MEMORANDUM

No 21/2005

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Tyra Ekhaugen

ISSN: 0801-1117

Department of Economics
University of Oslo

This series is published by the
University of Oslo
Department of Economics

P. O.Box 1095 Blindern
N-0317 OSLO Norway
Telephone: + 47 22855127
Fax: + 47 22855035
Internet: http://www.oekonomi.uio.no/
e-mail: econdep@econ.uio.no

In co-operation with
The Frisch Centre for Economic Research

Gaustadalleén 21
N-0371 OSLO Norway
Telephone: +47 22 95 88 20
Fax: +47 22 95 88 25
Internet: http://www.frisch.uio.no/
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12 August 2005

Extracting the causal component from the intergenerational correlation in unemployment*

By Tyra Ekhaugen

The Ragnar Frisch Centre for Economic Research

Abstract

This paper examines the intergenerational correlation in unemployment in Norway and, by use of the sibling-difference method, separates that correlation into its causal and non-causal parts. Detailed register data covering the entire Norwegian population provide the long panel of data this method requires, and allow experimentation with different definitions of parental unemployment. Confirming existing evidence, I find a substantial intergenerational correlation in unemployment. Approximately half of this is due to observed family heterogeneity. The estimated causal effect is non-significantly negative for all measures of parental unemployment.

JEL Classification: J62; J64.

Keywords: Intergenerational mobility; unemployment; sibling estimators.

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* This paper is part of the project "Mobilizing Labor Force Participation", funded by the Norwegian Research Council. I would like to thank Knut Røed, Oddbjørn Raaum and Steinar Strøm for their valuable comments. Correspondence to: Tyra Ekhaugen, The Ragnar Frisch Centre for Economic Research, Gaustadalléen 21, 0349 Oslo, Norway.
E-mail: t.m.ekhaugen@frisch.uio.no.

Section 1: Introduction

This paper aims to establish whether or not there is an adverse causal connection between parental unemployment and children's future labor market outcomes. The existence of such a connection could help explain the rising equilibrium rate of unemployment, as a higher rate of cyclical unemployment then would lead to a higher unemployment probability not only for those who are in the labor market at that point, but also for the next generation. Examining the contents of the relatively large intergenerational correlation in unemployment is also of more general interest: If this correlation is purely non-causal, removing parents from unemployment will have no effect on the child's unemployment likelihood, whereas the existence of a positive causal effect would imply such an added dividend.

This paper examines the intergenerational correlation in unemployment in Norway and deconstructs that correlation into its causal and non-causal parts. I find that there is indeed a strong correlation: A child who has experienced at least one unemployed parent during his or her teen-age years faces an approximately 50% larger unemployment probability than a child who has not.[1] Other papers on this subject confirm the existence of a substantial intergenerational correlation (O'Neill and Sweetman, 1998; Corak et al. 2000; and Österbacka, 2001). This correlation can be partly attributed to observed differences between families, e.g. parents' income and education, and partly to unobserved family-specific characteristics, such as genetic endowments, preferences for leisure, and attitudes to self-sufficiency.

A causal effect of parental unemployment could be thought to manifest itself in several different ways. Having an unemployed parent may reduce the child's perception of social stigma connected to unemployment and inability to support

[1] A child is said to become unemployed if he/she is registered with the unemployment office for 6 months, as a minimum, during a two-year period in his/her mid-twenties.

oneself, or the child might notice the increase in leisure time caused by unemployment: Either way, the child's own preferences for work may change as a direct consequence of parental unemployment. Furthermore, the parent may develop e.g. a depression or drinking problem due to being unemployed. This may harm their caring abilities, which in turn may cause a rise in the child's unemployment probability. Finally, unemployed parents experience an income reduction, which in some countries might limit their children's educational opportunities. This channel of causality may however be less relevant in Norway, where the educational system is explicitly constructed – through generous government student loans and free university enrolment – to provide equal opportunities to children regardless of background.

While all these channels point towards a *positive* causal correlation, which is the sign presupposed in the existing literature, I argue that the experience of parental unemployment may also cause a *reduction* in the child's own unemployment probability. First, unemployed parents normally have more spare time to spend with their children, which could benefit them later in life (Hanushek, 1992). In addition, the child acquires information about the adverse consequences of unemployment, and, keen to avoid it, may choose higher education, a line of work with high job security or something else that reduces its own exposure to unemployment.

In contrast to the papers mentioned above, this one employs the sibling-difference method (as applied in e.g. Ermisch and Fransesconi, 2001, Björklund and Sundström, 2002, and Ermisch et al., 2004), and provides a detailed discussion of possible pitfalls associated with this method. By looking at siblings who are of different ages when the parent becomes unemployed and making assumptions about at which ages the children must be for such an experience to affect their own subsequent unemployment probability, I am able to identify the causal component of the intergenerational correlation in unemployment. The sibling-difference method requires a rich panel of data, which is ensured through detailed register data for 1989-2004 covering the entire Norwegian population.

This paper's main results are as follows: For a child with an average unemployment probability, approximately half of the intergenerational correlation in unemployment can be explained by observed family heterogeneity. There is *no statistically significant causal effect* for any measure of parental unemployment, whether it is 6, 12 or 18 months; full-time unemployment, plain registrations with the unemployment office (which may also include part-time unemployment as well as different kinds of training) or continuous such registrations. If anything, the results indicate a *negative* causal effect, in contrast to the existing literature, which only acknowledges the possibility of, and in some cases find, a positive such effect.

Section 2: Identification strategies

The existing explicit attempts of extracting the causal component from the intergenerational correlation in unemployment are Österbacka (2001) Corak et al. (2000) and O'Neill and Sweetman (1998).

Österbacka (2001) and Corak et al. (2000) both employ the same method, first presented in Gottschalk (1996). This method states that the correlation between parental unemployment that occurs *prior to* the child's own outcome and the probability of child unemployment, both captures the causal and the non-causal correlation, while the correlation between parental unemployment that occurs *after* the child's own outcome and the probability of child unemployment only captures the non-causal correlation. The causal effect can then be determined as a residual.

However, identifying the causal effect this way hinges on comparing families where the parents become unemployed relatively early (i.e. prior to the child's outcome), with families where the parents become unemployed relatively late (i.e. after the child's outcome). The fact that the parents in the latter family category becomes unemployed relatively late indicates that they on average have a lower general unemployment probability than the parents in the other category – and the non-causal intergenerational correlation in unemployment may very well differ accordingly. While Corak et al. (2000) finds evidence of a positive causal effect in Canada, but not in Sweden, Österbacka (2001) suggests that such an effect in Finland exists only for sons.

O'Neill and Sweetman (1998) employs, on English data, an alternative method presented in Gottschalk (1996). Through the use of information about the difference between the parent's predicted and actual history, inferences are made about his/her unobservable characteristics, facilitating identification of the causal effect. This requires an explicit modeling of the unobserved heterogeneity. However, as O'Neill and Sweetman illustrate through their failure to isolate the causal component, even employing rather strict assumptions on the distribution of the error term does not guarantee identification of this model.

The present paper employs the sibling-difference approach. By assuming that the unobserved heterogeneity is identical for biological siblings who grow up together, and looking at families where only one of the siblings is exposed to parental unemployment, I can draw conclusions regarding the existence and size of a causal effect by comparing the siblings' outcome. More precisely, the basic identification idea is to look at families where one child became unemployed as an adult whereas the other did not, and see if parental unemployment occurring after the oldest of the two siblings (presumably) has moved out of the family home helps predict for which of the two siblings unemployment awaits.

The sibling-difference method has previously been used in several different areas. The following papers are perhaps most related to mine: Ermisch and Fransesconi (2001) and Björklund and Sundström (2002) attempt to find the causal effect of parental separation on children's labor market and educational outcome, while Ermisch et al. (2004) analyzes the effect of family poverty (of which parental joblessness is used as a proxy) and parental separation on child "inactivity" and other child outcomes.

The unobserved family heterogeneity is essentially assumed to disappear when we look at the siblings' *relative* unemployment probability. Estimates of the causal effect will however be biased if any factors, e.g. parental illness, systematically affect both the parent's and *one of* the siblings' unemployment likelihood. (Factors that affect both children's unemployment likelihood equally are on the other hand unproblematic.) The other concern raised in the referred literature is that the siblings have "idiosyncratic endowments": If, e.g., one of the siblings has a disability, it could both increase his/her own unemployment likelihood, as well as the likelihood of parental misfortune. This is probably of less relevance in our context.

The above-cited papers state that provided that these assumptions are correct the sibling-difference method identifies the causal effect. I argue, however, that this requirement alone does not guarantee an unbiased estimate. First of all, to be able to say that only the younger sibling may have been affected by parental unemployment, it is necessary to fix an upper age limit after which the older sibling cannot be affected by parental unemployment. I assume this age limit to be 20. (Existence of a causal effect is presumably dependent on the children having their parents as role models or caregivers, and thus that the children are mentally close to their parents. At the age of 20, however, a very large fraction of the children aren't even *geographically* close to their parents, as the Norwegian equivalent to high school typically ends when children are 19.)

Second, in order to interpret the causal effect found as the effect of parental unemployment, one must assume that no other "treatment" affecting the children's unemployment likelihood occurred systematically more often in the families exposed to parental unemployment. The present paper seeks to account for this by only including families in the sample who remained intact during the relevant period, and by also including in the estimation a dummy for parental disability occurring during the relevant period.

While working on this paper I also found that the results might be sensitive to when the labor market outcomes for parents and children are observed. As the local labor market conditions may affect both the parents' and the child's outcome, setting the parents' and the older sibling's outcome period to the same years will lend a downward bias to the causal effect. Therefore, both the siblings' outcome periods should be set *later than their parents'*. In addition, I found that both siblings' outcomes should not be observed during the same calendar years. While this would, in addition to allowing a shorter panel of data, imply that the calendar time-effects are properly accounted for, it would also, due to lifecycle-effects, cause an upward bias to the causal effect, even when adding an age-dummy to the regression equation. This is apparently because the unobserved family heterogeneity affects children *asymmetrically* at different ages: Children in families more likely to experience unemployment on average have a shorter education, and will thus enter the labor market at an earlier age than children in families less likely to experience unemployment – regardless of the fact that the parents were unemployed.[2] The chance of becoming unemployed is higher for a person who has just entered the labor market than for someone who is still in education or has been part of the labor market for a longer period of time. It is therefore vital to observe the siblings *at the same ages* in order to get unbiased results.

Section 3: Data

In order to implement the assumptions necessary to avoid the caveats concerned with the sibling-difference method, a plentiful database is required. The database is assembled from administrative register data provided by Statistics Norway. It covers the entire Norwegian population, and contains detailed information on labor market status during 1989-2004; current and previous income (pension points); and demographic factors and family situation. The unemployment data are monthly, and include information on the type of unemployment (full-time or part-time; recall or not), as well as on different kinds of training.

A sample of 6,412 families, i.e. 12,824 children, is used in the empirical analysis. This sample satisfies the following criteria: It contains *biological* siblings exclusively in order to eliminate the genetic part of the unobserved heterogeneity. The siblings are born at least five years apart, so that the outcome period for the parents is long enough to ensure a "sufficiently large" population at risk. More precisely, all sibling pairs were born in 1972/73 and 1978/79, respectively.[3] Furthermore, to ascertain which grownups the siblings live with, only families where the parents are

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[2] This is because there exists both a negative correlation between a person's unemployment probability and the length of his/her education (e.g., Røed and Nordberg, 2004), and a positive intergenerational correlation in education (Haveman and Wolfe, 1995, and Raaum et al., 2005).

[3] Cohort *pairs* are used in order to increase the sample size. As several sibling combinations are possible in each family, one sibling is drawn from each pair of cohorts. The first cohort pair (1972/73) is decided with regard to the years the original database covers, and the age difference between the siblings is set at five to seven.

married and all the children are the parents' biological children are used.[4] Last but not least, it is imperative that the parents were not unemployed while the oldest sibling was between 12 and 19, i.e. the years 1984-92.[5] Explicit unemployment data exists from 1989. For 1984-88 we must presume that unemployment manifests itself in "dips" in the pension point trend, where the dips correspond to the income reduction that is a result of receiving unemployment benefits.[6]

There is no data available on parental unemployment prior to 1984, i.e. before the siblings were 11-12 and 5-6 years old, respectively. This will not introduce any bias to the estimated causal effect if the subsequent labor market outcomes of children aged 5-12 when exposed to parental unemployment are on average equally affected as if they had been aged 0-6 (or, obviously, if children below 11-12 years of age are not affected by parental unemployment).[7]

Due to the sample requirements, this paper concentrates on finding the causal effect for intact families who are not usually affected by unemployment: Not only are the parents married throughout the younger sibling's teens. They are also not unemployed during a period of 9 years, some of which (around 1989-92) are characterized by an unusually high level of unemployment in Norway.

The parents' labor market outcome is observed for 1993-96, when the younger sibling is 14-18 years old. The children's outcome periods are 1997-98 and 2003-2004 for the older and younger sibling respectively, i.e. at 24-26 years of age. Unemployment is measured in months registered at the unemployment office. There

[4] While the method allows using families with stepfathers and stepmothers, this would complicate the creation of the database.
[5] In practice, I allow at most two months of registration, as allowing two instead of zero months added approximately 500 extra families.
[6] Thus tracing the parents' work history farther back than 1984 is problematic, as a large share of the mothers at that time still stayed at home with the younger sibling.
[7] An indication that these assumptions are true is the finding in Gottschalk (1996, p. 17) that exposure to parental use of welfare only has a significant causal effect on the child's own welfare probability when it occurs during the three years directly prior to the child's outcome, whereas earlier parental welfare participation has no significant effect.

are several different registration categories: part-time and full-time unemployment, as well as different kinds of training. Child unemployment is throughout the analysis measured as at least 6 months of registration during the abovementioned two-year period, and all registration categories are treated equal. Parental unemployment is defined in various ways – a type of experimentation novel to the literature, but one that may lend valuable insight into what kind of parental unemployment is most damaging. In particular, *full-time* parental unemployment is expected to affect children more than registrations in general as such unemployment entails actually staying at home during the unemployment period, which is important according to our guesses on the ways in which the causal effect works. But also when simply defining unemployment as months registered at the unemployment office, I use several measures such as *different numbers of months*, and *continuous registration periods*.

Section 4: Model

In order to quantify the intergenerational correlation in unemployment due to observed and unobserved family heterogeneity respectively, and the size of the possible causal effect relative to this non-causal correlation, three econometric models are specified. First, this very simple model shows the *gross* intergenerational correlation in unemployment:

(1) $P(y_i = 1 \mid pu_i) = l(\beta pu_i)$, $i = 1, ...,$ number of families (here: 6,412),

where $l(\cdot)$ denotes the cumulative logistic function. The outcome variable y_i equals 1 if child i became unemployed, and 0 if not. The sole explanatory variable pu_i is a dummy that equals 1 if at least one of child i's parents were unemployed while child i was 14-18 years old. Equation (1) is estimated only on the younger siblings in our sample, as (by construction) none of the older are affected by parental unemployment.

The same sample is used in the second exercise, where the correlation is adjusted for *observed family heterogeneity*. More precisely, equation (1) is generalized to also include the following family characteristics (z_i): Pre-unemployment long-run parental income[8], mother's and father's education, immigrant background, mother's and father's birth year, dummies for region of residence as well as a dummy indicating whether or not at least one of the parents became disabled while the child was 14-18.

(2) $P(y_i = 1 | pu_i, z_i) = l(\beta pu_i + z_i\delta)$

In order to extricate the causal effect from the estimated parameter for parental unemployment in eq. (2), eq. (3) is estimated. Here, a family specific parameter α_i is included to capture the family fixed effects shared by siblings. *i* indicates which family the child belongs to, while *j* indicates which sibling in family *i* is observed. Now, the whole sample is used.

(3) $P(y_{ij} = 1 | pu_{ij}, z_{ij}, \alpha_i) = l(\beta pu_{ij} + z_{ij}\delta + \alpha_i)$, j = 1, 2.[9]

In order to ease the computational burden, and at the same time reach a consistent ML estimator of the parameters, I use a *conditional* likelihood function in the estimation of eq. (3), which exploits the fact that $\Sigma_j y_{ij}$ is a sufficient statistic for α_j (Chamberlain, 1980). If $y_{i1}+y_{i2}=0$ or 2, i.e. if none or both of the siblings are unemployed, then y_{i1} and y_{i2} are both determined given their sum. So the only case of interest is $y_{i1}+y_{i2}=1$, meaning that the only families used in the estimation are those where one of the two children is unemployed, i.e. where (y_{i1}, y_{i2}) equals (0,1) or (1,0). The conditional density is

[8] Mean income over the years 1984-90.
[9] Note that pu_{ij} can only be 1 if *j* refers to the younger sibling.

$$P(y_{ik}=0,y_{ij}=1\,|\,y_{ik}+y_{ij}=1,j\neq k)=\frac{P(y_{ik}=0,y_{ij}=1)}{P(y_{ik}=1,y_{ij}=0)+P(y_{ik}=0,y_{ij}=1)} \tag{4}$$
$$=l[(\tilde{x}_{ij}-\tilde{x}_{ik})\gamma] \text{ for } j,k=1,2,$$

which does not depend on α_i. Note that only the parameters attached to the explanatory variables that can take different values for each sibling in a family are estimated. Let x_{ij} denote the vector of such explanatory variables. Eq. (4) can then be written as

$$P(y_{ik}=0,y_{ij}=1\,|\,y_{ik}+y_{ij}=1)=\frac{\exp(x_{ij}\gamma)}{1+\exp(x_{ik}\gamma+x_{ij}\gamma)}, \tag{5}$$

where

(6) $x_{ij}\gamma=\gamma_1 pu_{ij}+\gamma_2 pd_{ij}+\gamma_3 old_{ij}$, j=1, 2.

Let j=2 denote the younger sibling. Then, pu_{i2}=1 if at least one of the parents in family i were unemployed when the child was 14-18; pd_{i2}=1 if at least one of the parents in family i became disabled when the child was 14-18;[10] and old_{i1}=1 for all older siblings, intended to capture the fact that the siblings are measured in different years and thus during different business cycles.

Section 5: Empirical findings

The gross intergenerational correlation in unemployment is illustrated in Table 1. The sample used is the 6,412 younger siblings, and child unemployment is defined as at least 6 months of registration with the unemployment office during 2003-04. Varying the definition of parental unemployment, the first two columns show that children with unemployed parents face a 44-60% higher unemployment probability than other children. These numbers are not strictly comparable to the results from other countries

[10] As disability to a large extent is an absorbing condition, having parents who became disabled prior to 1993 is assumed to affect the younger and older sibling in equal measures. Such families are therefore included in the sample, and pd_{i1}=0 for all i.

as presented in O'Neill and Sweetman (1998), Corak et al. (2000) and Österbacka (2001). For one thing, the children are not observed at the same ages in all these papers, and this may have a bearing on the results.[11] That said, my findings are in line with the results for English and Finnish males (O'Neill and Sweetman, 1998, and Österbacka, 2001, respectively), while the correlations reported for Canadian and Swedish males (Corak, 2000) and Finnish females (Österbacka, 2001) are smaller.

Table 1: The gross intergenerational correlation in unemployment. The first two columns report unemployment fractions among the younger siblings who have and have not been exposed to parental unemployment, respectively. The last column reports results from the estimation of eq. (1), i.e. a logit model with parental unemployment as sole explanatory variable. The overall unemployment probability for all 6,412 younger siblings is .133.

Definition of parental unemployment	**Child unemployment fraction if at least one parent was unemployed**	**Child unemployment fraction if none of the parents were unemployed**	**Coefficient estimate with standard error**
Unspecified registrations at the unemployment office			
≥ 6 months	.191	.127	.484** (.106)
≥ 12 months	.192	.129	.467** (.129)
≥ 18 months	.204	.130	.534** (.153)
Full-time unemployment			
≥ 6 months	.207	.130	.561** (.145)
≥ 12 months	.191	.132	.436* (.225)
Continuous registrations			
≥ 6 months	.192	.128	.480** (.116)
≥ 12 months	.194	.130	.472** (.039)

Note: ** denotes significance on a 1% level; * on a 10% level.

Adjusting for observed family heterogeneity is shown in Table 2 to yield a drastically reduced coefficient on parental unemployment regardless of the definition of this variable.[12] In order to provide an intuitive understanding of this coefficient, we evaluate it at the mean child unemployment probability. In the estimated equation (2), $z_i\delta$ captures the effect of all observable family features that can affect the child's

[11] E.g. measuring child unemployment in 1999-2000 instead of 2003-04, and defining parental unemployment as at least 6 months of full-time unemployment, I find that a child with at least one unemployed parent faces a 90% higher unemployment probability than a child with no unemployed parent, as opposed to the 60% difference reported in Table 1.

[12] The results for four other definitions of parental unemployment (at least 6 and 18 months of registration, and at least 12 months of full-time unemployment and continuous registration, respectively) are not presented here, as they are very similar to the ones presented.

unemployment probability, other than parental unemployment. This quantity can be calculated for an average child who has not experienced parental unemployment by setting βpu_i equal to zero and inserting the proper probability from Table 1 on the left hand side. The unemployment probability for the observationally identical child who *has* experienced parental unemployment can then be calculated by inserting this quantity and the proper estimate for β as found in Table 2.[13]

Table 2: Adjusting for observed heterogeneity (eq. 2), using three measures of parental unemployment (PU).

Explanatory variable	**PU defined as at least 6 months of full-time unemployment**	**PU defined as at least 6 months of continuous registration**	**PU defined as at least 12 months of registration with the unemployment office**
Parental unemployment	.338* (.159)	.275* (.124)	.216 (.140)
Parental disability	.388* (.177)	.392* (.176)	.401* (.176)
Pre-unemployment long-run parental income	-.058* (.020)	-.057* (.020)	-.057* (.020)
Mother's education	-.062* (.019)	-.062* (.019)	-.063* (.019)
Father's education	-.024 (.016)	-.024 (.016)	-.024 (.016)
Immigrant background	-.056 (.239)	-.039 (.238)	-.038 (.238)
Mother's birth year	.012 (.015)	.012 (.015)	.012 (.015)
Father's birth year	.020 (.013)	.020 (.013)	.020 (.013)
Region 1	-.474* (.153)	-.469* (.153)	-.469* (.154)
Region 2	-.421* (.126)	-.423* (126)	-.418* (.126)
Region 3	-.238* (.111)	-.234* (.111)	-.236* (.111)
Constant	-1.769* (.588)	-1.764* (.587)	-1.761* (.587)

Note: * denotes significance on a 5% level.

This exercise reveals that the experience of parental unemployment, defined as at least 6 months of full-time unemployment, implies a 33% larger child unemployment probability. Compared to the 59% increase seen in Table 1, we deduce that observed family heterogeneity accounts for approximately half of the gross intergenerational correlation in unemployment. Similarly, at least 6 months of continuous registrations leads to a 27% increase when adjusting for observed family

[13] An example: When defining parental unemployment as at least 12 months of registration with the unemployment office, Table 1 shows that the relevant child unemployment probability conditional on no parental unemployment is .129. This implies $z_i\delta$=-1.9098. By inserting the relevant estimated coefficient of parental unemployment from Table 2, i.e. .216, the estimated child unemployment probability conditional on parental unemployment rises to .155, i.e. a 20% increase from .129.

heterogeneity; 50% when not. The coefficient reported in Table 2 on parental unemployment defined as at least 12 months of registration is insignificant, meaning we cannot rule out that observed family characteristics explain the *entire* intergenerational correlation in unemployment.[14]

The other estimates reported show the following: A child's unemployment probability is in fact more correlated with the parents' *disability* probability than their *unemployment* probability.[15] It is, as expected, negatively correlated with both parental income and education. The mother's education seems to be more important than the father's, which is consistent with results presented in, e.g., Haveman and Wolfe (1995). The coefficient for immigrant background is non-significantly negative, but the very few immigrants in this sample are hardly representative for the immigrant population in Norway.[16]

In order to isolate the causal effect, we must also account for the *unobserved* family characteristics that affect both generations' unemployment probability. This is done by estimating the conditional logit model as presented in equations (5) and (6). Table 3 shows the estimation results.

As we see from the first column, the estimated causal effect of parental unemployment is non-significantly negative, regardless of the definition of parental unemployment. As was discussed in the introduction, parental unemployment may affect the probability of child unemployment in numerous ways, some of which may imply a positive correlation, and some a negative one. And any causal effect found

[14] Still, it is significant when parental unemployment is defined as at least 6 months of registration, full-time unemployment and continuous registrations, respectively. As the coefficients for all definitions of parental unemployment are fairly similar, the issue of significance seems to be mainly a question of standard errors, which are obviously smaller for shorter periods of parental unemployment.

[15] While this is a potentially very interesting issue, it is difficult to analyse as the process leading up to disability normally lasts several years (Nordberg and Røed, 2002). It is therefore difficult to pinpoint exactly when someone "became disabled", and, as a consequence, when it may have affected their children's labor market outcome.

[16] All region coefficients are to be understood relative to the region of northern Norway. Region 1 is the Oslo area; region 2 is eastern and mid-Norway, while region 3 is southern and western Norway.

must be the *sum* of these effects. This has implications for the interpretation of the lack of statistical significance, even on a 10% level, for all of the estimated coefficients for parental unemployment in Table 3: there is either no causal effect of parental unemployment whatsoever, or there are causal effects in both directions, canceling each other out.

Table 3: Extracting the causal component: Estimation results from the conditional logit model.

Definition of parental unemployment	**Coefficient estimates, with standard errors**		
	Parental unemployment	**Parental disability**	**Business cycle effect (outcome in 1997-98 rather than 2003-04)**[17]
Unspecified registrations at the unemployment office			
≥ 6 months	-.102 (.166)	.105 (.257)	-.430* (.065)
≥ 12 months	-.224 (.192)	.116 (.257)	-.437* (.063)
≥ 18 months	-.224 (.230)	.103 (.256)	-.430* (.062)
Full-time unemployment			
≥ 6 months	-.205 (.218)	.106 (.257)	-.431* (.062)
≥ 12 months	-.499 (.312)	.124 (.257)	-.432* (.061)
Continuous registrations			
≥ 6 months	-.177 (.178)	.111 (.257)	-.436* (.064)
≥ 12 months	-.327 (.214)	.111 (.257)	-.441* (.063)

Note: * denotes significance on a 1% level.

Even though the estimated causal effect is not significantly different from zero, it may be of interest to comprehend its size. While straightforward insertions of variable values in the estimated equation (5) will only show to what extent parental unemployment affects the *conditional* unemployment probability (i.e. conditional on the fact that one and only one of the siblings becomes unemployed), insights into the effect on the *unconditional* probability may be reached as follows. For a younger sibling (i.e. j=2), the unconditional probability of child unemployment, adjusted for family heterogeneity, is given by

(3') $P(y_{i2}=1\,|\,pu_{i2}, z_{i2}, \alpha_i) = l(\beta pu_{i2} + z_{i2}\delta + \alpha_i) = l(\gamma_1 pu_{i2} + \alpha_i)$,

[17] The estimates of this coefficient reflect Norwegian business cycles, with a substantially larger unemployment probability in 2003-04 than in 1997-98. See e.g. Statistics Norway's web site, http://www.ssb.no/english/ under the sub-heading "unemployment" (May 2005).

where the last equality comes from isolating the effect of parental unemployment, i.e. the probability is calculated for a child who did not experience parental *disability*. The effect of γ_1 is evaluated at the mean child unemployment probability. The constant capturing the family-specific fixed effect, α_i, can be interpreted as "everything that may affect the child's unemployment probability *except* the experience of parental unemployment". This constant, which is not estimated, is calculated similarly as the quantity $z_i\delta$ from eq. (2), i.e. by setting pu_{i2}=0, and inserting one of the observed unemployment probabilities (conditional on no parental unemployment) from Table 1 on the left hand side. Then, the probability of child unemployment conditional on parental unemployment may be calculated from eq. (3'), inserting the appropriate coefficient estimate from Table 3.

For most definitions of parental unemployment (i.e. at least 12 and 18 months of registration; at least 6 months of full-time unemployment; and at least 6 months of continuous registrations), the causal effect is found to be a 14-17% reduction in the child's unemployment probability. The other definitions result in a reduction of 9% (at least 6 months of registration); 25% (at least 12 months of continuous registrations); and 36% (at least 12 months of full-time unemployment). While it is important to keep in mind the statistical non-significance of all these results, it is also worth noting, firstly, that the point estimate is negative for all measures of parental unemployment, and, secondly, that the alleged causal effect varies with different definitions of parental unemployment in a way that agrees well with the assumed channels for a negative causal effect, i.e. that parental unemployment is a metaphorical kick in the rear that encourages the children to take steps to avoid ending up in the same predicament as their parents and/or allows parents to spend more time with their children.

Section 6: Conclusion

This paper documents a large and statistically significant intergenerational correlation in unemployment: On average, a child who had at least one unemployed parent as a teenager has a roughly 50% higher unemployment probability in his/her mid-twenties than a child whose parents were not unemployed. Adjusting for observed family heterogeneity removes approximately half of this correlation. Employing the sibling-difference method enables us to adjust also for unobserved family heterogeneity. The remaining causal effect is found to be statistically insignificant for all measures of parental unemployment. I argue that there are many possible channels for a causal effect, some of which imply a positive correlation, and some a negative one. As any causal effect found must be the *net* of these effects, my findings imply that either no causal effect exists in Norway, or it consists of several components that cancel each other out.

This paper provides an argument against the hypothesis of the rising equilibrium rate of unemployment being (partially) explained by a direct causal intergenerational correlation in unemployment. In addition, we have seen that, at least in Norway, removing parents from unemployment gives no added dividend in reducing their children's unemployment probabilities. Yet much is still to be learned. For one, we would like to know how to accomplish a higher intergenerational mobility. If, for example, a part of the intergenerational correlation is due to neighborhood effects, then area-specific public initiatives could be the answer. Another interesting question is whether the "gross" correlation found in this paper is large or small compared to other countries – and whether e.g. differences in labor market institutions can help explain the cross-country variation.

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