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Parental Divorce and Other Determinants of Interpersonal Trust: Evidence from HILDA Panel Data

Tarja Viitanen, University of Otago

Abstract

This paper examines the determinants of interpersonal trust with an emphasis on parental divorce using Australian HILDA panel data. The dependent variable is composed of answers to the statement: 'Generally speaking, most people can be trusted'. The analysis is conducted using random effects ordered probit and correlated random effects ordered probit. Mother's higher education is a strong positive determinant for trust for daughters while father's education matters for sons. A working father when the respondent was age 14 is a strong positive determinant for both men and women. An immigrant mother is a negative determinant of trust for both men and women. Residential stability has a strong positive effect for men's interpersonal trust. The results also indicate that there is some correlation between the level of interpersonal trust and parental divorce for both men and women. However, the effect is not strong enough for the 'divorce revolution' to account for the overall lower societal trust in Australia.

Keywords: Parental divorce, Interpersonal trust, HILDA, Random effects ordered probit

JEL Classification: J12, J13, Z13

1. Introduction

Social capital including interpersonal trust is found to have a significant economic payoff. Trust reduces transaction costs in the economy (Arrow, 1997) and is positively correlated with economic growth,[1] crime prevention (Wilson, 1987), political

[1] See, for example, Putnam (1993); Fukuyama (1995); Knack and Keefer (1997); La Porta *et al*. (1997); Glaeser *et al*. (2000); Dasgupta and Sergaldin (2000); Knack and Zak (2001); Knack and Zak (2002); Beugelsdijk *et al*. (2004); Bengtsson *et al*. (2005).

Address for correspondence: Tarja Viitanen, Department of Economics, University of Otago, Clyde Street, Dunedin 9054, New Zealand. E-mail: tarja.viitanen@otago.ac.nz.
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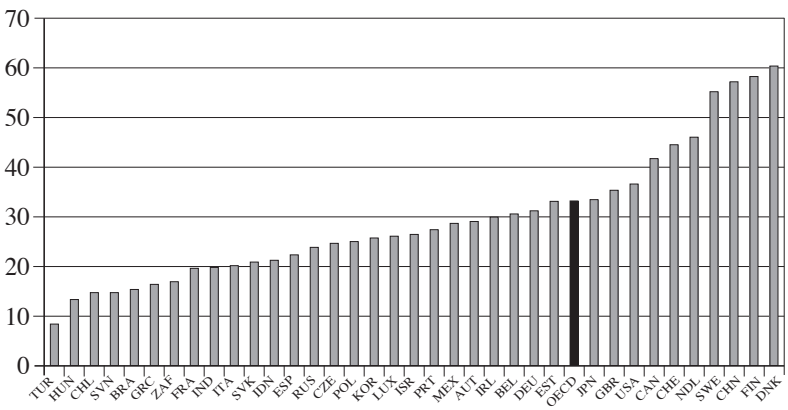
involvement (Knack and Keefer, 1997; La Porta *et al*., 1997), democratic stability (Inglehart, 1999; Uslaner, 2003), trade (Greif, 1989; Woolcock, 1998; Butter and Mosch, 2003), happiness (Uslaner, 2002; Bjornskov, 2003, 2006) and health (Putnam, 2000; Rose, 2000).

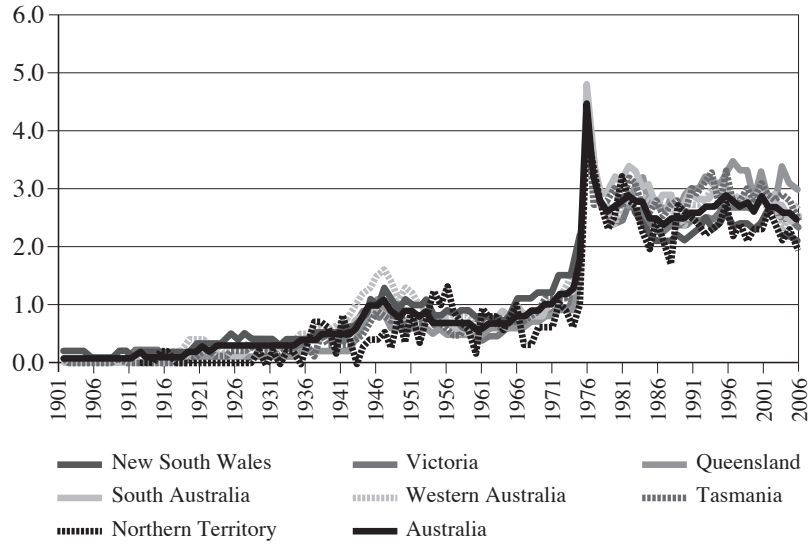
Figure 1 - Percentage of people saying that most people can be trusted, 2009 or latest available year



Note: Data refer to 2010 for Austria, Belgium, Chile, the Czech Republic, Denmark, Finland, Hungary, Luxembourg, Mexico, the Netherlands, Poland, Portugal, the Slovak Republic and Sweden.
Source: Gallup World Poll.

While Australia rates as a happy nation in general (Leigh and Wolfers, 2006) this does not appear to translate into a more trusting society (Bean, 2005). Figure 1 shows that interpersonal trust in Australia is lower than the OECD average not far above Mexico and well below the United States, Great Britain, Canada and the Nordic countries. In the past half a century Australia has faced a multitude of changes in social and family life including lower marriage rates and higher divorce rates, higher immigration and the resulting multiculturalism and increasing globalization and its effects on the labor market. This paper attempts to quantify the effect of these societal changes on interpersonal trust in Australia with a special emphasis on divorce. Although the effect of divorce has been estimated for outcomes of economic interest, for example, education, marriage and divorce propensity, and family incomes (Lang and Zagorski, 2001; Corak, 2001; Gruber, 2004; Gonzalez and Viitanen, 2008), the effect has not previously been estimated for interpersonal trust.

Figure 2 - Crude divorce rates (divorces per 1,000 population), states and territories, 1901-2006



Source: Australian Bureau of Statistics.

Figure 2 points out a large societal change in the form of higher post-World War 2 divorce rates which have risen at an accelerating pace since the 60s. This paper analyses the effect of parental divorce and other determinants of interpersonal trust using Australian HILDA panel data. Table 1 indicates that on average both men and women with divorced parents are less trusting in others compared to their counterparts with parents who have not divorced. The analysis is conducted using random effects ordered probit and correlated random effects ordered probit. The dependent variable is composed of answers to the statement: 'Generally speaking, most people can be trusted'. The explanatory variables include the occurrence of parental divorce as well as other determinants of trust.

The results indicate that while there is some correlation between interpersonal trust and parental divorce controlling for other confounding factors. However, the effect is not strong enough to explain the low societal trust level in Australia.

2. Previous literature

Trust is a key element of effective democratic decision-making in complex societies (Warren, 1999). Trust increases efficiency of transactions (Arrow, 1997) and promotes cooperation (Putnam, 1993). Furthermore, trust plays an important role in institutional efficiency including efficiency of the judicial system, corruption and tax compliance as found by La Porta *et al*., (1997). This finding confirms Putnam (1993) study, which discovers that social capital including trust is a strong determinant of the performance of local governments.

Significant positive determinants of trust at societal level include education and income equality (Knack and Keefer, 1997), country of ancestral origin (Uslaner, 2008; Moschion and Tabasso, 2013), cultural norms (Becker *et al*. 2011) and ethnic homogeneity (Knack and Keefer, 1997; Knack and Zak, 2001; Alesina and La Ferrara, 2002; Bjornskov, 2006). In general post-communist societies exhibit less trust than democratic societies (Bjornskov, 2006).

Brehm and Rahn (1997) find a strong effect of civic engagement on generalized trust and suggest that this relationship has consequences for confidence in institutions. For the US, there is evidence that trust in institutions is declining in particular as a result of the Global Financial Crisis (Stevenson and Wolfers, 2011). Stolle (1998) analyses the effects of association membership on generalized trust and finds that in particular time spent in an association with foreigners correlates positively with trust. However, he also concludes that more trusting people self-select into association membership.

There is substantial evidence on the individual level determinants of trust. These include one's moral attitude, trust based on past experiences as well as trusting people who are more similar to oneself and whom they have known longer (Alesina and La Ferrara, 2000). Alesina and La Ferrara (2002) find that trust is also determined by income.

Level of education is one of the strongest individual level determinants of trust (Alesina and La Ferrara, 2002). Knack and Keefer (1997) and Knack and Zak (2002) argue that trust is generated by the education system by making citizens better informed and more capable of interpreting perceived information as well as more conscious of the consequences of any actions taken. Schooling may have an important socialization effect that changes young people's attitudes toward strangers. On the other hand, it is possible that trust per se leads to better educational outcomes (Coleman, 1988; Putnam, 2000). Coleman (1988) argues that both social capital in the family and social capital in the community create human capital, with the former giving the child access to the adult's human capital and the latter giving access to fellow student and the wider community.

Borgonovi and Miyamoto (2010) in their survey of the literature do not report any causal effect of education on trust across Europe. On the other hand, Milligan *et al*. (2004) and Chevalier and Viitanen (2013) report evidence of a positive effect of education on interpersonal trust.

Furthermore at individual level Protestantism is a significant positive determinant of trust (La Porta *et al*. 1997; Bjornskov, 2006; Glaeser *et al*. 2000) and in general older people are more trusting (Glaeser *et al*. 2000; Alesina and La Ferrara, 2000). Alesina and La Ferrara (2002) find that trust is also determined by belonging to groups which have traditionally been discriminated against such as women or minorities or by having recent history of traumatic experiences.

Common traumatic experiences at an individual level include own or parental divorce, criminal victimization, illness, death in the family, unemployment and financial hardship. Smith (1997) analyses misanthropy rather interpersonal trust and hypothesizes that misanthropy is negatively correlated with income, education and social standing while it is hypothesized to be positively correlated with the above

common traumatic experiences. The empirical evidence points out significant negative effects of income, education and misanthropy and significant positive effects of recent financial hardship, recent immigration and crime victimization on misanthropy. However, own or parental divorce is not found to have a statistically significant effect on misanthropy in a pooled regression model for men and women.

Trust has an important intergenerational aspect with 75 per cent of the variation in teenagers' trust level explained by their parents' propensity to trust (Katz and Rotter, 1969). Psychological literature finds that children who witness the divorce of their parents grow up to have less trust in not only their own parents, but also their future conjugal partners (Franklin *et al*. 1990; Jacquet and Surra, 2001; King, 2002). Yoder and Nichols (1980) find evidence of divorced individuals being less satisfied with life, less optimistic and also less trusting in other people. They also find evidence of intergenerational transmission of divorce which could underpin the link between higher divorce rates and lower levels of trust within society.

Women who have experienced a parental divorce in their childhood face its consequences in their long-term decision making. Southworth and Schwarz (1987) examine the attitudes of female college students from divorced and intact families and find that parental divorce has a long-term effect on young women's expectations regarding their relation to men, work and marriage independent of the quality of the paternal relationship post-divorce.

Uslaner (2002) examines the determinants of trust and concludes that in pursuit of increased societal trust countries should put most effort into reducing inequality rather than creating wealth. He finds that the most important positive determinants of trust at an individual level include optimism, being in control of one's own life and a higher level of education. However, unlike the rest of the literature income and personal life history such as crime victimization are not found to be significant determinants of trust in Uslaner (2002).[2]

3. Data and econometric method

The analysis is based on the Household, Income and Labour Dynamics in Australia (HILDA) Survey, which is a nationally-representative Australian household-based panel survey that has been conducted since 2001.

The primary outcome measure used in this analysis is a seven-point Likert scale answer to the question 'To what extent do you agree or disagree with the following statements? Please indicate, by crossing one box on each line, how strongly you agree or disagree with each. a) Generally speaking, most people can be trusted', where the scale runs from one (Strongly Disagree) to seven (Strongly Agree). This outcome measure is part of the Self-Completion Questionnaire, which is not part of the face-to-face interview. Furthermore, this variable is only available in waves five, six, eight, 10 and 11 of the survey.

Of the initial Hilda sample for waves one-11 (201, 342 observations), 93,324 individuals participated in waves five, six, eight, 10 and/or 11. The minimum age of the individuals in the sample is restricted to 15 since this is the age when Self-Completion

[2] Uslaner (2002) does not provide regression estimates for the effect of own or parental divorce on trust.

Questionnaire is required to be completed; this reduces the sample size to 73,725 observations. There are four missing values for region, 12,657 missing values for trust data and a further 11,949 missing values for the parental divorce data[3]. This reduces the sample size to 49,115. Further six observations are not used due to missing socio-economic status variable, 1,452 are not used because of missing data on mother's labour force status and four observations are not used because of missing education data. There are missing values for number of siblings (2,326 observations) and the oldest child (2,086 observations) dummy, instead of dropping these observations a dummy for missing cells is included in all regressions and the variable is recoded accordingly. In the end we have a sample size of 49,094 observations. Descriptive statistics for both, the male (N=22,253) and female (N=25,400) subsamples are provided in table 1.

Table 1 - Mean trust by gender and parental divorce status

	Men		*Women*	
	Mean	*St. Dev.*	*Mean*	*St. Dev.*
Parents divorced	4.593	1.371	4.714	1.412
Parents not divorced	4.801	1.329	4.887	1.362
Age at parental divorce				
0-4	4.515	1.356	4.173	1.830
5-12	4.566	1.439	4.461	1.434
13-17	4.639	1.385	4.690	1.369
18+	4.590	1.328	4.904	1.331
Years since parental divorce				
Less than 5	4.383	1.374	4.201	1.526
5-9	4.227	1.425	4.532	1.378
10-19	4.466	1.335	4.672	1.337
20+	4.739	1.356	4.827	1.425

Note: Trust is measured using a 7-point Likert scale answer to the question 'To what extent do you agree or disagree with the following statements? Please indicate, by crossing one box on each line, how strongly you agree or disagree with each. a) Generally speaking, most people can be trusted', where the scale runs from 1 (Strongly Disagree) to 7 (Strongly Agree).

Tables 1 and 2 summarise the dependent and the control variables used in the analysis. Approximately 11 per cent of the sample has experienced parental divorce; six per cent of the divorces occurred before the child turned five years of age and 20 per cent occurred before they turned 13. The mean level of trust is lower for individuals with divorced parents and for those who experienced parental divorce at a younger age. Also, a more recent parental divorce is associated with a lower level of mean trust as summarised in table 1.

[3] Spearman rank-correlation coefficient between missing response for the generalized trust question and parental divorce is insignificant; the correlation coefficient between missing parental divorce variable and generalized trust is -0.08 and significant at one per cent level. Although the parental divorce may not be missing at random, this is likely to lead to an underestimate of the true effect of parental divorce on generalized trust.

Table 2 indicates that a typical respondent is in their mid-40s with diploma/certificate level education for men and year 11 or below education level for women. 60 per cent of women and 72 per cent of men are employed and about a third of the sample individuals have their own children. The average number of years at the current address is 11 years. Nine percent of respondent's mothers, and 13 per cent of fathers, have a university degree. The parental labour force participation when the respondent was age 14 is approximately 50 per cent for mothers and 95 per cent for fathers.

Table 2 - Summary statistics

	Males	*Females*
Parents divorced	0.111 (0.314)	0.111 (0.314)
Personal		
Age	45.799 (18.001)	46.265 (18.250)
Education: yr 11 and below	0.302 (0.459)	0.351 (0.477)
Education: yr 12	0.138 (0.345)	0.152 (0.359)
Education: diploma or certificate	0.375 (0.484)	0.251 (0.434)
Education: bachelor or honours	0.127 (0.333)	0.147 (0.354)
Education: postgraduate	0.101 (0.301)	0.100(0.300)
Employed	0.715 (0.451)	0.595 (0.491)
Own children 0-14	0.306 (0.461)	0.315 (0.464)
Indigenous	0.003 (0.050)	0.002 (0.048)
Years at current address	10.863 (11.963)	11.085 (12.197)
Parental Background		
Father has a university degree	0.129 (0.336)	0.132 (0.338)
Mother has a university degree	0.089 (0.285)	0.093 (0.290)
Father in paid employment	0.958 (0.200)	0.950 (0.219)
Mother in paid employment	0.498 (0.500)	0.510 (0.500)
Immigrant mother	0.329 (0.470)	0.325 (0.468)
Immigrant father	0.360 (0.480)	0.356 (0.479)
Health Conditions		
A nervous or emotional condition	0.024 (0.152)	0.036 (0.186)
Limited use of feet/legs	0.048 (0.215)	0.051 (0.219)
Mental illness	0.011 (0.102)	0.012 (0.109)
Any disfigurement/deformity	0.005 (0.073)	0.005 (0.069)
Number of observations	22,253	25,400

Note: Standard deviation in parentheses.

Income inequality is a strong determinant of trust and hence it is desirable to control for relative socio-economic status (Knack and Keefer, 1997). Deciles one-10 refer to the SEIFA 2001 index of relative socio-economic advantage/disadvantage, where one is the lowest and 10 is the highest decile. The lower the decile the more disadvantaged the area is while higher scores indicate more advantaged areas. The index is constructed using a number of different variables that indicate both advantage (for example, high income, high education) and disadvantage (for example, unemployment status, low income, not enough bedrooms). Indigenous refers to aboriginal (including Torres Strait) origin and this group has a representation of 0.3 per cent for men and 0.2 per cent for women in the sample.

Out of the health conditions, the most common one is limited use of feet/legs with about five per cent of the sample. Second most common ailment is nervous or emotional condition with 2.4 per cent of men and 3.6 per cent of women of the sample suffering from these health conditions. Approximately one per cent of the sample has a mental illness.

As discussed previously, the main dependent variable is a seven-point Likert scale answer to the question 'To what extent do you agree or disagree with the following statements? Please indicate, by crossing one box on each line, how strongly you agree or disagree with each. a) Generally speaking, most people can be trusted', where the scale runs from one (Strongly Disagree) to seven (Strongly Agree). An OLS analysis treats Likert-scale variables as cardinal. However, it is likely that respondents do not treat an attitude level four as four times as trusting as those reporting response one. Therefore the econometric method takes into account the ordinal nature of the dependent variable by using an ordinal response model.

The central idea of the ordered response model is that there is a latent continuous metric y^* underlying the ordinal responses observed by the researcher. The latent variable specification of the estimated random effects ordered probit model can be written as:

$$y_{it}^* = \beta x_{it} + \alpha_i + \varepsilon_{it} \tag{1}$$

where x_{it} is a set of observed variables that may be associated with the interpersonal trust indicator, α_i is an individual-specific, time-invariant random component capturing individual-specific heterogeneity and ε_{it} is assumed to be a random error term. The random error is assumed to be strictly exogenous, that is uncorrelated with x_{it}.

The observed interpersonal trust variable is assumed to be related to the latent interpersonal trust variable in the following way:

$$x_{it} = j \text{ if } \mu_{j-1} < y_{it}^* < \mu_j,\ j = 1,...,J \tag{2}$$

where J is the number of response categories. An ordered probit model estimates an underlying score as a linear function of the control variables and a set of cutpoints or threshold parameters μ_j that are empirically estimated. Equation (2) states that if y_{it}^* is between μ_{j-1} and μ_j, the response to the question on interpersonal trust is equal to $j(y_{it}=j)$. The ordered probit models are estimated using ordered probit available in Stata (Release 13, Stata Corporation) and random effects ordered probit estimator, which is a user-written program introduced to Stata by Frechette (2001a, 2001b). The random effects ordered probit model is estimated using maximum likelihood estimation with the likelihood for each unit approximated by Gauss-Hermite quadrature (see Butler and Moffitt, 1982 for more details).

The assumption that the random error term is uncorrelated with x_{it} is restrictive and if it is not satisfied, the estimates may be inconsistent. Correlated random effects ordered probit estimation allows for the possibility that the observed regressors may be correlated with the individual effect (Mundlak, 1978; Chamberlain, 1984; Wooldridge, 2009). In practice the individual effect is parameterized allowing correlation between the individual effects and the means of the regressors:

$$\alpha_i = \alpha_0 + \alpha_1 \bar{x}_i + u_i \quad (3)$$

where $\bar{x}_i$ is the the average of the observations on the exogenous variables over the sample period for individual i and u_i are independent of the variables.

The models are estimated separately for men and women. This is to ensure that the variance of the residual is not constrained to be the same in the two groups as would be the case with pooled data.[4] To confirm that the parallel lines assumption that is inherent in any ordered categorical variable estimation holds I have also estimated a random effects ordered probit model (regoprob2 by Pfarr *et al*. 2010) that allows for an autofit option that tests the assumption (Pfarr *et al*. 2011).[5]

All the models are also estimated using OLS which effectively treats the Likert-scale as cardinal. Ferrer-i-Carbonell and Frijters (2004) find that assuming cardinality or ordinality of the answers to Likert scale questions on life satisfaction is relatively unimportant to results.

4. Results of the impact of parental divorce on interpersonal trust

Effect of the incidence of parental divorce on trust

This section examines the effect of parental divorce on interpersonal trust later in life. Table 3 presents the results of the effect of parental divorce on interpersonal trust for women using OLS, random effects ordered probit and correlated random effects ordered probit. Estimates of the six threshold parameters (μ) are significant at the one per cent level but are not reported due to space considerations. All of the regressions also include dummies for missing values for education, number of siblings and being oldest child variables; these are not significant in any of the models and hence are not reported in the tables of results.

Likelihood ratio statistics were used to compare the random effects ordered probit model with the simple pooled ordered probit model (results not reported). Specifically the null hypothesis of the test is $\alpha_i = 0$. When α_i is not zero the panel-level variance component is important and the random effects ordered probit is a significant improvement on the simple pooled ordered probit. Results for both men and women indicate that the α_i is important.

Looking at the results in table 3 indicates that parental divorce is negative and statistically significant at five per cent level for OLS and random effects ordered probit and at 10 per cent level for the correlated random effects ordered probit model. This shows that the finding of lower trust levels of individuals with divorced parents reported in table 1 holds even after controlling for a variety of other determinants of trust. The result implies that women with divorced parents are in general less likely to express trust in other people. The marginal effect for the random effects ordered probit model indicates that women with divorced parents are 0.1 percentage points less likely to trust other people, however, this result is only significant at 10 per cent level in the correlated random effects ordered probit model.

[4] The results estimated using pooled data with intercept shifts and both intercept and slope shifts are available from the author upon request.

[5] These results are not reported due to space considerations but are available from the author upon request.

Table 3 - The effect of parental divorce on interpersonal trust for women

	(1) OLS	*(2) Random effects ordered probit*	*(3) Correlated random effects ordered probit*
Divorced parents	-0.077 **	-0.086 **	-0.073 *
	(0.038)	(0.040)	(0.040)
		[0.001 **]	[0.001 *]
Age	0.002	-0.001	0.002
	(0.003)	(0.003)	(0.003)
Age squared/100	0.020 **	0.023 ***	0.020 ***
	(0.004)	(0.004)	(0.004)
Education: yr 12	0.085 **	0.033	-0.121 **
	(0.037)	(0.035)	(0.061)
Education: diploma or certificate	0.010	0.009	0.004
	(0.032)	(0.032)	(0.074)
Education: bachelor or honours	0.237 ***	0.223 ***	0.051
	(0.039)	(0.040)	(0.100)
Education: postgraduate	0.276 ***	0.290 ***	0.068
	(0.045)	(0.047)	(0.132)
Employed	0.101 ***	0.046 **	0.028
	(0.026)	(0.023)	(0.023)
Local unemployment rate	0.005	-0.007	-0.005
	(0.014	(0.013)	(0.013)
Kids 0-14	0.022	0.050 **	0.085 **
	(0.026)	(0.023)	(0.034)
Years at current address	0.002	0.001	0.001
	(0.001)	(0.001)	(0.001)
Number of siblings	-0.012 *	-0.014 **	-0.010
	(0.006)	(0.007)	(0.007)
Oldest child	0.055 **	0.056 **	0.054 *
	(0.026)	(0.028)	(0.028)
Indigenous	-0.013	0.149	0.153
	(0.207)	(0.176)	(0.176)
Father has a university degree	0.065 *	0.080 *	0.058
	(0.038)	(0.042)	(0.042)
Mother has a university degree	0.101 **	0.129 ***	0.119 **
	(0.043)	(0.048)	(0.048)
Father in paid employment	0.161 ***	0.181 ***	0.167 ***
	(0.057)	(0.058)	(0.057)
Mother in paid employment	0.008	0.010	0.006
	(0.026)	(0.027)	(0.027)
Mother non-Oz	-0.163 ***	-0.161 ***	-0.167 ***
	(0.060)	(0.060)	(0.060)
Father non-Oz	-0.016	-0.017	-0.016
	(0.044)	(0.048)	(0.048)
A nervous or emotional condition	-0.452 ***	-0.275 ***	-0.072
	(0.064)	(0.048)	(0.056)
Limited use of feet/legs	-0.240 ***	-0.133 ***	-0.039
	(0.051)	(0.041)	(0.048)
Mental illness	-0.486 ***	-0.384 ***	-0.198 **
	(0.107)	(0.080)	(0.096)
Any disfigurement or deformity	-0.358 **	-0.161	0.025
	(0.159)	(0.119)	(0.131)

Table 3 - The effect of parental divorce on interpersonal trust for women (continued)

	(1) OLS	*(2) Random effects ordered probit*	*(3) Correlated random effects ordered probit*
Mundlak correction	No	No	Yes
Region	Yes	Yes	Yes
Socio-economic status	Yes	Yes	Yes
Year	Yes	Yes	Yes
Observations	25,400	25,400	25,400

Notes: The dependent variable is a 7-point Likert scale composed of slightly/moderately/strongly agreeing or disagreeing (with 4 being neutral) with the statement: 'Generally speaking, most people can be trusted'. The coefficient estimates for the socio-economic status, dummy for missing number of siblings, dummy for missing oldest child and region are not reported but are available on request. The Mundlak correction variables include means of the following variables: education, kids 0-14, socio-economic status and the four health condition variables. The reference category includes education year 11 and below, SEIFA decile 1 and region Sydney. Standard errors are in parentheses. Standard errors are clustered for OLS model (1). Coefficient significance levels are denoted by * (10%), ** (5%), and *** (1%). Marginal effects are in square brackets.

Education level has a positive effect on the level of interpersonal trust with those with a Bachelor degree or above being more trusting in the OLS and random effects ordered probit models. The results are not significant in the correlated random effects ordered probit model as the Mundlak correction captures this effect. Mundlak correction terms are highly significant but are not reported due to space considerations. Employed women are also more trusting in the first two models.

Interestingly, the number of own siblings is negatively associated with one's level of trust in the first two models, while being the oldest is positively related to the level of interpersonal trust. While education and number of siblings become insignificant in the correlated random effects model, the variable oldest child remains significant across all specifications.

Those with children aged 0-14 are more trusting which loosely reflect the findings of Brehm and Rahn (1997) and Stolle (1998) who argue that individuals with more civic engagement and association memberships are more trusting. The presence of children in the household necessarily brings in interaction with the other parents at childcare/school and hence they get more exposure to other members of the society.

The parental background variables contain interesting results regarding the determinants of generalised trust. Mothers with a higher education degree as well fathers who were employed when the respondent was 14 years old are significant positive determinants of trust whereas an immigrant mother is a negative determinant of trust.

The effect of a long-term health condition is investigated by including dummy variables for 1) a nervous/emotional condition, 2) any disfigurement/deformity, 3) limited use of feet or legs, and 4) a mental illness. All of these are significant and negative in the OLS model, while disfigurement/deformity loses significance in the random effects ordered probit model. All of the health condition variables except for mental illness become insignificant in the correlated random effects specification.

Therefore even controlling for time averages of health conditions in the form of the Mundlak correction, mental illness still remains a strong negative determinant of generalised trust.

The results for men are reported in table 4. The main independent variable looking at whether one's parents were divorced is negative and significant (albeit only at 10 per cent level in the correlated random effects ordered probit model) across all the specifications implying that men with divorced parents are less likely to trust other people in general.

Table 4 - The effect of parental divorce on interpersonal trust for men

	(1) OLS	*(2) Random effects ordered probit*	*(3) Correlated random effects ordered probit*
Divorced parents	-0.087 **	-0.083 **	-0.073 *
	(0.041)	(0.042)	(0.042)
		[0.001 *]	[0.001]
Age	-0.010 **	-0.016 ***	-0.014 ***
	(0.004)	(0.004)	(0.004)
Age squared/100	0.026 ***	0.035 ***	0.034 ***
	(0.004)	(0.004)	(0.004)
Education: yr 12	0.076 *	0.026	-0.083
	(0.041)	(0.039)	(0.067)
Education: diploma or certificate	-0.001	-0.031	-0.119
	(0.034)	(0.033)	(0.085)
Education: bachelor or honours	0.205 ***	0.185 ***	-0.111
	(0.045)	(0.046)	(0.126)
Education: postgraduate	0.251 ***	0.262 ***	0.024
	(0.050)	(0.052)	(0.165)
Employed	0.062 *	0.019	-0.003
	(0.033)	(0.028)	(0.028)
Local unemployment rate	-0.015	-0.016	-0.016
	(0.014)	(0.014)	(0.014)
Kids 0-14	0.015	0.023	0.003
	(0.026)	(0.024)	(0.034)
Years at current address	0.005 ***	0.002 **	0.002 **
	(0.001)	(0.001)	(0.001)
Number of siblings	0.006	0.003	0.006
	(0.007)	(0.007)	(0.007)
Oldest child	0.060 **	0.072 **	0.070 **
	(0.027)	(0.029)	(0.029)
Indigenous	-0.345 *	-0.309 *	-0.298 *
	(0.199)	(0.177)	(0.177)
Father has a university degree	0.108 ***	0.128 ***	0.122 ***
	(0.041)	(0.044)	(0.044)
Mother has a university degree	-0.022	-0.019	-0.027
	(0.049)	(0.051)	(0.051)
Father in paid employment	0.216 ***	0.236 ***	0.217 ***
	(0.062)	(0.065)	(0.065)
Mother in paid employment	-0.017	-0.017	-0.016
	(0.027)	(0.029)	(0.029)
Mother non-Oz	-0.127 **	-0.116 *	-0.117 *
	(0.059)	(0.063)	(0.063)

Table 4 - The effect of parental divorce on interpersonal trust for men

	(1) OLS	*(2) Random effects ordered probit*	*(3) Correlated random effects ordered probit*
Father non-Oz	-0.031	-0.033	-0.030
	(0.046)	(0.051)	(0.051)
A nervous or emotional condition	-0.548 ***	-0.436 ***	-0.277 ***
	(0.076)	(0.063)	(0.075)
Limited use of feet/legs	-0.175 ***	-0.121 ***	-0.019
	(0.054)	(0.045)	(0.054)
Mental illness	-0.170	-0.078	0.138
	(0.117)	(0.090)	(0.106)
Any disfigurement or deformity	0.064	0.066	0.097
	(0.128)	(0.130)	(0.155)
Mundlak correction	No	No	Yes
Region	Yes	Yes	Yes
Socio-economic status	Yes	Yes	Yes
Year	Yes	Yes	Yes
Observations	22,253	22,253	22,253

Notes: The dependent variable is a 7-point Likert scale composed of slightly/moderately/strongly agreeing or disagreeing (with 4 being neutral) with the statement: 'Generally speaking, most people can be trusted'. The coefficient estimates for the socio-economic status, dummy for missing number of siblings, dummy for missing oldest child and region are not reported but are available on request. The Mundlak correction variables include means of the following variables: education, kids 0-14, socio-economic status and the four health condition variables. The reference category includes education year 11 and below, SEIFA decile 1 and region Sydney. Standard errors are in parentheses. Standard errors are clustered for OLS model (1). Coefficient significance levels are denoted by * (10%), ** (5%), and *** (1%). Marginal effects are in square brackets.

The first two models show a positive correlation between education level and generalised trust, however, the inclusion of the Mundlak correction removes this significant relationship. Nervous or emotional health condition is the only one that is significantly associated with lower level of interpersonal trust across all specifications for men. Stability as proxied by number of years in current residence is a significant positive determinant of trust for men as is being the eldest child.

An interesting finding from a policy perspective is the result showing that having an immigrant mother is associated with lower levels of interpersonal trust. This could indicate some problems assimilating to the Australian society and might deserve more detailed research. Indigenous men are less trusting across the model specifications however this relationship only holds at 10 per cent level.

Parental background variables that are positive determinants of generalised trust include father having a university degree and father having being employed when the respondent was 14 years old. Unlike for women, mothers' education level has no significant effect on trust for men.

A nervous or emotional condition is the only health condition that has a significant negative impact on trust across all the specifications.

Further random effects ordered probit models are run for the following dependent variables that can be considered similar in nature to the interpersonal trust

question used as a dependent variable thus far. These variables include seven-point Likert scale composed of slightly/moderately/strongly agreeing or disagreeing (with four being neutral) with the following statements: 1) 'Most people you meet make agreements honestly', 2) 'Most people would try to take advantage of you if they got a chance' and 3) 'Neighbourhood: People in this neighbourhood can be trusted'. The parental divorce dummy is not significant for either gender in any of these regressions. Hence the interpersonal trust question appears to capture the individual's trust in general rather than any grievances one may feel due to previous bad experiences regarding specific past agreements.

Overall the results of the main research question of interest in this paper, the effect of parental divorce on one's own level of generalised trust are negative and significant at five per cent level in the first two models and at 10 per cent level with the inclusion of the Mundlak correction.

Effect of age at parental divorce

This section examines whether the age at which parents divorced affects ones level of generalised trust. The analysis is restricted to individuals whose parents have divorced; this reduces the sample size to 2,745 women and 2,411 men for the full sample. According to the marginal effects there is a negative association significant at 10 per cent level between trust and parental divorce that occurred when the respondent was between 13 and 17 years old.

Table 5 - The effect of age at parental divorce on generalised trust

	Women		*Men*	
	Random effects ordered probit	*Correlated random effects ordered probit*	*Random effects ordered probit*	*Correlated random effects ordered probit*
Age 0-4 years	-0.119	-0.080	0.131	0.175
	(0.166)	(0.167)	(0.181)	(0.181)
	[0.002]	[0.001]	[-0.001]	[-0.002]
Age 5-12 years	0.168	0.112	0.147	0.160
	(0.126)	(0.128)	(0.121)	(0.121)
	[-0.001]	[-0.001]	[-0.002]	[-0.002]
Age 13-17 years	-0.078	-0.039	0.172 *	0.176 **
	(0.089)	(0.090)	(0.089)	(0.089)
	[0.001]	[0.000]	[-0.002 *]	[-0.002 *]
Individual controls	Yes	Yes	Yes	Yes
Mundlak correction	No	Yes	No	Yes
Region	Yes	Yes	Yes	Yes
Socio-economic status	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	2,745	2,745	2,411	2,411

Notes: The dependent variable is a 7-point Likert scale composed of slightly/moderately/strongly agreeing or disagreeing (with 4 being neutral) with the statement: 'Generally speaking, most people can be trusted'. The coefficient estimates for the individual controls are not reported but are available on request. The Mundlak correction variables include means of the following variables: education, kids 0-14, socio-economic status and the four health condition variables. The reference category includes education year 11 and below, SEIFA decile 1 and region Sydney. Marginal effects are in square brackets. Standard errors are in parentheses. Coefficient significance levels are denoted by * (10%), ** (5%), and *** (1%).

Effect of years since parental divorce

This section examines whether the age at which parents divorced affects one's generalised trust. Although the probit coefficients are significant for men for age ranges five-nine and 10-19, the associated marginal effects fail to be significant possibly due to a small sample size.

Table 6 - The effect of years since parental divorce on generalised trust

	Women		*Men*	
	Random effects ordered probit	*Correlated random effects ordered probit*	*Random effects ordered probit*	*Correlated random effects ordered probit*
Less than 5	-0.273	-0.291	-0.221	-0.262
	(0.173)	(0.174)	(0.183)	(0.184)
	[0.004]	[0.004]	[0.004]	[0.004]
5 to 9	0.002	-0.003	-0.306 **	-0.312 **
	(0.133)	(0.133)	(0.145)	(0.146)
	[-0.000]	[0.000]	[0.005]	[0.005]
10 to 19	0.035	0.047	-0.154 *	-0.152 *
	(0.085)	(0.086)	(0.092)	(0.093)
	[-0.000]	[-0.000]	[0.002]	[0.002]
Individual controls	Yes	Yes	Yes	Yes
Mundlak correction	No	Yes	No	Yes
Region	Yes	Yes	Yes	Yes
Socio-economic status	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	2,745	2,745	2,411	2,411

Notes: The dependent variable is a 7-point Likert scale composed of slightly/moderately/strongly agreeing or disagreeing (with 4 being neutral) with the statement: 'Generally speaking, most people can be trusted'. The coefficient estimates for the individual controls are not reported but are available on request. The Mundlak correction variables include means of the following variables: education, kids 0-14, socio-economic status and the four health condition variables. The reference category includes education year 11 and below, SEIFA decile 1 and region Sydney. Marginal effects are in square brackets. Standard errors are in parentheses. Coefficient significance levels are denoted by * (10%), ** (5%), and *** (1%).

5. Conclusions

This paper analyses the effect of parental divorce during childhood on generalised trust later on in life using Australian HILDA panel data. The analysis is conducted using OLS, random effects ordered probit and correlated random effects probit. The dependent variable is a seven-point Likert scale answer agreeing or disagreeing with the statement: 'Generally speaking, most people can be trusted'. The main explanatory variable is the occurrence of parental divorce. The effect of parental divorce on the level of generalised trust is estimated using random effects models as well as instrumental variables models. Further analysis is conducted examining the effect at which parents divorced for the level of generalised trust.

The results indicate that the level of generalised trust is affected by parental divorce with both men and women who have experienced parental divorce expressing

marginally significantly lower levels of generalised trust. Other parental background variables also appear to be strong determinants of trust with father's employment when the respondent was age 14 having a strong positive effect on trust. For females mother's higher education has a positive association with trust, whereas for men father's higher education is associated with a higher level of generalised trust. Own level of higher education is a significant positive determinant of generalised trust in Australia confirming the findings for other countries.

Throughout the different specifications, there is a marginally significant negative effect of having one or both parents being immigrants. This is an interesting effect in itself and deserves further research.

Further analysis examining the effect of the age of the child when parental divorce took place, as well as years since parental divorce, show zero effects for women and zero or negligible effects for men.

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