Death and Divorce: The Long-term Consequences of Parental Loss on Adolescents

by

Miles Corak

No. 135

11F0019MPE No.135
ISSN: 1200-5223
ISBN: 0-660-17786-2

Price: $5.00 per issue, $25.00 annually

Family and Labour Studies
Statistics Canada, Ottawa K1A 0T6
E-mail: coramil@statcan.ca
Facsimile Number: (613) 951-5403

June 9, 1999

Earlier versions of this paper were presented to the meetings of: the Society of Labor Economists held in Boston US; the Canadian International Labour Network in Burlington, Ontario; the International Association for Research in Income and Wealth in Cambridge UK; the Canadian Employment Research Forum in Ottawa; and to departmental seminars at Statistics Canada, the University of Essex, and the University of Toronto. I would like to thank Thesia Garner, Jane Gentleman, Céline LeBourdais, John Myles, Gary Solon and Frances Woolley for comments.

Aussi disponible en français

Table of Contents

Introduction 1

1. Methods 2

2. Data and Measurement 6

3. Results 9

a) Difference in Differences 9

b) Difference in Differences with Controls 10

c) Difference in Differences in a Before and After Design 11

4. Conclusion 13

Bibliography 25

Abstract

Two quasi-experiments are used to estimate the impact of parental divorce on the adult incomes and labour market behaviour of adolescents, as well as on their use of social programs, and their marital/fertility behaviour. These involve the use of individuals experiencing the death of a parent, and legislative changes to the Canadian divorce law in 1986. Parental loss by death is assumed to be exogenous; the experiences of children with a bereaved background offering a benchmark to assess the endogeneity of parental loss through divorce. Differences between individuals with divorced parents and those from intact and bereaved families significantly overstate the impact of divorce across a broad range of outcomes. When background characteristics are controlled for—most notably the income and labour market activity of parents in the years leading up to the divorce—parental divorce seems to influence the marital and fertility decisions of children, but not their labour market outcomes. Adolescents whose parents divorced tend to put off marriage, and once married suffer a greater likelihood of marital instability, but their earnings and incomes are not on average much different from others.

Keywords: Intergenerational mobility; Divorce; Children; Quasi-Experimental Design.

Introduction

The relationship between familial background and the capacity of children to become self-reliant adults is a central element in the appropriate design of policies ranging from income distribution to family law. Yet we know surprising little about how intergenerational processes work to determine the long-term attainments of children. In a sweeping review of the U.S. literature Haveman and Wolfe (1995) point out that it is difficult to establish the causal patterns at work because unobserved processes may jointly determine family structure and children's outcomes. This is particularly so in analyses dealing with the impact of parental divorce on children. For example, McLanahan and Sandefur offer a thorough examination of the topic, but begin by noting that it is very difficult to determine if children who grow up with only one parent would have done better if their parents had not divorced (1994, pp. 9-11). As a result analysts are often forced to address a less demanding, and perhaps less meaningful question: do children from divorced families do as well on average as children from intact families with similar observable characteristics? In such a context it is easy to overstate the impact of divorce, and in fact, Cherlin *et al*. (1991) using longitudinal surveys point out that "a substantial portion of what is usually considered the effect of divorce on children is visible before the parents separate" (p. 1386).

While there have been attempts to overcome difficulties associated with the endogeneity of parental divorce by using instrumental variables and sibling information from longitudinal surveys (Lang and Zagorsky 1997, Sandefur and Wells 1997), many observers may share the pessimistic view of McLanahan and Sandefur who state that "[w]ithout a randomized experiment, we can never rule out the possibility that some other variable is causing both family structure and children's [outcomes]… Because of this analysts will always disagree about whether family structure plays a *causal* role in determining child well-being." (1994, p.11, emphasis in original)

While a true social experiment is obviously not possible, "quasi-experimental" methods are feasible. This approach, which is long-established in psychology and has gained a certain currency in the economics literature, is described and reviewed by Meyer (1995). A quasi-experiment involves the identification of exogenous changes in explanatory variables that influence comparable groups in different ways, usually as the result of changes in legislation. I examine the impact of parental divorce on the adult attainments of children by adopting this methodology. The methods and data employed are outlined in the first two sections of the paper. Two quasi-experiments are described. They both involve the use of multiple treatment groups. The outcomes of those experiencing parental loss through both divorce and death are compared with the outcomes of those from intact families. If parental loss through death is an exogenous event then the group of individuals from bereaved families represent a benchmark from which to judge the endogeneity of divorce. The second quasi-experiment relies on legislative changes to the Canadian Divorce Act that came into law during 1986, and uses multiple treatment groups in a before and after design. I argue that these quasi-experiments permit not only a more accurate estimate of the true effect of divorce on the attainments of children, but also offer a partial test of some competing theories of how parental loss influences these outcomes. The results using difference-in-differences estimators and Canadian administrative data are presented in Section 3.

Amato (1993) among others notes the importance of comparing the experiences of children with a bereaved background to those with a divorced background as a way of assessing different models of the impacts of divorce. However, many of the studies attempting

comparisons of this sort are limited in their relevance because of small sample sizes, usually less than 100 children. One of the contributions of this paper is to use administrative data from income tax records that offer much larger sample sizes—measured in the thousands— to address this issue. The findings suggest that raw differences between children from divorced families and those from intact families significantly overstate the detrimental impact of divorce across a wide range of outcomes, and in particular that it is important to control for parental labour market behaviour and income in the years before a divorce takes place. In general, the impact of parental divorce on the adult labour market outcomes of children is limited, but it does have important consequences for some aspects of social behaviour. Specifically, parental divorce lowers the adult incomes and earnings of sons, but on average only by about three percent. The incomes and earnings of daughters do not seem to be influenced. In contrast both men and women have a greater tendency to rely upon social programs, specifically Income Assistance. But this probably goes hand in hand with the finding that the most significant consequence of parental divorce is to raise the probability that children will in turn experience marital instability. Men and women from divorced families are more likely to put off marriage, and once married more likely to experience separation and divorce.

1. Methods

I assume that parental loss because of death is exogenous, and use children from both bereaved and divorced families as treatment groups.[1] If both events are exogenous and occur randomly across the population it might be expected that the detrimental effects of parental loss on the outcomes of children would be the same regardless of the reason for the loss, be it death or divorce. In the case of perfectly comparable control and treatment groups the difference in means between individuals from both bereaved and divorced families and the group of children from intact families is an appropriate estimator of the impact of the intervention.

If E is an outcome measure of interest, and if j and k indicate the family type (divorced and bereaved), then let

$$E_{jk} = \alpha + \beta_1 d_j + \beta_2 d_k + \varepsilon \qquad (1)$$

where all the variables are measured at the individual level, α, β_1, β_2 are coefficients to be estimated, and where d_j and d_k are binary variables taking the value of 1 if the individual was from respectively a divorced and a bereaved family, and a value of 0 otherwise. The difference in the average outcome between those children whose parents divorced and those whose families stayed together is just $(\bar{E}_{10} - \bar{E}_{00}) = (\alpha + \beta_1) - \alpha$, or just β_1. Similarly the differences between individuals from bereaved and intact families is $(\bar{E}_{01} - \bar{E}_{00}) = \beta_2$. The difference-in-differences estimator, $(\bar{E}_{10} - \bar{E}_{00}) - (\bar{E}_{01} - \bar{E}_{00}) = \beta_1 - \beta_2$, will control for any common differences between on the one hand bereaved and divorced families, and on the other hand intact families. A difference that is insignificantly different from zero might be taken as evidence that divorce, like death, is an exogenous event, and its impact accurately represented by β_1.[2]

[1] It can certainly be argued that death is not a completely exogenous event, and that some of the factors that determine it may also play a role in determining the adult outcomes of children. To offer only one example, education is correlated with activities such as smoking that may raise the probability of death (Millar 1996). At the same time parental education and the occupational choice and earnings of children are also correlated. To state the issue more accurately, the analysis is based upon the assumption that death is more exogenous than divorce, not that it is strictly exogenous.

[2] In fact, this is a slight abuse of the "difference-in-difference" terminology. Simply put, the concern is with testing the null hypothesis that $\beta_1 - \beta_2 = 0$.

Alternatively, a difference-in-differences estimate that is not zero could indicate several things. The first has to do with the possibility that children from bereaved families are not completely comparable to those from divorced families. The incidence of these events may not be random across the population. For example, individuals working in particular industries and occupations, or generally those with lower incomes, face a greater risk of death. While it may also be that divorce is more likely in certain situations than others, these may not be exactly the same. This possibility calls for the use of background variables to control for any differences in the composition of the two groups so that

$$E_{jk} = \alpha + \beta_1 d_j + \beta_2 d_k + \beta \mathbf{X} + \varepsilon \qquad (2)$$

is the appropriate model under the assumption that the vector of background variables, **X**, have the same coefficients across all three groups. I therefore offer estimates of both model (1) and (2). The impact of parental loss is determined by the extent to which β_1 and β_2 are significantly different from zero. Further, a difference between them that is not statistically significant from zero (either in model (1) or (2)) may be interpreted as evidence that divorce is exogenous (or rather at least as exogenous as death), and its impact accurately given by β_1.

However, β_1 and β_2 could continue to differ despite the use of a set of controls for two reasons: (1) the controls are not complete; (2) suffering bereavement and experiencing parental divorce are not equivalent events. Considering the latter, McLanahan and Sandefur (1994, p. 66) suggest that the death of a parent may not involve as many changes for children as parental loss through separation or divorce. There may be less of a tendency for children from bereaved families to have to deal with residential moves if widowed parents face less of a drop in income than divorced parents. This may happen, for example, when life insurance is more of a compensation for parental death than support payments are for parental divorce. It may also be that the two types of loss unleash a different process depending upon the nature of the outcome being examined. For example, parental divorce may change a child's perception of the value of marriage or the risks associated with it; something that need not be the case for those experiencing the death of a parent.

This issue aside, β_1 may continue to differ from β_2 if parental divorce is correlated with unmeasured attributes not captured by the vector of controls and that differ across the two groups. More specifically, this may be a reflection of the non-money investments that parents make in children. One interpretation, following Becker (1991), is to suggest that when a marriage is breaking up the parents are less able to invest as much time in their children. As a result, their children's human capital will not be as developed and they will experience inferior adult outcomes. A different, but essentially equivalent interpretation can be found in the sociology literature. For example, Amato (1993) describes five different theoretical perspectives and a host of associated testable hypotheses, but the most pertinent perspective for present purposes is the "Interparental Conflict" model. This perspective stresses that "conflict between parents prior to and during the dissolution process is responsible for the lowered well-being of children of divorce." (Amato 1993, p.30) As such it is not divorce *per se* that determines the outcomes of children, but the stress and conflict associated with an unhappy home life. Children may be drawn into the conflict between parents, and may not as a result learn the skills needed for the appropriate resolution of differences and building of relationships. This would appear to be another way of saying that the quantity and quality of the time parents invest in their children

is what matters. Assuming that parental death does not involve conflict, it may be hypothesized that there will be differences between children from divorced and bereaved families who on average lived with both biological parents for the same time, with the former faring worse.[3]

A complete list of controls that includes direct measures of the amount of parental time investments or of the stress children have experienced is rarely available to analysts, but some variables introduced to control for compositional differences between the groups may nonetheless be capturing a part of the underlying process. Therefore, the finding that a set of controls completely eliminates the difference between β_1 and β_2 is not necessarily evidence against the Interparental Conflict model. Parental income levels and fluctuations in parental incomes are important correlates of the income and earnings prospects of children (Mulligan 1997, Solon 1997), but at the same time it is easy to imagine that they may also be related to the amount of stress the family faces and also the probability of divorce. For example, in situations where the male has been the major provider for the family the loss of a secure job followed by a period of long-term unemployment may trigger a chain of events that expose children to more stress, and that may lead to divorce. In this case lower levels of incomes, and perhaps just the change in income, represent important proxies for the kind of control variables called for by the Interparental Conflict model.

This being said it is also possible to assess whether the available set of controls are complete—and therefore whether any remaining differences between β_1 and β_2 should be viewed as substantive differences—by examining the impact of some important changes to the Canadian Divorce Act introduced in 1986. In essence these changes eliminated "fault" grounds for divorce. It was felt that the process associated with establishing fault heightened the conflict between spouses rather than encouraging co-operation, and that as a result it fell short of protecting the rights and interests of children. A quasi-experiment designed around these changes permits exogenous variation in the amount of stress faced by children of divorcing parents to be used to assess the robustness of any differences between them and their counterparts with bereaved backgrounds.

The Divorce Act as it existed up to mid-1986 placed an emphasis on the fault of a spouse for the marriage's failure. It was also vague about the rights of children. There were two grounds for divorce: fault, and marriage breakdown. A divorce could be granted on the principle of fault if one spouse was found to have committed a "matrimonial offence."[4] A divorce based on these grounds could be granted as soon as the courts had time to deal with the case. In contrast divorces based on marital breakdown took much longer. A divorce on these grounds required the spouses to be living apart from each other, the length of time required before applying for a divorce varying from three to five years. (The notion of "fault" continued to play a part in determining this.) Even when a couple decided to separate by mutual consent, that is

[3] Amato (1993) also describes a "Parental Loss" model in which it is assumed that a two-parent family is generally a better environment for children as each parent represents an important resource, contributing in their own way to the family's social capital. The presence of two adults offers not only greater practical and emotional support, but also the development of a full range of role models from which to learn social and labour market skills. The absence of a parent diminishes the children's socialization, as well as access to resources and networks that could be of value later in life. (In this sense children from divorced families may even do better than those from bereaved families because they may retain some contact with their fathers.) What is emphasized in this perspective is the absence of the parent, rather than the reason for the absence. Therefore, children who experience parental divorce will have a lower level of well-being than their counterparts from intact families, but a similar level to those from bereaved families. Further, if role models are important, it is the absence of a same-sex parent that can be especially detrimental to the child. In one sense, this might be considered to be what I am calling the "true" effect of divorce, and is measured by β_2.

[4] These offences were defined in the legislation and included adultery, physical or mental cruelty, sodomy, and bestiality.

without any implication of fault, a separation of three years was required before divorce could be granted. Describing the process the Minister of Justice stated:

> If a spouse wants to avoid using fault grounds altogether, a separation period of three to five years must be endured to "prove" that the marriage is beyond repair. In effect, there is a penalty for *not* using fault grounds. The penalty is arbitrary and encourages those considering divorce to fabricate fault grounds. Most divorce actions are uncontested and involve some form of agreement between the spouses at the time of the trial. In many cases, assertions of "fault" may be made simply to comply with the law, which does not allow for a more straightforward divorce by consent. (1984, p.7, emphasis in the original)

New legislation was needed because the tendency to fabricate fault grounds in order to obtain a quicker divorce was putting the legitimacy of the law into question. As described in a 1984 discussion paper, under the new Act marriage breakdown would be the sole grounds for divorce and "could be invoked when: a) both spouses assert that their marriage has broken down and they agree to a divorce. In this case, a divorce would be granted one year after the petition is made, or; b) either spouse applies for a divorce, and the spouses have been living apart for one year before, or after, the application is filed." (Minister of Justice 1984, p. 31) The proposals would also drop the requirement of a formal trial, and allow out of court procedures if the divorce was not contested. New legislation, however, was also needed to clarify the rights of the children and base divorce cases on their interests. It was explicitly argued, in a manner that gives credence to the Interparental Conflict model, that by removing the adversarial nature of divorce procedures the new law would reduce the stress faced by children and help minimize the negative impact on their well-being.

The circulation of these proposals had a significant short-term impact on the divorce rate in Canada as couples who previously would have fabricated fault grounds postponed their divorces to take place under the new Act. Figure 1 charts the divorce rate in Canada (per 100,000 legally married couples) from 1981 to 1995. Overall there is little trend in the data, the rate in the first half of the 1990s being about the same as during the early 1980s. However, the most notable development is the sharp increase in divorces between 1985 and 1987. The number of divorces in 1985 was 61,976 (the lowest since 1979), but in 1987 it was 96,200, an increase of more than 55%. This increase and the associated drop between 1984 and 1985 are due to the anticipation of the new Act. The release of the white paper outlining the proposed changes to the Divorce Act in 1984 was followed by the introduction of legislation to the House of Commons on May 1, 1985, which in turn received Royal Assent on February 13, 1986 and was proclaimed into law on June 1, 1986. Thus, it is reasonable to believe that the proposed changes were anticipated in advance, and led many couples to postpone initiating divorce proceedings.

This postponement effect is the basis for a quasi-experiment used to control for the stress to which children have been exposed. The couples postponing divorce proceedings in 1985 in anticipation of the new law were those who wanted a quick divorce, and who did not have sufficient grounds to base divorce proceedings under the fault provisions of the old Act. They are the couples who would have had a tendency to fabricate a fault ground for divorce. Therefore the divorces that actually took place in 1985 might be considered to be on average more stressful for the family than those in 1987. These would be the cases in which the process either went on a lot longer, passed through the adversial process engendered by the old legislation, or cases in which there actually was fault as defined by the legislation. Divorces granted in previous years also probably occurred with less stress since a larger proportion of divorces in 1983, just before the public discussion of the new

law, were likely based on fabricated fault grounds. Thus, it might be expected that on average children whose parents divorced in 1987 experienced less stress than those whose parents divorced in 1985, with those whose parents divorced in 1983 experiencing an intermediate level.

This suggests that the outcomes of children should vary according to the year of parental divorce, and can be modeled in a before-after design with multiple treatment groups as a series of interaction terms between an indicator for divorce and time. Adding indicators for time to control for cohort effects, and an interaction term to model (2) yields:

$$E_{jkt} = \alpha + \beta_1 d_j + \beta_2 d_k + \beta_3 d_{83} + \beta_4 d_{87} + \beta_5 d_{j,83} + \beta_6 d_{j,87} + \beta_7 d_{k,83} + \beta_8 d_{k,87} + \beta \mathbf{X} + \varepsilon \qquad (3)$$

(The binary variables d_{83} and d_{87} take the value of 1 if the divorce or bereavement occurred in 1983 or 1987 respectively, and zero otherwise; while the remaining binary variables are interactions between these and the d_j and d_k indicators.) The coefficient of prime interest is β_6, which represents the difference-in-differences between divorced and married families: ($\bar{E}_{10,87}$- $\bar{E}_{10,85}$) - ($\bar{E}_{00,87}$- $\bar{E}_{00,85}$). If this coefficient is significantly different from zero the suggestion is that those children whose parents divorced in 1987 have a different experience than those whose parents divorced in 1985, relative to those from intact families. In a similar vein, β_5 captures the net effect of divorce for the 1983 cohort, while β_7 and β_8 measure the difference-in-differences of coming from a bereaved family. If β_6 is not statistically different from zero then it might be reasonable to suggest that any differences between β_1 and β_2 are substantive, and not due to the impact of this sort of unobserved influence. On the other hand, a statistically significant value of β_6 might be taken as evidence of the impact of unobservables associated with the stress to which children are exposed. This would lend support to the Interparental Conflict model.

2. Data and Measurement

Administrative data associated with the Canadian income tax system, specifically with the T1 forms that Canadians are required to submit to the tax authorities each year, are the basis for the analysis. The construction of the data is depicted in Figure 2. The set of families in which the parents are married or separated and in which there is at least one 16 to 19 year old child are identified in a particular year, T, where T is either 1982, 1984, or 1986. At least one of the parents and one of the children must have filed an income tax return in year T in order for the parent-child pair to be included in the analysis.[5] Further, the parents had to have considered themselves to be husband and wife (either married or separated) for a five year period before year T. The children are divided into one of three groups—one control group and two treatment groups—depending upon the transition the family makes between T and T+1: intact families if the parents remained married (representing the control group); bereaved families if one of the parents died in year T+1; and divorced families if the parents became divorced. The analysis is

[5] See Corak and Heisz (1998) for a more detailed description of the construction of the data, how the link between parents and children is established, and an assessment of sample selection bias. With respect to the latter, they point out that the requirement that children must file an income tax return while still living at home leads to an under-representation of young adults with inferior labour market outcomes. However, they find that correcting for this by using the two-stage correction for sample selection bias proposed by Heckman does not have implications for their estimate of the degree of intergenerational income mobility.

based upon a total of 122,488 children: 108,966 from intact families; 7,336 from bereaved families; and 6,186 from divorced families.[6, 7]

The children are then followed through the tax files in each year from T to 1995—when the youngest are 25 years of age and the oldest 32—and the outcome variables measured. There are a total of ten of these, and they are described in the first panel of Table 1. The first set of outcomes is associated with the adult labour market position of the children: average annual market income, average annual earnings, a measure of labour market activity, and the incidence of a spell of insured unemployment. Income and earnings are averaged over 1993 to 1995. This is meant to represent the permanent adult income/earnings of the child, the use of a three year average minimizing the impact of transitory fluctuations. Market income includes earnings, self-employment income, asset income, interest income, and other sources associated with the market. (All monetary values are pre-tax figures measured in 1986 constant dollars.) On average the sons in the sample have $20,559 of income and $18,621 in earnings, while the comparable figures for daughters are $15,999 and $13,896. Underlying these averages, however, are some very extreme values. Most notable is a woman with a market income of over $19 million, reflecting a one year income of over $50 million. (In addition, some individuals report negative market incomes because of capital losses that outweigh other income sources.) Labour market activity is measured as the number of times an income tax return is filed between 1982 and 1995. If there is any receipt of Unemployment Insurance benefits between 1993 and 1995 the individual is considered to have been unemployed. About 35% of men and 44% of women experienced a spell of insured unemployment.[8]

The second set of outcomes have to do with social outcomes, including evidence of higher education, reliance on Income Assistance (sometimes referred to as Social Assistance or Welfare), and marital/fertility behaviour. Higher education is measured as an indicator variable representing evidence of more than a high school education.[9] About 60% of men and 72% of women have gone

[6] The number of children from intact families is a one-in-ten random sample of the almost 1,225,000 individuals actually falling into this group. This selection is made simply to ease the computational burden. The samples for the other groups represent all of the children who could be obtained from the T1 records in this way. The proportion of deaths in the sample is slightly higher than the proportion of divorces because the analysis is focused on a group of individuals with relatively long marriages (and whose children are at least in their teen years). These individuals are necessarily older and have been together longer than average, implying that the death rate is higher than average while at the same time that the probability of divorce is lower. While the sample sizes for the two treatment groups are much smaller than the control group, all of the samples are orders of magnitude larger than those traditionally used in studies focused on these issues. See Amato (1993) who cites a number of studies.

[7] Given the construction of the sample, there is a possibility that the intact group is "contaminated" by some children who experienced parental divorce or death after year T+1. To continue the metaphor from experimental design, contamination of the control group will lead to an understatement of the impact of the treatment. However, given the numbers involved it is unlikely that this bias is large. For example, borrowing from Bloom *et al.* (1997), the true impact of the treatment, I^T, is given as $I^T = I^O/(1-r)$, where I^O is the observed impact and r represents the contamination rate. To develop a very rough sense of what the contamination rate might be consider the possibility of classifying individuals into the control and treatment groups on the basis of whether there was a divorce or death in the family by the time the child reached the age of twenty: that is, of following 16 year olds to year T+4, 17 year olds to year T+3, and 18 year olds to T+2. Given that the sample consists of about 1,225,000 children of which 13,522—or about 1.1%—fall into the treatment groups, then each of the four age groups contributes 0.275% to the proportion of the treatment group (assuming that each cohort is the same size and subject to the same the rate of parental divorce and death). This implies that 0.825% of the control group will experience bereavement or divorce in T+2, a further 0.55% in T+3, and a further 0.275% in T+4 as the 16 year olds finally attain the age of 20. As such, slightly less than 20,000 members of the control group will go on to experience the treatment. But the analysis is based on a one-in-ten sample, so about 2,000 individuals of 108,966 are misclassified. This implies a contamination rate of 2,000/(108,966) or about 1.8%, and suggests that the observed impacts reported should be multiplied by 1.018 to obtain the true impact.

[8] Not all periods of unemployment are compensated with the result that this measure likely understates the true incidence of unemployment.

[9] As such this variable is not indicating whether the individual graduated from high school or not, an often used indicator of child attainment in studies of the impact of divorce. It takes the value of one if there is any evidence in the child's T1 forms of ever having used either the education or tuition deductions between the year T and 1995. Otherwise it takes the value of zero. It should be noted that this is an imperfect indicator of participation in post-secondary education because not only must individuals attend a credited post-secondary institution, they must have also used the associated income tax deductions. Some individuals may well have attended these institutions but given their incomes not found it advantageous to use these deductions. However, this will be more likely for those who attending post-secondary institutions for only a short period and not completing their degrees. Further it should be noted that the definition of an accredited institution for income tax purposes goes beyond a community college or university.

beyond high school and spent at least some time in an accredited program. If there is receipt of Income Assistance between 1993 and 1995 the individual is considered to have relied on this program, regardless of the amount of money received. All of the T1 records of the children between 1983 and 1995 are examined to determine if the individual was ever married, ever separated, ever divorced, or had children before the age of 21. Marital status is reported directly on the T1 form. About 42% of the sons and about 62% of daughters had claimed at one point to have been married. In Table 1 the incidences of separation and divorce—at 7.1% and about 3% for men, and 10% and about 5% for women—are expressed unconditionally. Conditional on having reported being married these figures are respectively 12.0% and 5.6% for men, and 14.3% and 7.1% for women. The last outcome is a binary variable of whether the individual had children by the age of 21 years: the incidence of child-bearing while young is less than one percent.[10]

The remaining variables are the controls used in the estimation of models like equations (2) and (3). These are organized into seven sets, according to the successively larger models that are estimated. The first set consists simply of the indicator variables for coming from one of the treatment groups: a bereaved family, and a divorced family. As discussed above in conjunction with Figure 1, these are mutually exclusive.[11] Six percent of children come from bereaved families and about five percent from divorced families. It should be noted that these percentages are sample proportions, not estimates of the death and divorce rates in the population. They are much higher than the actual rates because, as mentioned, the intact group are a one-in-ten sample. Further, the sample includes siblings, and therefore represents the proportion of children experiencing parental divorce or death, not the proportion of marriages.

The first set of controls beyond these treatment-control indicators are the child's age and age squared in 1995. These are used to control for life cycle differences in income, earnings, and marital behaviour. The second set consists of the age and age squared of the oldest parent in year T to control for life cycle differences in the probability of death and divorce. The third and fourth set relate to parental income and regular participation in the labour market: the average income earned by each of the father and the mother over the five year period before the family transition is measured (that is, using the terminology of Figure 1, years T-4 to T inclusive); and the number of times an income tax return was filed in these years by the father and by the mother.[12] Parental income can be an important determinant of the capacity of parents to invest in the human capital of children. Often this capacity is phrased in terms of a model with perfect capital markets so that all that matters is the parents' permanent income (Mulligan 1997, Solon 1997). But it is conceivable that many individuals will be constrained in capital markets so that temporary fluctuations in

[10] This variable should be interpreted cautiously because it is defined according to whether a child tax exemption was claimed at any time by the age of 21. As such this indicator is likely to under-report the incidence of child bearing at a young age as it reflects behaviour associated with both child bearing and the filing of income tax returns.

[11] The sample described in Table 1 makes no distinction between individuals from bereaved families because of paternal death and individuals suffering the death of a mother. It might be argued that the treatment groups would be more comparable if only individuals suffering a death of their father were used. The argument in favour of this approach is strongest if divorce implies that full custody of the children is always granted to the mother, so that divorce implies the complete loss of contact with the father. I am not in a position to document the extent to which this is in fact so in the sample being used, but whether bereavement was due to paternal or maternal loss is available and used to define a sample in which the children from bereaved families are those experiencing the death of a father. A total of 2,016 individuals are lost as a result of this selection rule (1,132 sons and 884 daughters). The analysis in the following section was carried through using this more restrictive sample, but the findings were not significantly different. These results and the descriptive statistics associated with these data are available upon request.

[12] The income variables are defined as total income over the five years divided by five, that is regardless of the number of years an income tax return was filed. In addition, the incomes and reporting status of both parents are used throughout the five year period notwithstanding the length of time the parents were separated. Of the 6,186 individuals from divorced families 1,866 or 30.2% came from families in which the parents were separated throughout the five years previous to the divorce. About 13% came from families who were separated for each of the remaining possibilities: separation of 0, 1, 2, 3,or 4 years.

income also matter (Mayer 1997). The number of years in which a tax return was filed by each parent is a rough approximation of the family having experienced significant changes in income over the period. In addition, it may represent significant changes in the pattern of labour force behaviour of both the father and the mother that on the one hand might be interpreted as role model effects—when viewed for example as the consequences of having a working mother—or as a measure of the amount of change and stress that the family is experiencing—as might be the case if the main breadwinner is not able to remain consistently attached to the labour market. Either perspective is consistent with this being a measure of the quantity and quality of time that parents have to invest in their children. The next set of controls is the industry of employment of each parent in the year before the transition is measured (1982, 1984, or 1986). The major reason for using these variables is to control for the fact that the probability of death may be correlated with industry of employment. Those working in construction and the primary industries face a greater risk of on-the-job mortality than average, while those in the service sector face a lower risk.[13] The final set of controls are indicators for the region of residence since labour market conditions and some aspects of divorce and family law vary between provinces. (Except for the larger provinces—Ontario and Quebec—these are simply provincial indicators.)

3. Results

a) Difference in Differences

The estimates associated with model (1) are presented in Table 2 for both men and women. These are simply the mean values of the variables of interest (presented in columns (1), (2), and (3)), differences in these means (columns (4) and (5)), and the difference in differences between the two treatment groups (in columns (6)). For example, the results suggest that the average annual income of men from intact families is $20,769, while the income of their counterparts in bereaved and divorced families is lower at respectively $19,790 and $17,721. Similarly, women from intact, bereaved, and divorced backgrounds obtain on average $16,148, $15,363, and $14,185 in annual income. In general the findings in columns (4) and (5) imply that parental loss leads to inferior outcomes. With respect to the labour market outcomes, the incomes, earnings, and labour market activity of all groups experiencing parental loss are lower than those from intact families. The exceptions to this are the earnings and activity of women from bereaved families.[14] In fact, men from divorced families obtain about 14% less income than those from intact families and earn about 12% less. The comparable figures for women are lower but, at –12% and –9%, still substantial. These patterns are mirrored in the rate at which income tax returns are filed: men from both treatment groups have a lower rate of filing, but particularly those with divorced backgrounds. Only women whose parents divorced have a lower rate of filing. The results dealing with the incidence of insured unemployment are more mixed, with only men from divorced families showing a greater prevalence to have received UI benefits than those from intact families.

[13] These variables are not, however, simply industry dummy variables because some parents worked in more than one job and hence possibly in more than one industry during the year. In cases where the parent held two or more jobs in different industries each of the relevant industry indicators are used but weighted by the fraction of total earnings obtained in that industry. As such these variables are defined only for individuals reporting a positive amount of earnings: the self-employed and those not active in the labour market are assigned a value of zero for each indicator.

[14] This might also quite reasonably apply to the incomes of women from bereaved families. While the p-value for the t-test is less than 5%, that associated with the Wilcoxon test is almost 11%. The latter test is a distribution free test robust to outliers. As such it may be the more appropriate test for judging the statistical differences in incomes and earnings, particularly in the case of the incomes of women given the extreme data point discussed earlier in conjunction with Table 1.

With respect to other labour market related outcomes, both groups regardless of gender are less likely to have evidence of more than high school education, and display greater reliance on Income Assistance. Further, parental loss in general seems to be associated with a lower likelihood of marriage, greater marital instability (conditional on having been married), and at least for women with a greater probability of having children before 21 years of age.

This being said it is also clear from the difference-in-differences presented in columns (6) of the table that on average individuals from divorced families fare worse than those from bereaved families. Incomes and earnings are more than $1,000 lower, and as much as $2,000 lower in the case of the incomes of men. A similar result applies for all of the other outcomes. Men whose parents divorced are 3.6% more likely to rely on Income Assistance than those who lost a parent through death; women in similar circumstances are 4.2% more likely. Even more significantly, the probability of having married is about 7% lower for both men and women whose parents' divorced than it is for those from bereaved backgrounds. Likewise the conditional probabilities of separation and divorce are also higher. And, at least in the case of women, there is no significant difference in the probability of separation or divorce conditional on marriage between the intact and bereaved groups, while those from the divorced group are more likely to experience marital instability.

b) Difference in Differences with Controls

The robustness of these findings to the inclusion of controls for background characteristics is examined in Table 3. Different estimation techniques are used according to the nature of the dependent variable. For each of the ten outcomes the table reports the coefficient estimates associated with being in the treatment groups, and the p-value for a test of equality between them. Seven models are estimated for each gender. A successively larger set of controls is included as one moves from column (1) of the table through to column (7). The last panel of the table indicates the other variables included in each of the models.

The results in columns (1) of Panels 1 and 2—for income and earnings respectively—repeat the findings given in the first two panels of Table 2: parental divorce is associated with significantly lower child incomes and earnings, and the effect is statistically different from that for the bereaved group. However, in general these differences are much diminished or eliminated entirely by the use of additional controls. With the full set of background variables there is no difference between the divorced and bereaved group, and a negative effect of parental divorce is revealed only in the incomes, and possibly the earnings, of men. In this case parental loss, regardless of reason, implies on average an income of about $620 to $640 lower, which amounts to only about three percent.

In the case of women, the addition of child and parent ages are the only other background variables required to eliminate the divorced-bereaved differences in incomes and earnings. This happens in the models for men once parental labour market activity and parental incomes are included. The full regression results reveal that a decrease in father's labour market activity of one year is associated with about a $750 decrease in the son's adult income and earnings. Conversely decreases in the mother's activity by one year may actually increase adult income and earnings by about a small amount ($100 or less). For daughters these variables, including parental income levels, are not statistically significant, but once they are included the bereaved and divorced coefficients become statistically insignificant from zero.[15]

[15] The estimations in panels 1 and 2 were also performed using median regressions, which are robust to outliers, and using both the full sample and a subset that excludes those experiencing maternal deaths. The results led to essentially the same conclusions.

The results associated with labour market activity echo these conclusions. These are presented in panel 3 as the relative incidence rates from a Poisson model.[16] Men suffering parental loss tend to be slightly less active in the labour market, women display no difference across familial types. There does not seem to be any statistically different pattern in the incidence of insured unemployment between people from intact, bereaved, or divorced families.

The tendency to obtain more than a high school education runs, however, counter to these patterns. Individuals from bereaved family are actually less likely to attain higher education than those from intact families, while the opposite holds for those from divorced families. A difference in reliance on Income Assistance persists regardless of the set of controls included, those of both genders experiencing parental loss being more likely to rely on the program by about the same degree. The logit coefficient of the divorced group falls by about two-thirds and becomes statistically indistinguishable from the bereaved coefficient once parental income is controlled. It seems to be about 0.2 for both men and women. To put this in perspective a coefficient of this magnitude would raise the probability of a male receiving Income Assistance by about 1.5 percentage points for a reference case defined around the mean parental income levels (from 7.1 to about 8.6%).[17]

All of the first six outcomes have a labour market dimension. The results associated with the remaining outcomes, dealing with marital and fertility behaviour, are different. Those in the divorced group are much less likely to have claimed to have been married at some point, while the members of the bereaved group are no different than those from intact families. This pattern also holds with regard to the conditional probability of separation and divorce: given marriage, individuals from a divorced background are more likely to separate or divorce and the introduction of control variables does not alter this effect very much. The magnitude of the effect of parental divorce on the child's probability of marriage is significant. For example, the estimated probability that a son with reference case characteristics will marry is about 50%, but about 43% for someone from a divorced family.[18]

The probability of having a child before the age of 21 is actually substantially higher among women from bereaved families than from the other groups. (It is lower for men from divorced families, but this may represent the fact that mother's are generally the custodial parent and hence likely to report use of the child tax exemptions.) Unlike the coefficient associated with a divorced background, which loses statistical significance once parental income is controlled for, this coefficient is immune to the inclusion of other controls.

c) Difference in Differences in a Before and After Design

Finally, Table 4 offers a summary of the results obtained from estimating equation (3) for each of the ten outcomes. The p-values associated with t-tests of significance of the interaction term for

[16] The estimation controls for the number of years that individuals could have filed a tax return: either the number of years since they turned 16, or the number of years observed if the individual was older than 16 in the first year of observation (that is year T).

[17] The reference case also assumes that the child is 29 in 1995, the eldest parent 49 in year T, and that both parents filed income tax returns for each of the five years prior to the transition year (T+1). (These are the modal values.)

[18] I also estimated Cox proportional hazard models of the age at first marriage, treating individuals who had not married by 1995 as censored. These models confirm the logit results. Once parental age was controlled for the baseline hazard between bereaved and intact individuals was not statistically different. However, individuals from divorced backgrounds always had much lower hazard ratios: more than 20% lower in model (1) and about 16 to 18% lower in model (7).

divorce in 1987, β_6 of equation (3), are presented for the simplest model with no controls and for the model with the full set of controls (that is models (1) and (7)).[19] The general impression is that the impact of parental divorce after the introduction of the new legislation is no different than just before. Results from a pooled sample of both men and women is also offered, but the larger sample size does not lead to more precise estimates. The major exception to this finding concerns the separation experience of women. Regardless of the set of background variables included women are less likely to have experienced a separation (conditional on having claimed to be married) if their parents divorced in 1987 than if they had divorced in 1985. In fact this also holds for women whose parents divorced in 1983, before the public discussion of the legislative changes, but the former effect is stronger. (In the full model the logit coefficients are –0.403 and –0.342 for respectively the 1987 and 1983 interaction terms.) Furthermore, the hypothesis that β_6-β_7=0 , that the 1987 interaction terms associated with divorce and bereavement are the same, can be rejected with a p-value of 9.1%.[20] At the same time it should be noted that the chances women will divorce are not influenced by the timing of their parents' divorce.

It should be underscored that the indicators for divorce and bereavement continue to display the same patterns revealed in Table 2 for all of the models. It is whether this familial transition occurred before or after the legislative changes that makes in general no difference.

[19] The estimation was performed using all of the specifications presented in Table 2. The choice of models makes no difference to the conclusions. The full results are available upon request.

[20] The interaction term associated with the incidence of UI receipt is also significant for women across all the models estimated. However, its sign runs counter to what would be expected: women whose parents divorced in 1987 are more likely to receive UI as adults than their counterparts whose parents divorced in 1985.

4. Conclusion

The objective of the research summarized in this paper is to estimate the "true" impact of divorce on the capacity of children to become self-reliant adults. The approach adopted attempts to isolate the causal role of divorce by using a quasi-experimental design with multiple treatment groups, and is based upon the assumption that parental loss through death is more exogenous than parental divorce. The adult labour market outcomes and social behaviour of individuals from bereaved families represents a benchmark to judge the consequences of parental divorce. The outcomes associated with individuals from bereaved backgrounds is taken to represent the impact of parental loss, and any difference relative to those from divorced backgrounds represents the consequences of endogeneity.

An examination of raw differences between these groups and between them and individuals from intact families implies that parental loss leads to inferior outcomes across a wide range of economic and social measures. It also implies that coming from a divorced family is even more detrimental than from a bereaved background. Difference in differences methods with controls imply that taking parental income and attachment to the labour market into account eliminates differences between those from divorced and bereaved backgrounds for a host of labour market outcomes. In many cases the difference between these groups and individuals from intact families is also eliminated. The incomes and earnings of men suffer mildly—by about three percent—but incomes and earnings of women are the same regardless of familial background. However, individuals with bereaved and divorced family backgrounds are more likely to rely on Income Assistance (though not on Unemployment Insurance).

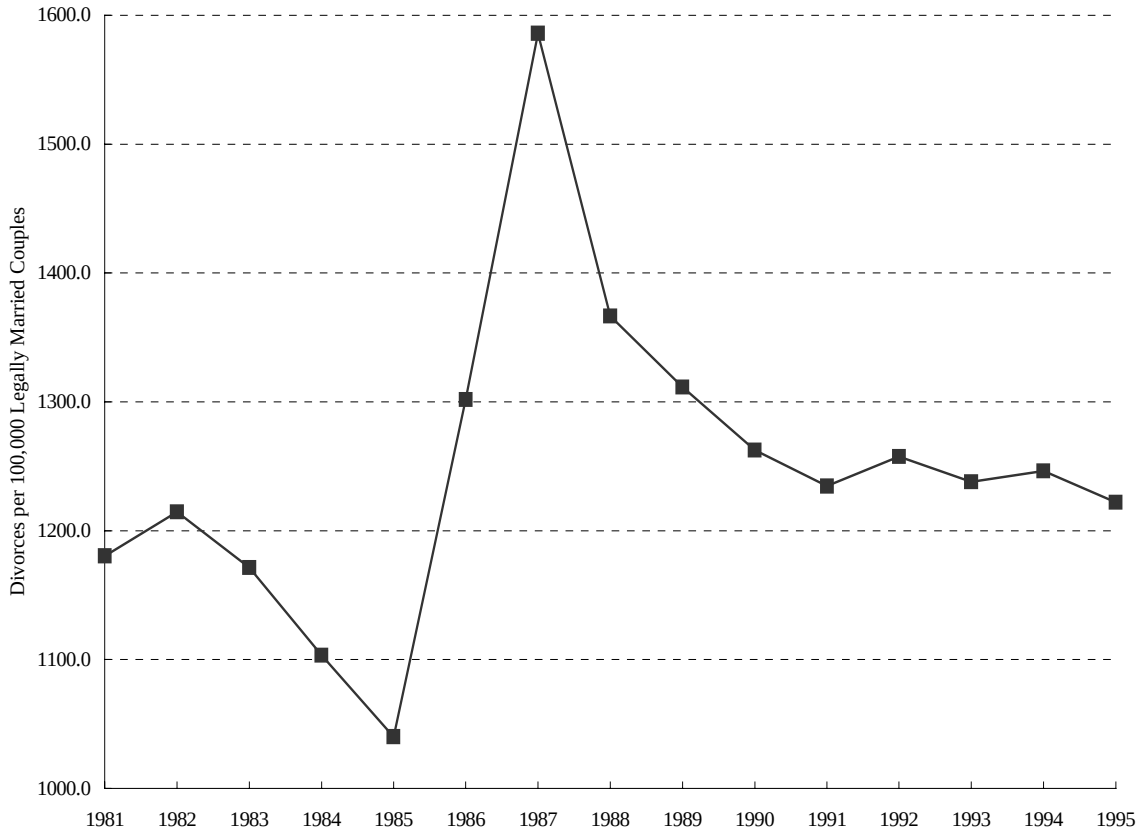
The major consequences of parental divorce are on the social behaviour, particularly on the marital behaviour, of children. As such the results are in accord with the recent findings by Lang and Zagorsky (1997) with U.S. data, and LeBourdais and Marcil-Gratton (1998) with Canadian data. Parental divorce has a significant negative effect on the likelihood that children will marry. Not only do children whose parents divorced put off marriage relative to children from intact families, but once married they are more likely to suffer separation or divorce. Children from bereaved families, on the other hand, are no different in their marital behavior than the intact group. It is reasonable to suggest that at least for this set of outcomes experiencing parental loss through divorce and through bereavement are not the same thing. In particular, attitudes to familial life and the importance of marriage may not be changed by the loss of a parent through death, while witnessing the divorce of one's parents may lead children to think of marriage as a much more riskier living arrangement. These bereaved-divorced differences are unlikely to reflect the influence of unobservables, notably the exposure to stress and conflict to which children of divorcing parents may be exposed. An analysis of children whose parents experienced divorce before and after a liberalization of the Canadian Divorce Law designed to reduce the adversarial nature of divorce suggests that a reduction in the adversarial nature of the divorce process did not reduce the chances that children will experience marital instability in their turn.

Even so, to understand the long-term implications of divorce it is important to appreciate developments in the family before the divorce actually takes place. Parental income and labour market behaviour are the crucial background variables that need to be controlled for, and they might in part be interpreted as proxies for the stress the family may be under and the quantity of time parents invest in children. But if this is so, the results suggest that it is not divorce *per se* that is

important in determining the outcomes of children, but rather the quality of the human and social capital available to them in their formative years.

There are a number of caveats associated with the analysis. First, the focus is on the effect of divorce on teenagers, not on young children. It may be that the impact of parental loss, especially with respect to cognitive development, may be greater for children at younger age. Nevertheless, the teen years are an important period in which human capital and marital decisions are being made. Second, it may be that the impact of divorce has non linear patterns affecting individuals at different points in the income distribution differently. The analysis has focused almost exclusively on average effects. It might be reasonable to suggest that the impact of parental loss is greater on children from lower income families since these families will have fewer resources available to compensate for the loss of a parent. These remain avenues for future research.

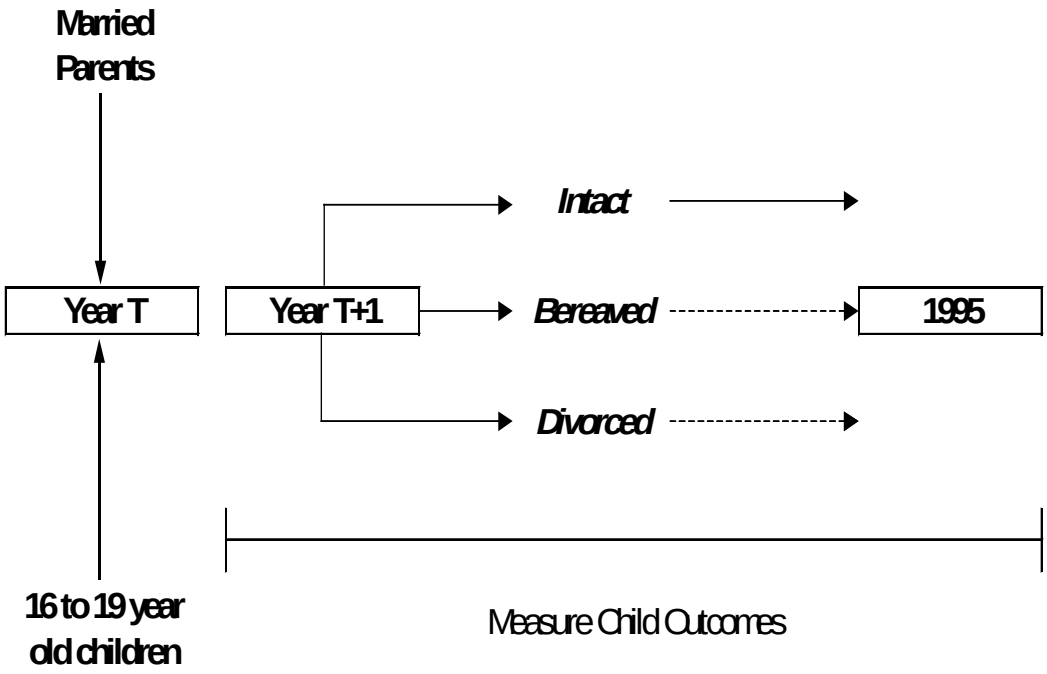
Figure 1
DIVORCE RATE IN CANADA: 1981 TO 1995
(Rate per 100,000 Legally Married Couples)



Source: Gentleman and Park (1997, table 1)

Figure 2

FLOWCHART DESCRIBING THE DATA



T = 1982, 1984, 1986

Table 1

DESCRIPTIVE STATISTICS

Variable	Men				Women			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
CHILD OUTCOMES								
Market Income (‘000s)	20.559	16.191	-79.654	451.598	15.999	85.549	-24.488	19,432.380
Earnings (‘000s)	18.621	15.112	0	504.241	13.896	11.149	0	163.495
Labour Market Activity (years)	11.614	2.217	1	14	11.816	2.006	1	14
Unemployment Insurance	0.354		0	1	0.442		0	1
More than High School	0.601		0	1	0.724		0	1
Income Assistance	0.102		0	1	0.084		0	1
Ever Married	0.475		0	1	0.620		0	1
Ever Separated	0.071		0	1	0.101		0	1
Ever Divorced	0.030		0	1	0.048		0	1
Children by 21 Years	0.007		0	1	0.010		0	1
FAMILY BACKGROUND								
Bereaved	0.060		0	1	0.060		0	1
Divorced	0.050		0	1	0.052		0	1
OTHER CONTROLS								
Child’s Age in 1995 (decades)	2.916	0.198	2.5	3.2	2.918	0.196	2.5	3.2
Child’s Age Squared	0.039	0.039	0.000	0.160	0.039	0.039	0.000	0.160
Parental Age (decades)	4.865	0.663	3.100	8.800	4.895	0.662	3.100	8.300
Parental Age Squared	0.440	0.646	0.000	15.210	0.438	0.657	0.000	11.560
Father’s Average Income (‘000s)	34.659	40.093	-101.234	4,646.872	35.778	43.927	-88.232	3,178.663
Mother’s Average Income (‘000s)	10.216	14.056	-43.458	1,079.372	10.904	12.914	-12.482	545.002
Father’s Labour Market Activity	4.666	1.162	0	5	4.651	1.196	0	5
Mother’s Labour Market Activity	4.228	1.699	0	5	4.270	1.654	0	5
Father’s Industry of Employment								
Primary	0.037		0	1	0.034		0	1
Manufacturing	0.194		0	1	0.192		0	1
Construction	0.076		0	1	0.071		0	1
Transportation	0.083		0	1	0.084		0	1
Trade	0.114		0	1	0.115		0	1
Fire	0.060		0	1	0.063		0	1
Government	0.169		0	1	0.174		0	1
Services	0.043		0	1	0.042		0	1
Unclassified	0.001		0	1	0.001		0	1
Mother’s Industry of Employment								
Primary	0.016		0	1	0.013		0	1
Manufacturing	0.066		0	1	0.068		0	1
Construction	0.013		0	1	0.012		0	1
Transportation	0.015		0	1	0.015		0	1
Trade	0.096		0	1	0.098		0	1
Fire	0.048		0	1	0.054		0	1
Government	0.139		0	1	0.140		0	1
Services	0.057		0	1	0.057		0	1
Unclassified	0.001		0	1	0.001		0	1

(continued)

Table 1 (concluded)

DESCRIPTIVE STATISTICS

Variable	Men				Women			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
Newfoundland	0.025		0	1	0.020		0	1
Prince Edward Island	0.006		0	1	0.006		0	1
Nova Scotia	0.033		0	1	0.032		0	1
New Brunswick	0.030		0	1	0.030		0	1
Eastern Quebec	0.061		0	1	0.051		0	1
Montreal	0.063		0	1	0.069		0	1
Western Quebec	0.089		0	1	0.077		0	1
Eastern Ontario	0.054		0	1	0.058		0	1
Central Ontario	0.115		0	1	0.118		0	1
Toronto	0.080		0	1	0.090		0	1
Southern Ontario	0.085		0	1	0.084		0	1
Northern Ontario	0.033		0	1	0.034		0	1
Manitoba	0.045		0	1	0.047		0	1
Saskatchewan	0.044		0	1	0.037		0	1
Alberta	0.093		0	1	0.095		0	1
British Columbia	0.087		0	1	0.091		0	1
Yukon or Northwest Territories	0.057		0	1	0.060		0	1
Number of Observations		69,815				52,673		

Source: Calculations by Author from Administrative Data

See text for variable definitions. All dollar figures are expressed in thousands of 1986 dollars using the CPI as the deflator. Child's age squared and Parental Age Squared are based upon the deviations of age from the mean value.

Table 2
MULTIPLE TREATMENT GROUPS: DIFFERENCES, AND DIFFERENCE-IN-DIFFERENCES

	Men						Women					
	Family Type			Differences		Differences in Differences	Family Type			Differences		Differences in Differences
	Intact (1)	Bereaved (2)	Divorced (3)	(2)-(1) (4)	(3)-(1) (5)	(5)-(4) (6)	Intact (1)	Bereaved (2)	Divorced (3)	(2)-(1) (4)	(3)-(1) (5)	(5)-(4) (6)
1 INCOME												
mean	20,769	19,790	17,721	-979	-3,048	-2,069	16,148	15,363	14,185	-785	-1,963	-1,177
standard deviation	16,234	16,953	14,067	271	248	367	90,662	11,992	13,012	470	488	678
p-value, t-test				0.000	0.000	0.000				0.048	0.000	
p-value, Wilcoxon test				0.000	0.000					0.109	0.000	
2 EARNINGS												
mean	18,795	17,720	16,575	-1,075	-2,220	-1,145	13,967	13,813	12,771	-153	-1,196	-1,042
standard deviation	15,180	15,148	13,597	242	239	340	11,166	10,802	11,204	199	221	297
p-value, t-test				0.000	0.000	0.000				0.220	0.000	0.000
p-value, Wilcoxon test				0.000	0.000					0.381	0.000	
3 LABOUR MARKET ACTIVITY												
Mean Number of Years Taxes Filed	9.46	9.39	8.91	-0.077	-0.550	-0.473	9.58	9.59	9.34	0.016	-0.240	-0.256
standard deviation	1.74	1.86	2.05	0.030	0.036	0.046	1.58	1.61	1.70	0.030	0.033	0.045
p-value, t-test				0.005	0.000					0.708	0.000	
4 UI												
Proportion receiving	0.353	0.360	0.374	0.007	0.021	0.014	0.443	0.436	0.431	-0.007	-0.013	-0.005
p-value, proportions test				0.171	0.006					0.215	0.101	
5 MORE THAN HIGH SCHOOL												
Proportion	0.610	0.545	0.522	-0.065	-0.088	-0.023	0.729	0.678	0.676	-0.052	-0.053	-0.001
p-value, proportions test				0.000	0.000					0.000	0.000	
6 INCOME ASSISTANCE												
Proportion receiving	0.097	0.128	0.164	0.032	0.068	0.036	0.079	0.099	0.141	0.020	0.062	0.042
p-value, proportions test				0.000	0.000					0.000	0.000	
7 EVER MARRIED												
Proportion	0.481	0.463	0.398	-0.017	-0.083	-0.066	0.626	0.606	0.536	-0.020	-0.090	-0.070
p-value, proportions test				0.016	0.000					0.014	0.000	
8 EVER SEPARATED*												
Proportion	0.117	0.136	0.165	0.019	0.047	0.029	0.140	0.147	0.195	0.007	0.055	0.048
p-value, proportions test				0.008	0.000					0.205	0.000	

9	EVER DIVORCED*											
	Proportion	0.055	0.059	0.080	0.003	0.025	0.022	0.070	0.074	0.100	0.005	0.031	0.026
	p-value, proportions test				0.278	0.000					0.217	0.000	
10	CHILDREN BEFORE 21												
	Proportion	0.0068	0.0082	0.0066	0.0014	-0.0001	-0.0015	0.0089	0.0174	0.0158	0.0085	0.0070	-0.0015
	p-value, proportions test				0.166	0.465					0.000	0.000	
	Number of Observations	62,180	4,166	3,469				46,786	3,170	2,717			

* Conditional on having claimed to be married. The number of observations for men are: intact – 29,886; bereaved – 1,930; divorced – 1,370. The number of observations for women are: intact – 29,265; bereaved – 1,920; divorced – 1,455.
In columns (4) and (5) the p-values are for a one-sided alternative, in columns (6) they are for two sided alternative.

Table 3

DIFFERENCES IN DIFFERENCES WITH CONTROLS

Child Outcomes	Sons							Daughters						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Adult Average Income	(Least Squares Regression Coefficients)							(Least Squares Regression Coefficients)						
Bereaved	-0.979	-1.312	-1.153	-0.846	-0.693	-0.641	-0.637	-0.785	-0.906	-0.855	2.981	1.980	1.768	1.594
P-value for t test	0.000	0.000	0.000	0.003	0.013	0.019	0.019	0.095	0.067	0.018	0.299	0.312	0.308	0.314
Divorced	-3.048	-2.963	-2.848	-1.703	-0.487	-0.453	-0.620	-1.963	-1.924	-1.384	7.344	-1.660	-1.927	-1.533
P-value for t test	0.000	0.000	0.000	0.000	0.100	0.125	0.039	0.000	0.000	0.006	0.284	0.327	0.316	0.330
P-value for F test of Equality	0.000	0.000	0.000	0.022	0.589	0.621	0.963	0.000	0.000	0.150	0.282	0.308	0.303	0.307
R-squared	0.002	0.026	0.026	0.059	0.060	0.063	0.067	0.000	0.002	0.000	0.074	0.075	0.077	0.078
2. Adult Average Earnings	(Least Squares Regression Coefficients)							(Least Squares Regression Coefficients)						
Bereaved	-1.075	-1.365	-1.109	-0.941	-0.766	-0.646	-0.607	-0.153	-0.224	-0.336	0.120	-0.083	-0.018	0.002
P-value for t test	0.000	0.000	0.000	0.000	0.002	0.009	0.013	0.440	0.259	0.094	0.551	0.679	0.928	0.994
Divorced	-2.220	-2.144	-2.154	-1.487	-0.061	0.014	-0.191	-1.196	-1.168	-0.663	-0.326	0.118	0.133	0.120
P-value for t test	0.000	0.000	0.000	0.000	0.830	0.962	0.507	0.000	0.000	0.003	0.187	0.677	0.637	0.676
P-value for F test of Equality	0.001	0.017	0.002	0.111	0.052	0.068	0.250	0.000	0.001	0.268	0.500	0.546	0.648	0.724
R-squared	0.001	0.022	0.023	0.033	0.035	0.041	0.052	0.001	0.006	0.009	0.024	0.024	0.028	0.052
3. Number of Years Taxes were Filed	(Poisson Regression – Relative Incidence Rates)							(Poisson Regression – Relative Incidence Rates)						
Bereaved	0.986	0.983	0.985	0.985	0.989	0.989	0.988	0.997	0.996	0.997	0.997	1.000	1.001	1.000
P-value for t test	0.002	0.000	0.001	0.001	0.019	0.024	0.013	0.595	0.418	0.617	0.624	0.991	0.887	0.963
Divorced	0.948	0.948	0.948	0.948	0.982	0.983	0.979	0.979	0.978	0.976	0.976	0.997	0.998	0.994
P-value for t test	0.000	0.000	0.000	0.000	0.005	0.005	0.001	0.000	0.000	0.000	0.000	0.726	0.780	0.419
P-value for Wald test of Equality	0.000	0.000	0.000	0.000	0.390	0.373	0.236	0.015	0.022	0.007	0.007	0.773	0.747	0.476
Pseudo R-squared	0.000	0.002	0.002	0.002	0.003	0.003	0.004	0.000	0.003	0.003	0.003	0.003	0.004	0.004

4. Probability of Receiving UI				(Logit Coefficients)							(Logit Coefficients)			
Bereaved	0.032	0.050	0.065	-0.002	0.014	0.016	0.005	-0.030	-0.037	-0.009	-0.032	-0.016	-0.015	-0.031
P-value for t test	0.334	0.132	0.056	0.943	0.683	0.637	0.884	0.419	0.322	0.802	0.392	0.673	0.696	0.423
Divorced	0.092	0.088	0.028	-0.153	-0.002	0.004	-0.026	-0.052	-0.047	-0.087	-0.137	0.005	0.010	-0.011
P-value for t test	0.011	0.015	0.455	0.000	0.964	0.931	0.560	0.195	0.234	0.032	0.002	0.915	0.853	0.831
P-value for Wald test of Equality	0.212	0.427	0.444	0.003	0.765	0.817	0.566	0.680	0.839	0.152	0.062	0.726	0.691	0.757
Pseudo R-squared	0.000	0.003	0.005	0.017	0.018	0.022	0.038	0.000	0.002	0.002	0.004	0.005	0.006	0.013

5. Probability of More than High School				(Logit Coefficients)							(Logit Coefficients)			
Bereaved	-0.266	-0.253	-0.275	-0.139	-0.159	-0.159	-0.151	-0.249	-0.239	-0.276	-0.145	-0.159	-0.161	-0.145
P-value for t test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Divorced	-0.359	-0.361	-0.249	0.185	-0.007	-0.014	0.037	-0.256	-0.258	-0.137	0.259	0.108	0.089	0.153
P-value for t test	0.000	0.000	0.000	0.000	0.879	0.749	0.414	0.000	0.000	0.002	0.000	0.057	0.119	0.008
P-value for Wald test of Equality	0.044	0.019	0.581	0.742	0.004	0.006	0.001	0.903	0.742	0.017	0.000	0.000	0.000	0.000
Pseudo R-squared	0.002	0.004	0.009	0.057	0.058	0.062	0.071	0.001	0.008	0.011	0.055	0.055	0.061	0.070

6. Probability of Receiving Income Assistance				(Logit Coefficients)							(Logit Coefficients)			
Bereaved	0.319	0.333	0.341	0.244	0.235	0.238	0.218	0.249	0.263	0.307	0.201	0.203	0.206	0.200
P-value for t test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.002
Divorced	0.607	0.605	0.504	0.224	0.147	0.152	0.119	0.649	0.646	0.505	0.185	0.193	0.210	0.213
P-value for t test	0.000	0.000	0.000	0.000	0.019	0.015	0.064	0.000	0.000	0.000	0.004	0.017	0.010	0.011
P-value for Wald test of Equality	0.000	0.000	0.017	0.767	0.247	0.257	0.197	0.000	0.000	0.019	0.848	0.919	0.971	0.896
Pseudo R-squared	0.004	0.005	0.008	0.025	0.025	0.028	0.035	0.004	0.007	0.010	0.027	0.027	0.031	0.035

7. Probability of Ever having Married				(Logit Coefficients)							(Logit Coefficients)			
Bereaved	-0.070	-0.132	-0.059	-0.061	-0.042	-0.042	-0.036	-0.084	-0.122	-0.060	-0.064	-0.041	-0.041	-0.010
P-value for t test	0.030	0.000	0.079	0.070	0.215	0.211	0.298	0.026	0.001	0.124	0.100	0.302	0.296	0.803
Divorced	-0.338	-0.340	-0.450	-0.461	-0.292	-0.293	-0.269	-0.371	-0.376	-0.487	-0.489	-0.292	-0.292	-0.239
P-value for t test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-value for Wald test of Equality	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R-squared	0.001	0.035	0.039	0.039	0.039	0.040	0.057	0.001	0.029	0.032	0.032	0.033	0.034	0.051

8. Probability of Ever Having Separated*			(Logit Coefficients)							(Logit Coefficients)				
Bereaved	0.168	0.145	0.185	0.158	0.164	0.165	0.159	0.057	0.047	0.089	0.083	0.081	0.091	0.094
P-value for t test	0.015	0.036	0.009	0.026	0.021	0.020	0.026	0.391	0.478	0.186	0.220	0.233	0.182	0.167
Divorced	0.395	0.389	0.261	0.170	0.224	0.228	0.207	0.396	0.396	0.295	0.274	0.232	0.249	0.293
P-value for t test	0.000	0.000	0.001	0.035	0.019	0.017	0.033	0.000	0.000	0.000	0.000	0.011	0.006	0.002
P-value for Wald test of Equality	0.021	0.014	0.455	0.909	0.600	0.582	0.675	0.000	0.000	0.031	0.048	0.167	0.147	0.074
Pseudo R-squared	0.001	0.009	0.012	0.014	0.014	0.015	0.019	0.001	0.005	0.007	0.007	0.008	0.011	0.013
9. Probability of Ever Having Divorced*			(Logit Coefficients)							(Logit Coefficients)				
Bereaved	0.064	0.033	0.096	0.086	0.095	0.092	0.094	0.075	0.059	0.097	0.099	0.098	0.107	0.110
P-value for t test	0.522	0.740	0.345	0.400	0.350	0.369	0.358	0.407	0.511	0.292	0.279	0.288	0.246	0.234
Divorced	0.406	0.397	0.285	0.255	0.354	0.353	0.372	0.401	0.400	0.302	0.315	0.314	0.323	0.358
P-value for t test	0.000	0.000	0.007	0.019	0.008	0.008	0.006	0.000	0.000	0.001	0.001	0.009	0.007	0.003
P-value for Wald test of Equality	0.014	0.009	0.187	0.242	0.110	0.107	0.087	0.008	0.006	0.109	0.093	0.135	0.137	0.088
Pseudo R-squared	0.001	0.012	0.014	0.015	0.015	0.017	0.019	0.001	0.011	0.012	0.012	0.012	0.015	0.018
10 Probability of Having Children before 21			(Logit Coefficients)							(Logit Coefficients)				
Bereaved	0.191	0.191	0.298	0.174	0.205	0.205	0.213	0.679	0.711	0.805	0.639	0.680	0.693	0.718
P-value for t test	0.287	0.288	0.113	0.347	0.265	0.266	0.249	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Divorced	-0.019	-0.017	-0.307	-0.687	-0.434	-0.437	-0.454	0.586	0.578	0.317	-0.106	0.152	0.179	0.191
P-value for t test	0.931	0.938	0.168	0.003	0.088	0.087	0.079	0.000	0.000	0.056	0.556	0.515	0.438	0.413
P-value for Wald test of Equality	0.440	0.445	0.034	0.003	0.040	0.040	0.033	0.649	0.517	0.025	0.001	0.045	0.049	0.046
Pseudo R-squared	0.000	0.001	0.011	0.023	0.024	0.028	0.050	0.005	0.014	0.023	0.044	0.046	0.052	0.061
Other Controls	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Child's Age and Age Squared		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES
Parental Age and Age Squared			YES	YES	YES	YES	YES			YES	YES	YES	YES	YES
Father's Average Income				YES	YES	YES	YES				YES	YES	YES	YES
Mother's Average Income				YES	YES	YES	YES				YES	YES	YES	YES
Number of Years Father Filed					YES	YES	YES					YES	YES	YES
Number of Years Mother Filed					YES	YES	YES					YES	YES	YES
Father's Industry of Employment						YES	YES						YES	YES
Mother's Industry of Employment						YES	YES						YES	YES
Province and Region of Residence							YES							YES
			Number of Observations = 69,815							Number of Observations = 52,673				

All models include a constant term. Standard errors are calculated using heteroscedastic robust estimators of the variance-covariance matrix

* The models of the probability of ever having separated and ever having divorced are conditional on having married, and are based on sample sizes of 33,195 men and 32,640 women.

Table 4
DIFFERENCES IN DIFFERENCES IN A BEFORE – AFTER DESIGN WITH MULITPLE TREATMENT GROUPS

Child Outcomes	P-Value of t-test		
	Men	Women	Pooled Sample
1. No Controls – Model (1)			
Market Income	0.914	0.406	0.491
Earnings	0.765	0.733	0.970
Labour Market Activity	0.543	0.441	0.382
More than High School	0.089	0.504	0.487
Income Assistance	0.470	0.758	0.462
Unemployment Insurance	0.680	0.049	0.301
Ever Married	0.303	0.377	0.956
Ever Separated	0.572	0.037	0.254
Ever Divorced	0.895	0.499	0.579
Children by 21 years	0.793	0.827	0.937
2. Complete Controls – Model (7)			
Market Income	0.870	0.195	0.424
Earnings	0.591	0.680	0.888
Labour Market Activity	0.459	0.468	0.338
More than High School	0.126	0.506	0.544
Income Assistance	0.663	0.665	0.561
Unemployment Insurance	0.585	0.032	0.250
Ever Married	0.385	0.204	0.687
Ever Separated	0.593	0.040	0.278
Ever Divorced	0.930	0.497	0.619
Children by 21 years	0.772	0.943	0.988

Table entries are the p-vales associated with the t-test of the coefficient β_6 of equation (3), described in the text. See Table 3 for a statement of the estimation procedures used and a list of the other controls included in the models.

Bibliography

AMATO, Paul R. (1993). "Children's Adjustment to Divorce: Theories, Hypotheses, and Empirical Support." *Journal of Marriage and the Family*. Vol. 55, 23-38.

BECKER, Gary S. (1991). *A Treatise on the Family*. Enlarged Edition. Cambridge, Massachusetts: Harvard University Press.

BLOOM, Howard S., Larry L. Orr, Stephen H. Bell, George Cave, Fred Doolittle, Winston Lin, and Johannes M. Bos (1997). "The Benefits and Costs of JTPA Title II-A Programs: Key Findings from the National Job Training Partnership Act Study." *Journal of Human Resources*. Vol. 32, No. 3 (Summer), 449-76.

CHERLIN, Andrew J., Frank F. Furtenberg Jr., P. Lindsay Chase-Lansdale, Kathleen E. Kiernan, Philip K. Robins, Donna Ruane Morrison, Julien O. Teitler (1991). "Longitudinal Studies of Effects of Divorce on Children in Great Britain and the United States." *Science*. Vol. 252, 1386-89.

CORAK, Miles and Andrew Heisz (1998). "The Intergenerational Earnings and Income Mobility of Canadian Men: Evidence from Longitudinal Income Tax Data." *Journal of Human Resources*. Forthcoming.

DUNCAN, Greg J., W. Jean Yeung, Jeanne Brooks-Gunn, and Judith R. Smith (1998). "How Much Does Childhood Poverty Affect the Life Chances of Children?" *American Sociological Review*. Vol. 63 No. 3, 406-23.

DUMAS, Jean and Yves Perron (1992). *Marriage and Conjugal Life in Canada*. Ottawa: Statistics Canada Catalogue No. 91-534.

GENTLEMAN, Jane F. and Evelyn Park (1997). "Divorce in the 1990s." *Health Reports*. Vol. 9, No. 2. Statistics Canada, Catalogue No. 82-003.

HAVEMAN, Robert and Barbara Wolfe (1995). "The Determinants of Children's Attainments: A Review of Methods and Findings." *Journal of Economic Literature*. Vol. 23, 1829-78.

LeBOURDAIS, Céline and Nicole Marcil-Gratton (1998). "The Impact of Family Disruption in Childhood on the Demographic Outcomes in Young Adulthood." In Miles Corak (editor). *Labour Markets, Social Institutions and the Future of Canada's Children*. Ottawa: Statistics Canada, Catalogue No. 89-553.

LANG, Kevin and Jay L. Zagorsky (1997). "Does Growing Up with a Parent Absent Really Hurt?" Unpublished Mimeo.

McLANAHAN, Sara and Gary Sandefur (1994). *Growing Up with a Single Parent: What Hurts, What Helps*. Cambridge, Massachusetts: Harvard University Press.

MANKSI, Charles F., Gary D. Sandefur, Sara McLanahan, and Daniel Powers (1992). "Alternative Estimates of the Effect of Family Structure During Adolescence on High School Graduation." *Journal of the American Statistical Association*. Vol. 87 No. 417, 25-37.

MAYER, Susan E. (1997). *What Money Can't Buy: Family Income and Children's Life Chances*. Cambridge, Massachusetts: Harvard University Press.

MEYER, Brue D. (1995). "Natural and Quasi-Experiments in Economics." *Journal of Business and Economic Statistics*. Vol. 13 No. 2, 151-61.

MILLAR, Wayne J. (1996). "Reaching Smokers with Lower Eductaional Attainment." Health Reports. Vol. 8, No. 2. Statistics Canada, Catalogue No. 82-003.

MININSTER OF JUSTICE, Government of Canada (1984). *Divorce Law in Canada: Proposals for Change*. Ottawa: Minister of Supply and Services.

MULLIGAN, Casey B. (1997). *Parental Priorities and Economic Inequality*. Chicago: University of Chicago Press.

SANDEFUR, Gary D. and Thomas Wells (1997). "Using Siblings to Investigate the Effects of Family Structure on Educational Attainment." Institute for Research on Poverty, Discussion Paper No. 1144-97.

SOLON, Gary (1997). "Intergenerational Income Mobility in the Labor Market." In Orley Ashenfelter and David Card (eds.). *Handbook of Labor Economics*. Forthcoming.