Long-term consequences on annual income of the onset of type 1 diabetes in young adults: Longitudinal analysis of annual data 1990-2005 from Sweden for persons born 1949-1970

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Abstract

Aim: To quantify and disentangle the long-term consequence on annual income of the onset of diabetes for persons aged 15-34 years old. **Method**: Applying the human-capital theoretical framework including developments of the Mincer equation, we estimated the effect on annual income of the onset of diabetes in young adults by the panel-data random-effects model and the Hausman-Taylor estimator. The model accounted for the duration of diabetes, age at diabetes onset, preschool children in household, own and parents' education, employment status, living in metropolitan area, and an index for the income development in the general Swedish population. **Data** was extracted from the Econ-DISS database (N=46,490) containing persons with diabetes onset in ages 15-34 in Sweden since year 1983 (n=9,298), and control persons matched for age, sex and municipality of residence at the time of diagnosis (n=37,192). Econ-DISS has over 290 demographic and economic annual variables from national registers at the Statistics Sweden for the period 1990-2005. This paper analyse a subset (N=17,873) consisting of persons with type I diabetes born 1949-1970 and their controls. **Results and conclusion** showed no difference in annual income *before the onset of diabetes*. After the diabetes onset, persons with diabetes gradually lag behind. In year 2005, the median annual income for persons with diabetes was 95% of the median annual income for control persons. The regression analyses showed a significant negative effect of diabetes on annual income from paid work for both men and women. We had indications that women in general more than men lag behind bit by bit, while the results on men pointed at a greater heterogeneity. For both men and women with diabetes, having a university degree did compensate for most of the negative diabetes impact. Consistent with previous findings, both mother's and father's higher education had significant positive effects on the subjects' income. We conclude that diabetes had a negative impact on annual income from paid work, but that education had a very important counteracting effect. The heterogeneity we found among persons with diabetes warrants further analysis of the underlying mechanisms.

Introduction

Rather than lack of interest in questions regarding long-run labour market consequences due to longstanding illnesses like diabetes, we claim that the means to study those questions have not been available so far. Longitudinal registers on disease and health-care utilisation are not readily available, and typically such registers, if they exist, lack adequate information on individual based longitudinal labour-market variables. The Scandinavian countries have a reputation of high-quality register data and one of the aims of Vetenskapsrådet (the Swedish Research Council) has been to promote the use of existing registers, merging them using the unique personal identification number in order to answer defined research questions. In line with these aims, we have created a quasi-experimental dataset to explore and analyse the long-term consequences of diabetes onset in young adults on education and labour market outcomes including income, as well as on health-care utilisation, Econ-DISS. Econ-DISS is based on all individuals registered in the Diabetes Incidence Study in Sweden, DISS, since 1983 and a selection of national population registers at Statistics Sweden. The Econ-DISS is described below.

The long-run health-related consequences of life-long diseases like diabetes are typically better known than the consequences of the disease outside the health sector, for instance direct and indirect effects on labour market participation, career opportunities and the development of income. This may partly be explained by the fact that conclusions on causal effects of a disease on income will place particularly high demand on the empirical data. Furthermore, before conclusions can be made, there must exist a sound theory for why correlations should be causal in the first place. The fact that two things happen at the same time could be just coincidence, or there may be a third factor, not included in the analysis, that is the true cause of both effects.

We claim that it is not because of the lack of interest from either the medical profession or policy makers, that the long-run labour market consequences of diabetes have been studied only sparsely, with some notable exceptions (Kahn 1998; Jonsson, Nystrom et al. 2001; American Diabetes Association 2003; Brown, Pagán et al. 2005) . These studies do however rely on more aggregate statistics and cross-sectional measures of entire cohorts and in some cases retrospective self-reported survey information on the time of diabetes onset. Cross-sectional data seriously limits the opportunity to make causal inferences. In the case of income dispersion, there is a series of other known correlates of income that could explain differences between individuals and cohorts. For instance, labour market economic studies from the US have found intergenerational income elasticities of 0.4 have been found (Solon 2002) . Income variations may also be associated with employment in the public/private sector of the economy, large cities and rural areas, men and women, young and old, etc. To some extent differences in income depend on explicit, or implicit, choices made by the individual including the choice of contents and length of formal education and to the type of work he/she applies for. Hence merely finding a difference in income between persons with diabetes and the general population at a specific point in time is not enough to claim that diabetes causes income loss.

Type 1 diabetes is a result of the destruction of the betacells in the pancreas which are responsible for the production of insulin. Insulin is a hormone that keeps the blood glucose within narrow limits and aids muscle and fat cells in the body to absorb glucose. Type 1 diabetes is a disease where the onset is sudden and cannot be anticipated by the individual. It will also change the conditions for the individual: treatment includes insulin injections several times a day and testing of blood glucose level on a regular basis. Physical activities are beneficial in general but even more for persons with diabetes. Historically, persons with diabetes have had strict dietary recommendations and a need for careful planning of insulin injections in advance of meals. Modern insulin may have enabled persons with diabetes to relax some of the stricter regulations. Nevertheless, insulin dependent diabetes takes time and energy from other activities for preventive treatment (blood glucose testing and insulin injections). Diabetes is not only related with risk for hypoglycaemia (too low blood glucose level) and the more rare hyperglycaemia (too high blood glucose level), but also with a range of other health problems including cardiovascular disease, stroke, neuropathy (nerves), retinopathy (eyes) and nephropathy (kidneys). Both in the short and long-term perspective, persons with diabetes have more sick days than people in general (Jonsson, Marké et al. 2000) .

The characteristics of type 1 diabetes; sudden and unanticipated onset, the demands of the disease on the individual's time for preventive treatment, an increase in sick days caused by diabetes; lead us to expect that diabetes will have consequences on the labour market variables that will show after onset. Moreover, before the onset of type 1 diabetes there is no reason to assume that the person differs from people in general.[1] Using

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[1] Type 2 diabetes, formerly known as old age diabetes, is different from type 1. Type 2 diabetes is a consequence of insulin resistance in the body cells. Physical inactivity and overweight are known causes of type 2 diabetes. In later analyses we will focus on type 2 diabetes.

standard labour market models we may therefore calculate the cost to the individual, and to society at large, in terms of lost income that can be causally linked to the onset of diabetes and potential development of diabetes-related complications. As such, it will also provide us with an estimate of the potential gain of improved diabetes treatment and management.

In this paper we ask the question "Is their at all a difference in the long-run development of income for persons with the onset of type 1 diabetes during ages 15-34, compared to persons of the same age, sex and municipality of residence from the general population?" To answer this question we first examine the development of median annual income from paid work over the period 1990-2005 and then we analyse the longitudinal individual data to explore potential causal factors.

Method

Econ-DISS

Econ-DISS builds on data from the Diabetes Incidence Study in Sweden (DISS), the Longitudinal Income Social Security and Labour market data (LISA) at Statistics Sweden, and health-care utilisation data from patient-administrative registers at Region Skåne.

Since 1983, the Diabetes Incidence Study in Sweden, DISS, follows nationwide the incidence of diabetes and its complications among young adults (15-34 years of age) in Sweden. Approximately 400 persons have been prospectively registered each year. The total database 1983-2005 contains 9298 individuals born between 1949 and 1990. The reporting physician made the clinical classification of type of diabetes at the time of diagnosis. In DISS, 73 percent were registered as diabetes type I, 17 percent diabetes type II and 10 percent were unclassified initially.

From the Register of the Population in Sweden at Statistics Sweden, we drew four persons who had the same age, sex and municipality of residence at the time of diabetes onset for each person registered in DISS, i.e. matched control persons. For persons with diabetes and their controls (N=46,490 of which 9,298 have experienced diabetes onset as young adults), the Statistics Sweden has at our request and following our design compiled data from a number of individual based population registers including LISA (Longitudinal Income Social Security and Labour market data) at Statistics Sweden into the new register, Econ-DISS. LISA covers the whole Swedish population aged 16 and over every year, and is currently available for years 1990-2005. Econ-DISS contains 290 variables measuring education, profession, income, labour market activity, periods of sick-leave and unemployment and work-place characteristics. We also linked health-care utilisation data for the Region Skåne (covering about 1/8 of the Swedish population) to Econ-DISS including primary care as well as outpatient and inpatient utilisation.

In addition, based on Flergenerationsregistret (Register of generations) at Statistics Sweden, we added mothers (N=43,838 or 94 percent) and fathers (N=43,284 or 93 percent) for persons with diabetes and their controls. For parents, we have longitudinal information on demographic and socio-economic characteristics.

Before compilation of Econ-DISS the research programme was submitted to the Regional Ethical Board at Lund University.

Population selected from Econ-DISS

For this specific study, we selected from the Econ-DISS all persons born 1949-1970 registered with type 1 diabetes in DISS (N=3,672) and their respective four control persons. The age limits were chosen so that the entire sample would be at least 20 years old in 1990 and thus potentially active in the labour market. The longitudinal labour-market data in Econ-DISS enable us to compare the pattern of income development over 16 years between 1990 and 2005 and also to explore patterns before and after diabetes onset.

Economic model

This paper reports from an empirical application in the human capital tradition, where we used a standard model for measuring the returns to schooling (Mincer 1974; Griliches 1977; Card 1999; Card 2001) but added two health-shock variables (diabetes onset and age at onset) and a variable measuring the diabetes duration in years. For type 1 diabetes, there is no reason to believe that the individual anticipates the diabetes onset. Hence we assume that all decisions made up to the year before diagnosis follow the same distribution for both cases and controls. The model is then

Income = f(age, level of education, diabetes, shift variables)

The shift variables are born before 1960, diabetes, duration of diabetes, labour-market activity, living in metropolitan area at the start of the period, parents' level of education, presence of young children and an index for the general income development over the time period.

Preventive care (checking blood sugar, insulin management, preventive and acute visits to doctors and nurses caused by diabetes etc), sick-leave, health-care utilisation and acute events are all examples of direct effects of diabetes on the uses of time. Our hypothesis was that the onset of diabetes reduces the time available for other activities for the individual. Diabetes may also have indirect effects through its effects on the individual's perception of his/her own potentials and his/her wishes for the future. The indirect effects then work both through the individual's valuation of activities and his/her beliefs on the future events.

In the empirical application, we have benefited from the fact that we have longitudinal data available and hence may control for some of the endogeneity problems as we follow individuals over time and have background data on their parents. Table 1 lists the variables in the analyses.

Statistical methods

Illustrations of income development used standard descriptive measures (median, interquartile range) for comparisons at the group level. We also report the results from non-parametric tests of equality of medians and the Kruskal-Wallis test of equality of distributions (Altman 1991; Greene 2000; StataCorp. 2003).

To further explore what factors were associated with the variation in income within and between individuals, we used the Hausman-Taylor random-effects model (Altman 1991; Greene 2000; StataCorp. 2003) . Explanatory variables included in the models were age, diabetes and time since diabetes onset, own education, mother's and father's education, an income index for the development of median income in the working age population (20-64 years old) and being active in the labour market in November of the specific year.

Results

The median income and interquartile range for persons with type 1 diabetes and their controls born 1949-1970 are reported in Table 2, where we also present the test statistics of the non-parametric test of equality of medians and the Kruskal-Wallis test of equality of distributions. The differences between the two groups were small in the first years of the 1990s. However, the distributions were not equal during the period 1992-2005. We also rejected the null-hypothesis of no difference in the median annual income for persons with diabetes and their controls far all years 1995-2005. While the interquartile range shows that there was a considerable income variation within each group, and many persons with diabetes do have substantially higher income than persons in the control group, it was also clear that the income distribution was shifted to a lower level for persons with diabetes.

Figures 1-3 show the development of median and the 25th and the 75th percentiles of annual income from paid work for the period 1990-2005 for individuals born 1949-1970 and having diabetes onset in ages 15-34 years old and the corresponding income development for matched controls. We show separate figures before and after diabetes onset, as well as by length of diabetes duration. Figure 1 contains only individuals before diabetes onset and their controls. The median and 25th and 75th percentiles were virtually identical before diabetes onset. This panel suffered from attrition as more and more persons eventually had experienced the onset of diabetes. In year 2000, only 105 persons remain in the "before onset" group and we omitted years 2001-5 from the graph due to lack of statistical power. Figure 2 shows what happened after diabetes onset. In the first years, where none had diabetes duration over ten years, we found small differences in annual income. However, differences between persons with diabetes and their controls that gradually increased, similar to the differences shown in Table 1. Figures 3a and 3b show the income development for persons with a diabetes duration of one to nine years and of at least ten years, respectively, compared to controls. Some interesting patterns emerge. The difference in median income tended to be somewhat smaller in the duration 1-9 years group but the differences for the 25th and 75th percentile was greater (Fig 3a). This gives reasons to look more carefully into both the lower and upper ends of the distribution. A potential explanation for the lower end of the distribution could be that this subgroup of persons with diabetes did meet more difficulties in the labour market in terms of fixed contracts and being hired for the first job. The difference at the higher end could be a result of being more restricted with respect to time and thus a disadvantage in a careers aiming for, for instance, managerial positions. The groups with at least 10 years of diabetes duration (Figure 3b) fit into the general picture, with potentially a more marked difference also for the median annual income.

In conclusion, the statistics presented in Table 1 and Figures 1-3 confirmed our first hypothesis that there were differences between persons with diabetes and the control group. Thus, it was relevant to go forward and analyse what factors were associated with or can be found to generate these differences. To do so, we used panel data regression methods on the 16 years of longitudinal individual data.

Our primary aim was to investigate whether the onset of diabetes and the time since onset showed a correlation with the income development. We were also interested in any significant correlation between income on the one hand and diabetes and level of education on the other hand. For this we specified a variable measuring the number of years since diagnosis where 1 was equivalent to diabetes onset in the current year. Controls score 0 in this variable each year, as do persons that will end up with diabetes, up to the year before onset.

First we explored standard fixed and random-effects panel data models, and found that the random-effects model was not consistent when compared to the fixed-effect model in a Hausman test. The results in the fixed-effect model however high-lighted the potential endogeneity problems with own and parents education. The benefits of using the Hausman-Taylor estimator were that we could allow an individual-level random effect and also having estimations on time-invarying effects. For our purposes, we estimated separate regressions for men and women, since previous research repeatedly has shown differences between men and women, and also from a policy and a clinical point of view, we might expect that there were differences between the sexes.

As the analysis covers sixteen years, we accounted for the general income development by including an index for the national median income for persons aged 20-64. The income index was obtained from statistics published on the Statistics Sweden website (www.scb.se).

Diabetes has a negative effect on annual income from paid work. For women, all else equal, diabetes implied 27 percent lower income and one additional year of diabetes duration implied 1 percent lower income on average. For men, all else equal, the negative base effect was only significant for the group who were 27 years old and older at diabetes onset and then corresponded to 16 percent lower annual income. One additional year of diabetes duration implied 0.4 percent lower annual income, on average.

Having young children (age 0-3) implies a significantly lower income from paid work for women, with the opposite effect for men. The effect of doing paid work in November in the specific year was also positive and significant for both men and women.

Own education, in general for both persons with diabetes and their controls, from upper secondary school had significant positive effects for both women (8 percent) and men (9 percent). Having a university degree increased annual income from paid work by 22 percent for women and by 28 percent for men. By the interaction variables, we also found an additional positive significant effect for persons with diabetes corresponding to additional 15 percent for upper secondary school for women (not significant for men) and to 35 (28) percent for university degree for women (men).

Parents education, treated as time invariant exogeneous variables in the model, did have significant and positive effects ranging from additional 15 percent for men who had mothers with degrees from upper secondary school, to additional 80 percent for men who had fathers with university degrees.

Discussion

The descriptive statistics shown in Figures 2, 3a and 3b as well as in Table 2, tell us that there were differences between persons with type 1 diabetes and their controls. Figure 1 does not give us reason to believe that the diabetes cohort differed from people in general (with the same age, sex and municipality of residence distribution). Preliminary analyses of the distribution of the level of education showed no differences between person who would later experience diabetes onset and the controls.

The results from the panel-data analysis tell that diabetes had a significant impact, but also that persons with diabetes should not be treated as a homogeneous group. Firstly, we found different patterns for men and women. The demands of diabetes management on time and energy may lead to different processes for women and men due to other choices in life, including preferences for market careers and for professions. Coming analyses using Econ-DISS will further disentangle the patterns using more detailed information on educational programme and age at exam as well as longitudinal information on the individual's employers characteristics (sector, number of employees, distribution of men/women and educational degrees at the workplace).

Secondly, there was also a clear educational gradient where the well educated managed to compensate for the negative impact of diabetes but that persons with only compulsory schooling, our control group, experienced on average a substantial negative impact of diabetes onset. These results were consistent with findings from the labour market literature where formal schooling and ability has been investigated.

We have a huge number of observations, and therefore one would expect that several of the coefficients of the explanatory variables would be statistically significantly different from zero, and they were. Thus it is important to consider the size of the estimated effects: Were they socially important? May they also have clinical relevance? In year 2005, the last year for which data was currently available, the difference in median annual income amounted to SEK 13,000 (approximately GBP 960 using exchange rates of

2005), corresponding to five per cent lower incomes for persons with diabetes. After tax, that would correspond to one-month rent in a four-room apartment in a middle-sized town in Sweden. Moreover at median income levels, in this relatively young cohort, 5 percent lower annual income would by most people be considered to make a difference.

As to the clinical relevance, we believe that the results presented here support the current trend with tailored health-educational programmes in health-care. Diabetes management, as the management of other longstanding illnesses, relies to a great extent on the individual and his/her family to find ways to learn to live with the new circumstances. Efficient use of health care resources may then imply targeting resource intensive educational programmes towards the groups here shown to be left more behind.

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Table 1 List of variables in the analysis

Dependent variable
Logarithm of annual income from paid work
Time varying exogenous variables
Age (in years)
Diabetes: Dummy variable = 1 if the person has diabetes in a specific year
Time since diagnosis (in years)
Dummy variable =1 for age at diabetes onset was 15-22 (only after onset)
Dummy variable =1 for aged 27 and over at diabetes onset (only after onset)
Born before 1960
Income index measuring the development median
Interaction term diabetes and highest degree upper secondary school
Interaction term diabetes and highest degree university
Time varying endogenous variables
Dummy variable = 1 if children aged 0-3 years old in the household
Dummy variable = 1 if children aged 4-6 years old in the household
Person doing paid work in November
Dummy variable = 1 if upper secondary school degree in specific year
Dummy variable = 1 if degree from university in specific year
Time invariant exogenous variables
Dummy variable =1 if born before 1960
Dummy variable =1 if Mother's highest degree upper secondary school
Dummy variable =1 if Father's highest degree upper secondary school
Dummy variable =1 if Mother's highest degree university
Dummy variable =1 if Father's highest degree university
Time invariant endogenous variables
Dummy variable = 1 if living in metropolitan area (Stockholm, Göteborg, Malmö) in first observation year for socio-economic data.

Table 2 Median and interquartile range (IQR) of annual income from paid work for persons with type 1 diabetes and their controls born between 1949 and 1970. Non-parametric tests of equality of medians and equality of distribution comparing incomes of persons with diabetes and their controls. (in SEK; SEK 1000 = GBP 74)

Year	Diabetes[1)] Median income (IQR)	Control Median income (IQR)	Equality of medians[2)] *p*-value	Equality of distribution[3)] *p*-value
1990	114 (55 – 147)	114 (52 – 152)	0.826	0.224
1991	121 (49 – 159)	123 (51 – 165)	0.242	0.029
1992	126 (41 – 167)	128 (43 – 172)	0.269	0.011
1993	121 (30 – 171)	126 (35 – 178)	0.083	0.001
1994	130 (33 – 180)	134 (39 – 188)	0.167	0.003
1995	142 (47 – 194)	148 (52 – 202)	0.016	<0.001
1996	156 (51 – 204)	161 (60 – 215)	0.007	<0.001
1997	166 (54 – 218)	172 (69 – 228)	0.002	<0.001
1998	175 (67 – 229)	183 (77 – 241)	0.000	<0.001
1999	185 (75 – 242)	192 (89 – 251)	0.001	<0.001
2000	196 (90 – 255)	203 (107 – 267)	0.002	<0.001
2001	206 (99 – 268)	215 (118 – 282)	<0.001	<0.001
2002	215 (107 – 280)	223 (125 – 293)	<0.001	<0.001
2003	220 (105 – 288)	231 (132 – 303)	<0.001	<0.001
2004	229 (103 – 297)	239 (138 – 314)	<0.001	<0.001
2005	235 (118 – 307)	248 (143 – 327)	<0.001	<0.001

[1)] Including person both before and after the onset of diabetes; [2)] Pearson Chi2 (continuity corrected); [3)] Kruskal-Wallis

Table 3 Hausman Taylor random-effects model on logarithm of annual income from paid work. Excluding observation years where income was zero. Persons born 1949-1970 and separate equations estimated for women and men. Coefficients significant at the 5-percent level in bold.

	Hausman-Taylor random effects **Women**			Hausman-Taylor random effects **Men**		
	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|
Time varying exogenous variables						
Age	**0.0360**	0.006	<0.001	**0.1077**	0.005	<0.001
Age squared	0.0001	0.000	0.172	**-0.0004**	0.000	<0.001
Diabetes in a specific year	**-0.2681**	0.093	0.004	0.0302	0.060	0.613
Time since diagnosis	**-0.0101**	0.002	<0.001	**-0.0035**	0.001	0.014
Age at diabetes onset was 15-22 years	-0.0499	0.156	0.749	0.0333	0.064	0.603
Aged 27 and over at diabetes onset	0.0486	0.075	0.517	**-0.1629**	0.045	<0.001
Born before 1960	-0.0214	0.123	0.862	-0.0916	0.055	0.095
Income index measuring the development median income	**0.0097**	0.001	<0.001	**0.0028**	0.001	<0.001
Time varying endogenous variables						
Children aged 0-3 years old in the household	**-0.6275**	0.008	<0.001	**0.0214**	0.006	<0.001
Children aged 4-6 years old in the household	**-0.0049**	0.008	0.546	**0.0255**	0.007	<0.001
Person doing paid work in November	**0.8004**	0.008	<0.001	**0.7203**	0.007	<0.001
Degree from upper secondary school in specific year	**0.0811**	0.031	0.008	**0.0861**	0.028	0.002
Degree from university in specific year	**0.2233**	0.036	<0.001	**0.2883**	0.033	<0.001
Diabetes and degree from	**0.1497**	0.067	0.025	0.0107	0.049	0.827

upper secondary school						
Diabetes and degree from university	**0.3453**	0.074	<0.001	**0.2764**	0.056	<0.001
Time invariant exogenous variables						
Born before 1960	-0.0555	0.106	0.601	**-0.3348**	0.040	<0.001
Mother had degree from upper secondary school	**0.2859**	0.087	0.001	**0.1536**	0.025	<0.001
Father had degree from upper secondary school	**0.3146**	0.086	<0.001	**0.4770**	0.030	<0.001
Mother had degree from university	**0.6577**	0.153	<0.001	**0.7103**	0.046	<0.001
Father had degree from university	**0.7134**	0.156	<0.001	**0.8041**	0.047	<0.001
Time invariant endogenous variables						
Living in metropolitan area (first observation)	**-5.2472**	0.924	<0.001	**-6.1839**	0.257	<0.001
Constant	**2.8342**	0.285	<0.001	**2.5010**	0.093	<0.001
Fraction of variance due to u_i	0.90			0.60		
Number of observations	80,233			158,269		
number of individuals	6,073			11,800		
Wald chi2(21)	24,808		<0.001	29,350		<0.001

Fig 1 The development of annual income 1990-2005 *before the onset of type 1 diabetes* and their controls. Median, 25th and 75th percentiles were based on observations born 1949-1970, diagnosed with type 1 diabetes and their matched controls. Persons with diabetes and their controls were only included up to the year before diabetes onset. (DMT1 = Diabetes Mellitus Type 1) (in SEK; SEK 1000 = GBP 74)

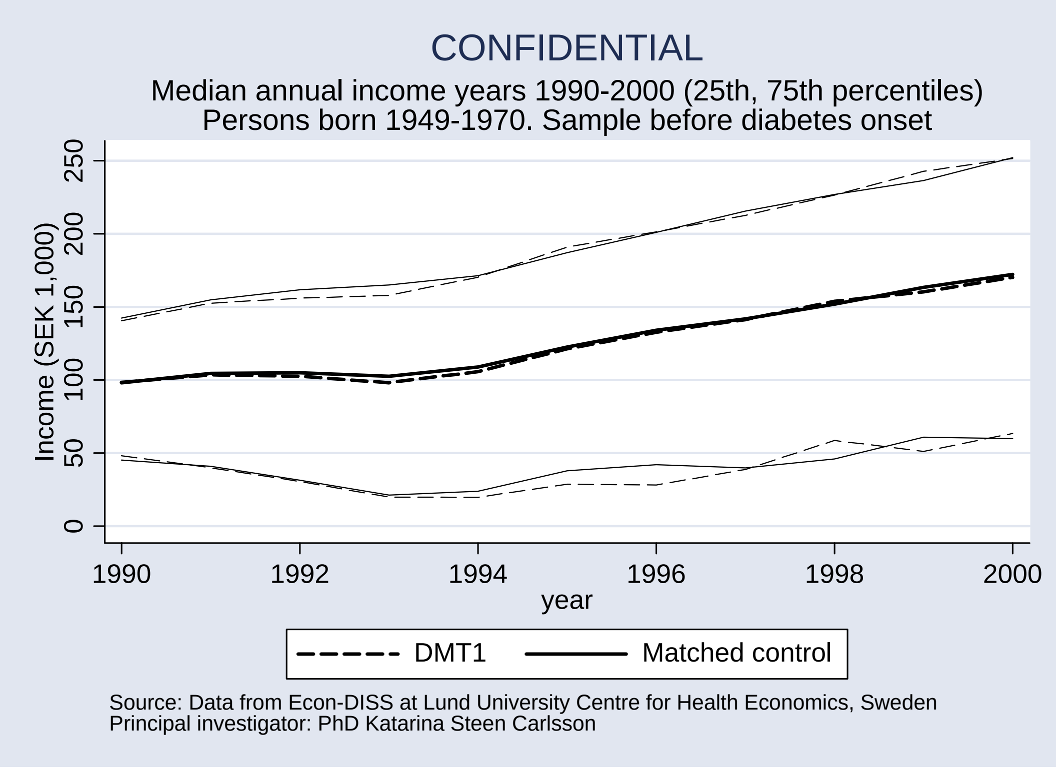

Fig 2 The development of annual income 1990-2005 *after the onset of type 1 diabetes* and their controls. Median, 25th and 75th percentiles were based on observations born 1949-1970 diagnosed with type 1 diabetes and their matched controls. Persons with diabetes and their controls were only included after the year of diabetes onset. (DMT1 = Diabetes Mellitus Type 1) (in SEK; SEK 1000 = GBP 74)

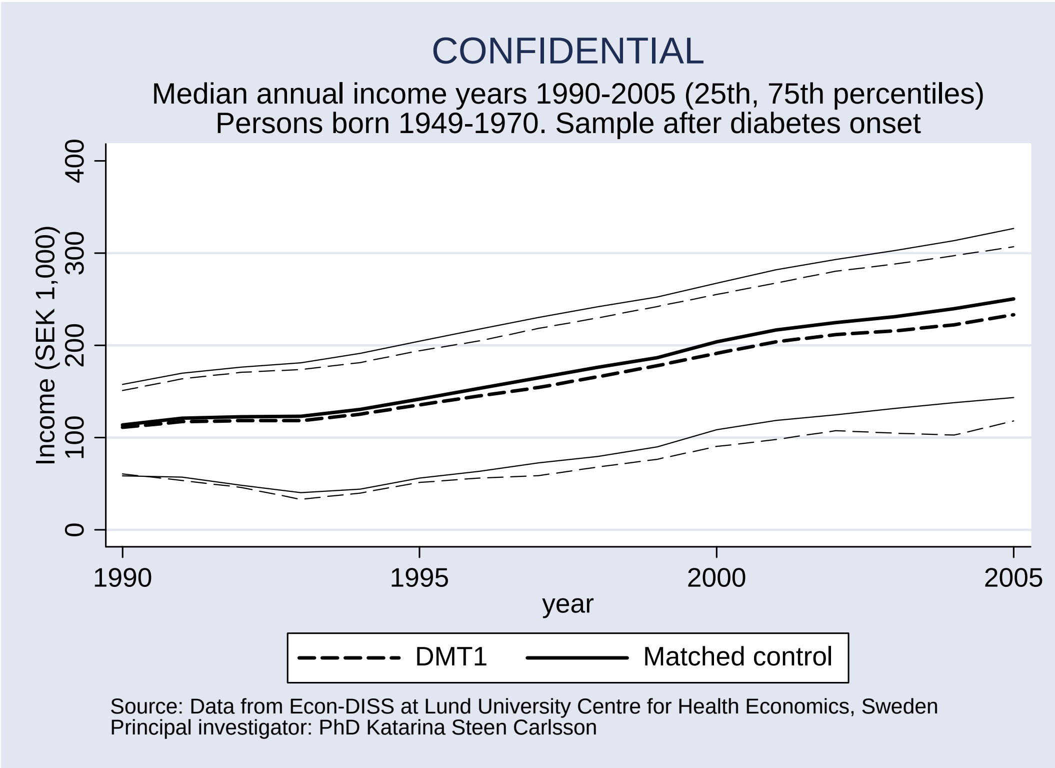

Fig 3a The development of annual income 1990-2005 *years 1through 9 after the onset of type 1 diabetes* compared to the controls. Median, 25th and 75th percentiles were based on observations born 1949-1970 diagnosed with type 1 diabetes and their matched controls. (DMT1 = Diabetes Mellitus Type 1) (in SEK; SEK 1000 = GBP 74)

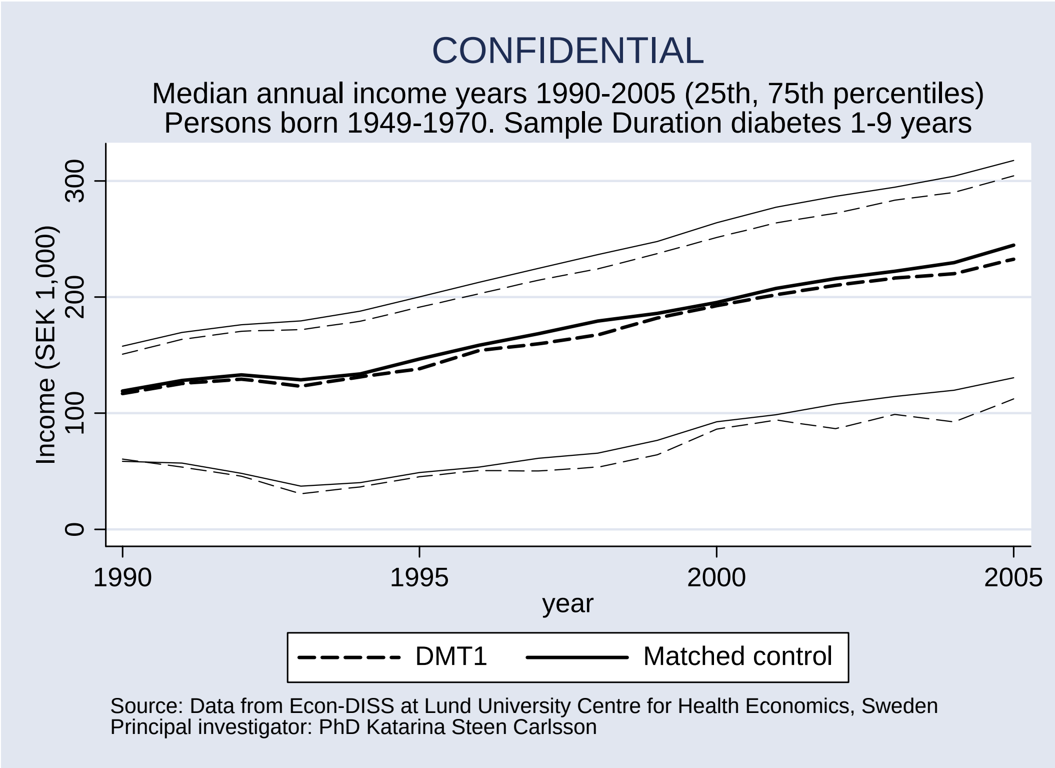

Fig 3b The development of annual income 1990-2005 *from 10 years after the onset of type 1 diabetes and up to maximum 23 years post onset* compared to the controls. Median, 25th and 75th percentiles were based on observations born 1949-1970 diagnosed with type 1 diabetes and their matched controls. (DMT1 = Diabetes Mellitus Type 1) (in SEK; SEK 1000 = GBP 74)