

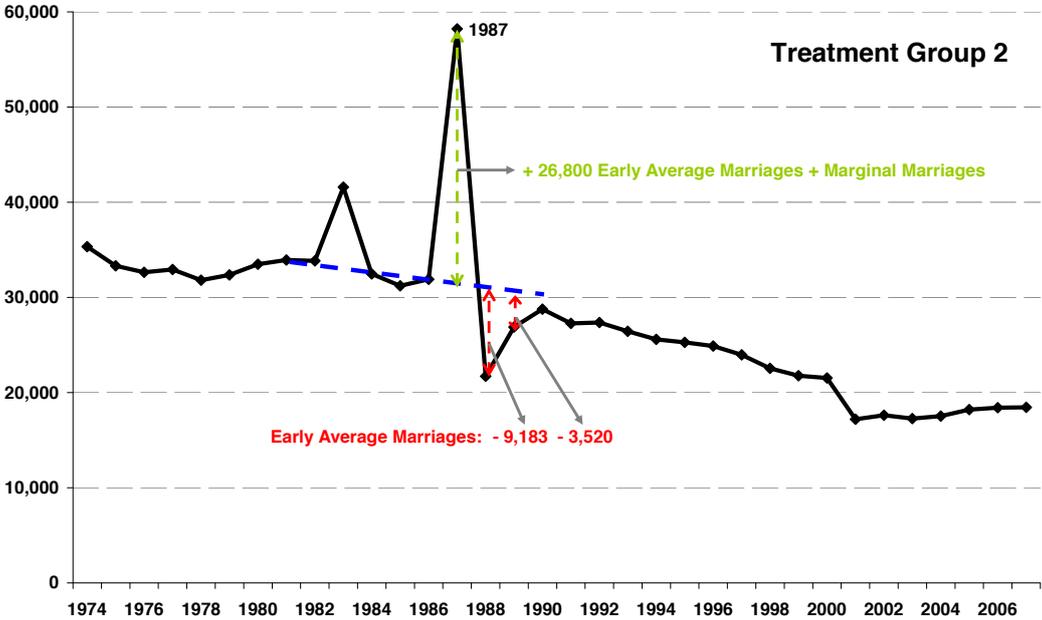
A Appendix – Key demographic developments in Austria and other selected countries

B Appendix – Alternative approximations of the shares of marriage types

In the paper we suggest a very simple linear interpolation of long-run trends in marriages that allows us to approximate the share of early average, average and marginal marriages. In this section we show that alternative methods give very comparable estimates of the respective shares. In particular, we suggest (i) an alternative linear method, and (ii) a regression-based method.

Linear extrapolation It is possible to estimate the long run trend based only on data from the period before the announcement of the suspension. We suggest to extrapolate based on a linear trend between 1981 and 1986; see Figure B.1 below. This results in estimated shortfalls of 9, 183 and 3, 520 marriages for the years 1988 and 1989, respectively (see the vertical red bars). The number of marginal marriages is then equal to 14, 097 — the difference between the surplus from 1987 and the sum of the shortfalls from 1988 and 1989. As argued in the paper, marginal marriages can by definition only be formed after the announcement of the suspension and before January 1, 1988. If we relate the 14, 097 marginal marriages (and the 12, 703 early average marriages) to all 31, 005 T^2 marriages formed between October and December 1987, we find that approximately 46 percent of these were marginal marriages, 41 percent were early average marriages, and the remaining 14 percent were average marriages. Our initial approximation (used in the paper) assumes 51 percent, 36 percent, and 13 percent, respectively.

Figure B.1: Alternative quantification of (early) average marriages and marginal marriages^a



^a Own calculations based on data from the *Austrian Marriage Register*. This graph shows the number of yearly of marriages of treatment group 2 couples (i. e. neither spouse has been married before) from 1981 through 1993. See also notes to Figures 1 and 2.

Regression-based approach A more elaborated way to approximate long-run trends in marriages is given by a regression-based approach. We follow here closely the idea of Persson (2013). We use aggregated quarterly data on the number of marriages for the

time period 1971-1990. In order to estimate the number of *additional* marriages induced by the announcement (i.e. the sum of marginal and early average marriages) we run the following regression separately for T^1 , T^2 and comparison couples:

$$marr_q = \beta_0 + \beta_1 * TP + \eta_q + t(q) + \epsilon, \quad (3)$$

where $marr_q$ is the number of marriages in quarter q , TP is a binary indicator for the last quarter of 1987, η_q are quarter fixed effects to correct for seasonality, and $t(q)$ are higher order polynomials in time. The estimate of β_1 provides us with our estimate for the sum of marginal and early average marriages in the last quarter of 1987.

Similarly, one can estimate the number of early average marriages with the following model

$$marr_q = \gamma_0 + \gamma_1 * PT + \eta_q + t(q) + \epsilon, \quad (4)$$

where PT is a binary indicator for post-treatment years 1988 and 1989. The estimate of γ_1 provides us with our estimate of the number of early average marriages. As in the paper, we assume here that couples did not advance their planned weddings more than 26 months (i.e. from December 1989 to October 1987). An extension of this period would, however, essentially lead to substantial lower estimates for early average marriages.

We have estimated the models with different orders of the quarterly time polynomials to approximate the underlying unknown functional form of marriages over time. The estimated number of early average marriages, however, seems to be sensitive to the order of polynomials. This sensitivity decreases with higher order polynomials and stabilizes at the order 6. Polynomials of even higher order lead to very comparable estimates. Table B.1 below summarizes the estimation results for polynomials of the order of two and six. It turns out that the estimated number of excess and early average marriages for T^1 - and T^2 -marriages are significant and consistent with our previous approximations. For T^2 -marriages, we find now 45% marginal marriages (compared to 51% and 46% in the other methods) and 38% early average marriages (compared to 36% and 41%). Similarly for T^1 -marriages, we find 37% marginal marriages (44% and 34%) and 32% early average marriages (26% or 34%).

In sum, we have shown that different methods for the approximation of the share of early average, average and marginal marriages give very comparable numbers. In all cases, we would multiply our estimates of the compositional effects for T^2 -marriages by roughly two and we would arrive at similar selection effects.

Table B.1: Regression based quantification of marginal and early average marriages^a

	T^2 -marriages		T^1 -marriages		Non-eligible	
	2 nd order	6 th order	2 nd order	6 th order	6 th order	6 th order
$\beta_1 : TP$	25,449.14*** (0.000)	25,937.09*** (0.000)	2,608.57*** (0.000)	2,659.04*** (0.000)	-66.23 (0.391)	
$\gamma_1 : PT$	-6,582.30*** (0.000)	-11,899.21*** (0.000)	-588.78*** (0.001)	-1,237.75*** (0.000)	26.68 (0.680)	
Quarter fixed-effects	yes	yes	yes	yes	yes	yes
Order of polynomial	2	6	2	6	6	6
No. of observations	80	80	80	80	80	80
<i>This corresponds to following approximate shares of</i>						
Marginal marriages	60.85%	45.28%	52.00%	36.59%	100%	
Early average marriages	21.23%	38.38%	15.16%	31.87%	0%	
Average marriages	17.92%	16.35%	32.84%	31.54%	0%	

^a Estimation method: OLS with p-values in parentheses. *, **, and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively.

C Appendix – Introduction of the marriage subsidy

In this section we analyze the introduction of the marriage subsidy in the year 1972. In particular, we check whether there were any compositional effects of the subsidy. This provides a consistency check of the estimation results presented in the paper; where we have to assume the absence of any compositional effects (prior to the announcement of its suspension) in order to cleanly identify the transfer effects.

It is important to note that the marriage subsidy was a substitute to a preceding tax deductibility scheme with very similar financial marriage incentives. Therefore in the absence of differences in financial incentives, transfer effects at the time of introduction of the subsidy should be zero. The access to these marriage-related policies, however, was fundamentally different and the simple cash-on hand scheme could incentivize different or more couples to marry. If divorce risk is found to be statistically different for couples marrying after the introduction, then this effect can be attributed to a changed composition of marriages rather than to a causal effect of the subsidy itself.

We use the following Differences-In-Difference model to test whether eligible T^1 and T^2 couples who married after the introduction of the marriage subsidy exhibit a significantly different divorce risk:

$$h(t|\mathbf{X}) = h_0(t) \exp(\mathbf{X}\beta), \quad (5a)$$

$$\mathbf{X}\beta = \beta_0 + \beta_1 T^1 + \beta_2 T^2 + \beta_3 SP + \beta_5 T^1 * SP + \beta_6 T^2 * SP + \gamma * X_i + u_i, \quad (5b)$$

where SP takes the value one for couples marrying in 1972 or later, and zero otherwise. We use the same control variables as in specification (IV) in Table 2 in the paper. As *Austrian Marriage Register Data* are only available since 1971, we only have one pre-subsidy year. In the absence of transfer effects, the interaction terms between subsidy period SP and the treatment groups indicators can then be interpreted as compositional effects. Specification (I) in Table C.1 summarizes the estimation results based on a sample covering the whole time period from 1971 through 1975. We find no significant compositional effects for T^1 -marriages. In the case of T^2 -marriages we find a marginally significant effect. One has to keep in mind that in the year 1972, when the subsidy was introduced, a substantial number of delayed marriages took place: compare the dip in marriages in 1971 and the spike in 1972 in Figure 1 in the paper. That means, marriages in 1972 might be substantially differently composed than marriages in the subsequent years. To eliminate this problem, we re-estimate our analysis in specification (II) excluding observations from the year 1972. Now we do not find any evidence for compositional effects. Finally specification (III) shows that this results is also robust to variations in the sample size. That means, our assumption of no compositional effects before the announcement seems justified and the transfer effects discussed in the paper are identified.

Table C.1: Effects of introduction of the marriage subsidy^a

	(I) 1971-1975		(II) 1971-1975 w/o 1972		(III) 1971-1977 w/o 1972	
Compositional effects:						
$\beta_5 : T_1 \cdot SP$	1.033	(0.428)	0.970	(0.579)	0.988	(0.825)
$\beta_6 : T_2 \cdot SP$	1.041*	(0.055)	1.003	(0.910)	1.007	(0.709)
$\beta_1 : T_1$	0.614***	(0.000)	0.589***	(0.000)	0.593***	(0.000)
$\beta_2 : T_2$	0.349***	(0.000)	0.333***	(0.000)	0.331***	(0.000)
$\beta_3 : SP(72-)$	1.062	(0.266)	1.119	(0.160)	1.099*	(0.092)
Quarter fixed-effects	yes		yes		yes	
District fixed-effects	yes		yes		yes	
Group-specific time trends	yes		yes		yes	
Age & age difference ^b	yes		yes		yes	
Religious denomination ^c	yes		yes		yes	
Labor market status ^d	yes		yes		yes	
No. of observations	222,059		174,185		258,483	

^a Estimation method: Cox proportional hazards model. Hazard ratios with p-values in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. Interaction terms recomputed according to Ai & Norton (2003). ^b The estimation controls for the wife's age and the spouses age difference (squared). ^c The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^d The estimation includes binary variables capturing the following labor market status of wife and husband (measured one quarter before marriage): employed as blue-collar worker, employed as white-collar worker, other employment (e. g. self-employed), unemployed, and out of labor force.

D Appendix – Sensitivity analysis of model specification and sample choice

Table D.1: Marital instability (specification without group-specific time trends)^a

	(I) 1981-1993	(II) without 1983	(III) w/o 1983 & h1-1988	(IV) + Labor	(V) + Kids
Compositional effects:					
$\beta_5 : T_1 \cdot TP$	0.975 (0.543)	0.981 (0.648)	0.982 (0.651)	0.974 (0.566)	0.957 (0.344)
$\beta_6 : T_2 \cdot TP$	1.017 (0.433)	1.023 (0.298)	1.022 (0.298)	1.030 (0.291)	1.020 (0.488)
Transfer effects (inverse):					
$\beta_7 : T_1 \cdot postTP$	1.006 (0.629)	1.012 (0.361)	1.006 (0.673)	1.046*** (0.004)	1.027 (0.124)
$\beta_8 : T_2 \cdot postTP$	0.996 (0.497)	1.001 (0.818)	0.998 (0.775)	1.026*** (0.002)	1.015 (0.115)
$\beta_1 : T_1$	0.614*** (0.000)	0.608*** (0.000)	0.607*** (0.000)	0.684*** (0.000)	0.698*** (0.000)
$\beta_2 : T_2$	0.324*** (0.000)	0.219*** (0.000)	0.319*** (0.000)	0.417*** (0.000)	0.422*** (0.000)
$\beta_3 : TP$	1.025 (0.691)	1.018 (0.778)	1.018 (0.782)	0.980 (0.744)	1.004 (0.952)
$\beta_4 : postTP$	1.010 (0.624)	0.996 (0.828)	1.004 (0.858)	0.970 (0.145)	0.967 (0.151)
Quarter fixed-effects	yes	yes	yes	yes	yes
District fixed-effects	yes	yes	yes	yes	yes
Group-specific time trends	no	no	no	no	no
Age & age difference ^b	yes	yes	yes	yes	yes
Religious denomination ^c	yes	yes	yes	yes	yes
Labor market status ^d	no	no	no	yes	yes
Pre-marital children ^e	no	no	no	no	yes
No. of observations	550,295	498,654	486,876	486,876	400,381

^a Estimation method: Cox proportional hazards model. Hazard ratios with p-values (based on heteroskedasticity-robust standard errors) in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. Interaction terms recomputed according to Ai & Norton (2003). ^b The estimation controls for the wife's age and the spouses age difference (squared). ^c The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^d The estimation includes binary variables capturing the following labor market status of wife and husband (measured one quarter before marriage): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed), unemployed, and out of labor force. ^e The estimation includes a cardinal variable capturing the number of joint pre-marital children.

Table D.2: Marital fertility (specification without group-specific time trends)^a

	(I)		(II)	
	w/o pre-marital children		with pre-marital children	
Compositional effects:				
$\beta_5 : T_1 \cdot TP$	-0.068***	(0.002)	-0.006	(0.759)
$\beta_6 : T_2 \cdot TP$	-0.163***	(0.000)	-0.107***	(0.000)
Transfer effects (inverse):				
$\beta_7 : T_1 \cdot postTP$	-0.011	(0.195)	0.004	(0.645)
$\beta_8 : T_2 \cdot postTP$	-0.016**	(0.017)	-0.006	(0.389)
$\beta_1 : T_1$	0.025***	(0.000)	0.075***	(0.000)
$\beta_2 : T_2$	0.261***	(0.000)	0.333***	(0.000)
$\beta_3 : TP$	0.027	(0.141)	-0.011	(0.529)
$\beta_4 : postTP$	0.036***	(0.000)	0.003	(0.733)
Quarter fixed-effects	yes		yes	
District fixed-effects	yes		yes	
Group-specific time trends	no		no	
Age & age difference ^b	yes		yes	
Religious denomination ^c	yes		yes	
Labor market status ^d	yes		yes	
Pre-marital children ^e	no		yes	
Mean of dep. var.		1.195		
S.d. of dep. var.		1.060		

^a Dependent variable is the number of marital children born by 2007. Estimation method: ordinary least squares. Coefficients with p-values (based on heteroskedasticity-robust standard errors) in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. The number of observations is in each estimation equal to 401,314. ^b The estimation controls for the wife's age and the spouses age difference (squared). ^c The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^d The estimation includes binary variables capturing the following labor market status of wife and husband (measured one quarter before marriage): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed), unemployed, and out of labor force. ^e The estimation includes a cardinal variable capturing the number of joint pre-marital children.

Table D.3: Health at birth (specification without group-specific time trends)^a

	Gestation length ^b	Birth weight ^c	Apgar score 10 ^d	Male birth
Compositional effects:				
$\beta_5 : T_1 \cdot TP$	-0.259 (0.118)	-99.40** (0.049)	-0.048 (0.159)	0.036 (0.469)
$\beta_6 : T_2 \cdot TP$	-0.209 (0.183)	-93.15* (0.052)	-0.035 (0.247)	0.021 (0.652)
Transfer effects (inverse):				
$\beta_7 : T_1 \cdot postTP$	-0.033 (0.583)	-25.07 (0.159)	0.008 (0.652)	-0.004 (0.814)
$\beta_8 : T_2 \cdot postTP$	-0.043 (0.442)	-27.47* (0.094)	0.006 (0.719)	-0.004 (0.757)
$\beta_1 : T_1$	0.073 (0.107)	-3.95 (0.770)	-0.002 (0.885)	0.001 (0.951)
$\beta_2 : T_2$	0.113*** (0.008)	-6.92 (0.582)	-0.004 (0.727)	0.005 (0.643)
$\beta_3 : TP$	0.202 (0.197)	85.85* (0.073)	0.027 (0.371)	-0.022 (0.639)
$\beta_4 : postTP$	0.057 (0.313)	21.50 (0.199)	-0.015 (0.377)	0.006 (0.705)
Quarter fixed-effects	yes	yes	yes	yes
District fixed-effects	yes	yes	yes	yes
Group-specific time trends	no	no	no	no
Birth quarter fixed-effects	yes	yes	yes	yes
Age of mother at birth	yes	yes	yes	yes
Religious denomination ^e	yes	yes	yes	yes
Labor market status ^f	yes	yes	yes	yes
Pre-marital children ^g	yes	yes	yes	yes
Observations	230,168	230,168	227,482	230,168
Mean of dep. var.	39.684	3,255.02	9.879	0.513
S.d. of dep. var.	1.773	516.07	0.535	-

^a Estimation method: ordinary least squares. Coefficients with p-values in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. Health outcomes refer to the first marital child. ^b The gestation length is measured in weeks. ^c The weight at birth is measured in grams. ^d Missing information on Apgar scores for 2,686 observations. ^e The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^f The estimation includes binary variables capturing the following labor market status of wife (measured at the time of birth): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed) & not employed. ^g The estimation includes a cardinal variable capturing the number of pre-marital children.

Table D.4: Marital instability (based on extended sample from 1974 through 2000)^a

	(I) 1981-1993	(II) without 1983	(III) w/o 1983 & h1-1988	(IV) + Labor	(V) + Kids
Compositional effects:					
$\beta_5 : T_1 \cdot TP$	0.996 (0.974)	1.005 (0.913)	1.001 (0.983)	0.993 (0.894)	0.960 (0.480)
$\beta_6 : T_2 \cdot TP$	1.037 (0.117)	1.044* (0.071)	1.041* (0.085)	1.037 (0.177)	1.037 (0.316)
Transfer effects (inverse):					
$\beta_7 : T_1 \cdot postTP$	1.027 (0.177)	1.036* (0.086)	1.023 (0.258)	1.053** (0.023)	1.094*** (0.007)
$\beta_8 : T_2 \cdot postTP$	1.005 (0.552)	1.013 (0.150)	1.007 (0.444)	1.015 (0.179)	1.067*** (0.001)
$\beta_1 : T_1$	0.632*** (0.000)	0.632*** (0.000)	0.625*** (0.000)	0.668*** (0.000)	0.841*** (0.001)
$\beta_2 : T_2$	0.337*** (0.000)	0.337*** (0.000)	0.333*** (0.000)	0.395*** (0.000)	0.534*** (0.000)
$\beta_3 : TP$	0.999 (0.982)	0.990 (0.869)	0.995 (0.931)	0.976 (0.699)	1.010 (0.880)
$\beta_4 : postTP$	0.996 (0.851)	0.978 (0.366)	0.993 (0.770)	0.991 (0.725)	0.978 (0.415)
Quarter fixed-effects	yes	yes	yes	yes	yes
District fixed-effects	yes	yes	yes	yes	yes
Group-specific time trends	yes	yes	yes	yes	yes
Age & age difference ^b	yes	yes	yes	yes	yes
Religious denomination ^c	yes	yes	yes	yes	yes
Labor market status ^d	no	no	no	yes	yes
Pre-marital children ^e	no	no	no	no	yes
No. of observations	1,082,437	1,030,796	1,019,018	1,019,018	634,154

^a Estimation method: Cox proportional hazards model. Hazard ratios with p-values (based on heteroskedasticity-robust standard errors) in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. Interaction terms recomputed according to Ai & Norton (2003). ^b The estimation controls for the wife's age and the spouses age difference (squared). ^c The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^d The estimation includes binary variables capturing the following labor market status of wife and husband (measured one quarter before marriage): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed), unemployed, and out of labor force. ^e The estimation includes a cardinal variable capturing the number of joint pre-marital children.

Table D.5: Marital fertility (based on extended sample from 1984 through 2000)^a

	(I)		(II)	
	w/o pre-marital children		with pre-marital children	
Compositional effects:				
$\beta_5 : T_1 \cdot TP$	-0.070***	(0.001)	-0.019	(0.364)
$\beta_6 : T_2 \cdot TP$	-0.153***	(0.000)	-0.110***	(0.000)
Transfer effects (inverse):				
$\beta_7 : T_1 \cdot postTP$	-0.012	(0.195)	-0.026**	(0.016)
$\beta_8 : T_2 \cdot postTP$	0.031***	(0.000)	-0.006	(0.518)
$\beta_1 : T_1$	0.058***	(0.000)	0.024	(0.123)
$\beta_2 : T_2$	0.459***	(0.000)	0.397***	(0.000)
$\beta_3 : TP$	0.021	(0.214)	-0.004	(0.806)
$\beta_4 : postTP$	0.020***	(0.010)	0.020***	(0.010)
Quarter fixed-effects	yes		yes	
District fixed-effects	yes		yes	
Group-specific time trends	yes		yes	
Age & age difference ^b	yes		yes	
Religious denomination ^c	yes		yes	
Labor market status ^d	yes		yes	
Pre-marital children ^e	no		yes	
Mean of dep. var.		1.107		
S.d. of dep. var.		1.031		

^a Dependent variable is the number of marital children born by 2007. Estimation method: ordinary least squares. Coefficients with p-values (based on heteroskedasticity-robust standard errors) in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. The number of observations is in each estimation equal to 635,297. ^b The estimation controls for the wife's age and the spouses age difference (squared). ^c The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^d The estimation includes binary variables capturing the following labor market status of wife and husband (measured one quarter before marriage): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed), unemployed, and out of labor force. ^e The estimation includes a cardinal variable capturing the number of joint pre-marital children.

Table D.6: Health at birth (based on extended sample from 1984 through 2000)^a

	Gestation length ^b	Birth weight ^c	Apgar score 10 ^d	Male birth
Compositional effects:				
$\beta_5 : T_1 \cdot TP$	-0.267 (0.110)	-104.70** (0.038)	-0.045 (0.185)	0.034 (0.494)
$\beta_6 : T_2 \cdot TP$	-0.210 (0.183)	-96.11** (0.046)	-0.027 (0.364)	0.019 (0.690)
Transfer effects (inverse):				
$\beta_7 : T_1 \cdot postTP$	-0.038 (0.646)	-33.00 (0.176)	0.006 (0.771)	-0.014 (0.505)
$\beta_8 : T_2 \cdot postTP$	-0.041 (0.593)	-28.69 (0.202)	0.003 (0.899)	-0.016 (0.420)
$\beta_1 : T_1$	0.000 (0.999)	-54.38 (0.143)	-0.011 (0.754)	-0.016 (0.619)
$\beta_2 : T_2$	0.101 (0.397)	-33.07 (0.334)	-0.013 (0.677)	-0.014 (0.632)
$\beta_3 : TP$	0.236 (0.133)	91.78* (0.057)	0.018 (0.535)	-0.019 (0.678)
$\beta_4 : postTP$	0.146* (0.054)	27.43 (0.217)	-0.016 (0.417)	0.015 (0.439)
Quarter fixed-effects	yes	yes	yes	yes
District fixed-effects	yes	yes	yes	yes
Group-specific time trends	yes	yes	yes	yes
Birth quarter fixed-effects	yes	yes	yes	yes
Age of mother at birth	yes	yes	yes	yes
Religious denomination ^e	yes	yes	yes	yes
Labor market status ^f	yes	yes	yes	yes
Pre-marital children ^g	yes	yes	yes	yes
Observations	351,876	351,876	348,081	351,876
Mean of dep. var.	39.657	3,265.87	9.886	0.513
S.d. of dep. var.	1.823	523.58	0.523	-

^a Estimation method: ordinary least squares. Coefficients with p-values in parentheses. *, ** and *** indicate statistical significance at the 10-percent, 5-percent and 1-percent level respectively. Health outcomes refer to the first marital child. ^b The gestation length is measured in weeks. ^c The weight at birth is measured in grams. ^d Missing information on Apgar scores for 2,686 observations. ^e The estimation includes binary variables capturing the following combinations of spouses' religious denominations: catholic & other denomination, catholic & no denomination, other denomination & no denomination, both other denominations and both without denomination. ^f The estimation includes binary variables capturing the following labor market status of wife (measured at the time of birth): employed as blue-collar worker, employed as white-collar worker, other employment (e.g. self-employed) & not employed. ^g The estimation includes a cardinal variable capturing the number of pre-marital children.