Earnings and Employment: Gender and Ethnic Gaps in Families with Pre-school Age Children[1]

Magnus Wikström, Elena Kotyrlo, Niklas Hanes
Umeå School of Business and Economics, Umeå University
SE-901 87, Umeå, Sweden

Abstract

This paper explores the earnings and labor force participation development of recent immigrants in Sweden as a response to the childcare reforms conducted in 2001 and 2002. Differences in earnings and employment rates between immigrant and native families with children in their pre-school ages are estimated to study the hypothesis that increased accessibility to childcare might be particularly beneficial to the groups having certain obstacles to enter labor market. A difference-in-difference approach is employed in on individual data for the period 1995-2009.

Keywords: immigrant, labor force participation, earnings, family policy

JEL Classification: D14, J13, J15, J16

1 Introduction

A recent contribution to the Swedish family policy is the childcare reform that took place in 2001/2002. The main aim of the reform was to increase childcare participation for groups of families that traditionally had no access to childcare and, thus, to improve

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opportunities to enter the labor market or study programs for people with children. The reform consisted of three components (Swedish National Agency for Education 2007). Firstly, a unitary (national) childcare fee system that restricted the fee to 1-3 per cent of family income Secondly, the reform introduced childcare for children whose parents were unemployed (15 hours per week), and thirdly, increased accessibility for families currently on parental insurance.

A few studies have assessed different effects of the Swedish childcare reform. Wikström (2007) analyzed the effects of changes in the childcare fee system on hours of care and participation and found that participation, as well as the number of hours of care, became significantly more equally distributed. Hanes et al. (2009) studied how the fee changes affected the municipalities' decisions in terms of taxation and public expenditures. They found that municipalities' pre-reform fee-systems affected post-reform taxes and expenditures, where child-care demand was increased in municipalities using time rates while income dependent fees did not affect demand. Lundin et al. (2007) analyzed effects of the fee changes on labor supply of families with small children but found no or small effects, arguable economic insignificant, on labor supply. Reform effects on fertility have been studied by Mörk et al. (2013). They found that the childcare reform had a positive effect on fertility.

The purpose of this paper is to study the development of earnings and labor force participation in relation to the reform in 2001/2002. Since heterogeneous reform effects might be a potentially important aspect to consider when evaluating the reform, this paper pays attention to differences between immigrant families and families of natural born Swedes. This aspect of the reform has not been considered in the previous studies. Since the rate of unemployment is higher in many immigrant groups compared to

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Swedes, the scope for positive effects on earnings and employment rates might be larger in these groups. However, it is not necessarily the case that the reform "reached" these groups because of cultural dissimilarities and differences in customs. Therefore, the outcome of the paper is related to a discussion on how well social policy (childcare reform in this case) can contribute to the assimilation process of immigrant groups. Improvement of social integration and further equalization of family and labor rights is one of the most important political issues in Sweden.

There is a large literature studying assimilation processes of immigrants and their earnings development in a receiving country. Chiswick (1978) and Borjas (1985, 1989) analyzed immigration to US and concluded that immigrants, as a rule, never reach the level of earnings of natives. They also argue that the assimilation process takes time and losses in earnings are connected with language and cultural constraints, in particular, gender roles in different ethnic groups. Similar conclusions can be drawn from resent contributions using Swedish data (e.g. Barth et al. 2004, Hammarstedt 2003). This pattern is also related to a higher level of unemployment among immigrants. Evidence from Scandinavian countries show that the unemployment rate is generally highest among refugee immigrants, and family income is lower compared to other immigrant groups (Hansen and Lofstrom 2009; Rosholm and Vejlin 2010, Bratsberg et al. 2007). Rosholm and Vejlin (2010) also show that female refugee immigrants have lower labor participation than men, especially, if they have children. The number of children is quite high in immigrant families. Therefore, a family policy aiming at increasing access to childcare may improve labor market opportunities differently for groups of immigrants. Vikman (2013) found that single mother-immigrants enter labor market faster than married. She also found that age of a child affects timing of labor market enter.

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The empirical analysis in this paper is based on data for the period 1995-2009, including earnings and labor force participation and other family characteristics for 98 thousand families in the pre-reform period and 109 thousand families in the post-reform period. Demographic Data Base, Umeå University is the source of data. Families with parents born in Sweden are used as the reference group. Three groups of different origin are considered in the analysis, Iran/Iraq, Northern and Central Europe, and Africa. Controlling for a number of confounding factors, we test two different hypotheses. First, if the reform package had any effect on the labor market opportunities of families with small children, then we would observe a larger increase in earnings and labor force participation among families with small children than other families. Second, if the reform package benefited families with a lesser connection to the labor market, we would observe a larger increase in earnings and labor force participation among the refugee immigrant families with small children.

The rest of the paper is organized as follows. Section 2 presents the research strategy, including a description of the reform as well as periods of comparison, hypotheses, and empirical model. Data, variable descriptions, and descriptive statistics are presented in section 3. Section 4 contains empirical results and section 5 concludes.

2 Research strategy

2.1 Policy Reform

In Sweden, the provision of childcare is devoted to the municipalities. Municipalities decide on the amount of spending on childcare as well as the user charges (fees), while the central government finances part of the expenditures by intergovernmental grants. During the 1990's, it had been noticed that the level of user charges had increased in many municipalities and that the variation in fees between municipalities had enlarged as well. In 1999, a government working committee was

appointed to propose changes in pre-school financing. The committee noted that there were groups of families that did not have access to public childcare, and that some families did not participate because of the high user fees. In particular, they noted that a large part of the children without access to public childcare were members of immigrant families. Based on their findings, the working committee proposed changes in financing and accessibility to public childcare and the publically provided after school care. In May 2000, the government proposed a reform package consisting of three major changes; (i) a uniform user fee system, with a payment per child depending on family earnings up to a maximum level. On average, the fee reduction amounted to approximately 50 percent compared to the pre-reform levels; (ii) an increased accessibility for children to parents in unemployment and on parental leave by introducing a minimum time in pre-school care. The minimum requirement was set to three hours per day; (iii) a generally available pre-school childcare system was introduced for 4-5 year old children. The latter was voluntary on the part of the family and amounted to at least 525 hours per year free of charge. In September 2000, the reform package was decided by the parliament. The reform of public childcare accessibility and childcare financing was implemented in the years 2001 to 2003.

Since the task of providing childcare is primarily a responsibility for the municipal level, the different parts of the reform were treated in different ways regarding financing and regulation. The accessibility part and the general pre-school were regulated by law. The maximum fee part was voluntary on part of the municipality. Those municipalities that accepted the proposal were compensated with a grant from the central government. In 2002, all municipalities, except two, accepted the maximum fee. By 2003, all municipalities had accepted the proposal.

The different parts of the reform package were introduced during a time span of one and a half year. On July 1, 2001, children to unemployed parents were given the

right to participate in pre-school. On January 1, 2002, children to parents on parental leave earned the same right, and the fee changes were implemented. Finally, on January 1, 2003, the general pre-school was implemented.

2.2 Periods of Comparison

The basic idea of the paper is to compare the development of earnings and labor force participation between immigrant and native families for the period surrounding the childcare reform package. One important question concerns the dates to include for the comparison. Since the reform was implemented in different stages, there is no single date that can mark the start of the reform. Implementations of the different parts were made between July 2001 and January 2003. The reform package was generally known in the autumn of 2000. This means that the years 2001 and 2002 could be considered pre-reform years as well as the post-reform years depending on which part of reform that is studied. For the year 2002 only the general pre-school had not been implemented. According to the follow up made by The Swedish National Agency for Education, the general pre-school had only minor effects on participation rates, since most 4-5 year old children were already participating prior to 2003. However, since the general pre-school is free of charge, parents to 4-5 year old children faced a fee reduction compared to the year 2002. The main assumption employed here is to treat the period prior to 2001 as the pre-reform period and the period from 2002 and onwards as the post-reform period, while the year 2001 is left out of the analysis. The data included in the analysis concerns the years 1995 to 2009.

2.3 Hypotheses and method of estimation

As mentioned in the introduction, the visible effect (at least initially) of the reform was to equalize participation and the number of hours of care among families (Wikström 2007). In particular, participation and hours increased at the lower en of the distribution,

meaning that the main effect was concentrated to the groups that did not have access to childcare prior to reform. Refugee immigrants have the highest unemployment rate (Bennich-Björkman 2002, Malm 2005), meaning that they, as a group, would be likely to increase employment rates and job search the most if given access to public childcare. However, the reform package also had income as well as substitution effects since user fees were reduced for most families with pre-school children, both on average and at the margin. The construction of the maximum fee system implied that the reduction in fees were on average the largest for families with many pre-school children and high family earnings. The marginal effects, however, differed a lot depending upon what system a municipality had in place prior to reform. The most common system was to charge users in relation to family income, where the percentage of income generally exceeded the levels of the maximum fee. Consequently, the "price" of childcare fell after the introduction of the reform. The second most common system was to charge users in relation to hours of care (Swedish National Agency for Education 2007). Under normal circumstances, a reduction in user fees is expected to diminish labor supply, especially female labor supply, because of the income effect and increase it because of the substitution effect. Therefore, earnings growth due to increased participation in childcare may or may not be counteracted. It should be noted that a previous study (Lundin et al. 2008) on the labor supply effects of the reform found no, or very small, average effects on female labor supply. Their study includes families where a vast majority is natives.

Childcare decisions are known to differ over ethnicity groups (see e.g. Brayfield and Hofferth 1995, Joesch 1998). Chiswick (1988) argues that parental investment in children may be influenced by the ethnic group to which they belong. If so, then the demand for formal childcare may also be influenced by ethnicity. Chiswick and DebBurman (2006) studied pre-school enrollment by different immigrant groups in the U.S. and found that enrollment in formal childcare varied with country of origin; some

groups had higher participation rates than natives, while others had lower participation rates. One explanation for this is the language barrier. Children to Spanish speaking immigrants had lower rates of enrollment than natives, while immigrants of English speaking origins had higher enrollment. Families with one English-speaking parent also had higher enrollment than Swedish families.

A second explanation is related to cultural differences, and in particular the roles of men and women in household work and child rearing. In many of the immigrant groups, the traditional division of labor applies, meaning that the female mainly takes care of the children and the household work (Rosholm and Vejlin 2010). This can negatively affect demand for childcare among immigrants. At the same time, families of natives can rely on grandparents' assistance in nursing children when immigrated families usually do not include grandparents. Supposedly, this moves demand for children in the opposite direction. The U.S. studies are not necessarily informative about differences between natives and immigrants childcare decisions, since the groups of immigrants differ between the U.S. and Sweden. One should also note that the division of labor among recent immigrants might be different from the traditional division of responsibilities because of investments in country-specific human capital. According to the family investment hypothesis (Long 1980), immigrant females may work more than native females in order to support human capital investment of the male. Swedish data, however, does not support the family investment hypothesis (Rashid 2004). In a study of the Swedish public childcare, Holmlund (2009) found that having a non-native father decreased the demand for hours of care with approximately 11 percent (compared to having a native father), while having a non-native mother increased the demand by four percent. These effects appear large when contrasted with the description made by the National Agency for Education in 2007 where the number of hours of care is compared. On average, the number of hours of care was slightly lower for children to non-native

parents. There is no information available regarding different immigrants groups' participation in pre-school. The biggest groups of immigrants by country of origin in the age 16-49 in population of Sweden are presented in Table A1.

The main hypothesis is that the childcare reform package affected earnings of parents of children in pre-school ages due to increased opportunity to find a job and to be (at least) part-time employed. Since immigrants, and refugee immigrants in particular, have lower earnings and lower employment rates, we expect that earnings in these groups to increase by more than for native Swedes. However, because of the language barrier and possibly other cultural differences, it is not necessarily the case that enrollment in pre-school increased by more in the immigrant groups. Of particular interest to us is if the reform enlarged labor force participation of recent immigrants and changes in their earnings. If there are barriers to labor market entry and participation in childcare among the immigrant groups, then the change in legislation may not have had any effect on these groups. Therefore, we study both the development of earnings and of participation as a response to the reform. We expect that we would observe larger positive earnings and labor force participation change among the refugee immigrant groups than among natives. In addition, since the reform package affected only those families who had pre-school children, earnings and labor force participation changes (because of the reform package) should only concern families with pre-school children.[2] Therefore, we also expect to find larger increases among families with pre-school children than among other families.

A formal statement of the hypotheses, we would like to test, can be made as follows. Suppose that there are *J* different country groups. Let P_1 and P_2 denote the pre-

[2] After-school care, organized by the municipalities, is also subject to fees. The maximum fee may have implied that families with children in after-school care faced lower fees, in particular if they had pre-school children as well. This is discussed further in the results section.

and post-reform period, respectively, and C the subset of observations of families with pre-school children. If we denote by y earnings, i the individual unit, and t time, the estimating equation is

$$y_{it} = \Gamma_1 + \sum_{j=2}^{J}\left(\Gamma_j \cdot 1(i \in j)\right) + z_{it} + \varepsilon_{it} \qquad (1)$$

where z_{it} and ε_{it} are observed and unobserved characteristics at the individual level, and where Γ_j is defined as

$$\Gamma_j = \alpha_j + \beta_j \cdot 1(i \in P_2) + \gamma_j \cdot 1(i \in C) + \delta_j \cdot 1(i \in P_2) \cdot 1(i \in C) + \varphi_j t. \qquad (2)$$

In equations (1) and (2), $1(i \in j)$ is an indicator variable that takes the value 1 if the observation belongs to country group j. Similarly, $1(i \in P_2)$ is a post-reform period dummy, and $1(i \in C)$ denotes the presence of pre-school children in the family. Group j=1 is here chosen as the reference group (natives). As mentioned above, we are primarily interested in comparing the changes in earnings and labor force participation in families with pre-school children between natives and immigrant groups. However, to shed further light on the development of the outcome variables, we also study differences within groups. We concentrate on the following hypotheses.

(i) Earnings (and labor force participation) of group j with small children increase by more than earnings (and labor force participation) of the same group without pre-school children. In terms of the parameters of the model, this hypothesis is given by $H_1 : \delta_j > 0$ for all j.

(ii) Earnings (and labor force participation) of migrant group j with pre-school children increase by more than earnings (and labor force participation) of similarly situated Swedes, which is $H_2 : \beta_j + \delta_j > \beta_1 + \delta_1$ for $j \neq i$.

Evaluation of the effects of the reform is based on a difference-in-differences approach (DD) (see e.g. Ashenfelter and Card 1985). One of the problems common to comparisons, where observational data is used, is to control for factors that affect outcomes and are correlated with the reform identifier. Here, we control for a number of background variables (see below) and we also test for the common trends assumption. The earnings equation is estimated by OLS. Labor force participation is estimated with the same set of explanatory variables and a suitable transformation of equation (1), in this case a probit model.

3 Data

The study is based on register data collected by Statistics Sweden and compiled into the Swedish Longitudinal Integration Database for Health Insurance and Labour Market Studies (Longitudinell Integrationsdatabas för Sjukförsäkrings- och Arbetsmarknads-studier, LISA). The data included covers the period 1995 to 2009. From the database, we select couples of the same country of origin, meaning that Swedish homogenous couples are compared to non-native homogenous couples. We classify immigrants by geographical origin, and we consider three groups of recent immigrants. The first group consists of families originating from Iran, Iraq and Turkey. This group is relatively large and consists of a majority of refugee immigrants. A second group, also mainly consisting of refugee immigrants, is of families originating from African countries, and the final group consists of families from Central and Northern European countries with a high human development index. This latter group mainly consists of labor immigrants. Immigrants from the Nordic countries have been excluded. A full list of the countries included in each of the groups is given in Table A2 in the Appendix. From the native population ten percent of the couples in the ages of female partner 16 to 49 years are selected at random to be included in the study, while the total number of immigrant couples with female partner in their fertile ages are included. The

data then consists of approximately one hundred thousand native couples. The number of couples from the Iran/Iraq group is 842 (2670) for the pre- (post-) reform period respectively, 277 (1714) from Northern and Central Europe, and 210 (726) from Africa.

The main variables we focus on are labor force participation and earnings. Since the register data do not include a precise definition of labor force participation, a convention used in this paper is to consider those who had some earnings from employment or self-employment as participants in the labor force. A list of variables included in the analysis is presented in Table A3 in the Appendix. Earnings from employment and self-employment are discounted by CPI, and participation in the labor force is coded as an indicator variable taking the value one for observations where non-zero earnings are observed. The set of explanatory variables is primarily based on variables found to be important in similar papers studying differences in earnings and employment rates between natives and immigrants (e.g. Barth et al. 2004, Blanchflower and Oswald 1994, Borjas 1987, Borjas 1995, Card 1995, Nekby 2002). In particular, age and age squared, three levels of educational attainment, the number of children at various ages, the number of years since in-migration, and dummy variables to control for immigrant groups and post-reform period are included; see Table A3 in the Appendix for a complete description of the variables.

Descriptive statistics are presented in Table A4-1 and Table A4-2 in the Appendix. Comparing the socio-demographic characteristics by country groups, one can first note that most of the migrants moved to Sweden relatively late in the 1990's. Immigrants had on average been in Sweden for 1.6 to 1.7 years before 2001. Men in these groups were on average 33 to 35 years of age and females 27 to 31 years prior to 2001. Native couples in the sample are considerably older. However, this difference is smaller when comparing couples that have pre-school children. There are some

differences in educational levels between the groups, which are slightly more pronounced among women. Women from Northern and Central Europe and Swedish women have the largest shares of high education (tertiary education), while African migrants has the lowest share. Among men, the share of highly educated is the lowest for natives. There is also a strong tendency for educational attainment to increase over time. In part, this may depend on the problems of identifying the relevant educational level prior to reform. The number of pre-school children varies relatively little across the different country groups.

There are large differences in earnings and labor force participation between the country groups, and they are more pronounced among women. In the post-reform period, Swedish-born women earn six times more than those originating from Iran/Iraq, and four times more than women from the African countries. Among men, the differences are also large; in the post-reform period, Swedish men earn three times more than men from Iran/Iraq group. The country-wise differences in earnings also translate into variation regarding male-female earnings. Men in the Iran/Iraq and African groups earn about three times more than their spouses, while the difference in native couples is about 50 percent.

It can be seen, from Table A4-1, that group differences in labor force participation are sizable as well. Among women, the lowest employment rates are observed for refugee groups prior to reform, 10 percent for Iran/Iraq group, and 19 percent for female immigrants from Africa. This is consonant to educational levels and presumably to the cultural differences in the family role of women. These rates contrast to labor force participation of Swedish women, which is over 91 percent. However, employment among female immigrants significantly increases over time, accompanied by increasing educational attainment and age. Labor participation of Swedish men is also high. More than 95 percent of had, at least, part-time employment prior to reform, and 92 percent

after the reform. Employment rates of migrants from Northern and Central Europe confirm the assumption on their labor character of immigration. More than 73 percent were employed in the pre-reform and 83 in the post-reform period. Less than half of male immigrants from Iran/Iraq had, at least, part-time job before, and 63 percent after the reform. The numbers for male immigrants from Africa are similar to the Iran/Iraq group.

4 Results

Parameter estimates of equation (1) are presented in Table 1 below. Since there is a large variation in the number of observations between natives and the different country groups, sampling weights are used in the estimation. These are calculated as the inverse of the frequency of respective country group.

Let us start by briefly discussing the results regarding the socio-demographic characteristics included in the equations. Earnings and labor force participation is assumed to be dependent on age, educational attainment, the number of children at various ages, the number of years since in-migration, and the characteristics of the spouse. In addition, since migrants and natives may have different earnings development unrelated to the reform package, which would violate the common trends assumption, we also allow the different groups to have separate time trends. Earnings-age profiles are usually found to be non-linear, and we find that both male and female earnings and labor force participation increase with age at a decreasing rate. Earnings and employment rates are positively associated with the educational level of an individual. Females with more than 12 years of education earn about the double amount of those with secondary education (or less), and the corresponding earnings difference for men is about 30 per cent.

Table 1: Estimates of earnings and labour force participations (LFP), full sample

Variables	Earnings Women	Earnings Men	LFP Women	LFP Men
Time trend	0.060***	0.054***	0.023***	0.024***
Time trend Iraq/Iran	-0.049*	0.192***	0.048*	0.058**
Time trend Northern & Central Europe	0.097	-0.011	0.015	-0.024
Time trend Africa	-0.049	0.036	0	-0.01
FEMALE PARTNER				
Age (yrs)	0.077***	-0.036	0.059***	0.004
Age squared	-0.001***	0	-0.001***	0
Education non-identified	-0.279**	-0.04	-0.290***	0
Education less 9 yrs	Reference		Reference	
Education 10-12 yrs	0.621***	0.360***	0.354***	0.148***
Education over 12 yrs	1.065***	0.521***	0.533***	0.243***
MALE PARTNER				
Age (yrs)	0.083***	0.316***	0.047***	0.124***
Age squared	-0.001***	-0.004***	-0.001***	-0.002***
Education non-identified	0.254*	-0.913***	0.197**	-0.437***
Education less 9 yrs	Reference		Reference	
Education 10-12 yrs	0.106*	0.401***	0.084*	0.210***
Education over 12 yrs	0.319***	0.730***	0.190***	0.251***
Number of children				
less than 1 year old	-0.849***	-0.165*	-0.368***	-0.097*
1 year	-1.413***	-0.347**	-0.704***	-0.159*
2-3 yrs	-0.859***	-0.360**	-0.481***	-0.165*
4-5 yrs	-0.378***	-0.326**	-0.245***	-0.162**
6-18 yrs	-0.119***	-0.202***	-0.057***	-0.088***
Years since migration	0.391***	0.109***	0.184***	0.056***
Group effects				
Native couple	Reference		Reference	
Iraq/Iran	-6.023***	-5.790***	-3.405***	-2.429***
Northern & Central Europe	-4.522***	-1.855***	-1.963***	-1.103***
Africa	-5.223***	-3.453***	-2.482***	-1.512***
After the reform				
Native couple	-0.221***	-0.151***	-0.109***	-0.100***

Iraq/Iran	0.459**	-0.119	0.17	-0.045
Northern & Central Europe	-0.218	-0.041	-0.116	0.077
Africa	0.489	-0.229	0.169	-0.133
Families with kids 1-5 yrs old				
Native couple	0.113	0.173	0.161*	0.144*
Iraq/Iran	0.552***	0.31	0.380***	0.109
Northern & Central Europe	-0.057	0.131	0.14	0.146
Africa	0.645**	0.232	0.31	0.113
After the reform. Families with kids 1-5 yrs old				
Native couple	0.114***	-0.031	0.072***	0.043*
Iraq/Iran	-0.574***	0.306	-0.316**	0.096
Northern & Central Europe	0.036	0.161	0.03	-0.099
Africa	-0.327	0.77	-0.134	0.318
Constant	3.138***	1.479**	-0.489	-0.594*
Number of observations	739902	772248	739902	772248
R^2 for OLS / Pseudo R^2 for probit-models	0.574	0.320	0.460	0.245

Note: Asterisks indicate *p*-values less than 0.001 (***), 0.01 (**), and 0.05 (*).

It is well known that partners' education levels tend to be positively correlated (e.g. Mare 1991). We also find evidence consistent with assortative mating; male earnings are positively related to the female level of education and vice versa. The presence of children in the household is associated with lower levels of earnings and also lower probability of participating in the labor market. The effects are larger the younger the age of a child and the more children there are in a given age group. In families with pre-school children, the effects are stronger for females than for males, while the opposite holds for families with children in the school ages.

We observe a positive earnings growth in the sample, with a slightly larger yearly increase for females of six percent than males (5.4 percent). The common trends assumption appears to be reasonable for the European and African migrant groups, while the time trends are very different in the Iraq/Iran group. Males in this group have an average yearly increase of 24 percent, while the average yearly growth for females is

close to zero. Male and female migrants from Iraq/Iran have larger growth in their labor force participation rates over time than the other groups. This means that women from Iraq/Iran increase their labor force participation rates over time, but appear to remain in the low-level income segment. The number of years since migration is measured among the migrant groups, and is assumed to capture the assimilation process. There is about a 1.5 percent yearly increase in male earnings, while female earnings by almost 7 percent per year. This latter figure is extraordinary large. However, female earnings at the immigration year are very low.

As discussed earlier earnings and employment rates are on average the highest for natives. Immigrants from Northern and Central Europe have lower but still high level of earnings and labor force participation compared to immigrants from the Iraq/Iran and Africa groups. Comparison of predictions of earnings and labor force participation before and after 2001 reveals large increase for all immigrant groups (see Figure A5). However, these changes results from several causes, while our interest is primarily test the hypotheses presented in section 2. Table 2 below presents the results from hypothesis testing.

Table 2: Tests of hypotheses

	Earnings Women	**Earnings Men**	**LFP Women**	**LFP Men**
H1: d_j				
Native	0.114***	-0.031	0.072***	0.043*
Iraq/Iran	-0.574***	0.306	-0.316**	0.096
Northern & Central Europe	0.036	0.161	0.03	-0.099
Africa	-0.327	0.77	-0.134	0.318
H2: $(b_j + d_j) - (b_1 + d_1)$				
Iraq/Iran	-0.007	0.369	-0.109	0.109
Northern & Central Europe	-0.074	0.301	-0.049	0.035
Africa	0.270	0.723	0.072	0.242

Note: Asterisks indicate *p*-values less than 0.001 (***), 0.01 (**), and 0.05 (*).

The first hypothesis concerns within-country differences, comparing the earnings (and labor force participation) development for families with pre-school children with the outcomes for families without small children. The results show that Swedish women with pre-school children earn approximately 11 percent more than their comparisons, and there is a positive and significant contribution in labor force participation. These results indicate the reform package may have had a positive effect on native women. There is also a positive effect (significant on the 95 percent level) on employment rates of Swedish-born men, although no effects on earnings. Contrary to this, the results clearly state that women with pre-school children in the Iran/Iraq group had a remarkably lower earnings and labor force participation rates compared to women without pre-school children. Parameters for the other groups are not significantly determined, meaning that we cannot reject the null hypothesis.

The main hypothesis we want to test concerns between-group differences for families with pre-school children. The second hypothesis, therefore, tests if the increase in earnings and labor force is larger for the immigrant groups than among natural born Swedes. Here, we find that women in the Iraq/Iran and European groups have lower development of earnings and labor force participation, while the estimates for the African group have the opposite sign. For males, all of the parameters are positive, indicating higher earnings and labor force participation increases than for native men with pre-school children. However, by formal tests the null hypothesis cannot be rejected for all the categories. Based on the evidence so far, we therefore conclude that, whatever the effects of the reform package had on earnings and labor force participation, there are no significant difference between country groups.

A large number of the observations in the sample includes families at time they do not have pre-school children. Adult members of these families are older and more educated than members in families with pre-school children. Since age in part are assumed to reflect returns to experience, parameter estimates are not necessarily stable over family types. We therefore estimate models with samples restricted to families where pre-school children are present. This makes it possible for us to compare results regarding the second hypothesis. The test results are presented in Table 3. Full results can be obtained from the authors upon request.

Table 3: Tests of H2; restricted sample, families with children one to years old

	Earnings Women	Earnings Men	LFP Women	LFP Men
Iraq/Iran	0.527*	0.420	0.243	0.218
Northern & Central Europe	-0.374	0.172	-0.215	0.144
Africa	0.380	1.068	0.211	0.588

Note: Asterisks indicate *p*-values less than 0.001 (***), 0.01 (**), and 0.05 (*).

Restricting the sample by including observations with pre-school children, males and females from the Iraq/Iran and African groups appear to have higher earnings growth than natives after the reform. However, the effects are imprecisely estimated. One way to interpret these differences is that earnings increases within groups are heterogeneous, and formal testing implies that we cannot reject that there are no differences. On potential problem with using the entire estimation period to study changes around 2001 is that pre- and post reform periods become too long so that any effects of the reform package may be confused with other changes during the period. To study if the assumptions made regarding the reform impact may affect the results, models with the full and restricted sample have been estimated for the period 1997 to 2005. Although there is quantitative variation in the parameter estimates, there are no differences regarding the results of hypothesis testing. We therefore conclude that decreasing the time period under study does not affect the main conclusion.

5 Concluding remarks

The main purposes of the child care reform package introduced in the early 2000's was to increase accessibility and to even out differences regarding the cost of public child care among the municipalities. Two groups of particular importance was parents unemployed and on parental leave. Because of the differences in employment and earnings between natives and refugee immigrants, the reforms had potential to improve the labor market situation in favor of the immigrant groups. This paper is a first attempt to address how changes in family policy and accessibility to pre-school childcare system, in particular, affects labor market outcomes of groups with relatively little attachment to the labor market. The results presented in this paper gives very limited evidence of differences in earnings development between natives and immigrants groups. The hypothesis that earnings of families with pre-school children and their employment rates should raise by more in the disadvantaged groups was rejected in nearly all cases. We conclude that, although childcare participation rates as well as the number of hours of care increased fairly much among the unemployed, this did not affect earnings and labor force participation among the immigrant groups relative to natives.

Many of the point estimates regarding the immigrant-native differences in earnings (and labor force participation) over the reform date are positive, indicating that there may be positive effects of the childcare reforms on the distribution of income. However, estimates are not precise suggesting that grouping individuals on the basis of their country of origin does not easily capture the effects of the reform.

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Appendix

Table A1: The largest groups of immigrants by country of origin at ages 16 to 49 in Sweden in (1995, 2001, 2009)

The order by descen-ding	Country[3]	1995	Country[4]	2001	Country[2]	2009
1	Finland	57713	Finland	72378	Iraq	81196
2	Bosnia and Herzegovina	30372	Yugoslavia, Federal Republic of	41540	Finland	41472
3	Yugoslavia, Federal Republic of	19000	Iran (Islamic Republic of)	40268	Yugoslavia, Federal Republic of	40362
4	Norway	18584	Iraq	38076	Iran (Islamic Republic of)	40113
5	Iran (Islamic Republic of)	17464	Bosnia and Herzegovina	33699	Poland	37771
6	Denmark	14638	Turkey	24068	Bosnia and Herzegovina	37578
7	Iraq	12861	Poland	22546	Turkey	28353
8	Turkey	11222	Chile	19842	Somalia	22951
9	Poland	10320	Lebanon	16799	Thailand	21279
10	Chile	9364	Norway	16746	Denmark	18791
11	United Kingdom	8213	Denmark	14412	Lebanon	18716
12	Germany	7254	Syrian Arab Republic	11304	Germany	18213
13	United States of America	6856	Germany	11213	Chile	17655
14	Somalia	6468	Somalia	10226	Norway	15722
15	Ethiopia	4476	Ethiopia	9851	China (excluding Hong Kong)	14316

Source: SCB

[3] Foreign citizens by country of citizenship

[4] Foreign-born persons in Sweden by country of birth

Table A2: Groups by source countries

Group's #	Groups of source countries by LISA classification	List of countries, included in the group
G1	A	Sweden
G2	N, H	Iraq, Iran, Turkey
G3	E (Northern & Central European countries with high HDI. Nordic countries are excluded)	Belgium, France, Ireland, Liechtenstein, Luxembourg, Netherlands, Switzerland, Great Britain And Northern Ireland, German Dem Rep (Ddr), Germany, Austria
G1	M (African countries)	Angola, Arab Republic Of Egypt, Benin, Botswana, Burkina Faso, Burundi, Central African Republic, Comoro, Djibouti, Equatorial Guinea, Ivory Coast, Eritrea, Ethiopia, French Morocco, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Cameroon, Cape Verde, Kenya, Congo, Congo, Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome And Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, South Africa, Tanzania, Chad, Togo, Uganda, Zambia, Zanzibar, Zimbabwe

Source: Longitudinell Integrationsdatabas, LISA, 2008.

Table A3: List of variables

Female log earnings corrected by CPI*.	
Male log earnings corrected by CPI*.	
Female age (yrs)	
Female age squared	
Male age (yrs)	
Male age squared	
Education 0 -Non available 1 - Compulsory schooling 9 yrs or less 2 - Secondary and post-secondary education less than two years 3 - Post-secondary for two years or longer or postgraduate education	
Number of children (0 year)	
Number of children (1 year)	
Number of children (2-3 yrs)	
Number of children (4-5 yrs)	
Number of children (6-18 yrs)	
Female employment experience (0 - no, 1 - yes)	1 - if a person had income from employment or self-employment in the previous period, 0 – no earnings in the previous period.
Male employment experience (0 - no, 1 - yes)	
Year since migration	
Ethnic groups: 1 – natives, 2 – Irak/Iran, 3 – Central Europe, 4 – Africa	
After the reform: year<2001; 1, year>2001	

***** Zeros changed to 1 before log operation

Table A4-1: Descriptive Statistics

Before the reform

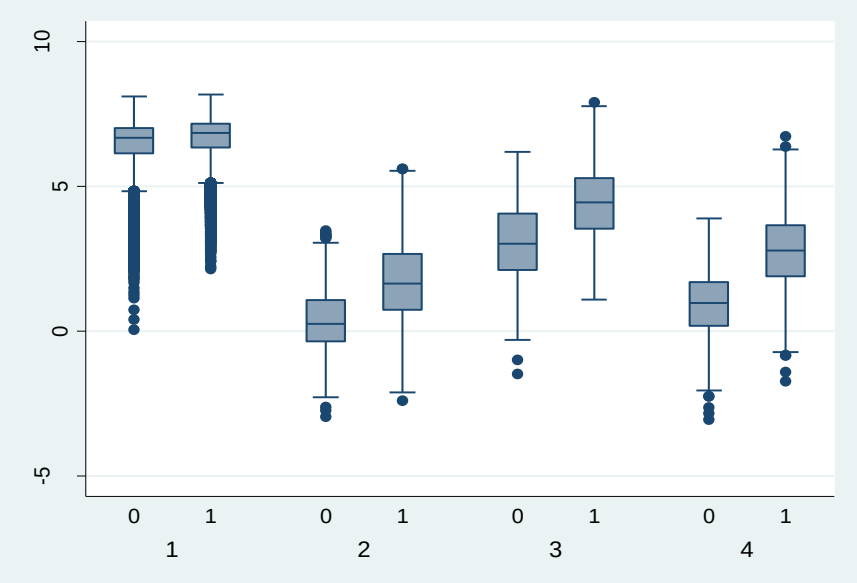
		Natives		**Iran**		**Northern&Central Europe**		**Africa**	
Variable		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Female earnings	overall	1325.805	953.593	52.565	221.283	457.585	797.644	86.130	273.297
(CPI, 1995=100)	between		828.531		164.352		774.020		233.388
	within		494.840		159.213		392.116		170.136
Male earnings (CPI,	overall	2270.934	1608.515	347.256	676.789	1898.354	2750.667	613.891	971.963
1995=100)	between		1467.981		614.215		2568.596		898.092
	within		669.481		320.011		1011.414		373.382
Age of parents in the sample									
Female age (yrs)	overall	40.070	8.170	26.726	6.153	30.609	6.607	27.206	5.515
	between		8.297		6.341		6.169		5.193
	within		1.644		1.123		1.075		1.100
Male age (yrs)	overall	42.743	8.860	33.404	6.580	35.119	8.603	33.582	8.433
	between		8.993		6.773		8.057		8.471
	within		1.666		1.178		1.591		1.698
Age of parents with children 1-5 years old									
Female age (yrs)	overall	32.926	5.039	27.587	4.826	29.678	5.702	27.637	5.040
	between		5.111		4.860		5.656		4.722
	within		1.296		0.830		0.834		0.891
Male age (yrs)	overall	35.442	5.900	34.077	5.186	33.790	7.184	33.602	7.756
	between		5.996		5.288		6.728		8.098
	within		1.318		0.830		0.850		0.897
Number of children (1-5 yrs)									
	overall	0.368	0.618	0.353	0.568	0.346	0.549	0.525	0.737
	between		0.487		0.388		0.413		0.576
	within		0.376		0.405		0.361		0.458
Year since migration									
	overall	0.000	0.000	1.697	1.486	1.588	1.455	1.687	1.676
	between		0.000		1.115		1.073		1.303
	within		0.000		1.122		1.071		1.100
Female employment									
	overall	0.921	0.269	0.103	0.304	0.453	0.498	0.190	0.393
	between		0.226		0.248		0.440		0.327
	within		0.162		0.207		0.289		0.248
Male employment									
	overall	0.952	0.214	0.413	0.492	0.729	0.445	0.567	0.496
	between		0.182		0.419		0.407		0.428
	within		0.125		0.299		0.237		0.294
Number of observations		**97038**		**842**		**277**		**210**	

After the reform

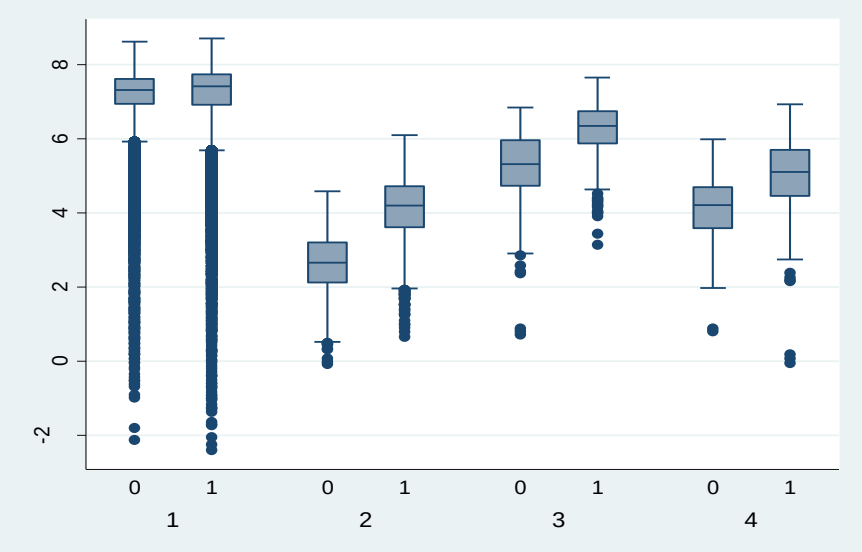
		Natives		Iran		Northern&Central Europe		Africa	
Variable		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Female	overall	1748.079	1214.568	267.275	584.362	837.173	1137.819	389.741	700.267
earnings (CPI,	between		1093.291		407.290		1010.043		550.691
1995=100)	within		541.388		380.399		561.022		400.692
Male earnings	overall	2678.637	2117.450	858.935	1084.277	2014.198	2008.827	1037.794	1223.303
(CPI,	between		1912.288		874.920		1854.413		1012.103
1995=100)	within		918.520		571.171		852.922		625.014
Age of parents in the sample									
Female age	overall	45.711	9.761	29.941	7.041	32.643	7.349	30.225	5.989
(yrs)	between		9.860		7.109		7.242		5.760
	within		2.195		1.881		1.534		1.642
Male age (yrs)	overall	48.245	10.414	35.750	7.767	35.996	8.766	35.742	8.410
	between		10.526		7.770		8.637		7.703
	within		2.213		2.083		1.589		2.358
Age of parents with children 1-5 years old									
Female age	overall	34.329	4.791	30.015	5.510	31.662	5.103	30.641	5.179
(yrs)	between		4.734		5.432		5.028		4.969
	within		1.592		1.685		1.292		1.519
Male age (yrs)	overall	36.569	5.585	36.286	6.170	34.989	6.397	36.443	7.918
	between		5.576		6.187		6.524		7.489
	within		1.616		1.732		1.317		1.802
Number of children (1-5 yrs)									
	overall	0.221	0.507	0.656	0.736	0.422	0.609	0.680	0.851
	between		0.400		0.515		0.424		0.601
	within		0.314		0.520		0.407		0.530
Year since migration									
	overall	0.000	0.000	5.237	3.601	3.693	3.239	4.396	3.491
	between		0.000		3.233		2.529		3.003
	within		0.000		1.882		1.541		1.664
Female employment									
	overall	0.914	0.280	0.301	0.459	0.623	0.485	0.410	0.492
	between		0.237		0.339		0.432		0.413
	within		0.157		0.300		0.273		0.283
Male employment									
	overall	0.922	0.268	0.631	0.482	0.833	0.373	0.672	0.470
	between		0.224		0.417		0.358		0.413
	within		0.153		0.296		0.201		0.279
Number of observations			**104393**		**2670**		**1714**		**726**

Table A4-2: Descriptive Statistics: Structure by level of education (percent)

	Before				After			
Female education	**Natives**	**Iran**	**Northern& Central Europe**	**Africa**	**Natives**	**Iran**	**Northern& Central Europe**	**Africa**
Not identified	0.04	36.22	31.84	53.7	0.02	15.8	14.83	22.23
Less than 9 years	15.38	19.87	6.08	18.66	11.36	31.95	4.04	28.33
10-12 years of schooling	56.59	22.94	22.29	18.84	53.44	27.8	29.42	28.45
More than 12 years of schooling	27.99	20.97	39.8	8.8	35.18	24.44	51.72	20.99
Male education								
Not identified	0.2	8.78	24.6	11.62	0.21	6.27	15.86	10.47
Less than 9 years	22.42	28.87	10.56	28.52	18.69	33.56	5.21	23.27
10-12 years of schooling	56.63	33.53	29.96	40.14	56.4	30.74	36.65	37.96
More than 12 years of schooling	20.75	28.82	34.88	19.72	24.69	29.43	42.27	28.29



a)



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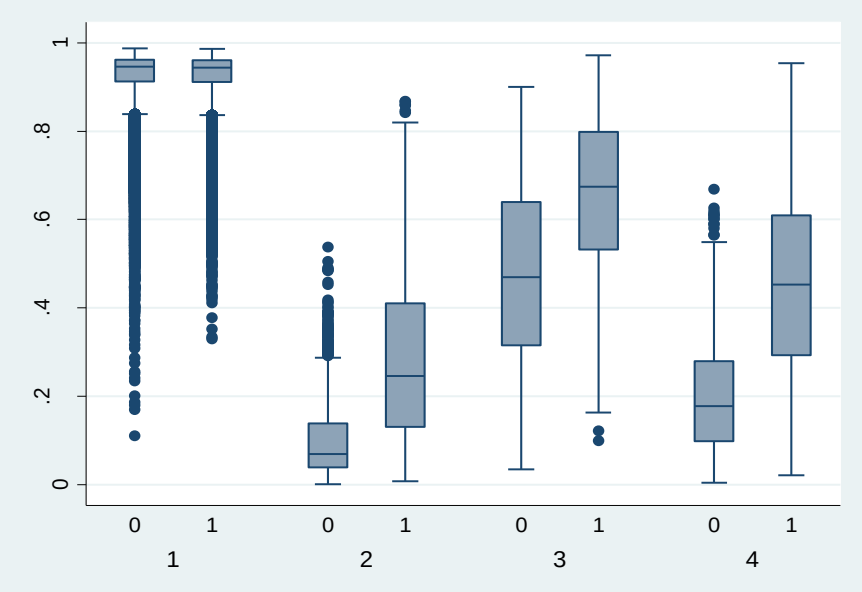

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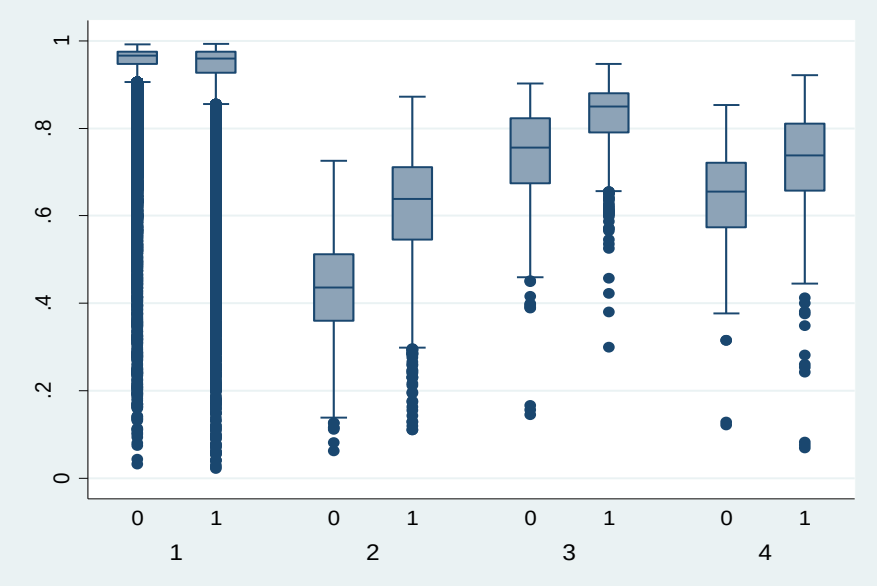

d)

Figure A5: Predictions of log-earnings and labor force participation: a) male log-earnings; b) female log-earnings; c) male labor force participation; d) female labor force participation. 1-Natives, 2-Iraq/Iran, 3 - the Central and Northern Europe, 4 – Africa. 0/1 – before/after 2001. Legend: Box plots depict 25th, median, 75th percentiles; upper and lower whiskers exhibit the respective adjacent values; dots depict outside values.