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# **AMID Working Paper Series 60/2006**

## **Immigration and the Welfare State: Some Danish Experiences<sup>1</sup>**

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### **Immigration, the public sector and the economy – the starting point**

Whatever the cause of international migration, the phenomenon produces economic effects in the host country and elsewhere. Immigration influences the economy of the host country in several ways. Among the effects of immigration are those which influence the public sector and economic policy. These effects can be divided into two groups. The first group results from the fact that the public sector redistributes resources among individuals and groups of individuals on the basis of factors such as family status, age, and labour market circumstances. The immigration of a group involves a transfer to and from the public sector, via taxes, transfers and public consumption. This can result in net transfers to and from the rest of the population. The second group of factors that affect public policy results from the fact that immigration can influence a country's economy and, thereby, also indirectly influence the circumstances on which economic policy is based, as well as that policy itself. In this paper we concentrate on the first types of effects, the direct effects for the public sector.

### **Immigration and its fiscal impact: theory<sup>2</sup>**

Individuals are consumers throughout their entire lives, but are only active in production for part of this time. Children are not allowed to take employment, and after a period of employment individuals typically spend a number of years as pensioners. What they produce during their 'active' lives must not only meet the needs of their own consumption in that period, but also cover consumption expenses for people of a 'passive' age, i.e. children and the elderly. This is made possible by means of a process of redistribution between the generations. This process takes place mainly in three different ways: via the family (for example, parents who provide for their children), via the market (for example,

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<sup>1</sup> This paper is a continuance of Wadensjö and Gerdes (2004). This study is updated and includes data from 2001.

<sup>2</sup> See Wadensjö & Orrje (2002) for a survey of the theory and empirical studies. A survey by Leibfritz, O'Brien & Dumont (2003) contains some additional recent references.

working individuals who invest in pension insurance), and via the public sector (two examples are publicly financed schools and a pension system funded by tax revenues).

The redistribution of resources is carried out not only between generations, but also between individuals at the 'active' age. An important form of this type of redistribution is that which takes place between those who are employed and those who are not employed or who hold a job but cannot work due to illness. Resources are also redistributed from people with high incomes to those with low incomes. This is done in part via a tax system in which the amount of tax paid increases along with an increase in income, and in part via the transfer system. On the other hand, individual-oriented public consumption is generally not dependent upon the individual's wage or income, but mainly on other attributes like age, while other types of public consumption and investment are mainly related to the size of the population.

Immigration can influence redistribution via the public sector in different ways. In most societies, immigrants are over-represented among those of the active age. This implies that resources are transferred from them to the rest of society, provided that all factors other than age are equal for both groups. On the other hand, in Denmark and most other European countries, employment and wages are lower among non-Western immigrants than among natives, which would suggest a transfer to the immigrants. The matter of the direction in which resources are actually transferred is an empirical question, and the answer varies from country to country and within a given country over time.

The public sector obtains revenues from taxes and contributions and has expenditures for transfer payments and for public consumption and investment. Both revenues and expenditures are influenced by immigration. We will treat these different items in turn.

Immigrants contribute to public sector finances by paying taxes and various special contributions, such as those paid for unemployment insurance and pensions. One problem in relating taxes to individuals and groups is that it is not always clear who actually pays the taxes. It is easy to determine who pays some taxes. Income tax, for example, can be attributed to the person who formally pays the tax. A fairly easy solution can also be found for some other taxes. Value-added tax and selective purchase tax can be allocated in proportion to the individual disposable income, and payroll taxes can be distributed in proportion to wages. The most difficult taxes to distribute are business taxes (taxes on profits, environment taxes, etc.). The degree of uncertainty surrounding this point, as well as many others, means that the type of calculations in which we are engaged should be interpreted with caution.

Transfer payments intended for specific individuals are easy to distribute. They are simply traced to the individual in question. It is more difficult, however, to find an appropriate principle for the granting of subsidies to businesses (in

many cases it might not be appropriate to distribute them on individuals). Each of these transfers must be examined separately to see what the relevant principle of distribution is.

Public sector consumption can be divided into several different parts:

- 1) a part that is independent of the size of the population (public good)
- 2) a part where the extent of public sector activity depends upon the size and composition of the population, but where it is not possible to tie a particular unit to a particular person
- 3) a part that can be viewed as publicly financed private goods.
- 4) a part consisting of public sector activities directly connected to immigrants.

The main principle is that expenditure should be tied to specific individuals if the expenditures vary with individual participation. This is easy in the case of transfer payments, since a direct connection can most often be made. This is also possible to do for some types of public consumption – for instance, when information is available about who attends a particular school, who has been admitted to a hospital, and so on. Sometimes this information is lacking, even in cases where individual-oriented public consumption is involved, and then it becomes necessary to work with general patterns, for example, in order to distribute expenditure evenly for all individuals in a particular age group. Certain kinds of expenditure cannot, as previously mentioned, even theoretically be related to specific individuals, even if the expenditure varies in accordance with the number of individuals in the economy. In such cases, general patterns and averages are the only way forward.

The way in which an analysis is carried out should depend upon the questions to be answered. The questions raised in much of the discussion are: ‘what effect does a marginal increase (or a non-marginal increase) in the number of immigrants moving to Denmark have on public sector finances?’ and ‘what does the redistribution pattern between natives and immigrants look like in a given year?’ In this paper, we try to answer the second question.

Cross-sectional studies are the most common in studies of the fiscal effects of immigration. Such studies examine the occurrence of redistribution over the course of a year (or more) between immigrants and the native population. It is important to include the children of immigrants. If they are not included, only a part of the effects of the increase in population enters into the calculations.

### **Data<sup>3</sup>**

The study presented here is based on data from the Ministry of Finance’s Law Model.<sup>4</sup> The database contains detailed information on income, taxes, transfers,

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<sup>3</sup> See Wadensjö & Orrje (2002) for a detailed presentation of the data used.

and public consumption for 1/30 (3.3 per cent) of the population living in Denmark. A new model population is created every year.<sup>5</sup> There is also information regarding demographic variables including whether a person is an immigrant or has a parent who is. The database also has information on employment status.

This study builds on detailed information from the Law Model covering average values for many different items for eight years – 1991 and 1995-2001 – for various groups (including groups of immigrants). For seven years, 1995-2001, information covering the net transfer on the individual level combined with some other variables has been used for the analysis. For six years – 1996-2001 – data on individuals aged 18 years and older, with information for the children included as part of the net transfer for their parents, has been used. For 1995 and 1998-2001 information on the net transfer for all, independent of age – not only those aged 18 years and older – has also been available, which makes it easier to see how net transfer varies over the life cycle. There is information on demographic variables – age, gender, family type, immigration status (classified by country of birth and country of birth of the parents, and year of arrival) – for net transfers between the individual and the public sector and for the individual employment rate. Information on the country of origin is divided into two categories, Western and non-Western countries.

The major part of the public sector's costs and revenues are distributed across individuals in the Law Model.<sup>6</sup> The direct personal income taxes are ascribed to the individuals who pay them, and the indirect taxes are distributed across individuals in proportion to their disposable incomes.<sup>7</sup> Income transfers are referred to those individuals who receive them. The main part of public consumption is either distributed according to information on actual use (for example school, health care and old age care) or evenly divided over the population. Public investment (for example road investments) is also evenly distributed across the whole population (both native Danes and immigrants). The public sector costs, which are not distributed across individuals and therefore not included in the Law Model, are such costs that are assumed to be independent of the size of the population. Some examples are central state

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<sup>4</sup> See Hansen, Nicolaisen, Dehlbæk & Schnor (1991), Ministry of Economic Affairs (2000) and Ministry of Finance (2003) for presentations of the database. The Law Model was earlier administrated by the Ministry of Economic Affairs. Knudsen, Larsen & Pedersen (1998) and Linderoth (1999) give detailed presentations of the structure of the public sector and of the tax system in Denmark.

<sup>5</sup> The design of the Law model has recently been changed to a panel which means that it will be possible to follow individuals from year to year.

<sup>6</sup> See Ministry of Economic Affairs (1997) pp. 188-200 for a presentation of how the different items are assigned to individuals.

<sup>7</sup> We have not taken into account the fact that the share of the income which is used for consumption may vary between groups including variations between immigrants and natives.

administration, defence, and some subsidies to the private sector (especially agriculture).<sup>8</sup>

The variable net transfer to the public sector is calculated for each individual as the difference between the taxes ascribed to the individual and the sum of income transfers and public consumption and investment ascribed to the same individual. Compared to an analysis by the Ministry of Economic Affairs<sup>9</sup> in 1995 there is one important difference as regards the items included in the calculation. In the analysis presented here, the costs for refugees in the period before they know if they will obtain refugee status or not are excluded. We consider those costs to be a part of the regulation of immigration and as such part of the border control costs.

The basic principles for the Law Model have been the same for all of the years covered by this study. However, there are some variations as to the extent to which it has been possible to attribute the transfers and other public expenditures to individuals.

The Law Model contains many observations covering almost 140,000 people aged 18 or older for every year. The large sample means that quite a few immigrants are included in the database. The groups who have foreign backgrounds are considerably larger in 2001 than in 1991. This is especially so for first- and second-generation immigrants from non-Western countries. In spite of the large total number of immigrants the number of observations is rather small for studying certain groups of immigrants, for example immigrants belonging to a certain age group.

The employment rate is an important variable in many of the analyses. An individual's employment rate varies between 0 and 100 per cent. In order to be counted as having an employment rate of 100 per cent, a person should have worked full-time during the entire year. There are some problems regarding the definition of full-time work. The working hours are calculated by using contributions to the ATP pension scheme. Since 1993, a person who has 27 or more working hours a week has had to pay a full contribution and is counted as working full-time in the Law Model.<sup>10</sup> A person who works at least 18 hours, but less than 27 hours, pays two-thirds of the full contribution and is counted as having an employment rate of two-thirds (of course given that the person works throughout the entire year). Those who work at least 9 hours but less than 18 hours pay one-third of the full contribution and are counted as working one-

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<sup>8</sup> See le Maire & Scheuer (2001) for a detailed presentation of what is and what is not distributed on individuals in the 1998 Law Model.

<sup>9</sup> See Ministry of Economic Affairs (1997) and Indenrigsministeriet (1999).

<sup>10</sup> The ATP contribution is also paid if a person is unemployed or on sick leave, but such periods are not included in the calculation of the employment rate.

third of full-time.<sup>11</sup> Those working less than 9 hours a week on a regular basis do not pay any ATP contribution and are not counted as employed.

Those who are self-employed, and the wives or husbands who work in their family businesses are counted as having an employment rate of 100 per cent if the income is the same or higher than the maximal benefit level in the unemployment insurance. If the income for the self-employed is below that level and non-negative, the employment rate is proportionally reduced. For the self-employed with a negative income from that activity the employment rate is set at zero. For those who are part-time self-employed and part-time in someone else's employ, the two employment rates are added, but the employment rate is never set higher than 100.

This method of calculation of working hours means that the rate of employment will not be correctly estimated for a number of people. For quite a few there will be an overestimation. People with long part-time work (for example 30 hours a week) will be counted as working full-time. Most likely more women than men will be wrongly classified in this way. The lower limit of 9 hours probably means that young people who are combining high school or university studies with odd jobs are wrongly counted as having an employment rate of 0. It is also not possible to see if people are working more than the full-time rate of 37 hours a week with this method. Another problem is that those aged 67 or older do not pay an ATP contribution and therefore we do not know their employment rate.

The uncertainties in the calculations of the working week and the resulting uncertainties in calculations of the employment rate also mean that the calculation of the hourly wage by using information on the earnings and employment rate will be uncertain.

### **The fiscal impact of immigration in Denmark, 1991-2001<sup>12</sup>**

We will start by studying the fiscal impact of immigration in Denmark on the aggregate level. In Table 1 the calculations for 1991 and 1995-2001 regarding the average net transfer per person aged 18 years and older to the public sector are given for various groups (the transfers to and from children aged 17 years or younger are added to those of their parents).<sup>13</sup>

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<sup>11</sup> Full-time work in Denmark is 37 hours a week. Working full time and for a full year, excluding the vacation period and public holidays, entails 1,692.5 hours a year. This figure is used in the calculation of the hourly wage rate.

<sup>12</sup> See Ministry of Economic Affairs (1997), Wadensjö (2000, 2000a, 2002) Wadensjö & Orrje (2002) and le Maire & Scheuer (2003) for earlier studies.

<sup>13</sup> We also have information for 1995, 1998, 1999 and 2000 for all individuals separately. The net transfers of the children are in this case ascribed to themselves. We will also use that data in this paper.

**Table 1. Net transfers per person to the public sector (in Euro)<sup>14</sup> for different groups in 1991 and 1995-2001. The amounts in 1997 prices are shown in parentheses**

Group	1991	1995	1996	1997	1998	1999	2000	2001
Danish population (excluding those who have one immigrant parent)	1,800 (2,000)	2,000 (2,100)	2,500 (2,500)	3,000	3,300 (3,200)	3,600 (3,400)	3,900 (3,700)	4,100 (3,800)
Second generation – two parents from Western countries	2,600 (2,900)	1,200 (1,300)	3,600 (3,700)	4,600	2,600 (2,600)	5,400 (5,100)	6,800 (6,300)	7,500 (6,800)
Immigrants from Western countries	2,000 (2,100)	1,900 (2,000)	1,500 (1,500)	1,700	3,200 (3,100)	3,400 (3,200)	5,300 (5,000)	5,500 (5,000)
Immigrants from Western countries (first and second generation)	2,000 (2,200)	1,900 (2,000)	1,600 (1,700)	2,000	3,200 (3,100)	3,500 (3,400)	5,500 (5,100)	5,700 (5,200)
Second generation – two parents from non-Western countries	0,090 (0,100)	-2,600 (-2,700)	-2,200 (-2,200)	-2,500	-0,100 (-0,100)	-2,600 (-2,500)	-1,900 (-1,800)	-0,600 (-0,500)
Immigrants from non-Western countries	-6,600 (-7,200)	-8,800 (-9,200)	-8,900 (-9,100)	-8,200	-7,300 (-7,200)	-7,500 (-7,200)	-7,900 (-7,400)	-7,800 (-7,100)
Immigrants from non-Western countries (first and second generation)	-6,500 (-7,100)	-8,600 (-8,900)	-8,600 (-8,800)	-7,900	-7,000 (-6,800)	-7,300 (-7,000)	-7,500 (-7,000)	-7,300 (-6,700)
Total	1,600 (1,800)	1,700 (1,700)	2,000 (2,100)	2,600	2,900 (2,800)	3,100 (3,000)	3,400 (3,200)	3,600 (3,300)

Note: Western countries are the EU countries (EU15 except Denmark), Norway, Switzerland, Iceland, North America, Australia and New Zealand; non-Western countries are all other countries.

From the last line in the table we can see that the average amount for all residents in Denmark is positive and increasing over time. This is not to be seen as indicating that Denmark has a large and increasing budget surplus. Rather it can be explained by the fact that a larger part of the revenues of the public sector (taxes and contributions) than of the costs for public consumption and investments are distributed across individuals. The reason that a large part of the public sector expenditures have not been distributed is that it is assumed that they are not sensitive to (marginal) changes in the size of the population. It is possible that it would have been better if a larger part had been distributed.<sup>15</sup> The immigration to Denmark is hardly a marginal phenomenon anymore, which means that most types of public expenditures, also those for roads, central governmental administration, and defense, vary to some extent with the population. We have made the choice here, however, to continue to follow the same procedure as in earlier studies based on the Law model.

For immigrants from Western countries the net transfer to the public sector is positive all the time. It declined between 1991 and 1995, which can be ascribed to the decline in activity in the Danish economy, and gradually increased after that. The figures are even higher for second generation immigrants from

<sup>14</sup> In all calculations we have converted Danish *kroner* to Euro at the rate 1 EUR = 7.424 DKK.

<sup>15</sup> For a discussion of this issue see for example Gott & Johnston (2002).



Western countries. The figures are also positive for native Danes and increase from year to year.

For immigrants from non-Western countries the amounts are strongly negative the entire time. There is always a net transfer from the public sector to this group of immigrants. These net transfers increase markedly – more was transferred per person – from 1991 to 1995, and the trend continued in the same direction in 1996, though to a lesser degree. The public sector transfers in year 1996 were EUR 8,900 per non-Western immigrants aged 18 years and older. The net transfers declined markedly between 1996 and 1998 when the economic and labour market situation improved. As business activity continued to improve up to 2001 there were reasons to expect a continued decline in the net transfers to the non-Western immigrants in those years.<sup>16</sup> That did not happen, however; on the contrary the net transfer was slightly higher in 2001 than in 1998 in real terms. This development differs markedly from that for Danes and Western immigrants, for whom the net transfers to the public sector increased between 1998 and 2001.

We have also studied if the net transfers to the public sector from non-Western immigrants vary with the length of stay in Denmark. There are some differences, but they are not as large as we would have expected from the experiences of the U.K. and the U.S., for example. The net transfers to the immigrants are largest to those who have been in the country for 3-5 years. There are some variations between the years of study in the pattern according to length of stay, but the general pattern is the same. Even for those who have lived in Denmark for a long period the net transfers go from the public sector to individuals.

Table 1 shows that there are large variations between the years in the net transfer for second-generation immigrants, both Western and non-Western. A contributing factor to the large variations in the net transfers from and to second-generation immigrants, especially those from non-Western countries, is that there are large changes in the size and composition of these groups. The majority are of the age when many are entering the labour market (which generally means going from negative to positive net transfers to the public sector). A small change in the age composition may lead to large changes in the size of the net transfers. Another explanation for the large variations is that the groups are small, which means that the inclusion of a person with very high positive net transfers one year but not another year may strongly influence the results.

In the public debate it is not the net transfers per person that have been of most interest, but figures for the total net transfers from the immigrants to the public sector. The total net transfers are also those which are of most interest in

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<sup>16</sup> See Wadensjö & Orrje (2002).

discussing the total economic effects of immigration. The total transfers from a group depend on the transfers per person and the number of persons in the group. Information on the total net transfers is presented in Table 2.

For the Western immigrants there exists a substantial net transfer *to* the public sector in all the years for which we have information. The net transfer declined somewhat in the first half of the 1990s and has gradually increased since then. The amount was EUR 546 million in the year 2000.

The pattern is quite different for immigrants from non-Western countries. The net transfers to these immigrants were already large in the early 1990s and they increased twofold by 1996. The net transfers declined in two years, 1997 and 1998, but increased again in 1999, 2000 and 2001 (mainly due to an increase in the size of the group, less due to an increase in the amount per person).

**Table 2. Total net transfers to the public sector (in million Euros) for different groups in 1991 and 1995-2000. The amounts in 1997 prices are shown in parentheses**

Group	1991	1995	1996	1997	1998	1999	2000	2001
Second generation – parents from Western countries	17 (18)	9 (9)	28 (28)	34	19 (18)	41 (39)	54 (51)	61 (55)
Immigrants from Western countries	141 (155)	154 (160)	123 (125)	142	283 (278)	297 (285)	466 (435)	485 (443)
Immigrants from Western countries (first and second generation)	158 (173)	162 (169)	151 (154)	176	302 (296)	338 (324)	521 (486)	546 (499)
Second generation – parents from non-Western countries	0,1 (0,1)	-11 (-11)	-10 (-10)	-14	2 (2)	-20 (-19)	-19 (-18)	-5 (-4)
Immigrants from non-Western countries	-654 (-719)	-1179 (-1229)	-1278 (-1305)	-1230	-1184 (-1160)	-1271 (-1219)	-1432 (-1337)	-1492 (-1363)
Immigrants from non-Western countries (first and second generation)	-645 (-719)	-1190 (-1240)	-1288 (-1315)	-1244	-1182 (-1158)	-1290 (-1238)	-1451 (-1355)	-1497 (-1367)
All immigrants (first and second generation)	-496 (-545)	-1027 (-1071)	-1138 (-1162)	-1068	-880 (-862)	-952 (-914)	-930 (-869)	-951 (-868)
Immigrants from Western countries (first and second generation) as per cent of GDP	+0.13	+0.11	+0.10	+0.12	+0.19	+0.21	+0.30	+0.30
Immigrants from non-Western countries (first and second generation) as per cent of GDP	-0.54	-0.88	-0.89	-0.83	-0.75	-0.79	-0.84	-0.83
All immigrants as per cent of GDP	-0.41	-0.76	-0.79	-0.71	-0.56	-0.58	-0.54	-0.53

Note: Western countries are the EU countries, Norway, Switzerland, Iceland, North America, Australia and New Zealand; non-Western countries are all other countries.

Another measure of the size of the transfers is given by comparing them with Denmark's GDP in the same years. In 1991 the total net transfers to immigrants, Western and non-Western, corresponded to 0.41 per cent of the GDP. This amount increased to 0.81 per cent in 1996. Between 1996 and 1998

it declined to 0.56 per cent and was 0.53 per cent of the GDP in 2001. If we only consider the net transfers to the non-Western immigrants the corresponding figures were 0.54 per cent in 1991, 0.91 per cent in 1996, 0.75 per cent in 1998 and 0.83 per cent in the year 2001.

According to Tables 1 and 2 there are large differences in net transfer between different groups of immigrants. There is a net transfer from the Western immigrants to the public sector, and a net transfer to the non-Western immigrants from the public sector. Another result that can be seen is that in total, net transfers go to the immigrants from the public sector. The same pattern of net transfers is found in Norway and Sweden and also in some other Western European countries, but not for all immigration countries. According to Gott & Johnston (2002), total net transfers in the U.K go from the immigrants to the public sector.<sup>17</sup>

### **Which factors influence the individual net transfers to the public sector in Denmark?**

Up to now we have considered the net transfers per person and aggregated for various groups. We will now examine how different factors influence the individual net transfers and we will start with Denmark.

In all societies transfers go from those of active age to those of passive age. It is typical for welfare societies like Denmark that these transfers go through the public sector to a very large extent. This means that the size of the average net transfers for a group largely depends on the age composition of the group. Among immigrants few are old and many are children or young people. The fact that few immigrants are old is a factor leading to low net transfers to the group, and the fact that many are children is a factor leading in the opposite direction. It is an empirical question to determine which effects are the most important. There is also a net transfer between men and women through the public sector, and a corresponding unregistered transfer in the form of unpaid household work in the other direction within households. Since women work less in the market economy (and more in households) they pay less taxes. This will be of importance in the individual analysis, but less so when studying aggregate figures as the gender composition is more or less the same in all groups.

We will illustrate the importance of the age composition by showing how the net transfers vary with age for natives, Western immigrants and non-Western immigrants. Here children are considered separately; the net transfers for them are not added to those of their parents.

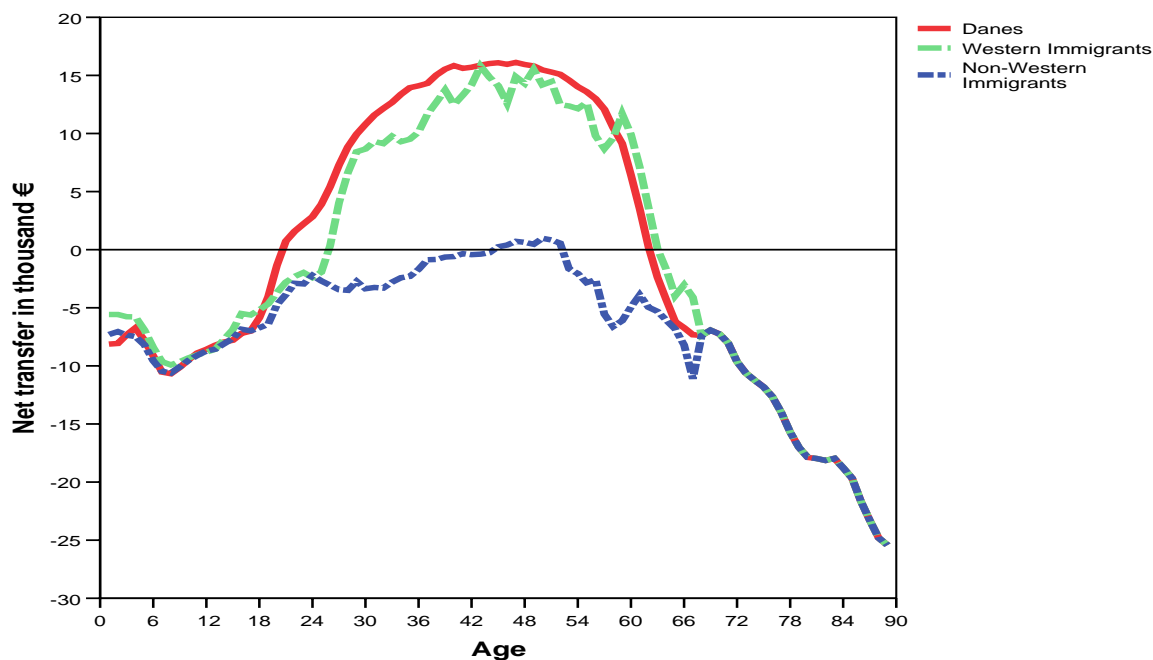
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<sup>17</sup> For a comprehensive survey of studies in the field, see Chapter 3 in Wadensjö & Orrje (2002).

Figure 1 shows that there is a net transfer to children and young people in all three groups. In the same way there is a net transfer to older people. For natives and Western immigrants the net transfer to the public sector changes to a net transfer from the public sector at around the age of 60. From that age the net transfers from the public sector gradually increase with age. It is the costs for health and nursing care that especially increase with age. There are few immigrants who are 71 years old or more and therefore we have used the figures for natives to represent immigrants who are of that age; otherwise outliers would have had too large an influence. In the figure we have also smoothed the variations by showing the average for three years of age (for example, the value for 42 years stands for an average of the values of those who are 41, 42 and 43 years old).

If we study those who are 20 to 60 years old, there are both similarities and dissimilarities between the groups. For native Danes and Western immigrants the pattern is more or less the same. Among young adults the net transfers are lower among Western immigrants, which may be explained by the fact that they study to a greater extent. Some of them have also come to Denmark to study. The students have low or no incomes and therefore pay less in taxes. However, the large difference is between non-Western immigrants on the one hand and natives and Western immigrants on the other. For non-Western immigrants the net transfer in almost all one-year age groups, even among those of active age, goes in the direction from the public sector to the immigrants. The reason for this is of course that this group is poorly integrated into the Danish labour market. We will return later to the importance of the relation between employment and net transfers.

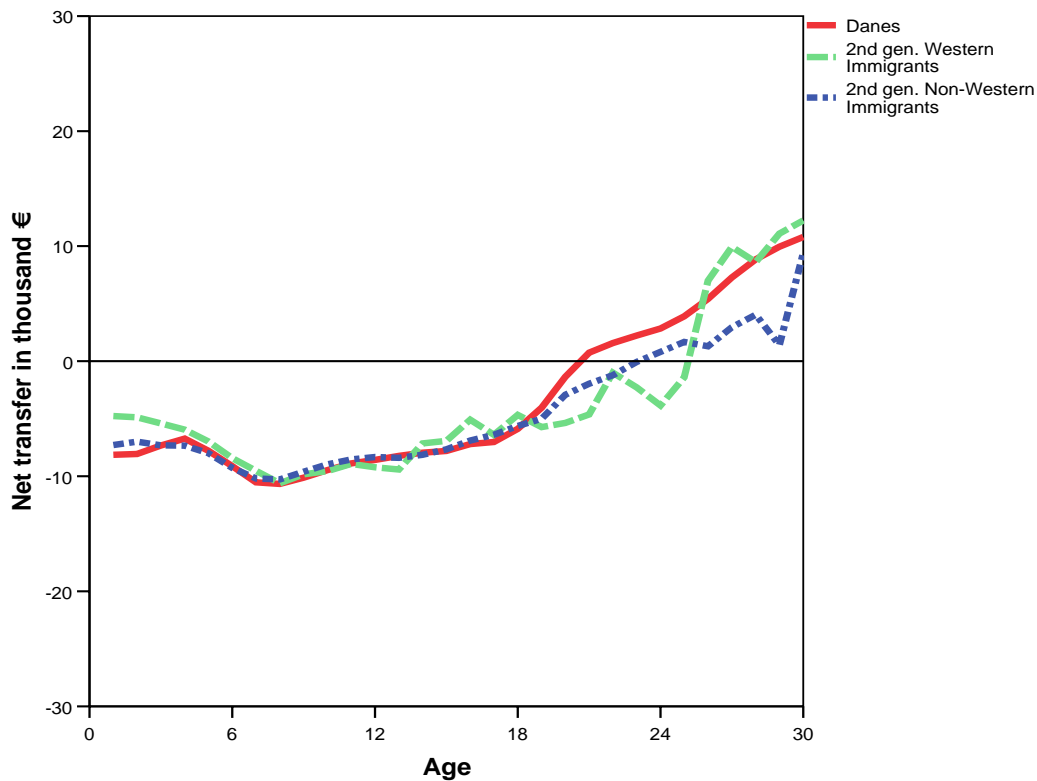
**Figure 1. Net transfers to the public sector per person (three-year average) in 2001**



Note. The actual average values have been used for those aged 0-70 years. For those aged 71 and older the values for natives have been used for all three groups as there are so few observations for older immigrants.

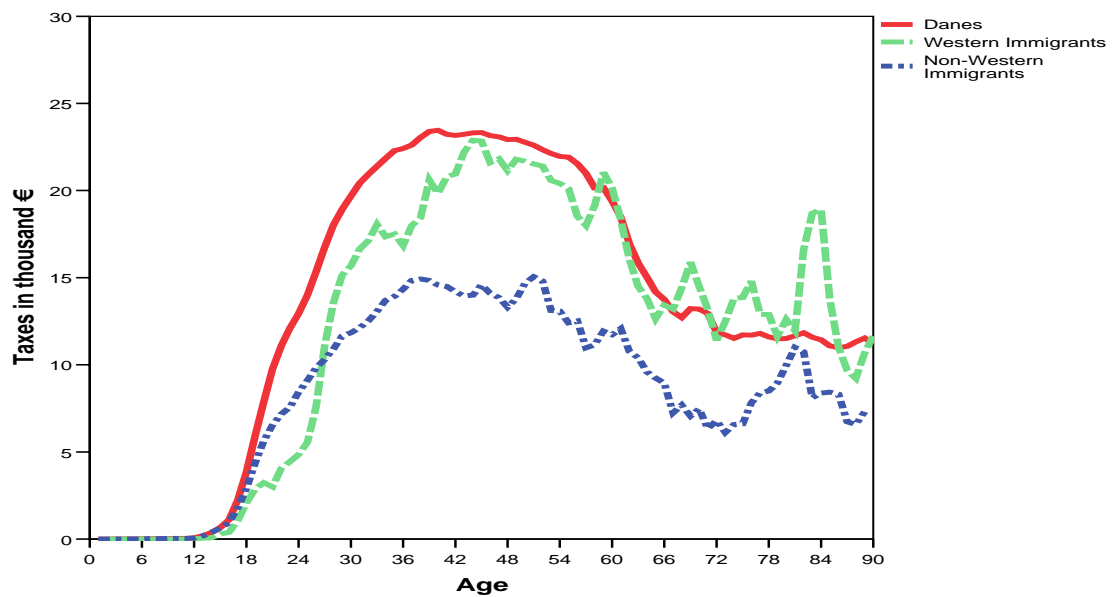
It is particularly interesting to see if the development of the net transfers from the second generation of immigrants is more like that of the natives. In Figure 2 we compare the net transfer from the second generation of Western and non-Western immigrants with that of natives. As there are only a few non-Western immigrants aged 30 and over we restrict the age interval to up to 30 years. The figure shows that the differences in net transfer are rather small but that the changes from a negative to a positive net transfer to the public sector happens at an earlier age for native Danes than for second generation immigrants.

**Figure 2. Net transfers to the public sector per person (three-year average) in 2001; Danes and second generation Western and non-Western immigrants**



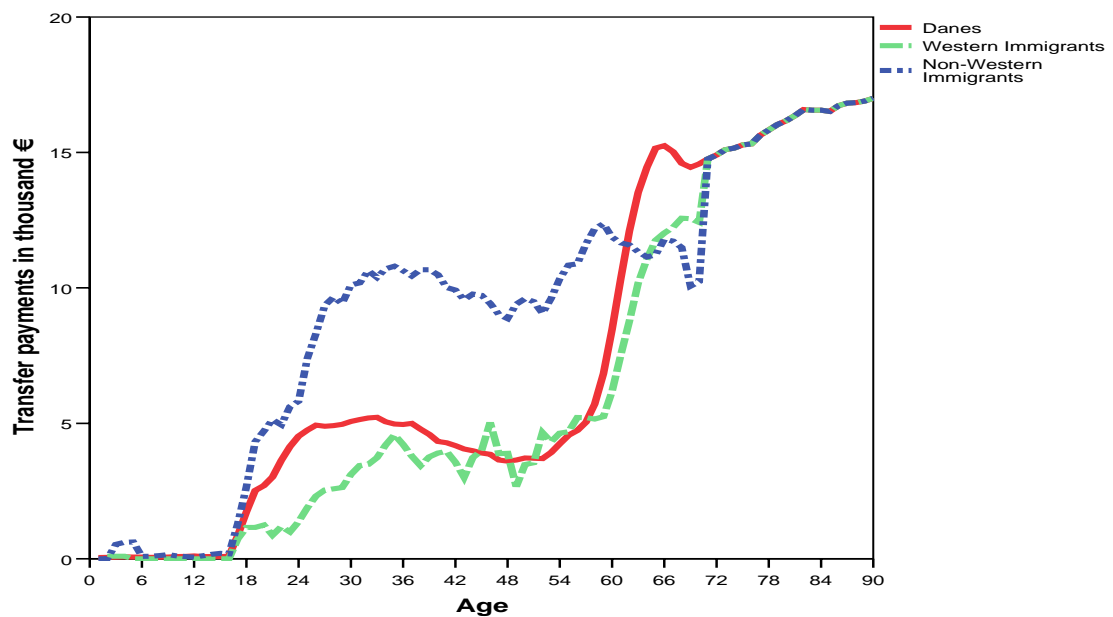
We will now turn to the three main components of the net transfers: taxes, income transfers and public consumption. Figure 3 shows how tax payments vary with age for the three groups: natives, immigrants from Western countries and immigrants from non-Western countries. Figures 4 and 5 show the corresponding pattern for transfer payments and public consumption. Large differences between the non-Western group and the other two groups are to be seen with respect to taxes and transfer payments. The non-Western immigrants are in employment less often than the other groups, and therefore pay less in taxes and receive more in transfer payments (unemployment benefits, social welfare payments).

**Figure 3. Tax payments (three-year average) in 2001**



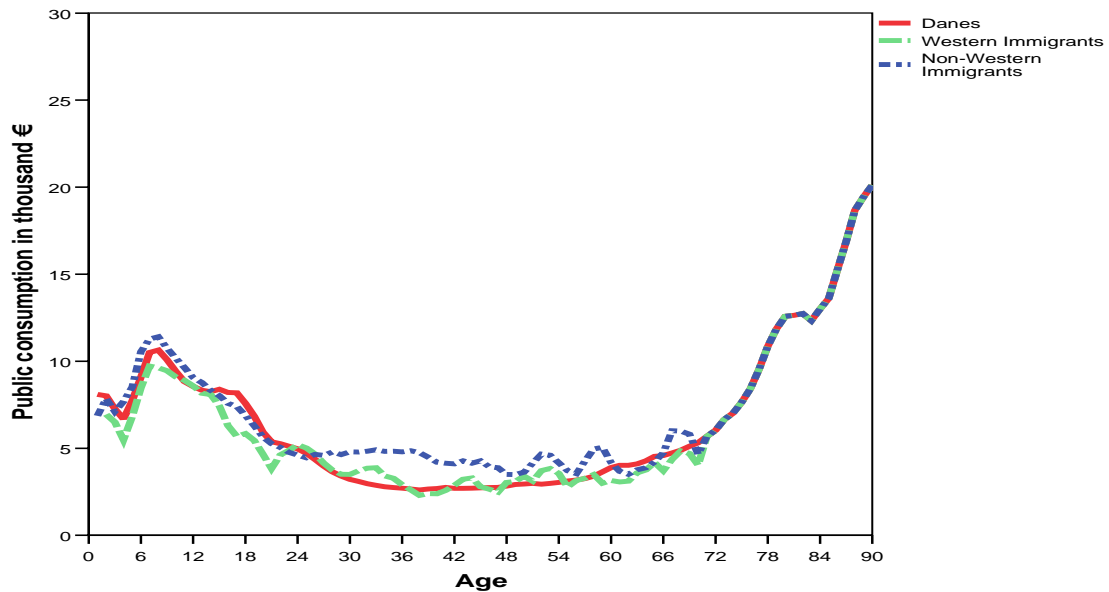
Note. Those under the age of 18 are also included with data of their own.

**Figure 4. Transfer payments from the public sector according to age (three-year average) in 2001**



Note. Those under the age of 18 are also included with data of their own. The actual average values have been used for those aged 0-70 years. For those aged 71 and older the values for natives have been used for all three groups as there are so few observations for older immigrants.

**Figure 5. Public consumption according to age (three-year average) in 2001**



Note. Those under the age of 18 are also included with data of their own. The actual average values have been used for those aged 0-70 years. For those aged 71 and older the values for natives have been used for all three groups as there are so few observations for older immigrants.

We will now continue by examining how much of the difference between immigrants and natives in net transfers to the public sector it is possible to explain by demographic factors such as age, gender and family status, by education, and by variables representing integration on the labour market and the economy such as employment, earnings and labour income (earnings plus income from self-employment). The analysis is based on regression analysis with net transfer as the dependent variable, and where we gradually include new explanatory variables to see how the differences in the coefficients representing various groups of immigrants change. The native Danish group is the reference group at all times. See Table 3. The net transfers to children under the age of 18 are added to those of their parents.



**Table 3. Difference in net transfer to the public sector per person aged 18 years and older in 2001 (in thousand Euros) according to regression estimates between those who are first- and second-generation immigrants and Danes (both parents born in Denmark)**

Group	Controls for other variables than country of origin					
	no controls	age, gender, family status	as (2) and education	as (3) and employment rate	as (3) and earnings	as (3) and labour income
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Born in Denmark</i>						
One parent born in Denmark, one in a Western country	2.2***	0.5	-0.5	0.7	0.1	0.1
One parent born in Denmark, one in a non-Western country	-0.8	-0.8	-1.7*	0.9	0.9	0.7
Both parents born in a Western country	3.4**	1.9	-0.3	2.3**	1.2*	1.3
Both parents born in a non-Western country	-4.6***	-2.1**	-0.8	2.6***	1.8**	1.3*
<i>Born outside Denmark</i>						
Born in Western country	0.8*	0.7*	-1.9***	3.0***	1.4***	1.4***
Born in non-Western country	-11.8***	-12.3***	-12.3***	-2.0***	-2.0***	-1.3***

Notes. \*\*\* = significant difference between the cross-section and panel estimates on the 1 per cent level; \*\* = significant difference on the 5 per cent level; \* = significant difference on the 10 per cent level. Calculation based on 10 family status groups: single or cohabiting, and with 0, 1, 2, 3, or 4 or more children. Age is represented with one linear and one quadratic term. Eight educational groups. Net transfers to children under the age of 18 are added to those of their parents.

In the first column no other variables than those representing immigrant groups have been included in the estimation. The numbers are more or less the same as in Table 1.<sup>18</sup> Note that the comparison is with the reference group (the Danes) in Table 3 (and not as in Table 1 with zero). The table shows that net transfer to the public sector is about the same for first-generation Western immigrants and native Danes (the difference is not statistically significant), positive for second-generation immigrants from the same countries, large and negative for the second-generation non-Western immigrant group (5,700 EUR), and even more so for the first generation from the same countries (11,700 EUR).

In the second column age, gender and family status are included among the independent variables. For most immigrant groups the coefficients are small and close to zero – i.e. close to the values of Danes. There are two exceptions: first- and second-generation immigrants from non-Western countries. The

<sup>18</sup> The numbers of groups is larger than in Table 1. Another difference is that a small group of young people who left home before the age of 18 is not included.

value of the coefficient for the first generation is close to that shown in column 1, and the value of the coefficient for the second generation is lower than in column 2 (the net transfer from the public sector is smaller).

If we include variables representing education (column 3), the value of the coefficient for the first-generation does not change, but the value of the coefficient for the second-generation immigrants declines. We now also get a significant negative effect for the group of first generation Western immigrants.

The next step is to control for the individual labour market situation. This is done in columns 4, 5 and 6. In column 4 the employment rate is included. The net transfer from the public sector is markedly reduced for non-Western immigrants – from 12,300 to 2,000 Euro (column 4). It shows that the low employment rate explains the major part of the difference in net transfer between that group and the Danes. For the other groups the coefficient value becomes positive and significantly different from zero in some of the cases.

The employment rate is not the only factor that determines labour income. It also depends on the wage rate for employees and the income from self-employment for those employed in that way. In column 5 the employment rate is replaced by earnings and in column 6 with labour income (earnings plus income from self-employment). The results change somewhat, but not very much. The demographic and the education variables probably took care of much of the variation in the wage rate in the earlier estimations.

There is an implicit assumption in Table 3 that the labour market variables have the same effects for the different groups. We test that assumption by making separate estimates for each group and looking at the coefficients for the employment rate, earnings and labour income. These estimates are shown in Tables 4, 5 and 6. In all estimations the net transfers to children under the age of 18 are added to the net transfers of their parents.

The coefficients for the employment rate are shown in Table 4. We show how much greater a net transfer a person would have had if the employment rate was 100 instead of 0. We see that there are some variations over time (partly explained by inflation) and between different groups. The most remarkable thing, however, is that the effects are rather similar in size for native Danes, Western immigrants and non-Western immigrants. This underlines the importance of employment for the net transfer to the public sector.

**Table 4. Effect on net transfers according to regression estimates in thousand Euro (in current prices) if a person had been employed full-time and all year instead of being non-employed; for different groups**

Group	Effect on net transfer in thousand Euro if a person instead of being non-employed had been employed full-time, all-year					
	1996	1997	1998	1999	2000	2001
<i>Born in Denmark</i>						
Both parents born in Denmark	26	27	28	29	31	31
Both parents born in Western countries	27	29	27	31	37	38
Both parents born in non-Western countries	17	20	25	21	25	25
<i>Born outside Denmark</i>						
Born in a Western country	23	23	23	24	26	24
Born in a non-Western country	26	25	25	27	29	30

Note. The other independent variables included in the regressions, but for which estimates are not shown here, are age<sup>2</sup>, female, and the family status variables (four categories).

The estimates shown in Table 4 do not show from which value the net transfer starts when the employment rate changes from 0 to 100. This value can be calculated by using the same regression equations. We have calculated the initial values by using the average values of both continuous and dummy variables, and the value of zero for the employment rate. The results, the initial values, are given in Table 5.

**Table 5. Initial values in thousand Euro (current prices) calculated by using the same regression equation as in table 4, that the employment rate is zero and that all other variables are at average values**

Group	Initial values (i.e., for a non-employed individual) in thousand Euro					
	1996	1997	1998	1999	2000	2001
<i>Born in Denmark</i>						
Both parents born in Denmark	-12	-12	-13	-13	-13	-14
Both parents born in Western countries	-11	-13	-11	-11	-14	-15
Both parents born in non-Western countries	-10	-10	-10	-11	-12	-12
<i>Born outside Denmark</i>						
Born in a Western country	-9	-8	-7	-7	-7	-6
Born in a non-Western country	-15	-15	-15	-16	-17	-18

Note. In addition to the employment rate, the independent variables included in the regressions are age, age<sup>2</sup>, female, and the family status variables (four categories).

The figures are all negative but the estimates differ due to differences in the age, gender and family status composition of the various groups. Note also that the values in Table 4 in all cases are larger than the initial values in Table 5. Full employment means a net transfer to the public sector for all groups.

In the next step, Table 6, we study the effects of a change in earnings. It can be seen as the marginal 'net tax' effect: How much of each extra earned Danish *krone* goes to strengthening the public finances? We see that the marginal effect is higher for those from non-Western countries. This can be explained by the importance of the transfer payment for those with low incomes and by the fact that these payments are reduced as earnings increase. As the immigrants are lower paid, they more often receive reduced transfer payments when their earnings increase.

**Table 6. Effect on net transfers according to regression estimates as per cent of a change of earnings for different groups**

Group	Effect on net transfers as per cent of a change in earnings				
	1996	1998	1999	2000	2001
<i>Born in Denmark</i>					
Both parents born in Denmark	69.6	69.8	70.8	72.8	72.4
Both parents born in Western countries	69.0	66.5	67.8	76.6	77.0
Both parents born in non-Western countries	71.8	53.2	82.2	76.4	76.1
<i>Born outside Denmark</i>					
Born in a Western country	66.0	65.0	67.1	74.3	61.5
Born in a non-Western country	88.8	77.9	83.2	81.8	82.0

Note. The other independent variables included in the regressions, but for which estimates are not shown here, are age, age<sup>2</sup>, female, and the family status variables (four categories).

In Table 7 the corresponding estimates for labour income are shown. The incomes from self-employment are also included. The pattern is the same with the greatest marginal effects for non-Western immigrants. The large marginal effects show that measures which lead to employment for immigrants may have positive effects on public finances even if the initial costs are high. A requisite is of course that the measures actually lead to a higher employment rate and higher incomes from labour.

**Table 7. Effect on net transfers according to regression estimates as per cent of a change of labour income for different groups**

Group	Effect on net transfers as per cent of a change in labour income				
	1996	1998	1999	2000	2001
<i>Born in Denmark</i>					
Both parents born in Denmark	68.6	68.1	70.3	73.0	69.1
Both parents born in Western countries	42.4	72.4	66.8	68.4	73.9
Both parents born in non-Western countries	79.4	70.9	84.7	82.7	82.0
<i>Born outside Denmark</i>					
Born in a Western country	67.7	64.8	73.1	61.9	58.9
Born in a non-Western country	88.3	80.3	81.4	81.8	84.0

Note. The other independent variables included in the regressions, but for which estimates are not shown here, are age, age<sup>2</sup>, female, and the family status variables (four categories).

The main conclusion of this analysis is that net transfers are influenced by several different types of variables. Both demographic variables and education are of importance. However, if we study the differences in net transfers to the public sector between natives and first generation immigrants from non-Western countries, those variables are not very important. The main part of the differences in net transfer to the public sector is explained instead by the fact that, given those variables, non-Western immigrants have a lower employment rate and thus lower incomes from labour.

## Summary and conclusions

Immigration has consequences for public sector finances. In this paper we have dealt with one of those consequences, the net transfers to the public sector from immigrants in Denmark. We have done so by looking at the effects of a number of variables by using information on cross-sections of the population.

The data make it possible to follow the development over time. The data show that the net transfer in all years studied goes from Western immigrants to the public sector, and from the public sector to immigrants from non-Western countries. The amounts are considerable. The size per person varies with the business cycle (and the employment rate), and the total amount also varies with the size of the immigrant population. It is a little surprising that the reduction in amounts for both individuals and in total which took place between 1996 and 1998 did not continue in 1998-2001 in spite of an improvement in the labour market situation.

It has been possible to study the effects of individual characteristics and the employment situation (and income from employment) on the individual net transfer to the public sector. If the employment/income variables are left out, the net transfers from the public sector are greater to women than to men, and greater to those who are young and especially to those who are old, and to those who have children (especially single parents). Some of these effects

disappear when variables representing employment/income are included, but the effect of having children is still very strong. For other variables the effects become smaller and to some extent change signs for the two countries, a result which may be explained by differences in the tax and transfer systems. The employment/income variables are highly significant with large effects.

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