Online Appendix

The Long-Term Effects of Measles Vaccination on Earnings and Employment

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	Measles Rate	Observations	R-squared
Total population density	0.748	50	0.068
	(0.351)		
Under 18 population density	2.188	50	0.051
	(1.218)		
Age 5 – 17 population density	3.266	50	0.054
	(1.744)		
Under 5 population density	6.738	50	0.052
	(3.685)		

Notes: The table shows regression adjusted estimates for association between measles rates and population density for various age groups. Each row represents a separate regression and presents the coefficient and standard error in column 2 for the indicated age group population density. The coefficient can be interpretated as a 1 unit increase in the population density increases the measles incidence rate (cases per 100,000) by the coefficient listed. The third column shows the number of observations included in the regression. Column 4 presents the R-squared value for each regression. All regressions models aggregate to the state level and include the years 1953-1962, weight by population, and omit the District of Columbia.

APPENDIX TABLE 2: ALTERNATIVE WAYS TO CALCULATE THE PRE-VACCINE MEASLES INCIDENCE RATE OUTCOMES

	Income (1)	Income (if > 0) (2)	ln Income (3)	Poverty (4)	Employed (5)	Hours Worked (6)
12-year average for $M^{pre}_{1952-1963}$	2901 (864)	4681 (1202)	0.1101 (0.0233)	-0.0326 (0.0040)	0.0186 (0.0032)	-1.2511 (0.3769)
11-year average for $M^{pre}_{1952-1963}$	3102 (895)	5092 (1245)	0.0963 (0.0255)	-0.0277 (0.0041)	0.0166 (0.0035)	-1.0991 (0.3869)
10-year average for $M^{pre}_{1952-1963}$	3459 (896)	5303 (1236)	0.1076 (0.0248)	-0.0300 (0.0042)	0.0178 (0.0034)	-0.9717 (0.3774)
9-year average for $M^{pre}_{1952-1963}$	4072 (836)	6380 (1141)	0.1252 (0.0226)	-0.0296 (0.0039)	0.0185 (0.0032)	-0.7452 (0.3637)
8-year average for $M^{pre}_{1952-1963}$	4274 (893)	6701 (1220)	0.1149 (0.0255)	-0.0236 (0.0042)	0.0175 (0.0036)	-0.2802 (0.3791)
7-year average for $M^{pre}_{1952-1963}$	4582 (835)	7211 (1119)	0.1243 (0.0230)	-0.0261 (0.0039)	0.0180 (0.0033)	-0.5877 (0.3718)
6-year average for $M^{pre}_{1952-1963}$	5186 (839)	7808 (1137)	0.1421 (0.0226)	-0.0251 (0.0040)	0.0189 (0.0033)	-0.0670 (0.3502)
5-year average for $M^{pre}_{1952-1963}$	5697 (937)	8475 (1256)	0.1516 (0.0255)	-0.0279 (0.0046)	0.0212 (0.0037)	-0.3978 (0.4060)
4-year average for $M^{pre}_{1952-1963}$	5363 (846)	7756 (1160)	0.1432 (0.0233)	-0.0216 (0.0042)	0.0197 (0.0034)	0.1869 (0.3695)
3-year average for $M^{pre}_{1952-1963}$	6206 (875)	8664 (1171)	0.1587 (0.0233)	-0.0223 (0.0045)	0.0206 (0.0035)	0.4296 (0.3743)
2-year average for $M^{pre}_{1952-1963}$	6052 (794)	8410 (1071)	0.1435 (0.0214)	-0.0201 (0.0041)	0.0187 (0.0032)	0.3556 (0.3439)
N	15,710,435	12,126,516	12,126,516	15,429,840	12,593,724	15,710,435

Notes: The table shows regression adjusted estimates for the impact of the measles vaccine on adult labor market outcomes. Each column represents a separate outcome as listed in the column heading. Each row describes the number of years used to calculate the pre-measles incidence rate in a state and is used for the regression estimates displayed. A separate regression is run for every sample-outcome pair and the coefficient of interest from Equation 2 and its standard error are presented. As described in Section IV, regression controls include: gender, race, age*race*female indicators, state-of-birth*race indicators, state-of-birth*female indicators, state-of-birth*race*female indicators, state-of-birth fixed effects, year-of-birth fixed effects, and survey year fixed effects. Standard errors are clustered at the state-of-birth by year-of-birth level. Individual data come from the ACS for the years 2000 – 2017, with native born individuals aged 25-60 included in the regressions. The last row displays the N for each regression.

APPENDIX TABLE 3: DIFFERENT STANDARD ERRORS: EFFECTS ON ADULT LABOR MARKET OUTCOMES

	Income (1)	Income (if > 0) (2)	ln Income (3)	Poverty (4)	Employed (5)	Hours Worked (6)
$\text{M}^{pre}_{1952-1963} * Exposure\ to\ Vaccine$	2901	4681	0.1101	-0.0326	0.0186	-1.2511
SE clustered at:						
State of birth by birthyear	(864)	(1202)	(0.0233)	(0.0040)	(0.0032)	(0.3769)
State of birth by exposure	(1552)	(2416)	(0.0474)	(0.0060)	(0.0047)	(0.6112)
State of birth	(2953)	(4685)	(0.1040)	(0.0128)	(0.0095)	(1.2669)
Census region of birth	(2722)	(2516)	(0.0424)	(0.0138)	(0.0026)	(2.3577)
Census division of birth	(4027)	(5838)	(0.1211)	(0.0137)	(0.0125)	(1.7790)
State of residence by exposure	(6387)	(7649)	(0.0987)	(0.0123)	(0.0048)	(0.6753)
State of residence by birthyear	(2696)	(3572)	(0.0475)	(0.0046)	(0.0029)	(0.3731)
State of residence	(2379)	(4262)	(0.0841)	(0.0098)	(0.0076)	(1.0368)
Exposure	(741)	(419)	(0.0097)	(0.0030)	(0.0033)	(0.5237)
Birthyear	(707)	(751)	(0.0125)	(0.0034)	(0.0032)	(0.2604)
Not clustered	(547)	(654)	(0.0112)	(0.0026)	(0.0023)	(0.1834)
N	15,710,435	12,126,516	12,126,516	15,429,840	12,593,724	15,710,435

Notes: The table shows regression adjusted estimates and standard errors for the impact of the measles vaccine on adult labor market outcomes. Each column represents a separate outcome as listed in the column heading. The top row presents the coefficient of interest from Equation 2. A separate regression is run for each outcome variable. As described in Section IV, regression controls include: gender, race, age*race*female indicators, state-of-birth*race indicators, state-of-birth*female indicators, state-of-birth*race*female indicators, state-of-birth fixed effects, year-of-birth fixed effects, and survey year fixed effects. Individual data come from the ACS for the years 2000 – 2017, with native born individuals aged 25-60 included in the regressions. Measles pre-vaccine incidence rate are calculated using data from Current Population Reports and MMWR Annual Reports for the 12-year period from 1952-1963. Rows 2-11 present standard errors at the indicated levels of clustering. The last row shows the N for each regression.

APPENDIX TABLE 4: CONVERGENCE CHECK, ADULT LABOR MARKET OUTCOMES

	Income (1)	Income (if > 0) (2)	ln Income (3)	Poverty (4)	Employed (5)	Hours Worked (6)
Panel A: Main Results						
M$^{pre}_{1952-1963}$ * *Exposure to Vaccine*	2901	4681	0.1101	-0.0326	0.0186	-1.2511
	(864)	(1202)	(0.0233)	(0.0040)	(0.0032)	(0.3769)
Panel B: Birth year effects vary by region						
M$^{pre}_{1952-1963}$ * *Exposure to Vaccine*	5224	7152	0.1222	-0.0267	0.0154	0.6413
	(850)	(1071)	(0.0196)	(0.0040)	(0.0030)	(0.3307)
Panel C: Birth year effects vary by division						
M$^{pre}_{1952-1963}$ * *Exposure to Vaccine*	7581	9633	0.2076	-0.0450	0.0229	0.7915
	(866)	(1091)	(0.0206)	(0.0039)	(0.0032)	(0.3497)
Panel D: State of birth linear cohort trend						
M$^{pre}_{1952-1963}$ * *Exposure to Vaccine*	9379	12229	0.1003	0.0042	0.0028	-0.2744
	(1431)	(1869)	(0.0243)	(0.0061)	(0.0044)	(0.5398)
N	15,710,435	12,126,516	12,126,516	15,429,840	12,593,724	15,710,435

Notes: The table shows regression adjusted estimates for the impact of the measles vaccine on adult labor market outcomes. Each column represents a separate outcome as listed in the column heading. Each panel describes the specification check for that section. A separate regression is run for every panel-outcome pair and the coefficient of interest from Equation 2 and its standard error are presented. As described in Section IV, regression controls include: gender, race, age*race*female indicators, state-of-birth*race indicators, state-of-birth*female indicators, state-of-birth*race*female indicators, state-of-birth fixed effects, year-of-birth fixed effects, and survey year fixed effects. Standard errors are clustered at the state-of-birth by year-of-birth level. Individual data come from the ACS for the years 2000 – 2017, with native born individuals aged 25-60 included in the regressions. Panel A reports the main results (all native born 25-60-year-olds) estimates and are the same as Table II. Panel B reports the estimates after including Census Region by birth year fixed effects. Panel C reports the estimates when Census Division by birth year fixed effects are added to Equation 2. Panel D reports the estimates after including the state of birth fixed effect interacted with year of birth to create a state specific linear cohort trend in Equation 2. The last row shows the N for the column.