Online Appendices for "Growing Together: Assessing Equity and Efficiency in a Prenatal Health Program" Clarke, Cortés Méndez & Vergara Sepúlveda

A Appendix Tables and Figures

	(1)	(2)	(3)
	Women	Men	All
Proportion of ChCC coverage	-1710.965	-2665.317	-4376.359
	[2135.177]	[3063.904]	[5044.565]
Constant	52395.850***	49867.394***	1.02e+05***
	[2354.014]	[3045.407]	[5321.473]
Mean of Dependent Variable	18456.73	17749.62	36206.27
Observations	23502	23502	23502
R-Squared	0.971	0.956	0.965

Table A1: Test of FONASA Coverage and ChCC Roll-out

Notes to Table A1: DD specifications are reported where birth outcomes are replaced by FONASA enrollees as the dependent variable. All remaining details follow specification 1. FONASA enrollment data is available at the municipal-level from December of 2005 onwards, and so only the December 2005-December 2010 period is available for use in this regression.

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
Proportion of ChCC coverage	10.891**	-0.003	0.002	0.027*	-0.002	-1.214
	[4.471]	[0.002]	[0.031]	[0.016]	[0.002]	[0.795]
ChCC Implemented	-1.817	0.001	0.004	-0.008	0.000	-0.719
	[2.844]	[0.001]	[0.021]	[0.012]	[0.001]	[0.540]
Constant	3351.524***	0.054***	49.479***	38.705***	0.065***	4.893***
	[4.083]	[0.002]	[0.026]	[0.016]	[0.002]	[0.517]
Mean of Dependent Variable	3346.281	0.054	49.475	38.659	0.064	9.563
Observations	31805	31805	31806	31806	31806	31842
R-Squared	0.261	0.051	0.451	0.278	0.095	0.056

Table A2: Difference-in-Difference Estimates using Municipal Variation in Coverage and a Rollout Indicator

Notes to Table A2: All specifications follow Table 3, however now augment each specification to include a binary indicator of each municipality's participation status in Chile Crece Contigo (1 if participating, 0 if not). This switches on in the month \times year period in which the municipality adopts ChCC. All other details follow specifications in Table 3. * p<0.10; ** p<0.05; *** p<0.01.

	Ν	Mean	Std. Dev.	Min	Max
Proportion Enrolled in ChCC	10826	0.26	0.36	0.00	1.00
Birth Weight (grams)	10814	3345.85	128.57	686.00	4868.00
Low Birth Weight < 2500 grams	10814	0.05	0.05	0.00	1.00
Gestation (weeks)	10814	38.66	0.47	24.00	42.00
Premature < 37 weeks	10814	0.06	0.05	0.00	1.00
Length (cm)	10814	49.47	0.69	30.00	55.00
Number of Births	10826	177.08	278.55	1.00	2217.00
Rate of Fetal Deaths/1000 Births	10826	9.20	27.09	0.00	1000.00
Year of Birth	10837	2006.51	2.29	2003.00	2010.00
Mother's Age	10824	26.69	1.72	15.00	44.00
Proportion Teen Births	10824	0.18	0.09	0.00	1.00
Number of Children	10826	2.02	0.32	1.00	8.00

Table A3: Summary Statistics by Trimester: Birth and Chile Crece Contigo Data

Notes to Table A3: Summary Statistics are displayed for municipality by trimesterly averages for each trimester from January 2003 to December 2010. Trimesters refer to January-March, April-June, July-September, and October-December. For additional notes, refer to Table 2 which provides summary statistics at the municipality by month level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
Proportion of ChCC coverage	8.990*	-0.002	-0.011	0.015	-0.003	-1.261
	[5.076]	[0.002]	[0.035]	[0.018]	[0.002]	[0.917]
Constant	3351.931***	0.054***	49.481***	38.712***	0.063***	4.801***
	[3.093]	[0.001]	[0.021]	[0.013]	[0.001]	[0.342]
Mean of Dependent Variable	3345.855	0.054	49.470	38.655	0.064	9.201
Observations	10814	10814	10814	10814	10814	10826
R-Squared	0.492	0.125	0.668	0.501	0.225	0.138

Table A4: Difference-in-Difference Estimates with Data Collapsed by Trimester

Estimation sample consists of all municipal-level averages for each quarter between 2003 and 2010 for all women. Refer to additional notes in table 3, and summary statistics for each variable at the trimester by municipal level in Table A3. * p<0.10; ** p<0.05; *** p<0.01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
Proportion of ChCC coverage	9.224	-0.001	0.075	-0.008	-0.001	-0.361
	[9.841]	[0.005]	[0.058]	[0.039]	[0.005]	[1.978]
Constant	3317.709***	0.058***	49.301***	38.526***	0.072***	10.451***
	[3.765]	[0.002]	[0.021]	[0.015]	[0.002]	[0.875]
Mean of Dependent Variable	3338.017	0.054	49.335	38.615	0.065	9.705
Observations	3969	3969	3969	3969	3969	3975
R-Squared	0.345	0.116	0.405	0.336	0.176	0.149

Table A5: Difference-in-Difference Estimates Based on the Year Surrounding Roll-out

Notes to Table A5: All specifications follow Table 3, however now use only the first year surrounding program rollout from June 2007-June 2008. Refer to Table 3 for additional notes. * p<0.10; ** p<0.05; *** p<0.01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
Proportion of ChCC coverage	28.585	-0.011	0.164	-0.030	-0.005	-0.695
	[22.621]	[0.011]	[0.132]	[0.097]	[0.012]	[5.300]
Constant	3374.729***	0.048***	49.294***	38.750***	0.053***	7.906***
	[4.612]	[0.002]	[0.027]	[0.022]	[0.003]	[1.189]
Mean of Dependent Variable	3338.017	0.054	49.335	38.615	0.065	9.705
Observations	3969	3969	3969	3969	3969	3975
R-Squared	0.344	0.114	0.405	0.336	0.175	0.149

Table A6: Instrumental Variables Estimates Based on the Year Surrounding Roll-out

Notes to Table A6: Observations consist of municipality by month cells for each municipality in the 12 months surrounding implementation (from June 2007). The participation of respondents enrolled in ChCC is instrumented by whether or not each municipality has begun participating in Chile Crece Contigo. Each cell is weighted using the number of births in the municipality and month, and all specifications include municipality and time (Year × Month) fixed effects. * p<0.10; ** p<0.05; *** p<0.01.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Winsorizing at 1 st and 99 th Percentiles									
Proportion of ChCC coverage	10.022**	9.275**	9.081**	8.512**	7.868*	7.121	11.668*	9.364*	9.962**
	[4.379]	[4.525]	[4.364]	[4.176]	[4.293]	[5.338]	[5.960]	[5.192]	[4.377]
Panel B: Trimming at 1 st and	99 th Percer	ntiles							
Proportion of ChCC coverage	10.164**	9.396**	8.980**	8.223**	7.527*	6.808	11.406*	8.844*	10.115**
	[4.368]	[4.520]	[4.355]	[4.166]	[4.288]	[5.342]	[5.965]	[5.142]	[4.366]
Municipal and Time FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls		Y			Y				
Region Time Trends			Y						
Region \times Year FEs				Y	Y				
Municipal Linear Trends						Y			
Municipal Quadratic Trends							Y		
Municipal $ imes$ Year FEs								Y	
Weighting by Pregnancies									Y

Table A7: Examining Robustness of Impacts on Birth weight to removal of extreme values

Notes to Table A7: Each specification follows models documented in Panel A of Table 4, however here examining robustness of the birth weight results to outliers. In panel A, average birth weight in each municipality (the outcome of interest) is Winsorized at the 1st and 99th percentiles implying that observations more extreme than these values are replaced with the values of these percentiles. In this case the full sample of 31,805 observations is used. In panel B, the sample is trimmed at the 1st and 99th percentiles, and so observations more extreme than these values are simply removed from the sample. In this case, the estimation sample consists of 31,169 municipality × year cells. In both specifications, average municipal birth weight ranges from a minimum of 2,844 grams, to a maximum of 3,825 grams. Refer to Table 4 for additional notes.

	Index Original Variables								
	Anderson Index	Birth Weight	LBW	Birth Size	Weeks Gestation	Premature			
Panel A: Municipal-Level Analysis									
<i>p</i> -value (Original)	-	0.0226	0.1356	0.8940	0.1168	0.1499			
<i>p</i> -value (Corrected)	0.1011	0.0588	0.3137	0.8235	0.3137	0.3137			
Panel B: Individual-	Level Analy	sis							
<i>p</i> -value (Original)		0.0000	0.0839	0.0257	0.0000	0.5553			
<i>p</i> -value (Corrected)	0.0479	0.0196	0.2745	0.1176	0.0000	0.7059			
Notes: Corrected <i>p</i> -value	Notes: Corrected <i>n</i> -values based on original variables are calculated using the Romano and Wolf (2005)								

Table A8: Adjusting For Multiple Hypothesis Testing

Notes: Corrected *p*-values based on original variables are calculated using the Romano and Wolf (2005) technique to control the Family Wise Error Rate of hypothesis tests, implemented by Clarke (2016). The Anderson (2008) index converts the multiple dependent variables into a single dependent variable (index) giving more weight to variables which provide more independent variation. The specification of each regression follows Table 3 (panel A), and Appendix Table D2 (panel B).

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
ChCC Availability	1.443	0.000	0.005	0.000	-0.000	-1.098**
	[2.905]	[0.001]	[0.019]	[0.012]	[0.001]	[0.531]
ChCC Availability (\geq 9 months)	3.250	0.001	0.017	-0.003	-0.000	-1.009
	[3.052]	[0.001]	[0.020]	[0.012]	[0.001]	[0.697]
Constant	3351.512***	0.054***	49.479***	38.705***	0.065***	4.894***
	[4.087]	[0.002]	[0.026]	[0.016]	[0.002]	[0.515]
Mean of Dependent Variable	3346.281	0.054	49.475	38.659	0.064	9.563
Observations	31805	31805	31806	31806	31806	31842
R-Squared	0.261	0.051	0.451	0.278	0.095	0.056

Table A9: Difference-in-Difference Estimates using Municipal Program Availability

Notes to Table 3: Estimation sample consists of all municipal-level averages for each month between 2003 and 2010 for all women Low birth weight refers to the proportion of births under 2,500 grams, and premature refers to the proportion of births occurring before 37 weeks of gestation. Birth weight is measured in grams, Size is measured in centimetres, and Gestation is measured in weeks. Fetal deaths are measured as the number of fetal deaths per 1,000 live births. Each cell is weighted using the number of births in the municipality and month, and all specifications include municipality and time (Year × Month) fixed effects. * p<0.10; ** p<0.05; *** p<0.01.

	(1) Weight	(2) LBW	(3) Size	(4) Gestation	(5) Premature	(6) Fetal Death
Second Stage Estimates						
Proportion of ChCC coverage	9.586	-0.002	-0.027	0.014	-0.004	-1.438
	[5.943]	[0.002]	[0.039]	[0.022]	[0.002]	[1.098]
First Stage Estimates						
Lagged ChCC coverage	0.701***	0.701***	0.701***	0.701***	0.701***	0.701***
	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]
Observations	31454	31454	31455	31455	31455	31489
AP First Stage (F)	1072.44	1072.44	1072.44	1072.44	1072.44	1071.79
AP First Stage (p)	0.000	0.000	0.000	0.000	0.000	0.000

Table A10: IV Estimates Using Lagged ChCC Enrollment

Notes: Difference-in-difference estimates are presented following the results of Table 3. However, here the Proportion of ChCC Coverage among births in a given month and municipality is instrumented with lagged ChCC coverage from the same municipality. The 2SLS results along with standard errors clustered by municipality are displayed in the top panel of the Table. The second panel documents the first stage results of regression ChCC coverage on its lagged value. The associated first stage F-statistic and its p-value are documented at the foot of the table.

	Birth We	eight	Gestation			
Cut-off	Original <i>p</i> -value	Romano Wolf <i>p</i> -value	Cut-off	Original <i>p</i> -value	Romano Wolf <i>p</i> -value	
1000	0.4592	0.6573	30	0.6905	0.7922	
1250	0.5786	0.7493	31	0.6245	0.7822	
1500	0.7191	0.8492	32	0.3666	0.5315	
1750	0.0632	0.0639	33	0.0464	0.0370	
2000	0.0014	0.0000	34	0.1695	0.2398	
2250	0.0135	0.0060	35	0.0804	0.0739	
2500	0.0737	0.0759	36	0.0539	0.0410	
2750	0.2736	0.4116	37	0.2337	0.3417	
3000	0.1169	0.1299	38	0.2651	0.3596	
3250	0.2212	0.3487	39	0.0477	0.0370	
3500	0.0056	0.0010	40	0.0005	0.0000	
3750	0.0030	0.0000	41	0.5312	0.7493	
4000	0.0221	0.0120	42	0.9967	0.9960	
4250	0.0167	0.0070				
4500	0.0144	0.0060				
4750	0.9501	0.9281				
5000	0.4313	0.6573				

Table A11: Correction for Multiple Hypothesis Testing in Distributional Estimates

Notes to Table A11: Un-adjusted and multiple-hypothesis test adjusted *p*-values are displayed corresponding to the estimates and standard errors displayed in Figure 4. Unadjusted *p*-values refer to the *p*-value on ChCC in each regression where the outcome variable is birth weight or gestation exceeding the listed cut-off. Romano Wolf adjusted *p*-values are based on a null re-sampled distribution as described in Romano and Wolf (2005). We re-sample using 1000 bootstrap samples.

	2007	2008	2009	2010
Panel A: All Amounts in 1000s of Chilean Pesos	7			
Costs Associated with PADBP	1,969,162	6,116,663	14,231,107	14,444,574
Costs Ministry of Planning	1,001,810	2,529,976	2,604,131	4,197,607
Massive Education Program	20,000	195,640	261,462	196,624
Total Prenatal Development Components	2,990,972	8,842,279	17,096,700	18,838,805
Total Budget (ChCC)	67,903,331	126,446,362	159,660,473	214,505,550
Total Budget/1000 (All Chile)	17,883,154	20,650,579	23,406,879	25,651,970
Total Women Participating during Gestation	47,683	166,900	171,811	171,799
Proportion of all Participants in Pre-natal Care	1	0.449	0.307	0.303
Cost per Pre-Natal Participant	62,726	24,714	30,549	33,116
Panel B: All Amounts in US Dollars				
Costs Associated with PADBP	3,702,025	12,288,376	22,257,451	28,470,255
Costs Ministry of Planning	1,883,403	5,082,722	4,072,861	8,273,483
Massive Education Program	37,600	393,041	408,917	387,546
Total Prenatal Development Components	5,623,027	17,764,139	26,739,239	37,131,285
Total Budget (ChCC)	127,658,262	254,030,741	249,708,980	422,790,439
Total Budget/1000 (All Chile)	33,620,330	41,487,013	36,608,359	50,560,033
Total Women Participating during Gestation	47,683	166,900	171,811	171,799
Proportion of all Participants in Pre-natal Care	1	0.449	0.307	0.303
Cost per Pre-Natal Participant	\$118	\$50	\$48	\$65
Cost per Pre-Natal Participant (PPP Adjusted)	\$192	\$72	\$87	\$93

Notes to Table A12: Costs per pre-natal participant are calculated by dividing the pro-rata total costs of prenatal development components by the total number of participants in the pre-natal period. Total prenatal development components are calculated as the sum of the costs of the PADBP program, fixed costs assigned to the Ministry of Planning, and the costs of the Massive Education program. Costs are assigned pro-rata to pre-natal versus non pre-natal components using the proportion of all participants which are in the pre-natal period, rather than during years 1-5. In the first year, the program only began in utero, so all costs are assigned to pre-natal development. Budget details are all compiled from the ChCC final reports (Arriet et al., 2013), and historic budget laws (for example Ministry of Finance, Government of Chile (2007)). Total participants during gestation as well as in the post-natal period are compiled from the Department of Health Statistics and Information from the Ministry of Health. PPP-adjusted costs are based on the World Bank's PPP conversion factor.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Home Visits	Supplement +	Supplement	Supplement 3	Prenatal Visits	Social Support	Chile Solidario	C-Section
ChCC Coverage	0.050	2.161***	1.291***	1.402***	0.092***	-1.012*	0.059***	-0.012
	[0.061]	[0.405]	[0.262]	[0.274]	[0.019]	[0.537]	[0.006]	[0.010]
Constant	5.153***	-0.089	2.851***	4.591***	-0.004	8.710***	0.167***	0.192***
	[0.051]	[0.061]	[0.121]	[0.141]	[0.004]	[0.621]	[0.004]	[0.008]
Mean of Dep. Var.	5.900	2.841	7.103	7.266	0.110	6.859	0.306	0.207
Observations	30750	30750	30750	30750	30750	30750	30880	30880
R-Squared	0.914	0.954	0.894	0.878	0.853	0.636	0.619	0.563

Table A13: Impact of Chile Crece Contigo on Pregnancy Inputs

Notes to Table A13: Each regression shows the correlation between ChCC useage and different program components. Each variable with the exception of Chile Solidario refers to the average usage per birth in the 9 months prior to each birth, and is measured at the level of health service and month. One health service split in two in 2008, and hence lags are not available for a small number of areas in this period. Home visits refers to the number of integral visits to expecting mothers by a nurse or midwife, Supplement, Supplement + and Supplement 3 refer to Leche Purita, a fortified powdered milk drink given to pregnant women with an updated formula from 2008 onwards, (+ refers to the new formula, 3 refers to the quantity given during trimester 3 only). Prenatal visits refer to controls with nurses, doctors or midwives at local health centres, Social support refers to all visits with Social Assistants, and Chile Solidario refers to the number of pregnant women giving birth each month who have at any point participated in Chile Solidario, a targeted social welfare program including a cash transfer. * p<0.10; ** p<0.05; *** p<0.01.

	(1)	(2)	(3)	(4)	(5)	(6)
	Weight	LBW	Size	Gestation	Premature	Fetal Death
Decomposition of Δ ChCC Coverage						
Prenatal Controls	0.263	-0.000	0.002	0.002	-0.000	0.025
	[0.351]	[0.000]	[0.003]	[0.002]	[0.000]	[0.030]
Food Supplementation	1.884	-0.000	0.005	0.009*	-0.002***	0.003
	[1.152]	[0.000]	[0.012]	[0.005]	[0.001]	[0.266]
Home Visits	0.109	0.001*	0.011	-0.007	0.001	0.481**
	[0.983]	[0.000]	[0.007]	[0.005]	[0.000]	[0.216]
Social Safety Net	0.487	0.000	0.002	0.004***	-0.000	0.038
	[0.387]	[0.000]	[0.003]	[0.002]	[0.000]	[0.069]
C-Section Rate	0.301	-0.000	0.003	0.002	-0.000	0.002
	[0.276]	[0.000]	[0.003]	[0.002]	[0.000]	[0.011]
Total Explained Difference	3.045*	0.000	0.023*	0.011	-0.002**	0.548**
	[1.587]	[0.001]	[0.012]	[0.007]	[0.001]	[0.243]
Observations	30738	30738	30738	30738	30738	30750

Table A14: Gelbach (2016) Decomposition of ChCC Mechanism

Notes to Table A14: Each column displays the coefficient change decompisition developed by Gelbach (2016) for a different outcome variable. This decomposition considers the change in the estimated effect of ChCC from the baseline diff-in-diff model compared with that estimated in the full model where all proposed mechanisms are accounted for. The full change is given by , and this is decomposed into the portion owing to each of the four mechanisms discussed in section 5.3. Full details of the decomposition and estimation of the variance-covariance matrix is provided by Gelbach (2016).



Figure A1: Program Roll-out by Date

(a) Full Country

Notes to Figure A1: Chile consists of 346 municipalities ("*comunas*") which are the lowest geographic administrative level with their own political administration. ChCC roll-out started in June 2007, and reached 159 of the 346 municipalities in 2007 (chosen due to the availability of infrastructure) and then was rolled out to the remaining municipalities during 2008. Precise roll-out dates are provided by the Ministry of Social Development of Chile. The full country is displayed in the left-hand panel, and only the Metropolitan Region of Santiago (from the centre of the country) is displayed in the right-hand panel.

Figure A2: ChCC Usage in Post-Implementation Period



Notes to Figure A2: The density of ChCC usage by municipality over the entire post-treatment period is displayed. Usage refers to the average proportion of all births in each municipality for which ChCC components were accessed by the mother during the gestational period. Usage data comes from The Ministry of Social Development's administrative data on public program use, and is averaged at the level of each municipality. Refer to Figure A4 for additional details regarding municipal level usage of ChCC components and municipal characteristics.





Notes to Figure A3: Figures on the proportion of births in the public health system and all births nation-wide are provided monthly by the Department of Statistics and Health Information (DEIS) of the Ministry of Health of Chile. Monthly proportions are displayed for each month from January 2002 until December 2010. The first vertical dotted line is the beginning of ChCC roll-out, while the second vertical dotted line is when ChCC reached the full country.



Figure A4: Municipal Characteristics and ChCC Enrollment

Notes to Figure A4: Each panel presents the proportion of Chile Crece Contigo enrollees in each municipality after the introduction of the program along with municipal level averages in a range of other social or political variables. In each case, ChCC enrollment is displayed on the horizontal axis, and alternative outcomes on the vertical axis.



Figure A5: Socioeconomic Quintiles and Health Distributions at Birth



(b) Gestational Period

Notes to Figure A5: Figures provide kernel density plots of birth weight (in grams) and weeks of gestation by quintiles of the Social Vulnerability Score. Quintile 1 is the most vulnerable, and quintiles 4 and above are grouped into a single plot. Means for birth weight are 3350 grams, 3333 grams, 3317 grams and 3298 grams for quintiles 1, 2, 3 and 4+ respectively. Similar means for gestational period are 38.66 weeks, 38.61 weeks, 38.55 weeks, and 38.43 weeks.





Notes to Figure A6: Left-hand panel provides a histogram of all Social Protection Scores ("Ficha de Protección Social") for mothers matched to their children's birth records. The vertical dashed line indicates 13,484 points, the cut-off point for Chile Crece Contigo's preferential benefits. This is defined as the top-end of the third quintile of vulnerability scores, though these quintiles are defined on all recipients of a score in the country, not just mothers. The right-hand panel documents McCrary (2008)'s density test around 13,484, documenting the dispersion of observations within 1000 points on either side of the cut-off.



Notes to Figure A7: Event studies present estimated models interacting ChCC treatment intensity with pre- and post-treatment indicators for each 3 month period pre- and post-reform. Here, the ChCC measure refers to average levels of ChCC use in the entire post-treatment period (to allow a constant treatment intensity for interaction), and this is interacted with indicators for the rollout of the ChCC program to each municipality. The precise specification is:

$$InfantHealth_{ct} = \alpha_0 + \sum_{j=-9}^{\infty} \beta_j 1\{\text{Time to Adoption} = j\}_t \times ChCC_c + \mu_c + \lambda_t + \varepsilon_{ct}.$$
(5)

As is standard, 1 period pre-treatment is the omitted reference group. Periods greater than 9 trimesters pre or post program are indicated in a single \geq 9 term.





Notes to Figure A8: Descriptive plot displays average birth weight outcomes in 5 point bins of the Social Protection Score, with a separate polynomial fitted on each side of the cut-off. This Figure replicates Figure 3(a), however now using bins of 5 points, rather than 55 points, for the running variable.



Notes to Figure A9: Descriptive plot documents the probability that mothers are enrolled in the ChCC program around the official cut-off for the receipt of preferential benefits targeted at the bottom three quintiles of recipients of the Social Protection Score. When estimating a regression discontinuity specification in a local linear model with Calonico, Cattaneo and Titiunik (2014)'s optimal bandwidth, the additional likelihood of of participating in ChCC when located just below the cut-off is 0.0065(0.019) (coefficient and standard error).



Figure A10: Variation in Home Visit Intensity by Municipality

Notes to Figure A10: Histogram documents the average quantity of "Integral Home Visits" received by each targeted family per municipality in Chile in 2013. A value of 1 refers to a situation where (on average) each family flagged to require a visit based on ChCC's administrative criteria receives one visit during the gestational period. These data are averaged for each municipality, and are based on the year 2013 only. These data are released by the Ministry of Health (available at http://chcc.minsal.cl/indicadores/resultados/293) and are not available for earlier years. One small municipality with an average number of visits of 14.5 per flagged family was removed to simplify graphical presentation.

Figure A11: Health Services and Municipalities



Notes to Figure A11: Municipalities are indicated by municipal boundaries, and health services are indicated by colours. Each of Chile's 346 municipalities belongs to one of 29 Health Services. The entire country is displayed at right, and the densely populated Metropolitan Region of Santiago is displayed at left.



(e) Social Assistance Appointments

(f) Chile Solidario

Notes to Figure A12: Solid blue line displays the roll-out of ChCC and proportion of coverage of births as in Figure 1. Dotted red lines display the total units of various components of the program disposed over time in whole of Chile. Each panel with the exception of Chile Solidario coverage in panel A12f presents the number of units divided by 1,000. Additional discussion of variables and their measurement is provided in section 5.3.

B Broader Context: Health System and Birth Outcomes Chile

B.1 Birth Outcomes and Maternal Characteristics

Following the return to democratic rule in 1990, full microdata on all births in Chile has been available from the Ministry of Health's Department of Statistics and Health Information (DEIS). These vital statistics include each child's birth weight, weeks of gestation, and a number of characteristics of the mother and father (when the father is present). These data are recognised to be of high quality and very close to universal (see for example Mikkelsen et al. (2015)).

The average age of mothers in Chile has risen from slightly over 26 in 1990, to slightly under 28 in 2015 (Figure B1). The average age of mothers increased constantly from 1990 until approximately 2004, before falling slightly, and ascending once again from 2009 onwards. This reduction in maternal age occurred during a considerable slow-down in growth, and an uptick in the number of births each year (Figure B2), in line with results suggesting countercyclicality in fertility. Panel b of Figure B1 displays the proportion of teenage births (among all births), which rose until the early 2000s, began to fall until the growth slowdown in the mid-2000s, and has fallen sharply from 2007.



Figure B1: Trends in Maternal Characteristics in Chile

Notes to Figure B1: Yearly averages of age and the proportion of all mothers aged under 20 years of age based on Ministry of Health (DEIS) microdata covering all births in Chile between 1990 and 2015.

We display descriptive plots of average birth outcomes across time in figure B3. These indicators, particularly birth weight, improved sharply following the transition to democracy in the early 1990s, and the implementation of a considerable public health reform. Average birth weight increased by more than 60 grams, and the proportion of low birth weight babies fell by a full percentage point (refer to panels B3a and B3b). From the year 2000 onwards, average outcomes have gradually worsened, in line with increases in maternal age.

Figure B2: Number of Births per Year



B.2 Prenatal health programs in Chile before ChCC

Prior to the implementation of ChCC, programs aimed at early childhood focused on health and education were already carried out in the country, separately.

With respect to the different health programs, the National Immunization Program (PNI) began in 1978, which is still in force at present. Its main objective is the reduction of morbidity and mortality, contributing to the reduction of infant mortality.

In 1987, the National Complementary Food Program (PNAC) was created, consisting of the delivery of milk to children under 6 years old and of food for pregnant women, delivered at primary care clinics. For the delivery of food, it must comply with health controls, controls for pregnant women and with the National Immunization Program.

In 1990, Chile ratified the Convention on the Rights of the Child, approved by the General Assembly of the United Nations, which promotes: non-discrimination, safeguarding the best interests, survival, development and protection of minors.

Since 1994 the government carries out the Program for the control of children Lower Respiratory Tract Infections (IRA, in Spanish), a campaign deployed every winter aimed at controlling these diseases.

In particular with regard to pre-formal education, there are two institutions with the longest history in the country. On the one hand, the National Board of Kindergartens (JUNJI) is a state institution created in 1979. On the one hand, the INTEGRA foundation, created in 1991, is a private non-profit educational institution whose objective is the integral development of children from 3 months to 4 years old (although



Figure B3: Longer Term Trends in Birth Outcomes in Chile

Notes to Figure B3: Yearly averages of birth weight, the proportion of low birth weight births (< 2500 grams), weeks of gestation, and the proportion of premature births (< 37 weeks) from Ministry of Health (DEIS) microdata covering all births in Chile between 1990 and 2015.

they also have kindergartens that offer kindergarten and pre kinder), belonging to families of the first and second income quintile.

B.3 The Chilean Health System

Primary care in the public health system in Chile is provided by municipal health centres which, among other things, provide pre-natal appointments for pregnant mothers and families. These municipal health centres exist in each municipality in Chile (refer to Figure B4a for geographic distribution). These health centres are distributed much more sparsely in less populated northern and southern regions of the country. Secondary and tertiary care are provided in hospitals which are located in each region of the country. Births attended in the public health centre are delivered in these hospitals. The geographical distribution of hospitals is displayed in Figure B4b, where once again these are concentrated in the central region of the country where the largest population resides.

The health system in Chile is a mixed system³², which consists of a public and private systems. In administrative terms, the public system operates thanks to the Sistema Nacional de Servicios de Salud (SNSS) that has autonomous services throughout the country, such as the Servicios Regionales Ministeriales (SEREMI), 29 Regional Health Services and the Servicio de Atención Primaria de Urgencia (SAPU). In this way, the Fondo Nacional de Salud (FONASA) is responsible for granting health care coverage as a financial institution with its own assets.

On the other hand, the private health system is composed of the Institutions of Provisional Health (ISAPRES). Currently there are 6 large private insurers and other smaller ones, that are empowered to capture and manage the mandatory health contribution of all formal workers that are not affiliated with FONASA, supplying the State in the granting and financing of health benefits.

Thanks to the contributions given to ISAPRES, they finance health services and the payment of medical licenses to their taxpayers. At present, the ISAPRES have achieved an increase in the supply and investment of private infrastructure in Chile. In addition, the main source of funding in ISAPRES is the contribution of its members, paying premiums based on the risks (sex and age) and their family responsibilities, thanks to an individual contract.

If an individual is enrolled in FONASA, they will be automatically assigned to one of the 4 groups depending on their disposable income, and their copayment will depend on this:

- Tranche/Section A: beneficiaries lacking resources to contribute, or in conditions of indigence (non-contributors).
- Tranche/Section B: Monthly taxable income less than or equal to \$276,000 with co-payment equal to 0%.
- Tranche/Section C: Monthly taxable income greater than \$276,000 and less than or equal to \$402,960 with a copayment equal to 10% (with 3 or more family responsibilities is assigned to tranche B).
- Tranche/Section D: Monthly taxable income greater than \$402,960 with a copayment equal to 20% (if 3 or more dependents, members in this group are assigned to tranche C).

³²There is 3% of the population that is under the Ministry of Defense's insurance system, corresponding to the National Defense Fund of the Armed Forces (CAPREDENA) and the Carabineros (DIPRECA), which provide for the attention of officials of the Armed Forces and its charges.

Figure B4: Geographic Distribution of Health Centres and Hospitals



Notes to Figure B4: Geo-referenced hospital and Health Clinic information from the Ministry of Health of Chile. All points represent public hospitals and health clinics.

The main difference between FONASA and ISAPRES is that FONASA is free or with low co-payments because the premiums do not depend on the risks or size of the family group, causing the state to make the largest contribution out of tax contributions.

The most recent data indicate the amount of the affiliated population in FONASA is 76% and in IS-APRE it is 18%.

C Additional Program Details and Component Data

Additional Program Details The full Chile Crece Contigo program covers children from before birth (officially from the first planned gestational check-up at week 14 of pregnancy) until early childhood. Initially, with the design and roll-out of the program in 2007, the program ended at age 4, once children enter the first transition level to primary school.³³ More recent extensions mean the program now follows children up until the age of 8, with mental health treatment for children with mental health disorders aged between 5 and 8.

The original program designed for children aged up to 4 years consisted of 5 components and various sub-components. We lay these out below in Table C1. Component 1, which is targeted to pregnant mothers, is the only component which can potentially impact birth outcomes, as the remainder of the components are entirely delivered in the birth to 4 year period of life. The components below are universal, with the exception of component 1B and component 5, which are preferential components received by families flagged as being among the 60% most vulnerable based on a social protection score.

Each particular program item described in table C1 consists of one or a series of check-ups, goods or other services. Each item also comes with a clear definition of how to deliver the item to the objective population, and key targets for public service workers. For example, Item 1A, Part i (pre-natal check-ups) specifies that 7 prenatal check-ups should be targeted in low risk cases, and that the duration of these check-ups is 40 minutes. Particular check-ups also have their own requirements, such as specific diagnostic tests including the abbreviated psycho-social evaluation during the first and third trimester.

In this appendix we provide only a short summary of each component in Table C1. Full details regarding each component are available in the ChCC guide to services (Ministerio de Desarrollo Social, 2014). Specific components targeted to vulnerable families consist of the generation of a personalised plan identifying availability of differential services, home visits lasting 1 hour (which are targeted to families with specific risk-factors), information related to other subsidies and local programs, and contact with local healthcare and social professionals. Additionally, all children in vulnerable families are guaranteed access to extended nursery and pre-school programs at no cost.

³³In Chile pre-primary education ends with the first and second levels of transition (or pre-kinder and kindergarten), which begin at ages 4 and 5 respectively. At age 6, children begin grade 1 of primary school.

Component Name	Subcomponent Name	Program Item	Time-Period
	A. Strengthening of Prenatal Care	i) Prenatal check-ups, establishment of link and detection of psychosocial risk factorsii) Receipt of gestational reading guides	
1. Strengthening of Prenatal Development	*B. Integral Support for families in Psycho-Social Vulnerability	 i) Design of individual health plan for pregnant mothers and families in psycho-social vulnerability ii) Integral home visits for pregnant mothers in vulnerable situations iii) Links with municipal ChCC Network in cases of vulnerability 	Weeks 14-40 Gestation
	C. Education for the Preg- nant women and her partner or companion	i) Group or individual education for pregnant women and partner/companion. Cognitive and emotional support for birth and child-rearing	
2. Personalised Care	A. Personalised care duringB. Integral Care during the Postpartum period	 i) Integral care prior and during childbirth i) Personalised integral support for the postpartum mother and infant ii) Personalised cross-check of families bio-psycho social development iii) Timely coordination with the primary health team 	At Dirth
During the Birth Process	C. Newborn Support Program (PARN)	i) Education regarding the use of the PARN implements and early-life child-rearingii) Handout of basic implement set and educational material	At biitii
3. Integral Developmental	A. Integral support for new- borns in neonatal care	i) Integral evaluation; Developmental care plan; integra- tion with families; hospitals open to families; prevention of neuro-developmental deficit; education and psycho-social interventions	0.4 Vears
Support for hospitalized children	B. Integral support for chil- dren in pediatric care	ii) Integral evaluation; Developmental care plan; Provision of space for education and play; Use of stimulation proto- col; Helpful relationships built between health team and fa- ther/mother/carer	

Table C1: List of ChCC Policy Components and Phases

Continued...

Component Name	Subcomponent Name	Contents	Time-Period
4. Strengthening Integral Development of Children	A. Strengthening Child Health Checkups for Integral Development	 i) Prenatal check-ups, establishment of link and detection of psychosocial risk factors ii) Participation in Child Health checkups ("Niño/a sano") iii) Check-ups with evaluation and follow-ups 	0-4 Years
	B. Educational Interventions to support child-rearing	i) Group or individual education for development of parent- ing tools, "Nobody is Perfect" workshops	
*5. Support for Children	A. Strengthening of interventions for children in	 i) Health support for children who are vulnerable, or developmentally delayed in integral components ii) Health support for children with developmental deficit in integral components iii)Integral home visits for families of children under 4 in 	
in Vulnerable Situations	vulnerable situations, or developmentally delayed	vulnerable situations for their bio-psycho-social develop- ment iv) Support module for infant development in health centres	0-4 Years

Notes: Components and sub-components are based on official Chile Crece Contigo guide to services (Ministerio de Desarrollo Social, 2014). Components or sub-components indicated with "*" are targeted components received only by means-tested groups. **Data on Program Component Coverage** The examination of program mechanisms of action in section 5.3 relies on data recording program components, and their coverage over time. As laid out in the paper, we collect these data from public monthly administrative health statistics data. In each case we calculate the average level of component use for each birth in the 9 months prior to birth. Averages are always calculated at the health service and monthly level. In a number of cases, we linearly extrapolate coverage by month *prior to 2005* only, given that data is not always available in 2003 and 2004. This period is entirely in the pre-program period, and time fixed effects also capture periods in which linear extrapolation is performed.

Fortified milk disbursed to pregnant women as part of the program was originally called "Leche Purita Fortificada" (*Purita* Fortified Milk). In 2008 this underwent a modification to better meet the dietary requirements of pregnant women, and was renamed to "Purita Mamá". Purita Mamá thus replaced Leche Purita Fortificada, although a very small number of batches of the original formula was still disbursed post 2008. In Table C2 we show the change in composition between the two types of dietary supplements. The guidelines issued by the Ministry of Health provide a clear description of how this milk should be disbursed to pregnant women. For those who begin pregnancy with normal weight, are overweight, or are obese, 1 kilogram of milk powder is given per month. For those women who begin pregnancy with an underweight diagnosis, 3kg of milk powder is delivered per month (Gobierno de Chile, 2008).

Measures of home visits refer to "Integral Home Visits" to pregnant women. Government reports highlight that Chile Crece Contigo has increased the frequency of home visits to pregnant mothers by around 500%. These home visits are targeted particularly to families identified as being in "psychosocial risk", which implies meeting the vulnerability cut-off, and also presenting a number of additional risk factors. Given that the demand for home visits varies considerably by income level of municipalities, the precise decision of which families to visit is made by municipal health centres, where visits should be targeted to families with the largest number of risk factors. A complete discussion of the goals and recommendations for social workers completing home visits is provided in Gobierno de Chile (2009).

Remaining components such as prenatal check-ups and appointments with social assistants in local health centres are also reported in monthly health usage data. In this case the number of appointments completed are reported, and in Section 5.3 we calculate the average number of appointments per health service for a pregnancy in the 9 months prior to the birth.

Micronutrient	Units/Portion	Purita Mamá	Purita Fortificada
Vitamin A	$\mu { m g}$	120	50
Vitamin C	mg	35	14
Vitamin D	$\mu {f g}$	1	0.6
Vitamin E	mg	7.5	0.1
Vitamin B ₁	mg	0.4	0.06
Vitamin B ₂	mg	0.4	0.24
Niacin	mg	4	0.12
Vitamin B ₆	mg	0.5	0.06
Folate	$\mu { m g}$	130	7.34
Vitamin B_{12}	$\mu {f g}$	1.3	0.64
Vitamin B ₅	mg	_	0.46
Calcium	mg	325	182.4
Iron	mg	_	2.0
Phosphorous	mg	291.5	155.2
Magnesium	mg	62.5	15.0
Zinc	mg	1.9	1.0
Copper	mg	_	0.08

Table C2: Changes in Composition of Complementary Nutrition Component

Notes: All values come from Technical Guidelines for Leche Purita Fortificada (old formula) and Leche Purita Mamá (new formula). Each are described in terms of quantity of nutrients per recommended portion. In the new formula, the recommended portion is 25 grams, versus a recommended portion of 20 grams in the old formula.

D Maternal Fixed Effects

As a consistency check of the difference-in-difference results reported in the paper, we also undertake an analysis using the full matched micro-data observing each mother's participation status in ChCC. Identification is driven by variation within mother's exposure to the program over time. We estimate the following mother FE specification:

$$InfantHealth_{ijt} = \beta_0 + \beta_1 ChCC_{jt} + X_{ijt}\beta_x + \phi_t + \mu_j + \varepsilon_{ijt}$$
(6)

where InfantHealth refers to the same measures of health at birth as discussed in the body of the paper of child *i* born to mother *j* at time *t*.

The matched administrative data allows us to construct a panel of mothers and their children, and the independent variable of interest in 6 is $ChCC_{jt}$. This measures for each mother at time t whether she participated in Chile Crece Contigo, and under typical (fixed effect) panel assumptions, β_1 identifies the effect of participation on infant health. We include maternal fixed effects μ_j and year fixed effects ϕ_t , as well as a series of time-varying controls for mothers including birth order dummies, mother's age at birth dummies, and child year of birth dummies.³⁴ Identification takes advantage of the fact that there are mothers who (a) participated in ChCC and had births both before and after the introduction of the policy, and (b) never participated in the policy and also had births both before and after the policy's introduction.

The matched mother and child data does not include the entire universe of births (we do use the entire universe of births in municipal-level regressions presented in the paper). As such, any estimated program impacts in the micro-level mother FE specification are at best suggestive of the average effects in the population. When matching vital statistics data with parental social program use data, approximately 50% of births were matched with fathers, rather than mothers, and in these cases we do not observe the mother's ChCC participation status. We thus restrict the analysis with mother FE only to the population of children matched with mothers, noting that it is not a representative sample, and as such not directly comparable to the municipal-level difference-in-difference regressions presented in the paper based on the entire universe of births. Nevertheless, it acts as a useful robustness check of the impact of ChCC based on different identifying assumptions.³⁵

In Table D1 we present summary statistics of births to all mothers, births to mothers who were matched with their social program usage, and births to mothers who were not matched the mother's social program usage data. While their observable measures are largely similar, matched mothers appear to be slightly younger (26.91 versus 27.19 years), and have births with slightly better health indicators (3,333 grams of birth weight versus 3,324 on average).

We present regression results using maternal fixed effects in Table D2. In this case identification is driven by mothers who have had more than one birth, and hence variation in program coverage. Despite the alternative methodology (and estimation sample) we observe results that are qualitatively similar to those reported using the municipal roll-out to estimate program impacts. In this case we observe a larger

³⁴We are also able to control for a number of other individual-level covariates including maternal education, however in our main specification do not propose include this control given that ChCC explicitly aims to ensure that young mothers who are still enrolled in education finish their studies, and hence education is likely a bad control. In supplementary analyses we augment the controls in 6 to examine the robustness of findings to alternative specifications.

³⁵The two proposed strategies (the DD estimates in the body of the paper and the mother FE estimates in Appendices) rely on strict (conditional) exogeneity for the family panel specification in equation 6 and parallel trends for the DD specification in equation 1.

	N	Mean	Std. Dev.	Min	Max
Panel A: All Mothers					
Birth Weight (grams)	1912573	3327.45	539.30	500.00	5000.00
Low Birth Weight < 2500 grams	1912573	0.06	0.23	0.00	1.00
Gestation (weeks)	1910932	38.59	1.74	25.00	44.00
Premature < 37 weeks	1910932	0.07	0.25	0.00	1.00
Length (cm)	1911391	49.47	2.49	30.00	60.00
Year of Birth	1917085	2006.57	2.30	2003.00	2010.00
Mother's Age	1915322	27.08	6.81	14.00	49.00
Proportion Teen Births	1917085	0.16	0.36	0.00	1.00
Number of Children	1916934	1.96	1.13	0.00	15.00
Panel B: Matched Mothers and Cl	hildren				
Proportion Ever Enrolled in ChCC	741963	0.38	0.48	0.00	1.00
Birth Weight (grams)	740393	3333.34	541.73	500.00	5000.00
Low Birth Weight < 2500 grams	740393	0.06	0.23	0.00	1.00
Gestation (weeks)	739707	38.64	1.76	25.00	44.00
Premature < 37 weeks	739707	0.07	0.25	0.00	1.00
Length (cm)	739913	49.50	2.50	30.00	60.00
Year of Birth	741963	2006.60	2.29	2003.00	2010.00
Mother's Age	741413	26.91	6.75	14.00	49.00
Proportion Teen Births	741963	0.15	0.36	0.00	1.00
Number of Children	741918	1.96	1.14	0.00	15.00
Panel C: Unmatched Mothers and	Children				
Birth Weight (grams)	1172180	3323.73	537.72	500.00	5000.00
Low Birth Weight < 2500 grams	1172180	0.06	0.23	0.00	1.00
Gestation (weeks)	1171225	38.57	1.73	25.00	44.00
Premature < 37 weeks	1171225	0.07	0.26	0.00	1.00
Length (cm)	1171478	49.46	2.48	30.00	60.00
Year of Birth	1175122	2006.55	2.31	2003.00	2010.00
Mother's Age	1173909	27.19	6.84	14.00	49.00
Proportion Teen Births	1175122	0.16	0.37	0.00	1.00
Number of Children	1175016	1.96	1.13	0.00	15.00

Table D1: Summary Statistics: Matched Mother, Child and Social Security Data

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Notes to Table D1: Summary statistics are presented for all births matched with the mother's participation in social programs. Summary statistics are presented for all years from 2003-2010. *Chile Crece Contigo* began in June of 2007, and so any mothers having all births prior to this date never participated in ChCC. For additional notes on variable definitions and comparison with the full universe of births (collapsed by municipality) refer to Table 2.

impact on birth weight (19 grams, versus 10 grams), and significant impacts also when considering size at birth of each child. One result does not agree across specifications, and this is the estimate on the impact of ChCC on low birth weight children. In this specification we observe a weakly positive impact, while in the specification reported in Table 3 we observed a weakly negative impact. However, in Table D3 when we additionally include full time and municipal fixed effects, we observe that the result is no longer statistically distinguishable from zero, while remaining effects are largely unchanged. In panel B of Appendix Table A11 we present *p*-values on the impact of ChCC when correcting for multiple hypothesis testing. For birth weight, birth size, and gestational length we observe that results remain statistically distinguishable from zero when controlling for the family wise error rate using Romano and Wolf's step-down correction.

	(1)	(2)	(3)	(4)	(5)
	Weight	LBW	Size	Gestation	Premature
Participated in ChCC	19.395***	0.004*	0.049**	0.090***	-0.001
	[4.534]	[0.002]	[0.022]	[0.016]	[0.002]
Constant	3074.884***	0.090**	48.412***	38.069***	0.124***
	[63.811]	[0.036]	[0.316]	[0.253]	[0.038]
Mean of Dep. Var. Observations	3333.458 739811	0.056 739811 0.002	49.499 739332	38.638 739126	0.068 739126 0.002
ix-squared	0.010	0.002	0.022	0.012	0.002

Table D2: Estimated Program Effects with Mother Fixed Effects

Estimation sample consists of all births where the data link exists between the child and the mother's participation in social programs, including ChCC. Additional details regarding this procedure are provided in Appendix D. In each case mother's fixed effects are included, and full fixed effects for mother's age at birth, child birth order, and child's year of birth are included. Standard errors are clustered by mother. * p<0.10; ** p<0.05; *** p<0.01.

	(1)	(2)	(3)	(4)	(5)
	Weight	LBW	Size	Gestation	Premature
Participated in ChCC	19.885***	0.003	0.056**	0.093***	-0.002
	[4.598]	[0.002]	[0.022]	[0.016]	[0.002]
Constant	3078.607***	0.110***	48.100***	37.869***	0.149***
	[72.793]	[0.040]	[0.356]	[0.281]	[0.042]
Mean of Dep. Var.	3333.458	0.056	49.499	38.638	0.068
Observations	739811	739811	739332	739126	739126
R-Squared	0.023	0.006	0.027	0.017	0.006

Table D3: Maternal FE Estimates with Additional Controls

Refer to notes in table D2. All details of estimated specifications are identical, however we now include year by month fixed effects, and fixed effects for municipality of birth. * p<0.10; ** p<0.05; *** p<0.01.

Finally, we briefly examine distributional impacts of the program on health at birth, as examined in Figure 4. In this case we simply examine descriptive evidence, considering the distribution of birth weight between program recipients and non-program recipients prior and posterior to the program's implementation. These are presented in Figure D1, and we observe that in the pre-program period, the distribution of birth weight for recipient mothers is slightly below the corresponding distribution for non-recipient mothers, while post-program the reverse pattern is observed (both differences are observed in the rejection Kolmogorov-Smirnov of tests of the equality of distributions). Interestingly, the distribution appears to be most shifted from around 2500-4500 grams, providing some descriptive support of the distributional results documented in Figure 4.



Figure D1: Birth weight Distributions Pre- and Post-Program Implementation

Notes to Figure D1: Densities are plotted using an Epanechnikov kernel with a bandwidth of 5 grams. Each panel separates distributions by whether the mother *ever* participates in Chile Crece Contigo. Panel (a) displays only pre-ChCC time periods, while panel (b) displays only post-ChCC time periods. In both cases, Kolmogorov-Smirnov tests reject equality of distributions (in different directions).