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# Refugees' integration:

# Lagging Wages or Lagging Employment?

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# Refugees′ integration: Lagging Wages or Lagging Employment?*

by

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## Abstract

With detailed micro data we are able to break up the earnings equation and study the relative importance of wages and employment for assimilation. A second feature of the paper is that we control for out-migration bias by focussing on refugee immigrants lacking the option to re-migrate. We show that refugees' poor earnings assimilation during the first 20 years after immigration is mainly caused by lagging employment while lagging wages is less of a problem. Refugees' earnings are more sensitive to business cycle effects than are natives' but estimated wage curves show that effects on refugees' wages are not systematically higher than those of natives. Thus, earnings are affected via changed employment. However, refugees' sensitivity to the business cycle falls with time in Sweden and wages of refugees with short duration are adversely affected in a slump.

## Introduction

To understand the process of assimilation it seems vital to know to what extent immigrants' lagging earnings are due to lagging wages and to lagging employment. Such studies are mainly missing, though, much due do data limitations. The economics literature is instead dominated by separate studies on earnings assimilation and duration analysis of immigrants' employment. As a consequence, no comprehensive view based on a coherent model is obtained. The first novel contribution of this paper is that we take a holistic view by analysing earnings assimilation with an *exact* separation of earnings into its wage- and employment components. With similar structures of the wage and unemployment equations, we straightforwardly obtain the earnings equations for immigrants and natives. The derived model allows us to find out whether it is poor labor market attachment, i.e. excessive number of days in unemployment, or slow wage equalisation that prevents total work incomes of immigrants to reach the same level as that of natives.

A popular model of wage assimilation is the so called synthetic panel method due to Borjas (1985)[1] and in which multiple cross sections of individuals are combined and the wage outcome of arriving cohorts of immigrants are tracked over time. A second contribution of this paper is that we extend this model to analyzing also the employment assimilation of immigrants. In doing so, we follow up on a methodological issue represented by a requirement that the parameters of the regression models are identified and can be estimated without bias across periods of differential economic activity. As stressed by Borjas (1999) parameter identification requires limiting restrictions on the wage equation normally solved by assuming that trends and transitory macroeconomic changes have identical relative effects on natives' and immigrants' wages. However, the limiting restrictions are in general unacceptable unless regional unemployment is used as a control variable since the sensitivity

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[1] See also Borjas (1999).

of immigrants' wages to economic fluctuations is different from that of natives.[2] We show

that an unemployment equation also suffers from the corresponding identification problem as

economic fluctuations may affect immigrants' unemployment differently than natives,

requiring an extra identifying covariate also for this equation. By using regional

unemployment as an identifying covariate, one may properly identify the parameters involved

also in the equation for days in unemployment.

A serious problem afflicting assimilation studies is that relative earnings are

affected by the return migration or re-migration of the (normally) less successful immigrants.

Therefore, estimates of assimilation studies generally suffer from out-migration bias.[3] A third

contribution of this paper is that we minimize the estimation bias by including only immigrant

groups for whom return migration is not an option. This is done by identifying immigrants

having received asylum in Sweden after escaping war or oppressive dictatorships or having

arrived from poor countries for other reasons than work. The identification is based on their

country of origin and the immigration year that we connect with dictatorships or wars

indicating that the immigrants to Sweden arrived as refugees for whom return was not an

option for a long time ahead. Thus, the groups in focus are basically refugee immigrants and

their relatives. Studying refugees also has the advantage that we focus in on groups for which

assimilation is of crucial importance. For immigrants from countries of similar income levels

as Sweden, assimilation is not an issue, particularly since remigration or return migration are

possible solutions to unsuccessful migrations.

The study closest to ours is Antecol, Kuhn and Trejo (2006) who analyse

immigrants' earnings-, wage-, and employment growth in Australia, Canada and the US.

Immigrants in their study include those that may return or re-migrate. A second difference to

ours is that employment in their data is represented by an indicator variable (indicating if the

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[2] See Bratsberg, Barth, and Raaum (2006) who show that previous studies on the US may have exaggerated the pace of wage integration between immigrants and natives. See also Barth, Bratsberg and Raaum (2004).
[3] See Lubotsky (2007) for the US and Edin, LaLonde and Åslund (2000) for Sweden.

individual was employed or not during the census week) implying that an exact breakdown of earnings into wages and employment is not possible. They relate their results to the labor market institutions of the three countries and one of their interesting findings is that wage assimilation is the highest in the US where wage flexibility is the highest.


## Modelling integration

*Dealing with out-migration bias*

In this section we present the basic theoretical issues and the regression equations that follow. In dealing with the issue of out-migration bias we first note that assimilation is an issue only for immigrants that have no option to return or to re-migrate. In a study of out-migration from Sweden, Edin, LaLonde and Åslund (2000) shows that immigrants from the Nordic and other OECD countries dominate strongly in terms of return migration. However, we shall proceed further by identifying stocks of refugee immigrants in the Swedish labor market that are well represented in our data. Sweden has experienced major waves of refugee inflows a fact that may be exploited to minimize the out-migration bias.

One group of refugee immigrants lacking the option of return migration is the refugees from the Baltic countries, i.e. Estonia, Latvia, and Lithuania, for whom Sweden became a place of refuge right after the end of WW2. Thus immigrants from these countries arriving before 1950 are included in our data. A second important group is Latin Americans, notably from Chile, but also from Argentina, Uruguay, Paraguay and Brazil who got asylum status in Sweden as they escaped the oppression in their home countries during the 1970.s and 1980.s. Thirdly, major groups of immigrants arrived from Iraq and Iran as a consequence of the war between the two countries 1980-1988. Fourthly, the Balkan war in the early 1990.s spurred major inflows of immigrants to Sweden. Finally, Sweden has accepted refugees from the former Soviet Union and from other communist countries, including Hungary (especially

after the events in 1956), Czechoslovakia (especially after 1968) and from Poland and other countries in Eastern Europe. The labor inflows following these events are easily identified in the data on immigrants in Sweden as individuals with no real options of remigration. Other immigrants have arrived from developing countries for marriage and may have entered the labor market and would unlikely return due to a labor market discouragement effect.

Edin, LaLonde and Åslund (2000) shows that the bulk of immigrants who leave do so within a few years. If they have been in the country for five or six years the likelihood is low of leaving. Since the groups that we include have been unable to return for many years after arrival in we can quite safely assume that our assimilation results are not afflicted by out emigration bias, at least not seriously so.

## Identification strategies

The basic synthetic panel model of Borjas (1985) consists of one equation determining immigrant wages and another determining native wages. We shall first set up the basic wage equations for immigrants and natives, respectively, and then turn to motivating the equations. Thereafter follow the corresponding equations for employment and income for work.

The estimation equation for wages of immigrant $j$ in time $t$ is determined as:

$$\ln w_{jt} = \phi^i X_{jt} + \delta^i A_{jt} + \alpha YII_{jt} + \Sigma_m \beta_m C_{jm} + \phi^i \ln u_{jt} + \tau^i \ln u_t^r + \sum_s \kappa_s^i \prod_{js} + \varepsilon_{jt} \quad (1)$$

where top index $i$ indicates the immigrant population. The wage $w_{jt}$ is the full time equivalent monthly wage rate covering a fixed wage, fixed extra wages, bonuses, performance pay, different wage compensations etc. $X_{jt}$ is a vector of socioeconomic characteristics, $A_{jt}$ is age of the worker at the time of observation, $YII_{jt}$ is the number of years in immigration country, $C_{jm}$ is an indicator variable capturing the cohort, i.e. the calendar year during which individual $j$ immigrated, $u_{jt}$ is the number of days registered with the employment agency during year $t$, $u_t^r$ is regional unemployment, and $\prod_{js}$ is an indicator variable equal to unity for an observation

in calendar year $t$. Non-linearity in age, years in immigration country and other variables and interaction terms are not shown but will be added in the empirical application.

A crucial variable is *YII*, i.e. years in the immigration country. Other studies have used "years since immigration" which measures the number of years since the last immigration date. Our variable, *YII*, has the advantage that it measures the *actual* number of years in the host country, i.e. it corrects for any period spent outside the host country.[4]

We include a large number of covariates among the socioeconomic characteristics in $X_{jt}$. One may question the inclusion of many characteristics since in many cases these are the result of the assimilation process itself. For this reason, Barth, Bratsberg and Raaum (2004) deliberately leave out "profession" as a covariate. However, Borjas (1999) argues that also "education" is a result of the assimilation process.[5] We do not know to what extent these and other covariates are the results of the assimilation process and pushing the argument by excluding any variable that involves adjustment of immigrants would lower the explanatory power of the model. For this reason we decided to include any available variable that may affect wages and employment.

For native worker $j$ the corresponding wage equation reads:

$$\ln w_{jt} = \phi^n X_{jt} + \delta^n A_{jt} + \phi^n \ln u_{jt} + \tau^n \ln u_t^r + \sum_s \kappa_s^n \prod_{js} + \varepsilon_{jt} \qquad (2)$$

where top index $n$ indicates the native population. In (1), the parameter $\beta$ captures any time invariant differences in wages across arrival cohorts and in (1) and (2) the $\kappa^i$ and $\kappa^n$, measure the periodical macroeconomic effects on immigrants and natives, respectively. The coefficient $\alpha$ in (1) measures the effects of spending one more year in the host country.[6]

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[4] In our case, though, where we focus on assimilation of refugee immigrants the periods spent outside the host country are few.

[5] This is one of the reasons for why there is a lack of comparability across studies.

[6] As noted by Borjas (1999), $\alpha$ and $\delta^i$ must exceed $\delta^n$ for immigrants' wages to grow faster than natives' wages.

The relation $YII_{jt} \equiv \sum_{t=1}^{\Omega} \prod_t (T_t - C_{jt})$, where $T$ represents the measurement year,

implies collinearity between $YII$, $C$ and $\Pi$. To identify the parameters $\alpha$, $\beta$ and $\kappa$, it is then

necessary to impose a restriction like $\kappa^i = \kappa^n$. This assumption, that trends and transitory

changes in the conditions of the macro economy and in the labor market have the same effect

on wages of natives and of immigrants, is however not innocent. It is forcefully rejected by

Bratsberg, Barth, and Raaum (2006) *unless* some other variable capturing the macroeconomic

situation is included. Following these authors we include a measure of regional

unemployment to capture the macroeconomic changes over the years included in our data set.

The improving Swedish labor market during the period covered by data would otherwise yield

an upward bias overestimating wage assimilation. We also include a variable to capture the

*individuals'* labor market situation, as measured by the number of days in unemployment, $u_{jt}$,

actually represented by the number of days registered with the employment agency. This

variable is a natural determinant of wages since the number of days excluded from the regular

labor market affects the individual's possibility of extracting a high wage, as less labor market

experience reduces the wage. Moreover, many unemployment days reflect a poor labor

market status and are associated with a low reservation wage.

Access to the number of days registered with employment agencies also opens

up for an analysis of the determinants of the labor market situation of immigrants relative to

natives.[7] In the following we define a day unemployed as a day when the individual is

registered with an employment agency.  With information of days in unemployment per year,

we depart from the common procedure of estimating duration models based on event data

unlimited by calendar years. Instead we estimate unemployment days in year *t* as a function of

a set of determinants in the same year. The major advantage of this approach is that it allows

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[7] In the following we refer to unemployment as identical to registered with an employment agency. Note that the individual can obtain a positive monthly wage despite a registration with the agency 365 days of a year. We are ultimately interested in the income obtained from working in the regular labor market, i.e. incomes from work when not registered with an agency.

us to compare how years in Sweden affect employment assimilation with how they affect wage assimilation. Moreover, since we disentangle earnings into the wage and employment parts, we should preferably use similar estimation approaches for all three models thereby facilitating the understanding of the relative effects of wage assimilation and employment assimilation.

Obviously, the labor market situation is determined by individuals' characteristics like education, gender, age etc.[8] Like for wages, the chances of job finding should be influenced by the number of years since immigration and employment status may also be influenced by cohort effects. Moreover, the measurement year should arguably be included to capture policy changes that affect the employment status. For immigrants, we are ultimately interested in evaluating the effects of years in Sweden on the number of days employed. We will argue below for the following estimation equation concerning the number of days in unemployment for immigrant $j$ during year $t$:

$$\ln u_{jt} = \phi^{*i} X_{jt} + \delta^{*i} A_{jt} + \alpha^* YSI_{jt} + \Sigma_m \beta_m^* C_{jm} + \gamma^{*i} R_{jt} + \tau^n \ln u_t^{*i} + \Sigma_s \kappa_s^* \Pi_{js} + \varepsilon_{jt}^*. \quad (3)$$

The variable $R_{jt}$ captures the regional effects. Again, non-linearities in age, years since immigration and other variables are not shown but will be added in the empirical application.

Again we face an identification problem, now in (3), since $YII_{jt} \equiv \sum_{t=1}^{\Omega} \Pi_t (T_t - C_{jt})$ applies to this equation as well. To impose the identifying restriction $\kappa^{*i} = \kappa^{*n}$ we again need to control for a variable that captures the macroeconomic effects on employment. To the extent that macroeconomic changes affect natives' unemployment days differently than immigrants', which is argued by Gustafsson and Zheng (2006) to be the case, a macroeconomic recovery would attribute the improvement to employment assimilation and hence cause an overestimation. By including regional unemployment as a covariate and estimating $\eta^i$ and $\eta^n$ we can impose the necessary restriction $\kappa^{*i} = \kappa^{*n}$ for the purpose of identification.

For native worker $j$ the corresponding unemployment equation reads:

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[8] See e.g. Chiswick, Cohen and Zach (1997) and Arai and Wilhelmsson (2004).

$$\ln u_{jt} = \phi^{*n} X_{jt} + \partial^{*n} A_{jt} + \gamma^{*n} R_{jt} + \tau^{*n} \ln u_t^r + \varepsilon_{jt}^*. \qquad (4)$$

Probably the best overarching representation of the assimilation of immigrants is to estimate income of work, i.e. the product of employment and wages for immigrants and natives respectively. The earnings equations immediately derive from (1) through (4). For immigrants, (1) and (3) yield

$$\ln(e_{jt} w_{jt}) = \ln e_{jt} + \ln w_{jt} = \phi^{**i} X_{jt} + \partial^{**i} A_{jt} + \alpha^{**} YSI_{jt} + \Sigma_m \beta_{jt}^{**} C_{jm} + \gamma^{**} R_{jt} + \sum_s \kappa_s^{**} \prod_{js} + \varepsilon_{jt}^{**} \quad (5)$$

where $e_{jt}$ is determined as $(1-u_{jt}/365)$ and where we have factored out $u_{jt}$.

Similarly, for natives, (2) and (4) yield:

$$\ln(e_{jt} w_{jt}) = \ln e_{jt} + \ln w_{jt} = \phi^{**n} X_{jt} + \partial^{**n} A_{jt} + \gamma^{**} R_{jt} + \tau^{**n} \ln u_t^r + \sum_s \kappa_s^{**} \prod_{js} + \varepsilon_{jt}^{**}.$$

(6)

Estimating (1) through (6) gives a rich information set enabling us to assess the rate of assimilation of immigrants in a host country. Moreover, if the rate is low the analysis allows us to evaluate whether it is slow wage assimilation or slow labor market assimilation or both that constitute the problem.

It is possible to estimate the system using fixed effects but this requires the exclusion of several variables that are crucial for the model, including cohorts, gender and any other variable that does not vary across individuals. Predictions based on FE-regressions also indicate a limited value of these regressions.


## Data

We use register data from Statistics Sweden based on event data and individual data on monthly wages, personal characteristics etc.[9] Data are collected for 1997 through 2007 and covers an unbalanced panel of totally 5319 743 observations of which 221447 are refugee immigrants. Natives are defined as people born in Sweden. Data cover all workers in Sweden

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[9] Data are available as a part of the MONA system of Statistics Sweden, Örebro.

in age groups 18 to 64. Appendix 1 shows the means, standard deviation, minimum and maximum values for all data and subdivided into refugee immigrants and natives. Definitions of variables are found in the notes. The wage variable is a full time equivalent monthly wage rate covering a fixed wage, fixed extra wages, bonuses, performance pay, different wage compensations etc.

## Empirical evaluation

In Appendix (available on request) we present the results from estimating equations (1) through (6) and to which we have added higher order terms of several explanatory variables and interaction terms not reported in the equations above.[10]

We evaluate the assimilation effects by predicting wages, days in unemployment and work incomes for natives and refugees for which we study the effects of number of years in Sweden on the differences compared to the native work force. The baseline prediction concerns immigrants who are 25 years of age at the time of immigration and if possible we then predict the incomes of immigrant workers with up to 39 years in Sweden (age 64). The resulting profiles for this typical immigrant worker are then compared to those for native workers in the same age brackets.

*Assimilation in terms of Work Income, Wages and Employment.*

As argued above, comparing immigrants' work income to natives' probably captures the assimilation of immigrants the best as it reflects assimilation of both pay and employment. The thick unbroken line in Figure 1 shows predicted work incomes of refugees as a share of natives' work incomes, based on the estimates of equations (5) and (6). The X-axes shows the number of years spent in Sweden for refugees and the age obtains by adding 25. For instance,

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[10] More specifically we estimate (1), (3) and (5) since these cover (2), (4) and (6) and impose the necessary restrictions for observations on natives and non-labor immigrants.

at point 18 years in Sweden, the refugees have spent 18 years in Sweden and are 18+25=43 years old and the age of the natives is 43. The incomes should be thought of as "adjusted" incomes, since predictions account for the differences in education, gender etc.

Figure 1

Figure 1. *The profiles show work incomes paths for refugee immigrants and for native workers. Predictions based on the estimates in appendix available on request. The profiles for the immigrants are drawn for individuals who are 25 years at 0 years in Sweden, 26 at 1 year in Sweden etc. The natives are of the same age as the corresponding refugees.*

Refugees' incomes from market work fall short of natives' for almost the full work life in the host country. During the first couple of years their incomes are less than fifty percent of natives' incomes and it takes more than thirty years in Sweden for relative incomes of refugees to reach 90 percent of natives' incomes. Towards the end of work life, they finally catch up and actually tend to exceed those of Swedish born workers.

The thin solid line shows how the wage gap changes with time in Sweden. It starts out at around fifteen percent, reaches six to seven percent after fourteen years in Sweden but tends to stay there for most of the work life. However, during the last five years, the gap not only closes but becomes negative.

As shown by the dotted line considerably larger differences are obtained for employment during the first twenty years. Initially, the employment gap is around forty percent which drops to ten after fifteen years and a six to seven percent after around twenty years. When twenty years have passed the employment gap is similar to the wage gap for many years but the gaps deviate at the end as the employment gap to natives never fully closes.

The conclusion to be drawn is that the major reason why refugees' work incomes lag behind is the lagging employment. Had wages been identical across the two groups of workers, the curve representing work incomes would have been identical to the

employment curve. Had employment been identical across the groups the income curve would have been identical to the wage curve. Thus, comparing the wage curve and the employment curve shows the importance of wages and employment, respectively for work incomes.

The slopes of the curves differ widely with time spent in Sweden. The employment and thus also the income curves increase at steady rates during the first fifteen years in Sweden. The composition of refugees differs widely across years in Sweden and though we have accounted for country of origin as covariates, compositional changes affect the profiles. During the first ten years, the dominating refugee groups are from Bosnia-Herzegovina who make up 42 percent and from Iran and Iraq who together make up 28 percent of all refugees.

During the last ten years of work life the relative employment rate of refugees again increases. Even more impressive is the increase in the relative growth rate of wages. The composition of refugees having spent more than thirty years in Sweden is very different from that of those having spent less than fifteen. Our data cover the period 1997-2007 and those individuals who have stayed for thirty years or more in Sweden in this period arrived in the late 1960.s and are dominated by refugees from Eastern Europe. This group makes up 64 percent of all refugees. Their share increases with the time spent in Sweden and the share of those having spent more than 35 years in Sweden is 68 percent.

The refugees having spent 15 to 25 years in Sweden during our data period 1997-2007 are dominated by Latin Americans, East Europeans and Iranians&Iraqis in almost identical shares (each around 28 percent). During this period and with this composition, the gap closes the least.

The changes in composition connected with changes in the curves suggest that integration differs widely across the groups. To further explore such differences, Figure 2 shows the predicted unemployment days for Latin Americans, East Europeans, Iranians,

Iraqis, refugees from Horn of Africa (i.e. Ethiopia, Eritrea, Somalia and Sudan) and natives. To obtain enough observations for the predictions, the x-axis, unlike that in Figure 1, measures time spent in Sweden *irrespective of age*, for the five refugee groups while it measures age by adding 25 for the natives. Figures 1 and 2 are therefore not directly comparable. In Figure 2, we have excluded predictions based on less than fifty observations.[11]

Figure 2

First of all, we note from Figure 2 that there are major differences across the groups. During the first years in Sweden, Iraqis and Iranians start at around 140 days in unemployment while the figure is less than 100 for Latin Americans. Days unemployed then fall for all groups during 15 to 20 years and the differences decrease over time. Still, the Iraqis continue to be the group with the highest number of unemployment days followed by Iranians and refugees from Horn of Africa.

What possible explanations could there be behind the figures? The falling trends in Figure 2 suggest that unobserved productivity, e.g. due to language proficiency, improves over time in Sweden for all groups. The unemployment differences between refugees from on the one hand Iraq, Iran and Horn of Africa and the other groups cannot easily be explained using our register data. They are, though, consistent with the general notion that refugees from Muslim countries are exposed to labor market discrimination as verified in studies by employers' reaction to job applicants with Arabic sounding names.[12]

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[11] Figure A1 in Appendix shows how the corresponding curves in Figure 1 change with this assumption. As expected the initial employment when compared to natives does not differ as much as in Figure 1 since the average age is higher.

[12] See Arai and Skogman Thoursie (2009). This literature lacks results concerning employment discrimination towards other groups than those with Arabic sounding names.

Figure 3 shows the predicted (adjusted) monthly wages for natives and for refugees from the same regions as above, over their work life (and age starting at 25) in Sweden. There are large initial differences when compared to natives but there are also initial differences between the refugee groups. Generally, Latin American refugees obtain lower wages than other refugee groups. Iranians and Iraqis perform the best in terms of wages and these groups are the first to reach par with natives, after around twenty years. While the wage improvement generally is the strongest for Iranians and Iraqis their labor market situation is the weakest as noted in Figure 2. Wages of Latin Americans are the lowest of the three, but, on the other hand, their labour market position is the strongest, particularly during the first couple of decades in Sweden.

Figure 3


In Figures 4 and 5 we compare male refugees to male natives and female refugees to female natives, respectively. In terms of employment there are only small initial differences across the genders. Both start out at around 55 percent of the corresponding natives' employment rates. However, the relative increase is stronger for females: After twelve years females have reached ninety percent of native peers' employment while it takes sixteen years for males. Females reach par with native peers at the end of work life while males never do.

Figure 4

Adjustment is faster for women also in terms of wages. After 13 years in Sweden, female refugees reach 95 percent of female natives' wages while it takes 18 years for males to approximately reach that level. Par with natives is reached some years earlier for females than males. In terms of work incomes, females reach par with natives after 36 years in Sweden while males reach par after 39 years.

Figure 5

In Figures 6 and 7 we perform the similar analysis but for high and low skilled workers, respectively. Initially, high and low skilled refugees' incomes of work as a share of native peers' income do not differ much; during the first couple of years refugee incomes are around half of that of natives. However, high educated refugee workers reach 85 percent of low educated natives' incomes a couple of years earlier than high educated workers do compared to high educated natives.

Figure 6

Figure 7

It should be quite clear that the major problem of integration of refugees does not lie in wage differences but in employment differences.

The above results for wages can be compared to those reported for the US in Bratsberg et.al. (2006), (see their Figure 2) where the wage gaps between immigrants (note labor and non-labor aggregated) and natives never is fully closed: For the US there remains a wage gap also in the long run. [13] Wage differences are hard to fully defeat also in Sweden but Figure 1 indicate that Sweden relative to the US is successful in terms of long run wage equalisation. This is so particularly since we focus on refugees, i.e. people that have not arrived for labor market reasons and who in many cases have experiences from oppression and wars that could make integration difficult. Also differences in employment across natives and refugees appear to go away in the long run with the problem being that the days spent in unemployment are extremely high during the first fifteen to twenty years.

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[13] See Bratsberg et. al. (2006) Figure 2. A difference, though, is that they evaluate their results assuming identical values of the independent variables for all workers. Another difference is that they do not separate labor from non-labor immigrants. Our approach in this respect follows that of Antecol et. al. (2006).

*Natives' and Immigrants' Wage Curves*

If a worker is employed in a high unemployment region, we expect following bargaining and efficiency wage theory, that he or she earns less than an individual in a low unemployment region.[14] In this section we investigate the existence of differential effects of local unemployment on wages of natives and some refugee groups. In Table 1, we present estimated wage curve elasticities by origin country (or region). As immigrants in general face worse employment prospects than natives do, one could expect wages of immigrants to be more responsive to unemployment than wages of natives. This hypothesis was confirmed by Barth, Bratsberg and Raaum (2004) on Norwegian data.

Table 1, Column 1 shows estimated wage curve elasticities using our monthly full time equivalent real wages. The estimated elasticity for natives is -.027 which in absolute terms is less than the estimate for Latin Americans (-.053) and Iraqis (-.038) but larger than for Iranians and Eastern Europeans (both -.019) and refugees from Horn of Africa (-.020). Thus, we find no systematic evidence that refugees' wages are more sensitive to local unemployment than are natives' but that they differ a great deal across origin region.

It is likely that time in the host country affects the estimates as wages of those with short durations can be expected to be more affected than those with long durations. We present estimates where we have split up the refugees into those having been up to fourteen years in Sweden (Column 2) and those with longer durations than fourteen years (Column 3). That wages of short term refugees are more sensitive holds for Latin Americans and Eastern Europeans. For Iranians, Iraqis and refugees from Horn of Africa neither estimate is significant. However, a comparison of Column 2 and Column 1 suggest that the conclusion holds also for refugees from Iraq and from Horn of Africa. For Iranians, on the other hand, the absolute value of the estimate in Column 3 is larger than the one in Column 1 suggesting the contrary conclusion.

A higher local unemployment rate also implies that the individuals' days in unemployment increases which may have an effect on his or her wage rate. Since the wage elasticities should capture business cycle effects, we control for individuals' days in unemployment and the results are presented in Column 4. While the estimated elasticities fall (as compared to those in Column 1) the change is not drastic and the basic conclusions remain. For Iranians, the estimate is no longer significant on standard levels.

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[14] See Blanchflower and Oswald (1994).

It is also of interest to see how the incomes of work change with local unemployment as this indicates the dependence of immigrants of different origin to the business cycle. The message here is very clear namely that immigrants' incomes are much more sensitive to changes in local unemployment than are the incomes of natives. While the estimate of the natives is -0.30, it is very high for refugees from Iran (-1.25), Horn of Africa (-1.15), and from Iraq (-0.90). Thus, an increase in unemployment lowers the incomes of Iranians four times more than natives. Work incomes of refugees from Latin America and Eastern Europe are less affected but still more so than natives.

Together with the estimated wage curve effects, this implies that in a business slump, the heavy drop in incomes pertaining to some countries is mainly due to an increase in the number of unemployment days and less so due to lowered wages. The wage effects, though, differ depending on time in Sweden. For immigrants with low duration in Sweden there also is a wage drop, particularly for refugees from Latin America, Iraq and Horn of Africa.

| Region of origin. | Wages. Basic model | Wages. Time in Sweden < 15 years | Wages. Time in Sweden > 14 years | Wages. Individuals' unemployment days included | Incomes of Work. Basic model |
|---|---|---|---|---|---|
| *Sweden* | -.027 (-37.78) | n.a. | n.a. | -.023 (-33.00) | -0.30 (-24.30) |
| *Latin America* | -.053 (-7.15) | -.11 (-8.43) [12139] | -.036 (-3.76) [26028] | -.046 (-6.29) | -0.42 (-2.99) |
| *Iran* | -.019 (-2.16) | -.007 (-.56) [15692] | -.03 (-2.09) [15723] | -.008 (-.96) | -1.25 (-5.75) |
| *Iraq* | -.038 (-3.60) | -.04 (-3.42) [20069] | -.009 (-.42) [6968] | -.026 (-2.46) | -0.90 (-3.48) |
| *Horn of Africa* | -.020 (-1.78) | -.04 (-2.78) [12529] | .02 (.81) [6048] | -.013 (-1.11) | -1.15 (-4.00) |
| *Eastern Europe* | -.019 (-2.87) | -.03 (-1.48) [7132] | -.02 (-2.08) [31304] | -.015 (-2.26) | -0.50 (-3.82) |

Table 1. Unemployment elasticities by country of birth.
Note: The results are based on separate regressions for each country. The effects on real monthly wages and of work incomes of unemployment rates at the regional (län) level are presented on double logarithmic form. t-ratios in parenthesis. Brackets in Column 3 and 4 show number of observations. The basic regression include controls for age, gender, educational level, immigrant cohort, region of residence, year of observation, time in Sweden and, if applicable, country of origin. Polynomials (squared and quadratic) are included for age and time in Sweden.


*Conclusions*

We present an integrated model of wage-, employment-, and earnings assimilation for groups

of immigrants and for natives and show that an augmented version of the synthetic panel

model of Borjas (1985) can be used for unbiased estimation of all three equations. This coherent model enables us to pinpoint to what extent the finding that immigrants' work income lag behind those of natives is due to lagging wages or to lagging employment. We have also proposed strategies to deal with central problems of immigration studies. One such problem deals with out-migration which has been shown to be a major cause of bias in previous studies. Our strategy here is to identify immigrants lacking a re-migration option. Another potential problem deals with the identification of the unemployment equation and our strategy in this respect is to allow for regional unemployment to have differential effects on natives and immigrants.

So far it has not been possible to clearly establish the existence of wage discrimination in Sweden.[15] When controlling for a large number of covariates, we find wage assimilation during the first 13-14 years in Sweden that, however, comes to a halt at less than 95 percent of the natives' wage. Unobserved productivity improvements are likely to be a prominent factor behind immigrants' catching up on natives. The wage gap remains, though, for almost the full work life.

Immigrants start out at extreme number of days in unemployment after arrival. The rate of labor market assimilation proceeds from initially less than sixty percent of natives' employment to around ninety in fifteen years. Our predictions of unemployment days reveal large differences across country of origin with refugees from Iran, Iraq and Horn of Africa facing major problems in entering the labor market despite many years of residence in Sweden.

During the first twenty years in the host country lagging employment rather than lagging wages is the reason why refugees' earnings from market work lag behind natives'. There is, of course, a relation between unemployment and wages that we account for in our

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[15] See Bantekas (1992), Le Grand and Szulkin (1999), Vilhelmsson (2002).

wage regressions, and this effect is considered in our analysis of natives' and immigrants' wage curves. We do not find that wages of immigrants are generally more sensitive to local unemployment than are wages of natives. This means that if the immigrants' incomes from work fall relative to natives' income, this is due to more days in unemployment among immigrants and not to lower relative wages. Hence, in terms of wages, refugees are not more adversely affected than natives by a business downturn.

We find, though, as might be expected from the wage curve literature, that wages of immigrants of short duration are more sensitive than are wages of immigrants of long duration, i.e. that the wage elasticity falls with time of residence in the host country. Thus, in a business downturn we expect not only that unemployment days increase more for immigrants of short duration but also that their wages fall relative to those of immigrants of long duration in the host country. The longer the time in Sweden the less sensitive is the assimilation rate to business cycle downturns.

Hence, a business upturn raises earnings of refugees both via more employment days and via higher wages than otherwise would be the case. Earnings of refugees with longer duration in Sweden are not more negatively affected than natives.

In their study of wage, employment, and earnings assimilation in Australia, Canada, and the United States, Antecol et. al.(2006) find that wage assimilation is the strongest in the US while employment assimilation is the strongest in Australia. The explanation suggested is an institutional one: Australia's compressed wage structure and relatively inflexible wages are claimed to support relatively more quantitative assimilation than price assimilation. For the US, wage flexibility yields relatively more price assimilation than quantitative assimilation.[16] Wages in Sweden are highly compressed at low levels but not so at high levels. We should then expect wages of the low educated to deviate less from

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[16] These are, of course, relative changes and as found by Kahn (2004) flexible relative wages in the US helps create more employment.

wages of low educated natives than is the case for the high educated. This is also what we find. However, the wage profile after around ten years in Sweden is more favourable to the high educated. Still, wage assimilation of the low educated is slightly better than among the high educated.

Another feature of the Swedish labor market is the reliance on active labor market policies which might counteract any negative employment impact of wage rigidity. For Sweden we find that employment assimilation in terms of years until par with natives is similar for the two education groups but that the low educated experience more days in unemployment during most of the assimilation period. Taken together, the low educated lag behind less than the high educated in terms of earnings.

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# APPENDIX 1

**Sample means. Standard deviations in parenthesis. Natives and refugees.**

| Variable | Natives | Refugees |
|---|---|---|
| Wage | 18625 (3800) | 17558 (3539) |
| Gender | 1.29 (.45) | 1.32 (.47) |
| Age | 39 (12.6) | 39 (11.1) |
| Unemployment days | 28.7 (83) | 47.7 (104) |
| Education level 1 | 10.4 (.30) | .09 (.28) |
| Education level 2 | .18 (.38) | .13 (.34) |
| Education level 3 | .64 (.48) | .58 (.49) |
| Education level 4 | .04 (.19) | .04 (.20) |
| Education level 5 | 3.4 (.18) | .14 (.35) |
| Education level 6 | .007 (.08) | .18 (.04) |

Notes: Wages is the full time equivalent monthly wage rate covering a fixed wage, fixed extra wages, bonuses, performance pay, different wage compensations etc. Education levels are: **1**: Pre high school education (SUN100-206); **2**: 2 or 3 years high school (SUN310-337) **3**: tertiary education <3 years (SUN410-527) **4**: tertiary education at least 3 years (SUN 530-557) **5**: Research education (SUN 600-640).

**Figure 1: Refugees' Income, Wages and Employment as a Share of Natives'.**



**Figure 2 . Predicted Unemployment Days. By Origin.**
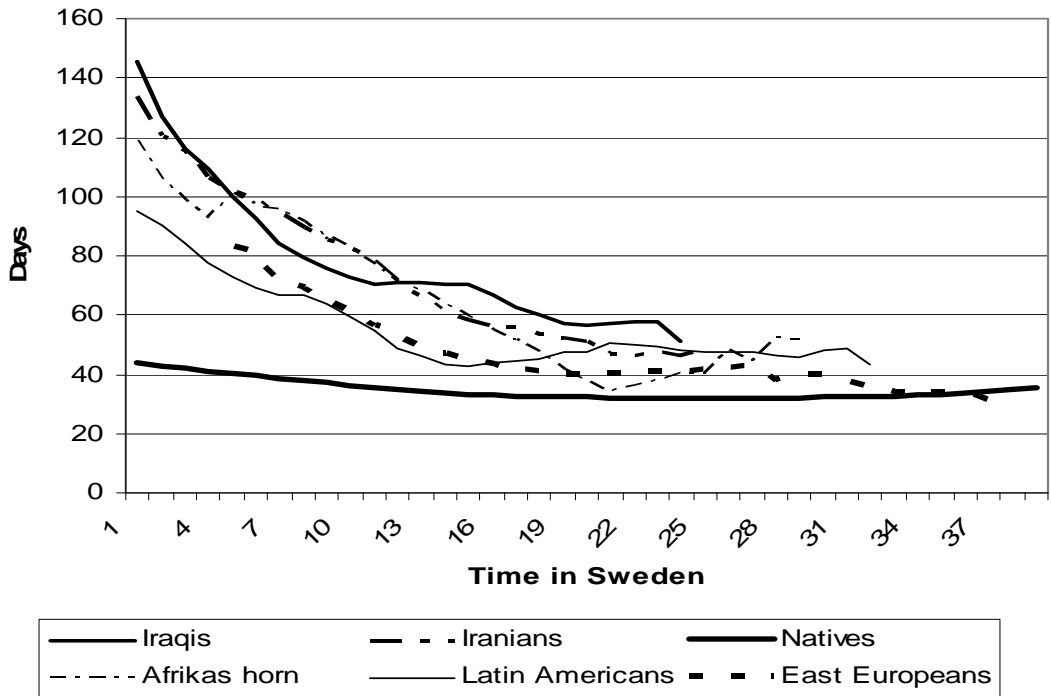
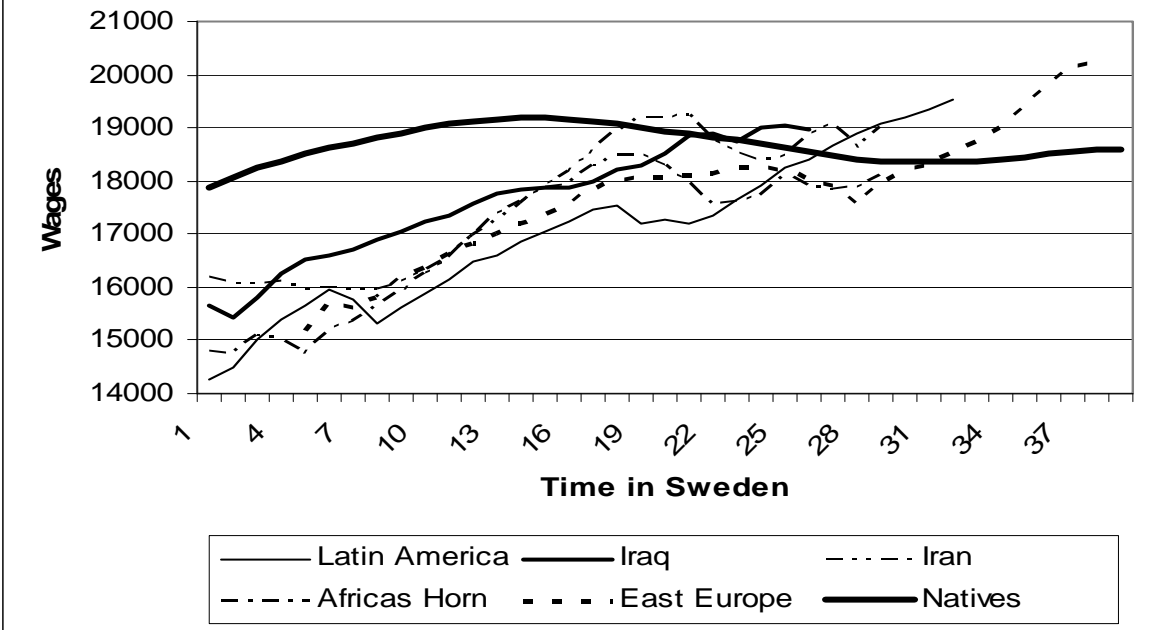**Figure 3. Predicted Real Monthly Wages. By origin**

Legend: Latin America — Iraq — Iran — Africas Horn — East Europe — Natives



**Figure 4. Male Refugees' Income, Wages and Employment as a Share of Male Natives'.**

Legend: Wages — Employment — Incomes
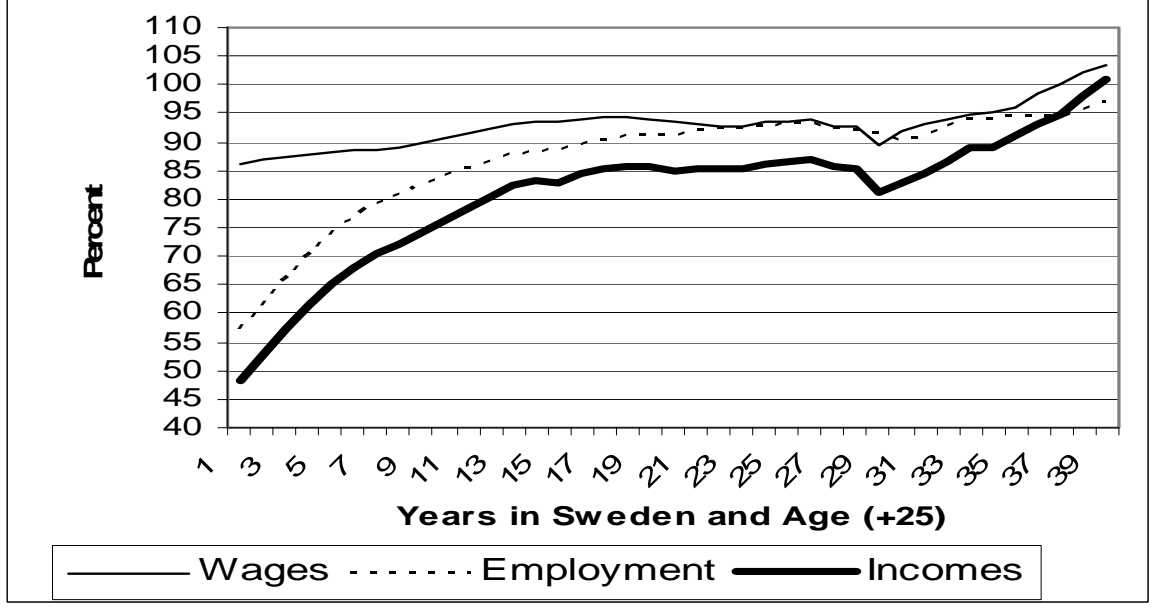
**Figure 5. Female Refugees' Wages, Employment and Incomes as a Share of Female Natives'.**



Percent

Years in Sweden and Age (+25)

—— Wages ······ Employment —— Incomes

**Figure 6. High Educated Refugees' Income, Wages and Employment as a Share of High Educated Natives'.**



percent

Years in Sweden and Age (+25)
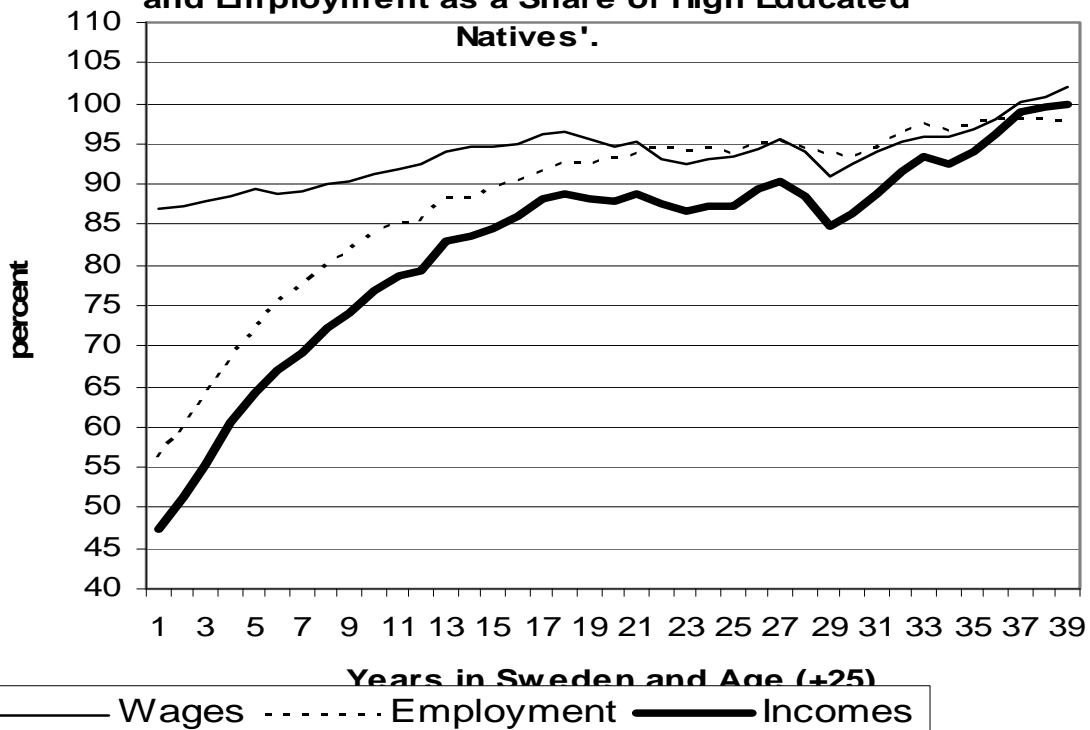
—— Wages ······ Employment —— Incomes

**Figure 7. Low Educated Refugees' Wages, Employment and Incomes as a Share of Low Educated Natives'.**

Years in Sweden and Age (+25)

—— Wages · · · · · · Employment ▬▬ Incomes