

# Appendix to “Effects of Labeled Child Benefits on Family Savings”

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## 1 DRD MODIFICATION

I want to impose that the time trend between the treatment and the control group are equal relative to the baseline level of the respective group instead of equal in absolute terms. This is equivalent to dividing the first difference by the pre-reform value. The standard difference-in-differences (DD) formulation

$$\delta = \{E(Y_{st} | Treated_s = 1, Post_t = 1) - E(Y_{st} | Treated_s = 1, Post_t = 0)\} - \{E(Y_{st} | Treated_s = 0, Post_t = 1) - E(Y_{st} | Treated_s = 0, Post_t = 0)\}, \quad (1)$$

then becomes difference-in-relative-differences (DRD) case

$$\delta = \frac{\{E(Y_{st} | Treated_s = 1, Post_t = 1) - E(Y_{st} | Treated_s = 1, Post_t = 0)\}}{E(Y_{st} | Treated_s = 1, Post_t = 0)} - \frac{\{E(Y_{st} | Treated_s = 0, Post_t = 1) - E(Y_{st} | Treated_s = 0, Post_t = 0)\}}{E(Y_{st} | Treated_s = 0, Post_t = 0)}. \quad (2)$$

In the fully specified model including control variables we estimate the regression form of the standard DD as in

$$Y_{st} = \alpha_0 + \alpha_1 Treated_s + \alpha_2 Post_t + \delta(Treated_s \times Post_t) + \beta_1 Inc_{st} + \beta_{11}(Inc_{st} \times Treated_s) + X_{st}\beta_2 + \epsilon_{st}. \quad (3)$$

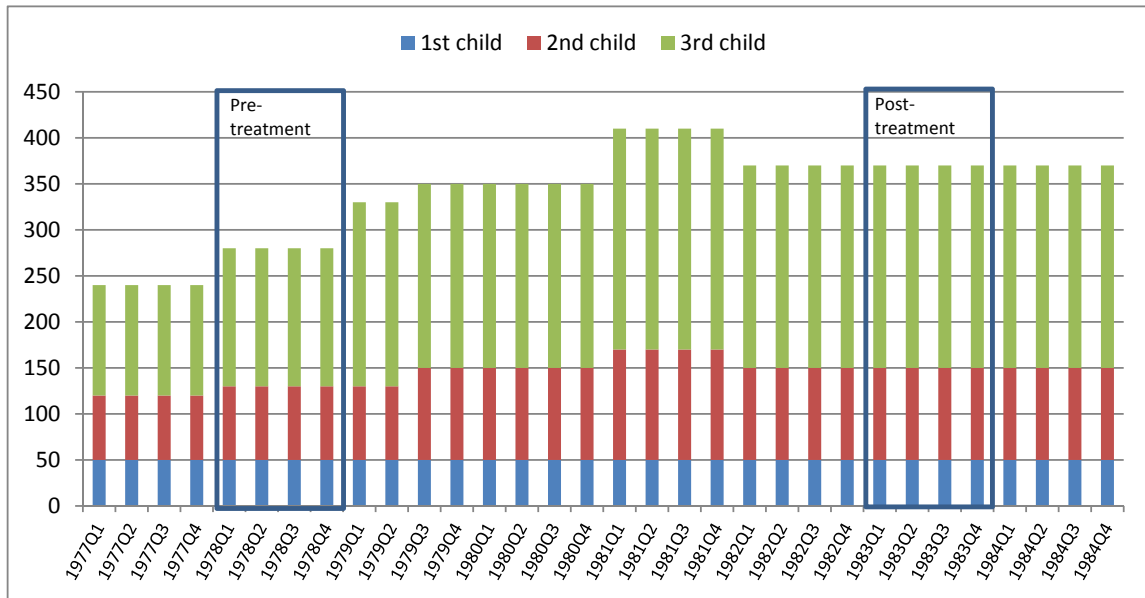
Now I can identify the expected outcomes from the regression coefficients and rewrite the DRD treatment effect as

$$\delta_{DRD} = \frac{\alpha_0 + \alpha_1 + \alpha_2 + \delta + \beta_1 \overline{Inc_1} + \beta_{11} \overline{Inc_1} + \beta_2 \overline{X_1} - (\alpha_0 + \alpha_1 + \beta_1 \overline{Inc_1} + \beta_{11} \overline{Inc_1} + \beta_2 \overline{X_1})}{\alpha_0 + \alpha_1 + \beta_1 \overline{Inc_1} + \beta_{11} \overline{Inc_1} + \beta_2 \overline{X_1}} - \frac{\alpha_0 + \alpha_2 + \beta_1 \overline{Inc_0} + \beta_2 \overline{X_0} - (\alpha_0 + \beta_1 \overline{Inc_0} + \beta_2 \overline{X_0})}{\alpha_0 + \beta_1 \overline{Inc_0} + \beta_2 \overline{X_0}}, \quad (4)$$

which simplifies to

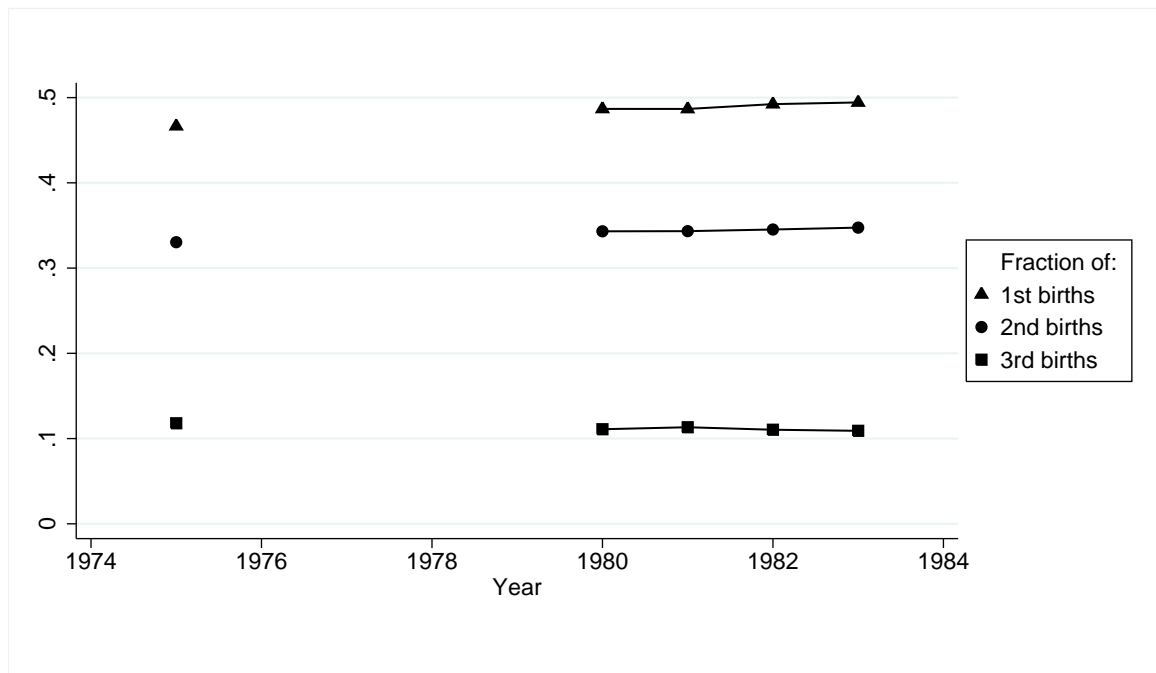
$$\delta_{DRD} = \frac{\alpha_2 + \delta}{\alpha_0 + \alpha_1 + \beta_1 \overline{Inc_1} + \beta_{11} \overline{Inc_1} + \beta_2 \overline{X_1}} - \frac{\alpha_2}{\alpha_0 + \beta_1 \overline{Inc_0} + \beta_2 \overline{X_0}}. \quad (5)$$

Figure 1: The policy reform – Child benefits



Notes: The figure depicts monthly child benefits for the first, second and third child. The full bar denotes child benefits of a family with three children. The marked bars denote the pre- and post-reform periods.

Figure 2: Fertility patterns by birth order



*Notes:* The figure shows the fraction of first, second and third births over all births for West German married couples. Data source: own calculations based on birth register information from Statistisches Bundesamt, Fachserie 1, Reihe 1.1, 2010, Table 2.9. Data is available for 1975, 1980, 1981, 1982 and 1983.

Table 1: Effect of child benefits on accumulated savings in DD

	(1)	(2)	(3)
Dependent variable:	HSP Value	Bank book Value	Securities Value
<b>Panel A</b>			
Treatment effect	2,578.640*** (844.501)	-517.190 (707.611)	-1,386.296 (1,793.337)
Household income	n	n	n
Additional controls	n	n	n
<b>Panel B</b>			
Treatment effect	2,373.621*** (816.807)	-653.666 (693.013)	-1,737.399 (1,746.194)
Household income	y	y	y
Additional controls	n	n	n
<b>Panel C</b>			
Treatment effect	1,762.320** (812.439)	-582.987 (702.074)	-2,396.796 (1,694.619)
Household income	y	y	y
Additional controls	y	y	y
<i>Observations</i>	11,753	11,754	11,754

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The results represent coefficients from difference-in-differences estimations as described in equation 2. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status.

Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.

Table 2: Exploration of income and total expenditure

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Hh net income		Savings		Consumption	
Treatment effect	1,118.928 (1,219.259)	1,824.995 (1,172.402)	1,313.881 (808.337)	595.512 (732.351)	146.067 (916.316)	-165.622 (702.864)
Household income	n	n	n	y	n	y
Additional controls	n	y	n	y	n	y
<i>Observations</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The results represent coefficients from difference-in-differences estimations as described in equation 2. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status.

Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.

Table 3: Effect of child benefits on housing in DD

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Living space			Tenant		
Treatment effect	1.369 (1.525)	0.750 (1.358)	0.673 (1.388)	0.003 (0.020)	0.009 (0.019)	-0.010 (0.019)
Household income	n	y	y	n	y	y
Additional controls	n	n	y	n	n	y
<i>Observations</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The results represent coefficients from difference-in-differences estimations as described in equation 2. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners.

Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.

Table 4: Effect of child benefits on savings in DRD

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent var:	HSP		Bank book		Securities		Life insurance	
	1/0	Contrib.	1/0	Contrib.	1/0	Contrib.	1/0	Contrib.
<b>Panel A</b>								
Treatm. effect	0.088***	0.289***	-0.004	0.007	0.039	-0.150	0.002	-0.070
	[0.009]	[0.004]	[0.668]	[0.903]	[0.565]	[0.732]	[0.922]	[0.169]
Hh income	y	y	y	y	y	y	y	y
Add. controls	n	n	n	n	n	n	n	n
<b>Panel B</b>								
Treatm. effect	0.062*	0.246***	-0.010	-0.013	0.032	-0.190	0.001	-0.076
	[0.050]	[0.010]	[0.313]	[0.822]	[0.637]	[0.655]	[0.936]	[0.159]
Hh income	y	y	y	y	y	y	y	y
Add. controls	y	y	y	y	y	y	y	y
<i>Observations</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The figures represent estimates of treatment effects from difference-in-relative-differences estimations as described in equation 5 evaluated at the treatment group specific mean of all included control variables. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status.

P-values based on delta method in squared brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.

Table 5: Disentangling the effect on HSPs by different family sizes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	0 vs. 1 child		1 vs. 2 children		2 vs. 3 children		1 vs. 3 children	
Dependent var:	Housing savings plan							
	1/0	Contrib.	1/0	Contrib.	1/0	Contrib.	1/0	Contrib.
<b>Panel A</b>								
Treatm. effect	0.002 (0.015)	-192.852 (167.845)	0.021 (0.013)	402.016** (157.894)	0.043** (0.018)	427.422 (283.563)	0.062*** (0.019)	824.175*** (277.439)
Hh income	y	y	y	y	y	y	y	y
Add. controls	n	n	n	n	n	n	n	n
<b>Panel B</b>								
Treatm. effect	0.005 (0.014)	-164.843 (165.289)	0.012 (0.013)	362.907** (156.786)	0.034* (0.018)	347.601 (278.332)	0.045** (0.019)	707.555** (274.689)
Hh income	y	y	y	y	y	y	y	y
Add. controls	y	y	y	y	y	y	y	y
<i>Observations</i>	<i>16,969</i>	<i>16,969</i>	<i>20,745</i>	<i>20,745</i>	<i>15,187</i>	<i>15,187</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The results represent coefficients from difference-in-differences estimations as described in equation 2. The treatment group dummy equals one for the larger family and is zero for the smaller family. The control group without children in columns (1) and (2) is restricted to couples with male ages until 55 years to make them more comparable to parents. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status.

Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.

Table 6: Effect of child benefits on savings as percentage of income in DD

	(1)	(2)	(3)	(4)
Dependent variable:	HSP	Bank book	Securities	Life insurance
		Income shares		
<b>Panel A</b>				
Treatment effect	1.095*** (0.320)	0.045 (0.562)	-0.154 (0.319)	-0.172 (0.148)
Household income	n	n	n	n
Additional controls	n	n	n	n
<b>Panel B</b>				
Treatment effect	1.077*** (0.319)	0.029 (0.562)	-0.181 (0.318)	-0.178 (0.148)
Household income	y	y	y	y
Additional controls	n	n	n	n
<b>Panel C</b>				
Treatment effect	0.947*** (0.318)	-0.169 (0.561)	-0.215 (0.322)	-0.182 (0.137)
Household income	y	y	y	y
Additional controls	y	y	y	y
<i>Observations</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The results represent coefficients from difference-in-differences estimations as described in equations 2 and 3. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status.

Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.



Table 7: Income heterogeneity of the effect of child benefits on savings in DD

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	1/0	HSP Contribution	1/0	Bank book Contribution	1/0	Securities Contribution	1/0	Life insurance Contribution
<b>Panel A</b>								
Treatment effect high income	0.057** (0.024)	1,134.412** (443.966)	0.004 (0.011)	406.315 (710.576)	0.005 (0.027)	-396.525 (503.713)	0.015 (0.018)	-104.641 (166.516)
Treatment effect low income	0.063* [0.050]	667.5*** [0.008]	-0.018 [0.257]	-23.330 [0.951]	0.006 [0.831]	-59.190 [0.694]	-0.013 [0.566]	-11.630 [0.901]
Household income	y	y	y	y	y	y	y	y
Additional controls	n	n	n	n	n	n	n	n
<b>Panel B</b>								
Treatment effect high income	0.047* (0.024)	959.745** (437.685)	-0.000 (0.011)	203.682 (695.634)	0.004 (0.027)	-447.678 (503.622)	0.016 (0.018)	-131.308 (168.733)
Treatment effect low income	0.041 [0.191]	582.1** [0.024]	-0.022 [0.161]	-163.200 [0.681]	0.006 [0.804]	-44.550 [0.790]	-0.015 [0.521]	-19.670 [0.834]
Household income	y	y	y	y	y	y	y	y
Additional controls	y	y	y	y	y	y	y	y
<i>Observations</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>	<i>11,754</i>

*Notes:* Each column in each panel reports the results of a regression for the outcome listed at the top. The figures represent treatment effects for high and low income household from a triple interacted difference-in-differences estimations. Reported coefficients are marginal treatment effects for each of the income groups, i.e., the baseline DD treatment effect for high income households and the baseline DD treatment plus the triple interaction for low income household. The treatment group dummy equals one if the family has three children and zero if it has one child. The post treatment dummy equals zero if the year is 1978 and one if the year is 1983. The low income household dummy equals zero for households at or above the median income in the sample and one for households with lower incomes. The household income control variable includes child benefits. Additional control variables include an interaction of household income with the treatment group dummy, household income squared, age dummies of the oldest child's age (16 years excluded category) and its interactions with the treatment group dummy, the oldest child's gender, federal state dummies (Schleswig-Holstein excluded category), age of each of the parents, the number of earners, a dummy for the tenant status. Robust standard errors in parenthesis. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% level.