field of economics. Since that time, research into the pattern of economic integration for immigrants has grown into a substantial field of study. Earnings assimilation for immigrants has been studied across a wide-range of countries; a (non-exhaustive) list includes Baker and Benjamin (1994) for Canada, Bell (1997) and Shields and Price (1998) for the United Kingdom, Schmidt (1997) for Germany, Aguilar and Gustafsson (1991) and Gustafsson and Zheng (2006) for Sweden and Hayfron (1998), Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004) for Norway. Barth, Bratsberg and Raaum (2006) also present recent results on earnings assimilation for the US. Further study into earnings assimilation has led to refinements such as the discussion of 'cohort quality' in Borjas (1985) or the attempt to identify and entangle period effects from measures of the duration of residence and the arrival cohort in Barth, Bratsberg and Raaum (2004). Despite the obvious difficulties in studying female earnings, Long (1980) did also attempt to analyze the earnings assimilation of immigrant women largely along the same lines as Chiswick (1978) did for immigrant men. Reimers (1985) also studied (cross-sectional) employment rates for women more directly, with particular emphasis on possible cultural differences for women from different ethnic groups. MacPherson and Steward (1989), Duleep and Sanders (1993) and Baker and Benjamin (1997) all discuss to some extent the possibility of a "household investment model" in which women initially work to subsidize their husbands' investments in human capital in the host country.

Many such studies have thus focused on the labor market performance of immigrants, but further studies have also aimed to shed light on the integration of immigrants by studying participation in social assistance or welfare programs. Such studies include, for example, Borjas and Trejo (1991), Baker and Benjamin (1995), Borjas and Hilton (1996) and Hansen and Lofstrom (2003).

However, despite these forays into the analysis of social assistance use, the majority of economic analyzes of the integration of immigrants have nonetheless focused on the earnings of employed immigrant men. In a situation in which a large portion of immigrants are unable to immediately enter the labor market and women are increasingly entering employment in many of the host countries studied in the international economics literature, such an approach becomes questionable for several reasons. Firstly, it clearly neglects the question of how immigrants outside of the labor market are faring. Secondly, labor market performance is not merely a matter of the understanding the growth in wages for employed immigrants. One must certainly also ask about the extent of employment and developments in employment rates for immigrants. Finally, selection bias quite naturally poses a threat to the accuracy of conclusions in studies of earnings assimilation which focus

exclusively on employed immigrants alone.

The papers included in this dissertation in each their own way address some such shortcoming in the existing literature. The outcomes analyzed are more or less loosely related to experiences and performance in the labor market, although the topic of the first two papers – the high incidence of income poverty among immigrants – is somewhat broader in the sense that it touches on issues of inequality and welfare for immigrants. Whenever the topic of poverty is discussed one inevitably encounters questions about the labor market status and labor earnings of the poor. Thus, this inquiry into the economic integration of immigrants quite naturally proceeded to further investigation into the labor market performance of immigrants; those efforts eventually resulted in the two final papers for this dissertation. Throughout the work on this dissertation, insights from the one project quite naturally led to refinements and modifications of the other projects. There were, in other words, clear synergy effects at play. Thus, the work on this dissertation represents a rather extensive and coherent documentation and analysis of the manner in which immigrants in Norway have adapted to the labor market and society of their new home. In addition, since it has grown out of a perception and understanding of the shortcomings in the existing literature, it also provides some new perspectives of interest to a wider international audience.

## 3   Data

Many of the previous studies mentioned above were hampered by yet another difficulty when attempting to study the manner in which immigrants adjust to the host country: data on immigrants is often scarce and may not be appropriate or sufficient in their coverage to allow for detailed analysis of relevant aspects of immigrant adjustment. Since immigrants make up just a minority of the population in any country, they will generally not be sufficiently represented in traditional household or individual panels. This difficulty is often further exacerbated by the fact that the immigrant population itself is generally quite diverse and encompasses individuals from many different countries and cultures.

Several of the previous studies, such as Chiswick (1978), Borjas (1985, 1995) and Baker and Benjamin (1994), have had to rely on sub-samples of censuses to obtain sufficient samples of immigrants for analysis. While this allows for the study of individual immigrant groups and a more differentiated analysis along such lines, it does not allow the researcher to actually follow the same individuals over several years. Thus, the study of any form of dynamics is greatly inhibited. Other studies, such as Barth,Bratsberg and Raaum (2006), Bell (1997) and Shields and Price (1998) have relied on labor force surveys or similar surveys which were either cross-sections or rotating panels. While some such studies would have sufficient observations to study many large immigrant groups, they still suffer from limitations in the extent to which they allow for the study of dynamics and developments for

immigrants over time.

The register data on immigrants in Norway used in this dissertation is thus rather unusual in that it allows researchers to follow and study very many individual immigrants over a period of several years from 1993 to 2001. In fact, the Norwegian register data used in the studies included in this dissertation actually encompasses *all* the legal immigrants residing Norway during that period. Norwegian register data includes detailed information on labor and other earnings, use of benefits such as social security and social assistance, family relations and composition, and place of residence; much of this information is administered and made available by Statistics Norway. However, information from various sources and government institutions can also be combined and merged based on a unique person identifier. Furthermore, information on the individual level can also be complemented with information on the neighborhoods, municipality and regions where individuals reside. Finally, extensive work by myself and colleagues at Statistics Norway led to the creation of a household panel for the entire resident population for the period 1993-2001; this household panel has enabled more reliable studies of income inequality and poverty based on register data. Work on the creation of that household panel was thus particularly instrumental for the analyzes contained in the first two papers of this dissertation.

Finally, since the data sources used in this dissertation rely on data from official registers, the analysis focuses on immigrants who are registered in the data and, thus, legally residing in the country. There is, however, little evidence that large numbers of illegal immigrants enter and remain in Norway; a very recent study in Zhang (2008) estimates the illegal immigrant population at just 0.39 percent of the total population in Norway, a proportion which is considered low in comparison to estimates from most other countries. Thus, it would seem that illegal immigration to Norway is still somewhat limited and that analyzes of the legal immigrant population contained in this dissertation would generally suffice at the current time.

## 4 Summary of Papers

### Paper 1: Assimilation Effects on Poverty among Immigrants in Norway[2] (with R. Aaberge)

Despite low rates of income poverty in Norway in general, the percentage of poor among immigrants in the country is much larger than the percentage in the native population. One key question in attempting to analyze and understand poverty rates among immigrants in Norway revolves around the extent to which the rather high incidence of poverty among immigrants persists even after immigrants have been in the country for a long period. If one considers both an immigrant's initial adjustment difficulties and the different demographic composition of the immigrant

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[2]This paper has been published in Journal of Population Economic, 18, 691-718.

population as compared to the native population, a difference in the likelihood for poverty in the immigrant and native population hardly seems surprising. If one can control for some major demographic differences, such as household composition, age and education, one would expect that an immigrant's probability of being poor would be lower after he or she had been in the country for several years and had therefore been able to adapt and adjust to his or her new environment. One might even expect that, after a sufficiently long period of adaptation and integration, immigrants' probability for poverty would converge to the level of the native population with the same or very similar demographic characteristics.

A certain degree of wage assimilation for foreigners in Norway has been suggested by previous studies (Hayfron 1998, Longva and Raaum 2003 and Barth, Bratsberg and Raaum 2004) and such studies certainly give rise to expectations of a similar assimilation effect with regards to poverty. There are, however, some major differences between studies of wage assimilation and poverty that should be noted. Firstly, wage assimilation studies focus on the labor market success of individuals. The labor market difficulties of immigrants are hardly a new tale, so focusing on wages alone does not give us a complete picture of the welfare situation for immigrants without regular work. It also fails to take into account welfare issues for household members that do not participate in the labor market. Secondly, increasing success in escaping poverty does not have to mean that a large degree of wage assimilation has taken place nor that wage assimilation is the only cause of the decrease in poverty. It could be due to improved access to welfare programs or better access to low-paying jobs that nonetheless provide income just over the poverty line. While studying wage assimilation is very important for establishing the extent to which immigrants are able to improve their situation by their own means when they find employment, analyzing assimilation with respect to poverty propensity helps to establish the extent to which immigrants are able to avoid very low income in a manner similar to the native population.

Thus, a study of assimilation with respect to poverty simply measures something different than labor market assimilation. It focuses on welfare for the lower end of the income distribution and for all individuals, regardless of their relationship with the labor market or the social insurance system. In end effect it combines elements from both studies of welfare participation and studies of wage assimilation, but, more importantly, it reflects the degree to which immigrants as a whole are able to achieve at least the minimum necessary to participate in the life of their new home and avoid potential difficulties later on. This crucial distinction represents the main innovation of the perspective offered in the first paper of this dissertation. By studying how immigrants are faring with respect to a certain minimum in society, we can better establish the extent to which more specific policies and programs with respect to immigration in general, labor market assimilation, social insurance or even welfare are needed.

The results of this paper indicate that poverty rates do decrease for immigrants

the longer their duration of residence; poverty rates nonetheless remain high for many groups of immigrants even after several years in the country. The study distinguishes between immigrants from several different regions of origin and a particularly low degree of assimilation in poverty rates appears to take place for immigrants from Asia. Since Asian immigrants make up a very large and increasing proportion of the immigrant population in Norway, further insights into developments in poverty for this group is surely needed. Thus, while this paper indicates that high poverty rates among immigrants may in part be simply an artefact of initial adjustment difficulties, it also documents that poverty rates in the immigrant population do not seem to converge entirely to rates in the native population.

## Paper 2: Do Immigrants Integrate out of Poverty?

As the first paper of this dissertation contends, the question of how immigrants are faring with respect to a certain minimum in society is both a timely and pertinent question for a number of European countries. Unless high poverty rates in the immigrant population are just a transient feature of immigrants' initial period of adjustment in the host country, poverty among immigrants is surely a topic of policy relevance.

The second paper of this dissertation extends the first by further analyzing the extent to which one could claim that immigrants "integrate out of poverty". In other words, the goal is to provide evidence as to whether or not the high incidence of poverty among immigrants–as seen in descriptive statistics or basic analyzes–is indicative of a *persistently* high probability of poverty for (individual) immigrants over the duration of their stay in Norway. To this end, the main analysis of this paper exploits the fact that repeated observations of immigrants are available in Norwegian register data, as described above, and attempts to model household-specific heterogeneity in order to assess the extent to which such heterogeneity may influence results with respect to a possible integration effect influencing the probability of poverty for immigrants in Norway.

The focus of this second paper, i.e. immigrants' performance in relation to a certain minimum income or, implicitly, a minimum living standard in the host society, is related to two different general literatures or topics. As indicated previously, it has clear ties to the literature on earnings assimilation and immigrants' use of social assistance. However, the analysis provided in this paper is also related to the general topic of poverty dynamics, as discussed in Bane and Ellwood (1986) and surveyed in Jenkins (2000). Studies on poverty dynamics have generally attempted to understand poverty not simply as a static state but rather as a dynamic phenomenon. The main objective of that perspective is to establish the extent to which various underlying factors contribute to persistent or chronic poverty for individuals. Since the second paper in this dissertation attempts to interpret developments in poverty for immigrants in relation to the time spent in the country, it provides insights of relevance to the more general literature on poverty dynamics, albeit in

a slightly different manner than direct analyzes of poverty duration. In particular, the paper can thus also be interpreted as a contribution toward understanding the particular dynamics of *immigrant* poverty.

The paper's findings indicate that decreasing poverty rates for many immigrant groups can be indicative of a sort of integration effect, i.e. that longer duration in the country leads to immigrants eventually being able to leave poverty. Different immigrant groups differ however in the extent to which this integration effect can be found and the magnitude of any integration effect is somewhat sensitive to the manner in which unobserved household-specific heterogeneity is modelled.

**Paper 3: The Labor Market Integration of Immigrant Men and Women**

As previously outlined in this Introduction, a large body of research has followed in the footsteps of Chiswick (1978) and analyzed the earnings assimilation of immigrants. Such studies have generally interpreted earnings growth for immigrants as indicative of investments in host country specific human capital, such as language acquisition, formal training and on-the-job experience. Such human capital investments are assumed to raise the productivity and, hence, the earnings of immigrants during time spent in the country. The duration of residence is thus often assumed to be an appropriate proxy for such investments, which the econometrician often cannot observe or model in a more direct manner. However, depending on the structures in place in the labor market, investments in human capital may not express themselves solely through changes in earnings and the growth of earnings relative to the duration of residence; acquisition of basic human capital, such as relevant language skills and knowledge of the workings of the labor market, may be pre-requisites for immigrants to even gain access to employment. Similarly, alternative sources of income, such as social assistance or generous unemployment insurance, can raise the reservation wage for immigrants who have low earnings potential (productivity), as one might suspect to be the case particularly at the start of an immigrant's stay in the country. In sum, results on earnings assimilation may not tell us the whole story about the labor market integration of immigrants, because such studies rarely consider the extent to which immigrants are employed and the pattern with which they enter the labor market over time.

Motivation for the analysis in the third paper came from several different sources, and work on this paper has clear ties to both the study of poverty among immigrants and the final paper in this dissertation, which studies earnings assimilation among immigrants. The insights garnered from the earlier work on poverty made the need for further study on employment and labor market performance abundantly clear. At the same time, since much of the international literature on immigrant economic performance has focused on immigrant men, further insights on the extent of labor market participation of immigrant women were clearly lacking; such insights are also particularly important for countries – such as Norway – with high female labor market participation in general. Finally, much of the

literature on the economic integration of immigrants had previously focused more narrowly on the earnings of immigrants in employment, a practice that could be quite problematic if immigrants, for whatever reasons, have low employment probabilities.

Altogether, therefore, the third paper represents a wish to investigate the pattern of integration into the labor market of immigrants as a complement to insights on poverty among immigrants, as valuable documentation for later work on earnings assimilation and as a topic of considerable importance in its own right. The paper employs several different techniques to rule out the presence of spurious results due to unobserved individual heterogeneity or period effects acting through general economic conditions in labor market. Thus, this paper studies the extent to which rising employment rates for immigrants over time can be attributed to an "integration effect" that manifests itself as an increase in the individual immigrant's probability of employment over the time spent in the country.

The finding indicate that immigrants do indeed integrate into employment in the sense that the probability of employment rises, often quite dramatically, as the duration of residence increases. Failure to account for unobserved individual heterogeneity in the probability of employment general leads to a large underestimation of the importance of the time spent in the country for employment probabilities. Thus, studies which rely on purely cross-sectional data or other data sources which cannot identify and analyze employment for the same individuals, might fail to correctly identify the extent of the integration into employment for immigrants. Furthermore, the integration effects and the importance of individual heterogeneity quite clearly documented in this paper have repercussions for any study which attempts to analyze earnings for immigrants, since one must expect that the not all immigrants are employed and thus observed with earnings in the labor market.

**Paper 4: Re-Examining the Earnings Assimilation of Immigrants**

The main purpose of this study is to indicate how the failure to account for employment status and actual labor market experience can affect our conclusions about the earnings and earnings assimilation of immigrants. This paper thus clearly builds insights provided by the third paper, which documents that employment rates are higher for immigrants with longer duration of residence in the country and suggests that that rise is attributable both to an integration effect and to individual differences in employment probabilities. Thus, it would seem that employment probabilities change for individual immigrants as they adjust and adapt to the labor market in Norway, but the population of employed immigrants at any one time consists of individuals with different inherent probabilities or propensities for employment. The purpose of this final paper is to evaluate the extent to which previous studies, which have failed to account for such a possible integration effect in employment for immigrants, may have led to biased conclusions on the earnings

assimilation of immigrants in Norway. In light of the evidence to be presented here, a major revision of previous conclusions on the earnings assimilation of non-Western immigrants in Norway may be in order.

While previous studies suggest that immigrants initially have lower earnings than natives and experience some degree of earnings assimilation as time passes, immigrants' earnings still tend to be lower than natives' after many years in the country. However, results based on slightly different methods and definitions indicate that the immigrants in the groups to be studied here earn roughly the same as – and in some cases even better than – natives with similar levels of human capital. In addition, earnings growth for immigrants largely follows the same pattern as for natives. Thus, there appears to be neither a meaningful gap in earnings between immigrants and natives with similar levels of human capital nor indication of some sort of added premium to Norwegian labor market experience for immigrants in Norway.

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# Assimilation Effects on Poverty among Immigrants in Norway[1]

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## Abstract

This paper discusses the question of whether or not the high incidence of poverty among immigrants in Norway persists even after immigrants have been in the country for a long period, that is, after they have had the opportunity to integrate and adapt their skills to the expectations in their new home. While similar to traditional studies of wage assimilation, a study of assimilation in relation to poverty propensity nevertheless measures something different than labor market assimilation, and this represents the main innovation of this study. Analysis of assimilation with respect to poverty focuses on welfare for the lower end of the income distribution and for all individuals, regardless of their relationship with the labor market. It can therefore be seen to better reflect the degree to which immigrants as a whole are able to achieve at least the minimum necessary to participate in the life of their new home and avoid difficulties later on.

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**1. Introduction**

Norway has long been regarded as a rich welfare state with relatively low income inequality and would therefore hardly seem the likely object for a study of poverty. However, a certain proportion of the Norwegian population does have a level of income so far below that of the rest of the population that participation in societal life most certainly is impaired. In some respects, the persistence of poverty in a country such as Norway can help us to isolate some of the particularly intractable factors which allow poverty to exist even in affluent welfare states. The percentage of poor among immigrants in Norway is much larger than the percentage in the native population so that immigrant status and ethnic origin may just help to explain to some degree the continuing existence of poverty in the country. However, the more crucial question is whether or not this rather high incidence of poverty among immigrants persists even after immigrants have been in the country for a long period, that is, after they have had the opportunity to integrate and adapt their skills to the expectations in their new home.

If one considers both an immigrant's initial adjustment difficulties and the different demographic composition of the immigrant population as compared to the native population, a difference in the likelihood for poverty in the immigrant and native population hardly seems surprising. If one can control for some major demographic differences, such as household composition, age and education, one would expect that an immigrant's probability of being poor would be lower after he or she had been in the country for several years and had therefore been able to adapt and adjust to his or her new environment. One might even expect that, after a sufficiently long period of adaptation and integration, immigrants' probability for poverty would converge to the level of the native population with the same or very similar demographic characteristics.

A large number of labor market studies have addressed the issue of the wage assimilation of foreigners relative to native workers. Chiswick (1978) was the first to analyze wage assimilation for immigrants in the US and was able to discern a positive relationship between years in the country and wages relative to natives, but later studies have introduced various refinements on that main model. In particular, results in Borjas (1985) suggest that cross-sectional analysis, such as in Chiswick (1978), need not imply wage assimilation, but might rather be indicative of a decline in cohort quality among successive immigrant groups. The analysis in Borjas (1985) relies, in turn, on an implicit assumption of equal period effects for all immigrant cohorts, in other words, that the effects of economic conditions were the same for natives and various immigrant cohorts during the entire period of investigation. A forthcoming Norwegian study (Barth, Bratsberg and Raaum (2004)) discusses how such an assumption can introduce biases in the measure of assimilation as well as cohort quality and introduces differential period effects embodied by local labor market conditions (unemployment) for immigrant and natives. That study indicates that failure to take into consideration different period effects results in an overestimation of differences in cohort quality as well as underestimation of wage assimilation for non-OECD immigrants in Norway. While all of these refinements have resulted in differences in the interpretation of the extent to which wage assimilation has occurred, they do not reverse the general finding that some assimilation does in fact take place.

A certain degree of wage assimilation for foreigners in Norway has therefore been suggested by previous studies[2] and such studies certainly give rise to expectations

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[2]Hayfron (1998) and Longvå and Raaum (2002) as well as the forthcoming paper by Barth, Bratsberg and Raaum (2004) provide results from Norway.

of a similar assimilation effect with regards to poverty. There are, however, some major differences between studies of wage assimilation and poverty that should be noted. Firstly, wage assimilation studies focus on the labor market success of individuals. The labor market difficulties of immigrants are hardly a new tale, so focusing on wages alone does not give us a complete picture of the welfare situation for immigrants without regular work. It also fails to take into account welfare issues for household members that do not participate in the labor market. In other words, wage assimilation does not provide us with the whole picture, because it leaves out many relevant variables, such as household composition and the actual number of wage earners in the household. Secondly, increasing success in escaping poverty does not have to mean that a large degree of wage assimilation has taken place nor that wage assimilation is the only cause of the decrease in poverty. It could be due to improved access to welfare programs or better access to low-paying jobs that nonetheless provide income just over the poverty line. While studying wage assimilation is very important for establishing the extent to which immigrants are able to improve their situation by their own means when they find employment, assimilation with respect to poverty propensity helps to establish the extent to which immigrants are able to avoid very low income in a manner similar to the native population.

Another phenomenon relevant in this context is assimilation with regards to participation in social assistance (welfare) programs or other forms of transfers, a topic which has started to gain some attention within the last decade. It may not be entirely clear just what assimilation means in such a context. If immigrants start out at a lower level of welfare participation than the native population, would assimilation mean *increased* participation over time or does assimilation mean that immigrants' are less reliant on welfare, regardless of how they compare to the native population? The crucial question in the literature seems to be whether higher or lower participation rates occur over time. Hansen and Lofstrom (2003) elegantly solve this semantic difficulty by speaking of increased participation over time as "assimilation into welfare" and decreased participation as "assimilation out of welfare". In fact, Hansen and Lofstrom need to make this distinction because their findings for Sweden, which suggest assimilation *out* of welfare, are the exact opposite of previous findings for the US and Canada[3]. Although similar studies have yet to appear for Norway, similarities to Sweden politically and economically as well as very basic descriptive analysis of immigrants' income makes assimilation out of welfare also seem likely in Norway.[4]

Finally, welfare or social assistance is just one aspect of the social safety net in modern welfare economies. Participation in social *insurance* based on rights typically acquired by paying into the social insurance system over time is another area in which immigrants can become more similar, i.e. assimilate, to their native counterparts. Data for Norway, for example, indicate that there are proportionally fewer immigrants on disability insurance than in the general Norwegian population. However, the percentage of immigrants with disability insurance does increase with the time spent in the country, first and foremost due to larger numbers of immigrants acquiring the rights to such benefits through employment after several years in the country (Dahl, 2002).

A study of assimilation with respect to poverty propensity simply measures something different than labor market assimilation. It focuses on welfare for the lower

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[3] See Borjas and Trejo (1991) and Borjas and Hilton (1996) for analysis of the US and Baker and Benjamin (1995) for results from Cananda.

[4] Lie (2002), pp. 83-95, gives an overview of immigrants' income components, also relative to their time in the country.

end of the income distribution and for all individuals, regardless of their relationship with the labor market or the social insurance system. In end effect it combines elements from both studies of welfare participation and studies of wage assimilation, but, more importantly, it reflects the degree to which immigrants as a whole are able to achieve at least the minimum necessary to participate in the life of their new home and avoid potential difficulties later on. This crucial distinction represents the main innovation of our approach. By having a look at how immigrants are faring with respect to a certain minimum in the society, we can better establish the extent to which more specific policies and programs with respect to immigration in general, labor market assimilation, social insurance or even welfare are needed.

While the well-being of today's immigrants appears to have its own place besides efficiency arguments in the general immigration debate in Norway, there is also an efficiency aspect involved in maintaining the welfare of immigrants. Immigrant groups with a persistently high probability of poverty, i.e. a lack of assimilation with respect to poverty probabilities over time, may bring with them any of a number of social woes generally associated with poverty for any group, native or immigrant, be it depressed neighborhoods, increased crime, stigmatization or social unrest.

The paper is organized as follows. The next section provides a basic overview of the data, definitions and methods used to measure poverty in this study. It is followed by a section that gives a general picture of developments in immigration to Norway as well as the prevalence of poverty among immigrants to Norway by ethnic origin. The discussion in that section indicates the need for the more detailed logistic regression analysis presented in Section 4. That analysis focuses on the question of the impact of integration, measured very roughly as the number of years since migration, on the probability of being poor. The analysis based on annual income is also supplemented by an analysis of the situation with income over a three-year period. The final section, Section 5, discusses the findings, suggests possible interpretation and addresses some of the shortcomings and challenges presented by the analysis.

**2. Definitions, Methods and Data**

Construction of the relative poverty line used here was based on official data from the Norwegian national statistical office, Statistics Norway, and encompasses the entire resident population of Norway in each of the years 1995-1997. More specifically, we use a poverty line given at 50 % of median equivalent income after tax for the entire population in the relevant time period (one or three years) as described in more detail below. The logistic regressions performed later on in this paper to model immigrants' and natives' probabilities of poverty include only working age (16-68 years) persons who were not in education, but the classification as poor was based on calculations with the entire population. The main reason behind excluding groups such as the elderly, children and students lies with the fact that the income for these groups are determined by forces far different than those of the working age populations, i.e. the pension system, parents' income, and education grants and loans. The income level of such groups is relevant in establishing a measure of the general income situation in the population, so they are included when determining the poverty line, but the different forces influencing their income level would present complications in isolating the effects of assimilation. These groups require a separate and very different approach if one wants to address the issue of their assimilation with respect to poverty.

Use of data from the entire working age population of Norway makes it possible to obtain more reliable information than survey data, especially with regards to small groups. Survey data on groups that make up just a small portion of the population entail a large degree of uncertainty with respect to statistical results, and

thus the ability to interpret any such results with confidence can be severely impaired. This is all the more true for immigrants, especially if one does not wish to treat them as a homogenous group, but would rather distinguish between immigrants of different ethnic origin, as we intend to do here.

Although the individual will eventually constitute the unit of analysis, we first look at *household* income after tax (see Table 1) in order to later assign an income level to each individual based on household income allocated to household members according to two different equivalence scales. Income data is based on official income tax records and as such does not include income from sources like illegal employment and unpaid household work. In order to avoid potential distortions as a result of large losses on the stock market or negative income from self-employment, negative employment and/or capital income was set equal to zero before calculating total household income[5]. Interest payments on mortgages or other loans are not included in our income definition, neither is any attempt made to account for an income equivalent for the value of owner-occupied housing or other differences in purchasing power due to housing costs.

**Table 1. Overview of income components**

| | |
|---|---|
| *Market income* | = Employment income<br>    • wages<br>    • income from self-employment<br>+ Capital income, for example<br>    • interest<br>    • stock dividends<br>    • sale of stocks |
| *Total income* | = Market income<br>+ Transfers, such as:<br>    • welfare<br>    • old-age pension<br>    • unemployment benefits<br>    • child allowance<br>    • student grants |
| *Income after tax* | = Total income<br>- taxes and negative transfers |

We make use of two difference equivalence scales to compare households of various sizes. As equivalence scales make assumptions about the extent of the economies of scale within households, poverty analysis can be highly sensitive to the choice of equivalence scale. Our first scale, the square-root scale, assigns each household member an equivalent income by dividing total household income (after tax) by the square root of the number of household members. The second scale, the OECD scale, applies different weights to adults and children: the first adult receives weight 1, further adults the weight 0.7 and each child (under 16) the weight 0.5. Total

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[5] In 1997 17,742 working-age persons were members of households with negative capital income and 7,106 lived in households with negative labor income. Only 1.8% and 2.0% of those with negative capital income ended up with the classification as poor with the OECD equivalence scale and the square-root scale, respectively, in our analysis. (Equivalence scales will be discussed later in this section.) A much larger portion—approximately one-third—of those with negative *labor* income were classified as poor, but this group only accounted for 2.8% and 2.5% of the poor population with the OECD scale and square-root scale, respectively.

income is then divided by the total weight for household members and the amount thus obtained is allotted to each member. All household members therefore receive the same *equivalent* income level regardless of who actually earned the income. It is on the basis of these equivalent incomes that we calculate the poverty line at 50 % of median equivalent income after tax in the (entire) population.

As the example in Table 2 illustrates, the square-root scale entails larger economies of scales within a household than the OECD scale. The two scales can therefore lead to different and even conflicting results with respect to the relative level of poverty among certain groups in society. A Norwegian study of the sensitivity of poverty results with the use of different equivalence scales in conjunction with a relative poverty line given at 50% of median income indicates that the level of poverty in the entire population is generally larger when an equivalence scale with larger economies of scale is used (Lund and Aaberge, 1999). More importantly however, certain demographic groups can be highly sensitive to the choice of equivalence scale depending in particular on the type of household composition prevalent in those groups. Use of two different equivalence scales will therefore be particularly useful in helping us establish which results are robust to such considerations.

**Table 2. Comparison of scale rates for two alternative equivalence scales**
**Household income necessary for different households if each member is to receive an equivalent income of NOK 100 000.**

| Household composition | Square-root scale | | OECD scale | |
|---|---|---|---|---|
| | weight | income (NOK) | weight | income (NOK) |
| 1 adult | 1,00 | 100 000 | 1,00 | 100 000 |
| 1 adult, 1 child | 1,41 | 141 000 | 1,50 | 150 000 |
| 2 adults | 1,41 | 141 000 | 1,70 | 170 000 |
| 2 adults, 1 child | 1,73 | 173 000 | 2,20 | 220 000 |
| 2 adults, 2 children | 2,00 | 200 000 | 2,70 | 270 000 |
| 2 adults, 3 children | 2,24 | 224 000 | 3,20 | 320 000 |
| | ➔ larger economies of scale | | ➔ smaller economies of scale | |

While use of data from the entire country makes the study of small immigrant groups possible, it also brings with it a complication that revolves around the increasingly large number of cohabitants in the Norwegian population. The above discussion about equivalence scales indicates the large part economies of scale can play in poverty analysis. Failure to correctly identify households' composition can therefore lead to biases in poverty results. While cohabitant households with children can be identified in official Norwegian register data, identification of cohabitant households without children is not possible. As a result, cohabitants without children are registered as two separate single households in the database we use here.

Åserud (2001) developed a method of predicting cohabitation in the Norwegian population in order to approximate the effect on the Norwegian income distribution in 1997 and that method was implemented here. It should be noted that correct identification of cohabitants was not necessary as long as the 'simulated' cohabitant households resembled the true ones sufficiently to create a similar income distribution. Åserud's study indicated that inclusion of cohabitant households should result in a decrease in inequality and poverty. The distribution created by our match-making methods did in fact result in the expected change in the Gini-coefficient and the Gini-coefficient with our 'simulated' cohabitants was, in fact, not significantly different than that obtained by Åserud (2001), who was able to identify actual cohabitants for

the sample of the population used in his study. Our data also exhibited the expected reduction in poverty upon inclusion of cohabitant households (see Table 3)[67].

**Table 3. Comparison of Gini coefficient and percentage of poor in entire population with and without cohabitants as households.**

|  | Square.-root scale | | | OECD scale | | |
|---|---|---|---|---|---|---|
|  | 1995 | 1996 | 1997 | 1995 | 1996 | 1997 |
| *Gini coefficient:* | | | | | | |
| **Register family** (cohabitants not as household) | 0.256 | 0.254 | 0.258 | 0.240 | 0.241 | 0.245 |
| **Household** (cohabitants as household) | 0.253 | 0.250 | 0.254 | 0.239 | 0.239 | 0.243 |
| *Percentage of poor:* | | | | | | |
| **Register family** (cohabitants not as household) | 7.8 | 7.1 | 6.8 | 4.3 | 3.9 | 3.9 |
| **Household** (cohabitants as household) | 7.3 | 6.8 | 6.5 | 3.9 | 3.5 | 3.4 |

## 3. A Brief Overview of Immigration and Poverty in Norway

Immigration from non-Western countries is a relatively new phenomenon in Norway. Net immigration in Norway was, in fact, negative up until about the late-1960s, and it was only after positive net immigration persisted for a number of years that any real restrictions on immigration were implemented in 1975. Due to similarities in language and culture as well as formal political agreements allowing for free movement—also for labor immigration—among the Nordic countries, large numbers of Nordic immigrants have been common for quite some time. Similarly, Norway's involvement in the European Economic Area (EEA) also allows for free movement into the country for EEA-citizens. After 1975, immigration from non-EEA countries has been restricted to three main kinds: specialist (skills-based) labor immigration, family reunification, and political asylum. At the same time, large-scale immigration from non-Western countries first started in the early 1970s. In fact, as Table 4 indicates, the number of non-Western and Eastern European immigrants surpassed Western immigrants only at the start of the 1990s. By the early 1990s, immigrants from Eastern Europe, Asia, Africa, Turkey and South and Central America accounted for roughly one-half of the immigrant population.

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[6] Åserud (2001) used survey data on approximately 10,000 households from Statistics Norway to identify and then model the affinity for having a cohabitant with certain characteristics based, in particular, on level of education and age group. We used the estimated parameters from Åserud's model together with address information to predict and simulate cohabitation in the official data on the entire population. Single women and men with the same address who best fit together according to the affinities based on Åserud's estimates were then treated as cohabitants in our study.

[7] Unless otherwise stated tables and figures will be based on own calculations.

**Table 4. Composition of the immigrant population of Norway by ethnic origin, total numbers and percent of immigrant population**

| | Nordic countries | | Western Europe except Turkey | | Eastern Europe | | North America, Oceania | | Asia, Africa, South and Central America, Turkey | |
|---|---|---|---|---|---|---|---|---|---|---|
| | number | percent* | number | percent* | number | percent* | number | percent* | number | percent* |
| 1970 | 26 548 | 44.8 | 15 190 | 25.7 | 5 806 | 9.8 | 8 103 | 13.7 | 3 549 | 6.0 |
| 1980 | 31 210 | 32.8 | 22 686 | 23.8 | 7 114 | 7.5 | 11 810 | 12.4 | 22 382 | 23.5 |
| 1986 | 35 766 | 29.0 | 28 503 | 23.1 | 8 868 | 7.2 | 11 332 | 9.2 | 38 879 | 31.5 |
| 1987 | 37 880 | 28.9 | 28 797 | 22.0 | 9 374 | 7.1 | 11 320 | 8.6 | 43 771 | 33.4 |
| 1988 | 39 509 | 27.0 | 29 420 | 20.1 | 10 639 | 7.3 | 11 350 | 7.8 | 55 379 | 37.9 |
| 1989 | 40 037 | 25.0 | 29 972 | 18.7 | 11 878 | 7.4 | 11 292 | 7.0 | 67 114 | 41.9 |
| 1990 | 38 089 | 22.6 | 29 107 | 17.3 | 13 551 | 8.1 | 10 769 | 6.4 | 76 782 | 45.6 |
| 1995 | 40 608 | 18.9 | 28 853 | 13.4 | 30 276 | 14.1 | 10 211 | 4.7 | 105 100 | 48.9 |
| 1996 | 41 643 | 18.6 | 29 188 | 13.0 | 33 200 | 14.8 | 10 037 | 4.5 | 109 729 | 49.0 |
| 1997 | 43 696 | 18.8 | 29 491 | 12.7 | 34 486 | 14.9 | 9 879 | 4.3 | 114 640 | 49.4 |

Source: Statistics Norway (http://www.ssb.no)
* Percent of total immigrant population

The extent to which immigrants have access to the same transfers and government-funded programs as natives varies according to the specific benefit or program. Child allowance is given to all families with children residing in Norway, regardless of their nationality and regardless of their earnings. Unemployment insurance benefits are granted on the basis of a person's labor market history, and the same rules and rights are in place regardless of nationality. There are some slight differences with respect to disability and old-age pensions, which in part depend upon the number of years in the country[8]. Access to labor market programs through the employment office is generally along the same lines as for natives, and some programs are specifically intended for immigrants. All adult immigrants have access to free language instruction up to 850 classroom hours[9]. Refugees have the same access to educational grants and loans as natives. Although access to such funding is more limited for other immigrants, it is far from impossible. If, for example, an immigrant has worked full-time for a year before the commencement of studies, then he or she is eligible for the same educational grants and loans as natives.

Table 5 uses cross-sectional data to illustrate the large differences in the percentages of poor in groups of different ethnic origin in the period 1995-1997[10]. Poverty seems to be a very prevalent phenomenon in the immigrant community in Norway, particularly among non-Western immigrants, but the estimates presented in Table 5 fail to take into account differences in age, education and type of household in

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[8] Disability and old-age pensions generally consist of two parts, a basic pension and a supplementary pension. Immigrants and natives are treated essentially the same with regards to the supplementary pension, the part of the pension which depends on the person's earnings history. The basic (minimum) pension, however, depends on the length of the 'insured period', which for immigrants is the length of time in the country. (For natives it is the length of time since age 16.) A 40 year 'insured period' is needed to get the full basic pension.

[9] Up to 3000 hours for immigrants with no formal education.

[10] Table A.1 in the Appendix provides information on the percentage of working age persons with even lower income—less than 25 % of median annual (equivalent) income after tax. While income that low is extremely rare for natives, large percentages of immigrants do fall into this category for an annual measure of poverty, i.e. based on income from one year alone. However, Table A.2, which is based on income from a three-year period, indicates that persistent income at such a very low level is also very rare among immigrants. (See subsection 4.2 for further discussion of chronic poverty, i.e. poverty based on income from several years.)

the various ethnic groups. In addition, those figures are an average over various immigrant cohort groups. The high percentages may therefore be due to a large prevalence of poverty among immigrants who have just arrived recently while the incidence of poverty among more established immigrants may not differ greatly from that of the native population.

**Table 5. Percentage of poor in working age population\* in Norway by ethnic origin 1995-1997**

| | Square-root scale | | | OECD scale | | |
| --- | --- | --- | --- | --- | --- | --- |
| | 1995 | 1996 | 1997 | 1995 | 1996 | 1997 |
| All | 4.5 | 4.3 | 4.0 | 3.2 | 3.2 | 3.0 |
| By ethnic origin: | | | | | | |
| Norway | 3.7 | 3.4 | 3.3 | 2.5 | 2.3 | 2.2 |
| Nordic country | 7.1 | 9.5 | 7.6 | 5.8 | 8.1 | 6.5 |
| Western country\*\* | 14.4 | 17.2 | 14.1 | 13.1 | 16.2 | 13.2 |
| Eastern Europe | 23.3 | 20.2 | 17.3 | 22.4 | 19.8 | 17.0 |
| Asia (incl. Turkey) | 22.3 | 20.2 | 18.8 | 23.5 | 22.3 | 20.9 |
| Africa | 25.2 | 23.1 | 20.3 | 23.2 | 22.9 | 20.4 |
| South and Central American | 16.4 | 16.8 | 13.9 | 13.8 | 14.3 | 12.4 |

\*Age 16-68, not in education
\*\*Western Europe (non-Nordic), North America, Australia and New Zealand

Similarly, the picture presented in Figure 1 seems to suggest that just such a negative relationship between the percentage of poor immigrants and the length of time since their migration may exist, but, as already mentioned, it too may be very misleading if that negative relationship is largely due to changes in the demographic composition of the immigrant population over the course of the last few decades.

**Figure 1. Percentage poor in working age population\* in Norway in 1996 by ethnic origin and number of years since migration.**
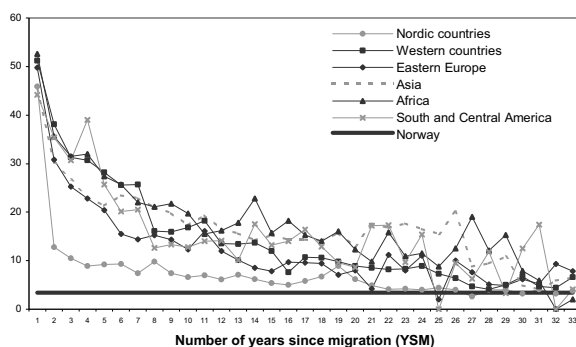


*Age 16-68, not in education

The logistic regressions based on cross-sectional data for 1997 presented in the next section can be viewed as an attempt to find some answers to the effect of what we shall very broadly refer to as integration or assimilation. Integration is, of course, a very diffuse and complicated concept which is difficult for the researcher to observe and even more difficult to measure, but it is reasonable to assume, as we do here, that the length of time the immigrant has spent in his or her new country provides a proxy

for at least potential integration. Alternatively, the number of years since migration could be interpreted as experience and potential for investment in human capital in the new country and society, be it with respect to language, culture, the educational system, the labor market or the social security system.

## 4. Prevalence of Poverty among Immigrants

*4.1 Poverty Defined in Terms of Annual Income*

The relationship between classification as poor and a number of person-related characteristics was modeled with the aid of logistic regressions. Due to the presumption of a very large degree of heterogeneity among immigrants groups of different ethnic origin, separate regressions were run for each of the groups. This allowed for the variables' effects to vary greatly in the different ethnic groups on the one hand, but also resulted in a smaller number of observations and less accurate estimates for some of the groups on the other hand. Model parameter estimates are presented in Tables A.3 and A.4 in the Appendix for both the square-root and OECD scales and some basic descriptive statistics on age and YSM are provided in Table A.5.

The number of years since migration (YSM) does indeed have a significantly negative effect on the probability of being poor, but the extent of the effect varies substantially across the different ethnic groups. Figure 2 shows the relationship between YSM and the probability of being poor based on the regression coefficients presented in Table A.3 and A.4 in the Appendix for married men without children at age 40, the average age of working age immigrants in Norway[11]. We present diagrams for four different levels of education in order to simultaneously examine the effect of education on the probability of being poor in the various ethnic groups. While the expected differences in poverty results for the two different equivalence scales as described in Section 2 suggest that the estimated effect of YSM may have a different magnitude for the different scales, inspection of the coefficient estimates show that at least the sign of the effect is robust with respect to the choice of equivalence scale. In addition, the diagrams in Figure 2 suggest that the magnitude of the effect of YSM as well as the relative differences between the ethnic groups with respect to education level are also very similar for the two equivalence scales.

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[11] See Figure A.1 in the Appendix for the probability of poverty relative to age.

**Figure 2. The probability of poverty by ethnic origin and level of education**
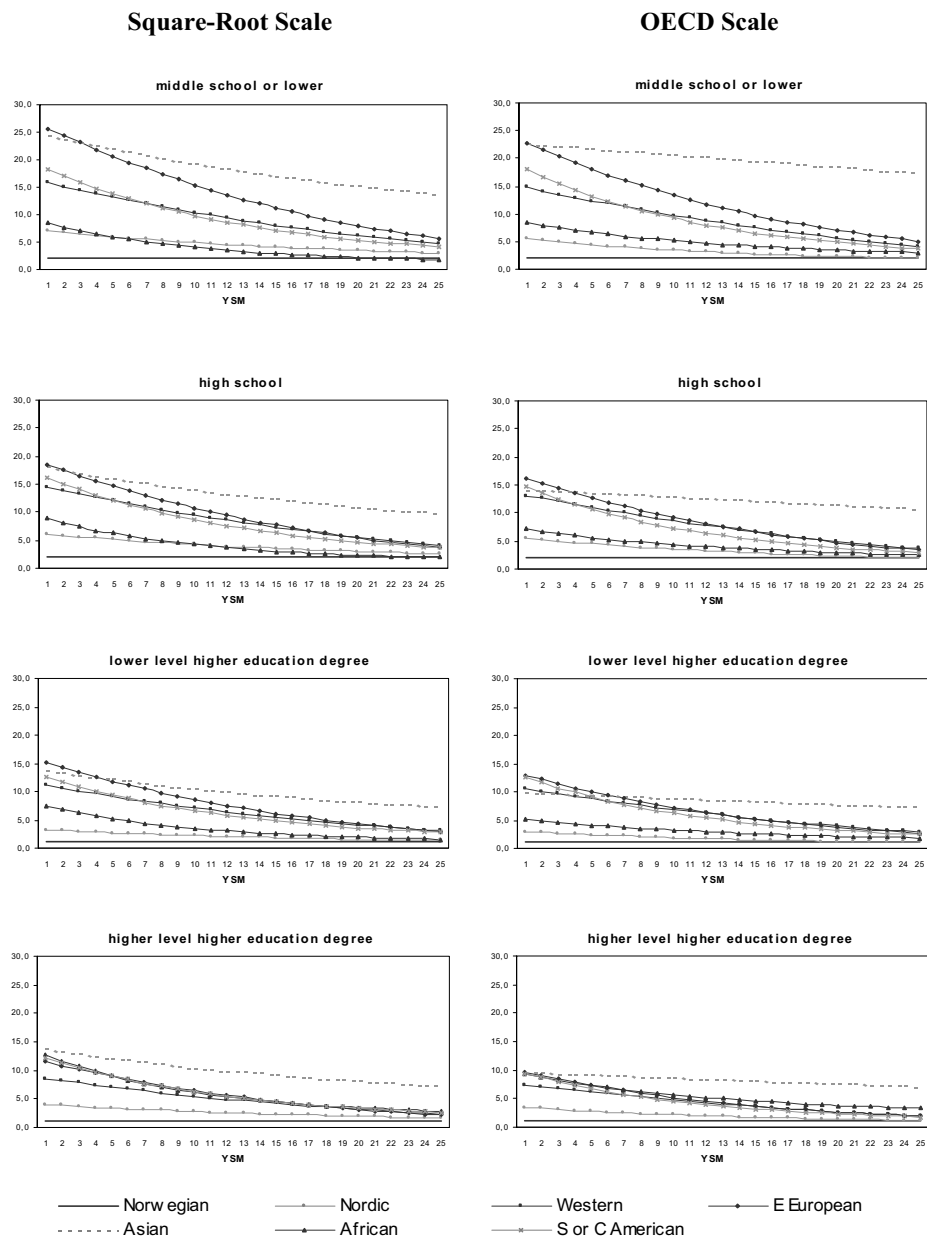
**Square-Root Scale**                                    **OCD Scale**



The predicted probabilities are calculated with the following variables held constant: age 40 (average age of working age immigrants in Norway), couple without children, male.

The diagrams in Figure 2 indicate that immigrant groups from Nordic countries, non-Nordic western countries, Africa, South and Central America and Eastern Europe all exhibit a strongly downward sloping relationship between YSM and the probability for being poor with a large degree of convergence towards the poverty level for natives. The curves cannot be said to converge entirely to the level of natives, except perhaps in the case of Nordic immigrants. Asian immigrants stand out as the group for which YSM has relatively little effect on the probability of being poor. African immigrants generally have a low predicted probability of being poor, but in light of that group's small size and the large standard deviations associated with the estimates for that group (see Table A.3 and A.4 in the Appendix), caution should be exercised in interpreting those results. Nordic immigrants are most similar to their native Norwegian counterparts shortly after arrival and their probability of being poor converges relatively quickly to a level similar to that of the native population. In light of the large degree of similarity in language, human capital and culture among the Nordic countries, one would expect that such immigrants face very little integration or assimilation difficulties and, hence, that just such a picture would emerge. This leaves the seemingly lack of a strong effect of YSM among Asian immigrants as the anomaly in this context, a topic which will be considered in greater detail in light of the general discussion and interpretation of results in the following discussion section.

Finally, it is also interesting to note that the differences between the groups in terms of the (starting) level of poverty probability seem to be smaller for higher education levels and that the groups converge more quickly to a common level for immigrants (excluding Asian immigrants) for higher education levels than for the lower ones. In particular, immigrants from different ethnic groups with a very high level of education (second level higher education degree) exhibit only small differences in the probability of being poor, while there is a large degree of dispersion in the probability of being poor for immigrants of different ethnic origin with a low level of education. This suggests that education leads to a certain degree of similarity between groups from the onset or very early on, that is, before or shortly after they arrive in Norway.

*4.2 Poverty Defined in Terms of Three-Year Income*
In a previous study of poverty in Norway, Aaberge et al. (1999) pointed out that annual income might not provide the best method of measuring (income) poverty. Annual results fail to consider the issues of transitions into and out of poverty as well as poverty duration. If, for example, many of the persons classified as poor based on annual income experience only temporary stints of poverty, then the annual measure may exaggerate poverty results both in extent and severity. Within this context, persistent low-income over several years constitutes a far greater threat to welfare than short-term income fluctuations that may lead to a classification as poor in one particular year.

The same income definition as above is used in this section, but the time period is extended from one to three years: in other words, individuals are considered chronically poor if their equivalent income after tax for the entire three-year period 1995-1997 lies below 50 % of the median for that period. As with the annual results presented above, the poverty line was first constructed based on the population of all persons residing in Norway during the relevant period, but the population used in later regressions will be that of working-age persons not in education.

Table 6 and Table 7 indicate that the percentage of chronically poor as well as the effect of the move from annual income to three-year income varies across ethnic groups. Also in this case the native Norwegian population seems to fare best: very few

natives are chronically poor and almost half of the poor in the native population in any given year are not considered chronically poor when income from several years is used to define the poverty line. A large portion of annual poverty in the native population can, thus, be attributed to income fluctuations that may not have a highly detrimental effect on welfare in the long run. Immigrants tend to have a higher proportion of chronically poor in their ranks than natives and fewer of the immigrants registered as poor with an annual measure in a given year escape classification as chronically poor.

**Table 6. Percentage of chronically poor in working age population\* in Norway by ethnic origin**

|  | Square-Root Scale | OECD Scale |
|---|---|---|
|  | 2,8 | 1,8 |
| Norway | 2.4 | 1.3 |
| Nordic country | 3.9 | 2.8 |
| Western country** | 7.5 | 6.3 |
| Eastern Europe | 15.2 | 13.8 |
| Asia (incl. Turkey) | 15.9 | 14.8 |
| Africa | 16.6 | 12.8 |
| South and Central American | 11.0 | 7.8 |

\*Age 16-68, not in education
\*\*Western Europe (non-Nordic), North America, Australia and New Zealand

**Table 7. Percentage of persons classified as poor in a given year who are *not* classified as chronically poor based on total income after tax for the entire three-year period.**

|  | Square-Root Scale | | | OECD Scale | | |
|---|---|---|---|---|---|---|
|  | 1995 | 1996 | 1997 | 1995 | 1996 | 1997 |
| Norway | 48.4 | 40.3 | 46.9 | 51.6 | 42.7 | 47.9 |
| Nordic country | 49.3 | 30.8 | 33.6 | 50.6 | 29.7 | 31.4 |
| Western country** | 36.1 | 21.6 | 27.0 | 34.8 | 21.1 | 25.8 |
| Eastern Europe | 42.8 | 28.5 | 29.7 | 45.5 | 34.1 | 33.7 |
| Asia (incl. Turkey) | 38.6 | 25.4 | 29.9 | 45.6 | 37.3 | 40.1 |
| Africa | 42.8 | 28.6 | 28.5 | 45.3 | 34.7 | 35.6 |
| South and Central American | 39.6 | 31.7 | 32.4 | 38.3 | 28.8 | 32.1 |

\*Age 16-68, not in education
\*\*Western Europe (non-Nordic), North America, Australia and New Zealand

Figure 3, which is based on the estimated coefficients presented in Table A.6 and A.7 in the Appendix, indicates that a negative relationship between YSM and the probability of chronic poverty also exists, although the slopes of the curves appear to be flatter than with an annual measure of poverty. In this respect it should however be noted that, due to the definition of chronic poverty used here, the population consists of only those immigrants who were in the country all three years 1995-1997. Hence, immigrants with YSM less than three could not be included in this analysis. This may, in part, account for the lower starting points for the curves in Figure 3 compared with those in Figure 2. Nonetheless, that alone cannot account for the differences between the figures: the effect of income fluctuations and the differences between the various ethnic groups in that regard must also play a part.

Comparison of Figure 2 and Figure 3 also shows that the move from an annual measure of poverty to a chronic one influences results for immigrants with lower education levels the most. That suggests that immigrants with lower education levels may often experience short-term stints of poverty, but nonetheless escape poverty

when a longer accounting period is used as the basis for defining poverty. The curves for immigrants with higher education levels exhibit such an effect to a far lesser extent. The relative importance of the effect as we move from an annual to a chronic measure also varies greatly across ethnic groups.

**Figure 3. The probability of chronic poverty by ethnic origin and level of education**
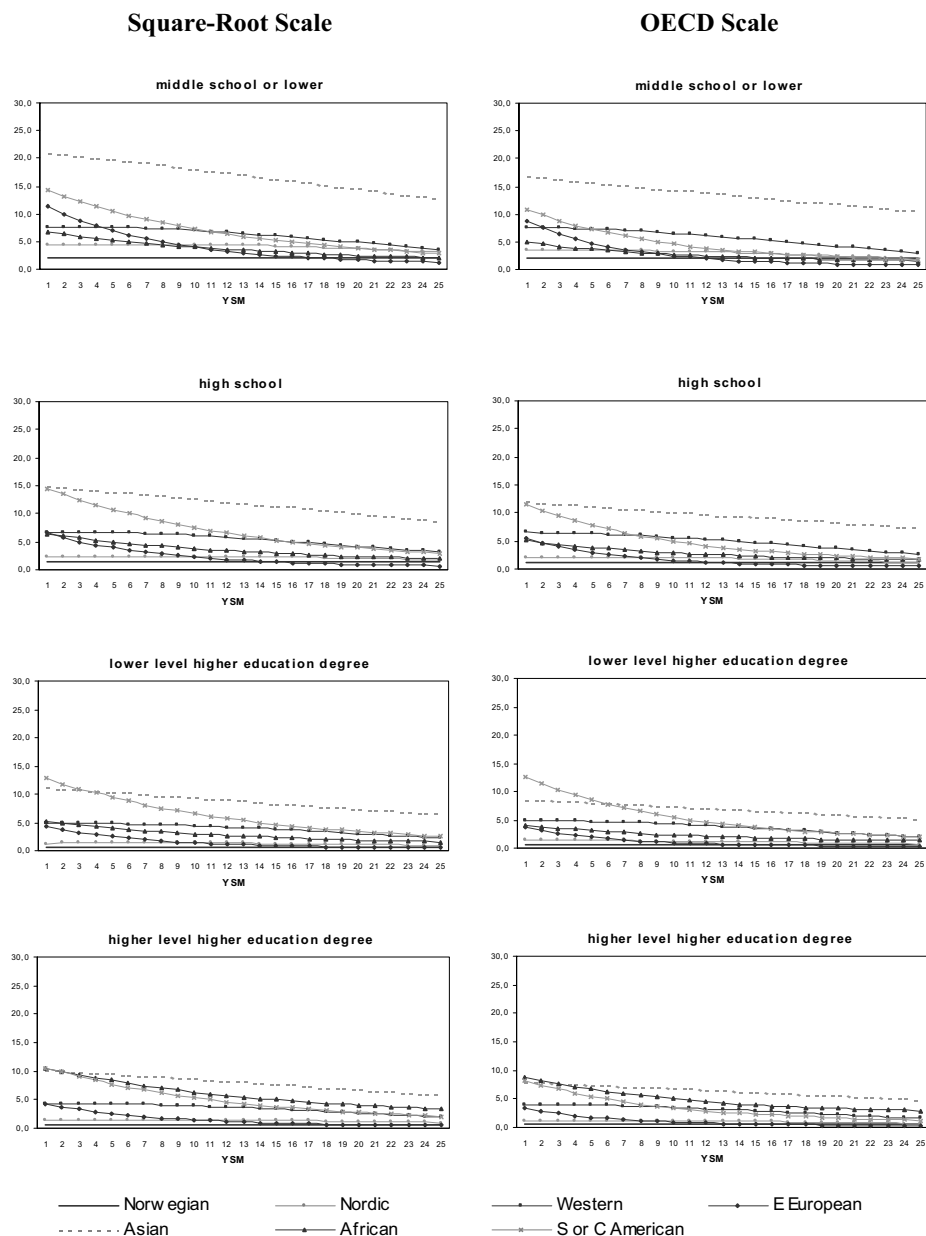
**Square-Root Scale**                                        **OECD Scale**



The predicted probabilities are calculated with the following variables held constant: age 40 (average age of working age immigrants in Norway), couple without children, male.

In order to help establish just what sort of income factors are important in raising some households above the poverty line, Figure 4 compares the income composition of the chronic poor with that of those individuals just above the poverty line (i.e. with an income level between 50 and 60 percent of median equivalent income after tax over a three year period) for natives and immigrants by ethnic origin. The different ethnic groups vary greatly in their average income composition, but, in general, labor income is the largest income source. Transfers do, however, make up a very large part of total average income, and, in the case of non-Western immigrant groups, account for nearly as much as labor income. That does lend support to our claim that focusing on wage assimilation may not provide the whole story with regards to the welfare assimilation of immigrants, i.e. the extent to which immigrants are able to avoid very low levels of income in a manner similar to natives. Labor income and the type of assimilation that occurs with respect to wages has an undeniably large effect, but Figure 4 demonstrates that it may not be the only relevant factor.

**Figure 4. Income Composition over Three Years of the Chronic Poor Compared to Individuals Just Over the Chronic Poverty Line\***
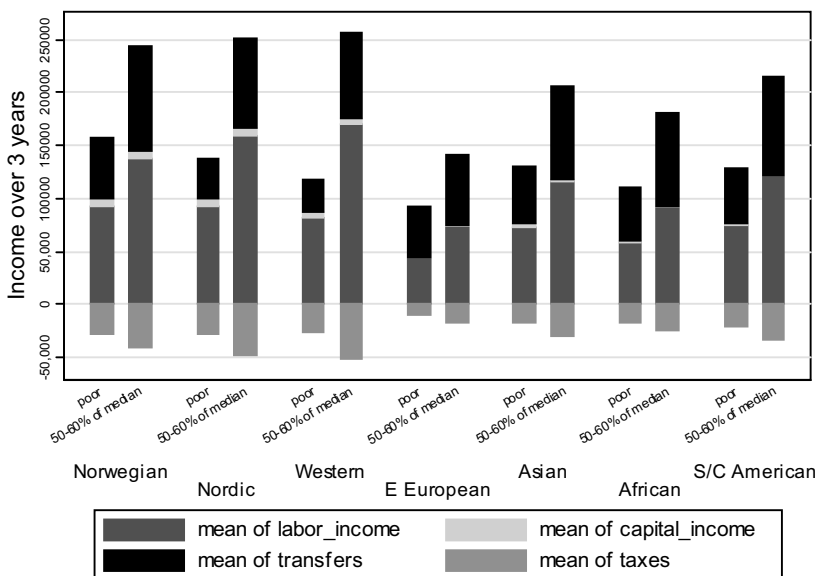


\*Individuals with equivalent income after tax between 50 and 60 percent of the median

## 5. Discussion

The results in the preceding section suggest three main questions: why might a negative relationship between YSM (years since migration) and the probability of poverty exist, why might the extent of that effect vary across ethnic groups and, finally, what might our findings fail to take into account? In exploring these questions we would like to also keep in mind the seemingly weak YSM effect for Asian immigrants.

Some of the possible reasons for the observed negative relationship between

YSM and the probability of being poor will surely lie with the labor market participation of immigrants. As mentioned in the introduction, studies on the assimilation of immigrant wages relative to the native population suggest that some assimilation does take place, that is, that immigrants' wages do, after a sufficiently long period in the country, increase relative to the wages of natives. Such growth in wages relative to the native population may raise some immigrants (and their households) out of poverty after a certain amount of time. In addition, the labor market participation of immigrants may increase over time either through lower unemployment or by means of more immigrants actually pursuing employment. While the relationship from improved labor market income, either through rising relative wages or increased labor market participation, and lower incidence of poverty is more or less a direct one, it is nonetheless difficult to ascertain the actual mechanisms leading to higher relative wages and/or labor market participation. Borjas (1994) points out the importance language acquisition has been given in the literature attempting to explain some sort of difference in human capital accumulation between immigrants and natives as the mechanism underlying wage assimilation. Borjas also notes that while many of these studies indicate very large returns to language capital for immigrants, they often fail to take into account the potential selection bias in acquiring language proficiency in the first place, that is, that high-wage workers may simply have or quickly acquire better language skills, not vice versa.

However, as emphasized in the introduction, human capital accumulation and labor market performance are far from the only aspects that enter into poverty analysis. The tax and social security system can also have a direct influence on immigrants' income and, hence, the probability of being poor via tax deductions, universal transfers and means-tested programs as well as indirectly by means of labor market and educational programs with long-term returns. Moreover, the tax and social security system of any country may be difficult even for natives to understand, never mind immigrants who face difficulties with the language and culture. After some time in the country, immigrants may be better able to understand and benefit from the various programs available. In addition, even if immigrants have problems on the labor market, participation in temporary, part-time or low-paying jobs may nonetheless help them obtain rights to such benefits as unemployment and disability insurance as well as loans and stipends for education or other means of accumulating human capital; at the same time, once immigrants do manage to obtain steady employment with wages that raise them above the poverty line, the rights they have earned through such employment can prevent them from falling back into poverty in the event of unemployment, sickness or simply old-age.

The effects of the two aforementioned aspects—labor market participation and eligibility and participation in the tax and social security system—may also differ across the various immigrant groups. As already indicated with respect to Nordic immigrants, certain groups will be expected to have little adjustment problems from the start. Hence, their labor market performance would be expected to be better from the onset implying that their starting probability of being poor would be lower and the effect from addition years in the country less. Other groups may start out at a very high level due to initial difficulties that are easily overcome over time. That scenario fits in well with the picture for Eastern European immigrants, who start off at a very high probability of being poor, but experience a rapid decrease in the probability of poverty over time. The formal and cultural ties to these countries were for obvious historical reasons less developed than the ties with Western Europe and, hence, one would expect that that group would experience initial difficulties. At the same time, that group certainly shares in what could be considered a common European background.

Hence, they would be expected to have less trouble in overcoming initial difficulties than other groups with far less in common culturally and could, therefore, be more successful in raising their income above the poverty line.

In addition, immigrant groups may differ in the networks and ties they form within their respective ethnic communities. Such networks could conceivably have both a negative and a positive effect on the probability of being poor. On the one hand, strong ethnic communities may assist new arrivals in understanding how to function in their new environment. Ethnic community networks may provide channels by which to transfer information on available jobs and opportunities or, in the case of very large groups, the ethnic community may itself even constitute a source of employment for compatriots in ethnic-owned businesses. Within the American context, Borjas and Hilton (1996) show that immigrants' participation in welfare programs often exhibit patterns along ethnic lines and suggest that ethnic communities may transmit knowledge of certain types of benefits to new arrivals. On the other hand, the presence of strong ethnic communities may hinder language acquisition or the incentive to interact with the larger native community.

All of the above-mentioned factors—labor market performance, social security benefits and the existence and activity of ethnic networks—can have contributed to the relatively flat curve for Asian immigrants in Figure 2. Immigrants from Pakistan and Vietnam constitute two of the largest immigrants groups in Norway and are, in addition, two of the non-Western groups that have been in the country in substantial numbers the longest. As such, these groups would be good candidates for strong ethnic community networks, with all of the potential effects described above. Several different scenarios are possible: new arrivals from Asia may by themselves have a much higher probability of being poor, but help from the ethnic community prevents them from becoming poor early on. This could also be the case if large numbers of new arrivals come as family members and therefore join households made up of immigrants with longer 'experience' in Norway and a lower probability of being poor. That suggests that the 'true' curve for Asian immigrants might start at a much higher level and then have a steeper slope than we can observe. The effect of YSM might, in other words, exist as immigrants become more self-sufficient and less reliant on aid from their ethnic community, but that might not be observable in our data. Strong ties within such ethnic communities might, however, also lead to a situation in which the immigrants largely stay within their own communities and do not gain the skills and knowledge they need to improve their income and escape from poverty.

Another possible scenario also brings up a major drawback or possible shortcoming of our analysis. The cross-sectional nature of our data may mean that the curves presented in Figures 1 and 2 do not represent assimilation effects at all or only to a far lesser degree than suggested by the graphs. They might instead reflect differences in cohort groups over time. In other words, the immigrants who arrived 20 years ago may have in some important ways been better suited to succeed in their new environment and therefore even at the time of their arrival had a lower probability of poverty. Such a possible deterioration of cohort quality may also have taken place to a lesser or greater extent in different ethnic groups, thus explaining the differences in the slopes of the curves in Figures 1 and 2. Differences in the economic climate at the time of arrival might also have contributed to differences in the probability of poverty for different cohort groups.

In a similar manner, it could be argued that non-random selection effects may also have an impact on our results. The low probability of poverty among what is essentially earlier immigrant cohorts may reflect a situation in which only successful immigrants remained in Norway, while unsuccessful immigrants—those that were

unable to raise their standard of living above a certain level such as the poverty line—returned to their native countries or went elsewhere. In other words, the immigrants from earlier cohort groups that still turn up in our data may represent a non-random positive selection of the immigrants that entered the country at earlier dates versus more recently.

A Norwegian study of the migration behavior of immigrants to Norway (Tysse and Keilman, 1998) suggests that the potential for such self-selection is, however, small among non-Western immigrants[12]. Table A.8 in the Appendix provides results from Tysse and Keilman (1998) with regards to the migration behavior as of 1996 among 1986-1990-immigrant cohorts, a group highly relevant with respect to our data. Strikingly, the percentage of non-Western immigrants remaining in the country is largely unaffected by their employment status: 96% of employed immigrants from Eastern Europe as well as Asia, Africa and South and Central America remain in the country 5-10 years after initial immigration while over 97% of the *unemployed* immigrants from those same regions are also still residing in the country.[13]

While the results we have presented here do for the most part suggest a negative relationship between the length of time in Norway and immigrants' probability of being poor, they also suggest a number of questions for further research. With time we will be able to track the same immigrants as a panel with a longer time series in order to attempt to separate the cohort effect from the true effect of increased assimilation. In addition, the actual mechanisms leading to the negative relationship need to be uncovered by looking more closely at how such issues as labor market performance, human capital accumulation, and transfers relate to immigrants' probability of poverty.

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[12] The potential for such self-selection appears greatest for Western immigrants, in other words, those immigrants that have the least problems from the start and, hence, are only of limited interest for this study. See Table A.8 in the Appendix.

[13] Migration out of the country occurs mostly for the categories "outside of the labor force" and "unknown". According to Tysse and Keilman (1998), the former group largely consists of students, who we have already excluded from our analysis, while the latter group is to a large extent made up of immigrants with such a short duration of stay in Norway that they are never registered with any sort of employment status. The authors suggest that that asylum seekers refused asylum are a major group in this category.

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# Appendix

## Figure A.1. The probability of poverty by age and ethnic origin

### Square-Root Scale
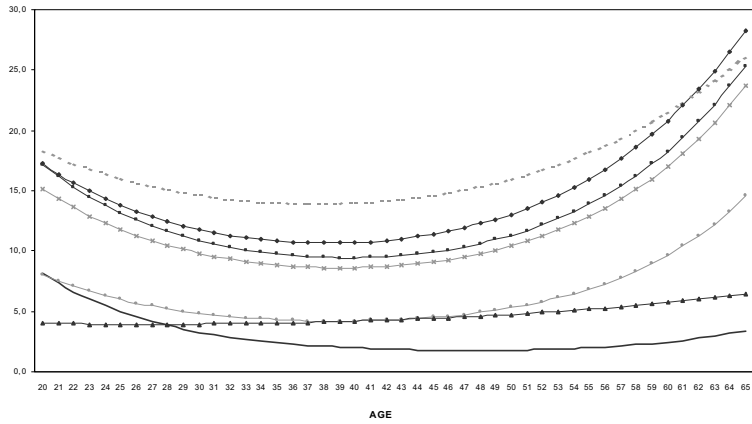


### OECD Scale
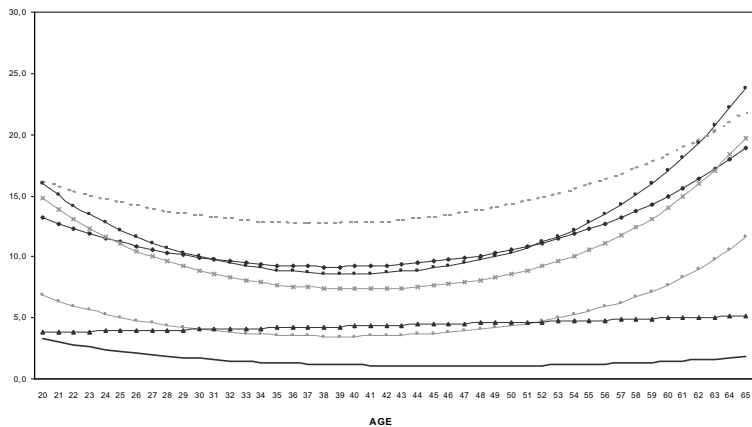


Legend: Norwegian, Nordic, Western, E European, Asian, African, S or C American

The predicted probabilities are calculated with the following variables held constant: YSM=10 for immigrants, couple without children, male, high school education.

**Table A.1. Percentage of working age population\* with income under 25 percent of annual median equivalent income after tax in Norway by ethnic origin. 1995-1997.**

|  | Square-root scale | | | OECD scale | | |
|---|---|---|---|---|---|---|
|  | 1995 | 1996 | 1997 | 1995 | 1996 | 1997 |
| All | 1.2 | 1.1 | 1.0 | 1.0 | 0.9 | 0.9 |
| By ethnic origin: | | | | | | |
|   Norway | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 |
|   Nordic country | 2.8 | 3.8 | 3.2 | 2.6 | 3.5 | 2.9 |
|   Western country\*\* | 9.0 | 11.4 | 9.3 | 8.6 | 11.1 | 9.0 |
|   Eastern Europe | 8.9 | 6.8 | 5.3 | 8.6 | 6.4 | 5.0 |
|   Asia (incl. Turkey) | 7.8 | 7.0 | 6.2 | 7.4 | 6.8 | 6.0 |
|   Africa | 10.4 | 9.7 | 8.0 | 9.6 | 9.1 | 7.4 |
|   South and Central American | 6.8 | 6.8 | 5.6 | 6.2 | 6.4 | 5.1 |

\*Age 16-68, not in education
\*\*Western Europe (non-Nordic), North America, Australia and New Zealand


**Table A.2. Percentage of  working age population\* in Norway under 25 percent of median three-year equivalent income after tax by ethnic origin. 1995-1997.**

|  | Square-root scale | OECD scale |
|---|---|---|
| All | 0.1 | 0.1 |
| By ethnic origin: | | |
|   Norway | 0.1 | 0.1 |
|   Nordic country | 0.5 | 0.5 |
|   Western country\*\* | 1.7 | 1.6 |
|   Eastern Europe | 1.1 | 1.0 |
|   Asia (incl. Turkey) | 1.3 | 1.2 |
|   Africa | 1.8 | 1.7 |
|   South and Central American | 1.0 | 0.9 |

\*Age 16-68, not in education
\*\*Western Europe (non-Nordic), North America, Australia and New Zealand

**Table A.3. Regression Results for Probability of Being Poor in 1997 by Ethnic Group. Square-root scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | 0.8160 | 0.2846 | 1.0879 | 1.0320 | -0.0146 | -2.0494 | 1.1454 |
| | (0.0621) | (0.3229) | (0.2638) | (0.2698) | (0.1643) | (25.5746) | (0.4771) |
| Age | -0.2051 | -0.1536 | -0.1428 | -0.1278 | -0.0782 | -0.0184 | -0.1382 |
| | (0.00296) | (0.0153) | (0.0126) | (0.0114) | (0.00765) | (0.0186) | (0.0240) |
| Age$^2$ | 0.00217 | -0.00198 | 0.00181 | 0.00167 | 0.00104 | 0.000349 | 0.00177 |
| | (0.000036) | (0.000184) | (0.000150) | (0.000134) | (0.000093) | (0.000237) | (0.000297) |
| Female | 0.0969 | -0.1243 | 0.0956 | 0.0321 | -0.0500 | -0.0471 | 0.0173 |
| | (0.00624) | (0.0276) | (0.0226) | (0.0235) | (0.0154) | (0.0362) | (0.0536) |
| Single | 1.2729 | 0.5977 | 1.1411 | 1.1515 | 1.2502 | 2.8526 | 1.4074 |
| | (0.0243) | (0.1074) | (0.0799) | (0.1435) | (0.0784) | (25.5724) | (0.1301) |
| Couple, child under 7 | -0.7431 | -0.3425 | -0.7455 | -0.4414 | 0.3316 | 1.1126 | -0.5810 |
| | (0.0272) | (0.1113) | (0.0834) | (0.1429) | (0.0759) | (25.5724) | (0.1405) |
| Couple, child 7+ | -1.7449 | -0.8808 | -0.6994 | -0.6369 | -0.4300 | 1.0115 | -0.7538 |
| | (0.0303) | (0.1287) | (0.0880) | (0.1438) | (0.0782) | (25.5725) | (0.1573) |
| Single mother, child under 7 | 1.5407 | 1.1521 | 0.6115 | 0.4714 | 0.0846 | 1.5518 | 0.5393 |
| | (0.0294) | (0.1501) | (0.1752) | (0.1777) | (0.1063) | (25.5726) | (0.1901) |
| Single mother, child 7+ | 0.0407 | 0.6978 | 0.6188 | 0.1019 | -0.0627 | 1.2229 | -0.0366 |
| | (0.0300) | (0.1446) | (0.1214) | (0.1632) | (0.0985) | (25.5728) | (0.1925) |
| Single father | -0.5068 | 0.0977 | 0.2149 | 0.6123 | 0.1653 | 1.2593 | 0.0928 |
| | (0.0485) | (0.2294) | (0.1833) | (0.2258) | (0.1378) | (25.5731) | (0.3426) |
| Other hh type | 0.9000 | -0.4343 | -0.6076 | -1.1649 | -0.5728 | -10.3874 | -0.3567 |
| | (0.1525) | (0.6493) | (0.4298) | (0.9242) | (0.4807) | (179.0) | (0.5732) |
| Middle school or less | 0.0182 | 0.1628 | 0.1077 | 0.4174 | 0.3845 | -0.0447 | 0.1446 |
| | (0.0659) | (0.2302) | (0.2047) | (0.2069) | (0.0512) | (0.1363) | (0.2194) |
| Education after high school | -0.2013 | -0.1114 | -0.2559 | 0.1011 | -0.1547 | -0.1741 | -0.0849 |
| | (0.0199) | (0.1266) | (0.0966) | (0.1168) | (0.0636) | (0.1148) | (0.1694) |
| College/university first degree | -0.5299 | -0.6826 | -0.3085 | -0.2456 | -0.3169 | -0.1833 | -0.2917 |
| | (0.0208) | (0.1486) | (0.0925) | (0.1304) | (0.0598) | (0.1172) | (0.1831) |
| College/university second degree | -0.5590 | -0.4338 | -0.5851 | 0.5554 | -0.3196 | 0.4069 | -0.3395 |
| | (0.0274) | (0.1656) | (0.1050) | (0.1276) | (0.0736) | (0.1154) | (0.2201) |
| Edu not available | 1.3452 | 0.9121 | 0.9955 | 0.2663 | 0.5255 | 0.1503 | 0.6862 |
| | (0.0251) | (0.0789) | (0.0621) | (0.0721) | (0.0312) | (0.0644) | (0.1029) |
| Years since migration (YSM) | -- | -0.0474 | -0.0513 | -0.0700 | -0.0360 | -0.1046 | -0.0890 |
| | | (0.00991) | (0.00828) | (0.0125) | (0.00745) | (0.0148) | (0.0231) |
| YSM$^2$ | -- | 0.000365 | -0.00021 | -0.00013 | 0.000255 | 0.00142 | 0.000790 |
| | | (0.000275) | (0.000234) | (0.000370) | (0.000250) | (0.000483) | (0.000754) |
| Number of observations | 1 337 022 | 34 371 | 22 812 | 16 493 | 36 583 | 8 358 | 4 660 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.4. Regression Results for Probability of Being Poor in 1997 by Ethnic Group. OECD scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | -0.2388 | 0.1880 | 1.0242 | 0.2153 | -0.5572 | -2.7634 | 1.4103 |
| | (0.0695) | (0.3414) | (0.2663) | (0.2693) | (0.1582) | (25.4330) | (0.4850) |
| Age | -0.1589 | -0.1512 | -0.1453 | -0.0925 | -0.0651 | 0.00578 | -0.1521 |
| | (0.00337) | (0.0162) | (0.0127) | (0.0114) | (0.00730) | (0.0181) | (0.0245) |
| $Age^2$ | 0.00165 | 0.00193 | 0.00184 | 0.00120 | 0.00086 | 0.000014 | 0.00188 |
| | (0.000041) | (0.000196) | (0.000151) | (0.000134) | (0.000089) | (0.000232) | (0.000306) |
| Female | 0.0406 | -0.1218 | 0.0880 | 0.0172 | -0.0376 | -0.00889 | -0.0217 |
| | (0.00693) | (0.0287) | (0.0227) | (0.0225) | (0.0142) | (0.0337) | (0.0536) |
| Single | 0.8306 | 0.3035 | 1.0207 | 0.7608 | 0.8239 | 2.3672 | 1.1244 |
| | (0.0258) | (0.1102) | (0.0858) | (0.1453) | (0.0792) | (25.4309) | (0.1357) |
| Couple, child under 7 | -0.2476 | -0.1552 | -0.5515 | 0.1449 | 0.1519 | 1.6365 | -0.1347 |
| | (0.0270) | (0.1117) | (0.0882) | (0.1424) | (0.0755) | (25.4308) | (0.1382) |
| Couple, child 7+ | -1.1367 | -0.5322 | -0.4213 | 0.00808 | 0.1859 | 1.5233 | -0.3729 |
| | (0.0289) | (0.1263) | (0.0918) | (0.1428) | (0.0769) | (25.4309) | (0.1545) |
| Single mother, child under 7 | 1.0337 | 0.9397 | 0.4492 | 0.0194 | -0.2719 | 1.1236 | 0.0789 |
| | (0.0337) | (0.1573) | (0.1847) | (0.1912) | (0.1130) | (25.4311) | (0.2177) |
| Single mother, child 7+ | -0.1218 | 0.5284 | 0.6886 | 0.0264 | 0.2082 | 1.1819 | -0.1330 |
| | (0.0330) | (0.1543) | (0.1269) | (0.1676) | (0.1007) | (25.4312) | (0.2109) |
| Single father | -0.5816 | 0.1218 | 0.0947 | 0.2479 | 0.0358 | 1.2178 | -0.0526 |
| | (0.0538) | (0.2392) | (0.1971) | (0.2468) | (0.1420) | (25.4316) | (0.3793) |
| Other hh type | 1.0034 | -0.3016 | -0.7597 | -0.9983 | -0.4441 | -10.2292 | -0.2104 |
| | (0.1560) | (0.6513) | (0.4719) | (0.9231) | (0.4806) | (178.0) | (0.5738) |
| Middle school or less | 0.0770 | -0.0145 | 0.1353 | 0.4189 | 0.5696 | 0.1810 | 0.2437 |
| | (0.0792) | (0.2755) | (0.2066) | (0.2130) | (0.0460) | (0.1179) | (0.2267) |
| Education after high school | -0.2285 | 0.0937 | -0.3127 | 0.1221 | -0.2128 | -0.1924 | -0.0217 |
| | (0.0230) | (0.1337) | (0.1021) | (0.1193) | (0.0601) | (0.1111) | (0.1743) |
| College/university first degree | -0.6389 | -0.6521 | -0.2453 | -0.2651 | -0.4172 | -0.3227 | -0.1772 |
| | (0.0245) | (0.1627) | (0.0929) | (0.1342) | (0.0580) | (0.1152 ) | (0.1852) |
| College/university second degree | -0.5652 | -0.5007 | -0.636 | -0.6106 | -0.4430 | 0.2890 | -0.5026 |
| | (0.0307) | (0.1882) | (0.1098) | (0.1327) | (0.0723) | (0.1111) | (0.2495) |
| Not available | 1.4524 | 0.9663 | 0.9986 | 0.3409 | 0.6652 | 0.2747 | 0.5843 |
| | (0.0275) | (0.0886) | (0.0630) | (0.0729) | (0.0292) | (0.0603) | (0.1094) |
| Years since migration (YSM) | - | -0.0604 | -0.0479 | -0.0735 | -0.0121 | -0.0671 | -0.0958 |
| | | (0.0106) | (0.00842) | (0.0125) | (0.00706) | (0.0141) | (0.0242) |
| $YSM^2$ | - | 0.000581 | -0.00038 | 0.000093 | -0.00006 | 0.000839 | 0.000883 |
| | | (0.000299) | (0.000243) | (0.000387) | (0.000236) | (0.000461) | (0.000810) |
| Number of observations | 1 337 022 | 34 371 | 22 812 | 16 493 | 36 583 | 8 358 | 4 660 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.5. Descriptive Statistics on Age, Years since Migration and Age at Migration by Ethnic Group in the Working Age Population**

| | Age | | Years since Migration | | Age at Migration* | |
|---|---|---|---|---|---|---|
| | *Mean* | *Std. Dev.* | *Mean* | *Std. Dev.* | *Mean* | *Std. Dev.* |
| Norwegian | 42.6 | 13.1 | - | - | - | - |
| All immigrants | 40.2 | 12.0 | 13.9 | 10.5 | 26.3 | 9.8 |
| *Immigrants by ethnic group:* | | | | | | |
| Nordic | 44.0 | 12.4 | 17.7 | 12.6 | 25.3 | 9.1 |
| Western | 44.7 | 11.9 | 17.7 | 12.2 | 26.9 | 8.9 |
| Eastern European | 40.1 | 12.1 | 9.9 | 9.4 | 30.2 | 11.7 |
| Asian | 36.7 | 10.6 | 12.0 | 7.2 | 24.7 | 9.8 |
| African | 35.6 | 10.0 | 11.1 | 7.8 | 24.5 | 8.0 |
| South or Central American | 38.6 | 10.9 | 12.3 | 7.4 | 26.3 | 9.3 |

*Age at migration is age-YSM-1, due to the fact that the first year in the country counts as one year.

The observations used to the calculate these statistics are the same as for the regression results. The total number of observations are therefore the same as in Tables A.1 and A.2.

**Table A.6. Regression Results for Chronic Poverty by Ethnic Group. Square-root scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | -0.4400 | 0.2702 | 1.5856 | -0.3540 | 0.0976 | -0.3069 | 1.4899 |
| | (0.0783) | (0.4890) | (0.3708) | (26.9209) | (0.1847) | (33.6099) | (0.5920 |
| Age | -0.1690 | -0.2002 | -0.1965 | -0.1179 | -0.0931 | -0.1093 | -0.1606 |
| | (0.00376) | (0.0228) | (0.0176) | (0.0134) | (0.00895) | (0.0224) | (0.0288) |
| Age$^2$ | 0.00186 | 0.00249 | 0.00227 | 0.00160 | 0.00119 | 0.00129 | 0.00203 |
| | (0.000045) | (0.000262) | (0.000205) | (0.000158) | (0.000109) | (0.000286) | (0.000348) |
| Female | 0.0273 | -0.1564 | 0.0996 | 0.0175 | -0.0314 | -0.0221 | 0.0431 |
| | (0.00823) | (0.0435) | (0.0325) | (0.0265) | (0.0182) | (0.0451) | (0.0664) |
| Single | 1.0539 | 0.9067 | 1.1081 | 2.1216 | 0.8651 | 2.3202 | 1.2242 |
| | (0.0281) | (0.1587) | (0.1175) | (26.9195) | (0.0746) | (33.6075) | (0.1570) |
| Couple, child under 7 | -0.7803 | -0.5331 | -0.7359 | 1.1982 | -0.2922 | 1.0694 | -0.8572 |
| | (0.0334) | (0.1739) | (0.1263) | (26.9195) | (0.0712) | (33.6075) | (0.1869) |
| Couple, child 7+ | -1.9556 | -1.3455 | -0.6311 | 0.8748 | -0.4167 | 0.8206 | -0.8786 |
| | (0.0373) | (0.2060) | (0.1268) | (26.9195) | (0.0738) | (33.6076) | (0.1944) |
| Single mother, child under 7 | 1.4840 | 1.4288 | 0.6796 | 1.7142 | -0.2399 | 1.3503 | 0.4291 |
| | (0.0360) | (0.2250) | (0.2258) | (26.9198) | (0.1174) | (33.6077) | (0.2230) |
| Single mother, child 7+ | 0.1560 | 0.8248 | 0.7230 | 1.6005 | -0.1771 | 1.3460 | -0.1320 |
| | (0.0349) | (0.2082) | (0.1591) | (26.9197) | (0.1019) | (33.6078) | (0.2240) |
| Single father | -0.3906 | -0.6531 | -0.0941 | 1.3672 | -0.1291 | 1.4376 | -0.2030 |
| | (0.0568) | (0.4669) | (0.2805) | (26.9212) | (0.1524) | (33.6081) | (0.5497) |
| Other hh type | 1.2129 | -0.1703 | -0.7684 | -10.0522 | 0.6040 | -9.4036 | 0.6594 |
| | (0.1713) | (0.9059) | (0.6516) | (188.4) | (0.4195) | (235.3) | (0.6314) |
| Middle school or less | 0.4200 | 0.6246 | 0.1506 | 0.5994 | 0.4200 | 0.0506 | -0.0287 |
| | (0.0670) | (0.2165) | (0.2352) | (0.2197) | (0.0551) | (0.1434) | (0.2459) |
| Education after high school | -0.2827 | -0.3793 | -0.3388 | 0.1194 | -0.1087 | -0.3047 | -0.0764 |
| | (0.0244) | (0.1672) | (0.1193) | (0.1374) | (0.0706) | (0.1359) | (0.1907) |
| College/university first degree | -0.8231 | -0.6085 | -0.3504 | -0.4725 | -0.3335 | -0.2397 | -0.1457 |
| | (0.0283) | (0.1828) | (0.1127) | (0.1711) | (0.0695) | (0.1421) | (0.2059) |
| College/university second degree | -0.9373 | -0.5472 | -0.4696 | -0.4489 | -0.4295 | 0.5514 | -0.3576 |
| | (0.0401) | (0.2149) | (0.1227) | (0.1457) | (0.0907) | (0.1340) | (0.2551) |
| Not available | 1.6116 | 0.9373 | 0.9617 | 0.2981 | 0.5460 | 0.1649 | 0.6228 |
| | (0.0278) | (0.0925) | (0.0738) | (0.0865) | (0.0356) | (0.0735) | (0.1157) |
| Years since migration (YSM) | -- | 0.0181 | 0.00513 | -0.1479 | -0.0180 | -0.0697 | -0.0902 |
| | | (0.0158) | (0.0125) | (0.0158) | (0.0100) | (0.0202) | (0.0326) |
| YSM$^2$ | -- | -0.00123 | -0.00148 | 0.00199 | -0.00027 | 0.000701 | 0.000723 |
| | | (0.000424) | (0.000346) | (0.000452) | (0.000338) | (0.000654) | (0.00102) |
| Number of observations | 1 201 241 | 18 203 | 17 464 | 13 443 | 28 795 | 6 201 | 3 754 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.7. Regression Results for Chronic Poverty by Ethnic Group. OECD scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | -0.9503 | -0.2069 | 1.4874 | -1.0727 | -0.5146 | -1.4977 | 1.5296 |
| | (0.0917) | (0.5461) | (0.3838) | (27.6067) | (0.1882) | (37.0847) | (0.6560) |
| Age | -0.1538 | -0.1827 | -0.1917 | -0.0897 | -0.0732 | -0.0569 | -0.1624 |
| | (0.00451) | (0.0255) | (0.0183) | (0.0138) | (0.00914) | (0.0250) | (0.0317) |
| Age$^2$ | 0.00165 | 0.00230 | 0.00220 | 0.00124 | 0.000918 | 0.000584 | 0.00191 |
| | (0.000054) | (0.000294) | (0.000215) | (0.000164) | (0.000112) | (0.000323) | (0.000389) |
| Female | 0.0135 | -0.1274 | 0.0912 | 0.00839 | -0.0183 | -0.0257 | -0.00022 |
| | (0.00964) | (0.0476) | (0.0337) | (0.0265) | (0.0182) | (0.0477) | (0.0718) |
| Single | 0.7991 | 0.6887 | 0.9146 | 1.8502 | 0.6313 | 2.0877 | 1.0114 |
| | (0.0303) | (0.1756) | (0.1207) | (27.6052) | (0.0777) | (37.0821) | (0.1986) |
| Couple, child under 7 | -0.3468 | -0.2796 | -0.5777 | 1.5277 | 0.0222 | 1.3542 | -0.4372 |
| | (0.0339) | (0.1857) | (0.1269) | (27.6052) | (0.0727) | (37.0821) | (0.2165) |
| Couple, child 7+ | -1.3249 | -0.8928 | -0.3696 | 1.4240 | 0.0280 | 1.0051 | -0.1251 |
| | (0.0359) | (0.2117) | (0.1270) | (27.6052) | (0.0747) | (37.0822) | (0.2152) |
| Single mother, child under 7 | 0.8820 | 0.9574 | 0.3479 | 1.4577 | -0.6484 | 0.9867 | -0.0150 |
| | (0.0448) | (0.2658) | (0.2508) | (27.6056) | (0.1376) | (37.0824) | (0.2949) |
| Single mother, child 7+ | -0.1409 | 0.7958 | 0.6071 | 1.3787 | -0.3625 | 1.4494 | -0.4412 |
| | (0.0411) | (0.2320) | (0.1693) | (27.6054) | (0.1120) | (37.0824) | (0.3061) |
| Single father | -0.5704 | -1.0436 | 0.0656 | 1.0575 | -0.2201 | 1.3153 | -0.9004 |
| | (0.0697) | (0.6407) | (0.2819) | (27.6077) | (0.1675) | (37.0829) | (0.9080) |
| Other hh type | 1.4901 | 0.1022 | -0.6698 | -9.8712 | 0.8363 | -9.2282 | 0.9654 |
| | (0.1740) | (0.9094) | (0.6526) | (193.2) | (0.4208) | (259.6) | (0.6418) |
| Middle school or less | 0.5404 | 0.5056 | 0.1542 | 0.5030 | 0.3898 | -0.0532 | -0.0772 |
| | (0.0800) | (0.2530) | (0.2482) | (0.2529) | (0.0568) | (0.1625) | (0.2938) |
| Education after high school | -0.2857 | -0.3048 | -0.2845 | 0.1626 | -0.1275 | -0.3017 | 0.0450 |
| | (0.0288) | (0.1903) | (0.1274) | (0.1526) | (0.0734) | (0.1516) | (0.2088) |
| College/university first degree | -0.8509 | -0.4847 | -0.3079 | -0.4316 | -0.3703 | -0.2306 | 0.0994 |
| | (0.0337) | (0.1966) | (0.1179) | (0.1904) | (0.0732) | (0.1563) | (0.2166) |
| College/university second degree | -0.9504 | -0.5485 | -0.5040 | -0.4853 | -0.4442 | 0.5746 | -0.3799 |
| | (0.0468) | (0.2443) | (0.1322) | (0.1642) | (0.0949) | (0.1422) | (0.2981) |
| Not available | 1.6093 | 0.9222 | 0.9167 | 0.3792 | 0.6371 | 0.2409 | 0.4990 |
| | (0.0322) | (0.1042) | (0.0780) | (0.0953) | (0.0365) | (0.0802) | (0.1341) |
| Years since migration (YSM) | -- | 0.00766 | -0.00075 | -0.1796 | -0.0185 | -0.0818 | -0.1194 |
| | | (0.0179) | (0.0133) | (0.0167) | (0.0102) | (0.0217) | (0.0370) |
| YSM$^2$ | -- | -0.00130 | -0.00152 | 0.00290 | -0.00013 | 0.00130 | 0.00146 |
| | | (0.000497) | (0.000378) | (0.000484) | (0.000347) | (0.000711) | (0.00119) |
| Number of observations | 1 201 241 | 18 203 | 17 464 | 13 443 | 28 795 | 6 201 | 3 754 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.8.**
**Percentage of 1986-1990 Immigrant Cohorts Still Residing in Norway as of January 1st, 1996 by Employment Status**

| | Number of observations | Percentage residing in Norway as of January 1st, 1996 | | |
|---|---|---|---|---|
| | | All | Men | Women |
| *Employed* | | | | |
| Nordic | 3 981 | 45.2 | 52.1 | 40.4 |
| Western Europe | 1 411 | 72.9 | 74.9 | 69.9 |
| North America | 393 | 61.1 | 54.7 | 68.7 |
| Eastern Europe | 1 136 | 96.0 | 95.7 | 96.3 |
| Other regions | 8 506 | 96.4 | 96.5 | 96.1 |
| | | | | |
| *Unemployed* | | | | |
| Nordic | 190 | 51.1 | 44.8 | 58.8 |
| Western Europe | 81 | 84.0 | 78.9 | 95.8 |
| North America | 25 | 76.0 | 75.0 | 76.9 |
| Eastern Europe | 330 | 97.3 | 97.4 | 97.0 |
| Other regions | 3 081 | 97.5 | 97.4 | 97.7 |
| | | | | |
| *Not in labor force* | | | | |
| Nordic | 3 238 | 18.3 | 17.4 | 18.9 |
| Western Europe | 1 957 | 31.1 | 28.9 | 32.9 |
| North America | 1 316 | 23.3 | 23.4 | 23.3 |
| Eastern Europe | 1 954 | 55.2 | 42.9 | 67.4 |
| Other regions | 13 531 | 77.0 | 70.6 | 84.7 |
| | | | | |
| *Unspecified* | | | | |
| Nordic | 3 960 | 1.7 | 1.7 | 1.7 |
| Western Europe | 1 195 | 2.8 | 3.1 | 2.4 |
| North America | 619 | 1.1 | 1.8 | 0.6 |
| Eastern Europe | 779 | 5.8 | 4.3 | 8.4 |
| Other regions | 3 174 | 36.2 | 34.8 | 39.1 |

Source: Tysse and Keilman (1998), Table 2.5.3.a and Table 2.5.3.b, p. 64.

**Table A.6. Regression Results for Chronic Poverty by Ethnic Group. Square-root scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | -0.4400 | 0.2702 | 1.5856 | -0.3540 | 0.0976 | -0.3069 | 1.4899 |
| | (0.0783) | (0.4890) | (0.3708) | (26.9209) | (0.1847) | (33.6099) | (0.5920 |
| | | | | | | | |
| Age | -0.1690 | -0.2002 | -0.1965 | -0.1179 | -0.0931 | -0.1093 | -0.1606 |
| | (0.00376) | (0.0228) | (0.0176) | (0.0134) | (0.00895) | (0.0224) | (0.0288) |
| | | | | | | | |
| Age$^2$ | 0.00186 | 0.00249 | 0.00227 | 0.00160 | 0.00119 | 0.00129 | 0.00203 |
| | (0.000045) | (0.000262) | (0.000205) | (0.000158) | (0.000109) | (0.000286) | (0.000348) |
| | | | | | | | |
| Female | 0.0273 | -0.1564 | 0.0996 | 0.0175 | -0.0314 | -0.0221 | 0.0431 |
| | (0.00823) | (0.0435) | (0.0325) | (0.0265) | (0.0182) | (0.0451) | (0.0664) |
| | | | | | | | |
| Single | 1.0539 | 0.9067 | 1.1081 | 2.1216 | 0.8651 | 2.3202 | 1.2242 |
| | (0.0281) | (0.1587) | (0.1175) | (26.9195) | (0.0746) | (33.6075) | (0.1570) |
| | | | | | | | |
| Couple, child under 7 | -0.7803 | -0.5331 | -0.7359 | 1.1982 | -0.2922 | 1.0694 | -0.8572 |
| | (0.0334) | (0.1739) | (0.1263) | (26.9195) | (0.0712) | (33.6075) | (0.1869) |
| | | | | | | | |
| Couple, child 7+ | -1.9556 | -1.3455 | -0.6311 | 0.8748 | -0.4167 | 0.8206 | -0.8786 |
| | (0.0373) | (0.2060) | (0.1268) | (26.9195) | (0.0738) | (33.6076) | (0.1944) |
| | | | | | | | |
| Single mother, child under 7 | 1.4840 | 1.4288 | 0.6796 | 1.7142 | -0.2399 | 1.3503 | 0.4291 |
| | (0.0360) | (0.2250) | (0.2258) | (26.9198) | (0.1174) | (33.6077) | (0.2230) |
| | | | | | | | |
| Single mother, child 7+ | 0.1560 | 0.8248 | 0.7230 | 1.6005 | -0.1771 | 1.3460 | -0.1320 |
| | (0.0349) | (0.2082) | (0.1591) | (26.9197) | (0.1019) | (33.6078) | (0.2240) |
| | | | | | | | |
| Single father | -0.3906 | -0.6531 | -0.0941 | 1.3672 | -0.1291 | 1.4376 | -0.2030 |
| | (0.0568) | (0.4669) | (0.2805) | (26.9212) | (0.1524) | (33.6081) | (0.5497) |
| | | | | | | | |
| Other hh type | 1.2129 | -0.1703 | -0.7684 | -10.0522 | 0.6040 | -9.4036 | 0.6594 |
| | (0.1713) | (0.9059) | (0.6516) | (188.4) | (0.4195) | (235.3) | (0.6314) |
| | | | | | | | |
| Middle school or less | 0.4200 | 0.6246 | 0.1506 | 0.5994 | 0.4200 | 0.0506 | -0.0287 |
| | (0.0670) | (0.2165) | (0.2352) | (0.2197) | (0.0551) | (0.1434) | (0.2459) |
| | | | | | | | |
| Education after high school | -0.2827 | -0.3793 | -0.3388 | 0.1194 | -0.1087 | -0.3047 | -0.0764 |
| | (0.0244) | (0.1672) | (0.1193) | (0.1374) | (0.0706) | (0.1359) | (0.1907) |
| | | | | | | | |
| College/university first degree | -0.8231 | -0.6085 | -0.3504 | -0.4725 | -0.3335 | -0.2397 | -0.1457 |
| | (0.0283) | (0.1828) | (0.1127) | (0.1711) | (0.0695) | (0.1421) | (0.2059) |
| | | | | | | | |
| College/university second degree | -0.9373 | -0.5472 | -0.4696 | -0.4489 | -0.4295 | 0.5514 | -0.3576 |
| | (0.0401) | (0.2149) | (0.1227) | (0.1457) | (0.0907) | (0.1340) | (0.2551) |
| | | | | | | | |
| Not available | 1.6116 | 0.9373 | 0.9617 | 0.2981 | 0.5460 | 0.1649 | 0.6228 |
| | (0.0278) | (0.0925) | (0.0738) | (0.0865) | (0.0356) | (0.0735) | (0.1157) |
| | | | | | | | |
| Years since migration (YSM) | -- | 0.0181 | 0.00513 | -0.1479 | -0.0180 | -0.0697 | -0.0902 |
| | | (0.0158) | (0.0125) | (0.0158) | (0.0100) | (0.0202) | (0.0326) |
| | | | | | | | |
| YSM$^2$ | -- | -0.00123 | -0.00148 | 0.00199 | -0.00027 | 0.000701 | 0.000723 |
| | | (0.000424) | (0.000346) | (0.000452) | (0.000338) | (0.000654) | (0.00102) |
| | | | | | | | |
| Number of observations | 1 201 241 | 18 203 | 17 464 | 13 443 | 28 795 | 6 201 | 3 754 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.7. Regression Results for Chronic Poverty by Ethnic Group. OECD scale**

| | Natives | Nordic | Western | Eastern European | Asian | African | South or Central American |
|---|---|---|---|---|---|---|---|
| *Intercept* | -0.9503 | -0.2069 | 1.4874 | -1.0727 | -0.5146 | -1.4977 | 1.5296 |
| | (0.0917) | (0.5461) | (0.3838) | (27.6067) | (0.1882) | (37.0847) | (0.6560) |
| Age | -0.1538 | -0.1827 | -0.1917 | -0.0897 | -0.0732 | -0.0569 | -0.1624 |
| | (0.00451) | (0.0255) | (0.0183) | (0.0138) | (0.00914) | (0.0250) | (0.0317) |
| Age$^2$ | 0.00165 | 0.00230 | 0.00220 | 0.00124 | 0.000918 | 0.000584 | 0.00191 |
| | (0.000054) | (0.000294) | (0.000215) | (0.000164) | (0.000112) | (0.000323) | (0.000389) |
| Female | 0.0135 | -0.1274 | 0.0912 | 0.00839 | -0.0183 | -0.0257 | -0.00022 |
| | (0.00964) | (0.0476) | (0.0337) | (0.0265) | (0.0182) | (0.0477) | (0.0718) |
| Single | 0.7991 | 0.6887 | 0.9146 | 1.8502 | 0.6313 | 2.0877 | 1.0114 |
| | (0.0303) | (0.1756) | (0.1207) | (27.6052) | (0.0777) | (37.0821) | (0.1986) |
| Couple, child under 7 | -0.3468 | -0.2796 | -0.5777 | 1.5277 | 0.0222 | 1.3542 | -0.4372 |
| | (0.0339) | (0.1857) | (0.1269) | (27.6052) | (0.0727) | (37.0821) | (0.2165) |
| Couple, child 7+ | -1.3249 | -0.8928 | -0.3696 | 1.4240 | 0.0280 | 1.0051 | -0.1251 |
| | (0.0359) | (0.2117) | (0.1270) | (27.6052) | (0.0747) | (37.0822) | (0.2152) |
| Single mother, child under 7 | 0.8820 | 0.9574 | 0.3479 | 1.4577 | -0.6484 | 0.9867 | -0.0150 |
| | (0.0448) | (0.2658) | (0.2508) | (27.6056) | (0.1376) | (37.0824) | (0.2949) |
| Single mother, child 7+ | -0.1409 | 0.7958 | 0.6071 | 1.3787 | -0.3625 | 1.4494 | -0.4412 |
| | (0.0411) | (0.2320) | (0.1693) | (27.6054) | (0.1120) | (37.0824) | (0.3061) |
| Single father | -0.5704 | -1.0436 | 0.0656 | 1.0575 | -0.2201 | 1.3153 | -0.9004 |
| | (0.0697) | (0.6407) | (0.2819) | (27.6077) | (0.1675) | (37.0829) | (0.9080) |
| Other hh type | 1.4901 | 0.1022 | -0.6698 | -9.8712 | 0.8363 | -9.2282 | 0.9654 |
| | (0.1740) | (0.9094) | (0.6526) | (193.2) | (0.4208) | (259.6) | (0.6418) |
| Middle school or less | 0.5404 | 0.5056 | 0.1542 | 0.5030 | 0.3898 | -0.0532 | -0.0772 |
| | (0.0800) | (0.2530) | (0.2482) | (0.2529) | (0.0568) | (0.1625) | (0.2938) |
| Education after high school | -0.2857 | -0.3048 | -0.2845 | 0.1626 | -0.1275 | -0.3017 | 0.0450 |
| | (0.0288) | (0.1903) | (0.1274) | (0.1526) | (0.0734) | (0.1516) | (0.2088) |
| College/university first degree | -0.8509 | -0.4847 | -0.3079 | -0.4316 | -0.3703 | -0.2306 | 0.0994 |
| | (0.0337) | (0.1966) | (0.1179) | (0.1904) | (0.0732) | (0.1563) | (0.2166) |
| College/university second degree | -0.9504 | -0.5485 | -0.5040 | -0.4853 | -0.4442 | 0.5746 | -0.3799 |
| | (0.0468) | (0.2443) | (0.1322) | (0.1642) | (0.0949) | (0.1422) | (0.2981) |
| Not available | 1.6093 | 0.9222 | 0.9167 | 0.3792 | 0.6371 | 0.2409 | 0.4990 |
| | (0.0322) | (0.1042) | (0.0780) | (0.0953) | (0.0365) | (0.0802) | (0.1341) |
| Years since migration (YSM) | -- | 0.00766 | -0.00075 | -0.1796 | -0.0185 | -0.0818 | -0.1194 |
| | | (0.0179) | (0.0133) | (0.0167) | (0.0102) | (0.0217) | (0.0370) |
| YSM$^2$ | -- | -0.00130 | -0.00152 | 0.00290 | -0.00013 | 0.00130 | 0.00146 |
| | | (0.000497) | (0.000378) | (0.000484) | (0.000347) | (0.000711) | (0.00119) |
| Number of observations | 1 201 241 | 18 203 | 17 464 | 13 443 | 28 795 | 6 201 | 3 754 |

Standard deviation listed in parentheses.
The following categories are references for dummy variables: household type—couple, no children; education—high school.

**Table A.8.**
**Percentage of 1986-1990 Immigrant Cohorts Still Residing in Norway as of January 1$^{st}$, 1996 by Employment Status**

| | Number of observations | Percentage residing in Norway as of January 1$^{st}$, 1996 | | |
| --- | --- | --- | --- | --- |
| | | All | Men | Women |
| *Employed* | | | | |
| Nordic | 3 981 | 45.2 | 52.1 | 40.4 |
| Western Europe | 1 411 | 72.9 | 74.9 | 69.9 |
| North America | 393 | 61.1 | 54.7 | 68.7 |
| Eastern Europe | 1 136 | 96.0 | 95.7 | 96.3 |
| Other regions | 8 506 | 96.4 | 96.5 | 96.1 |
| | | | | |
| *Unemployed* | | | | |
| Nordic | 190 | 51.1 | 44.8 | 58.8 |
| Western Europe | 81 | 84.0 | 78.9 | 95.8 |
| North America | 25 | 76.0 | 75.0 | 76.9 |
| Eastern Europe | 330 | 97.3 | 97.4 | 97.0 |
| Other regions | 3 081 | 97.5 | 97.4 | 97.7 |
| | | | | |
| *Not in labor force* | | | | |
| Nordic | 3 238 | 18.3 | 17.4 | 18.9 |
| Western Europe | 1 957 | 31.1 | 28.9 | 32.9 |
| North America | 1 316 | 23.3 | 23.4 | 23.3 |
| Eastern Europe | 1 954 | 55.2 | 42.9 | 67.4 |
| Other regions | 13 531 | 77.0 | 70.6 | 84.7 |
| | | | | |
| *Unspecified* | | | | |
| Nordic | 3 960 | 1.7 | 1.7 | 1.7 |
| Western Europe | 1 195 | 2.8 | 3.1 | 2.4 |
| North America | 619 | 1.1 | 1.8 | 0.6 |
| Eastern Europe | 779 | 5.8 | 4.3 | 8.4 |
| Other regions | 3 174 | 36.2 | 34.8 | 39.1 |

Source: Tysse and Keilman (1998), Table 2.5.3.a and Table 2.5.3.b, p. 64.

# Do Immigrants Integrate out of Poverty?

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**Abstract**

The question of how immigrants are faring with respect to a certain minimum in society is both a timely and pertinent question for a number of European countries. In Norway, the prevalence of poverty is alarmingly high among immigrants and stands in stark contrast to the very low poverty rates for the native Norwegian population. Thus, unless the high poverty rates in the immigrant population are just a temporary feature of the immigrants' initial period of adjustment in the host country, poverty among immigrants is a cause for concern in Norway, too. This paper wishes to serve as a complement or extension of previous studies of immigrant adjustment; the study also aims to provide insights on the substantial heterogeneity – observed, unobserved and unobservable – in the immigrant population in Norway. The results suggest that the duration of residence is a very relevant factor which at least in part explains the high prevalence of poverty among immigrants in Norway.

# 1 Introduction

The question of how immigrants are faring with respect to a certain minimum in society is both a timely and pertinent question for a number of European countries. In Norway the prevalence of poverty is alarmingly high among immigrants and stands in stark contrast to the very low poverty rates for the native population. Unless high poverty rates in the immigrant population are just a transient feature of immigrants' initial period of adjustment in the host country, poverty among immigrants is surely a topic of policy relevance, both related to immigration policy itself and with respect to policies meant to foster immigrants' integration into the host society.

This paper thus wishes to investigate the extent to which one could claim that immigrants "integrate out of poverty". In other words, we wish to provide evidence as to whether or not the high incidence of poverty among immigrants–as seen in descriptive statistics–is indicative of a *persistently* high probability of poverty for (individual) immigrants over the duration of their stay in Norway. To this end, we utilize a very rich data source–register data on the entire population of Norway over a nine year period (from 1993 to 2001). These data provide us with a unique opportunity to study thousands upon thousands of individual immigrants from very diverse ethnic backgrounds over many years. Furthermore, Norway is a particularly interesting case in a broader international perspective, due to its otherwise low levels of inequality and poverty. Put somewhat loosely, in international comparison Norway seems to have a good track record in limiting the extent of poverty and inequality within its borders. Thus, a discussion of poverty among immigrants in Norway would not necessarily require a lengthy deliberation of the relevance of broader structural problems in the society, i.e. general factors that lead to high poverty rates both among natives and immigrants.

Immigrant groups with persistently high probabilities of poverty, i.e. who fail to integrate out of poverty, may be a source of concern for the host countries both for reasons of efficiency and altruism. Poverty in large numbers in any segment of society, native or immigrant, is generally feared to entail any of a number of social costs and woes, such as increased crime, unrest, and discrimination. It might thus be in the interest of the society as a whole to limit the potential for such problems by paying particular attention to the lower end of the distribution regardless of whether that segment of society is dominated by immigrants or natives. In addition, when immigrants (legally) enter a country they do become rightful members of that society. The precise rights associated with that membership are sources of constant debate and revision in receiving countries. There can, however, be little doubt that (legal) immigrants do to some extent become a part of the general altruistic concern of the societies they (legitimately) enter. Finally, in an even broader perspective, poverty among immigrants relates to issues of global inequality, i.e. the (relative) poverty of immigrants in rich, Western countries may to some extent be a reflection of the (absolute) poverty and deprivation in the Third World; many would also

see this as a reason for altruistic interest in the fate of immigrants in Western receiving countries; see Roemer (2006) for a discussion and an economic model which addresses such issues.

This study, with its focus on immigrants' performance in relation to a certain minimum living standard in the host society, is at the crossroads of two different literatures. On the one hand, it provides an alternative perspective and serves as a complement to previous studies on the earnings assimilation of immigrants. The focus on poverty implicitly places emphasis on household income and well-being instead of concentrating, more narrowly, on wages for individuals in the labor market i.e. the main topic of traditional studies of earnings assimilation.[1] Poverty studies thus provide valuable additional insights on portions of the immigrant population *outside* of the labor market. On the other hand, the analysis provided in this paper is also related to the topic of poverty dynamics; this literature can be seen as following in the steps of Bane and Ellwood (1986) and is surveyed in Jenkins (2000). The key feature of this literature is an interest in understanding poverty not simply from a static, cross-sectional perspective, but as a dynamic phenomenon. The ultimate goal of that literature is to gain a better understanding of the underlying factors contributing to (persistent) poverty for individuals. This article can, thus, also be interpreted as a contribution toward understanding the particular dynamics of *immigrant* poverty and, in that sense, is also a contribution to the general literature on poverty dynamics.

The paper is structured as follows. The next section provides an brief overview over immigration in Norway and discusses the prevalence of poverty in the immigrant population. Such discussions provide greater details on the relevance of the topic of this article and make it easier to outline and elaborate on the specific research focus of this study. Section 3 describes the definitions, methods and specification used in the more detailed analysis and Section 4 presents the main empirical results. The final section summarizes the findings and discusses them in a broader perspective.

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[1]Studies of earnings or wage assimilation have been the backbone of studies on the economic integration of immigrants since the seminal work on immigrants to the US in Chiswick (1978) and Borjas (1985). Hayfron (1998), Longva and Raaum (2003), and Barth, Bratsberg and Raaum (2004) have analyzed the earnings assimilation of immigrants in Norway. Immigrant adjustment or performance has also been assessed based on use of welfare or social assistance, see for example Baker and Benjamin (1995) analysis of welfare use among immigrants to Canada, Borjas and Hilton (1996) and Borjas and Trejo (1991) for welfare use among immigrants to the US and Hansen and Lofstrom (2003) a Swedish study.

# 2 A Brief Overview over Immigration and Poverty among Immigrants to Norway

## 2.1 Immigration and Immigrants to Norway

Immigration from non-Western countries is a relatively new phenomenon in Norway. Net annual immigration to Norway was, in fact, still more often negative than positive up until about the late 1960s[2], and it was only after substantial positive net immigration persisted for several years that restrictions were placed on immigration in 1975.[3] The moratorium on immigration implemented on 1 February 1975 was intended as an interim measure; in reality those temporary policies actually formulated the main principles of immigration policy still in place today.[4] Those policies allow for immigration to Norway based on three main criteria: the demand for specific skilled labor, family ties and political asylum.

As Figure 1 indicates, Norway has experienced more than a seven-fold increase in its population of immigrant origin since 1970. Furthermore, the composition of the immigrant population has changed dramatically in the past few decades. Whereas the vast majority of immigrants to Norway were of Western origin in 1970 and 1980, dramatic growth in the numbers of immigrants from non-Western countries has lead to Western immigrants now comprising less than half of the immigrants to Norway. As of 1 January 2008, immigrants made up 9.7 percent of the population in Norway.

Table 1 provides some further insights on the substantial changes that have taken place with respect to the composition of the immigrant population in Norway. In 1970, immigrants from neighboring nations and large Western countries were by far the largest groups in Norway; there were no non-Western countries among the top ten countries of origin for immigrants to Norway in 1970.[5] By 1980, immigrants from Pakistan and Turkey were two of the 10 largest groups; these immigrants consisted largely of labor migrants and their family members, many of whom entered the country before the change in immigration legislation in 1975. By the year 2000 five of the top ten immigrant groups in Norway were from non-

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[2]Statistics Norway's statistical database "Statbank Norway" is the source for the population statistics presented in this subsection. See http://statbank.ssb.no//statistikkbanken/ for details.

[3]Brochmann (2003) provides a historical account and analysis of the events and discussions leading up to the adoption of restrictions on immigration in 1975. She suggests that the policy was a response to union worries *both* about immigrants accepting lower wages and thus undermining the progress made in improving conditions for workers *and* sincere concerns about poor living standards among–and exploitation of–the immigrants themselves.

[4]The restrictions from 1975 were first renewed for several years and then adopted as permanent measures in 1981. A new immigration law was adopted in 1988 and implemented in 1991; this new law was in many ways a formal declaration of ad hoc practices that were established in the wake of the immigration restrictions of 1975, see Brochman (2003).

[5]The 401 immigrants of Moroccan origin were the largest non-Western group in Norway in 1970.

Western countries and it is precisely those five non-Western groups we will study in greater detail in the main analysis of this current.

The number of immigrants to Norway has continued to grow dramatically in the new millennium; most notably, two new groups–refugees from Iraq and Somalia– have taken their place among the largest groups in Norway; the performance and well-being of those two groups are therefore also of considerable interest for migration experts and policy-makers in Norway. However, given the relatively recent arrival of those groups and the data available for this study, i.e. from 1993-2001, we were unable to include them in this current study.

## 2.2 Poverty among Immigrants in Norway

As Table 2 clearly illustrates, immigrants are vastly overrepresented among the poor in Norway. The exact methods for measuring poverty will be described in greater detail in Section 3.1, but we can mention briefly here that poverty status is determined based on a relative poverty line is defined at 50 percent of the median equivalent disposable income (income after tax) in the population. Poverty rates among so-called first generation immigrants are more than six times higher than the rates among the native Norwegian population; poverty rates among persons born in Norway to two foreign parents, i.e. persons often referred to as "second generation immigrants", are even higher. Since the group of persons born in Norway to two foreign parents largely consists of children and young adults,[6] the prevalence of poverty in that group is also indicative of high rates of child poverty among immigrant children to Norway. Altogether, the very high poverty rates among immigrants do warrant further analysis.

As briefly mentioned in the introduction, analysis of poverty among immigrants offers an alternative perspective on the issue of immigrant adjustment or can serve as a complement to traditional studies of immigrant labor market performance. Traditional studies of earnings assimilation mostly focus on the earnings of employed immigrant men; thus, they are unable to give a more complete picture of the economic well-being of immigrants outside of the labor market, such as women and children, and those immigrants struggling to gain a foothold in the labor market.[7] To put this another way, even if one finds evidence of considerable growth and assimilation in earnings for employed (male) immigrants, one might still uncover disturbing trends in poverty for immigrants, due to the portion of the immigrant population outside of the labor force.

Figure 2 presents poverty rates during the period 1993-2001 for the five largest non-Western immigrant groups as of 1993; these are the same groups we will study

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[6]This is a result of the fact that immigration in large numbers is a relatively recent phenomenon in Norway, as explained in the previous subsection. Statbank Norway (see footnote 4) also provides detailed information on the age composition of the immigrant population in Norway.

[7]For insights on earnings assimilation among immigrants to Norway, see Hayfron (1998), Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004).

more closely later on in the paper. The picture presented in Figure 1 therefore sets the stage for the more detailed analysis to follow.

The five immigrants groups all exhibit much higher poverty rates than the native Norwegian population, but there are many noteworthy differences between the groups. Descriptive statistics on poverty among immigrants will be greatly influenced by many factors, including demographic variables such as age, education and household type, economic factors such as the supply and demand for labor in the labor market, and the composition of the relevant immigrant population with respect to the duration of residence in the host country. Economic conditions were, for example, particularly favorable in the mid- to late-1990s in Norway and this could in part explain the decline in immigrant poverty rates as indicated by Figure 2. However, the passing of time also means that the average duration of residence may have increased for many of the immigrant groups; the extent to which this is the case depends in part on whether or not immigrants continued to arrive from these countries in the period. Altogether, it can be difficult to assess the extent to which an "integration effect" may lead to lower poverty rates for immigrants over time based solely on descriptive statistics or descriptive analysis.

## 2.3   Research Focus and Scientific Contributions

The main focus of this paper is thus on establishing the extent to which we might claim that immigrants are able to "integrate out of poverty". As touched on in the Introduction, such a question serves as a complement to the analysis of earnings assimilation and helps to broaden our perspective on immigrants' adjustment to the host country. This thematic or topical focus thus represents the first major contribution of this paper. Furthermore, numerous studies have attempted to uncover factors which contribute to poverty dynamics or poverty persistence. This paper contributes to better understanding the dynamics of poverty for immigrants.

Study of such topics obviously leads to many subsidiary questions; this paper also make contributions related to such questions. Most notably, the paper exploits the unique data available to discuss the relevance of unobserved population heterogeneity. This topic has received considerable attention–often under the guise of "cohort differences" in the literature on earnings assimilation–and can be interpreted as a specification bias. However, since we are able to observe the same individuals and households over time, we are able to to model unobserved heterogeneity more directly. Thus, we are also to assess the extent to which other methods, such as modelling cohort differences, are sufficient with respect to addressing such specification bias. This paper thus also makes a contribution to the literature by providing an assessment of the appropriateness of the cohort approach for addressing such specification bias.

As briefly mentioned above, we will focus on five major immigrant groups for the main part of this study; these five groups were the largest non-Western groups in Norway at the start of the period for which the data was available (1993); as

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Table 1 indicates, these groups were still the five largest in 2000.

There are a number of reasons why we would choose to focus more narrowly on these particular groups. Firstly, the study of Western immigrants are both more difficult and of lesser policy interest. The analytical difficulty lies with the fact that there is considerably more turnover in the immigrant population originating in Western countries. Norway places no restrictions on immigration (of citizens) from the other Nordic countries; the rules and regulations governing immigration from other countries within the European Economic Area (EEA) and the European Free Trade Association (EFTA) are also much less restrictive than for immigrants from more distant countries.[8] Thus, individuals from such countries come to Norway for shorter periods and do not necessarily choose to reside permanently in the country (Tysse and Keilman (1998), Bratsberg et al 2002). There is also less policy interest in the performance of these groups, simply because they are generally perceived of as being better integrated – or better equipped to successfully integrate – into the labor market and society as a whole in Norway.

Secondly, as the results in this paper will themselves clearly document, immigrants groups do differ–often greatly–from one another both in the extent and manner in which they adjust to the host country. Some would suggest that this presents a challenge to the applicability or generalizability of the results; the scope of analysis would, in this view, appear too narrow. However, the perspective of this paper is that there do exist large and persistent differences between immigrant groups and that failure to acknowledge such differences poses an even greater threat to the generalizability of results. In other words, by focusing on certain major groups we hope to provide insights that give a sense of the range of varying outcomes and results; if we are able to find consistent evidence of some degree of "integration out of poverty" for many different groups, then this supports the hypothesis that the perspective of this article is, in fact, a useful one.

Separate analysis of different immigrant groups based on some more or less broadly defined ethnic similarity is also hardly a novel approach in the literature; in fact, where it is possible, i.e. given sufficient observations of separate groups in the data for analysis, it would appear to be 'best practice'. A far from exhaustive list of examples of separate analyzes for different ethnic groups or immigrants by country of origin includes: Borjas (1985), who presents separate analyzes for immigrants characterized as "white", "black", "Asian", "Mexican", "Cuban" and "Other Hispanic" and even suggests that one should assess the extent of earnings assimilation relative to *ethnically similar* citizens of the US; Lubotsky (2007), who provides separate analysis of earnings assimilation for Hispanic immigrants to the US (and finds slower convergence for them compared to other groups); Smith (2006), who discusses separate results for groups such as "Hispanic", "Mexican",

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[8]Immigrants from EEA/EFTA countries can, for example, enter the country freely and stay there for up to three months without a visa; such persons may stay in the country up to 6 months if looking for employment. With an employment offer, such persons are then eligible for a visa for longer periods.

"European" and "Asian" in different parts of his analysis; and Schoeni (1998), who focuses separately on groups of immigrants from Mexico, Central America, Europe, "UK and Canada", "Japan/Korea/China", the Philippines, "Middle East, Other Asia", and "All Others" when analyzing earnings for *female* immigrants.

Aside from documenting that any eventual "integration effects" would appear to apply to many different groups, there are also more specific arguments for why the results on these particular immigrant groups in Norway are of value to a wider audience around the world. Firstly, the different groups to be studied here represent two different types of immigration that are also common in many other industrialized nations. The first type of immigration is one which originally started as labor migration, but which has largely changed over to family reunification or the immigration of tied-movers after immigration restrictions were put into place. Immigrants from Pakistan and Turkey are largely of this kind in Norway.[9] The second type of immigration is largely based on the need for protection, i.e. as a refugee or asylum seeker. Vietnamese boat refugees as well as (UN) refugees from Sri Lanka and asylum seekers from Iran are representatives of this type of immigration to Norway. Furthermore, one finds many of these same groups as large immigrant groups in other Western countries. Turkish 'guest workers' are the largest group of non-Western immigrants to Germany; there are many Pakistani migrants in the UK; the US also took in many refugees from the war in Vietnam. Thus, these results should be of interest for host countries with the same groups.[10]

To summarize, by focusing on poverty among immigrants, this study offers a unique contribution to the literature on the economic assimilation or integration of immigrants as well as insights of relevance for studies of poverty dynamics in countries with significant (poor) immigrant populations. The study also provides a discussion of the relevance of unobserved population heterogeneity when studying immigrant adjustment. Finally, by studying major immigrant groups separately, this study also adheres to what might be termed 'best practice' in the field and can, thus, give a more thorough assessment of the extent to which integration out of poverty is a phenomenon to be found among many different ethnic groups.

# 3   Methods and Specification

## 3.1   Poverty definition

Construction of the poverty line was based on register data supplied by tax authorities as well as the appropriate government welfare and pension agencies and

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[9]There are, however, also some Kurdish asylum seekers among the immigrants from Turkey.

[10]Of course, there is still a question of whether the composition of the population of Pakistani immigrants in Norway is similar to the population of immigrants from that same country in the UK, for example; but results such as those to be presented in this study provide an interesting basis for discussing similarities and/or differences between countries, should significant ones be found.

made available by Statistics Norway for the years 1993 to 2001. The data encompassed the entire resident population of Norway during the period and the entire population was also used for determining the relative poverty line set at 50 percent of median equivalent income after tax based on the traditional OECD equivalence scale.[11] Household income after tax was defined as the sum of labor income, income from self-employment, capital income and all types of cash benefits from the government minus taxes for all members of the household. The total household income after tax was divided by the relevant household equivalence weight and each member of the household was thus assigned the resulting equivalent income after tax. Classification as poor was then determined by comparison of each individual's equivalent income after tax with the poverty line defined at 50 percent of median equivalent income after tax; the robustness of results with respect to slightly different definitions of the poverty line will be discussed briefly later.

## 3.2   Logit Model for the Analysis of Poverty Rates

Within each group by country of origin we wish to model the probability of poverty based on a logistic regression of poverty status which includes a modelling of an unobserved household-specific effect. More specifically, we assume that the probability of poverty for individual $i$ in household $h$ at time $t$ is given by

$$(1) \qquad p_{iht}(\alpha_h) = Pr(y_{iht} = 1) = \frac{exp(\alpha_h + \beta' x_{iht})}{1 + exp(\alpha_h + \beta' x_{iht})}.$$

where subscript $i$, $i = 1, ..., N$, is used to represent individuals, subscript $h$, $h = 1, ..., H$, is used to denote the household (to which $i$ belongs) and the subscript $t$, $t = 1, ...T$, indicates the year of the observation. The variable $y_{iht} = 1$ if individual $i$ in household $h$ is poor in year $t$ and $y_{iht} = 0$ otherwise; $\alpha_h$ represents the household-specific intercept for the household to which individual $i$ belongs; $x_{iht}$ is a vector of covariates for individual $i$ in household $h$ in year $t$; and $\beta$ represents the vector of parameters to be estimated.

The covariates included in $x_{iht}$ will be discussed in greater detail in subsection 3.4 below. The following subsection elaborates on the different methods to be used to capture and model household heterogeneity as represented by $\alpha_h$ above.

## 3.3   Modelling Unobserved Heterogeneity

Different strategies have previously been employed to account for possible heterogeneity in the immigrant population in studies of earnings assimilation; particular attention has been paid to (unobserved) differences in immigrants who arrived at

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[11]The traditional OECD scale assigns weight one to the first adult in a household, 0.7 to the second adult and 0.5 to each child (under the age of 16).

different periods, a phenomenon that is often referred to as changes in "cohort quality", see Borjas (1985, 1995). In lieu of true panel data, i.e. repeated observations of the same individuals over time, a number of studies on immigrant adjustment thus exploit repeated cross-sections or "a synthetic panel" in an attempt to account for the extent to which such changes in cohort quality may bias results based on purely cross-sectional data.[12] While discussion of differences in arrival cohorts may be of interest in and of itself, for the sake of this study we interpret such differences as a potential source of specification bias. From this perspective of this paper, attempts to account for differences in cohort quality are simply *substitutes* for the inability to otherwise account for individual (or household) heterogeneity.

Modelling household-specific heterogeneity, as will be done in this current paper, is thus an alternative and more direct method of trying to establish the extent to which unobserved heterogeneity influences results. Since the data available for this study allow us to model household heterogeneity, we are thus also able to compare such results with estimation results which either do not model any form of unobserved heterogeneity or which simply model cohort heterogeneity.

The ability to include a household-specific intercept helps us study potential bias due to household-specific unobservables, but entails a departure from the somewhat more typical practice of estimating an individual-specific intercept with longitudinal data. The correlation between individuals within the same household (and over time) is thus emphasized over the correlation in observations of the same individual *alone* over time. The households are in end effect treated as clusters encompassing both different individuals at the same time period and the same individuals over time. This is desirable due to the manner in which equivalent income is defined and poverty status determined. If individuals change households due to divorce, marriage or widowhood, for example, then a new household (i.e. a new cluster) is formed or a person joins an existing household. More specifically, the household is defined according to its head, which is the man for couples or couples with adult children in the household and the single parent (person) for single parent (person) households.[13] Note that individuals are still the unit of observation, but we are modelling the correlation of those different observations based on their household membership.

While one might be tempted to suggest a three-level model to account for both the correlation in the individual observations over time as well as the correlation within each household (at a given time and/or over time), this is, in fact, largely

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[12]Examples of studies using such an approach when studying the labor market performance of immigrants include Barth, Bratsberg and Raaum (2004, 2006), Bell (1997), Longva and Raaum (2003) and Schoeni (1998).

[13]Hence, the split-up of a marriage results in the wife forming a new household, while the man remains in the old. When an adult child leaves the parental home, he or she thus forms a new household or turns up in the household of another adult. The birth of children to an already existing couple does not affect the household identifier, but does result in a change in the variable on household type, which is included as a covariate in $x_{iht}$.

unfeasible given the data situation here. The (standard) higher dimensional multi-level model requires a hierarchical framework in which the lower level cluster – the individual in our analysis – is nested in the higher level (super-)cluster – the household. This is, however, not the case when individuals change households over time; we have a situation with crossed random effects. Attempts to accommodate such crossed random effects or non-hierarchical models would be, at best, unduly complicated; with the data for this study, it is largely unfeasible.[14] In modelling household-specific heterogeneity we are thus in a sense toning down the correlation between observations of the same individual over time in order to let the more relevant correlation between the members of a given household (also over time) come to the fore.

We are thus interested in maximizing, with respect to $\beta$ and $\sigma$, a likelihood function of the following general form

$$(2) \quad \prod_{h=1}^{H}\left[\int_{-\infty}^{\infty}\prod_{t=1}^{T}\prod_{i=1}^{N_h}p_{iht}(\alpha_h)^{y_{iht}}(1-p_{iht}(\alpha_h))^{1-y_{iht}}g(\alpha_h;\sigma)d\alpha_h\right],$$

where $N_h$ is the total number of members in household $h$ and $g(\alpha_h;\sigma)$ represents the density function of the distribution of the $\alpha_h$s which can be described by a vector of parameters $\sigma$.

If we assume that the $\alpha_h$s are normally distributed random variables with mean 0 and variance $\sigma^2$, $\alpha_h \sim N(0,\sigma^2)$, then the likelihood function becomes

$$(3) \quad \prod_{h=1}^{H}\left[\int_{-\infty}^{\infty}\prod_{i=1}^{N_h}\prod_{t=1}^{T}p_{iht}(\alpha_h)^{y_{iht}}(1-p_{iht}(\alpha_h))^{1-y_{iht}}\frac{1}{\sqrt{2\pi\sigma^2}}exp\left(\frac{-\alpha_h^2}{2\sigma^2}\right)d\alpha_h\right].$$

If we wish to avoid strict or limiting assumptions on the distribution of the household-specific effect, we can employ a semi-parametric method akin to Heckman and Singer (1984). In this case, we assume that the household-specific intercepts $\alpha_h$ are multinomially distributed in the relevant immigrant population with $M$ support points and associated probabilities $q_m$ , $\sum_{m=1}^{M}q_m = 1$. In other words,

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[14]See Skrondal and Rabe-Hesketh (2004, Chapter 3) for further insight on the issue of crossed random effects. They also discuss some suggestions for dealing with this complication. One possible strategy is employed in the study of low income transition in Cappellari and Jenkins (2004), where a multi-level model with both individual and household effects based on household membership in a given wave of the British Household Panel Survey (BHPS) is employed. Note, however, that the survey methodology of the BHPS itself, i.e. an interviewing strategy based on *household* membership, helps to render that strategy more manageable for that study. In this study, which relies on comprehensive register data, we are confronted with the problems that households not only split up or that new individuals enter existing households, but that individuals from different household come together to form new households. Such complications are very unlikely in a household survey and can, thus, be ignored by Cappellari and Jenkins (2004). They are, however, a major problem with data on the entire population, as in this current study.

there are $M$ different types of households which appear in our data with respective probabilities $q_m$; these parameters are estimated alongside the parameters in $\beta$ vector. The likelihood thus becomes

(4)
$$\prod_{h=1}^{H} \sum_{m=1}^{M} q_m \prod_{t=1}^{T} \prod_{i=1}^{N_h} p_{iht}(\alpha_{hm})^{y_{iht}} (1 - p_{iht}(\alpha_{hm})^{1-y_{iht}})$$

In this paper, we estimate both the model with normally distributed household-specific effects – the likelihood in (3 – and the semi-parametric model represented by the likelihood in expression (4); both of these approaches can be interpreted as "random effects models". In addition, for the sake of comparison estimation is also performed with no account of unobserved heterogeneity, i.e. as a logit model performed on pooled data for all the individuals over time. Since such estimation disregards info on the existence of any relationship between observations over time, it essentially mimics a cross-sectional analysis. Results from that model are presented largely for comparison and in order to illustrate the relevance of accounting for unobserved household heterogeneity. Finally, since the modelling of cohort heterogeneity has been so common in related studies of immigrants' earnings assimilation, estimation is also performed on pooled individual data with *cohort* dummy variables included as a means of capturing cohort heterogeneity. Once again, those results are presented for the sake of comparison and to illustrate the potential relevance modelling household heterogeneity more directly.

## 3.4   Further Specification

Once the poverty line has been established and the poverty status of individuals ascertained, the analysis focuses solely on first generation immigrants between the ages of 18 and 67; so-called second generation immigrants, i.e. children born in Norway to two immigrant parents, as well as first generation immigrant children, are thus excluded. In addition, we analyze only those immigrants that arrived in Norway after the age of 16, i.e. those who had the major part of their upbringing and basic education abroad, as well as only those immigrants in purely immigrant households, i.e. households with no native Norwegian members.

When appropriate, cohort dummy variables are included based on five-year periods of arrival and according to dates relevant for each specific group. The cohort dummies are, in other words, adjusted to reflect when the group first arrived in Norway in substantial numbers.[15] The earliest cohort is always used as the reference group for the dummy variables. Pakistani immigrants, the non-Western immigrant

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[15]Immigrants who arrived more than five years before large numbers of compatriots were also excluded from the analysis. One would expect that such isolated early immigrants were a very select group and, therefore, not representative of their compatriots who arrived in large numbers at a later date. Such observations could thus bias the results because they would be the only representatives with very long durations of residence.

group with the longest history in Norway, are thus assigned cohort dummies for the following arrival dates: up to 1974, 1975-1979, 1980-1984, 1985-1989, 1990-1994 and 1995-1999 with the group arriving up to 1974 used as reference. It should be noted that the cohort dummy variables take on slightly different interpretations depending on the further specification of the model.

Note that the estimated parameters associated with the cohort dummy variables take on slightly different interpretations depending on the approach used to capture unobserved difference. In estimation on pooled observations with cohort dummy variables alone, the parameters can be interpreted as measuring both unobserved individual and/or cohort differences as well as other factors which might affect arrival cohorts differently (and which are otherwise unobservable for the researcher). These might include, for example, economic conditions at the time of arrival, i.e. before the period 1993-2001 when we have direct observations on local labor market conditions. When household heterogeneity is modelled more directly, the parameters associated with the cohort dummy variables only capture factors other than household heterogeneity which might affect cohorts differently.

As an extension of the practice in Barth, Bratsberg and Raaum (2004),[16] we construct a measure of economic conditions in the local labor market by utilizing the regional grouping of municipalities based on labor market and economic ties as described in Statistics Norway (2001). This measure of local labor market conditions is intended to measure period effects due to general economic conditions. A measure based on an intermediate regional grouping is a significant improvement over other measures of local economic conditions because it better reflects the relevant labor market for persons where they actually live and work. Data at the municipal level, i.e. at a lower level, fail to reflect the degree to which individuals travel between municipalities for work and other economic purposes; data on a larger regional or national level would be unable to identify just which arena is truly relevant for the economic activity of individuals at their place of residence (in other words, in the short run). A regional measure of unemployment is calculated by taking the average number of registered unemployed for the relevant year and dividing this by the number of persons in the working-age population (persons age 16-66 years) in the relevant economic region.

The main parameters of interest will be those associated with the duration of residence or the "years since migration" (YSM). Further variables reflect information on age, education[17] and household type. Summary statistics for the pooled

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[16]They used municipal unemployment rates in their study.

[17]Information on the education of many immigrants is often missing in the first few years after their arrival. We can, however, fill in some of these blanks by two means. First, we can make use of information on immigrants who participate in education in Norway and impute education for earlier years based on the education level achieved in Norway. More specifically, if immigrants have taken some type of education during the period we study, we assume that their educational level is one below the level they are taking, i.e. middle school if they are taking high school education, Bachelor's degree if they are enrolled in a Master's program, etc. Second, Statistics

populations of the different ethnic groups for the period 1993-2001 are presented in Table A.1 in the Appendix.

# 4   Results

The parameters estimates for each country are presented in separate tables (A.2-A.6) in the Appendix. In order to help the reader keep track of the different types of estimations, the following notation or short-hand is used to distinguish between different strategies for accounting for household-specific heterogeneity. The term "pooled" is used to refer to results based on estimation when the possible correlation between observations of the same individual or same cohorts or persons in the same households are not taken into account at all, i.e. the time series of the different individuals in households are simply pooled and standard (logistic) regression techniques are applied. Results based on estimation which includes cohort dummy variables for different arrival cohorts (based on five-year intervals, as described above) are referred to as "cohort" in the tables and figures. The random effects model with a household-specific constant term assumed to be normally distributed will often be dubbed "normal". Non-parametric representation of the household-specific heterogeneity is abbreviated as "M" followed by the number of mass points, i.e. "M2" and "M4". Results from the pooled, cohort, normal, M2 and M4 specifications are reported for all of the groups; specifications M3 and M5 were also estimated for the groups, but those results roughly fall into line with the insights from M2 and M4 for all the groups except for immigrants from Turkey. We will discuss the lack of robustness of results for Turkish immigrants in greater detail later.

## 4.1   The Relevance of YSM

As is well-known, one cannot read marginal effects directly from the estimated coefficients in a logistic regression; constant terms are also not readily interpretable with the various strategies meant to account for cohort or household heterogeneity here. Thus, we must find some way of presenting and assessing differences in estimated effects across the different estimation strategies in this paper. This is done in this subsection by focusing on a (hypothetical) individual who starts off his or her stay in Norway with a probability of poverty equal to 0.5 and then illustrating how that probability changes as the duration of residence increases.

The first insight that we would like to point out is that complete disregard for unobserved heterogeneity gives the (arguably) mistaken impression of similarity in the relevance of YSM for these groups. Figure 3 illustrates this by means of

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Norway made explicit efforts to obtain this information for immigrants in 1998. Given that no form of education was registered for the intervening years, the information thus obtained can be used for earlier years.

a comparison between the effects of YSM estimated by pooled estimation and by a random effects model with normally distributed household-specific constant term ("normal"). The estimated effect of YSM in with the cohort, M2 and M4 approaches is also different from the presented effects with pooled estimation; an illustration of the difference between "pooled" and "normal" in Figure 3 is provided simply as a useful example of this general insight. Altogether, Figure 3 suggests that any similarity in the effect of YSM between the groups, if based on results from pooled (or cross-sectional) analysis, may in fact be spurious.

Figure 4 presents the estimated effect of YSM with different approaches separately for each of the immigrant groups; the relationship between YSM and the probability of poverty is found to be statistically significant in all the estimations and for all the groups except for M4 for Turkish immigrants. (We will return to a discussion of that result shortly.) Estimation based on pooled cross-sections seems to greatly underestimate the relevance of YSM for immigrants from Sri Lanka and Vietnam when compared to results which attempt to account for unobserved heterogeneity in some way. The results of the cohort approach lie somewhere between the "pooled" results and the results which model household heterogeneity in a more direct manner, i.e. "normal", "M2" and "M4", for the immigrants from Sri Lanka and Vietnam. Altogether there is very strong evidence that failure to account for the possibility of household heterogeneity leads to an underestimation of results for those groups. Furthermore, the results suggest that simply modelling cohort differences may not be sufficient to eliminate bias from unobserved differences.

With the exception of M4 for Turkish immigrants, the results for the Turkish and Pakistani immigrants are similar. There seems to be evidence that modelling unobserved household heterogeneity leads to a *lesser* effect of YSM on poverty for these groups. The results from the M4 estimation cast some doubts on the relevance of YSM for Turkish immigrants, however. The results from estimation with a M3 and M5 formulations[18] provide further evidence that the significance of YSM is not even robust to the manner in which unobserved household heterogeneity is modelled. Thus, there is good reason to doubt that longer duration of residence results in lower poverty rates for immigrants from Turkey in Norway.

The results for immigrants from Iran are roughly the same regardless of the manner in which unobserved heterogeneity is modelled; the effect of YSM for this group is similar to that found for immigrants from Pakistan and is, thus, less than that found for immigrants from Sri Lanka or Vietnam.

Altogether, these results suggest that estimation with various strategies for modelling unobserved heterogeneity is fraught with difficulty and results seldom appear entirely robust to the choice of modelling strategy. Nonetheless, with the exception of immigrants from Turkey, the relationship between YSM and the probability of poverty is still statistically significant and noticeably large. It should be noted that these results also illustrate that attempts to model unobserved hetero-

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[18]These results are available from the author on request.

geneity provide us with some general insights which are useful for assessing the extent to which results may over- or understimate the relevance of a variable such a YSM.

## 4.2 Further Insights on Unobserved Heterogeneity

When unobserved heterogeneity is modelled by means of constant terms specific for households (or cohorts), the estimated levels of probabilities are no longer readily interpretable as average probabilities for the population as a whole. The distribution of unobserved (latent) household types, as they might be termed, is estimated as part of the model with the M2 and M4 approaches, i.e. the likelihood is maximized with respect to the constant terms $\alpha_m$ and the proportions $q_m$ (as well as the other parameters) so as to best fit the data. These estimated parameters should be interpreted with caution, but they can also provide some interesting insights on how unobserved differences play a role in perceived (observed) differences in poverty rates as exhibited by descriptive statistics, for example.

Table 4 will be used to elaborate on this notion; it presents estimated probabilities of poverty for different latent household types, based on the estimates of the $\alpha_m$s and the $q_m$s from the M4 specification. The probabilities are presented for a reference person defined on the basis of the observed characteristics listed at the bottom of the table. If we look at the second row in the table, i.e. $m = 2$ for Pakistani immigrants, we could say that an estimated 33.9 percent of the Pakistani immigrants belong to a household type for which the specified reference person would have an estimated probability of poverty equal to 0.154 at the start of their stay in Norway, i.e. for YSM=1. This probability (for the reference person in that latent type of household) is estimated to decrease to 0.131 after 10 years in the country.

Based on such an interpretation, Table 4 suggests that substantial portions of all the immigrant groups are more or less never poor, i.e. they have estimated probabilities of poverty near zero from the very onset of their stay in Norway. The estimated proportion of this extreme "low-poverty type" varies within the different ethnic groups. The *majority* of the immigrants from Sri Lanka are actually of this type according to the estimates from the M4 specification. Over 40 percent of the immigrants from Vietnam and Iran are also estimated to be of this type and over one-quarter of the households from Pakistan are estimated to have such extremely low probabilities of poverty.

Similarly, a small, but nonetheless noticeable portion of each ethnic group is estimated to have extremely high probabilities of poverty. The estimated size of this high-poverty household type ranges from just 4 percent among Vietnamese and Iranian immigrants to almost 10 percent for immigrants from Sri Lanka and over 12 percent for immigrants from Pakistan and Turkey. Such differences in the distribution of "extreme" households with very low or very high probabilities of poverty low probabilities will thus greatly influence impressions of results for an

"average" household type.

The distribution of latent types is, however, not a fixed or permanent feature of these ethnic groups. It will, in fact, be affected by such factors as immigration and asylum policy (i.e. access to the host country) as well as the distribution of types in the original (source country) population. New questions thus arise: How do refugees arrive in Norway? Might dissidents be of different types than "boat people"? Are labor migrants negatively or positively selected from the source country? How do policies upon arrival affect the distribution of latent types? Obviously, the scope of these questions is beyond this present paper, but they are representative of the little questions that ultimately need to be addressed when hoping to answer the big questions of immigrant adjustment in the long run.

### 4.3 Some Comments on Robustness

A number of modifications were made in order to assess the robustness of the conclusions. Since the definition of the poverty line itself is somewhat arbitrary, estimations were also performed with a different poverty line, set at 60 percent of median equivalent income with the modified OECD-scale.[19] Generally, the estimated probabilities of poverty were higher, as is consistent with the generally higher poverty rates for such a poverty line[20]; the qualitative results – with respect to the differences between the ethnic groups in terms of the both level and slopes – were, however, very similar. Discrete periods for the duration of residence as well as alternative groupings for arrival cohorts were also analyzed but did not alter the main insights of this analysis.

## 5   Conclusions and Discussion

The results presented here lend credence to the hypothesis that high poverty rates among immigrants in Norway are, at least in part, attributable to high poverty rates for newly arrived immigrants. High poverty rates are by no means a persistent or pervasive feature of the immigrant experience and the probability of poverty does generally decrease with increased duration of residence for the immigrant groups studied here. These results suggest that descriptive statistics which document high poverty rates among immigrants should at least be complemented by additional information on the composition of the immigrant population in terms of duration of residence in order to assess the extent to which high poverty rates are the result of initial adjustment difficulties in the host country. Furthermore, the results here

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[19]This scale entails larger economics of scale within household; the first adult receives weight 1, the second 0.5 and children (under 16) 0.3. Since this scale is much used by studies in the European Union, it is also often referred to as the EU-scale.

[20]Galloway and Mogstad (2006) provide a detailed descriptive account of this difference in the context of Norway.

also discount the hypothesis that falling poverty rates for immigrants in Norway, as documented for example with cross-sectional analysis, are due solely to differences in arrival cohorts or favorable conditions in the labor market.

The immigrant groups studied here do, however, differ greatly in their poverty experience in Norway. The results suggest that immigrants from Sri Lanka or Vietnam experience a rather rapid decline in poverty with increased duration of residence. Results based solely on descriptive statistics or cross-sectional estimation are likely to understate the true extent of this decline for the immigrants in these groups. While there is some reason to doubt the robustness of results for Turkish immigrants, immigrants from Pakistan and Iran also experience declining probabilities of poverty with increased time spent in the country, although that decline is relatively modest when compared to the large decrease in poverty propensity for immigrants from Sri Lanka and Vietnam.

The sources of the differences between and within these groups can be many and we have previously hinted at some of the possibilities. Selection into the host country, i.e. the type of immigration prevalent in a particular group arriving in Norway, would be expected to have an impact on the type of individuals who enter the country. Such a perspective focuses on differences in the groups upon arrival. Differences can, however, also be created: access and eligibility for benefits and other types of assistance can also have an impact on what sort of "types" immigrants eventually become and how well they integrate into the functioning of their new home. Finally, many of the differences may simply be cultural or, in other words, the sum of all the influences and experiences these immigrant group bring with them and let influence their behavior and attitudes, as well as their perceptions of opportunities, in the host country. All these explanations probably play some role in the differences we have uncovered and one is immediately tempted to compare and contrast these groups.

Descriptive analysis in Lie (2004) as well as Østby (2004a, 2004b) suggest that different ethnic groups have very different employment rates in Norway; a more recent and detailed regression analysis in Galloway (2006) provides further insight into that issue. The groups that are performing well in terms of poverty are, in fact, the same ones with high employment rates for *both women and men*. While there are notable differences between immigrant men in the groups studied here, the vast majority of the men from these groups do eventually integrate into the labor market in Norway. The women from these groups, however, adjust quite differently to the labor market in Norway. Women from Sri Lanka, Vietnam and Iran eventually achieve participation rates similar to their male counterparts; the majority of the women from Pakistan and Turkey remain outside the labor market in Norway.

The insights into welfare effects such as those provided by this study of poverty are important for understanding the adjustment of immigrants in Norway. Without the household perspective offered by such a study we might be tempted to interpret

a decent degree of earnings assimilation for immigrant men as indication that, over time, all is well with immigrants in Norway. Differences in employment propensities might also simply be interpreted as preferences for a division of labor – with paid employment for men and unpaid household production for women – in some of these immigrants groups. However, the knowledge of rather persistently high poverty rates, as revealed for some of the groups in this study, are far more troubling. It suggests that some immigrant groups might nonetheless be failing to keep up with welfare improvements taken for granted in the rest of Norwegian society.

It is interesting to note that it is immigrants from two refugee countries – Sri Lanka and Vietnam – who seem to perform the best in this poverty analysis. That might, however, be simply coincidental; the reasons for their success might not be due to their special treatment as refugees, but, rather, a result of a culture or characteristics they have brought with them. However, such results lend little support to claims that refugees are themselves a sort of poorer 'quality' immigrant; they also suggest that further detailed study of these groups may aid in uncovering what types of integration programs and assistance may be useful in immigrants' adjustment to the host country. Similarly, it is immigrants from the predominantly Muslim countries of Turkey, Pakistan and Iran that seem to fare the worst among the groups studied here, although that does not mean that the roots of the differences lie in religion per se. Rather, cultural differences in perceptions of the role of men and women in these groups may be an important factor to take into account when attempting to foster rapid and successful adjustment to the host country.

Finally, in closing we should also note in particular that the large differences between these immigrant groups suggest that pooling very different ethnic groups can lead to spurious results and misleading conclusions. Where possible, studies of immigrant adjustment should abstain from relying on an implicit assumption that immigrants from different ethnic groups represent suitable counterfactuals for each other. The heterogeneity both observed and unobserved as well as between and among immigrant groups warrant sufficient attention if one wishes to avoid drawing incorrect policy conclusions.

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# Figures

**Figure 1. Number of Immigrants in Norway by Region of Origin, 1970, 1980 and 1986-2007**
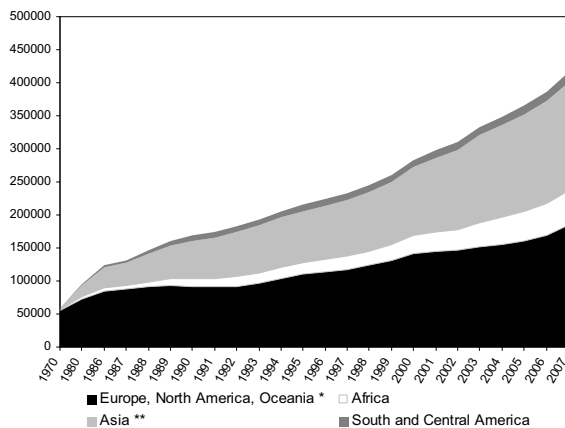


* Immigrants from Turkey are included in the category of immigrants from Asia.
**Immigrants from Australia and New Zealand make up 97 % of the immigrants from Oceania.
*Source*: Statistics Norway

**Table 1. Top Ten Immigrant Groups to Norway by Country of Origin in 1970, 1980, 1990, 2000 and 2007.**

| Rank | 1970 Country | Persons | 1980 Country | Persons | 1990 Country | Persons | 2000 Country | Persons | 2007 Country | Persons |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Denmark | 12306 | Denmark | 14571 | Denmark | 18543 | Sweden | 23240 | Pakistan | 28278 |
| 2 | Sweden | 11198 | Sweden | 11018 | Pakistan | 15488 | Pakistan | 22831 | Sweden | 24527 |
| 3 | USA | 7069 | USA | 10289 | Sweden | 12732 | Denmark | 18863 | Irak | 21418 |
| 4 | Germany | 5295 | UK | 8658 | UK | 11830 | Serbia | 15466 | Somalia | 19656 |
| 5 | UK | 4738 | Pakistan | 6828 | USA | 8999 | Vietnam | 15390 | Denmark | 19090 |
| 6 | Finland | 1993 | Germany | 5891 | Vietnam | 8757 | Bosnia | 12614 | Poland | 18834 |
| 7 | Hungary | 1481 | Finland | 3590 | Germany | 6718 | UK | 11161 | Vietnam | 18783 |
| 8 | Netherlands | 1465 | Turkey | 2384 | Turkey | 6155 | Turkey | 10481 | Bosnia | 15667 |
| 9 | Serbia | 1222 | Netherlands | 2222 | Chile | 5901 | Iran | 10354 | Iran | 14662 |
| 10 | Poland | 1198 | Serbia | 2117 | Iran | 5381 | Sri Lanka | 9826 | Turkey | 14546 |

**Table 2. Poverty Rates by Immigrant Status in Norway. 1993-2001.**

|  | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|
| **No Immigrant Background / Norwegian** | 2,9 | 2,5 | 2,0 | 2,0 | 2,0 | 1,9 | 2,4 | 2,3 | 2,5 |
| **Immigrant** | 21,1 | 21,0 | 16,2 | 15,3 | 14,2 | 13,2 | 14,8 | 15,9 | 16,0 |
| **Children born to two immigrant parents** | 21,7 | 21,3 | 21,6 | 19,9 | 19,2 | 17,9 | 17,1 | 16,4 | 17,9 |

*Source*: Galloway and Mogstad (2006)

**Figure 2.
Percentage Poor in Selected Immigrant
Groups. 1993-2001**
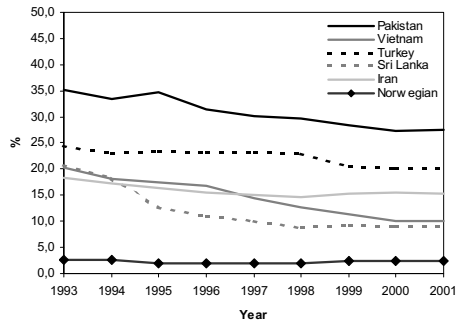


*Source*: Galloway and Mogstad (2006)

**Figure 3. Comparison of Effects of YSM: Pooled vs Random Effects Model**
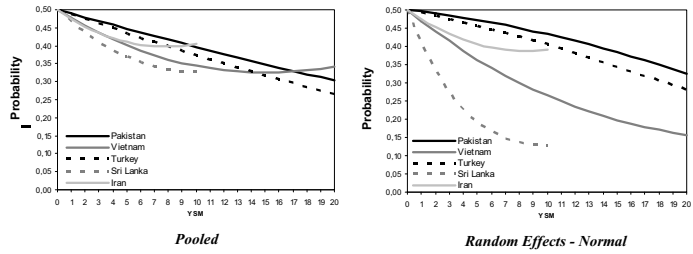


*Pooled*

*Random Effects - Normal*

*Note:* The effects are presented for a (hypothetical) individual with a 0.50 probability of poverty at the start of the stay in Norway. The curves reflect the decrease in probability attributable to ysm and $ysm^2$ only. "Pooled" refers to estimates based on pooled data for 1993-2001. "Random effects" refers to a random effects model where unobserved household heterogeneity is assumed to be normally distributed.

**Figure 4. Comparison of Effects of YSM with Different Models of Unobserved Household Heterogeneity for Selected Immigrant Groups**
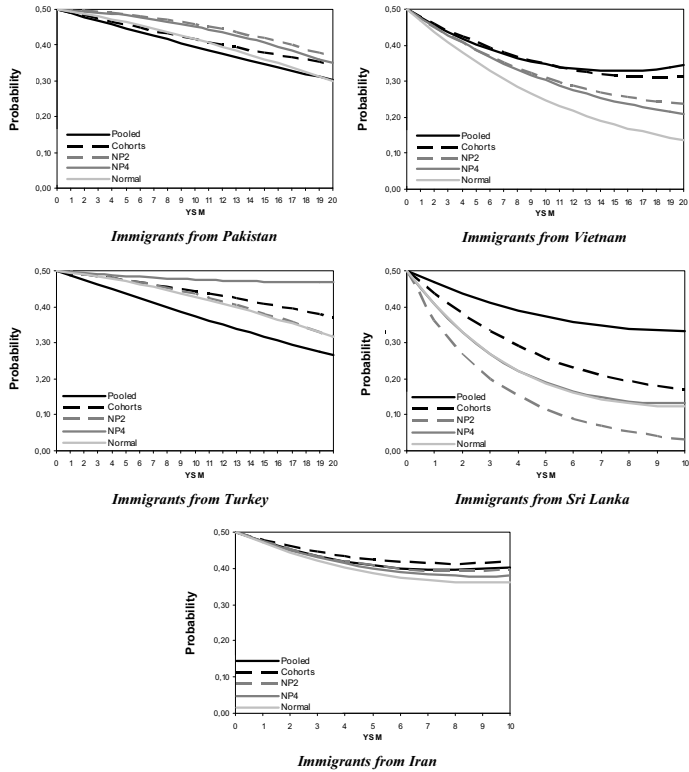


*Immigrants from Pakistan*



*Immigrants from Vietnam*



*Immigrants from Turkey*



*Immigrants from Sri Lanka*



*Immigrants from Iran*

*Note:* The effects are presented for a (hypothetical) individual with a 0.50 probability of poverty at the start of his or her stay in Norway. The curves reflect the decrease in probability attributable to ysm and $ysm^2$ only. "Pooled" refers to estimates based on pooled data for 1993-2001. "Cohorts" with dummy variables for arrival cohorts. "NP2" and "NP4" refers to random effects models with non-parametric estimation of unobserved household heterogeneity. "Normal" refers to a random effects model where unobserved household heterogeneity is assumed to be normally distributed.

**Table 3.**
**The Distribution of Latent Household Types in the M4-Model**

| m | $q_m$ | $\alpha_m$ | YSM=1 | Probability of poverty YSM=5 | YSM=10 |
|---|---|---|---|---|---|
| *Immigrants from Pakistan* | | | | | |
| 1 | 0.277 | -26.428 | 0.000 | 0.000 | 0.000 |
| 2 | 0.339 | -1.710 | 0.155 | 0.150 | 0.145 |
| 3 | 0.259 | -0.017 | 0.497 | 0.489 | 0.479 |
| 4 | 0.125 | 2.248 | 0.929 | 0.927 | 0.923 |
| *Immigrants from Turkey* | | | | | |
| 1 | 0.3472 | -14.000 | 0.000 | 0.000 | 0.000 |
| 2 | 0.3002 | -1.7095 | 0.116 | 0.110 | 0.104 |
| 3 | 0.2241 | -0.2063 | 0.397 | 0.384 | 0.369 |
| 4 | 0.1286 | 1.8672 | 0.828 | 0.820 | 0.810 |
| *Immigrants from Vietnam* | | | | | |
| 1 | 0.436 | -7.401 | 0.000 | 0.000 | 0.000 |
| 2 | 0.161 | 0.731 | 0.452 | 0.355 | 0.249 |
| 3 | 0.364 | -0.845 | 0.157 | 0.111 | 0.070 |
| 4 | 0.039 | 2.679 | 0.824 | 0.758 | 0.653 |
| *Immigrants from Sri Lanka* | | | | | |
| 1 | 0.580 | -1.673 | 0.003 | 0.001 | 0.000 |
| 2 | 0.219 | 1.643 | 0.269 | 0.071 | 0.010 |
| 3 | 0.107 | 3.654 | 0.723 | 0.350 | 0.070 |
| 4 | 0.093 | 7.594 | 0.995 | 0.977 | 0.854 |
| *Immigrants from Iran* | | | | | |
| 1 | 0.419 | -3.555 | 0.014 | 0.009 | 0.005 |
| 2 | 0.394 | -0.523 | 0.268 | 0.189 | 0.118 |
| 3 | 0.144 | 1.276 | 0.692 | 0.590 | 0.451 |
| 4 | 0.042 | 3.692 | 0.964 | 0.945 | 0.908 |

The probabilities of poverty are for a reference person defined as a 40-year old married man with no children living in a region with a local unemployment rate of 2.87%.

# Appendix

**Table A.1**
**Summary Statistics for Pooled Observations by Ethnic Group.**
Mean (standard deviation).

|  | Pakistan | Tyrkia | Vietnam | Sri Lanka | Iran |
|---|---|---|---|---|---|
| Poor | 0.296 | 0.238 | 0.131 | 0.126 | 0.152 |
| Age | 40.3 (10.4) | 37.0 (10.6) | 38.1 (10.6) | 33.9 (7.9) | 36.7 (8.6) |
| YSM | 14.8 (8.3) | 11.6 (7.4) | 10.3 (5.5) | 7.9 (4.0) | 7.4 (3.7) |
| Local unemployment rate | 0.029 (0.010) | 0.029 (0.010) | 0.029 (0.010) | 0.029 (0.010) | 0.028 (0.010) |
| Female | 0.484 | 0.461 | 0.473 | 0.402 | 0.371 |
| Single, no children | 0.132 | 0.176 | 0.250 | 0.304 | 0.394 |
| Single, 1 child | 0.013 | 0.021 | 0.036 | 0.010 | 0.039 |
| Single, 2 or more children | 0.021 | 0.025 | 0.046 | 0.008 | 0.038 |
| Couple, no children | 0.170 | 0.170 | 0.151 | 0.181 | 0.130 |
| Couple, 1 child | 0.152 | 0.186 | 0.148 | 0.209 | 0.150 |
| Couple, 2 children | 0.171 | 0.221 | 0.177 | 0.193 | 0.163 |
| Couple, 3 or more children | 0.340 | 0.199 | 0.191 | 0.095 | 0.084 |
| Secondary education | 0.319 | 0.281 | 0.558 | 0.552 | 0.516 |
| Tertiary education | 0.111 | 0.072 | 0.094 | 0.142 | 0.285 |
| Cohort up to 1974 | 0.232 | 0.120 |  |  |  |
| Cohort 1975-1979 | 0.195 | 0.119 | 0.085 |  |  |
| Cohort 1980-1984 | 0.118 | 0.122 | 0.280 | 0.067 | 0.011 |
| Cohort 1985-1989 | 0.237 | 0.323 | 0.275 | 0.532 | 0.569 |
| Cohort 1990-1994 | 0.131 | 0.201 | 0.315 | 0.276 | 0.284 |
| Cohort 1995-1999 | 0.083 | 0.109 | 0.043 | 0.120 | 0.126 |
| Number of observations | 70 273 | 34 575 | 57 610 | 44 967 | 43 377 |

**Table A.2**
**Estimation Results for Pooled Cross Sections**
(Standard errors in parentheses)

| | Pakistan | | Turkey | | Vietnam | | Sri Lanka | | Iran | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | St.dev | Est. | St.dev | Est. | St.dev | Est. | St.dev | Est. | St.dev |
| Female | -0,1357 | 0,0196 | -0,0549 | 0,0288 | 0,0009 | 0,0272 | 0,4428 | 0,0352 | -0,0533 | 0,0327 |
| Single. no children | 0,7391 | 0,0328 | 0,6918 | 0,0457 | 0,9070 | 0,0471 | 1,4866 | 0,0492 | 0,5803 | 0,0495 |
| Single. 1 child | 0,4198 | 0,0790 | 0,1537 | 0,0988 | 0,3952 | 0,0810 | 1,4892 | 0,1177 | -0,1712 | 0,0964 |
| Single. 2 or more children | 0,5586 | 0,0628 | 0,1146 | 0,0947 | 0,2252 | 0,0800 | 0,9812 | 0,1333 | -0,1570 | 0,0939 |
| Couple. 1 child | -0,0524 | 0,0343 | -0,2294 | 0,0494 | 0,2019 | 0,0555 | -0,3675 | 0,0635 | -0,1494 | 0,0622 |
| Couple. 2 children | 0,2681 | 0,0328 | 0,1532 | 0,0475 | 0,3192 | 0,0540 | -0,1902 | 0,0633 | 0,1854 | 0,0582 |
| Couple. 3 or more children | 1,0209 | 0,0293 | 0,9073 | 0,0462 | 1,1390 | 0,0496 | 0,4528 | 0,0647 | 0,9214 | 0,0596 |
| Tertiary education | -0,6498 | 0,0308 | -0,5207 | 0,0580 | -0,7187 | 0,0565 | -0,7105 | 0,0523 | -1,2962 | 0,0428 |
| Secondary education | -0,4216 | 0,0199 | -0,2951 | 0,0316 | -0,4069 | 0,0284 | -0,5922 | 0,0339 | -0,9848 | 0,0339 |
| Age | -0,0142 | 0,0073 | -0,0547 | 0,0095 | -0,0360 | 0,0085 | -0,0121 | 0,0120 | -0,0403 | 0,0105 |
| Age$^2$ | 0,0005 | 0,0001 | 0,0011 | 0,0001 | 0,0007 | 0,0001 | 0,0008 | 0,0001 | 0,0006 | 0,0001 |
| YSM | -0,0427 | 0,0053 | -0,0526 | 0,0077 | -0,0946 | 0,0093 | -0,1390 | 0,0136 | -0,1094 | 0,0142 |
| YSM | 0,0000 | 0,0002 | 0,0001 | 0,0003 | 0,0031 | 0,0004 | 0,0070 | 0,0008 | 0,0071 | 0,0009 |
| Local unemployment rate | 0,1590 | 0,0092 | 0,0536 | 0,0138 | 0,1628 | 0,0134 | 0,2688 | 0,0157 | 0,1444 | 0,0150 |
| Constant | -1,3218 | 0,1363 | -0,5446 | 0,1730 | -1,8531 | 0,1712 | -3,1863 | 0,2288 | -0,6930 | 0,2081 |

**Table A.3**
**Estimation Results for Pooled Cross Sections with Cohort Dummy Variables**
(Standard errors in parentheses)

| | Pakistan Est. | Pakistan St.dev | Turkey Est. | Turkey St.dev | Vietnam Est. | Vietnam St.dev | Sri Lanka Est. | Sri Lanka St.dev | Iran Est. | Iran St.dev |
|---|---|---|---|---|---|---|---|---|---|---|
| Female | -0.1236 | 0.0201 | -0.0581 | 0.0292 | -0.0103 | 0.0273 | 0.4776 | 0.0352 | -0.0466 | 0.0326 |
| Single. no children | 0.7275 | 0.0329 | 0.7022 | 0.0455 | 0.9353 | 0.0471 | 1.4834 | 0.0490 | 0.6222 | 0.0497 |
| Single. 1 child | 0.4109 | 0.0790 | 0.1477 | 0.0984 | 0.4494 | 0.0805 | 1.5076 | 0.1166 | -0.1460 | 0.0967 |
| Single. 2 or more children | 0.5450 | 0.0629 | 0.1332 | 0.0942 | 0.2683 | 0.0801 | 0.9958 | 0.1329 | -0.1295 | 0.0941 |
| Couple. 1 child | -0.0535 | 0.0343 | -0.2327 | 0.0493 | 0.2040 | 0.0553 | -0.3315 | 0.0634 | -0.1237 | 0.0622 |
| Couple. 2 children | 0.2614 | 0.0330 | 0.1593 | 0.0474 | 0.3423 | 0.0540 | -0.1572 | 0.0633 | 0.2281 | 0.0583 |
| Couple. 3 or more children | 1.0178 | 0.0294 | 0.9182 | 0.0462 | 1.1646 | 0.0496 | 0.4630 | 0.0648 | 0.9434 | 0.0595 |
| Tertiary education | -0.6449 | 0.0308 | -0.5165 | 0.0582 | -0.7282 | 0.0566 | -0.7256 | 0.0524 | -1.3097 | 0.0434 |
| Secondary education | -0.4206 | 0.0199 | -0.2960 | 0.0318 | -0.3955 | 0.0284 | -0.6058 | 0.0340 | -0.9605 | 0.0341 |
| Age | -0.0156 | 0.0073 | -0.0565 | 0.0094 | -0.0349 | 0.0085 | -0.0224 | 0.0120 | -0.0404 | 0.0104 |
| $Age^2$ | 0.0005 | 0.0001 | 0.0011 | 0.0001 | 0.0007 | 0.0001 | 0.0009 | 0.0001 | 0.0006 | 0.0001 |
| YSM | -0.0353 | 0.0086 | -0.0369 | 0.0104 | -0.0892 | 0.0119 | -0.2535 | 0.0165 | -0.0770 | 0.0173 |
| YSM | 0.0002 | 0.0002 | -0.0002 | 0.0003 | 0.0024 | 0.0005 | 0.0105 | 0.0008 | 0.0049 | 0.0011 |
| Local unemployment rate | 0.1814 | 0.0144 | 0.0741 | 0.0170 | 0.1577 | 0.0174 | 0.1742 | 0.0177 | 0.1703 | 0.0183 |
| Cohort 1995-1999 | 0.2142 | 0.1203 | 0.2171 | 0.1070 | 0.0454 | 0.1189 | -0.8134 | 0.0775 | 0.1786 | 0.0669 |
| Cohort 1990-1994 | 0.2289 | 0.0975 | 0.1897 | 0.0839 | -0.3633 | 0.0870 | -0.5233 | 0.0472 | -0.2364 | 0.0404 |
| Cohort 1985-1989 | 0.2503 | 0.0756 | 0.0527 | 0.0680 | -0.2084 | 0.0740 | | | | |
| Cohort 1980-1984 | 0.0195 | 0.0599 | 0.0761 | 0.0600 | -0.2439 | 0.0548 | | | | |
| Cohort 1975-1979 | 0.0910 | 0.0350 | | | | | | | | |
| Constant | -1.6309 | 0.2065 | -0.7903 | 0.2190 | -1.6229 | 0.2164 | -1.8978 | 0.2461 | -0.9096 | 0.2203 |

**Table A.4**
**Estimation Results for Random Effects Model with Normally Distributed Household-Specific Effect**
(Standard errors in parentheses)

| | Pakistan Est. | Pakistan St.dev | Turkey Est. | Turkey St.dev | Vietnam Est. | Vietnam St.dev | Sri Lanka Est. | Sri Lanka St.dev | Iran Est. | Iran St.dev |
|---|---|---|---|---|---|---|---|---|---|---|
| **Female** | -0.1384 | 0.0353 | -0.1189 | 0.0495 | -0.0368 | 0.0399 | 0.3325 | 0.0639 | -0.0795 | 0.0490 |
| **Single. no children** | 0.4784 | 0.0668 | 0.8234 | 0.0942 | 1.2775 | 0.0877 | 1.6975 | 0.1034 | 0.7687 | 0.0871 |
| **Single. 1 child** | 0.7745 | 0.1402 | 0.5215 | 0.1816 | 0.9998 | 0.1322 | 2.3519 | 0.2245 | -0.0946 | 0.1603 |
| **Single. 2 or more children** | 0.9774 | 0.1245 | 0.6284 | 0.1724 | 0.8827 | 0.1336 | 1.6348 | 0.2675 | 0.0797 | 0.1632 |
| **Couple. 1 child** | 0.1279 | 0.0569 | -0.0294 | 0.0833 | 0.3114 | 0.0869 | -0.1621 | 0.1110 | -0.1530 | 0.0980 |
| **Couple. 2 children** | 0.5253 | 0.0599 | 0.4567 | 0.0892 | 0.5779 | 0.0915 | 0.1169 | 0.1178 | 0.2501 | 0.1028 |
| **Couple. 3 or more children** | 1.5108 | 0.0619 | 1.4334 | 0.0977 | 1.4804 | 0.0971 | 1.1294 | 0.1343 | 1.1035 | 0.1215 |
| **Tertiary education** | -0.5692 | 0.0668 | -0.5195 | 0.1339 | -0.6446 | 0.1035 | -1.1844 | 0.1245 | -1.6125 | 0.0884 |
| **Secondary education** | -0.3896 | 0.0405 | -0.3913 | 0.0630 | -0.3935 | 0.0507 | -0.8148 | 0.0771 | -1.1936 | 0.0694 |
| **Age** | -0.0327 | 0.0141 | -0.0665 | 0.0192 | -0.0583 | 0.0148 | -0.1290 | 0.0250 | -0.0382 | 0.0186 |
| **Age$^2$** | 0.0007 | 0.0002 | 0.0013 | 0.0002 | 0.0009 | 0.0002 | 0.0023 | 0.0003 | 0.0006 | 0.0002 |
| **YSM** | -0.0247 | 0.0141 | -0.0192 | 0.0192 | -0.1296 | 0.0186 | -0.3921 | 0.0284 | -0.1261 | 0.0273 |
| **YSM** | -0.0009 | 0.0003 | -0.0010 | 0.0005 | 0.0019 | 0.0007 | 0.0195 | 0.0014 | 0.0069 | 0.0014 |
| **Local unemployment rate** | 0.1190 | 0.0260 | -0.0243 | 0.0340 | 0.0580 | 0.0323 | 0.0872 | 0.0378 | 0.0908 | 0.0344 |
| **Cohort 1995-1999** | -0.2851 | 0.2238 | 0.2373 | 0.2557 | -0.4946 | 0.2499 | -0.6181 | 0.1718 | -0.0006 | 0.1493 |
| **Cohort 1990-1994** | -0.2817 | 0.1810 | 0.0591 | 0.2002 | -0.8874 | 0.1887 | -0.4822 | 0.1071 | -0.2651 | 0.0930 |
| **Cohort 1985-1989** | -0.2228 | 0.1388 | -0.0195 | 0.1608 | -0.5359 | 0.1599 | | | | |
| **Cohort 1980-1984** | -0.2458 | 0.1089 | -0.0407 | 0.1249 | -0.3475 | 0.1245 | | | | |
| **Cohort 1975-1979** | -0.0675 | 0.0625 | | | | | | | | |
| **Constant** | -1.4437 | 0.3845 | -1.3229 | 0.4750 | -1.4994 | 0.4161 | -0.6056 | 0.5150 | -1.2888 | 0.4193 |
| **σ** | 2.4582 | 0.0370 | 2.5064 | 0.0538 | 2.1416 | 0.0441 | 3.0795 | 0.0535 | 2.1266 | 0.0465 |

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**Table A.5**
**Estimation Results for Semi-Parametric Random Effects with Two Mass Points (M2)**
(Standard errors in parentheses)

| | Pakistan | | Turkey | | Vietnam | | Sri Lanka | | Iran | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | St.dev | Est. | St.dev | Est. | St.dev | Est. | St.dev | Est. | St.dev |
| Female | -0.1557 | 0.0291 | -0.0850 | 0.0413 | 0.0136 | 0.0357 | 0.3741 | 0.0531 | -0.0204 | 0.0434 |
| Single. no children | 0.5980 | 0.0482 | 0.7388 | 0.0724 | 1.0644 | 0.0657 | 1.3071 | 0.0778 | 0.6469 | 0.0696 |
| Single. 1 child | 0.7174 | 0.1141 | 0.3022 | 0.1491 | 0.7236 | 0.1152 | 1.8398 | 0.2046 | -0.1114 | 0.1288 |
| Single. 2 or more children | 0.8007 | 0.0960 | 0.1078 | 0.1475 | 0.5136 | 0.1173 | 0.8940 | 0.2102 | -0.0467 | 0.1477 |
| Couple. 1 child | -0.0439 | 0.0471 | -0.2181 | 0.0705 | 0.1910 | 0.0695 | -0.5051 | 0.0875 | -0.1947 | 0.0819 |
| Couple. 2 children | 0.2460 | 0.0463 | 0.0759 | 0.0727 | 0.3108 | 0.0710 | -0.5451 | 0.0915 | 0.1514 | 0.0830 |
| Couple. 3 or more children | 1.0478 | 0.0469 | 0.8703 | 0.0768 | 0.9962 | 0.0715 | -0.0956 | 0.1148 | 0.8241 | 0.1077 |
| Tertiary education | -0.4687 | 0.0325 | -0.3037 | 0.0510 | -0.3959 | 0.0417 | -0.6994 | 0.0629 | -1.0702 | 0.0551 |
| Secondary education | -0.4927 | 0.0481 | -0.3390 | 0.0918 | -0.5757 | 0.0783 | -0.8941 | 0.0860 | -1.3841 | 0.0698 |
| Age/10 | -0.2746 | 0.1138 | -0.6344 | 0.1506 | -0.1691 | 0.1238 | -0.8134 | 0.2078 | -0.2839 | 0.1510 |
| Age$^2$/100 [1] | 0.0667 | 0.0133 | 0.1182 | 0.0183 | 0.0403 | 0.0145 | 0.1520 | 0.0254 | 0.4773 | 0.1798 |
| YSM/10 [2] | -0.0569 | 0.1050 | -0.1361 | 0.1444 | -1.0311 | 0.1561 | -0.3308 | 0.0249 | -1.0753 | 0.2189 |
| YSM$^2$/100 [3] | -0.1072 | 0.0293 | -0.1247 | 0.0446 | 0.2257 | 0.0592 | 0.0167 | 0.0012 | 0.6585 | 0.1249 |
| Local unemployment rate | 0.1496 | 0.0176 | 0.0014 | 0.0244 | 0.1388 | 0.0249 | 0.1576 | 0.0330 | 0.1511 | 0.0254 |
| Cohort 1995-1999 | 0.1369 | 0.1341 | 0.0999 | 0.1595 | -0.4239 | 0.1710 | -0.7207 | 0.0843 | 0.0119 | 0.1040 |
| Cohort 1990-1994 | 0.1579 | 0.1089 | 0.0007 | 0.1225 | -0.8308 | 0.1226 | -0.7953 | 0.1371 | -0.3506 | 0.0679 |
| Cohort 1985-1989 | 0.1259 | 0.0850 | -0.1896 | 0.1014 | -0.5715 | 0.1030 | | | | |
| Cohort 1980-1984 | -0.0648 | 0.0737 | -0.0333 | 0.0915 | -0.3453 | 0.0755 | | | | |
| Cohort 1975-1979 | 0.0215 | 0.0471 | | | | | | | | |
| q$_2$ | 0.4047 | 0.0079 | 0.3676 | 0.0107 | 0.7344 | 0.0095 | 0.2968 | 0.0089 | 0.7440 | 0.0094 |
| α$_1$ | -2.7764 | 0.2743 | -1.8902 | 0.3335 | 0.0899 | 0.3173 | -1.8333 | 0.4408 | 0.9180 | 0.3246 |
| α$_2$ | 0.1224 | 0.2727 | 1.1736 | 0.3342 | -2.8560 | 0.3195 | 2.1069 | 0.4440 | -2.0235 | 0.3244 |

[1] Age$^2$/1000 was used for Iran.
[2] YSM was used for Sri Lanka
[3] YSM$^2$ was used for Sri Lanka.

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**Table A.6**
**Estimation Results for Semi-Parametric Random Effects with Four Mass Points (M4)**
(Standard errors in parentheses)

| | Pakistan Est. | Pakistan St.dev | Turkey Est. | Turkey St.dev | Vietnam Est. | Vietnam St.dev | Sri Lanka Est. | Sri Lanka St.dev | Iran Est. | Iran St.dev |
|---|---|---|---|---|---|---|---|---|---|---|
| Female | -0.0586 | 0.0331 | 0.0158 | 0.0462 | 0.0052 | 0.0383 | 0.2605 | 0.0677 | -0.0447 | 0.0483 |
| Single, no children | 0.4387 | 0.0626 | 0.7336 | 0.0892 | 1.1205 | 0.0831 | 1.5917 | 0.1149 | 0.7563 | 0.0862 |
| Single, 1 child | 0.6160 | 0.1362 | 0.4075 | 0.1748 | 0.8212 | 0.1263 | 2.4518 | 0.2569 | -0.0987 | 0.1580 |
| Single, 2 or more children | 0.7375 | 0.1108 | 0.3458 | 0.1589 | 0.6759 | 0.1280 | 1.5563 | 0.2720 | 0.0861 | 0.1566 |
| Couple, 1 child | 0.0656 | 0.0544 | -0.0974 | 0.0798 | 0.2520 | 0.0833 | -0.0698 | 0.1100 | -0.1410 | 0.0963 |
| Couple, 2 children | 0.4187 | 0.0560 | 0.3070 | 0.0845 | 0.4668 | 0.0899 | 0.1138 | 0.1207 | 0.2675 | 0.1005 |
| Couple, 3 or more children | 1.2810 | 0.0562 | 1.0766 | 0.0926 | 1.2851 | 0.0939 | 1.0766 | 0.1261 | 1.1232 | 0.1146 |
| Tertiary education | -0.3475 | 0.0373 | -0.3981 | 0.0598 | -0.4068 | 0.0491 | -0.7554 | 0.0845 | -1.0720 | 0.0710 |
| Secondary education | -0.4551 | 0.0620 | -0.4533 | 0.1256 | -0.6011 | 0.1068 | -1.0957 | 0.1277 | -1.4935 | 0.0871 |
| Age/10 | -0.3683 | 0.1296 | -0.6261 | 0.1627 | -0.5586 | 0.1360 | -1.4486 | 0.2658 | -0.5098 | 0.1768 |
| Age$^2$/100 [1] | 0.0806 | 0.0155 | 0.1111 | 0.0207 | 0.8988 | 0.1643 | 0.2342 | 0.0339 | 0.8507 | 0.2191 |
| YSM/10 [2] | -0.0805 | 0.1144 | -0.1317 | 0.1917 | -0.1010 | 0.0164 | -0.3942 | 0.0291 | -1.1186 | 0.2450 |
| YSM$^2$/100 [3] | -0.1153 | 0.0324 | 0.0338 | 0.0969 | 0.1734 | 0.0650 | 0.0206 | 0.0014 | 0.6275 | 0.1366 |
| Local unemployment rate | 0.1473 | 0.0194 | 0.0735 | 0.0229 | 0.1181 | 0.0265 | 0.0487 | 0.0378 | 0.1108 | 0.0296 |
| Cohort 1995-1999 | -0.1461 | 0.1523 | 0.6128 | 0.1173 | -0.3610 | 0.1927 | -0.4111 | 0.1037 | 0.0752 | 0.1242 |
| Cohort 1990-1994 | -0.2437 | 0.1227 | 0.3151 | 0.1005 | -0.9260 | 0.1405 | -0.5757 | 0.1641 | -0.2538 | 0.0835 |
| Cohort 1985-1989 | -0.2242 | 0.0968 | 0.2350 | 0.0853 | -0.5762 | 0.1268 | | | | |
| Cohort 1980-1984 | -0.2538 | 0.0842 | 0.2029 | 0.0952 | -0.2785 | 0.1098 | | | | |
| Cohort 1975-1979 | -0.0644 | 0.0538 | | | | | | | | |
| $q_2$ | 0.3391 | | 0.3002 | | 0.4357 | | 0.2191 | | 0.4195 | |
| $q_3$ | 0.2590 | | 0.1286 | | 0.0388 | | 0.1071 | | 0.3945 | |
| $q_4$ | 0.1248 | | 0.2241 | | 0.3642 | | 0.0934 | | 0.1443 | |
| $\alpha_1$ | -26.4289 | | -14.0000 | | 0.7315 | | -1.6734 | | 3.6924 | |
| $\alpha_2$ | -1.7100 | | -1.7095 | | -7.4013 | | 1.6427 | | -3.5546 | |
| $\alpha_3$ | -0.0174 | | 1.8672 | | 2.6785 | | 3.6538 | | -0.5233 | |
| $\alpha_4$ | 2.2481 | | -0.2063 | | -0.8450 | | 7.5942 | | 1.2756 | |

[1] Age$^2$/1000 was used for Vietnam and Iran.
[2] YSM was used for Vietnam and Sri Lanka
[3] YSM$^2$ was used for Sri Lanka.

# The Labor Market Integration of Immigrant Men and Women

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## Abstract

Given that the analysis of earnings is fraught with difficulty for groups with a tenuous relationship to the labor market, this study aims to focus more closely on employment probabilities for immigrants. More specifically, the main question is whether or not one can reasonably attribute a rise in employment probabilities with increased time spent in the country to an "integration effect". Such insights are also especially important for assessing the labor market integration of immigrant women. The study is able to exploit a unique data set that includes all the immigrants in Norway for a nine year period 1993-2001; the longitudinal nature of the available data provides opportunities to rule out spurious effects due to unobserved individual heterogeneity and period effects due to general economic conditions in the labor market. Thus, the study is able to better distill the true influence of an integration effect on employment for immigrants.

# 1 Introduction

During the last few decades the vast majority of Western countries have been confronted with a large influx of immigrants from cultures and countries far away. For many of these host countries, large-scale immigration was in and of itself a new phenomenon, but immigration from vastly different cultures represents a challenge to basically all the Western host societies. Much debate – both in politics and research – has focused on the extent to which immigrants participate in the host labor market and contribute to the economic welfare of the host economy. This paper aims to contribute to this discussion by analyzing the pattern of integration into employment for immigrants relative to the amount of time spent in the host country – Norway in this study. It employs several different techniques to rule out the presence of spurious results due to unobserved individual heterogeneity or period effects acting through general economic conditions in labor market. Thus, this paper studies the extent to which rising employment rates for immigrants over time can be attributed to an "integration effect" that manifests itself as an increase in the individual immigrant's probability of employment over the time spent in the country. The underlying (unobservable) mechanisms behind this effect are assumed to be acquisition of relevant human capital, such a language skills and knowledge of the workings of the labor market in the host country. This paper is able to analyze such questions in a more detailed and sophisticated manner than previous studies due to the availability of a unique data set which includes the entire immigrant population of Norway for the period 1993-2001.

Following in the footsteps of Chiswick (1978), a large body of research has focused on the earnings assimilation of immigrants.[1] Such studies have usually related earnings growth to investments in host country specific human capital, such as language acquisition, formal training and on-the-job experience, all of which are assumed to raise the productivity and, hence, the earnings of immigrants during time spent in the country. However, depending on the structures in place in the labor market, investments in human capital may not express themselves solely through changes in earnings; acquisition of basic human capital, such as relevant language skills and knowledge of the workings of the labor market, may also be a necessary pre-requisite for immigrants to even gain access to employment. Similarly, alternative sources of income, such as social assistance or generous unemployment insurance, can raise the reservation wage for immigrants who have low earnings potential (productivity), as one might suspect to be the case particularly at the start of an immigrant's stay in the country. In sum, results on earnings assimilation

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[1]Earnings assimilation has been the focus of many studies from several different countries during the last three decades. A far from exhaustive list includes Borjas (1985, 1995) and Barth, Bratsberg and Raaum (2006) for results from the US; Baker and Benjamin (1994) for Canada; Bell (1997) and Shields and Price (1998) for the United Kingdom; Schmidt (1997) for Germany; Aguilar and Gustafsson (1991) and Gustafsson and Zheng (2006) for Sweden and Hayfron (1998), Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004) for Norway.

may not tell us the whole story about the labor market integration of immigrants, because such studies rarely consider the extent to which immigrants are employed and the pattern with which they enter the labor market over time.

There are, therefore, several reasons one might like to focus more explicitly on employment propensities in order to gain a better understanding of the labor market integration of immigrants. As is well-known from studies of women in the labor market, analysis of earnings for groups with a tenuous relationship to the labor market can be fraught with many difficulties related to selection in the population being studied, i.e. persons with employment and observed earnings. One way to assess the extent of the potential for such selection bias is precisely to analyze employment propensities more directly. Such analysis also provides valuable insights for studies which later attempt to correct for selection bias.

In addition, because such issues of selection into employment almost inevitably taint the analysis of earnings for women in general, it is quite common to consider employment rates for women as a topic in its own right. Along such lines, analysis of employment rates may be the more appropriate one for gaining knowledge of the extent to which immigrant women integrate into employment and participate in the labor market in a manner similar to native women. In fact, compared to the relatively large literature that has emerged on the earnings assimilation of immigrant men, studies of the labor market performance of immigrant women are few and far between. Despite the obvious difficulties in studying female earnings, Long (1980) did analyze the earnings assimilation of immigrant women largely along the same lines as Chiswick (1978); Reimers (1985) also studied (cross-sectional) employment rates for women more directly, with particular emphasis on possible cultural differences for women from different ethnic groups. MacPherson and Steward (1989), Duleep and Sanders (1993) and Baker and Benjamin (1997) all discuss to some extent the possibility of a "household investment model" in which women initially work to subsidize their husbands' investments in human capital in the host country. The evidence for such a situation is, at best, opaque.

Finally, the above discussion has implicitly assumed that some sort of integration into employment does in fact take place for immigrants, i.e. that the probability of employment increases the longer an immigrant has been in the host country. However, we should not assume that this is the case. Any report increases in employment for immigrants with longer duration of evidence – as documented by descriptive statistics or cross-sectional analysis – may simply be related to other factors at play, such as general economic conditions or changes in the composition of the immigrant population.[2] Access to unique longitudinal data makes it possible to shed light on the robustness of the relationship between duration of residence and employment rates in this study. In turn, knowledge of the extent of the ro-

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[2]Changes in 'cohort quality', i.e. the composition of the immigrant population was the focus of the analysis of immigrant earnings Borjas (1985). Barth, Bratsberg and Raaum (2004, 2006) study the relevance of labor market conditions as a means of accounting for period effects in studies of earnings assimilation.

bustness of those results provides further insights on the extent of the relevance of integration into employment both for policy purposes and for further research.

The paper proceeds in the following manner. The next section sets the stage for the main analysis by providing some basic information on immigration to Norway as well as on employment rates for selected immigrant groups in Norway. Section 3 discusses the methods and specifications used for the more detailed analysis of employment probabilities for immigrants. Section 4 presents the main results and discusses the extent to which one can reasonably claim that the employment probabilities of immigrants do indeed rise with increasing time in the host country. Section 5 summarizes and sets the results in relation to other studies and a broader perspective on the labor market adjustment of immigrants.

# 2 Employment among Immigrants to Norway

## 2.1 Immigrants in Norway

Immigration from non-Western countries is a relatively new phenomenon in Norway. Net annual immigration to Norway was, in fact, still more often negative than positive up until about the late 1960s[3], and it was only after substantial positive net immigration persisted for several years that restrictions were placed on immigration in 1975.[4] The moratorium on immigration implemented on 1 February 1975 was intended as an interim measure; in reality those temporary policies actually formulated the main principles of immigration policy still in place today.[5] Those policies allow for immigration to Norway based on three main criteria: the demand for specific skilled labor, family ties and political asylum.

Up until the late 1960s, few immigrants to Norway came from non-Western countries; the largest groups either originated from other Scandinavian or Western countries.[6] Labor migrants from countries such as Pakistan, Turkey and Morocco started arriving in the late 1960s; immigrants from Pakistan and Turkey made up two of the 10 largest groups of immigrants in Norway by 1980. By the year 2000 five of the top ten immigrant groups in Norway were from non-Western countries.

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[3]Statistics Norway's statistical database "Statbank Norway" is the source for the population statistics presented in this subsection. See http://statbank.ssb.no//statistikkbanken/ for details.

[4]Brochmann (2003) provides a historical account and analysis of the events and discussions leading up to the adoption of restrictions on immigration in 1975. She suggests that the policy was a response to union worries *both* about immigrants accepting lower wages and thus undermining the progress made in improving conditions for workers *and* sincere concerns about poor living standards among–and exploitation of–the immigrants themselves.

[5]The restrictions from 1975 were first renewed for several years and then adopted as permanent measures in 1981. A new immigration law was adopted in 1988 and implemented in 1991; this new law was in many ways a formal declaration of ad hoc practices that were established in the wake of the immigration restrictions of 1975, see Brochman (2003).

[6]See Galloway (2008) for further details as well as a figure and table documenting the changes in the composition of immigrants to Norway.

Those five groups, consisting of immigrants from Pakistan, Vietnam, Turkey, Sri Lanka and Iran, will be the main focus of the rest of this paper.

The number of immigrants to Norway has continued to grow dramatically in the new millennium. As of 1 January 2008, immigrants made up 9.7 percent of the population in Norway. Two new groups–refugees from Iraq and Somalia–have taken their place among the largest groups in Norway since 2000; the performance and well-being of those two groups are therefore also of considerable interest for migration experts and policy-makers in Norway. However, given the relatively recent arrival of those groups and the data available for this study, i.e. from 1993-2001, we were unable to include them in this current study.

## 2.2   Definition of Employment Status

The ability to utilize register data on the entire resident population of Norway provides us with unique opportunities in the study of the immigrant population. In fact, proper study of immigrants, and, in particular, non-Western immigrants in Norway would hardly be possible without the use of such data, simply because the immigrant population is both too small and too diverse to be done justice in surveys. Detailed information on hours worked as well as the number of days, weeks or months employed is not available in Norwegian register data. However, the Norwegian pension and social welfare system regularly invokes the use of a construct or parameter that can be useful for the task at hand. This parameter is referred to as the 'basic amount' (BA) and is used to assess an individual's eligibility for a wide variety of social security benefits as well as the amount of benefits he or she can receive based on previous earnings. Broadly speaking, a person receives pension points towards an old-age pension if he or she earns more than 1 BA during the course of a calendar year. The BA is also used in the system for unemployment insurance; in addition to other requirements, a person must have earned more than 1.5 times the BA during the course of the previous calendar year in order to be eligible for any unemployment benefits.[7] Multiples of the BA thus represent administrative benchmarks for determining real and substantial participation in the labor market in a given year. Table 1 provides further information on the BA in relation to other parameters of interest in the Norwegian economy and social welfare system.

In this research, employment definitions based on earnings above both 1 BA and 2 BA were constructed, i.e. a person was classified as participating in the labor market if his or her earnings were more than 1 BA or 2 BA in a given year. The definition of employment status based on the 1 BA cut-off resulted in employment rates that differed little from employment rates published by the Norwegian Labor

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[7]A person is, however, eligible to receive the maximum *duration* of unemployment benefits only if he or she earned more than 2 BA during the previous calendar year. Lesser earnings result in a shorter maximum duration for employment benefits.

Force Survey (LFS), see Table A.1 in the Appendix.[8]

The LFS definition of employment status is determined according to whether or not a person in the LFS answers that he or she was engaged in paid employment of at least one hour's duration during a specified reference week. The definition of employment status in the LFS is, thus, clearly very different from the one we use here. However, both the LFS definition and the one used in this study suffer from advantages and disadvantages, albeit different ones. As an example, a person who only works a couple of weeks during the course(including the LFS reference week) of the year would be defined as employed in the LFS, but would be unlikely to earn enough to be defined as employed based on the BA threshold in the Norwegian social security system (and in this current study.) Alternatively, a person might have earned well about the 1 (or 2) BA threshold in a given calendar year, but might have been temporarily without employment in the reference week for the LFS. Such cases simply illustrate how difficult it can be to define employment status either way. Altogether, however, it is somewhat reassuring that the aggregate employment rates are so similar with the two approaches, i.e. based on a 1 BA threshold and in the LFS.

The main results in this study will, however, be presented based on the 2 BA cut-off. The minimum old-age pension and the poverty line (both for a single person) can be interpreted as indication of the minimum income required to participate in Norwegian society; as Table 2 indicates, both were a little under 2 BA in the period 1993-2001.[9] One could therefore interpret 2 BA as subsistence earnings and this, too, might be of interest if one wishes to acquire insights into the extent to which immigrants are able to fend for themselves in Norway. Altogether, the 2 BA cut-off is a "stricter" definition that more easily rules out cases in which an individual did not have a secure foothold in the labor market and such a stricter definition would seem appropriate for a study such as this one. However, aside from very minor differences in the levels of the probability of employment, the main substantive results of this study were unaffected by the choice of the 1 BA or 2 BA cut-off.

The earnings which will be compared with the BA thresholds for the classification of labor market status are based on tax records and defined as the sum of wages, salary or other income from employment as well as income from self-employment

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[8]Note that Table A.1 reports employment rates for the age group 25-54, because that is one of the age groupings for which LFS statistics are produced. The main results of this study will, however, be based on analysis of the age group 25-64. Descriptive statistics for that age group with the definition of employment status based on the 1 BA and 2 BA cut-offs are given in Table A.2. Table A.3 in the Appendix also indicates of the prevalence of part-time work based on the LFS; part-time employment would explain some of the differences between the rates with 1BA and 2BA.

[9]The BA is adjusted each year by Stortinget (Norwegian parliament). The express purpose of the adjustment is to keep pensions in line with (expected) developments for wages. Roughly speaking, this means that changes in the BA reflects general wage growth in the economy.

over the course of the entire calendar year.[10] For tax reasons a substantial portion of the earnings of self-employed persons may be reported as capital income. If a person is registered with any income from self-employment in the data, capital income is thus also included in earnings. Finally, unemployment benefits are *not* included in the definition of earnings employed in this study; this is done in order to allow for the interpretation of the 2 BA threshold as subsistence earnings from actual employment.[11]

## 2.3 Descriptive Results on the Relationship between YSM and Employment Rates for Immigrants

Figure 1 provides some basic descriptive results on the relationship between years since migration and employment for male immigrants in the five largest non-Western immigrant groups based on the 2 BA definition of employment status. The figure distinguishes between different arrival cohorts to give an impression of the potential for cohort differences in employment rates. Since the main purpose of Figure 2 is to illustrate the relationship between employment and YSM rather than changes in employment rates for different calendar years, the employment rates are based on pooled observations of cohort over the entire 9 year period from 1993 to 2001. As a useful comparison, native (Norwegian) men had employment rates – also based on the 2 BA cut-off – ranging from 84.2 percent in 1993 to 85.9 percent in 2000. Figure 2 presents analogous results for immigrant women; for the sake of comparison, employment rates for Norwegian women rose from 67 percent in 1993 to 72.5 percent in 2001.

Figure 1 and Figure 2 do give the impression that the employment rates of immigrants rise with the time spent in the country. The employment rates for some of the groups also seem to approach rates similar to those for the native Norwegian population. One should, however, note that the period 1993 to 2001 was one with

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[10]All adult residents of Norway were required to file tax returns during the period analyzed in this study (1993-2001). The tax authorities themselves summarize and send out individual tax information to each individual resident of Norway based on the information they have received from employers, banks, other government authorities, etc. The individual taxpayer then has to either check and confirm the information as it is or claim further deductions and/or report any additional income. This also applies to people who have not earned any income in Norway, but are registered as residents or citizens; thus, a person who is registered with no earned income has had to confirm this at some point to the tax authorities.

[11]Unemployment benefits were included in the earnings definition employed in previous studies of the earnings assimilation of immigrants in Norway (Hayfron 1998), Longva and Raaum 2000, and Barth, Bratsberg and Raaum 2004). Thus, the earnings definition used in those studies of earnings assimilation in Norway in a sense exacerbate the problems and shortcomings involved in interpreting studies of earnings assimilation as indicative of the labor market performance of immigrants. More generally, it is debatable whether or not benefits from the system of unemployment insurance should be counted as part of earnings when studying the performance of immigrants in the labor market.

high economic growth and a particularly favorable labor market. Hence, the rise in employment rates might, in fact, be partly or largely due to these general economic improvements. Furthermore, there is evidence of differences in employment rates for different cohorts. Such differences may be related to unobservable differences between the cohorts or may also be related to a more or less favorable labor market upon arrival in Norway. Note, in particular, that the most recent arrivals, i.e. the cohort 1995-1999, appear to have higher employment rates than earlier arrivals at the same duration of residence. This might in part reflect a situation in which it was easier for the 1995-1999 cohort to enter employment, because the labor market was so favorable at the start of their stay. For women, lower employment rates for earlier cohorts might also simply reflect a more general generational difference, i.e. that younger women (most recent arrivals) are more likely to be employed; in other words, the rise in employment rates for women might actually be larger than the figures suggest.

Based solely on descriptive results such as those presented in Figure 1 and Figure 2, it is therefore difficult to conclude that an integration into employment takes place for some of the groups in Norway. It is, in particular, difficult to distinguish between general economic effects and general conditions in the labor market, both during the period of observation and at the time of arrival for the groups. For this reason, we would like to exploit the opportunities available due to the fact that we are actually able to observe these immigrants over several years. The following section thus outlines the methods used to take advantage of the longitudinal nature of the data available.

# 3    Econometric Specification

In this study, the main variable of interest in explaining employment developments for immigrants is the time spent in the country; this is typically referred to as years since migration (YSM). This variable serves as a proxy for potential experience in the host country, whereby such experience is meant to encompass such things as acquiring knowledge of the language and customs of the society as well as insights into relevant structures and workings of the labor market.

When discussing the results, we will often refer to the "effect" of YSM, but it is important to note what we do and do not mean with usage. The very ticking of the clock (time itself) obviously does not have a direct effect, but time is meant to represent and provide a proxy for other underlying *unobservable* mechanisms and factors, which presumably affect employment propensities. In this paper, those underlying mechanisms and factors are assumed to be such things as langauge acquisition and the workings of the host labor market, none of which are easily observable and, hence, often need to be approximated and represented with such observable variables as YSM. However, it can be difficult to distinguish such an effect of YSM from other factors also working over time. Such factors can be

changes in the composition of the immigrant population or general period effects. In discussing an "effect" of YSM we are referring to a rise in employment probabilities that remains once we have attempted to account for other potentially confounding factors.

Employment probabilities are analyzed in this paper with three different methods for exploiting the longitudinal nature of the available data. All three specifications are essentially based on a logistic regression. However, the three specifications employ different methods to account for unobserved heterogeneity in the populations. The first approach does not account for unobserved individual differences directly, but includes cohort dummy variables to account for postulated unobserved compositional differences in the arrival cohorts. This approach thus follows in the general tradition of the arguments presented in Borjas (1985); a similar approach has been used in previous Norwegian studies of earnings assimilation, see Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004). The second and third approaches do attempt to account for individual heterogeneity more directly, as will be outlined in greater detail in the following subsection. Finally, period effects are assumed to work through the labor market and are accounted for by means of a measure of local labor market conditions, as will be described in greater detail below.[12]

## 3.1 Model for the Analysis of Employment Probabilities

We assume that there is some latent process $y_{it}^*$ determining employment status for individual $i, i = 1, 2, ... N$, at time $t, t = 1, 2, ..., T$, and related to observed characteristics $x_{it}$ such that

$$(1) \qquad y_{it}^* = \alpha_i + \beta' x_{it} + \epsilon_{it} = \beta' x_{it} + v_{it},$$

where $\alpha_i$ represents the individual-specific intercept for the individual $i$; $x_{it}$ is a vector of covariates for individual $i$ in year $t$; and $\beta$ represents the vector of parameters to be estimated. Furthermore, we can define a combined error term $v_{it} = \alpha_i + \epsilon_{it}$ and and indicator variable $y_{it} = 1$ when the individual $i$ is employed at time $t$ and $y_{it} = 0$ otherwise.

If we assume that $\epsilon_{it}$ is i.i.d with an extreme value distribution and that $y_{it} = 1$ if $y_{it}^* > 0$, then we arrive at the logit model for employment status such that probability of employment for individual $i$ at time $t$ is given by

$$(2) \qquad p_{it}(\alpha_i) = Pr(y_{it} = 1) = \frac{exp(\alpha_i + \beta' x_{it})}{1 + exp(\alpha_i + \beta' x_{it})}.$$

The inclusion of $\alpha_i$ in (1) emphasizes the possibility of modelling unobserved *individual* heterogeneity. However, previous studies have generally resorted to the

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[12]Such as strategy, with a different definition of the local labor market, was previously employed as a means by which to disentangle period, YSM and cohort effects in studies of earnings assimilation for immigrants in Barth, Bratsberg and Raaum (2004, 2006).

attempt to account for unobserved differences in the composition of arrival cohorts, i.e. have somehow tried to model *cohort* heterogeneity. In many previous studies of immigrant assimilation, the choice of such an approach was surely in part motivated by data limitations. One may not have been able to observe changes in the ethnic composition of different cohorts directly or one may not have been able to identify repeated observations of the same individual over time. In addition, one might actually be more directly interested in any actual differences between arrival cohorts. However, for the sake of this study, we are primarily interested in the "cohort approach" as a means by which to account for some otherwise unobserved individual differences and, since this approach is so widespread, it does merit some consideration in this study. Given the excellent data available for this study, we are also in the unique position of being able to evaluate the extent to which results with this approach coincide with results based on other more direct methods for modelling unobserved *individual* differences.

If we assume that the $\alpha_i$s, i.e. the individual-specific constant terms, are normally distributed random variables with mean 0 and variance $\sigma^2$, i.e. $\alpha_i \sim N(0, \sigma^2)$, we have a random effects (RE) logit model for which the objective is to maximize the following likelihood with respect to $\beta$ and $\sigma^2$:

$$(3) \qquad \prod_{i=1}^{N} \left[ \int_{-\infty}^{\infty} \prod_{t=1}^{T} p_{it}(\alpha_i)^{y_{it}} (1 - p_{it}(\alpha_i))^{1-y_{it}} \frac{1}{\sqrt{2\pi\sigma^2}} exp \left( \frac{-\alpha_i}{2\sigma^2} \right)^2 d\alpha_i \right] .$$

With this specification we will also report the following measure

$$(4) \qquad \rho = \frac{\sigma^2}{\sigma^2 + \sigma_l^2} = \frac{\sigma^2}{\sigma^2 + \frac{\pi^2}{3}},$$

which gives the proportion of the total variance explained by the individual heterogeneity parameter (variance) $\sigma^2$. With this interpretation, $\sigma_l^2$ represents the variance of the error term of the latent process $\epsilon_{it}$, which with the logit formulation is equal to $\pi^2/3$. Thus, $\rho$ is the correlation between $v_{it}$ and $v_{js}$, i.e. $\rho = corr(v_{it}, v_{is})$, for $s \neq t$.

There are various arguments that speak for and against a RE specification, the most typical disadvantage seen in the assumption of strong exogeneity between the explanatory variables, i.e. the $x_{it}$s here, and individual-specific effect, i.e. the $\alpha_i$ term, implicit in a RE formulation. A consistent fixed-effects (FE) logit based on the conditional logit formulation of Chamberlain (1980) would suggest itself as an alternative to the RE formulation here, because it implies no such assumption of exogeneity. However, as with all FE formulations, the conditional logit (FE) model with individual-specific constant term is only able to estimate parameters associated with time-varying covariates. While many of the variables available for this study, i.e. household type, education, and the number of children, can theoretically change over time, FE estimation with such variables can still

be dubious, difficult to interpret and questionable with respect to generalization to the population as a whole. Thus, only time-varying variables such as YSM and, perhaps, measures of local labor market conditions would seem legitimate candidates for explanatory variables in a FE formulation. Of course, given that YSM is our main variable of interest, one could still argue for the relevance of such a rather degenerate model. Thus, for the sake of robustness arguments here, a conditional logit (FE) model with just YSM and a variable on local labor market conditions (as well as the squares of those variaebls) as covariates is also estimated and the "marginal" effect of YSM in that model is briefly compared with the results from the RE formulation.

In addition, since this analysis – like most others of its kind – is only able to study immigrants that remain in the country, non-random out-migration of immigrants represents a factor which might bias results. However, the form and potential for such problems are slightly different in this study than in other studies that rely exclusively on cross-sectional data or synthetic panels. In the RE formulation, non-random out-migration would entail that an unobserved characteristic relevant to both employment and out-migration, something which ideally would be part of the individual-specific constant term $\alpha_i$, is possibly correlated with observed characteristics, most notably, YSM and cohort dummies. Thus, out-migration might cause a violation of the exogeneity assumption in the RE model as discussed above. However, since the FE model does not entail the same such exogeneity assumption, evidence based on the FE approach helps to argue for the robustness of the results with respect to the potential for non-random out-migration driven by constant unobserved differences among immigrants. More refined arguments can, however, still be levelled against the FE approach; most notably, if non-random out-migration is related to relevant unobservable factors which are *time-varying*, then the FE results would also be biased. However, the methods used in this study help to assess the potential for bias from some forms of non-random out-migration and surely limits the scope of bias for others.

Altogether, therefore, three different estimations were performed based on the "cohort approach" applied to pooled data, a random effect logit (RE) and a fixed effects (FE) logit. For the sake of brevity, these will be referred to as "cohort", "RE" and "FE" in the following.

## 3.2   Further Details on Specification

As briefly mentioned above, we will concentrate on the five largest non-Western immigrant groups in Norway as of 1993: immigrants from Pakistan, Vietnam, Turkey, Sri Lanka and Iran. The data span the period 1993-2001. Separate analyzes were conducted for the men and women in each of the five immigrant groups. Analogous

models were also estimated for a random sample of the native population.[13] The analysis focuses solely on first generation immigrants between the ages of 18 and 67; so-called second generation immigrants, i.e. children born in Norway to two immigrant parents, as well as all first generation immigrant children under the age of 18 are thus excluded. Immigrants who arrived in the country before the age of 16 and are thus likely to have received a good portion of education or formal training in Norway are also excluded from the analysis. Finally, Meng and Gregory (2005) suggest that intermarried immigrants, i.e. those married to natives, perform better than endogamously married immigrants in the labor market of the host country. We therefore exclude such intermarried immigrants from our population for study.

Cohort dummy variables are included based on five-year periods of arrival and according to dates relevant for each specific group. The cohort dummies are, in other words, adjusted to reflect when each individual group first arrived in Norway in substantial numbers. The earliest cohort is always used as the reference group for the dummy variables. Pakistani immigrants, the non-Western immigrant group with the longest history in Norway, are thus assigned cohort dummies for the following arrival dates: up to 1974, 1975-1979, 1980-1984, 1985-1989, 1990-1994 and 1995-1999, with the earliest cohort used as reference for the dummy variables. The estimated parameters associated with such cohort dummy variables represent all factors that might lead to differences between arrival cohorts; these can include such things as conditions in the labor market at the time of arrival or changes in the structure of the labor market in Norway prior to the period of observation.

Barth, Bratsberg and Raaum (2004) illustrate both the relevance and difficulties of incorporating good measures of labor market conditions in studies of earnings assimilation. We provide an improvement on the measure of labor market conditions employed in Barth, Bratsberg and Raaum (2004) by constructing a measure of economic conditions in the local labor market defined by the regional groupings of municipalities described in Statistics Norway (2001). A measure based on such an intermediate regional grouping better reflects the relevant labor market for persons where they actually live and work. Data on the municipal level, i.e. at a lower level, fail to reflect the degree to which individuals travel between municipalities for work and other economic purposes; data on a larger regional or national level would be unable to identify just which arena is truly relevant for the economic activity of individuals (in the short run) at their place of residence. A regional measure of unemployment is calculated by taking the average number of registered unemployed for the relevant year and dividing this by the number of persons in the working-age population (persons age 16-66 years) in the relevant economic region. This constructed measure of local labor market conditions is meant to capture period effects due to general economic conditions which affect the labor market.

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[13]Access to the data for the entire native population – well over 4 million people in each of the 9 years of the analysis – was available, but a random sample was analyzed in order to facilitate the maximization of the likelihood in expression (3) for natives.

The main parameters of interest will be those associated with the duration of residence or the "years since migration" (YSM). Information on age, household type (including the number of children), and education are also included.[14] Summary statistics for the pooled populations over time for women and men by ethnic group are presented in Table A.4 and A.5 in the Appendix. The panels are inherently unbalanced–due to new immigration, emigration and general mortality–and are allowed to remain so in estimation.

# 4    Results

The parameter estimates for the three approaches are presented for each of the ethnic groups plus natives in the Appendix. Due to the inability to read marginal effects directly from the parameter estimates in logistic regressions, this section will focus on presentations of the results which are meant to facilitate the interpretation and understanding of the main insights of the study.

Figure 3 and 4 are meant to provide some insights which allow for comparison to native Norwegians; Figure 3 is for men and Figure 4 for women. The figures use the estimated parameters of the cohort and RE approach to calculate the probability of being employed for a reference person defined as having entered Norway at age 25 as part of the 1990-1994 arrival cohort and with secondary education.[15] Furthermore, the local employment rate is set at 2.87 percent, which was the national annual average for the period under investigation.[16] Increasing time is indicated as increasing age on the x-axis, although the increase in YSM for each year is also reflected in the increase in age on the x-axis. (Note, too, that $YSM = 0$ indicates the first *full* year of residence in Norway.) Changes in probabilities with increasing age thus reflect both age effects and YSM effects for immigrants, but age

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[14]Missing information on many immigrants is imputed based on two different methods. Firstly, if immigrants participate in some form of formal education in Norway, we use that information to assign the individual a relevant (lower) level of education for the years prior to the start of that education. In other words, if we observe that an immigrant has started higher education in 1995, we assume that the person had secondary education in the years 1993 and 1994. Second, Statistics Norway made explicit efforts to acquire missing information from immigrants in 1999 and 2000, see Dalheim (2001) for an overview over such efforts. Particular attention was given to interpreting and correctly classifying levels of education taken in various parts of the world and to provide extensive support and aid in filling out the questionnaire and the response rate ended up at 85 percent. The information obtained by these efforts are thus here assumed to be a reasonable reflection of an immigrant's level of education. In addition, given that no form of education was registered for intervening years, we also use this information to impute education levels for the years prior to 1999.

[15]We are unable to calculate such probabilities for the FE model, since the very nature of the FE model does not allow for estimation of a common constant term, parameters on cohort dummies or individual-specific constant terms. We will, however, discuss FE results later.

[16]For this purpose, a national rate was calculated by the author in the same manner as the local unemployment rate used in the study and the average was taken over the years 1993-2001.

effects only for natives; this representation is in keeping with the manner in which results are often presented in studies of earnings assimilation. The upper panels of the two figures are based on the parameter estimates of the cohort approach, the lower panels use the RE parameters. Note, too, that the RE probabilities are for an "average" or median individual type, i.e. with $\alpha_i = 0$. Results for immigrants from Iran and Sri Lanka are presented only up to YSM equal to 10, because immigrants with longer duration of residence were rare in those populations during the 1990s.

Aside from the fact that the parameter estimates indicate a statistically significant relationship between YSM and the probability of employment, the figures suggest that the effects of YSM are potentially quite large. While these particular figures do not allow us to say what portion of the increase in probabilities is estimated to be attributable to YSM (and not age)–this will be discussed shortly–the probabilities for natives do provide us a reasonable comparison for evaluating the increase in probability due to the combination of age and YSM for immigrants vs simply age for natives. Since a measure of local economic conditions is included when estimating these models, it is no longer quite as easy to disregard them as due to the generally favorable economic conditions in the labor market in the period for which data are available; similarly, cohort dummy variables aid in capturing the effect of general conditions *before* the period we can observe. Altogether, the figures present much more convincing evidence that integration into employment is truly the result of mechanisms working through experience gained in the host country, as approximated by YSM, and not simply a spurious relationship.

However, in order to isolate the importance of YSM in explaining the employment rates of immigrants, we turn to Figures 5 and 6 for men and women, respectively. These figures present the estimated increase in probability for an immigrant who is assumed to start off his or her stay with a 0.5 probability of employment; this presentation is thus meant to isolate and illustrate the effects of the time spent in the country and make comparison between the models possible. The increase in probability illustrated in the figures thus represent the estimated change due to increased YSM alone. Altogether, compared to the "cohort approach", the two approaches which represent individual heterogeneity in a more direct manner, i.e. RE and FE, suggest a more dramatic role for the time spent in the country for these immigrant groups, with the possible exception of immigrant men from Turkey. In other words, they suggest a stronger "integration effect" on employment probabilities.

While Figures 5 and 6 were meant to give a quick overview over the general differences between the methods for all the immigrant groups as a whole, Figures 7 and 8 provide an alternative presentation of the results which allow us to more easily interpret any differences in the effect of YSM with different methods for the individual immigrant groups.

Most of the men and women in these immigrant groups exhibit rather strong "integration effects" regardless of the method used. The differences between the

various approaches runs most clearly along the lines of the cohort approach on the one hand and the FE and RE approach on the other. More specifically, modelling individual heterogeneity rather than simply cohort heterogeneity generates an impression of slightly faster integration.

The estimated results for the Turkish men cast doubt on the applicability of the notion of an integration effect for that particular group. The estimated results are highly sensitive to the manner in which heterogeneity is modelled and therefore cannot provide convincing evidence of integration into employment for Turkish men.[17] Turkish men thus serve as a useful reminder that the intuitively appealing notion of an integration effect for immigrants may not apply to all groups, even if the results presented here in general lend support to the idea that the amount of experience in the host country does raise employment rates.

Most of the differences between the estimated effect of YSM with the RE and FE approaches appear small; analysis of confidence bands around those estimates also suggest that those slight differences are not statistically significant.[18] Although there is some evidence that the RE and FE differences are significant for immigrants from Iran and Turkey, they are still quite small, except in the above-mentioned case of Turkish men. Altogether it appears that the cohort approach does not produce the same results as the methods which model individual heterogeneity when analyzing the pattern of integration into the labor market for immigrants, but the (marginal) results appear somewhat robust to the manner in which individual heterogeneity is modelled. In other words, the relevant distinction is between the cohort approach on the one hand and the RE or FE approach on the other rather than between the RE and FE specifications.

Interestingly, comparison of the figures for the men and the women indicate that the effect of YSM appears to be very similar or even larger for the immigrant women in each of these groups. Of course, this does not mean that more immigrant women than men eventually end up in employment, because immigrant women generally start off with lower lower employment probabilities than immigrant men. However, the rise in employment probabilities attributable to YSM for the women is larger than for the men from that lower starting point. In this sense, the "integration effect" appears to be somewhat larger for the women than the men.

# 5   Conclusions and Discussion

As the findings of this analysis indicate, there does seem to be a sort of integration effect on employment probabilities for most of the immigrant groups studied here.

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[17]In a companion study, Galloway (2008) is also unable to document a clear effect of YSM on the probability of poverty for immigrants. Those ambiguous results can, at least in part, be due to the same ambiguity of results here.

[18]The confidence bands are available from the author on request; they were not included in the figure simply in order to make the structure of the figure clear for the reader.

Low employment rates for some immigrant groups – particularly those with many recent arrivals – are, thus, not necessarily a cause for great concern in the host country or an indication of generally poor labor market performance for immigrants since these results suggest that low employment probabilities are not a permanent feature of the immigrant experience in Norway.

Since this study clearly documents a rise in employment probabilities which is attributable to an increased duration of residence, it calls into question the appropriateness of studies which purport to analyze earnings assimilation based on observations of immigrants in employment. The pattern of entry into employment can bias the results on earnings assimilation and it is only by gaining a better understanding of employment propensities that researchers and policy-makers can assess the extent to which such a bias can be important. The results here suggest that the potential for such bias is quite large. In such a case, analysis of employment probabilities, as done here, also provides another means by which to assess how immigrants are adjusting to the labor market in the host country.

Furthermore, analysis of earnings is likely to be particularly difficult when attempting to study the labor market performance of women. Thus, analysis of employment probabilities provides an alternative perspective by which to gain knowledge of how immigrant women may be adjusting to the host country labor market. While employment probabilities are often low for immigrant women, the results of this study clearly indicate that immigrant women do, also, experience a dramatic rise in employment probabilities, in a other words, an integration effect.

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# Figures and Tables in Text

**Figure 1. Employment Rates for Men in Selected Immigrant Groups by YSM**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*



*Iran*
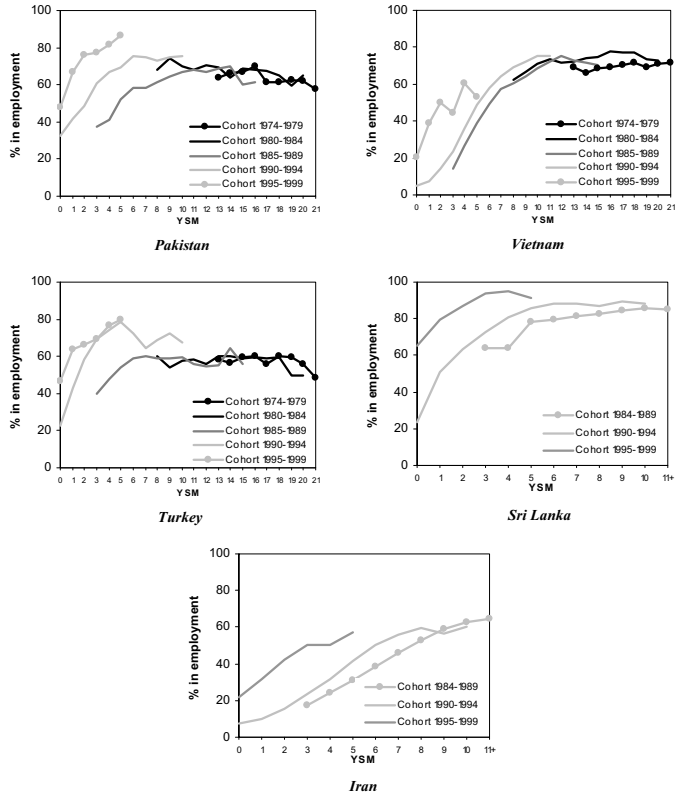
**Figure 2. Employment Rates for Women in Selected Immigrant Groups by YSM**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*



*Iran*
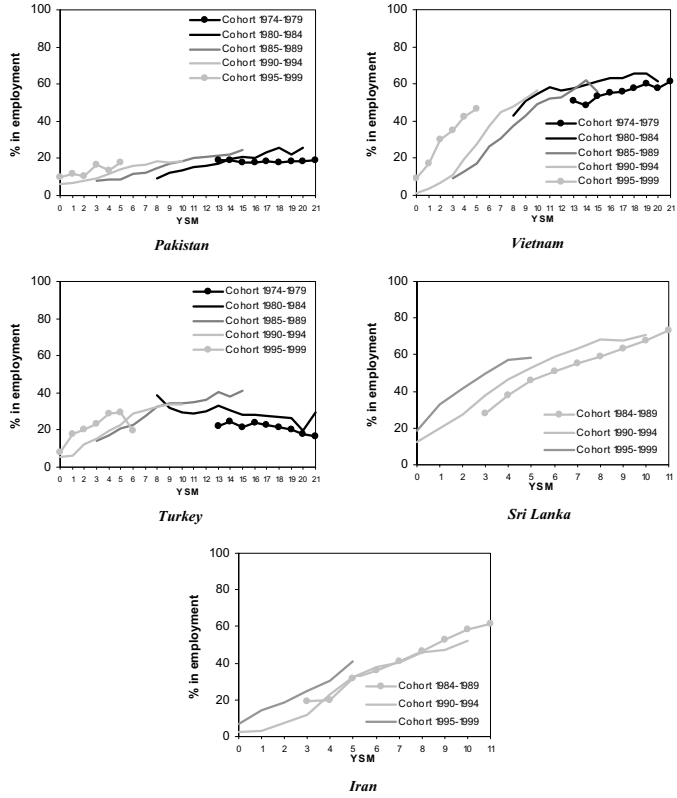
**Figure 3**
**Probability of Employment for Immigrant and Native Men***
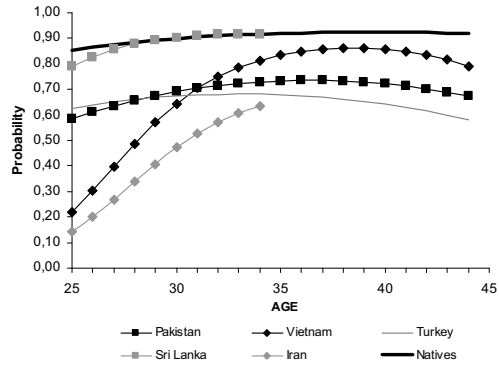


**Cohort Approach**
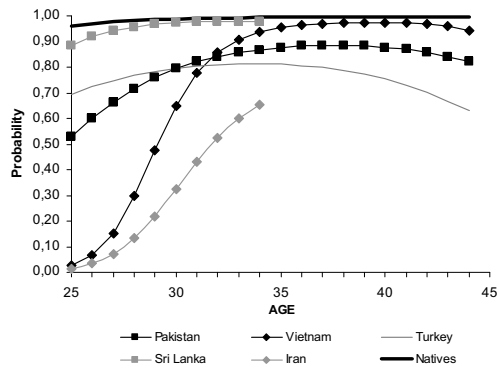


**Random Effects**

\* For a reference person defined as married person with no children; secondary education; local unemployment equal to 2.87%; member of 1990-1994 arrival cohort; $\alpha_i = 0$ for RE.

**Figure 4**
**Probability of Employment for Immigrant and Native Women***
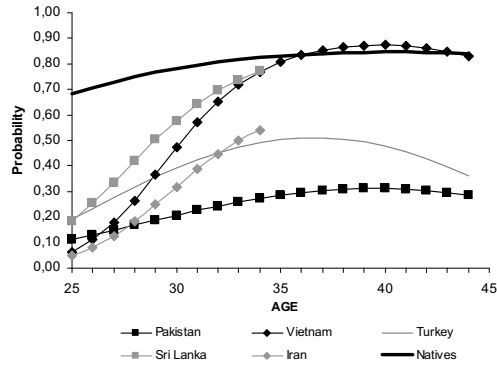


**Cohort Approach**
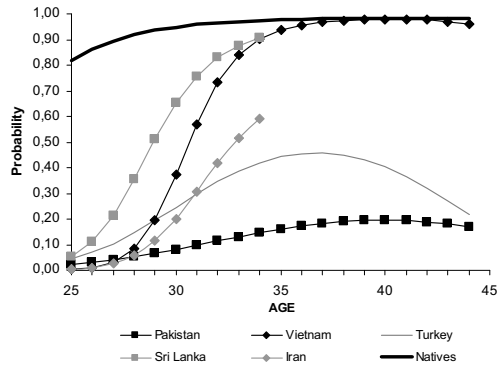


**Random Effects**

* For a reference person defined as married person with no children; secondary education; local unemployment equal to 2.87%; member of 1990-1994 arrival cohort; $\alpha_i = 0$ for RE.

**Figure 5. Comparison of Effect of YSM on Employment for Immigrant Men with Different Approaches**
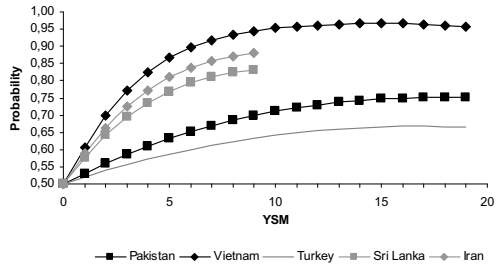


**Cohort Approach**



**RE**



**FE**

97
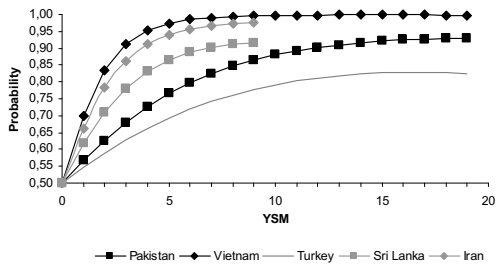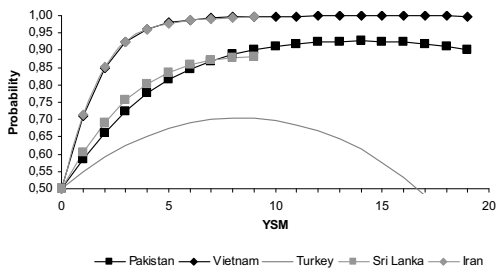
**Figure 6. Comparison of Effect of YSM on Employment for Immigrant Women with Different Approaches**
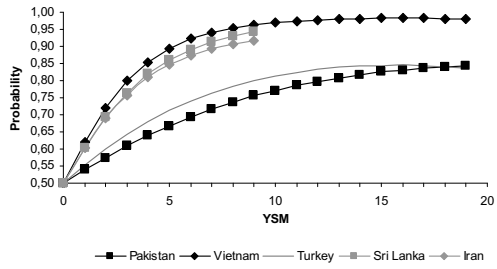


Cohort Approach
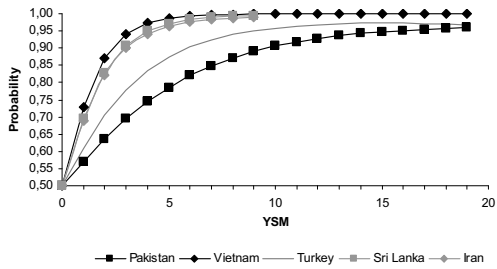


RE
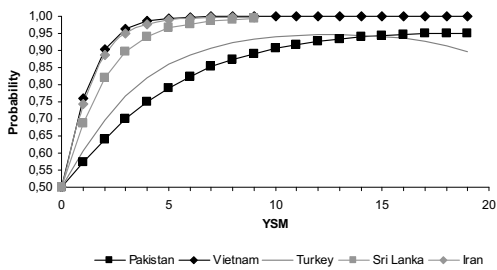
**Figure 7. Comparison of Effect of YSM with Different Approaches by Group for Men.**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*



*Iran*
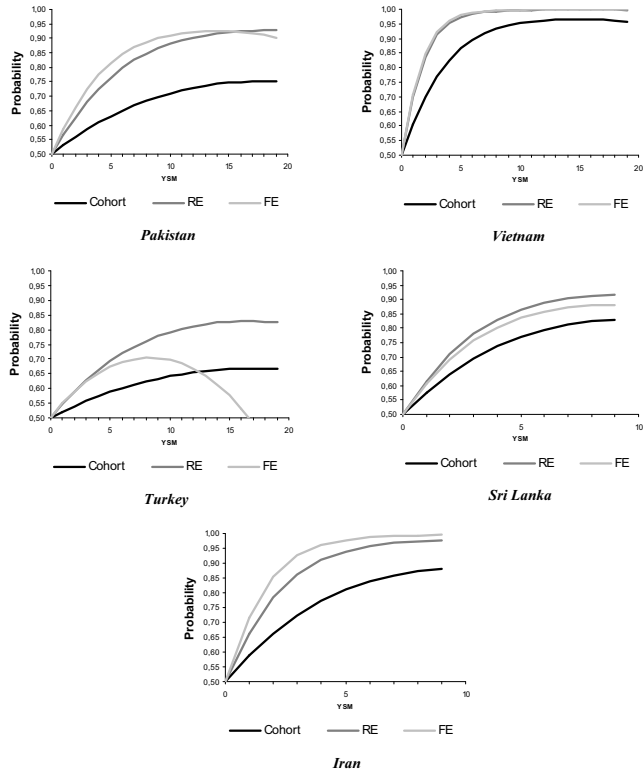
**Figure 8. Comparison of Effect of YSM with Different Approaches by Group for Women.**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*



*Iran*
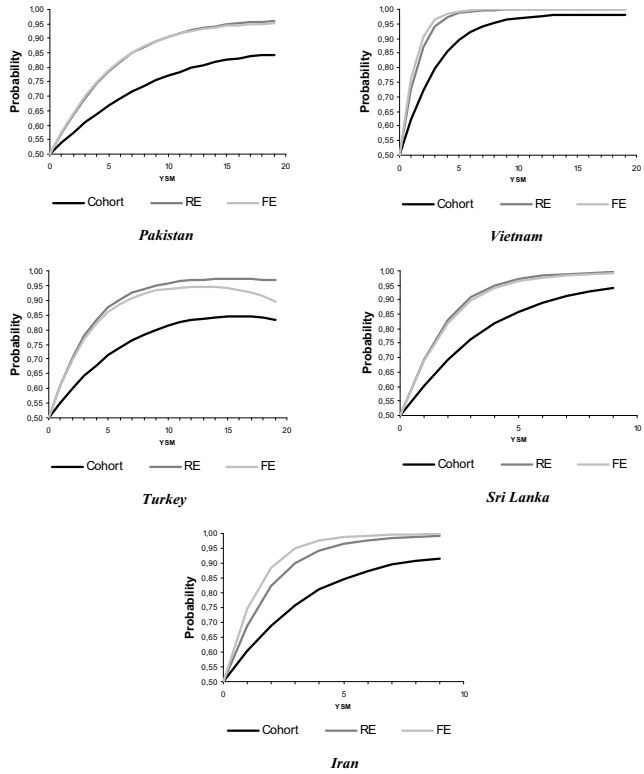
**Table 1.**
**The Basic Amount (BA) in Norwegian Kroner (NOK). 1993-2001**

|  | Basic amount (BA) in NOK | Minimum old-age pension* (MP) in NOK | MP/ BA | Poverty line* in NOK | Poverty line / BA | Average yearly wage in industry (AAWI) | AAWI/ BA |
|---|---|---|---|---|---|---|---|
| **1993** | 37 033 | 71 312 | 1.93 | 68 037 | 1.84 | | |
| **1994** | 37 820 | 71 798 | 1.90 | 68 203 | 1.80 | | |
| **1995** | 38 847 | 72 238 | 1.86 | 68 859 | 1.77 | | |
| **1996** | 40 410 | 74 277 | 1.84 | 71 430 | 1.77 | | |
| **1997** | 42 000 | 75 927 | 1.81 | 73 197 | 1.74 | | |
| **1998** | 44 413 | 83 979 | 1.89 | 77 324 | 1.74 | 252 200 | 5.68 |
| **1999** | 46 423 | 88 459 | 1.91 | 80 284 | 1.73 | 265 900 | 5.73 |
| **2000** | 48 377 | 89 386 | 1.85 | 81 808 | 1.69 | 277 000 | 5.73 |
| **2001** | 50 603 | 90 746 | 1.79 | 83 620 | 1.65 | 289 400 | 5.72 |

* For a single person household.
*Source*: Poverty line and minimum pension: Galloway and Mogstad (2006);  AAWI: Labor Force Survey (LFS), Statistics Norway. The AAWI is only available starting in 1998.

# Appendix

**Table A.1**
**Percentage of Men and Women in Employment from the Labor Force Survey**
**(LFS) and Based on Earnings Thresholds at 1BA and 2BA\*. Age 25-54.**

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | LFS | 1 BA | 2BA | LFS | 1 BA | 2BA |
| **1993** | 85.1 | 87.7 | 84.9 | 76.1 | 77.6 | 71.4 |
| **1994** | 85.9 | 87.9 | 85.3 | 76.5 | 78.0 | 72.1 |
| **1995** | 87.3 | 88.3 | 85.8 | 77.4 | 78.8 | 73.2 |
| **1996** | 88.3 | 88.6 | 86.2 | 78.3 | 79.5 | 74.0 |
| **1997** | 89.5 | 88.8 | 86.6 | 80.2 | 80.0 | 74.7 |
| **1998** | 90.3 | 89.0 | 86.8 | 81.3 | 80.8 | 75.7 |
| **1999** | 89.5 | 88.9 | 86.7 | 81.5 | 81.1 | 76.1 |
| **2000** | 88.8 | 89.3 | 86.3 | 81.5 | 81.1 | 74.7 |
| **2001** | 88.9 | 88.7 | 85.6 | 81.2 | 81.1 | 74.7 |

*Source:* Labour Force Survey (LFS), Statistics Norway and author's calculations.
\* BA refers to the Basic Amount as used in the Norwegian social security system; see the text for details.

**Table A.2**
**Percentage of Men and Women in Employment Based on Earnings**
**Thresholds at 1BA and 2BA\*. Age 25-64.**

| | Men | | Women | |
|---|---|---|---|---|
| | 1 BA | 2BA | 1 BA | 2BA |
| **1993** | 87.1 | 84.2 | 73.9 | 67.0 |
| **1994** | 87.4 | 84.7 | 74.8 | 67.9 |
| **1995** | 88.0 | 85.2 | 75.9 | 69.3 |
| **1996** | 88.1 | 85.2 | 76.5 | 70.3 |
| **1997** | 88.4 | 85.8 | 77.1 | 70.8 |
| **1998** | 88.5 | 85.9 | 77.7 | 71.6 |
| **1999** | 87.9 | 85.3 | 77.6 | 71.7 |
| **2000** | 87.7 | 86.0 | 78.1 | 72.3 |
| **2001** | 87.1 | 84.4 | 78.2 | 72.5 |

*Source:* Author's calculations.
\* BA refers to the Basic Amount as used in the Norwegian social security system; see the text for details.

**Table A.3**
**Distribution of working hours for men and women. 1996-2001. Percent**

| | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | 1-19 hrs | 20-36 hrs | 37+ hrs | All | 1-19 hrs | 20-36 hrs | 37+ hrs | All |
| **1996** | 5.6 | 4.4 | 90.1 | 100.0 | 21.9 | 23.8 | 54.3 | 100.0 |
| **1997** | 5.6 | 4.1 | 90.3 | 100.0 | 20.9 | 24.6 | 54.6 | 100.0 |
| **1998** | 5.6 | 4.1 | 90.3 | 100.0 | 20.5 | 24.3 | 55.2 | 100.0 |
| **1999** | 6.0 | 4.4 | 89.6 | 100.0 | 20.1 | 24.5 | 55.3 | 100.0 |
| **2000** | 6.3 | 4.1 | 89.6 | 100.0 | 19.1 | 23.9 | 57.0 | 100.0 |
| **2001** | 6.5 | 4.6 | 88.9 | 100.0 | 18.9 | 23.9 | 57.2 | 100.0 |

*Source:* Labour Force Survey (LFS), Statistics Norway.

**Table A.4**
**Summary Statistics for Immigrant Men by Ethnic Group**
Mean (standard deviation)

|  | Pakistan | Tyrkia | Vietnam | Sri Lanka | Iran |
|---|---|---|---|---|---|
| Age | 42.1 (10.4) | 38.2 (10.4) | 38.2 (10.2) | 34.3 (7.5) | 36.7 (8.1) |
| YSM | 17.0 (8.7) | 13.0 (7.9) | 11.3 (5.4) | 8.9 (3.8) | 7.8 (3.6) |
| Local unemployment | 0.029 (0.010) | 0.029 (0.010) | 0.029 (0.010) | 0.029 (0.010) | 0.028 (0.010) |
| Female |  |  |  |  |  |
| Single, no children | 0.201 | 0.265 | 0.342 | 0.419 | 0.533 |
| Single, 1 child | 0.008 | 0.010 | 0.014 | 0.006 | 0.014 |
| Single, 2 or more children | 0.008 | 0.008 | 0.009 | 0.003 | 0.009 |
| Couple, no children | 0.162 | 0.159 | 0.138 | 0.154 | 0.111 |
| Couple, 1 child | 0.147 | 0.172 | 0.139 | 0.177 | 0.128 |
| Couple, 2 children | 0.163 | 0.201 | 0.171 | 0.162 | 0.136 |
| Couple, 3 or more children | 0.311 | 0.184 | 0.185 | 0.078 | 0.069 |
| Secondary education | 0.391 | 0.331 | 0.627 | 0.547 | 0.515 |
| Tertiary education | 0.143 | 0.089 | 0.117 | 0.157 | 0.313 |
| Cohort up to 1974 | 0.384 | 0.203 | 0.001 |  |  |
| Cohort 1975-1979 | 0.190 | 0.110 | 0.102 |  |  |
| Cohort 1980-1984 | 0.053 | 0.100 | 0.340 | 0.087 | 0.013 |
| Cohort 1985-1989 | 0.208 | 0.351 | 0.269 | 0.657 | 0.620 |
| Cohort 1990-1994 | 0.091 | 0.136 | 0.268 | 0.200 | 0.269 |
| Cohort 1995-1999 | 0.070 | 0.093 | 0.019 | 0.053 | 0.090 |
| Number of observations | 36262 | 18648 | 30346 | 26899 | 27303 |

Pooled observations within each ethnic group 1993-2001

**Table A.5**
**Summary Statistics for Immigrant Women by Ethnic Group**
Mean (standard deviation).

|  | Pakistan | Tyrkia | Vietnam | Sri Lanka | Iran |
|---|---|---|---|---|---|
| **Age** | 38.3 (10.2) | 35.6 (10.6) | 37.9 (10.9) | 33.4 (8.4) | 36.6 (9.3) |
| **YSM** | 12.4 (7.1) | 9.9 (6.3) | 9.2 (5.3) | 6.4 (4.0) | 6.8 (3.7) |
| **Local unemployment** | 0.029 (0.009) | 0.028 (0.009) | 0.029 (0.010) | 0.028 (0.010) | 0.027 (0.010) |
| **Female** | | | | | |
| **Single, no children** | 0.058 | 0.072 | 0.148 | 0.131 | 0.157 |
| **Single, 1 child** | 0.019 | 0.034 | 0.061 | 0.016 | 0.081 |
| **Single, 2 or more children** | 0.036 | 0.047 | 0.086 | 0.016 | 0.090 |
| **Couple, no children** | 0.178 | 0.183 | 0.166 | 0.221 | 0.163 |
| **Couple, 1 child** | 0.158 | 0.202 | 0.157 | 0.256 | 0.189 |
| **Couple, 2 children** | 0.180 | 0.245 | 0.184 | 0.240 | 0.210 |
| **Couple, 3 or more children** | 0.372 | 0.216 | 0.198 | 0.120 | 0.110 |
| **Secondary education** | 0.244 | 0.224 | 0.481 | 0.558 | 0.517 |
| **Tertiary education** | 0.077 | 0.052 | 0.069 | 0.119 | 0.238 |
| **Cohort up to 1974** | 0.070 | 0.023 | | | |
| **Cohort 1975-1979** | 0.200 | 0.129 | 0.066 | | |
| **Cohort 1980-1984** | 0.187 | 0.147 | 0.213 | 0.038 | 0.008 |
| **Cohort 1985-1989** | 0.268 | 0.291 | 0.280 | 0.347 | 0.481 |
| **Cohort 1990-1994** | 0.173 | 0.276 | 0.367 | 0.388 | 0.310 |
| **Cohort 1995-1999** | 0.096 | 0.128 | 0.070 | 0.220 | 0.187 |
| **Number of observations** | 34011 | 15927 | 27264 | 18068 | 16074 |

Pooled observations within each ethnic group 1993-2001

**Table A.6. Estimation Results for Immigrants from Pakistan**

**Men**

|  | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
|  | Coeff | StdErr | Coeff | Std Err | Coeff | Std Err |
| Single, no children | -0.5644 | 0.0413 | -0.3439 | 0.0882 | | |
| Single, 1 child | -0.1765 | 0.1397 | 0.0576 | 0.2497 | | |
| Single, 2 or more children | -0.1163 | 0.1323 | 0.3073 | 0.2453 | | |
| Couple, 1 child | 0.3384 | 0.0434 | 0.5048 | 0.0831 | | |
| Couple, 2 children | 0.3591 | 0.0431 | 0.4651 | 0.0895 | | |
| Couple, 3 or more children | 0.2359 | 0.0394 | 0.4616 | 0.0943 | | |
| Tertiary Education | 0.5293 | 0.0354 | 1.1556 | 0.1432 | | |
| Secondary Education | 0.3400 | 0.0255 | 0.8065 | 0.1031 | | |
| Age | 0.0796 | 0.0132 | 0.2784 | 0.0380 | | |
| Age squared | -0.0017 | 0.0001 | -0.0050 | 0.0004 | | |
| YSM | 0.1207 | 0.0104 | 0.2560 | 0.0217 | 0.3610 | 0.0254 |
| YSM squared | -0.0038 | 0.0003 | -0.0076 | 0.0006 | -0.0129 | 0.0005 |
| Local unemployment | -0.4775 | 0.0883 | -0.5227 | 0.1558 | -0.1588 | 0.1720 |
| Local unemployment squared | 0.0400 | 0.0144 | 0.0360 | 0.0247 | 0.0200 | 0.0264 |
| Cohort 1995-1999 | 0.1644 | 0.1328 | 0.6848 | 0.3128 | | |
| Cohort 1990-1994 | -0.1318 | 0.1078 | -0.2775 | 0.2761 | | |
| Cohort 1985-1989 | -0.2693 | 0.0814 | -0.7344 | 0.2095 | | |
| Cohort 1980-1984 | -0.1766 | 0.0758 | -0.3916 | 0.2616 | | |
| Cohort 1975-1979 | -0.1480 | 0.0389 | -0.3661 | 0.1488 | | |
| Constant | 0.2876 | 0.3209 | -2.9638 | 0.8566 | | |
| σ | | | 2.9867 | 0.0453 | | |
| ρ | | | 0.7306 | 0.0060 | | |

**Women**

|  | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
|  | Coeff | StdErr | Coeff | StdErr | Coeff | StdErr |
| Single, no children | 0.4942 | 0.0784 | 0.7366 | 0.1551 | | |
| Single, 1 child | -0.0315 | 0.1201 | -0.0818 | 0.2318 | | |
| Single, 2 or more children | -0.5055 | 0.0994 | -0.6432 | 0.1964 | | |
| Couple, 1 child | -0.0399 | 0.0606 | -0.1312 | 0.1080 | | |
| Couple, 2 children | 0.0214 | 0.0573 | -0.0467 | 0.1122 | | |
| Couple, 3 or more children | -0.4420 | 0.0553 | -0.6428 | 0.1198 | | |
| Tertiary Education | 1.2985 | 0.0491 | 2.4425 | 0.1813 | | |
| Secondary Education | 0.7627 | 0.0357 | 1.5885 | 0.1153 | | |
| Age | 0.1408 | 0.0210 | 0.2110 | 0.0483 | | |
| Age squared | -0.0024 | 0.0003 | -0.0038 | 0.0006 | | |
| YSM | 0.1769 | 0.0169 | 0.3139 | 0.0307 | 0.3046 | 0.0317 |
| YSM squared | -0.0037 | 0.0005 | -0.0066 | 0.0009 | -0.0078 | 0.0008 |
| Local unemployment | -0.5446 | 0.1096 | -0.6382 | 0.1865 | -0.5151 | 0.2052 |
| Local unemployment squared | 0.0610 | 0.0187 | 0.0650 | 0.0301 | 0.0620 | 0.0319 |
| Cohort 1995-1999 | 0.3065 | 0.1973 | 0.7543 | 0.4272 | | |
| Cohort 1990-1994 | 0.1415 | 0.1590 | 0.3988 | 0.3608 | | |
| Cohort 1985-1989 | 0.1864 | 0.1278 | 0.3592 | 0.3017 | | |
| Cohort 1980-1984 | 0.0382 | 0.1041 | 0.0471 | 0.2714 | | |
| Cohort 1975-1979 | -0.0482 | 0.0732 | -0.1292 | 0.2368 | | |
| Constant | -4.0102 | 0.4586 | -7.3888 | 1.0397 | | |
| σ | | | 2.7251 | 0.0545 | | |
| ρ | | | 0.6930 | 0.0085 | | |

**Table A.7. Estimation Results for Immigrants from Vietnam**

**Men**

|  | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
|  | Coeff | StdErr | Coeff | Std Err | Coeff | Std Err |
| Single, no children | -0.9402 | 0.0497 | -0.7808 | 0.1006 | | |
| Single, 1 child | -0.6651 | 0.1299 | -0.4577 | 0.2514 | | |
| Single, 2 or more children | -0.4636 | 0.1475 | -0.4526 | 0.2844 | | |
| Couple, 1 child | 0.0192 | 0.0569 | -0.0034 | 0.1075 | | |
| Couple, 2 children | 0.1093 | 0.0561 | 0.0683 | 0.1152 | | |
| Couple, 3 or more children | -0.1289 | 0.0555 | -0.0859 | 0.1265 | | |
| Tertiary Education | 0.9727 | 0.0525 | 1.8860 | 0.1902 | | |
| Secondary Education | 0.4499 | 0.0332 | 0.7960 | 0.1243 | | |
| Age | 0.1031 | 0.0137 | 0.5470 | 0.0387 | | |
| Age squared | -0.0019 | 0.0002 | -0.0077 | 0.0005 | | |
| YSM | 0.4352 | 0.0148 | 0.8619 | 0.0286 | 0.9215 | 0.0329 |
| YSM squared | -0.0152 | 0.0006 | -0.0288 | 0.0010 | -0.0311 | 0.0011 |
| Local unemployment | -0.7841 | 0.0914 | -1.2746 | 0.1602 | -0.8817 | 0.1722 |
| Local unemployment squared | 0.0785 | 0.0146 | 0.1351 | 0.0245 | 0.0987 | 0.0258 |
| Cohort 1995-1999 | 0.3504 | 0.1719 | 1.2629 | 0.4605 | | |
| Cohort 1990-1994 | -0.0835 | 0.1040 | 0.2355 | 0.2834 | | |
| Cohort 1985-1989 | -0.2355 | 0.0831 | -0.2526 | 0.2475 | | |
| Cohort 1980-1984 | -0.0812 | 0.0565 | -0.1136 | 0.2068 | | |
| Constant | -1.3460 | 0.3399 | -10.916 | 0.8920 | | |
| σ | | | 2.9665 | 0.0531 | | |
| ρ | | | 0.7279 | 0.0071 | | |

**Women**

|  | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
|  | Coeff | StdErr | Coeff | StdErr | Coeff | StdErr |
| Single, no children | -0.6649 | 0.0601 | -0.6130 | 0.1427 | | |
| Single, 1 child | -1.4291 | 0.0797 | -1.8319 | 0.1794 | | |
| Single, 2 or more children | -1.9346 | 0.0731 | -2.4529 | 0.1693 | | |
| Couple, 1 child | -0.3251 | 0.0575 | -0.4493 | 0.1222 | | |
| Couple, 2 children | -0.5198 | 0.0564 | -0.7620 | 0.1313 | | |
| Couple, 3 or more children | -1.0394 | 0.0579 | -1.6205 | 0.1470 | | |
| Tertiary Education | 0.8319 | 0.0617 | 2.1094 | 0.2163 | | |
| Secondary Education | 0.3523 | 0.0333 | 0.8363 | 0.1144 | | |
| Age | 0.3522 | 0.0157 | 0.7989 | 0.0432 | | |
| Age squared | -0.0048 | 0.0002 | -0.0108 | 0.0005 | | |
| YSM | 0.4903 | 0.0160 | 1.0035 | 0.0306 | 1.1965 | 0.0362 |
| YSM squared | -0.0164 | 0.0007 | -0.0314 | 0.0012 | -0.0354 | 0.0013 |
| Local unemployment | -0.7390 | 0.0934 | -0.8392 | 0.1706 | 0.0317 | 0.1864 |
| Local unemployment squared | 0.0809 | 0.0155 | 0.1010 | 0.0272 | 0.0156 | 0.0292 |
| Cohort 1995-1999 | 0.4980 | 0.1507 | 2.0572 | 0.3841 | | |
| Cohort 1990-1994 | -0.0108 | 0.1106 | 0.3904 | 0.3005 | | |
| Cohort 1985-1989 | -0.2786 | 0.0929 | -0.4077 | 0.2774 | | |
| Cohort 1980-1984 | -0.0036 | 0.0686 | -0.1501 | 0.2559 | | |
| Constant | -7.2961 | 0.3612 | -18.689 | 0.9550 | | |
| σ | | | 2.9742 | 0.0563 | | |
| ρ | | | 0.7289 | 0.0075 | | |

**Table A.8. Estimation Results for Immigrants from Turkey**

**Men**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | Std Err | Coeff | Std Err |
| Single, no children | -0.2055 | 0.0570 | 0.0088 | 0.1209 | | |
| Single, 1 child | 0.0566 | 0.1773 | 0.7013 | 0.3112 | | |
| Single, 2 or more children | 0.5442 | 0.1977 | 0.9510 | 0.3364 | | |
| Couple, 1 child | 0.3463 | 0.0612 | 0.5029 | 0.1163 | | |
| Couple, 2 children | 0.4285 | 0.0603 | 0.6910 | 0.1248 | | |
| Couple, 3 or more children | 0.2294 | 0.0623 | 0.7745 | 0.1401 | | |
| Tertiary Education | 0.7026 | 0.0607 | 1.5422 | 0.2221 | | |
| Secondary Education | 0.2366 | 0.0369 | 0.7658 | 0.1296 | | |
| Age | 0.0387 | 0.0182 | 0.1032 | 0.0480 | | |
| Age squared | -0.0013 | 0.0002 | -0.0029 | 0.0006 | | |
| YSM | 0.0872 | 0.0134 | 0.1794 | 0.0267 | 0.2080 | 0.0298 |
| YSM squared | -0.0029 | 0.0005 | -0.0068 | 0.0009 | -0.0125 | 0.0009 |
| Local unemployment | -0.2224 | 0.1140 | -0.0340 | 0.1913 | -0.0522 | 0.2069 |
| Local unemployment squared | 0.0187 | 0.0183 | -0.0053 | 0.0300 | 0.0207 | 0.0319 |
| Cohort 1995-1999 | 0.2186 | 0.1668 | 0.1153 | 0.3776 | | |
| Cohort 1990-1994 | 0.1912 | 0.1365 | -0.2416 | 0.3317 | | |
| Cohort 1985-1989 | -0.1332 | 0.1103 | -0.9806 | 0.2663 | | |
| Cohort 1980-1984 | -0.2681 | 0.0957 | -1.0253 | 0.2935 | | |
| Cohort 1975-1979 | 0.0507 | 0.0715 | -0.0839 | 0.2610 | | |
| Constant | 0.3917 | 0.4265 | -0.1834 | 1.0503 | | |
| σ | | | 2.8091 | 0.0625 | | |
| ρ | | | 0.7058 | 0.0092 | | |

**Women**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | StdErr | Coeff | StdErr |
| Single, no children | -0.2055 | 0.0570 | 0.0088 | 0.1209 | | |
| Single, 1 child | 0.0566 | 0.1773 | 0.7013 | 0.3112 | | |
| Single, 2 or more children | 0.5442 | 0.1977 | 0.9510 | 0.3364 | | |
| Couple, 1 child | 0.3463 | 0.0612 | 0.5029 | 0.1163 | | |
| Couple, 2 children | 0.4285 | 0.0603 | 0.6910 | 0.1248 | | |
| Couple, 3 or more children | 0.2294 | 0.0623 | 0.7745 | 0.1401 | | |
| Tertiary Education | 0.7026 | 0.0607 | 1.5422 | 0.2221 | | |
| Secondary Education | 0.2366 | 0.0369 | 0.7658 | 0.1296 | | |
| Age | 0.0387 | 0.0182 | 0.1032 | 0.0480 | | |
| Age squared | -0.0013 | 0.0002 | -0.0029 | 0.0006 | | |
| YSM | 0.0872 | 0.0134 | 0.1794 | 0.0267 | 0.2080 | 0.0298 |
| YSM squared | -0.0029 | 0.0005 | -0.0068 | 0.0009 | -0.0125 | 0.0009 |
| Local unemployment | -0.2224 | 0.1140 | -0.0340 | 0.1913 | -0.0522 | 0.2069 |
| Local unemployment squared | 0.0187 | 0.0183 | -0.0053 | 0.0300 | 0.0207 | 0.0319 |
| Cohort 1995-1999 | 0.2186 | 0.1668 | 0.1153 | 0.3776 | | |
| Cohort 1990-1994 | 0.1912 | 0.1365 | -0.2416 | 0.3317 | | |
| Cohort 1985-1989 | -0.1332 | 0.1103 | -0.9806 | 0.2663 | | |
| Cohort 1980-1984 | -0.2681 | 0.0957 | -1.0253 | 0.2935 | | |
| Cohort 1975-1979 | 0.0507 | 0.0715 | -0.0839 | 0.2610 | | |
| Constant | 0.3917 | 0.4265 | -0.1834 | 1.0503 | | |
| σ | | | 2.8091 | 0.0625 | | |
| ρ | | | 0.7058 | 0.0092 | | |

**Table A.9. Estimation Results for Immigrants from Sri Lanka**

**Men**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | Std Err | Coeff | Std Err |
| Single, no children | -0.9045 | 0.0528 | -0.9865 | 0.0978 | | |
| Single, 1 child | -0.1139 | 0.3519 | -0.1026 | 0.5192 | | |
| Single, 2 or more children | -0.1952 | 0.2819 | -0.8067 | 0.4691 | | |
| Couple, 1 child | 0.4942 | 0.0682 | 0.3824 | 0.1110 | | |
| Couple, 2 children | 0.3766 | 0.0676 | 0.3199 | 0.1235 | | |
| Couple, 3 or more children | 0.4027 | 0.0815 | 0.6147 | 0.1610 | | |
| Tertiary Education | 0.0051 | 0.0528 | 0.6317 | 0.1688 | | |
| Secondary Education | 0.1636 | 0.0406 | 0.4039 | 0.1310 | | |
| Age | -0.0396 | 0.0193 | 0.0287 | 0.0462 | | |
| Age squared | -0.0003 | 0.0002 | -0.0017 | 0.0006 | | |
| YSM | 0.3214 | 0.0195 | 0.5020 | 0.0337 | 0.4543 | 0.0368 |
| YSM squared | -0.0161 | 0.0010 | -0.0262 | 0.0017 | -0.0257 | 0.0018 |
| Local unemployment | -0.2113 | 0.1003 | 0.1136 | 0.1680 | 0.2783 | 0.1823 |
| Local unemployment squared | 0.0019 | 0.0151 | -0.0675 | 0.0248 | -0.0757 | 0.0266 |
| Cohort 1995-1999 | 1.1166 | 0.1182 | 1.5722 | 0.2796 | | |
| Cohort 1990-1994 | 0.2922 | 0.0577 | 0.2791 | 0.1676 | | |
| Constant | 2.6339 | 0.4173 | 1.9161 | 0.9560 | | |
| σ | | | 2.8528 | 0.0597 | | |
| ρ | | | 0.7121 | 0.0086 | | |

**Women**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | StdErr | Coeff | StdErr |
| Single, no children | -0.7021 | 0.0678 | -0.8990 | 0.1469 | | |
| Single, 1 child | -0.4787 | 0.1474 | -0.4573 | 0.2709 | | |
| Single, 2 or more children | -0.6217 | 0.1462 | -1.1215 | 0.2839 | | |
| Couple, 1 child | -0.0260 | 0.0524 | -0.1661 | 0.0981 | | |
| Couple, 2 children | -0.1382 | 0.0560 | -0.4986 | 0.1177 | | |
| Couple, 3 or more children | -0.2709 | 0.0668 | -0.7342 | 0.1495 | | |
| Tertiary Education | 0.3121 | 0.0599 | 0.6111 | 0.1813 | | |
| Secondary Education | 0.1067 | 0.0396 | 0.0550 | 0.1196 | | |
| Age | 0.0638 | 0.0202 | 0.1769 | 0.0521 | | |
| Age squared | -0.0012 | 0.0003 | -0.0031 | 0.0007 | | |
| YSM | 0.4313 | 0.0182 | 0.8492 | 0.0327 | 0.8179 | 0.0336 |
| YSM squared | -0.0136 | 0.0011 | -0.0292 | 0.0018 | -0.0308 | 0.0019 |
| Local unemployment | -0.1918 | 0.0998 | -0.4266 | 0.1736 | -0.4409 | 0.1920 |
| Local unemployment squared | 0.0371 | 0.0161 | 0.0742 | 0.0269 | 0.0868 | 0.0290 |
| Cohort 1995-1999 | 0.7810 | 0.0804 | 1.7603 | 0.1966 | | |
| Cohort 1990-1994 | 0.3209 | 0.0514 | 0.8260 | 0.1568 | | |
| Constant | -2.5070 | 0.4154 | -5.6335 | 1.0266 | | |
| σ | | | 2.5477 | 0.0624 | | |
| ρ | | | 0.6636 | 0.0109 | | |

**Table A.10. Estimation Results for Immigrants from Iran**

**Men**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | Std Err | Coeff | Std Err |
| Single, no children | -0.6141 | 0.0459 | -0.4788 | 0.0815 | | |
| Single, 1 child | -0.5584 | 0.1229 | -0.3369 | 0.2171 | | |
| Single, 2 or more children | -0.5779 | 0.1790 | -0.7121 | 0.3445 | | |
| Couple, 1 child | 0.1448 | 0.0564 | 0.2237 | 0.0965 | | |
| Couple, 2 children | 0.0975 | 0.0567 | 0.2262 | 0.1074 | | |
| Couple, 3 or more children | -0.4605 | 0.0689 | -0.3981 | 0.1435 | | |
| Tertiary Education | 0.8636 | 0.0461 | 1.5884 | 0.1318 | | |
| Secondary Education | 0.4273 | 0.0425 | 0.4512 | 0.1184 | | |
| Age | 0.1756 | 0.0158 | 0.4684 | 0.0382 | | |
| Age squared | -0.0024 | 0.0002 | -0.0061 | 0.0005 | | |
| YSM | 0.3721 | 0.0201 | 0.7089 | 0.0327 | 0.9597 | 0.0404 |
| YSM squared | -0.0165 | 0.0012 | -0.0319 | 0.0019 | -0.0406 | 0.0021 |
| Local unemployment | -0.5163 | 0.0770 | -0.7293 | 0.1278 | -0.2935 | 0.1414 |
| Local unemployment squared | 0.0296 | 0.0126 | 0.0391 | 0.0200 | 0.0050 | 0.0218 |
| Cohort 1995-1999 | 0.6485 | 0.0888 | 1.4166 | 0.1890 | | |
| Cohort 1990-1994 | 0.0473 | 0.0424 | 0.2316 | 0.1175 | | |
| Constant | -3.9243 | 0.3409 | -10.995 | 0.8004 | | |
| σ | | | 2.3882 | 0.0495 | | |
| ρ | | | 0.6342 | 0.0096 | | |

**Women**

| | Cohort | | Random Effects | | Fixed Effects | |
|---|---|---|---|---|---|---|
| | Coeff | StdErr | Coeff | StdErr | Coeff | StdErr |
| Single, no children | -0.2768 | 0.0758 | -0.3085 | 0.1568 | | |
| Single, 1 child | -0.6098 | 0.0881 | -0.7143 | 0.1770 | | |
| Single, 2 or more children | -0.7965 | 0.0885 | -1.1136 | 0.1808 | | |
| Couple, 1 child | -0.3348 | 0.0718 | -0.5217 | 0.1331 | | |
| Couple, 2 children | -0.1603 | 0.0715 | -0.4019 | 0.1454 | | |
| Couple, 3 or more children | -0.4720 | 0.0865 | -0.7372 | 0.1852 | | |
| Tertiary Education | 1.4554 | 0.0676 | 2.4267 | 0.1871 | | |
| Secondary Education | 0.8050 | 0.0615 | 1.0962 | 0.1592 | | |
| Age | 0.3247 | 0.0240 | 0.5710 | 0.0557 | | |
| Age squared | -0.0042 | 0.0003 | -0.0074 | 0.0007 | | |
| YSM | 0.4379 | 0.0288 | 0.8351 | 0.0476 | 1.1146 | 0.0596 |
| YSM squared | -0.0190 | 0.0018 | -0.0350 | 0.0028 | -0.0449 | 0.0032 |
| Local unemployment | -0.5837 | 0.1021 | -0.7124 | 0.1771 | -0.2049 | 0.1994 |
| Local unemployment squared | 0.0541 | 0.0176 | 0.0620 | 0.0285 | 0.0286 | 0.0307 |
| Cohort 1995-1999 | 0.1347 | 0.1112 | 0.6249 | 0.2340 | | |
| Cohort 1990-1994 | -0.1729 | 0.0575 | -0.0856 | 0.1658 | | |
| Constant | -7.8753 | 0.4918 | -14.593 | 1.1382 | | |
| σ | | | 2.5684 | 0.0708 | | |
| ρ | | | 0.6672 | 0.0122 | | |

# Re-Examining the Earnings Assimilation of Immigrants

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**Abstract**

Studies on the earnings assimilation of immigrants have traditionally focused exclusively on immigrants in employment. However, given evidence of immigrants' difficulties in entering and remaining in the labor market, restricting the population to those in employment may entail a selection bias. In addition, the primary variable of interest in such studies is often the duration of residence or the years since migration (YSM), which is interpreted as a proxy for potential labor market experience in the host country. The appropriateness of that proxy will, however, also depend on the extent to which immigrants are able to quickly enter and remain in the labor market. This study thus re-examines evidence on the earnings assimilation of immigrants in light of selection into the labor market and with better information on actual labor market experience in the host country. The findings suggest that a major revision of previous conclusions about the earnings assimilation of immigrants in Norway may be in order.

# 1 Introduction

The pioneering study of Chiswick (1978) on the earnings of immigrant men led to a renewed interest in the topic of immigrant adjustment within the field of economics. Since that time, the topic has burgeoned into a substantial field of study encompassing analysis of immigrants' performance not only in the labor market, but also in terms of participation in social assistance programs and with respect to poverty.[1] Further study into earnings assimilation has led to refinements such as the discussion of 'cohort quality' in Borjas (1985) or the attempt to identify and entangle period effects from measures of the duration of residence and the arrival cohort in Barth, Bratsberg og Raaum (2004). Studies also now span across a wide-range of countries and include Baker and Benjamin (1994) for Canada, Bell (1997) and Shields and Price (1998) for the United Kingdom, Schmidt (1997) for Germany, Aguilar and Gustafsson (1991) and Gustafsson and Zheng (2006) for Sweden and Hayfron (1998), Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004) for Norway. Barth, Bratsberg and Raaum (2006) also present recent results for the US.

The majority of these analyzes of immigrant labor market performance have, however, focused solely on the earnings of employed immigrant men. In a situation in which a large portion of immigrants are unable to immediately enter the labor market and women are increasingly entering employment in many of the host countries studied, such an approach becomes questionable. Selection bias quite clearly poses a threat to the accuracy of the conclusions in such studies. Furthermore, delayed entry into the labor market or a tenuous relationship to employment has implications not just as a selection bias with respect to current observations of earnings. It also undermines the appropriateness of the duration of residence or the years since migration (YSM) as a proxy for the labor market experience of immigrants in the host country, simply because immigrants may have spent considerable amounts of time outside the labor market.

The main purpose of this study is to indicate how the failure to account for employment status and actual labor market experience can affect our conclusions about the earnings and earnings assimilation of immigrants. In light of the evidence to be presented here, a major revision of previous conclusions on the earnings assimilation of non-Western immigrants in Norway may be in order. More specifically, while previous studies suggest that immigrants initially have lower earnings than natives and experience some degree of earnings assimilation as time passes, immigrants' earnings still tend to be lower than natives' after many years in the country. However, results based on slightly different methods and definitions indicate that the immigrants in the groups to be studied here earn roughly the same as – and in some cases even better than – natives with similar levels of human capital.

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[1]See Borjas and Trejo (1991), Baker and Benjamin (1995), Borjas and Hilton (1996) and Hansen and Lofstrom (2003) for studies of social assistance or welfare; Galloway and Aaberge (2005) and Blume et al. (2007) study poverty among immigrants.

In addition, earnings growth for immigrants largely follows the same pattern as for natives. Thus, there appears to be neither a meaningful gap in earnings between immigrants and native nor indication of some sort of added premium to labor market experience for immigrants in Norway. Of course, if (most) immigrants earn roughly the same as comparable natives, then there is no need for such an added return to host country labor market experience for immigrants.

The following section will first present the underlying and, to a certain extent, largely unspoken and unchallenged assumptions prevalent in the previous literature on the earnings assimilation of immigrants. The intention is, perhaps unsurprisingly, to be able to articulate doubts as to the pertinence of those assumptions. The discussions will also be used to motivate and introduce some important conceptual distinctions which will enable us to more easily discuss different aspects of earnings assimilation. Section 2 will also provide the reader with a brief overview over immigration to Norway and previous results on the labor market performance of immigrant there. The section will culminate in the formulation of explicit questions to be addressed empirically in this study. Section 3 will present in detail the methods, data and definitions to be used in the actual empirical analysis; Section 4 will report the empirical results. Much of Section 4 will focus on answering the main question of this study, i.e. how the results with modified methods differ from results based on previous methods. The final section will summarize those results while also interpreting them and highlighting their significance in broader terms.

# 2 Studying Immigrants' Adjustment to the Host Labor Market

## 2.1 Immigrants' Accumulation of Human Capital in the Host Country

Following Chiswick (1978), theories of human capital have generally been invoked when discussing and interpreting the earnings levels and earnings assimilation of immigrants. In order to fix ideas, we can broadly speak of three periods with respect to immigrants' human capital accumulation in the host country. In the first period, immigrants have just crossed the border into the host country and experience a 'destruction' or large depreciation of their human capital due to the non-transferability of their skills and qualifications. In the second period, immigrants are actually adjusting to the host country by learning the language, acquiring additional training and gaining experience in the labor market. Finally, in the third phase, the immigrants are fully integrated in the host country society and labor market.

The degree of depreciation in human capital at the start of an immigrant's stay depends on various special features within the context of each particular host

country, i.e. the extent of the knowledge, familiarity and ties the host labor market has with respect to the home or source country. The actual skills and abilities of the individual immigrant may not have changed dramatically, but the host labor market may not value or be able to assess the appropriateness of those skills, and language difficulties can make it impossible for the immigrants to express and use existing skills and knowledge.[2] The productivity and earnings potential of new arrivals to the host country may therefore be quite low in the eyes of prospective employers; alternatively, employers might view new immigrant employees as a risky investment.

The second period is the actual period of adjustment; immigrants learn the host country language and gain experience and knowledge of the host country labor market. They may engage in further education or training within their previous occupation or acquire skills in a new field more relevant in the host country. Chiswick (1978) also suggests that job turnover may be quite high among immigrants as they test the waters of the labor market and make use of different jobs and types of employment in order to find the correct match for their skills and abilities in the host labor market. Initial employment – with low earnings – may also be used to build up experience interpretable by host country employers; from this perspective, the element of 'risk' in hiring the immigrant will also gradually decline, because the immigrant's experience can be more easily understood and evaluated by employers in the host country. In addition, immigrants may not work full-time while they pursue formal education or training. All in all, a very large number of factors and forces are likely to be at play during this period of adjustment and the period itself may extend over many, many years. These factors would, however, be expected to lead to an increase in the immigrants' earnings potential on the job or in the labor market in general as well as a rise in an immigrants' productivity from the view of current and potential employers. Finally, the presence, form and strength of unions will also have an impact on possibilities for rapid successful entry into the labor market. If unions disregard general economic conditions and focus exclusively on 'insiders', then immigrants may experience initially difficulties in entering the labor market, i.e. becoming an insider. Altogether, therefore, in this phase of adjustment to the host country there are several forces that may cause us to expect larger growth in earnings for immigrants compared to similar natives, especially at the start of their stay in the host country, but, at the same time,

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[2]Within Norway immigrants from other Scandinavian countries probably experience but a slight depreciation in their human capital upon moving to Norway; their native tongue is, with a little bit of effort, understandable for Norwegians and Norwegian employers will generally have good knowledge and respect for the institutions of the other Scandinavian countries. Note too, however, that language is likely to represent a particularly large barrier to the (host) labor market in small countries or language communities such as Norway; Norwegian as a second language is hardly widespread, so few, if any, non-Scandinavian immigrants arrive in Norway with substantial knowledge of the language. Lack of language skills will therefore severely limit the types of jobs available to almost all immigrants at the start of their stay in Norway.

many of these same factors also may make it difficult for immigrants to enter and remain in the labor market.

In the final phase of the immigrant's development of human capital in the host country, adjustment to the labor market and investments in education or training are complete. The immigrant is fully integrated in the labor market; he or she has acquired the skills, training and/or experience necessary to find the correct employment match and the labor market is able to properly assess and value his or her productivity. At this point, growth in earnings for the immigrant might be expected to largely flatten out, although they might also continue to a level above that of natives for a while as immigrants make up for their lower earnings earlier in life.

As this scenario illustrates, there are really three distinct phenomena that characterize the situation which is normally subsumed under the term "earnings assimilation". Firstly, talk of earnings assimilation only makes sense if there is some meaningful difference in earnings for immigrants and natives; studies of earnings assimilation generally aim to explain this difference in relation to immigrants' lack of experience in the host country. Thus, this difference is usually assumed to be more pronounced at the start of the stay in the country. Secondly, as immigrants adjust and adapt to the labor market in the host country, they may experience larger earnings growth than natives; their earnings thus move closer to the level of natives. Finally, one might expect that immigrants' earnings eventually converge to roughly the same level as natives. In order to distinguish between these different aspects of earnings assimilation, we shall refer to a meaningful difference in earnings as an "earnings gap". The term "earnings assimilation" will be reserved for the situation in which earnings growth somehow appears to be greater for immigrants than for natives, i.e. there is reason to suggest that immigrants' earning are becoming more similar to natives'. Finally, it is possible that immigrants experience earnings assimilation, in the sense just described, but that their earnings never quite converge to the same level as natives. Earnings growth for immigrants might, for example, flatten out before earnings reach the same level as natives. A situation in which immigrant and native earnings are roughly the same will be referred to as "earnings parity".

The importance of these distinctions will become more apparent as we start to discuss the main empirical results of this study. The main idea, however, is that changes in the methods used to study earnings assimilation can affect just one or all of these different aspects or influence them to varying degrees. Thus, we will need to be able to distinguish between them in later discussions.

## 2.2 Selection in the Labor Market and the Earnings Assimilation of Immigrants

In the scenario of the previous subsection, the duration of residence in the host country is simply a proxy for human capital investments and developments largely unobservable to the econometrician. Growth in earnings relative to the duration of residence is also often interpreted as a measure of immigrants' success (or failure) to integrate into the labor market of the host country. As hinted at above, the structure and institutions of the labor market in the host country can confound or complicate this picture. The existence of minimum wages and the strength of job protection may make employers unwilling to hire new arrivals with low or uncertain productivity. The extent of unionization and the system of wage bargaining may leave immigrants as 'outsiders' in the labor market or inflate the general level of wages in society to a level above the productivity of (newly arrived) immigrants. If the skills of other of other workers is believed to be of higher quality or more productive, employers may bypass immigrants when hiring. Finally, the availability of social assistance or other forms of income support and welfare programs can raise the reservation wage for immigrants and natives alike. In the special case of refugees or those granted political asylum, the host country may even willingly finance special programs of education, training and income support in order to ease initial difficulties and facilitate integration into society. Such programs might, thus, keep new arrivals out of the labor market during the first few years of residence, but are implemented in the expectation that they generate good returns with respect to labor market performance in the long run. Altogether one might suspect that immigrants are not all immediately able or willing to enter employment in the host country, and it would be quite wrong to base conclusions solely on analyzes of immigrants in employment.

Estimations of earnings assimilation based on *observed* earnings of *employed* immigrants may thus be biased by selection into the labor market and the use of a poor proxy for actual labor market experience. Figure 1 provides an example of how selection into the labor market may affect results on the earnings assimilation of immigrants. The y-axis represents the log of wages or earnings; the x-axis represents the duration of residence in the host country. The darkest gray curve is the true (unobserved) earnings curve for immigrants who immediately enter the labor market upon arrival in the host country. The two curves of a lighter gray color represent those immigrants who enter the labor market at later dates, i.e. only after an increasing number of years in the country. In the figure we assume that the first immigrants to enter the labor market are the "most able" and, hence, achieve higher wages; this difference in ability is assumed to be unobservable for the econometrician. Later labor market entrants have successively lower wages and are, thus, assumed to be "less able". The overlaid black curve is meant to represent what sort of (biased) results might arise if one focused only on immigrants in employment, i.e. used a traditional approach for studying earnings assimilation.

In this particular example, initial earnings would be *overestimated* by a traditional approach, because only the most able are observed with earnings at lower YSM and thus included in the analysis. In addition, a traditional analysis would *underestimate* the assimilation effect, i.e. the increase in wages for longer duration of residence, because the earlier arrivals–those observations with longer durations of residence–would encompass immigrants of successively lesser and lesser ability or earnings potential.

In light of such thoughts on selection into the labor market, one can also distinguish between two different types of experience relevant in the host country. The first type is of a general nature. In other words, it encompasses elementary knowledge and skills in such areas as language and customs as well as understanding of the basic workings of the labor market. One might suppose that the acquisition of such skills is furthered participation in employment, but at a very basic level such knowledge may be a pre-requisite for entry into the labor market and is, thus, first learned elsewhere. This type of human capital accumulation might also encompass formal education which is needed to gain a foothold in the labor market.

The second type of experience is true labor market experience, i.e. specific skills and knowledge acquired on the job and in employment. One suspects that this is the major force behind growth in the earnings of immigrants or natives once they do enter the labor market. Furthermore, selection into the labor market, or forces keeping immigrants out of the labor market, also disrupt the accumulation of human capital specific to labor market experience. Thus, such selection has an effect not only at the time of observation, but also implies that many immigrants have less employment experience than a measure of YSM would indicate. From such a perspective, one can question the appropriateness of YSM as a proxy for labor market experience in the host country.

## 2.3   Immigrants to Norway

Immigration from non-Western countries has a rather short history in Norway; substantial numbers of immigrants from non-Western countries only first appeared in Norway during the early 1970s. Net immigration was actually negative in Norway up until about the late 1960s. Even at the end of the 1980s, over a quarter of the immigrants to Norway were from other Scandinavian countries; over half of the immigrants were from Western or industrialized countries.[3] While there were no restrictions on immigration to Norway up until 1975, immigration from outside the European Economic Area has since been limited to specialist (skills-based) labor immigration, political asylum and family reunification.[4] As of 1 January 2008, immigrants made up 9.7 percent of the population in Norway.

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[3]Statistics on the size and composition of the immigrant population can be found in the database Statbank available on the webpage of Statistics Norway (www.ssb.no).

[4]Brochman (2003) provides a historical account and analysis of the events and discussions related to the more modern history of immigration to Norway, i.e. from the early 1970s.

Previous studies of earnings assimilation among immigrants to Norway in Hayfron (1998), Longva and Raaum (2003) and Barth, Bratsberg and Raaum (2004) suggest that immigrants do start off earnings less than natives in Norway, but that they do in general experience some degree of earnings assimilation. However, while there is indication that immigrants from Nordic and other Western (or OECD) countries may achieve earnings parity with natives, a gap in earnings persists between natives and immigrants from non-Western (non-OECD) countries even after the immigrants have been in the country for many years.

There are many differences between immigrants and natives in terms of employment rates. If one studies several of the largest non-Western ethnic groups in Norway, evidence resoundingly rejects the notion that immigrants immediately enter the labor market. Galloway (2008) studies more directly the patterns of entrance into the labor market for immigrants from Pakistan, Turkey, Vietnam, Sri Lanka and Iran; these immigrants made up the five largest immigrant groups in the early 1990s in Norway. That analysis suggests that there is a significant rise in employment probabilities for immigrants and that the rise is in part attributable to the duration of residence in the host country. In other words, there is an "integration effect" that plays a part in how quickly immigrants gain a foothold in the labor market. Furthermore, that study indicates that unobserved heterogeneity influences the estimated pattern of integration into the labor market. Thus, there is potential for selection bias due to both observables and unobservables in studies of earnings assimilation which fail to account for employment status.

## 2.4 Main Questions for Analysis

The main empirical analysis of this paper is intended to estimate the earnings assimilation of immigrants while incorporating the above-mentioned thoughts and evidence on potential selection into the labor market. This is done both by means of a sample selection model and by introducing a measure of labor market experience. Results based on such an estimation strategy are compared with results from estimation based on a "traditional approach" for studying earnings assimilation. Further details of these methods will be given in the next section.

The main question for this analysis is: Do we reach vastly different conclusions about the earnings of immigrants once we have attempted to model selection into employment and used a better measure of labor market experience? More specifically, we can also ask how large the earnings gap between immigrants and comparable natives is. The definition of "comparable" is obviously important in such a context. Indeed, any meaningful answer to the question of the extent of earnings assimilation must rely on some notion of comparability; it would come as no surprise that newly arrived young immigrants with low levels of education earn less than middle-aged, highly educated natives. Very briefly stated, we will consider immigrants and natives to be "comparable" or "observationally similar" if they have the same levels of relevant observable human capital; since the definition

of those relevant variables will vary somehow in the models and methods to be used, the definition of "comparable" will also vary somewhat. The details of these matters should become clearer for the reader once we have provided a thorough description of definitions and methods in the next section.

In keeping with the conceptual distinctions about different aspects of earnings assimilation for immigrants, we can ask not only about the existence of an earnings gap between immigrants and natives; we can also ask if immigrants experience earnings assimilation, i.e. have higher earnings growth than comparable natives. Finally, we might also be interested if immigrants are thus eventually able to achieve earnings parity with comparable natives.

In discussing the results of this analysis, we do touch on several subsidiary questions, including the extent to which previous studies of Norway may have reached different conclusions on earnings assimilation also due to a failure to account for the large degree of (ethnic) heterogeneity in the immigrant population. Our main results focus on four of the largest immigrant groups, because differences between the ethnic groups are large and worthy of note.

# 3 Methods, Data and Specification

This analysis will focus on and compare two different econometric models for estimating the earnings for the four largest non-Western immigrant groups in Norway during the 1990s. The first model is termed the "Traditional Approach" and is meant to represent the type of specification generally employed in previous studies of earnings assimilation. The exact variables included in any particular specification are obviously going to vary somewhat from study to study and from country to country, depending on the data available. We nonetheless maintain that the specification of the Traditional Approach here remains true to the essence of such analyzes in that it only includes observations on individuals in employment and that it makes use of 'years since migration' (YSM) and age as proxies for labor market experience.

The second model, which we will refer to as the "Modified Approach", accounts for potential selection into employment by means of a selection model with an improved measure of labor market experience. Details on the data and, more specifically, the definition of employment status, earnings and the new measure of labor market experience to be used in this study will be described in the following subsection. Further details on the econometric models will be described in the second subsection; that subsection will focus largely on the main differences between the two approaches and discuss differences with respect to the main variables of interest in those approaches. The third subsection will provide additional details on other explanatory variables used in those specifications.

## 3.1 Data and Definitions

The ability to utilize register data on the entire resident population of the Norway provides us with unique opportunities for the study of the immigrant population. Proper study of immigrants in Norway would hardly be possible without the use of such data, simply because the immigrant population is both too small and too diverse to be done justice in surveys. The register data used in this study is collected by various government institutions and administered by Statistics Norway. It includes such information as earnings and income, marital status, family relations, household composition, education and place of residence for the entire resident population of Norway. Information from diverse sources and different government agencies can be easily merged by means of a universal and unique person number.

The information on annual earnings is based on data from tax records; earnings are defined as the sum of wages, salary or other income from employment as well as income from self-employment, where relevant. More specifically, a substantial portion of the earnings of self-employed persons may be reported as capital income for tax reasons. Hence, we also include capital income in earnings if a person is registered with any income from self-employment. Earnings from different years are deflated based on the Norwegian Consumer Price Index with 2001 used as the base year.

It should be noted that earnings for employees as well as most other forms of (taxable) income, such as from disability and old-age pensions or capital investments (in Norway), are reported directly to the tax authorities; hence, they are only self-reported to a limited degree.[5] Self-employed persons would have to report their income to a larger degree themselves, but this process is also likely to be subjected to more scrutiny by the authorities. The data on earnings from the tax authorities are, thus, very comprehensive and can be assumed to be of reasonable quality.[6]

Finally, this study focuses on immigrants who are registered in the data and, thus, legally residing in the country. There is little evidence that large numbers of illegal immigrants are or have been residing in Norway and, for obvious reasons, little is known about the presumably few illegal immigrants that are here. A very recent study by Zhang (2008) estimates the illegal immigrant population at

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[5]All adult residents of Norway were required to file tax returns during the period analyzed in this study (1993-2001). The tax authorities themselves summarize and send out individual tax information to each individual resident of Norway based on the information they have received from employers, banks, other government authorities, etc. The individual taxpayer then has to either check and confirm the information as it is or claim further deductions and/or report any additional information. This also applies to people who have not earned any income in Norway (but are registered as residents or citizens); thus, a person also has to confirm in writing that he or she did not earn any income in a given year if this is the case.

[6]There is still obviously room for tax evasion and the associated underreporting of income for some individuals in this data. However, unreported income from illegal or black market activities are a challenge for any data source on income, not only the data sources used here.

0.39 percent of the population in Norway, which is considered low in comparison to estimates from most other countries. Zhang (2008) also emphasizes the large degree of uncertainty surrounding such estimates.

While it might at first glance seem likely that such seemingly comprehensive register data also includes detailed information on employment status, this is, unfortunately, not entirely true. The Norwegian tax and benefit system is largely organized around *earnings*; more specifically, the social security system assesses the eligibility and amount of benefits on previous earnings and not previous employment status per se. Hence, information on (annual) earnings is very good, but information on the length of employment and/or working hours is poor or of questionable reliability.

Thus, the definition of employment status to be used in this study will itself be based on an earnings threshold.[7] In principle, positive earnings of any amount could serve as indication of employment for the purposes of this study. However, zero or very low annual earnings may not reflect the true earnings potential of an individual, simply because such low earnings may be the result of either the inability to find employment of a more extensive nature or the voluntary decision to engage in only intermittent, part-time employment. Thus, we prefer to base the classification of labor market status on a level of earnings considered substantial enough to indicate true attachment to the labor market. The earnings threshold used here is itself a parameter, referred to as the "basic amount" (BA), that plays a very integral part in the Norwegian social security system. The BA is used to assess both the eligibility and amount of benefits (based on previous earnings) for a wide range of social security programs in Norway. In this study, we classify a person as participating in the labor market if his or her earnings are at least 2 times the BA in the relevant calendar year. This corresponds to the current eligibility requirements for receipt of the full duration of unemployment benefits.[8] Galloway (2008) provides a more lengthy discussion of the BA and provides examples of the BA in relation or to other parameters of interest in the Norwegian economy and social welfare system; that study also documents that employment rates based on the BA thresholds correspond closely to employment rates in the Norwegian Labor Force Survey. Individuals with earnings below the 2 BA threshold are thus considered non-employed in the following analyzes.

The new measure of previous labor market experience is also based on the BA and its relevance in the Norwegian system for old-age pensions and disability benefits. "Pension points" are awarded to an individual if a person earns above 1

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[7]It should be noted that, for practical purposes previous studies of earnings assimilation in Norway, such as Barth, Bratsberg and Raaum (2004), have also had to introduce some sort of earnings threshold to define their population for study and eliminate observations with extremely low earnings. Some discretion has always been and must always be employed when defining employment status in studies such as this one.

[8]In general, persons are eligible for the full duration of unemployment benefits in Norway if they had earned at least 2 times the BA during the calendar year preceding unemployment.

BA during the course of a calendar year and details on the number of years with pension points are available in data from the social security authorities. Thus, even though we do not have comprehensive information on all earnings in the period preceding 1993, we do have information on the number of years for which an individual earned more than 1 BA going all the way back to 1967. This information is what we propose to use as an "improved" measure of labor market experience. Thus, we say a person has $x$ years of previous "experience" if he or she has received pension points in $x$ years prior to the current calendar year.[9]

Note, finally, that unemployment benefits are *not* included in this definition of earnings, whereas they were included in the earnings definition employed in previous studies of the earnings assimilation of immigrants in Norway.[10] There are arguments both for and against the inclusion of unemployment benefits when studying the earnings assimilation of immigrants. The system of unemployment benefits is a social *insurance*, which relates benefits to previous earnings by replacement rates and determines eligibility by various rules and regulations. Thus, receipt of unemployment benefits does suggest that a person is integrated in the labor market, albeit perhaps temporarily without gainful employment. One might therefore wish to include unemployment benefits when interpreting earnings assimilation as a measure of labor market attachment. However, if one wishes to discuss earnings assimilation in relation to the extent to which immigrants eventually are able to contribute to the economy of the host society in a manner commensurate to their skills, ability and experience, then the inclusion of unemployment benefits might distort the picture, especially if immigrants are more likely to receive such benefits. Since the purpose of this paper is to examine precisely the relationship between earnings and various patterns of experience or selection in the labor market, it seems reasonable to exclude such benefits from the measure of earnings.

## 3.2 Econometric Models for the Study of the Earnings Assimilation of Immigrants

### 3.2.1 Model 1: The Traditional Approach

What we will term the "Traditional Approach" to studying earnings assimilation has typically invoked some variant of a Mincer-style earnings equation to relate an

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[9]It is, perhaps, unfortunate and somewhat inconsistent that our measure of labor market experience is based on a lower earnings cut-off than our measure of current labor market participation. This is, however, largely a result of limitations in the data on pension points. As Galloway (2008) indicates, very few individuals earn between 1 BA and 2 BA; thus, one expects no large effect from this minor inconsistency. Alternative estimates with an earnings cut-off for labor market selection at 1 BA, i.e. for earnings cut-off in line with the measure of labor market experience, confirm this suspicion.

[10]Hayfron (1998), Longva and Raaum (2003), Barth, Bratsberg and Raaum(2004).

individual's log earnings, $y_i$ to various relevant observable characteristics,

$$(1) \qquad y_i = \beta' X_i^T + \epsilon_i,$$

where $X_i^T$ is a vector of relevant explanatory variables, $\beta$ is a vector of parameters to be estimated and $\epsilon_i$ is the classical error term in linear regression. With this approach, only persons classified as in employment are included in the analysis; in the context of this study, this means persons defined as having earnings above 2 BA. Note also that $X_i^T$ includes age and YSM as well as second-order polynomials on age and YSM as relevant *proxies* to labor market experience in this model. Other relevant variables contained in $X_i^T$ will be described below.

### 3.2.2 Model 2: The Modified Approach

Model 2 aims to incorporate the concerns raised in the previous sections along two lines: 1) by accounting for selection into current labor market status and 2) by providing a better measure of actual previous labor market experience in Norway. The new wage equation is similar to (1):

$$(2) \qquad y_i = \beta' X_i^M + \epsilon_i,$$

but note that, in the vector of explanatory variables $X_i^M$, YSM and AGE are now replaced by a variable, experience, which is assumed to better measure the actual amount of previous labor market experience in Norway. (Other variables included in $X_i^M$ will be described below.) With this approach, we assume that the process determining employment for the individual is latent, but related to certain observed characteristics, $Z_i$ and $y_i$ is thus only observed for individuals in employment. A (reduced-form) specification of this latent process determining employment can thus be expressed as

$$(3) \qquad I_i^* = \gamma' Z_i + \eta_i,$$

where $\gamma$ is a vector of parameters and $\eta_i$ is an error term. We introduce a selection indicator $I_i$ equal to 1 if the individual is employed; we assume that $I_i = 1$ if $I_i^* > 0$ and $I_i = 0$ otherwise.

If we assume that the error term in the earnings equation, $\epsilon_i$, and the error term in the latent process determining employment status, $\eta_i$, are correlated such that $cov(\epsilon_i, \eta_i) \neq 0$, then expectation of $y_i$ given $X_i^M$, $Z_i$, and $I_i^* > 0$ is given by

$$(4) \qquad \begin{aligned} E[y_i | X_i^M, Z_i, I^* > 0] &= E[\beta' X_i^M + \epsilon_i | \gamma' Z_i + \eta_i > 0] \\ &= \beta' X_i^M + E[\epsilon_i | \eta_i > -\gamma' Z_i]. \end{aligned}$$

More specifically, if we also assume that the joint distribution of $\epsilon_i, \eta_i$ is bivariate normal with $E(\epsilon_i) = E(\eta_i) = 0$, $var(\epsilon) = \sigma_\epsilon$, $var(\eta) = \sigma_\eta = 1$ and $cov(\epsilon, \eta) = \sigma_{\epsilon\eta}$, then the expectation (4) becomes

$$(5) \qquad E[y_i | X_i^M, Z_i, I^* > 0] = \beta' X_i^M + \sigma_{\epsilon\eta} \lambda(\gamma' Z_i),$$

where $\lambda(\gamma'Z_i) = \phi(\gamma'Z_i)/\Phi(\gamma'Z_i)$ is the inverse Mill's ratio and $\phi()$ and $\Phi()$ denote, respectively, the pdf and cdf of the standard normal distribution. Note in particular that we will later report and discuss the estimated correlation between $\epsilon$ and $\eta$, that is,

$$(6) \qquad \rho = corr(\epsilon, \eta) = \frac{\sigma_{\epsilon\eta}}{\sigma_\epsilon \sigma_\eta} = \frac{\sigma_{\epsilon\eta}}{\sigma_\epsilon},$$

where the last equality follows from the fact that $var(\eta) = 1$.

This formulation assumes that the error term in the earnings equation is normally distributed and the estimation results that will be discussed were obtained with maximum likelihood (ML). Estimation was however also performed with the two-step method of Heckman (1979) since this also entails a relaxation of the normality assumption on the error term of the wage equation. There were no noteworthy differences between the two-stage results and the ML results, so only the ML results are reported.

## 3.3   Further Details

Separate analyzes are performed for in the four largest non-Western/non-European immigrant groups in Norway as of 1993 – immigrants from Pakistan, Vietnam, Turkey, and Sri Lanka – as well as for natives. Although results for the pooled population of all non-Western immigrants will be discussed briefly, the main body of this presentation of empirical results will focus on results for the separate analyzes of the various ethnic groups. The reason for this is the conviction that separate analysis of individual ethnic groups, where possible, represents best practice in the field; indeed the brief discussion of the pooled results will reveal why this is so.

Separate estimation of the models is performed for the men and women in each of the above-mentioned groups. The data are from the period 1993-2001. The focus is on ("first generation") immigrants between the ages of 25 and 64; so-called "second generation immigrants", i.e. children born in Norway to two immigrant parents, as well as individuals who arrived in the country before the age of 16 are excluded from the analysis. Immigrants married to Norwegians are also excluded, since the factors influencing their integration into the labor market are expected to be somewhat different than the core of the populations we wish to study here.

In line with common practice in the literature, cohort dummy variables or cohort fixed-effects are included based on five-year periods of arrival; the number of cohort dummy variables depends on the periods which are relevant for each specific group, i.e. to reflect when the group first started to arrive in Norway is substantial numbers. Pakistani immigrants are assigned cohort dummies for the following arrival dates: up to 1974, 1975-1979, 1980-1984, 1985-1989, 1990-1994 and 1995-1999 with the group arriving up to 1974 used as reference; immigrants from Sri Lanka did not start arriving in Norway before the 1980s so the dummy variables for immigrants from Sri Lanka are: up to 1989, 1990-1994 and 1995-1999. The cohort dummies are included in the vector of explanatory variables for the

earnings equations in both Model 1 and Model 2, i.e. $X^M$ and $X^T$, as well as in the vector of explanatory variables $Z$ in the reduced-form selection equation of Model 2.

In order to provide a measure of general economic developments and, hence, capture period effects related to the the economic climate of different years, the rate of local unemployment is included.[11] This measure is constructed by utilizing the regional groupings of municipalities based on labor market and economic ties as described in Statistics Norway (2001); an intermediate regional grouping is assumed to better reflect the relevant labor market where the individuals actually live and work.[12] The regional measure of unemployment is calculated by taking the average number of registered unemployed over the 12 months of the relevant calendar year and dividing this by the number of persons in the working-age population (persons age 16-66 years) in the economic region (at the start of the year). The measure of regional unemployment is included in $X^T$, $X^M$ and $Z$.

Further variables reflect information on education[13] in $X^T$, $X^M$ and $Z$ as well as age, YSM and household composition in $Z$. Note in particular that inclusion of age and YSM in $Z$ are thus used for identification of Model 2. This implies that YSM and age are interpreted as important factors which determine employment status, but which do not influence earnings directly. The variable *experience* is thus assumed to be the main influence on earnings and earnings growth. Summary statistics for the pooled populations (over time) of each ethnic group (by gender) are presented in Table A.1 in the Appendix.

# 4   Results

The complete regression results for immigrants from Pakistan, Vietnam, Turkey and Sri Lanka as well as native Norwegians and the pooled population of all non-Western immigrants are provided in Tables A.2-A.5 in the Appendix. The main

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[11]This is a slight modification of the practice in Barth, Bratsberg and Raaum (2004), which is based on *municipal* unemployment rates.

[12]On the one hand, municipal level unemployment data – data on a smaller regional level – can be unsatisfactory because people do travel between municipalities for work and other economic purposes; on the other hand, county level data probably encompasses too large a region to be truly relevant in Norway.

[13]Information on the education of many newly arrived immigrants is often missing in the first few years after their arrival. We can, however, fill in some of these blanks by two means. First, we can make use of information on immigrants who participate in education in Norway and impute education for earlier years based on the education level achieved in Norway (later on). More specifically, if immigrants have taken some type of education during the period we study, we assume that their educational level is one below the level they are taking, i.e. middle school if they are taking high school education, Bachelor's degree if they are enrolled in a Master's program, etc. Second, Statistics Norway made explicit efforts to obtain this information for immigrants in 1999/2000. Given that no form of education was registered for intervening years, the information thus obtained can be used for earlier years.

insights of this paper are best illustrated by the use of appropriate figures and the figures to be presented in the following subsections attempt to compare earnings for observationally similar immigrants and natives.

The following subsection will start by discussing the main differences in results suggested by Model 1 and Model 2. Further subsections provide some general insights on the relevance of level of education for the results, selection on unobservables, common estimation for all non-Western immigrants and participation in formal education for immigrants. With results from two models for men and women for native Norwegians, non-Western immigrants as a whole as well as 4 different ethnic groups, exhaustive discussion of all the results is hardly possible in this one paper. The aim will thus be to highlight the main and most interesting findings and insights in the best and most accessible manner.

## 4.1 "Traditional" Methods vs. Sample Selection with Labor Market Experience

The main purpose of the first four figures to be presented here is to illustrate just how the different modelling approaches and the different proxies or conceptions of relevant (labor market) experience affect our impressions of earnings assimilation and can influence our conclusions on the subject. The estimates of immigrants' and natives' log earnings will be presented for individuals assumed to have secondary education; immigrants are assumed to have arrived in the country in the period 1985-1989. The rate of local unemployment is assumed to be 2.87 percent, which is the national average for the period when a national rate is computed the same way as for the regional rates. For the Traditional Approach, both immigrants and natives are assumed to start off the period to be presented at the age of 25; furthermore, immigrants are assumed to start off the period with YSM=0. Note that the passing of time represented by the x-axis for the Traditional Approach thus encompasses both age and YSM effects for immigrants and age only for natives. For the Modified Approach, both immigrants and natives are assumed to start off the period with no previous labor market experience (experience=0); the passing of time represented by the x-axis for the Modified Approach thus indicates the effect of increased labor market experience only, in accordance with the motivation behind the formulation of Model 2. The results for immigrants from Sri Lanka are only presented for 15 years, since few members of this group had durations of residence much longer than that in the data material for this study.

Figure 2 presents results based on the Traditional Approach (Model 1) for studying earnings assimilation. Those estimates suggest that the immigrants in these groups start off with considerably lower earnings than natives. The immigrants in most of these groups experience somewhat larger earnings growth than natives and therefore close that initial earnings gap somewhat. In this sense, some degree of earnings assimilation does appear to take place, but the immigrants in these

groups do not seem to achieve earnings parity with natives.

The results for the Modified Approach presented in Figure 3 suggest some very different conclusions about earnings assimilation for these groups. Figure 3 gives the general impression that the earnings of immigrants do not differ greatly from the earnings of natives with the same levels of labor market experience in Norway. Men from Sri Lanka do seem to start off with slightly lower earnings than similar natives, but that small gap in earnings is closed quite quickly. Vietnamese men have slightly *higher* earnings than Norwegians with the same level of labor market experience in Norway. The earnings curve for the Vietnamese immigrants runs largely parallel to the curve for the natives, i.e. the slopes for the two groups are largely the same. Men from Turkey earn less than natives, but, once again, native and Turkish men experience very similar earnings growth, as indicated by the slopes of the relevant curves. Altogether, the Modified Approach gives the impression of earnings parity – or at least similarity – between natives and the immigrants in these groups.

Given the large numbers of observations for all of the groups in this analysis, confidence intervals for the predictions presented in Figure 2 and 3 are quite narrow; any attempt to present such intervals in these figures would largely obscure the main results. However, in order to give the reader some impression of the magnitude of the confidence intervals, we can mention that the standard errors of the predictions for natives in Figure 2 and 3 are in the range of 0.002 to 0.004. For immigrants, the standard error of the predictions are as low as 0.005 and as high as 0.022. The latter standard error can be found, for example, for Turkish men with 19 years of labor market experience in Norway with the Modified Approach; given a prediction of 12.417 for a such a Turkish man (with the other characteristics as specified for Figure 3), the 95 percent confidence interval would be [12.374, 12.460]. Such narrow intervals would hardly be distinguishable in the presented figures; perhaps more importantly, however, the interval is more than narrow enough that the difference between Turkish men and natives is statistically significant. The slight difference between Vietnamese and native men is, upon similar analysis, also statistically significant, but it is still just a very small difference in earnings levels. The main insights to be gained from this brief discussion of confidence intervals is that anything but the smallest differences presented in the figures are generally statistically significant; very small differences are, however, still just very small differences.

Overall, the Modified Approach suggests that little earnings assimilation takes place for these immigrants in Norway; this is simply because immigrants are earning more or less the same as natives with comparable characteristics. In other words, we find little, if any, earnings assimilation, because there is hardly any earnings gap to be closed by these immigrants. Immigrants in some of the groups even appear to earn *better* than comparable natives. It is difficult to say what the reasons between the persistently lower levels of earnings for Turkish men might be, but it could

depend on these workers being concentrated in certain industries or may be the result of differences in skills that are not as easily captured otherwise and which have their origins in the home country. Thus, the Turkish men may differ from natives in ways we cannot observe and are therefore unable to properly measure or account for in this analysis.

Figure 4 and Figure 5 present analogous results for women with the Traditional and Modified Approach, respectively; as with the men, the Modified Approach gives more of an impression of similarity in earnings for native and immigrant women than the Traditional Approach. Since part-time work is generally more widespread among women it should be particularly emphasized here that we are analyzing annual earnings, rather than hourly wages. The same level of annual earnings can thus be achieved with different combinations of working hours and hourly wage and there could still be differences between the immigrant and native women in the package of hours and wages which they need to obtain the same level of annual earnings as estimated by these methods and presented in the figures.

In going from Model 1 to Model 2 we have instituted two distinct modifications to the Traditional Approach. Firstly, we have introduced methods for dealing with selection into the labor market at the time of observation. Secondly, we provide a better measure of labor market experience than simply the duration of residence. The arguments for introducing those two modifications are related, since they both ultimately refer to the fact that immigrants have difficulties in obtaining and remaining in employment, especially at the start of their stay in Norway. Thus, it is difficult to separate the two and make definitive statements about the different contribution of the modifications to the changes in results. The main conclusion is, thus, that *both* modifications had an effect on both levels and slopes and that the effects of the two modifications together contributed to higher estimates of immigrants' earnings.

Since the change in going from Model 1 to Model 2 has an impact on both the estimated levels of earnings and the estimated growth in earnings, we would like to briefly isolate and discuss the differences in slope here. Figure 6 and Figure 7 present the differences in slopes for the two approaches for men and women, respectively. Growth is measured relative to a base of 100 for the first year in Norway and for a starting age of 25 years for the Traditional Approach; the growth thus reflects the effect of both YSM and age for the Traditional Approach and experience for the Modified Approach.

Compared with the Traditional Approach, the Modified Approach leads to steeper slopes, i.e. larger estimated growth, for immigrant men from Sri Lanka, Pakistan and Turkey; the slopes for immigrant men from Vietnam as well as the women in basically all the groups are *flatter* with the Modified Approach. (The difference is hardly distinguishable for the Turkish women and the Sri Lankan men.) An understanding of the pattern of employment rates for these groups can

help to shed some light on these differences.[14] Most notably, the women in these immigrant groups as well as the men from Vietnam have low employment rates the first few years in Norway, but they experience a large 'integration effect' with respect to employment. In other words, their employment probabilities increase greatly as they spend more time in the country. Based on the differences presented in Figure 6 and Figure 7, it seems likely that the Traditional Approach is partly capturing this integration into employment and perhaps somewhat misleadingly interpreting it as an assimilation in earnings. It would seem likely that the later labor market entrants are thus actually biasing the earnings curves upwards. Employment probabilities are much higher from the start of the stay in Norway for the men from Sri Lanka, Pakistan and Turkey, so the differences in slopes between the different approaches suggest that later labor market entrants may have been causing a downward bias in the slopes with the Traditional Approach among the men in those groups.

## 4.2 Level of Education

While the estimated results presented above suggest that the earnings of immigrants with secondary education do largely converge to the same level as natives once we properly account for differences in labor market experience and selection into the labor market, such findings do not hold for immigrants with higher education. As Figure 8 illustrates, the earnings of immigrant men with higher education generally do not converge to the earnings of native men with similar levels of education. As Figure 9 indicates, immigrant men with *low* levels of education, however, quite quickly attain earnings similar to or considerably higher than observationally similar native men.[15]

The differences with respect to education surely reflect a number of factors. Firstly, one expects that many talented and highly motivated immigrants may have low levels of education simply because they did not have educational opportunities in their home countries or prior to arrival in Norway. To put this a different way, observationally similar natives and immigrants are quite possibly very different in unobservable ways. Secondly, the more specialized skills likely to have been acquired by higher levels of education may be less easily transferrable to the host labor market. Thus, it is possible that only a portion of the returns to higher education taken abroad can be translated into higher earnings for these immigrants in Norway. Altogether, therefore, one does not find and, indeed, might not expect to find that immigrants with high levels of education are able to match the earnings of their native counterparts.

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[14]Such insights are provided by closer analysis of the results from the selection equations; however, a more thorough discussion on employment probabilities can be found in Galloway (2008).

[15]The results for the women are largely similar with the exception that highly educated immigrant women do seem to earn approximately the same as highly educated native women.

## 4.3 Correlation between Unobservables in Selection and Earnings Equation

The estimated correlation $\rho$ between the unobservables in the selection and earnings equations is reported along with the other estimated parameters in the Appendix. The correlation is estimated to be negative and a likelihood ratio test of the null hypothesis of $\rho = 0$ can be resoundingly rejected for both the men and women in all the groups.[16] In other words, a null hypothesis of no selection effect is clearly rejected.

A negative correlation may seem counterintuitive at first glance, but it is hardly unreasonable. The counterintuitive nature of such results seems to often stem from a belief that the (correlated) unobservables are largely determined by such factors as motivation or ability. Thus, a negative correlation is often interpreted to mean that individuals who are more motivated for employment earn less than other – less motivated or able – individuals. However, the interpretation is not quite that straightforward. Understanding how selection on observables and unobservables may interact in this specification is the key to understanding the results here.

To really understand these issues, consider two immigrants that are identical in all ways except for the amount of time they have been in the country. Note that this is also meant to imply that these immigrants' earnings and (actual) labor market experience in the host country are the same. Assume also specifically that Immigrant A has been in the country longer than Immigrant B, i.e. $YSM_A > YSM_B$. Since there is a positive relationship between YSM and employment and since the inverse Mill's ratio $\lambda(.)$ is a monotone decreasing function of the probability of selection (employment), we would actually have $\lambda_A < \lambda_B$. Since we have assumed and estimated that these two hypothetical immigrants are otherwise identical, there would have to be a negative relationship between the unobservables in the earnings and selection for these two immigrants. (See also equation (5).) However, the population is obviously not just made up of two individuals. Overall, an estimated positive or negative correlation essentially depends on whether we have more immigrants like A or B in the populations we analyze. Note, too, that there are other variables other than YSM which are used for identification in this model, i.e. which imply exclusion restrictions, and which can thus be used to imagine other scenarios than the one example used here.

A negative correlation between unobservables can arise if being non-employed (for a period) has some positive effect which is unobservable and thus cannot be otherwise accounted for in the model. Since most immigrants do first need to obtain knowledge of the language and customs in Norway, they may actually be better off if they first spend some time outside the labor market and invest their time and energy in acquiring such relevant basic skills and knowledge. It might, thus, be

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[16]The probability of the likelihood ratio test statistic being larger than the appropriate $\chi^2$ value are less than 0.0001 for the men and women in all of the immigrant groups.

the immigrants who – for unobservable reasons – are better able to make use of human capital investment prior to labor market entry who also later earn better in the labor market. This would be the case if an immigrant of higher "ability" chooses to take full-time language classes for a longer period of time than other immigrants (of lesser ability), because he or she will be able to achieve a higher level of language skills and earn better later on when he or she does enter the labor market. We will return to this possible explanation later when we have a brief look at the extent to which the immigrants studied here participate in some form of formal education in Norway, see Section 4.5.

Of course, the key issue in this discussion is that the negative correlation is between the *unobservables* in the earnings and selection equation. Thus, since we do not know exactly which unobservable factors pull in which direction and the specification of Model 2 is a reduced-form one, it is difficult to have conclusive and definitive opinions on what sort of relationship between unobservables we should expect.

## 4.4   Common Estimation for All Non-Western Immigrants

One major difference between the results hitherto discussed in this paper and previous work on Norway is that separate analyzes was performed for four of the largest non-Western immigrants groups in Norway in the earlier 1990s; previous studies have used more broadly defined groups, such as immigrants from OECD and non-OECD countries. Pooling all the non-Western immigrants into one group[17]in this study leads, perhaps unsurprisingly, to earnings estimations somewhere between the 'best' groups and the 'worst' groups in the analyzes of the individual groups presented above. Thus, as Figure 10 indicates we would not conclude that there is earnings parity for non-Western immigrant men based on a Traditional Approach. The Modified Approach (Figure 11) does suggest a slightly higher degree of earnings assimilation for non-Western immigrant men, but this is not estimated to be enough to achieve any sort of earnings parity with natives.

The key insights to be obtained from this brief discussion is that the non-Western immigrant population in Norway does in fact seem to be too diverse to be able to adequately account for difference in a common framework. The heterogeneity of the immigrant population is going to manifest itself in observable ways, but it can also bias results by means of selection on unobservables. The relevance of such factors can also quite easily vary across immigrants groups, as the main results for the different immigrants groups clearly illustrate. Altogether, the results presented in this paper suggest that attempts should be made to distinguish between immigrant groups in order to have better opportunities to capture and model both observed and unobservable differences between and within these groups.

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[17]Non-Western immigrants are here defined as those coming from Asia (including Turkey), Africa, and South and Central America.

## 4.5 Immigrants in Education

In the discussion of the estimated correlation between unobservables in the earnings and selection equation, we suggested that unobserved factors may result in a negative correlation between the unobservables in the selection and earnings equations if there are factors which cause some immigrants of high earning ability to choose non-employment, at least for a period. Participation in language courses was given as one possible example of this. Similarly, some higher ability immigrants might remain outside of the labor market for a period in order to make further investments in human capital by taking some form of formal education within the regular educational system in Norway. Upon arrival in Norway, refugees are immediately eligible for generous student loans along the same lines as native Norwegians. Other immigrants are also eligible for student loans if they have lived and worked in Norway for at least 24 months. Thus, some immigrants may choose to invest in their human capital by taking advantage of the opportunities in the Norwegian educational system and it does not seem entirely implausible that immigrants with the most to gain from such investments – the most "able" – are also the ones that do so. Thus, such immigrants may not be observed in employment for some periods of time, but they eventually earn more when they are employed. This could lead to a negative correlation between the unobservables in the selection and earnings equations.

Modelling such education decisions for immigrants brings up a myriad of further issues and is beyond the scope of this current paper. We can, however, still provide some evidence to evaluate the extent to which such a situation might contribute to the type of results we are finding here. Figure 12 presents some descriptive results on the extent to which the immigrants in from two recent arrival cohorts in the groups studied here participate in formal education in Norway; clearly, many immigrants do participate in some form of education, especially at the start of their stay in the country.[18] The reader should also note that an immigrant is not classified as engaging in formal education or training here if he or she is taking language courses; information on participation in language courses is, unfortunately, not available. However, for the period we study, such language instruction was available to all immigrants in Norway free of charge. It is also likely that the rise in the rates of participation in formal education for low YSM, as seen in Figure 12, is, at least in part, due to immigrants first taking language classes before being able to later enroll in formal education.

Note also in particular that a rather large proportion of immigrants from Vietnam participate in some form of formal education. Recall, too, that this was the one group for which we found that the Traditional Approach *overestimated* the slope of earnings curve for men. Such overestimation in the Traditional Approach can easily be the result of many Vietnamese immigrants first getting an education

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[18]Such high participation in education is not due to the fact that these immigrants are coming to Norway on student visas. Student visas are rare for the immigrants in the groups studied here.

and then entering the labor market with high earnings. The educated immigrants with late labor market entry and relatively high YSM are essentially contaminating the average returns to YSM with the Traditional Approach. The educated immigrants are not achieving higher returns to labor market experience, but returns to education; thus, the Traditional Approach may not be solely estimating *earnings* assimilation in the sense of a high return to labor market experience, but rather "assimilation in education" for Vietnamese immigrants. Such potential for assimilation in education is certainly a very interesting topic for understanding how immigrants adjust to the labor market in the host country, but it is not earnings assimilation in the strict sense of an added premium on labor market experience for immigrants.

# 5    Discussion

When analyzing the earnings of immigrants in four of the major groups in Norway, this study attempts to account for possible selection into employment status and also employs a better measure of actual labor market experience in the host country. Previous studies, on immigrants both in Norway and many other countries, have generally analyzed the earnings of immigrants in employment only and have used the number of years since migration (YSM) as a proxy for potential labor market experience in the host country. A comparison of the two different approaches applied to Norway and presented here suggests that previous studies may suffer from severe bias due to both the methods and definitions used. This paper thus indicates that there is good reason to doubt conclusions based on previous studies of the earnings assimilation of immigrants in Norway.

Specifically, more traditional methods which mimic those generally applied in previous studies indicate a large gap in earnings between natives and immigrants in Norway. Furthermore, analysis based on such methods suggests that while the immigrants in the groups studied here do experience some degree of earnings assimilation, i.e. that their earnings closer to the level of natives over time, they generally fail to achieve earnings parity with natives.

In contrast, estimates based on a selection model with a better measure of actual labor market experience present a very different picture on the earnings of these immigrants in Norway. Immigrants with low or intermediate levels of education appear to have earnings vastly similar to, or in some instances even slightly better, than natives with the same levels of education and labor market experience. Immigrants with higher education appear to experience a rather persistent earnings gap and, hence, do not achieve earnings parity with natives with the same level of education and experience. The estimates of earnings for such highly educated immigrants are, however, much closer to the estimates for natives with this model than with the more traditional approach.

As with all empirical work, these results are in part dependent on the assump-

tions made; several caveats do, therefore, apply. It is well-known that the results of selection models such as the one used here are sensitive to distributional assumptions. The selection equation postulated here is also admittedly of a 'reduced-form' type. It cannot therefore be used to pinpoint the exact mechanisms behind selection into employment; at best, it indicates only correlates of employment. However, the main purpose of this study was to indicate the extent to which assumptions and methods invoked by other studies may have influenced previous results. Thus, this study makes no claims of being the last word on earnings assimilation for immigrants and further study is certainly needed along several lines – in order to establish the extent to which similar considerations are relevant for other countries and to further investigate the robustness of findings of earnings assimilation to various underlying assumptions.

Non-random or selective return migration could bias results in a study such as this one and most of its predecessors. However, evidence suggests that return migration is generally a potentially confounding factor for studies of *Western* immigrants to Norway, not such non-Western groups as studied here.[19] Tysse and Keilman (1998) also find no compelling evidence of any particular relationship between out-migration and labor market status, in part precisely because immigrants from non-Western countries have such low rates of return migration.

Another subtle but very important point must also be noted in closing. The results which here point to a large degree of similarity in the earnings of natives and immigrants are entirely compatible with a situation in which very many immigrants spend long periods outside the labor market and in which more basic summary statistics find a large and persistent average earnings gap between immigrants and natives. Put somewhat roughly and intuitively, the main results here are really suggesting that immigrants earn approximately the same as natives with the same level of education and previous labor market experience when they are employed and able to remain in employment. Hence, these findings can be true and we can still find low rates of employment and other problematic aspects of immigrant labor market performance. The one does not preclude the other. It is therefore also important to make a distinction between assimilation in earnings when employed and integration into the labor market, i.e. finding employment. An upshot of these findings is that policies meant to foster the integration of immigrants in the labor market should focus more closely on patterns and determinants of entry into employment rather than differences, or potential discrimination, in earnings for those immigrants when they are able to enter the labor market.

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[19]See Tysse og Keilman (1998) for comprehensive documentation on the extent of return migration for immigrants to Norway.

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**Figure 1.**
**An Example of Potential Bias in Studies of Earnings Assimilation.**

**Figure 2. Earnings Assimilation for Men with Traditional Approach (Model 1)**



*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. Both immigrants and natives are assumed to start off the period at age 25 and immigrants start off with YSM=0. Local unemployment is assumed to be 2.87%.
The x-axis represents the passing of time measured as the number of years since age 25. Increases on the x-axis represent the combined effect of both age and YSM for immigrants and age effects only for natives.

**Figure 3. Earnings Assimilation for Men with Modified Approach (Model 2)**



*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. The x-axis represents the passing of time in increasing years of labor market experience for both immigrants and natives. Local unemployment is assumed to be 2.87%.

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**Figure 2. Earnings Assimilation for Men with Traditional Approach (Model 1)**



*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. Both immigrants and natives are assumed to start off the period at age 25 and immigrants start off with YSM=0. Local unemployment is assumed to be 2.87%.
The x-axis represents the passing of time measured as the number of years since age 25. Increases on the x-axis represent the combined effect of both age and YSM for immigrants and age effects only for natives.


**Figure 3. Earnings Assimilation for Men with Modified Approach (Model 2)**



*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. The x-axis represents the passing of time in increasing years of labor market experience for both immigrants and natives. Local unemployment is assumed to be 2.87%.
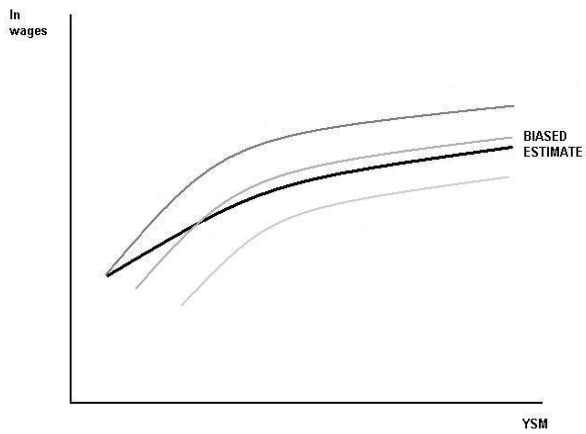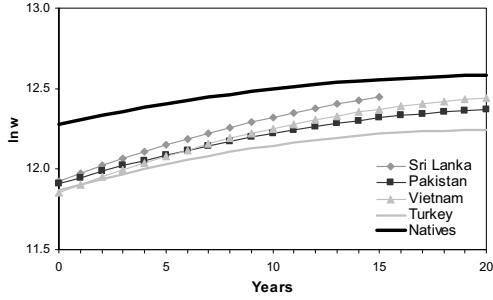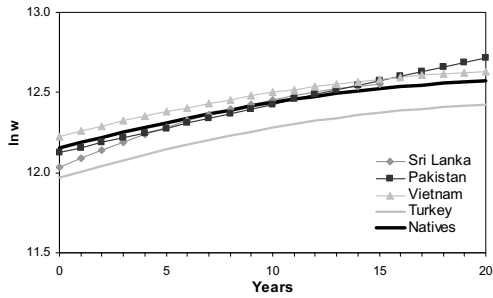
**Figure 4. Earnings Assimilation for Women
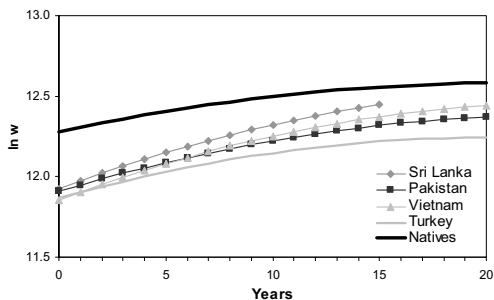with Traditional Approach (Model 1)**



*Notes:* The y-axis measures the natural logarithm of earnings
for individuals with secondary education. Immigrants are
assumed to belong to the 1985-1989 arrival cohort. Both
immigrants and natives are assumed to start off the period at
age 25 and immigrants start off with YSM=0. Local
unemployment is assumed to be 2.87%.
The x-axis represents the passing of time measured as the
number of years since age 25. Increases on the x-axis
represent the combined effect of both age and YSM for
immigrants and age effects only for natives.

**Figure 5. Earnings Assimilation for Women
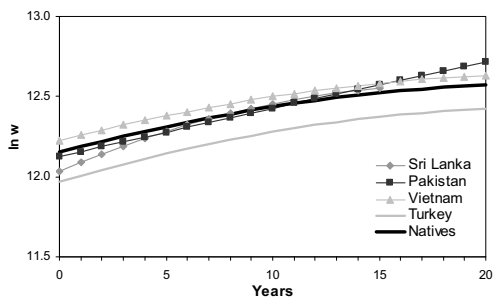with Modified Approach (Model 2)**



*Notes:* The y-axis measures the natural logarithm of earnings
for individuals with secondary education. Immigrants are
assumed to belong to the 1985-1989 arrival cohort. The x-axis
represents the passing of time in increasing years of labor
market experience for both immigrants and natives. Local
unemployment is assumed to be 2.87%.

**Figure 6. Earnings Growth with Increasing Experience in Norway
for Male Immigrants**
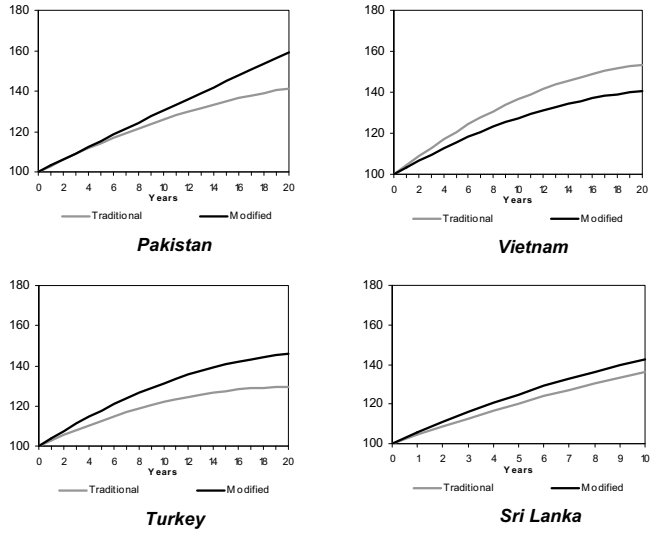


*Pakistan*

*Vietnam*

*Turkey*

*Sri Lanka*

**Notes:** The y-axis measures growth relative to earnings in the first full year in the country
(=100). The x-axis measures the number of years increasing in age and YSM from a
starting point age=25 and YSM=0 for the Traditional Approach and increasing number of
years of labor market experience for the Modified Approach.

**Figure 7. Earnings Growth with Increasing Experience in Norway
for Female Immigrants**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*

**Notes:** The y-axis measures growth relative to earnings in the first full year in the country (=100). The x-axis measures the number of years increasing in age and YSM from a starting point age=25 and YSM=0 for the Traditional Approach and increasing number of years of labor market experience for the Modified Approach.

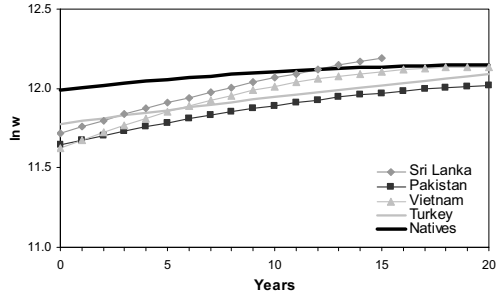**Figure 8. Earnings Assimilation for Men with Higher Education. Modified Approach (Model 2)**
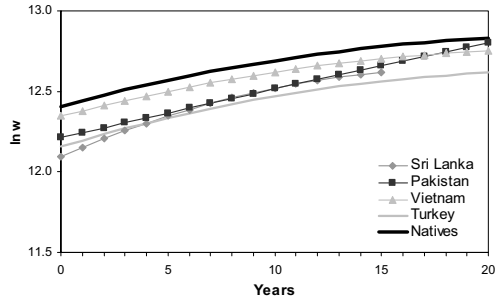


*Notes:* The y-axis measures the natural logarithm of earnings for individuals with higher education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. The x-axis represents the passing of time in increasing years of labor market experience for both immigrants and natives. Local unemployment is assumed to be 2.87%.

**Figure 9. Earnings Assimilation for Men with Low Education. Modified Approach (Model 2)**
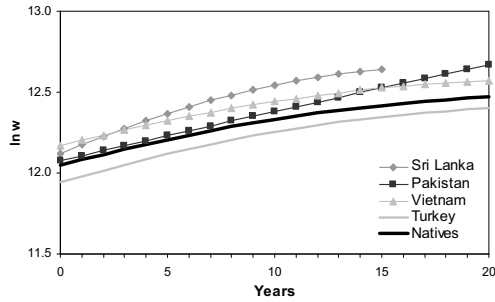


*Notes:* The y-axis measures the natural logarithm of earnings for individuals with education lower than secondary level. Immigrants are assumed to belong to the 1985-1989 arrival cohort. The x-axis represents the passing of time in increasing years of labor market experience for both immigrants and natives. Local unemployment is assumed to be 2.87%.

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**Figure 10. Earnings Assimilation for Non-Western Immigrant Men with Traditional Approach (Model 1)**
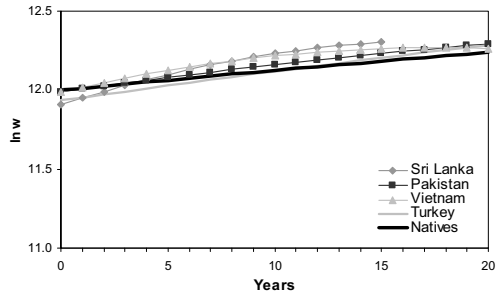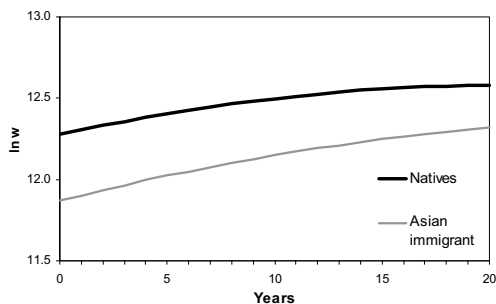


*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. Both immigrants and natives are assumed to start off the period at age 25 and immigrants start off with YSM=0. Local unemployment is assumed to be 2.87%.
The x-axis represents the passing of time measured as the number of years since age 25. Increases on the x-axis represent the combined effect of both age and YSM for immigrants and age effects only for natives.

**Figure 11. Earnings Assimilation for Non-Western Immigrant Men with Modified Approach (Model 2)**
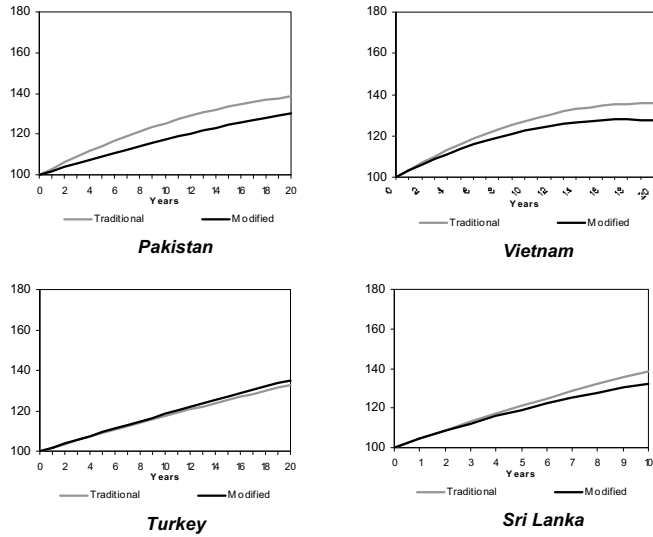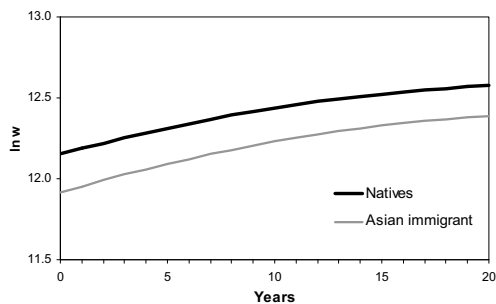


*Notes:* The y-axis measures the natural logarithm of earnings for individuals with secondary education. Immigrants are assumed to belong to the 1985-1989 arrival cohort. The x-axis represents the passing of time in increasing years of labor market experience for both immigrants and natives. Local unemployment is assumed to be 2.87%.

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**Figure 12. Percentage of Immigrants in Formal Education by YSM for Immigrants in Selected Cohort and Groups**



*Pakistan*



*Vietnam*



*Turkey*



*Sri Lanka*
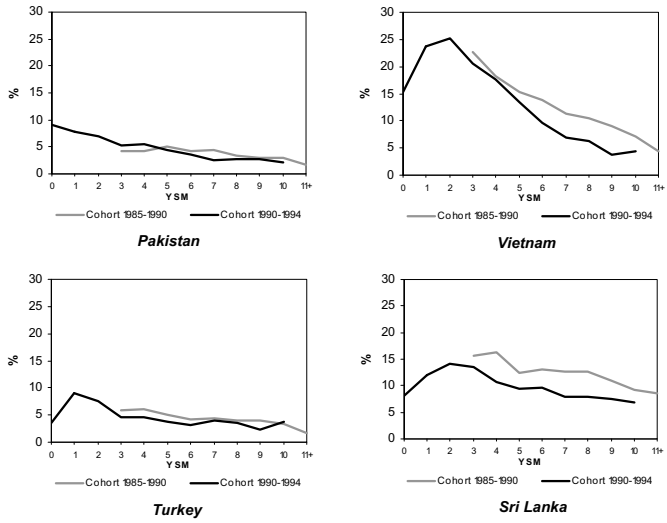
**Notes:** Formal education refers to education within the regular system of formal education in Norway, i.e. secondary school, university, (formal) vocational training, etc. Participation in language courses is *not* classified as formal education here.

**Table A.1. Descriptive Statistics**

| | Natives Men | Natives Women | Non-Western Men | Non-Western Women | Pakistan Men | Pakistan Women | Turkey Men | Turkey Women | Vietnam Men | Vietnam Women | Sri Lanka Men | Sri Lanka Women |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single | 0.254 | 0.187 | 0.437 | 0.161 | 0.198 | 0.054 | 0.265 | 0.066 | 0.324 | 0.131 | 0.397 | 0.121 |
| Single parent, 1 child | 0.010 | 0.050 | 0.011 | 0.063 | 0.007 | 0.019 | 0.009 | 0.035 | 0.012 | 0.060 | 0.002 | 0.015 |
| Single parent, 2 children | 0.003 | 0.031 | 0.007 | 0.082 | 0.008 | 0.038 | 0.007 | 0.051 | 0.010 | 0.092 | 0.003 | 0.016 |
| Couple, 1 child | 0.151 | 0.142 | 0.133 | 0.161 | 0.144 | 0.144 | 0.168 | 0.173 | 0.143 | 0.154 | 0.186 | 0.260 |
| Couple, 2 children | 0.164 | 0.164 | 0.145 | 0.184 | 0.167 | 0.183 | 0.212 | 0.268 | 0.181 | 0.195 | 0.171 | 0.261 |
| Couple, 3 children | 0.074 | 0.079 | 0.141 | 0.190 | 0.323 | 0.397 | 0.194 | 0.246 | 0.196 | 0.214 | 0.081 | 0.131 |
| Higher education | 0.235 | 0.243 | 0.227 | 0.176 | 0.147 | 0.081 | 0.095 | 0.058 | 0.124 | 0.074 | 0.165 | 0.131 |
| Secondary education | 0.580 | 0.554 | 0.454 | 0.178 | 0.392 | 0.241 | 0.323 | 0.213 | 0.620 | 0.479 | 0.545 | 0.560 |
| Education not available | | | 0.162 | 0.178 | 0.192 | 0.241 | 0.174 | 0.188 | 0.059 | 0.086 | 0.142 | 0.131 |
| Age | 42.50 | 42.70 | 38.80 | 37.90 | 42.70 | 39.50 | 39.40 | 37.80 | 39.10 | 39.10 | 35.10 | 34.50 |
| Std. Dev. | 11.00 | 11.00 | 8.90 | 9.10 | 9.70 | 9.30 | 9.50 | 9.40 | 9.10 | 9.80 | 7.00 | 7.60 |
| Experience | | 13.50 | 5.90 | 2.50 | 12.50 | 1.50 | 8.80 | 2.90 | 5.50 | 2.50 | 5.50 | 2.00 |
| Std. Dev. | | 8.10 | 7.10 | 5.10 | 8.30 | 4.50 | 7.30 | 5.00 | 5.80 | 5.00 | 3.80 | 3.50 |
| YSM | | | 10.00 | 8.60 | 16.50 | 12.10 | 12.80 | 10.00 | 10.80 | 8.70 | 8.20 | 5.80 |
| Std. Dev. | | | 7.20 | 6.40 | 8.40 | 6.80 | 7.70 | 6.10 | 5.20 | 5.20 | 3.60 | 3.90 |
| Unemployment Rate (UR) | 2.86 | 2.85 | 2.87 | 2.79 | 2.91 | 2.86 | 2.88 | 2.82 | 2.89 | 2.84 | 2.92 | 2.78 |
| Std. Dev. | 1.06 | 1.10 | 0.99 | 0.97 | 0.95 | 0.95 | 0.97 | 0.94 | 0.99 | 0.98 | 1.03 | 0.99 |
| Cohort 1995-1999 | | | 0.087 | 0.131 | 0.056 | 0.066 | 0.064 | 0.070 | 0.016 | 0.052 | 0.202 | 0.187 |
| Cohort 1990-1994 | | | 0.203 | 0.282 | 0.082 | 0.155 | 0.118 | 0.251 | 0.234 | 0.346 | 0.384 | 0.385 |
| Cohort 1985-1989 | | | 0.403 | 0.327 | 0.211 | 0.281 | 0.370 | 0.325 | 0.272 | 0.292 | | |
| Cohort 1980-1984 | | | 0.111 | 0.123 | 0.056 | 0.203 | 0.109 | 0.173 | 0.367 | 0.234 | | |
| Cohort 1975-1979 | | | 0.079 | 0.094 | 0.198 | 0.217 | | | | | | |
| Africa | | | 0.221 | | | | | | | | | |
| South and Central America | | | 0.077 | | | | | | | | | |
| Employment | 0.847 | 0.709 | 0.564 | 0.360 | 0.560 | 0.164 | 0.531 | 0.258 | 0.622 | 0.399 | 0.809 | 0.504 |
| Earnings | 264854 | 151359 | 138055 | 74653 | 135786 | 32247 | 120236 | 50200 | 148193 | 79993 | 193710 | 99514 |
| Std. Dev. | 215465 | 124090 | 151868 | 99203 | 139259 | 67966 | 129537 | 81674 | 126209 | 95344 | 117755 | 95715 |
| Observations | 93492 | 89800 | 243297 | 183744 | 34474 | 31025 | 17006 | 13372 | 27566 | 24273 | 24861 | 15851 |

Average and standard deviation is reported for age, experience, YSM and the local unemployment rate. Earnings is reported in NOK, observations lists the number of observations analyzed in each group. The proportion with given characteristic is reported for the other variables.

**Table A.2. Estimation Results for Men. Traditional Approach**

| | Natives | | Non-Western | | Pakistan | | Turkey | | Vietnam | | Sri Lanka | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. |
| Higher education | 0.3625 | 0.0026 | 0.1544 | 0.0036 | 0.1388 | 0.0090 | 0.2020 | 0.0134 | 0.1749 | 0.0094 | 0.0098 | 0.0086 |
| Secondary education | 0.1218 | 0.0023 | 0.0260 | 0.0033 | 0.0391 | 0.0071 | 0.0085 | 0.0093 | 0.0300 | 0.0074 | -0.0328 | 0.0069 |
| Education not available | | | 0.0747 | 0.0046 | -0.0290 | 0.0096 | 0.0271 | 0.0130 | -0.0278 | 0.0162 | -0.0017 | 0.0093 |
| Age | 0.0636 | 0.0007 | 0.0209 | 0.0012 | 0.0134 | 0.0033 | 0.0177 | 0.0047 | 0.0077 | 0.0028 | 0.0082 | 0.0032 |
| Age$^2$ | -0.0007 | 0.00001 | -0.0003 | 0.00001 | -0.0002 | 0.00004 | -0.0003 | 0.0001 | -0.0002 | 0.0000 | -0.0002 | 0.0000 |
| YSM | | | 0.0299 | 0.0009 | 0.0374 | 0.0025 | 0.0320 | 0.0033 | 0.0508 | 0.0033 | 0.0500 | 0.0033 |
| YSM$^2$ | | | -0.0004 | 0.00003 | -0.0006 | 0.0001 | -0.0007 | 0.0001 | -0.0009 | 0.0001 | -0.0008 | 0.0002 |
| Unemployment Rate (UR) | -0.0571 | 0.0039 | -0.1189 | 0.0066 | -0.1279 | 0.0203 | -0.0776 | 0.0269 | -0.0934 | 0.0158 | -0.0785 | 0.0137 |
| UR$^2$ | 0.0004 | 0.0006 | 0.0087 | 0.0011 | 0.0078 | 0.0034 | 0.0026 | 0.0044 | 0.0062 | 0.0026 | 0.0031 | 0.0022 |
| Cohort 1995-1999 | | | -0.0721 | 0.0029 | 0.1911 | 0.0308 | 0.1420 | 0.0352 | 0.3271 | 0.0360 | 0.3304 | 0.0168 |
| Cohort 1990-1994 | | | 0.0188 | 0.0039 | 0.1304 | 0.0255 | 0.0412 | 0.0278 | 0.1646 | 0.0187 | 0.1051 | 0.0078 |
| Cohort 1985-1989 | | | 0.2660 | 0.0092 | 0.0369 | 0.0197 | -0.0365 | 0.0213 | 0.0960 | 0.0145 | | |
| Cohort 1980-1984 | | | 0.1304 | 0.0078 | 0.0733 | 0.0179 | 0.0351 | 0.0182 | 0.0355 | 0.0097 | | |
| Cohort 1975-1979 | | | 0.0699 | 0.0071 | 0.0010 | 0.0097 | | | | | | |
| Africa | | | 0.0693 | 0.0068 | | | | | | | | |
| South and Central America | | | 0.0413 | 0.0060 | | | | | | | | |
| Constant | 11.1572 | 0.0147 | 11.7256 | 0.0271 | 11.9357 | 0.0785 | 11.8051 | 0.1062 | 11.8472 | 0.0662 | 12.0629 | 0.0649 |
| Adjusted R$^2$ | 0.1523 | | 0.1127 | | 0.1133 | | 0.1171 | | 0.1447 | | 0.1506 | |

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**Table A.3. Estimation Results for Women. Traditional Approach**

| | Natives | | Non-Western | | Pakistan | | Turkey | | Vietnam | | Sri Lanka | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Std.err | Coeff. | Std.err | Coeff. | Std.err | Coeff. | Std.err | Coeff. | Std.err | Coeff. | Std.err |
| Higher education | 0.3570 | 0.0027 | 0.2072 | 0.0134 | 0.1948 | 0.0041 | 0.2790 | 0.0146 | 0.1830 | 0.0190 | 0.1203 | 0.0109 |
| Secondary education | 0.1159 | 0.0024 | 0.0300 | 0.0103 | 0.0087 | 0.0038 | 0.0210 | 0.0115 | 0.0058 | 0.0139 | 0.0122 | 0.0075 |
| Education not available | | | 0.0957 | 0.0155 | -0.0153 | 0.0056 | -0.0036 | 0.0151 | 0.0549 | 0.0187 | 0.0442 | 0.0157 |
| Age | 0.0339 | 0.0007 | 0.0177 | 0.0047 | 0.0001 | 0.0015 | 0.0017 | 0.0061 | 0.0237 | 0.0079 | -0.0071 | 0.0035 |
| Age$^2$ | -0.0004 | 0.00001 | -0.0002 | 0.0001 | -0.00001 | 0.00002 | -0.00003 | 0.0001 | -0.0003 | 0.0001 | 0.0001 | 0.00004 |
| YSM | | | 0.0291 | 0.0041 | 0.0313 | 0.0011 | 0.0184 | 0.0050 | 0.0421 | 0.0059 | 0.0421 | 0.0037 |
| YSM$^2$ | | | -0.0005 | 0.0002 | -0.0006 | 0.00004 | -0.0001 | 0.0002 | -0.0011 | 0.0002 | -0.0007 | 0.0002 |
| Unemployment Rate (UR) | -0.0598 | 0.0038 | -0.0908 | 0.0212 | -0.0986 | 0.0077 | -0.0451 | 0.0313 | -0.1142 | 0.0389 | -0.0538 | 0.0183 |
| UR$^2$ | 0.0022 | 0.0006 | 0.0076 | 0.0035 | 0.0097 | 0.0013 | 0.0012 | 0.0054 | 0.0093 | 0.0067 | 0.0076 | 0.0031 |
| Cohort 1995-1999 | | | -0.0215 | 0.0176 | 0.2334 | 0.0040 | 0.1836 | 0.0573 | 0.1953 | 0.0593 | 0.1776 | 0.0313 |
| Cohort 1990-1994 | | | 0.1691 | 0.0105 | 0.1786 | 0.0043 | 0.1147 | 0.0458 | 0.1062 | 0.0432 | 0.0505 | 0.0215 |
| Cohort 1985-1989 | | | 0.0895 | | 0.0770 | 0.0139 | 0.0897 | 0.0371 | 0.0268 | 0.0343 | | 0.0178 |
| Cohort 1980-1984 | | | 0.0601 | | -0.0078 | 0.0124 | 0.1244 | 0.0304 | 0.0229 | 0.0257 | | 0.0129 |
| Cohort 1975-1979 | | | 0.0182 | | -0.0283 | 0.0116 | | 0.0220 | | | | |
| Africa | | | | | | | | | | | | |
| South and Central America | | | -0.0292 | | | | | | | | | |
| Constant | 11.4126 | 0.0146 | 11.5065 | 0.0936 | 11.7623 | 0.0342 | 11.7634 | 0.1307 | 11.4213 | 0.1620 | 11.9076 | 0.0773 |
| Adjusted R$^2$ | 0.1466 | | 0.1229 | | 0.0852 | | 0.1114 | | 0.1285 | | 0.1009 | |

**Table A.4. Estimation Results for Men. Modified Approach**

| | Natives | | Non-Western | | Pakistan | | Turkey | | Vietnam | | Sri Lanka | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. |
| *Ln wages* | | | | | | | | | | | | |
| Higher education | 0.3610 | 0.0028 | 0.1793 | 0.0036 | 0.1351 | 0.0093 | 0.2161 | 0.0135 | 0.1783 | 0.0100 | 0.0874 | 0.0088 |
| Secondary education | 0.1053 | 0.0024 | 0.0593 | 0.0033 | 0.0469 | 0.0074 | 0.0255 | 0.0093 | 0.0574 | 0.0077 | 0.0228 | 0.0070 |
| Education not available | | | 0.1068 | 0.0047 | 0.0546 | 0.0103 | 0.0584 | 0.0137 | 0.0459 | 0.0164 | 0.0557 | 0.0098 |
| Experience (Exp) | 0.0355 | 0.0005 | 0.0400 | 0.0006 | 0.0312 | 0.0019 | 0.0398 | 0.0024 | 0.0345 | 0.0018 | 0.0577 | 0.0025 |
| Exp$^2$ | -0.0007 | 0.00001 | -0.0008 | 0.00003 | -0.0001 | 0.0001 | -0.0009 | 0.0001 | -0.0007 | 0.0001 | -0.0015 | 0.0002 |
| Unemployment Rate (UR) | -0.0555 | 0.0039 | -0.0976 | 0.0065 | -0.0809 | 0.0212 | -0.0684 | 0.0268 | -0.0431 | 0.0165 | -0.0554 | 0.0139 |
| UR$^2$ | 0.00002 | 0.0006 | 0.0056 | 0.0011 | 0.0058 | 0.0035 | 0.0022 | 0.0043 | -0.0002 | 0.0027 | 0.0020 | 0.0022 |
| Cohort 1995-1999 | | | -0.0476 | 0.0030 | 0.3491 | 0.0243 | 0.2219 | 0.0276 | 0.2613 | 0.0302 | 0.2794 | 0.0141 |
| Cohort 1990-1994 | | | -0.0075 | 0.0039 | 0.3262 | 0.0208 | 0.1209 | 0.0227 | 0.1987 | 0.0145 | 0.1101 | 0.0075 |
| Cohort 1985-1989 | | | 0.2968 | 0.0080 | 0.2465 | 0.0161 | 0.0433 | 0.0179 | 0.1287 | 0.0122 | | |
| Cohort 1980-1984 | | | 0.1933 | 0.0070 | 0.2206 | 0.0161 | 0.0729 | 0.0171 | 0.0293 | 0.0094 | | |
| Cohort 1975-1979 | | | 0.1023 | 0.0065 | 0.0691 | 0.0094 | | | | | | |
| Africa | | | 0.0742 | 0.0065 | | | | | | | | |
| South and Central America | | | 0.0257 | 0.0058 | | | | | | | | |
| Constant | 12.2071 | 0.0073 | 12.1138 | 0.0123 | 12.0152 | 0.0386 | 12.0760 | 0.0476 | 12.1636 | 0.0289 | 12.1506 | 0.0241 |

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**Table A.4 (cont.)**

| Selection equation | Natives Coeff. | Std.err. | Non-Western Coeff. | Std.err. | Pakistan Coeff. | Std.err. | Turkey Coeff. | Std.err. | Vietnam Coeff. | Std.err. | Sri Lanka Coeff. | Std.err. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Couple | 0.5438 | 0.0077 | 0.4358 | 0.0090 | 0.2937 | 0.0238 | 0.0831 | 0.0345 | 0.4851 | 0.0275 | 0.4906 | 0.0286 |
| Single parent | 0.1422 | 0.0297 | 0.0153 | 0.0223 | -0.0417 | 0.0603 | 0.0157 | 0.0857 | 0.1510 | 0.0589 | 0.1802 | 0.1241 |
| Child under 3 yrs | 0.0526 | 0.0147 | 0.0385 | 0.0074 | 0.0942 | 0.0182 | -0.0572 | 0.0277 | 0.0543 | 0.0229 | 0.0660 | 0.0341 |
| 1 Child | 0.2655 | 0.0118 | 0.0850 | 0.0112 | 0.1478 | 0.0263 | 0.2398 | 0.0395 | -0.0105 | 0.0328 | 0.1815 | 0.0426 |
| 2 Children | 0.3608 | 0.0129 | 0.0745 | 0.0111 | 0.1631 | 0.0262 | 0.3066 | 0.0387 | 0.0656 | 0.0322 | 0.1101 | 0.0421 |
| 3 Children | 0.3205 | 0.0190 | -0.0871 | 0.0128 | 0.1555 | 0.0270 | 0.2173 | 0.0436 | -0.0483 | 0.0349 | 0.0755 | 0.0505 |
| 4 Children | 0.0576 | 0.0336 | -0.3542 | 0.0140 | 0.0595 | 0.0274 | 0.1171 | 0.0505 | -0.0946 | 0.0385 | 0.0176 | 0.0854 |
| Higher education | 0.7646 | 0.0101 | 0.2002 | 0.0090 | 0.1779 | 0.0231 | 0.3230 | 0.0379 | 0.5147 | 0.0315 | -0.2696 | 0.0368 |
| Secondary education | 0.4190 | 0.0076 | 0.0573 | 0.0080 | 0.0601 | 0.0178 | 0.0423 | 0.0244 | 0.1881 | 0.0217 | -0.2145 | 0.0310 |
| Education not available | | | -0.2711 | 0.0100 | -0.3568 | 0.0218 | -0.3457 | 0.0301 | -0.2548 | 0.0401 | -0.5475 | 0.0370 |
| Age | 0.1668 | 0.0024 | 0.0460 | 0.0028 | 0.0542 | 0.0075 | 0.0270 | 0.0108 | 0.0505 | 0.0077 | -0.0234 | 0.0109 |
| Age$^2$ | -0.0021 | 0.00003 | -0.0009 | 0.00003 | -0.0011 | 0.0001 | -0.0008 | 0.0001 | -0.0010 | 0.0001 | -0.0002 | 0.0001 |
| YSM | | | 0.1117 | 0.0019 | 0.0655 | 0.0060 | 0.0409 | 0.0080 | 0.2425 | 0.0083 | 0.1604 | 0.0111 |
| YSM$^2$ | | | -0.0035 | 0.0001 | -0.0025 | 0.0002 | -0.0016 | 0.0003 | -0.0082 | 0.0003 | -0.0076 | 0.0006 |
| Unemployment Rate (UR) | -0.0355 | 0.0153 | -0.2886 | 0.0167 | -0.2651 | 0.0530 | -0.1305 | 0.0696 | -0.4427 | 0.0528 | -0.1127 | 0.0558 |
| UR$^2$ | 0.0003 | 0.0024 | 0.0230 | 0.0027 | 0.0177 | 0.0087 | 0.0088 | 0.0112 | 0.0435 | 0.0084 | -0.0007 | 0.0085 |
| Cohort 1995-1999 | | | -0.1737 | 0.0067 | -0.1219 | 0.0769 | 0.0694 | 0.0935 | 0.2211 | 0.0993 | 0.6893 | 0.0671 |
| Cohort 1990-1994 | | | 0.4230 | 0.0109 | -0.2841 | 0.0629 | 0.0676 | 0.0731 | -0.0568 | 0.0585 | 0.2120 | 0.0324 |
| Cohort 1985-1989 | | | -0.1102 | 0.0196 | -0.3734 | 0.0481 | -0.1387 | 0.0544 | -0.1495 | 0.0471 | | |
| Cohort 1980-1984 | | | -0.2159 | 0.0166 | -0.2596 | 0.0454 | -0.1891 | 0.0468 | -0.0525 | 0.0327 | | |
| Cohort 1975-1979 | | | -0.1313 | 0.0157 | -0.1439 | 0.0237 | | | | | | |
| Africa | | | -0.0589 | 0.0160 | | | | | | | | |
| South and Central America | | | -0.0615 | 0.0142 | | | | | | | | |
| Constant | -2.7032 | 0.0553 | -0.3582 | 0.0629 | 0.1282 | 0.1879 | 0.3188 | 0.2577 | -0.9584 | 0.1934 | 1.4896 | 0.2337 |
| ρ | -0.3624 | 0.0066 | -0.1866 | 0.0105 | -0.5772 | 0.0207 | -0.2624 | 0.0440 | -0.6298 | 0.0186 | -0.5291 | 0.0314 |
| σ | 0.3960 | 0.0007 | 0.4052 | 0.0009 | 0.4281 | 0.0041 | 0.3759 | 0.0038 | 0.3684 | 0.0032 | 0.3482 | 0.0029 |

**Table A.5. Estimation Results for Women. Modified Approach**

| | Natives | | Non-Western | | Pakistan | | Turkey | | Vietnam | | Sri Lanka | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. | Coeff. | Std.err. |
| *Ln wages* | | | | | | | | | | | | |
| Higher education | 0.2655 | 0.0030 | 0.1319 | 0.0050 | 0.0929 | 0.0180 | 0.2324 | 0.0222 | 0.1372 | 0.0119 | 0.1175 | 0.0133 |
| Secondary education | 0.0592 | 0.0026 | 0.0020 | 0.0042 | -0.0361 | 0.0135 | 0.0067 | 0.0150 | -0.0136 | 0.0077 | 0.0143 | 0.0102 |
| Education not available | | | 0.0930 | 0.0054 | -0.0063 | 0.0151 | 0.0226 | 0.0186 | 0.0514 | 0.0155 | 0.0468 | 0.0155 |
| Experience (Exp) | 0.0128 | 0.0004 | 0.0364 | 0.0008 | 0.0193 | 0.0025 | 0.0190 | 0.0033 | 0.0316 | 0.0021 | 0.0445 | 0.0031 |
| $Exp^2$ | -0.00004 | 0.00001 | -0.0006 | 0.00004 | -0.0002 | 0.0001 | -0.0001 | 0.0002 | -0.0009 | 0.0001 | -0.0012 | 0.0002 |
| Unemployment Rate (UR) | -0.0453 | 0.0039 | -0.0662 | 0.0076 | -0.0440 | 0.0314 | -0.0357 | 0.0389 | -0.0836 | 0.0185 | -0.0370 | 0.0210 |
| $UR^2$ | 0.0015 | 0.0006 | 0.0047 | 0.0013 | -0.0004 | 0.0053 | -0.0014 | 0.0065 | 0.0041 | 0.0031 | 0.0025 | 0.0034 |
| Cohort 1995-1999 | | | 0.0044 | 0.0039 | 0.1276 | 0.0308 | 0.1586 | 0.0361 | 0.1373 | 0.0238 | 0.1345 | 0.0136 |
| Cohort 1990-1994 | | | -0.0250 | 0.0042 | 0.1356 | 0.0251 | 0.1110 | 0.0268 | 0.1405 | 0.0163 | 0.0482 | 0.0094 |
| Cohort 1985-1989 | | | 0.2045 | 0.0103 | 0.0771 | 0.0222 | 0.0796 | 0.0234 | 0.0785 | 0.0146 | | |
| Cohort 1980-1984 | | | 0.1487 | 0.0094 | 0.0217 | 0.0218 | 0.1031 | 0.0215 | 0.0300 | 0.0119 | | |
| Cohort 1975-1979 | | | 0.0999 | 0.0091 | 0.0087 | 0.0203 | | | | | | |
| Africa | | | 0.0369 | 0.0090 | | | | | | | | |
| South and Central America | | | -0.0214 | 0.0086 | | | | | | | | |
| Constant | 12.0587 | 0.0071 | 11.9934 | 0.0156 | 12.0773 | 0.0548 | 11.9627 | 0.0650 | 12.1306 | 0.0308 | 11.9771 | 0.0352 |

**Table A.5 (cont.)**

| *Selection equation* | Natives Coeff. | Std.err. | Non-Western Coeff. | Std.err. | Pakistan Coeff. | Std.err. | Turkey Coeff. | Std.err. | Vietnam Coeff. | Std.err. | Sri Lanka Coeff. | Std.err. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Couple** | 0.0721 | 0.0076 | 0.0433 | 0.0114 | -0.3265 | 0.0436 | 0.0080 | 0.0620 | 0.3713 | 0.0345 | 0.3874 | 0.0406 |
| **Single parent** | -0.2345 | 0.0125 | -0.2871 | 0.0148 | -0.4160 | 0.0582 | -0.3220 | 0.0763 | -0.2967 | 0.0434 | 0.0893 | 0.0725 |
| **Child under 3 yrs** | -0.1792 | 0.0092 | -0.0650 | 0.0077 | -0.0631 | 0.0225 | -0.1369 | 0.0307 | -0.0761 | 0.0228 | -0.2213 | 0.0294 |
| **1 Child** | -0.0508 | 0.0090 | -0.0218 | 0.0113 | 0.0082 | 0.0342 | 0.0336 | 0.0471 | -0.1612 | 0.0340 | 0.1079 | 0.0384 |
| **2 Children** | -0.2754 | 0.0090 | -0.1375 | 0.0113 | 0.0096 | 0.0334 | -0.1188 | 0.0461 | -0.2946 | 0.0341 | 0.0289 | 0.0404 |
| **3 Children** | -0.6088 | 0.0115 | -0.3845 | 0.0130 | -0.1123 | 0.0345 | -0.2587 | 0.0520 | -0.4941 | 0.0375 | -0.0120 | 0.0465 |
| **4 Children** | -0.9445 | 0.0213 | -0.8096 | 0.0153 | -0.3258 | 0.0363 | -0.6297 | 0.0632 | -0.6818 | 0.0417 | -0.1449 | 0.0764 |
| **Higher education** | 1.0919 | 0.0088 | 0.6391 | 0.0101 | 0.6987 | 0.0302 | 0.6611 | 0.0512 | 0.5015 | 0.0370 | 0.1256 | 0.0398 |
| **Secondary education** | 0.5425 | 0.0068 | 0.3814 | 0.0085 | 0.3851 | 0.0219 | 0.2192 | 0.0319 | 0.2152 | 0.0210 | 0.0075 | 0.0289 |
| **Education not available** | | | -0.0946 | 0.0111 | -0.0972 | 0.0252 | -0.1048 | 0.0364 | 0.0497 | 0.0383 | -0.1461 | 0.0392 |
| **Age** | 0.1860 | 0.0021 | 0.1467 | 0.0033 | 0.0810 | 0.0110 | 0.1380 | 0.0154 | 0.2147 | 0.0090 | 0.0284 | 0.0123 |
| **Age$^2$** | -0.0024 | 0.00002 | -0.0020 | 0.00004 | -0.0014 | 0.0001 | -0.0023 | 0.0002 | -0.0029 | 0.0001 | -0.0006 | 0.0002 |
| **YSM** | | | 0.1379 | 0.0025 | 0.1001 | 0.0090 | 0.1281 | 0.0116 | 0.2884 | 0.0090 | 0.2670 | 0.0108 |
| **YSM$^2$** | | | -0.0035 | 0.0001 | -0.0020 | 0.0003 | -0.0033 | 0.0004 | -0.0094 | 0.0004 | -0.0080 | 0.0006 |
| **Unemployment Rate (UR)** | -0.1063 | 0.0130 | -0.3275 | 0.0191 | -0.3260 | 0.0624 | -0.3001 | 0.0881 | -0.4552 | 0.0555 | -0.1108 | 0.0608 |
| **UR$^2$** | 0.0109 | 0.0021 | 0.0378 | 0.0032 | 0.0385 | 0.0106 | 0.0346 | 0.0146 | 0.0512 | 0.0092 | 0.0209 | 0.0098 |
| **Cohort 1995-1999** | | | -0.0054 | 0.0091 | 0.2904 | 0.1098 | 0.3842 | 0.1276 | 0.3446 | 0.0878 | 0.5588 | 0.0493 |
| **Cohort 1990-1994** | | | 0.2055 | 0.0113 | 0.1883 | 0.0896 | 0.3369 | 0.0950 | 0.0377 | 0.0650 | 0.2452 | 0.0317 |
| **Cohort 1985-1989** | | | 0.2384 | 0.0304 | 0.1771 | 0.0725 | 0.2936 | 0.0755 | -0.1206 | 0.0549 | | |
| **Cohort 1980-1984** | | | 0.2144 | 0.0269 | 0.0680 | 0.0590 | 0.1279 | 0.0545 | 0.0150 | 0.0406 | | |
| **Cohort 1975-1979** | | | 0.2115 | 0.0252 | -0.0056 | 0.0411 | | | | | | |
| **Africa** | | | 0.0989 | 0.0239 | | | | | | | | |
| **South and Central America** | | | -0.1687 | 0.0214 | | | | | | | | |
| **Constant** | -2.9944 | 0.0487 | -3.4042 | 0.0764 | -2.0473 | 0.2458 | -2.8483 | 0.3370 | -4.8414 | 0.2109 | -1.6704 | 0.2515 |
| **ρ** | -0.5192 | 0.0067 | -0.2968 | 0.0171 | -0.3586 | 0.0541 | -0.2705 | 0.0733 | -0.3480 | 0.0369 | -0.2693 | 0.0612 |
| **σ** | 0.3584 | 0.0009 | 0.3417 | 0.0015 | 0.3485 | 0.0067 | 0.3369 | 0.0063 | 0.3122 | 0.0033 | 0.3247 | 0.0041 |