ONLINE APPENDIX

Pensions and Fertility: Micro-Economic Evidence

Alexander M. Danzer
Catholic University of
Eichstätt-Ingolstadt

Lennard Zyska
Catholic University of
Eichstätt-Ingolstadt

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This Appendix supplements the paper by the same authors "Pensions and Fertility: Micro-Economic Evidence", *American Economic Journal: Economic Policy*. Section A contains all additional Figures and Tables. In Section B, we explain step-by-step how we compute our measure of pension wealth for the retired and non-retired population. In Section C, we provide detailed information regarding the assignment of urban (control) vs. rural (treatment) work status. In Section D, we provide an extensive analysis of various policies and macroeconomic developments during the stabilization phase of the late 80s and early 90s, assess how they may have influenced fertility outcomes, and explain why we do not expect that these stabilization efforts and the economic circumstances confound fertility outcomes during that period.

A. Figures and Tables

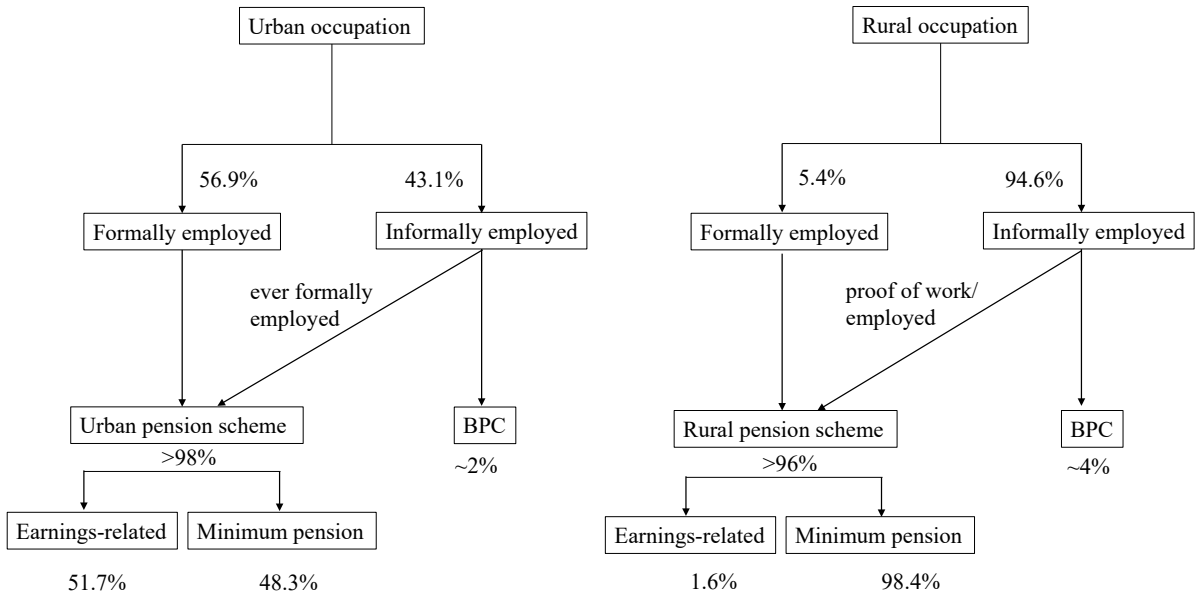

Figure A1: Pension Scheme Affiliations after the Pension Reform

Note: Informality data refer to the entire post period, pension system affiliations refer to the year 1995, benefit entitlements refer to the year 2002. The BPC is the social assistence pension for the few urban and rural workers who entirely lack proof of employment. It serves as ultimate security net at old-age.

Source: Schwarzer and Querino (2002).

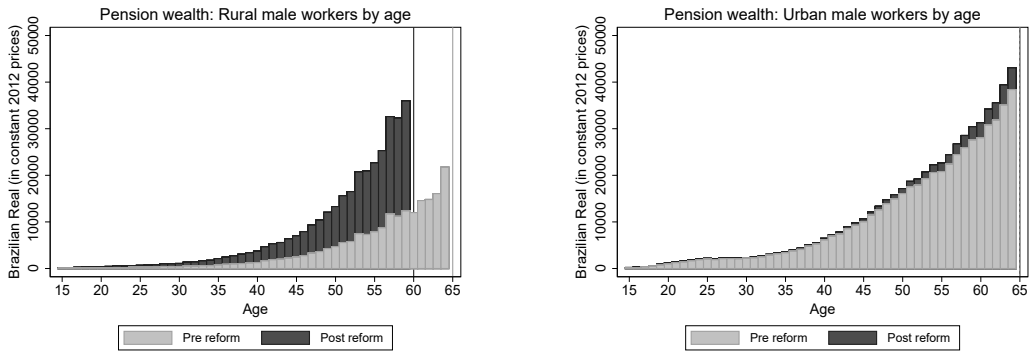

Figure A2: Gross Present Pension Wealth of Rural and Urban Male Workers.

Note: Pre- and post-reform pension wealth is computed as the present value of expected old age benefits before/after the reform adjusted for real interest rates and average survival probabilities (computed using IBGE mortality tables; first time available in 1998): $Pension\ Wealth = \sum_{t=0}^{T-a} s_{a,t} \times \frac{1}{(1+i)^t} \times pension_t$, with $s_{a,t}$ denoting the probability of a person of age a in a given year surviving until year t; $T - a$, indicates the remaining maximum lifespan differentiated by sex and birth cohort; i is a constant discount rate (12%); and $pension_t$ denotes the old age pension benefits in t. A non-retired person receives the pension starting in a future period $t > 0$, defined by the person's age and the regular retirement age. Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded. For further details on the pension wealth computation, see online Appendix Section B.

Data: PNAD 1981-90, 1992-93, 1995-99.

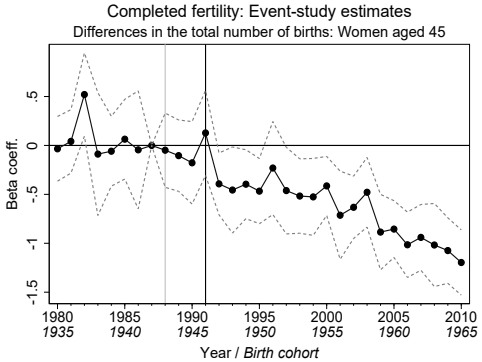

Figure A3: Event-Study Estimates, Using Only Few Age Groups

Note: Graph shows ES estimates of the pension reform for the total number of births (alive and dead) of women at the age of 45 before and after the reform. As few age groups as possible in every given wave used for estimation (age 45-47 from 1996 to 2014, 45-50 for 1984 and 1985 and 45-52 for 1992, 1993 and 1995). 90% confidence interval based on standard errors clustered at the regional (federal state) level. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2.

Data: PNAD 1984-85, 1992-93, 1995-99, 2001-09, 2011-14.

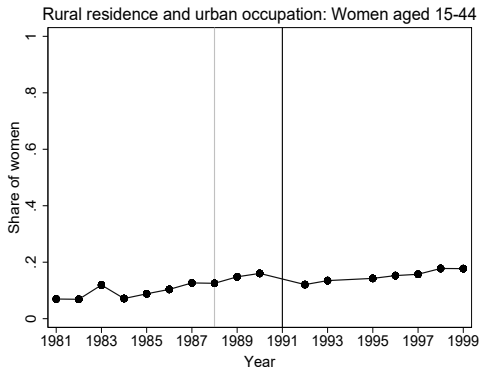

Figure A4: Rural Residence and Urban Occupation: Women Aged 15-44

Note: Graph shows the share of women who are rural residents and who have an urban occupation. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black).

Data: PNAD 1981-90, 1992-93, 1995-99.

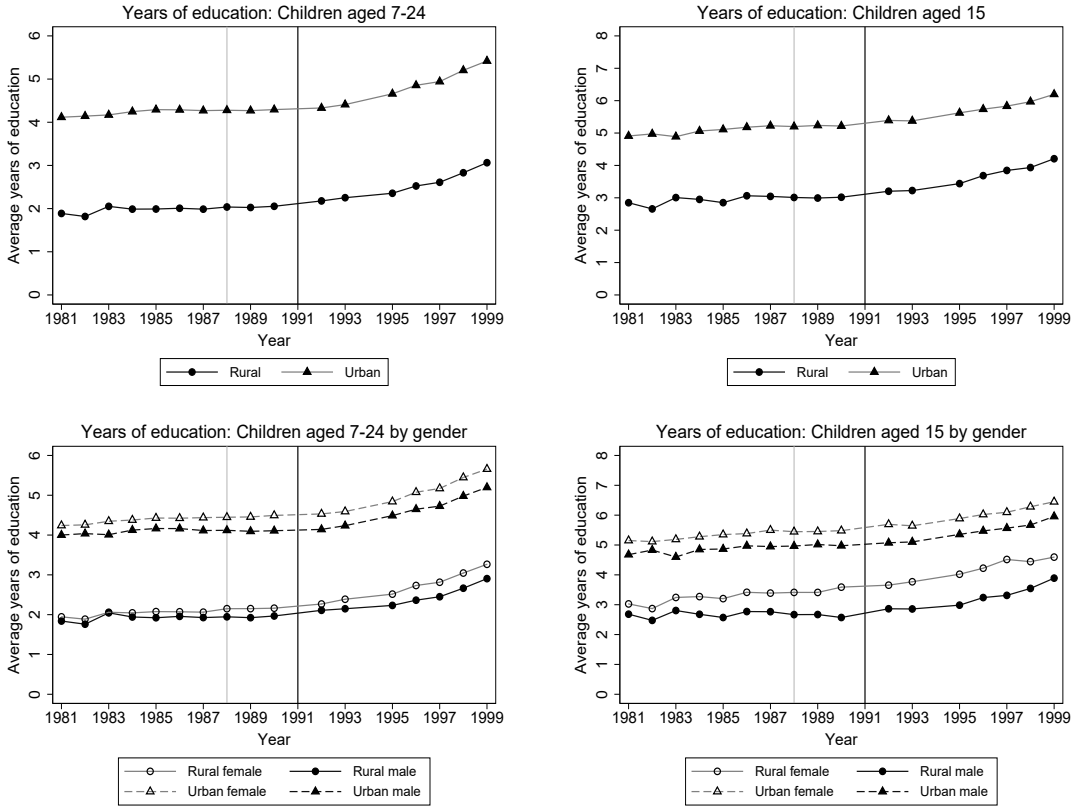

Figure A5: Educational Outcomes of Children - Years of Schooling, Brazil 1981-99

Note: Graphs show average years of education of children living in households with female rural and urban workers aged 15-44. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined by the parents occupation, defined as in Table 2.

Data: PNAD 1981-90, 1992-93, 1995-99.

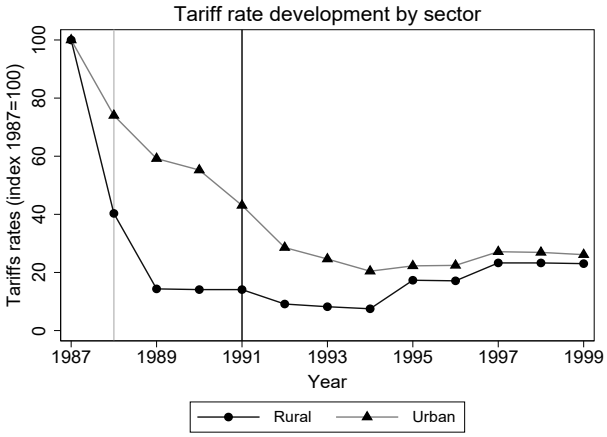

Figure A6: Development of the Indexed Tariff Rates (1987=100): By Urban and Rural Industrial Sectors, Brazil 1987-1999

Note: Graph shows the indexed annual indexed tariff rates applicable for urban and rural industries (1987=100). Tariff rates for the agricultural industry are assigned to rural, tariff rates of all other manufacturing industries are assigned to urban. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black).

Data: De Paiva Abreu (2004).

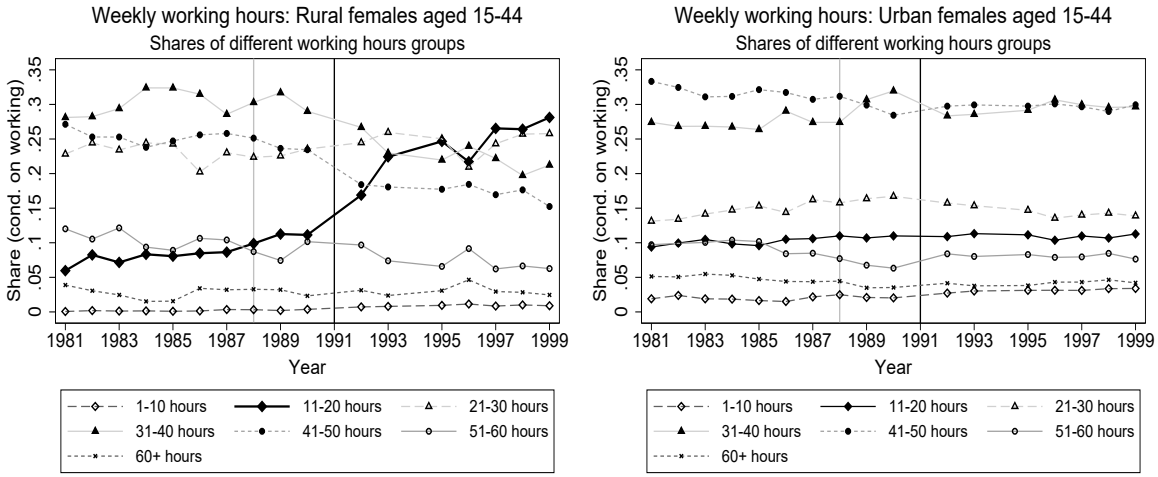

Figure A7: Full- and Part-Time Employment Shares, Brazil 1981-99

Note: Graphs show the share of women in 10-hour brackets of working hours for female rural and urban workers. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2.

Data: PNAD 1981-90, 1992-93, 1995-99.

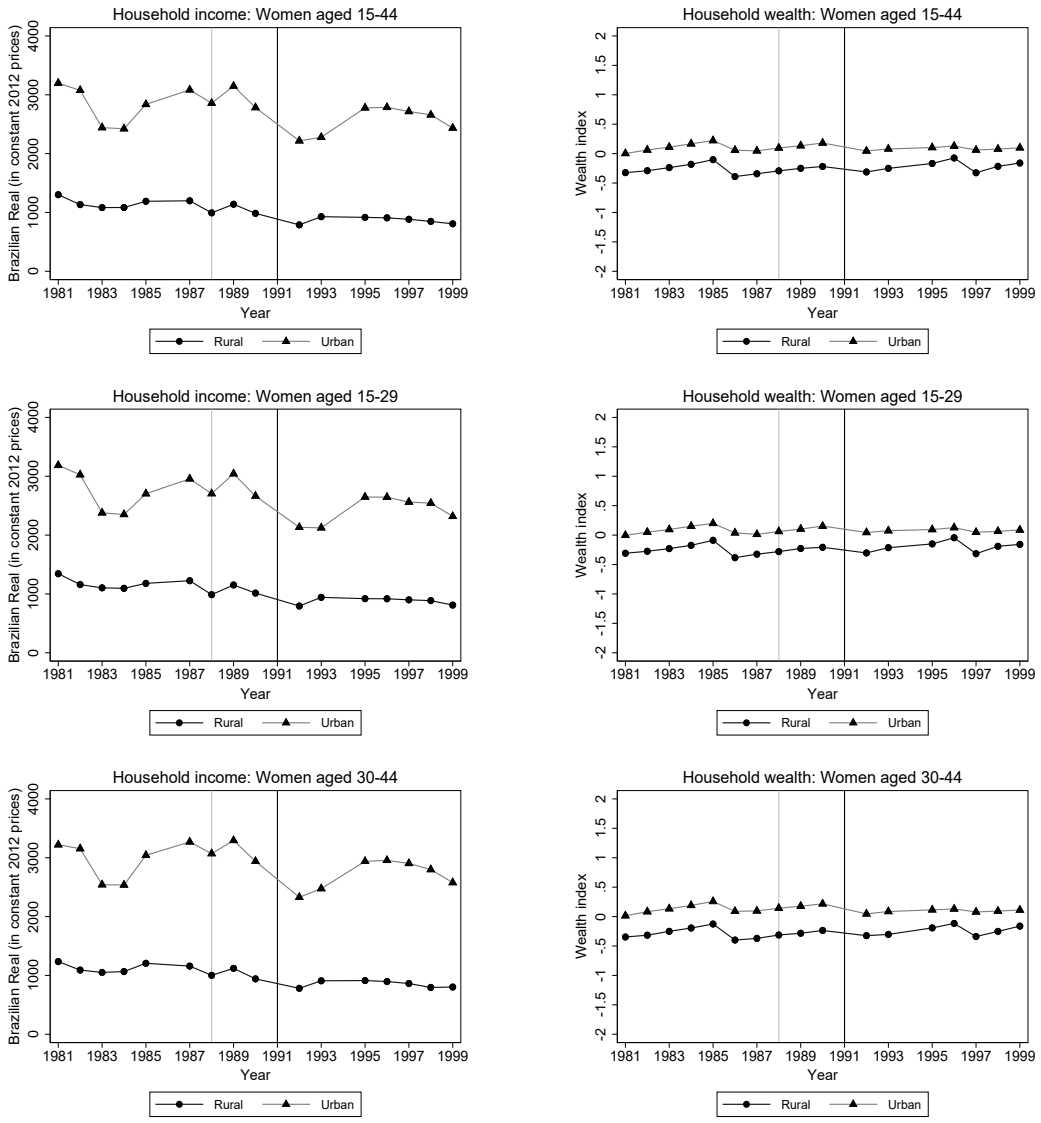

Figure A8: Household Income (Without Pensions) and Household Wealth Index, Brazil 1981-99

Note: Left graphs show average household income (excl. retirement pensions) for rural and urban worker households. Right graphs show average wealth index levels of rural and urban worker households. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

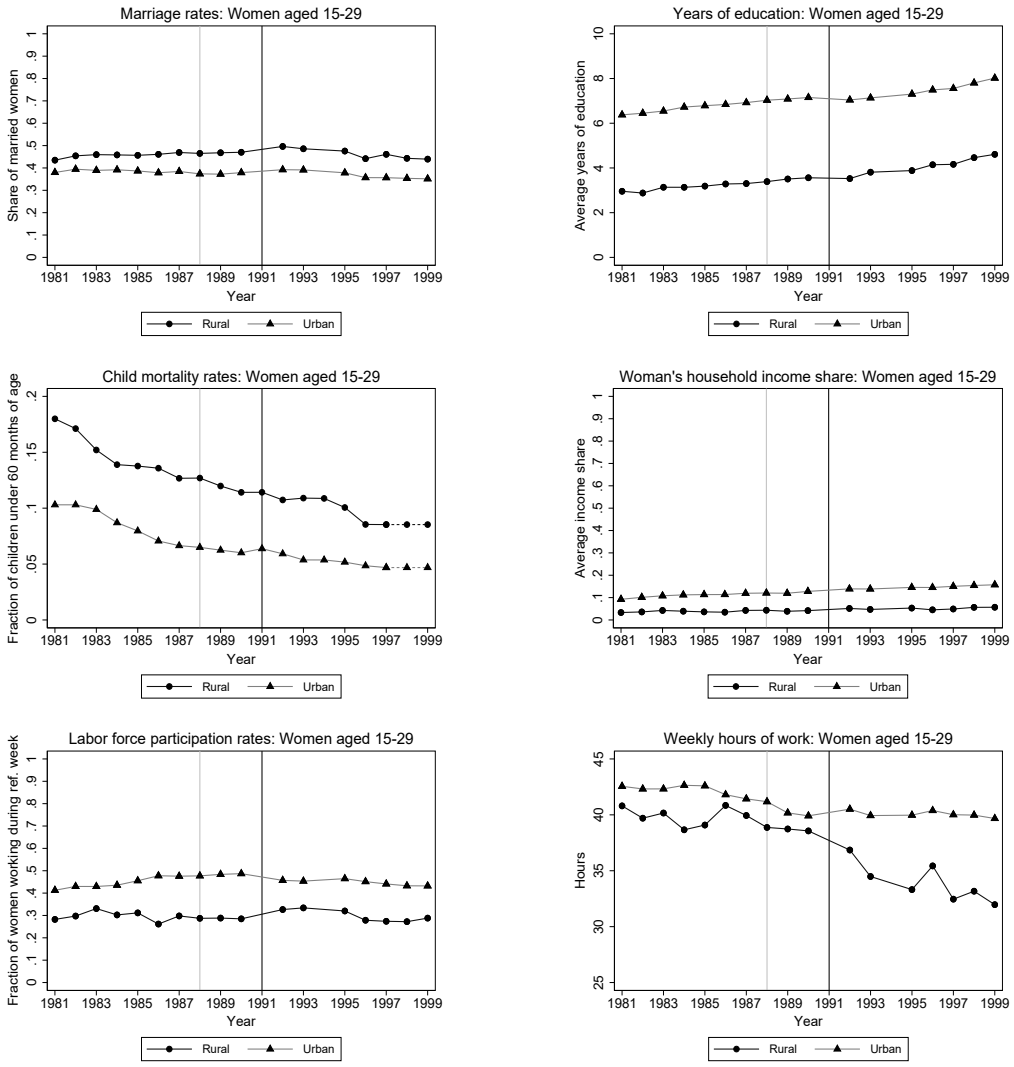

Figure A9: Confounding Factor Trends: Women Aged 15-29

Note: Graphs show average marriage rates, years of education, child mortality rates, income of women as a share of household income, labor force participation rates, and weekly hours of work for rural and urban female workers. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

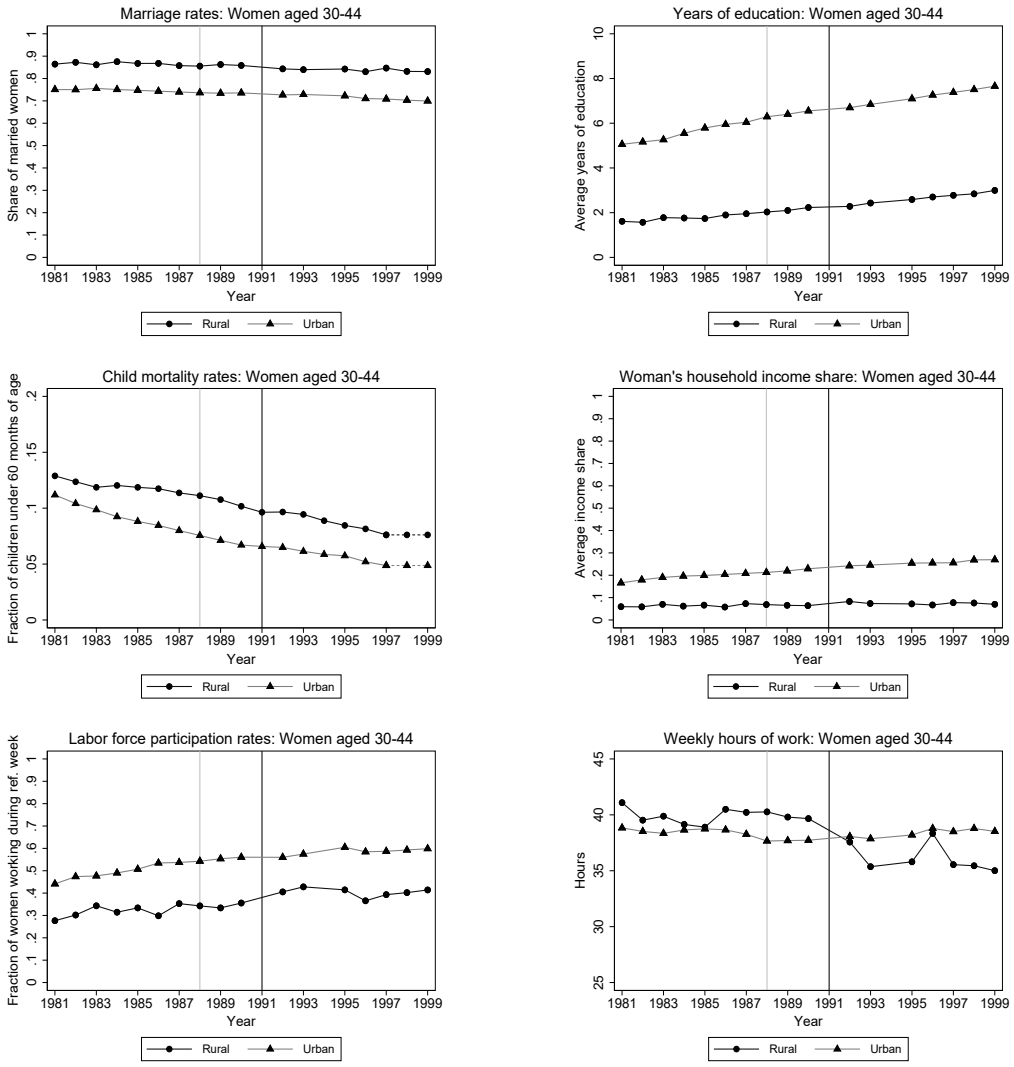

Figure A10: Confounding Factor Trends: Women Aged 30-44

Note: Graphs show average marriage rates, years of education, child mortality rates, income of women as a share of household income, labor force participation rates, and weekly hours of work for rural and urban female workers. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

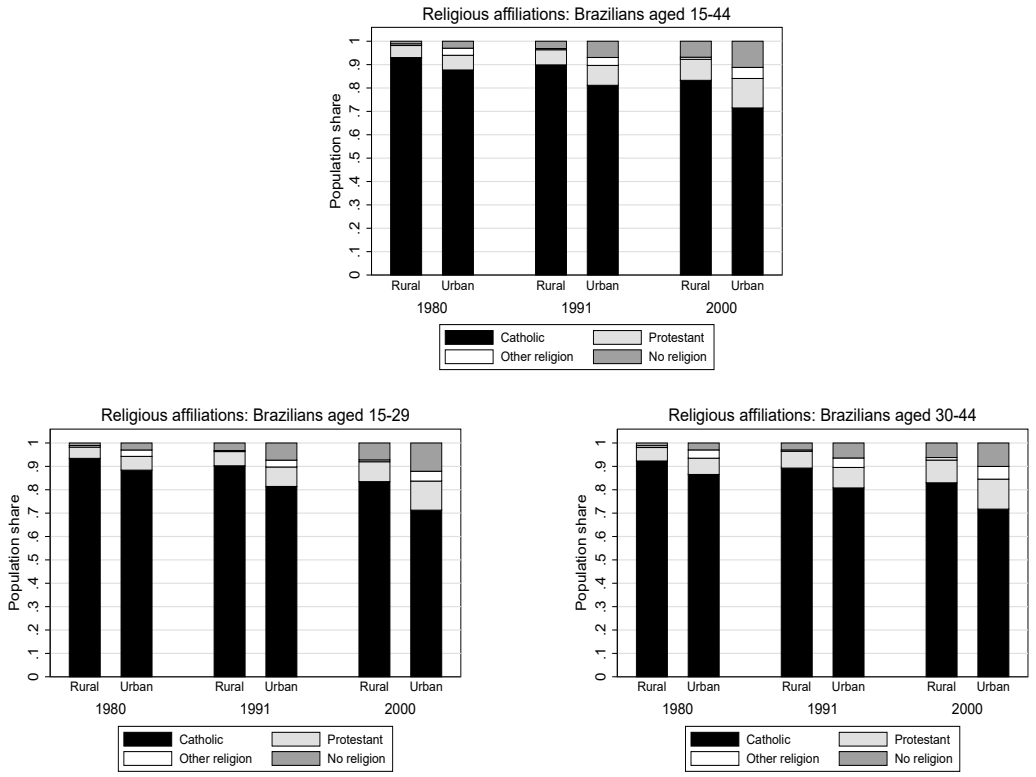

Figure A11: Religious Affiliations, Brazil 1980, 1991, 2000

Note: Sample consists of the Brazilian population aged 15-44 participating in the Census. Rural and urban groups defined by household location.

Data: Brazilian Census 1980, 1991, 2000.

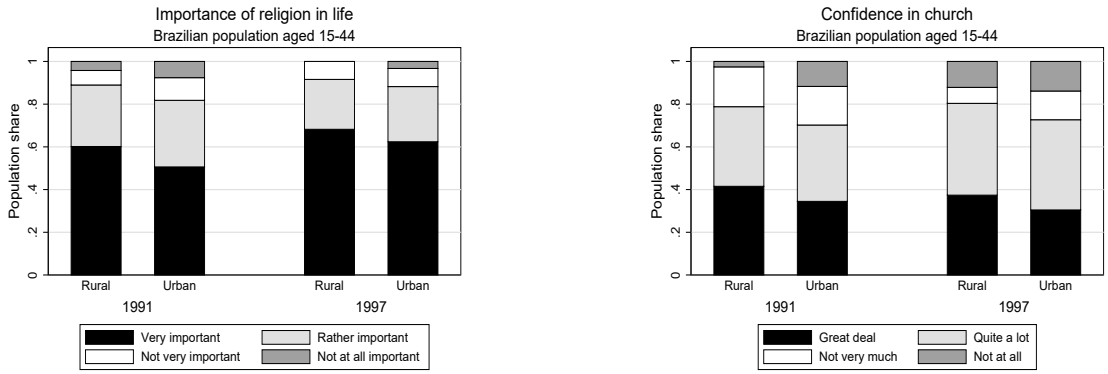

Figure A12: Importance of Religion in Life and Confidence in Church, Brazil 1991, 1997

Note: Sample consists of the Brazilian population aged 15-44 participating in the World Values Survey. Rural and urban groups defined by household location (for the WVS we approximate this by the size of the town: smaller or larger than 10.000 inhabitants).

Data: WVS 1991, 1997 (IInglehart et al. (2014a,b)).

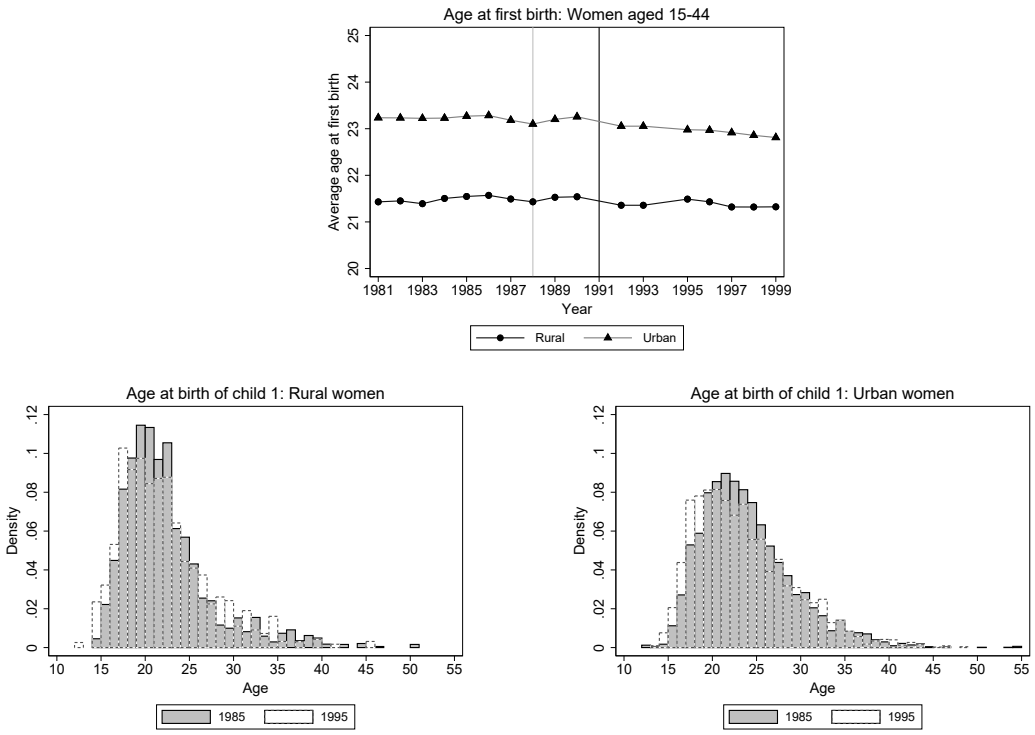

Figure A13: Women's Age at First Birth

Note: Top graph show 3-year moving averages (2-years at the edges: 1981-82, 1989-90, 1992-93 and 1998-99) of women's age at first birth. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Bottom graphs show the age-distribution of mothers at first birth, rural and urban, for 1985 and 1995 (Sample consists of Brazilian females aged 10-55.). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

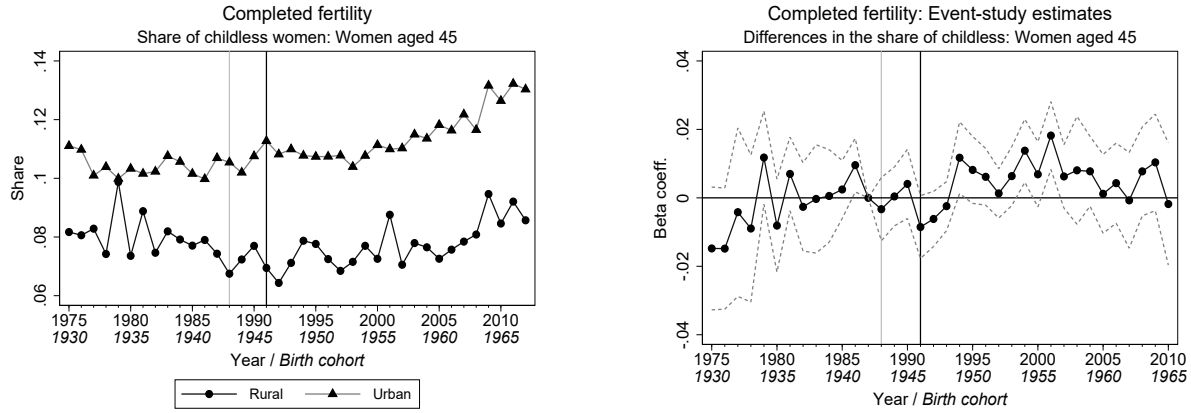

Figure A14: Childlessness: Differences in the Share of Childless Women at the Age of 45

Note: Left graph shows the share of childless women at age 45. Right graph shows ES estimates of the pension reform for the share of childless women at age 45 for each year before and after the reform. Dependent variable: Dummy equal to one if a woman never gave birth to a child (alive or dead). 90% confidence interval based on standard errors clustered at the regional (federal state) level. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1984-85, 1992-93, 1995-99, 2001-09, 2011-14.

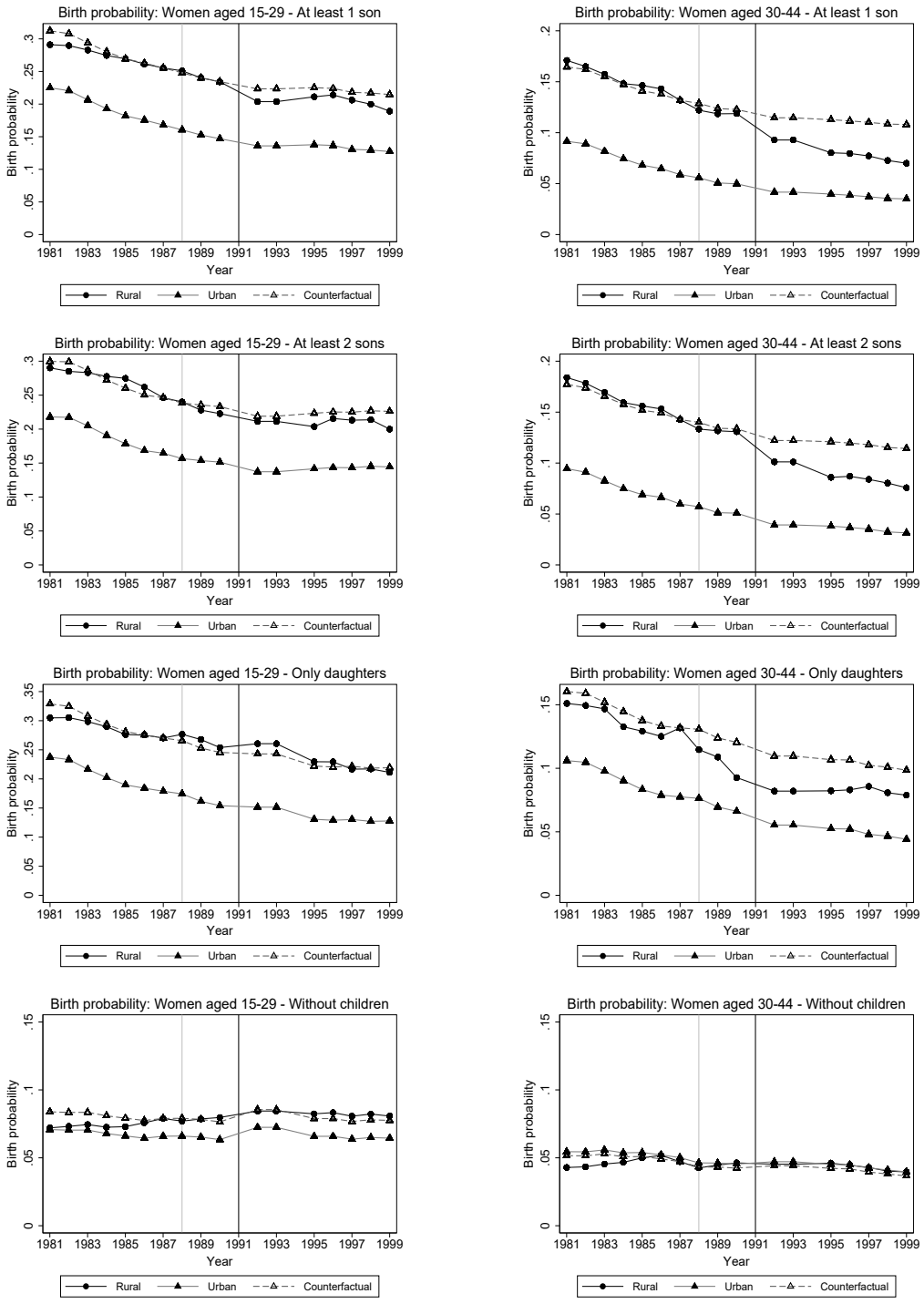

Figure A15: Birth Probabilities by Older Children's Gender: Women Aged 15-29 vs. Women Aged 30-44

Note: Graphs show 3-year moving averages (2-years at the edges: 1981-82, 1989-90, 1992-93 and 1998-99) of birth probabilities, i.e., average childbearing (0/1) rates within the last 12 months, conditional on whether women already gave birth to at least one boy, at least two boys, had only girls born before or had no children before. Left graphs for women aged 15-29, right graphs for women aged 30-44. Counterfactual trend as of 1987: gray dashed line. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

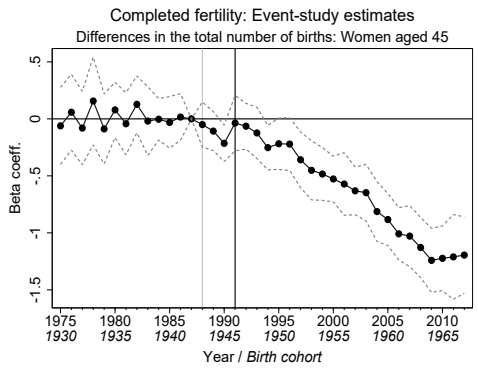

Figure A16: Event-Study Estimates, Binned Endpoint in 2012

Note: Graph shows ES estimates of the pension reform for the total number of births (alive and dead) of women at the age of 45 before and after the reform when we add data points for 2011-2014 (binned endpoint in 2012). 90% confidence interval based on standard errors clustered at the regional (federal state) level. Vertical lines: new Constitution approved in 1988 (light-gray); Pension reform implemented in 1991 (black). Rural and urban groups are defined as in Table 2.

Data: PNAD 1984-85, 1992-93, 1995-99, 2001-09, 2011-14.

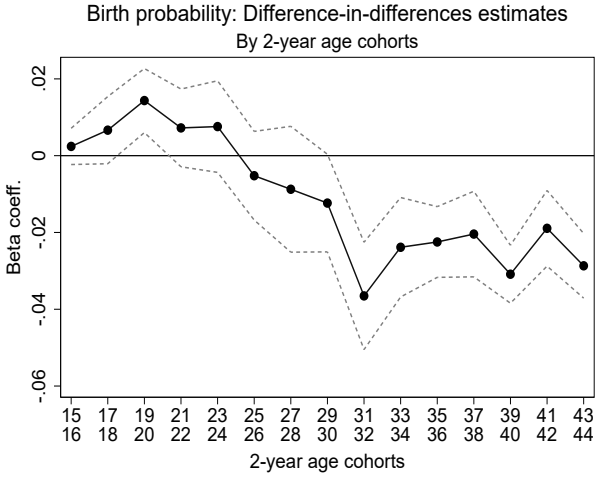

Figure A17: DiD Regression Results: Women by Age

Note: DID estimates of the pension reform for 2-year age groups of women aged 15-44. Dependent variable: Dummy, whether a child was born in the last 12 months. Full set of covariates, as in Table 3, column 6. Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded. 90% confidence interval based on standard errors clustered at the regional (federal state) level.

Data: PNAD 1981-90, 1992-93, 1995-99.

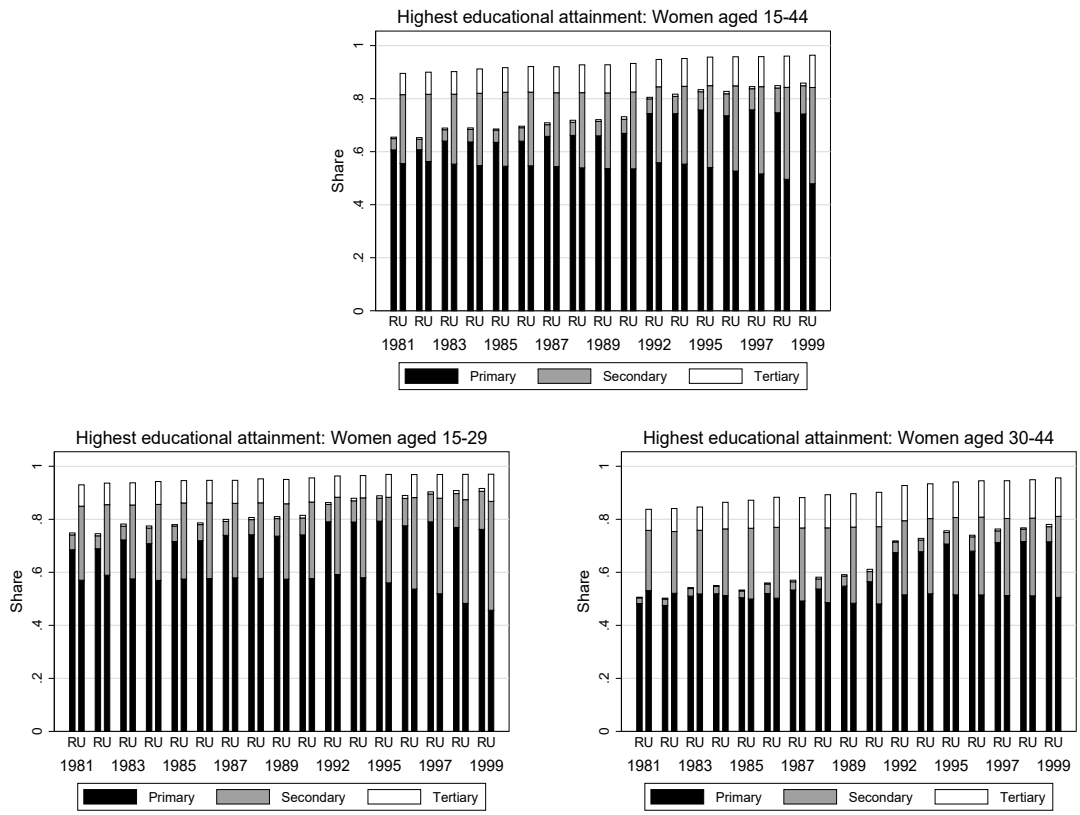

Figure A18: Highest Educational Attainment, Brazil 1981-99

Note: Graphs show shares of female rural (R) and urban (U) workers primary, secondary or tertiary educational attainments. Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

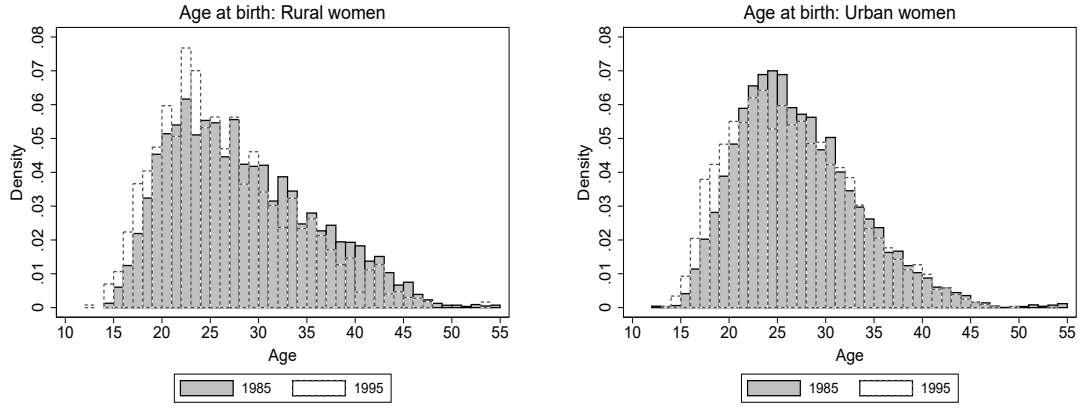

Figure A19: Age of Mothers at Birth, Density Plots

Note: Graphs show age of mothers at birth, rural and urban, for 1985 and 1995. Sample consists of Brazilian females aged 10-55. Rural and urban groups are defined as in Table 2. Mixed urban-rural couples excluded.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A1: DiD Regression Results - Formality: Pooled (Women Aged 15-44) and Subgroups (Women aged 15-29 vs. 30-44)

Dep. Variable	Newborn child under 1 year old (0/1)		
	(1)	(2)	(3)
Period	Women aged 15-44	Women aged 15-29	Women aged 30-44
Panel A: Formal urban (control) vs. informal urban (treatment)			
DID estimator	0.003	0.004	0.000
	(0.002)	(0.002)	(0.002)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	591,590	316,221	275,369
R^2:	0.063	0.087	0.043
Panel B: Informal urban (control) vs. rural (treatment)			
DID estimator	-0.011	0.003	-0.028
	(0.003)	(0.003)	(0.004)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	482,651	284,385	198,266
R^2:	0.105	0.139	0.068
Panel C: Formal urban (control) vs. rural (treatment)			
DID estimator	-0.007	0.007	-0.022
	(0.003)	(0.002)	(0.004)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	568,457	309,274	259,183
R^2:	0.111	0.151	0.072

Note: DID estimates of the pension reform. We use the reported formality status for the current job, or if unavailable we assign past own formality status (if available). Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3 col. 6. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A2: Contribution and Funding Rules for the Brazilian RGPS Pension Schemes

	Urban scheme		Rural scheme			
	Employer	Employee	Product sales tax	Employee	Urban employer	Budget transfers
Pre-reform	20%* payroll contributions	8-11% SIC, average 10%**	2.10%	no SIC	3% payroll tax	filling funding gaps
Post-reform	20%*-22%** payroll contributions	8-11% SIC, average 10%**	2.20%	no SIC	3% incorporated into general SIC	filling funding gaps

Note: *Numbers from Table 11-10 in Matijascic and Kay (2008). **Barreto de Oliveira and Beltrão (2015). The general employer's contribution rate is 20%; additionally they have to pay 8% payroll contributions for the Length-of-Service Guarantee Fund and additional 2.5% payroll contributions if it is a financial institution. The 'Product sales tax' in the rural scheme refers to the tax on the commercialization price of agricultural products paid for by the first purchaser (wholesalers).

Table A3: Sensitivity Analysis - Women Outside Age Range Excluded: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
DID women aged 15-44	-0.007	-0.007	-0.010	-0.008	-0.007	-0.009
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.004	0.005	0.003	0.004	0.005	0.003
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.028	-0.028	-0.026	-0.024	-0.024	-0.023
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes
N:	15-44 (1,440,753); 15-29 (854,531); 30-44 (586,222)					
R^2 15-44:	0.006	0.008	0.094	0.099	0.108	0.108
R^2 15-29:	0.003	0.005	0.131	0.136	0.142	0.142
R^2 30-44:	0.010	0.014	0.046	0.050	0.059	0.060

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A4: Sensitivity Analysis - Rural and Urban Group Definition: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Defined by household location						
DID women aged 15-44	-0.009	-0.010	-0.012	-0.011	-0.010	-0.006
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.002	0.002	-0.001	0.001	0.001	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
DID women aged 30-44	-0.030	-0.030	-0.028	-0.027	-0.026	-0.019
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
N:	15-44 (1,548,011); 15-29 (920,437); 30-44 (627,574)					
R^2 15-44:	0.005	0.008	0.094	0.100	0.108	0.109
R^2 15-29:	0.003	0.005	0.134	0.139	0.145	0.145
R^2 30-44:	0.010	0.015	0.045	0.049	0.058	0.059
Panel B: Defined by personal occupational information and household location						
DID women aged 15-44	-0.010	-0.010	-0.014	-0.012	-0.013	-0.013
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.003	0.004	-0.001	0.000	0.000	-0.001
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.030	-0.030	-0.029	-0.028	-0.029	-0.026
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N:	15-44 (1,548,011); 15-29 (920,437); 30-44 (627,574)					
R^2 15-44:	0.006	0.009	0.094	0.100	0.108	0.109
R^2 15-29:	0.004	0.006	0.134	0.139	0.145	0.145
R^2 30-44:	0.011	0.016	0.045	0.049	0.058	0.059
Panel C: Defined by personal and family head occupational information						
DID women aged 15-44	-0.007	-0.007	-0.012	-0.010	-0.010	-0.010
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.007	0.008	0.001	0.002	0.002	0.001
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.029	-0.028	-0.028	-0.027	-0.027	-0.025
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N:	15-44 (1,441,387); 15-29 (851,914); 30-44 (589,473)					
R^2 15-44:	0.006	0.009	0.102	0.107	0.115	0.115
R^2 15-29:	0.004	0.006	0.147	0.150	0.155	0.156
R^2 30-44:	0.011	0.016	0.046	0.050	0.059	0.060
Controls in Panel A, Panel B and Panel C:						
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Panel A: Rural and urban group definition by household location; Panel B: Rural and urban group definition by personal occupational information and household location (not using occupational information of the household head); Panel C: Rural and urban group definition by personal and family head occupational information (not using information on household location). Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A5: Sensitivity Analysis - Mixed Occupation Couples: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Women from mixed occupation couples included, dummy for mixed couple						
DID women aged 15-44	-0.007	-0.007	-0.010	-0.009	-0.009	-0.009
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.007	0.008	0.003	0.003	0.003	0.002
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.030	-0.029	-0.027	-0.027	-0.027	-0.024
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N:	15-44 (1,548,011); 15-29 (920,437); 30-44 (627,574)					
R^2: 15-44	0.006	0.008	0.094	0.100	0.108	0.109
R^2: 15-29	0.003	0.005	0.134	0.139	0.145	0.145
R^2: 30-44	0.011	0.016	0.045	0.049	0.058	0.059
Panel B: Women from mixed occupation couples included, no dummy for mixed couple						
DID women aged 15-44	-0.006	-0.006	-0.011	-0.010	-0.009	-0.010
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.007	0.008	0.002	0.002	0.003	0.002
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.028	-0.027	-0.027	-0.026	-0.025	-0.024
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N:	15-44 (1,548,011); 15-29 (920,437); 30-44 (627,574)					
R^2 15-44:	0.005	0.008	0.094	0.100	0.108	0.108
R^2 15-29:	0.003	0.005	0.134	0.139	0.145	0.145
R^2 30-44:	0.010	0.015	0.045	0.049	0.057	0.059
Controls in Panel A and Panel B:						
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Panel A: Dummy for mixed couple=1 if occupation of the woman is not equal the occupation of her partner, 0 otherwise; Panel B: Mixed couples included according to the woman's occupation. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A6: Outcome Variables (fertility Measures)

Variables	Description
Total number of children born (alive or dead) after completed fertility phase (45 years or above)	This variable is constructed from the PNAD survey years with a fertility section including information on the total number of births (alive or dead), i.e., the 1984-85, 1992-93, 1995-99, 2001-09 and 2011-14 waves. Our sample includes female respondents of the birth cohorts between 1930 to 1969, who are between 45-69 years of age in a given survey year (In 1984, the fertility section is only answered by women up to 54 years old. We exclude women above 69 years to account for selective mortality). We assign the reported total number of births of women older than 45 years of age in a given year retrospectively to the year in that they were 45 years old.
New-born Child under 1 year old (0/1)	Binary indicator variable that equals 1 if a woman has a new-born child under 12 months of age and 0 otherwise. Constructed using household composition and birth data. Multiples and two birth events per year are coded single births.
Childlessness (0/1)	Binary indicator that equals 1 if a woman aged 45 years or above never gave birth to a child. Based on the variable 'total number of children born (alive or dead) after completed fertility phase'.

Table A7: Treatment Variables

Variables	Description
RURAL	Binary indicators that equals 1 if an individual is a rural worker, 0 otherwise. Assignment of rural worker status according to an (legal) occupation-based definition, as follows: 1.) by the legal classification of the individual's current occupation performed during the reference week. 2.) for individuals not employed during the reference week we use retrospective occupational information available for up to 4 years prior to the reference year. 3.) for individuals with insufficient personal occupational information we assign the treatment status based on the occupation of the family head. 4.) for individuals with insufficient personal and household head information we assign the status using information on the household location, i.e., rural or urban residence.
POST	Binary indicators that equals 1 for observations in the years after the pension reform in July 1991, 0 otherwise.
Gross present pension wealth	Pre- and post-reform pension wealth is computed as the present value of predicted old age benefits before and after the reform adjusted for real interest rates and average survival probabilities (computed using IBGE mortality tables; first time available in 1998): $Pension\ Wealth = \sum_{t=0}^{T-a} s_{a,t} \times \frac{1}{(1+i)^t} \times pension_t$, with $s_{a,t}$ denoting the probability of a person of age a in a given year surviving until year t; $T-a$, indicates the remaining maximum lifespan differentiated by sex and birth cohort; i a constant discount rate (a plausible rate of 12% in the main analysis, see Azzoni and Isai (1994)); and $pension_t$ denotes the old age minimum pension benefit. A retired person receives the pension from period $t = 0$ until death. A non-retired person receives the pension starting in a future period $t > 0$, defined by the person's age and the regular retirement age. We compute pre- and post reform pension wealth for each individual and every year on the basis of individuals income from its main job. We assume that this income is the relevant base income for individuals regarding their retirement pension benefits. Further we assume that the future benefit level is 100% of this income, i.e., that individuals work until they are eligible for full benefits. If an individual is not working (i.e., has no current main job income) or its main job income falls below the minimum pension level (minimum wage), we impute the average pension benefit level of current pensioners by year, men and women and by rural and urban (in more detail, we take the conditional mean of pension benefits that lie between the 1st and 99th percentile of the distribution; for rural workers this is about the applicable minimum pension benefit level since almost all rural pensioner receive minimum pension benefits). To compute couples pension wealth, the pension wealth of rural women with a partner eligible for the regular old age pension before the reform is set to 0.

Table A8: Individual covariates

Variables	Description
Age of the woman	Age of the female respondent (in years).
Age of the woman's partner	Age of the female respondent's partner (in years). For female respondents who currently do not have a partner, we impute the value by adding the samples (by year, federal state and rural residence) average difference in ages between women and their partners to the age of the woman.
Can read and write (literacy)	Binary indicator that equals 1 if the individual knows how to read and write (self-assessed), 0 otherwise.
Employed during reference week	Binary indicator variable that equals 1 if the respondent worked during the reference-week, 0 otherwise. Following Helfand and Brunstein (2001), our variable is harmonized by using the IBGE definition until 1992. The PNAD captures various types of employment, including employees, domestic workers, self-employed or own account workers, employers and unpaid family workers. To ensure consistency over time, our variable considers only economic activities enumerated in cash or in kind as well as unremunerated activities of at least 15 hours per week. Activities related only to the production for own consumption purposes and unpaid family work for the purpose of producing a non-marketed services (e.g. care for elderly/children) were not considered as employment. Individuals having a job but were temporarily away from work during the reference week (e.g. due to vacation or strike, etc.) are considered employed as long as they report an economic activity.
Highest educational attainment	Four binary indicators (No, Primary, Secondary, Tertiary education) for the highest educational attainment.
Married	Binary indicator that equals 1 if female is married, 0 otherwise. Based on the PNAD household and family roster. The household and family roster definition of "spouse" includes formal and informal marriages and domestic partnerships.
Years of education	Years of education, i.e., all years of school attendance (Primary, Secondary, Tertiary) reported by the respondent. For female respondents who do not report their years of education, we impute the mean value by year, region and rural residence.

Table A9: Job related covariates

Variables	Description
Dummies for 10-hour brackets of reported number of hours of work per week	Binary indicators (8) that equals 1 if the individual is working 0 hours (not working), 1-10 hours, 11-20 hours, 21-30 hours, 31-40 hours, 41-50 hours, 51-60 hours or more than 60 hours on average per week, 0 otherwise. Average number of hours worked per week are conditional on employment during reference-week. Employed during reference-week refers to a binary indicator (see variable description for details).
Woman's income share	The female respondents income as a share of total household income (excluding retirement pension income).
Woman's lifetime labor supply	The female respondents lifetime labor supply is proxied by the sum of predicted cubic age-specific work probabilities over the working life separated by Brazilian federal states and urban/rural occupation.

Table A10: Household covariates

Variables	Description
Caretaker in the household	Binary indicator that equals 1 if a non-working (indicated by employment during reference-week variable) pension-eligible person or actual pensioner is co-residing in the household.
Household/Family pension income share	Retirement pension income (old-age, length of service and disability) of all family members/household members as a share of household/family income. Households are defined as potentially extended multigenerational family units, which may include, in addition to first-degree relatives, more distant relatives or other co-residing persons, who live in the same household and under the same roof and make their living through contributions from the household members (i.e., a potentially extended multigenerational family). Since we do not know anything about caring arrangements and intra-family bargaining within those households, we additionally use a narrower concept than households, i.e., self assessed families within those households.
Log household/family income	Natural logarithm of the income of all household/family members excluding retirement pension income. Income sources: labor income from main and other jobs, merchandise income, wage bonuses, income from rent, interest, donations, transfers and other sources.)
Number of adults in the household	Number of adults in the household, i.e., individuals aged 18 years or older.
Dummies for prior children	Six dummies indicating the number of previously born children (birth parity), i.e., born at least one year before the survey: 0, 1, 2, 3, 4, 5+.
Wealth Index	The wealth index is constructed as the first principal component from the following variables: Six dummies indicating the form of water supply used by the household: main network with internal/external plumbing, well or spring with internal/external plumbing, other sources with internal/external plumbing. Four dummies indicating the sewage treatment: sanitation network, septic tank, rudimentary tank, other forms of sewage treatment. Two dummies indicating access to sanitary instalments: use of sanitary instalments is exclusive to household, sanitary instalments are shared by more than one household. One dummy for whether the household has electricity. Five dummies for household ownership of durable goods: refrigerator, stove, water filter, radio, television. Three dummies indicating the type of garbage disposal: collected, burned or buried, other (dumped into empty land or into river/lake/sea). Fifteen interaction terms of three dummies for household type (house, apartment, room) with five dummies for ownership status (paid for, still paying, rented, ceded, other). Three dummies indicating the main material used on walls of the household type: masonry, wood, other materials. Four dummies indicating main material used on roof of the household type: shingle roof, concrete roof, zinc roof, other materials. Two variables for the number of rooms per capita and the number of bedrooms per capita. We construct the wealth index separately by rural and urban household location to measure relative living conditions in rural and urban areas - this is relevant regarding structural differences in housing conditions (cf. McKenzie (2005) and Vyas and Kumaranayake (2006) for the problem of clumping and truncation in PCA). In the case of item non-response we impute averages by federal state and rural/urban residence in the time spans from 1981-85, 1986-90, 1992-96 and 1997-99 (if for example a value is missing for a rural household in a federal state in one year it is replaced by the time spans mean value of the variable of rural households in this region.).

Table A11: Region and group covariates

Variables	Description
Child mortality	Constructed from Demographic and Health Surveys (DHS) data (1986 and 1996) for each year between 1981-97 (constant 1997 level for 1998-99) for four different macro-regions, i.e., north-east, mid-west, south and south-east (region south is represented by Rio de Janeiro and Sao Paulo in the DHS, Minas Gerais and Espirito Santo are not covered). Generated as the moving average of the number of children having dying before 60 months old in the past 10 years divided by the total number of children being born in the past 10 years (The same procedure is applied by DHS to generate child mortality statistics on regional levels.).
Race shares	Four variables constructed from Brazilian Census data (1980, 1990 and 2000). Shares are matched to the PNAD using the nearest neighbour census year. Share of black, mixed-race, white or other skin colour/race within a federal state and by rural/urban residence.
Catholic/Protestant/ Other/No religion shares	Four variables constructed from Brazilian Census data (1980, 1990 and 2000). Shares are matched to the PNAD using the nearest neighbour census year. Definition of religious affiliation includes several religious groups reported by the individual. Catholic's include: Catholic roman, Brazilian Catholic Apostolic, other Catholic, Anglican. Protestant's include: Protestant, undetermined Protestant, Adventist, Baptist, Lutheran, Methodist, Presbyterian, other traditional Protestant, Mennonite, Congregational, Pentecostal, Assembly of God, Christian Congregation of Brazil, God is Love, Foursquare Gospel, Universal of the Kingdom of God, New Life Evangelical Protestant Pentecostal, Evangelical Protestant Biblical Revival Pentecostal, Chain Of Prayer Pentecostal, House of the Blessing, Brazil for Christ, Church of the Nazarene, House of Prayer, Maranata, Salvation Army, Religion of God, Undetermined Evangelical Protestant, Renewed Evangelical Protestant without institutional ties, Pentecostal Evangelical without institutional ties. Other include: Buddhist, Hindu, Jewish, Muslim, Orthodox, Neo-Christian, other Neo-Christian, undetermined Christian, Christian without institutional ties, Jehovah's Witnesses, Latter Day Saints (Mormons), Spiritist, other afro Brazilian, oriental Brazil, new oriental, other oriental, esoteric, indigenous, other minorities, other not classified.
Rede Globo Coverage	Constructed using the La Ferrara, Chong and Duryea (2012) data set on Rede Globo coverage. Share of individuals in a federal state receiving the Rede Globo broadcasting signal (television reception) in the year preceding the survey.
Regional industry specific trade shocks	Constructed as in Dix-Carneiro and Kovak (2017) but not aggregated on regional level (therefore, regional industry specific) using annual tariff reductions taken from De Paiva Abreu (2004), Table 1. Region-industry specific trade shocks for 20 industry groups: 1) agriculture; 2) mineral mining; 3) petroleum and gas extraction and coal mining; 4) non-metallic mineral goods manufacturing; 5) iron and steel nonferrous and other metal production and processing; 6) machinery, equipment, commercial installation manufacturing and tractor manufacturing; 7) electric, electronic and communication equipment and component manufacturing; 8) automobile, transportation and vehicle parts manufacturing; 9) wood products, furniture manufacturing and peat production; 10) paper manufacturing, publishing and printing; 11) rubber product manufacturing; 12) chemical product manufacturing; 13) petroleum refining and petrochemical manufacturing; 14) pharmaceutical products, perfumes and detergents manufacturing; 15) plastic products manufacturing; 16) textiles manufacturing; 17) apparel and apparel accessories manufacturing; 18) footwear and leather and hide products manufacturing; 19) food processing (coffee, plant products, meat, dairy, sugar, oils, beverages and other); 20) miscellaneous other products manufacturing.

Table A12: Test of the Common Trend: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dep. Variable	Newborn child under 1 year old (0/1)		
	(1)	(2)	(3)
Period	Women aged 15-44	Women aged 15-29	Women aged 30-44
1981	-0.007	-0.012	0.003
	(0.005)	(0.006)	(0.007)
1982	-0.000	-0.009	0.012
	(0.006)	(0.007)	(0.009)
1983	0.001	0.000	0.002
	(0.004)	(0.006)	(0.007)
1984	-0.003	-0.006	0.001
	(0.005)	(0.006)	(0.008)
1985	0.002	-0.001	0.007
	(0.004)	(0.005)	(0.007)
1986	-0.003	-0.007	0.004
	(0.005)	(0.005)	(0.007)
1987	-0.006	-0.007	-0.006
	(0.004)	(0.005)	(0.007)
1988	-0.007	-0.006	-0.009
	(0.004)	(0.007)	(0.008)
1989	-0.005	0.001	-0.013
	(0.005)	(0.006)	(0.008)
1992	-0.009	-0.008	-0.011
	(0.004)	(0.004)	(0.008)
1993	-0.007	0.002	-0.020
	(0.005)	(0.006)	(0.008)
1995	-0.005	0.007	-0.021
	(0.005)	(0.006)	(0.005)
1996	-0.017	-0.007	-0.027
	(0.005)	(0.007)	(0.006)
1997	-0.012	0.000	-0.026
	(0.006)	(0.009)	(0.007)
1998	-0.011	-0.001	-0.024
	(0.006)	(0.008)	(0.006)
1999	-0.022	-0.010	-0.034
	(0.006)	(0.006)	(0.007)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	1,442,376	854,814	587,562
R^2:	0.107	0.142	0.058

Note: Year-specific treatment effects for the full sample and by age groups 15-29 and 30-44. Dependent variable: Dummy, whether a child was born in the last 12 months. Full set of covariates, as in Table 3, column 6. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A13: Test with Placebo Event Dates: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1992	1993	1995	1996	1997	1998	1999
DID women	0.007	-0.004	-0.003	-0.002	-0.006	0.004	0.006	0.009	0.007	-0.007	-0.007	-0.004	-0.012	-0.006	-0.009	-0.018
aged 15-44	(0.004)	(0.006)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)	(0.007)	(0.005)	(0.006)
N:	176,595	181,925	182,022	182,901	186,472	133,156	135,880	135,768	136,592	140,807	141,909	145,897	146,076	149,785	149,765	151,826
R^2:	0.120	0.122	0.118	0.110	0.109	0.105	0.101	0.105	0.100	0.095	0.096	0.093	0.091	0.091	0.089	0.089
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1992	1993	1995	1996	1997	1998	1999
DID women	0.008	0.003	-0.006	-0.002	-0.005	0.008	0.007	0.008	0.002	-0.007	0.002	0.007	-0.001	0.004	-0.002	-0.009
aged 15-29	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)	(0.004)	(0.006)	(0.006)	(0.007)	(0.010)	(0.008)	(0.007)
N:	107,555	110,806	109,893	110,500	112,270	78,839	80,377	79,956	80,129	81,525	81,714	83,530	83,113	85,183	85,162	86,272
R^2:	0.165	0.164	0.162	0.147	0.147	0.143	0.137	0.143	0.136	0.127	0.130	0.123	0.125	0.120	0.121	0.119
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1992	1993	1995	1996	1997	1998	1999
DID women	0.005	-0.013	0.003	-0.002	-0.006	-0.004	0.007	0.010	0.013	-0.009	-0.020	-0.019	-0.025	-0.018	-0.019	-0.027
aged 30-44	(0.007)	(0.009)	(0.008)	(0.009)	(0.008)	(0.005)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
N:	69,040	71,119	72,129	72,401	74,202	54,317	55,503	55,812	56,463	59,282	60,195	62,367	62,963	64,602	64,603	65,554
R^2:	0.064	0.070	0.061	0.061	0.060	0.059	0.055	0.053	0.052	0.050	0.049	0.052	0.048	0.049	0.048	0.048

Note: DID estimates for placebo reforms in two-period models. Before 1991, all years are compared to the last pre-reform period, i.e. 1990, serving as the placebo treatment date. After 1991, all years are compared as actual treatment dates to the last pre-reform period, i.e. 1990. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A14: Desired Number of Children, by Urban/Rural and Age Groups

Desired number of children of women						
Panel A: All women						
	1986		1996		Change	
Age groups	Urban	Rural	Urban	Rural	Urban	Rural
15-44	2.67	3.07	2.19	2.52	-0.48	-0.55
15-29	2.48	2.82	2.03	2.26	-0.45	-0.56
30-44	2.95	3.45	2.40	2.84	-0.55	-0.60
Panel B: Women with at least one child						
	1986		1996		Change	
Age groups	Urban	Rural	Urban	Rural	Urban	Rural
15-44	2.82	3.25	2.30	2.68	-0.52	-0.57
15-29	2.52	2.93	2.01	2.34	-0.50	-0.59
30-44	3.03	3.51	2.47	2.93	-0.56	-0.58
Panel C: Women with number of children<children desired						
	1986		1996		Change	
Age groups	Urban	Rural	Urban	Rural	Urban	Rural
15-44	2.91	3.41	2.51	2.80	-0.40	-0.61
15-29	2.66	3.12	2.25	2.51	-0.41	-0.61
30-44	3.68	4.65	3.28	3.86	-0.40	-0.79

Note: Sample consists of Brazilian females aged 15-44. Rural and urban groups are defined by household location. The corresponding DHS questionnaire asks for the number of desired children the respondent would like to have in her whole life, irrespective of the number of already born children.

Data: DHS 1986, 1996.

Table A15: Contraceptive Methods, by Urban/Rural and Age Groups

Panel A: Modern Methods	1986		1996		Change		Change in %	
Age groups	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
15-44	0.395	0.308	0.512	0.441	0.117	0.134	29.7	43.4
15-29	0.395	0.307	0.508	0.438	0.114	0.131	28.8	42.8
30-44	0.396	0.309	0.517	0.445	0.122	0.136	30.8	44.1
Panel B: Traditional Methods	1986		1996		Change		Change in %	
Age groups	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
15-44	0.060	0.077	0.039	0.057	-0.021	-0.020	-34.8	-26.7
15-29	0.060	0.076	0.039	0.056	-0.021	-0.020	-35.1	-26.6
30-44	0.061	0.079	0.040	0.057	-0.020	-0.022	-34.4	-27.1
Panel C: Methods in Detail	1986		1996		Change		Change in %	
Women aged 15-44	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Pill	0.169	0.159	0.175	0.138	0.006	-0.021	3.5	-13.0
IUD	0.009	0.001	0.011	0.004	0.002	0.002	21.7	175.7
Injections	0.006	0.001	0.013	0.007	0.007	0.006	131.4	865.1
Diaphragm, Foam or Jelly	0.004	0.003	0.001	0.000	-0.003	-0.003	-81.5	-100.0
Condom	0.013	0.007	0.050	0.023	0.038	0.017	295.6	244.7
Female sterilization	0.183	0.131	0.244	0.267	0.062	0.136	33.7	104.3
Male sterilization	0.006	0.002	0.019	0.004	0.013	0.002	200.1	106.8
Rhythm	0.032	0.018	0.018	0.022	-0.014	0.004	-43.3	20.0
Withdrawal	0.025	0.052	0.019	0.027	-0.006	-0.025	-22.3	-47.4
Other	0.007	0.002	0.002	0.004	-0.005	0.002	-76.1	83.8
Age at sterilization	29.87	30.42	27.94	27.91	-1.936	-2.507	-6.5	-8.2
Knowledge of modern methods	0.996	0.979	0.998	0.990	0.002	0.011	0.2	1.1
Knows source for modern method	0.969	0.877	—	—	—	—	—	—

Note: Numbers in Panel A, B and C show the shares of current contraceptive methods used by women. Numbers in Panel D show average age of women at sterilization and shares of knowledge about modern contraceptive methods and the source for modern methods, i.e. where it is supplied. Pregnant women are coded as not currently using. Classification of contraceptive methods according to DHS definition: Modern methods are Pill, IUD, Injections, Diaphragm/Foam/Jelly, Condom, Female Sterilization, Male Sterilization and Norplant. Traditional methods are Periodic Abstinence (Rhythm), Withdrawal, Abstinence, and any other country specific methods. Rural and urban groups are defined by household location.

Data: DHS 1986, 1996.

Table A16: DiD Regression Results - Covariates: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)		(2)		(3)	
	Women aged 15-44		Women aged 15-29		Women aged 30-44	
DID estimator	-0.009	(0.003)	0.003	(0.003)	-0.024	(0.004)
Years of education	-0.002	(0.000)	-0.004	(0.000)	0.001	(0.000)
Dummy married	0.163	(0.003)	0.232	(0.004)	0.043	(0.003)
Dummy birth-parity 1	-0.005	(0.007)	-0.025	(0.009)	0.011	(0.003)
Dummy birth-parity 2	-0.069	(0.006)	-0.100	(0.009)	-0.026	(0.004)
Dummy birth-parity 3	-0.083	(0.007)	-0.120	(0.010)	-0.032	(0.004)
Dummy birth-parity 4	-0.067	(0.006)	-0.090	(0.010)	-0.016	(0.004)
Dummy birth-parity 5+	-0.029	(0.007)	-0.052	(0.008)	0.027	(0.005)
Dummy 1-10 hours of work	-0.036	(0.003)	-0.038	(0.005)	-0.027	(0.002)
Dummy 11-20 hours of work	-0.035	(0.002)	-0.038	(0.003)	-0.027	(0.002)
Dummy 21-30 hours of work	-0.037	(0.002)	-0.040	(0.002)	-0.030	(0.002)
Dummy 31-40 hours of work	-0.040	(0.002)	-0.047	(0.003)	-0.032	(0.002)
Dummy 41-50 hours of work	-0.048	(0.002)	-0.053	(0.003)	-0.039	(0.002)
Dummy 51-60 hours of work	-0.046	(0.003)	-0.051	(0.004)	-0.040	(0.002)
Dummy 60+ hours of work	-0.045	(0.002)	-0.050	(0.004)	-0.037	(0.002)
Household income share of the woman	0.012	(0.002)	-0.006	(0.003)	0.013	(0.002)
Dummy caretaker	0.004	(0.001)	-0.003	(0.001)	-0.005	(0.001)
Log of household income excl. pensions	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Wealth index	-0.016	(0.002)	-0.016	(0.002)	-0.013	(0.002)
Dummy Globo coverage	0.004	(0.008)	0.010	(0.007)	-0.010	(0.010)
Protestants share	-0.131	(0.063)	-0.046	(0.067)	-0.241	(0.068)
Other religions share	-0.417	(0.135)	-0.388	(0.121)	-0.367	(0.168)
No religion share	0.001	(0.087)	-0.084	(0.082)	0.141	(0.094)
Race share black	0.086	(0.123)	0.137	(0.111)	-0.053	(0.158)
Race share mixed	0.099	(0.039)	0.109	(0.033)	0.073	(0.052)
Race share other	-0.234	(0.145)	-0.240	(0.146)	-0.266	(0.185)
Under 5 years mortality rate	0.209	(0.082)	0.145	(0.079)	0.328	(0.101)
Year and region FE	Yes		Yes		Yes	
Other Covariates (see note)	Yes		Yes		Yes	
N:	1,442,376		854,814		587,562	
R^2:	0.107		0.142		0.058	

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3 col. 6, explained in detail in Tables A6-A11. Other individual covariates: dummies for the age of the women. Other household covariates: dummies for the age of the partners of the women. Other household covariates: dummies for the number of adults in the household. Other regional/group covariates: regional industry specific trade shocks (variable based on methodology of Dix-Carneiro and Kovak (2017) and annual tariff reduction data taken from De Paiva Abreu (2004)). Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A17: DiD Regression Results: Subgroups (5-Year Age Cohorts)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
DID women aged 15-19	0.004	0.004	0.004	0.005	0.005	0.003
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
in % to baseline	4.9	4.9	4.9	6.1	6.1	3.7
DID women aged 20-24	0.008	0.008	0.007	0.008	0.009	0.008
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
in % to baseline	3.9	3.9	3.4	3.9	4.4	3.9
DID women aged 25-29	-0.012	-0.012	-0.011	-0.008	-0.007	-0.009
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
in % to baseline	-7.0	-7.0	-6.5	-4.8	-4.2	-5.3
DID women aged 30-34	-0.036	-0.036	-0.031	-0.028	-0.028	-0.028
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)
in % to baseline	-25.7	-25.7	-22.9	-21.2	-21.2	-21.2
DID women aged 35-39	-0.032	-0.031	-0.027	-0.025	-0.024	-0.024
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
in % to baseline	-30.5	-29.8	-27.0	-25.5	-24.8	-24.8
DID women aged 40-44	-0.026	-0.027	-0.026	-0.026	-0.025	-0.023
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
in % to baseline	-36.2	-37.1	-36.2	-36.2	-35.3	-33.4
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes
N:	15-19 (319,086), 20-24 (282,344), 25-29 (253,384), 30-34 (226,782), 35-39 (195,242), 40-44 (165,538)					
R^2 15-19:	0.001	0.004	0.212	0.213	0.217	0.217
R^2 20-24:	0.008	0.012	0.130	0.137	0.143	0.144
R^2 25-29:	0.008	0.012	0.066	0.075	0.081	0.081
R^2 30-34:	0.010	0.015	0.044	0.050	0.059	0.060
R^2 35-39:	0.014	0.018	0.034	0.038	0.047	0.048
R^2 40-44:	0.014	0.020	0.035	0.035	0.044	0.045

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A18: Results of the DiD Regression Analysis - Alternative Specifications: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DID women aged 15-44	-0.008	-0.008	-0.011	-0.007	-0.008	-0.010	-0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
DID women aged 15-29	0.003	0.003	0.000	0.004	0.003	0.002	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DID women aged 30-44	-0.023	-0.024	-0.024	-0.023	-0.023	-0.023	-0.024
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year and region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Covariates (see note):							
Individual	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Job	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional/group	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other indicators for educational achievements	Yes	No	No	No	No	No	No
Household retirement income share	No	Yes	No	No	No	No	No
Income variables on family basis	No	No	Yes	No	No	No	No
Dummies working unpaid or in public sector	No	No	No	Yes	No	No	No
Squared terms	No	No	No	No	Yes	No	No
Only linear Age and age partner	No	No	No	No	No	Yes	No
Age and age partner linear and squared	No	No	No	No	No	No	Yes
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)						
R^2 15-44:	0.107	0.107	0.113	0.107	0.108	0.094	0.096
R^2 15-29:	0.143	0.142	0.154	0.142	0.143	0.136	0.141
R^2 30-44:	0.059	0.058	0.059	0.058	0.059	0.053	0.068

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Individual, job, household and region/group level covariates as in Table 3. Other indicators for educational achievements are a dummy indicating the ability to read and write and three dummies indicating highest educational stage (primary, secondary, college/university; has not attended any school dummy omitted) attended/attending. Income variables on family basis are log of family income and share of family income earned by the woman (both excl. pensions) for the nuclear family, i.e., only the woman, her partner and own children. Additional squared terms are years of schooling, log of household income (excl. pensions), share of household income (excl. pensions) earned by the woman and household wealth. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A19: Other Specifications - Time Trends and Region-Time Trends: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Time-trend						
DID women aged 15-44	-0.008	-0.008	-0.011	-0.008	-0.008	-0.008
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.004	0.004	0.003	0.004	0.005	0.004
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.029	-0.030	-0.028	-0.026	-0.025	-0.023
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)					
R^2: 15-44	0.007	0.008	0.092	0.098	0.106	0.107
R^2: 15-29	0.004	0.005	0.131	0.136	0.142	0.142
R^2: 30-44	0.013	0.015	0.044	0.048	0.057	0.058
Panel B: Region-Time-Trend						
DID women aged 15-44	-0.008	-0.006	-0.008	-0.006	-0.005	-0.007
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.004	0.004	0.004	0.005	0.006	0.004
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)
DID women aged 30-44	-0.030	-0.024	-0.023	-0.021	-0.020	-0.021
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)					
R^2 15-44:	0.008	0.008	0.092	0.098	0.106	0.107
R^2 15-29:	0.005	0.005	0.131	0.136	0.142	0.142
R^2 30-44:	0.015	0.016	0.045	0.049	0.058	0.058
Panel A: Time trend						
Panel B: Region-Time trend						
Controls in Panel A and Panel B (see note):						
Region FE	No	Yes	Yes	Yes	Yes	Yes
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A20: DiD Regression Results, Women Co-Residing vs. Not Co-Residing with a Pensioner: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dep. Variable	Newborn child under 1 year old (0/1)		
	(1)	(2)	(3)
Period	Women aged 15-44	Women aged 15-29	Women aged 30-44
Panel A: Women co-residing with a pensioner			
DID estimator	-0.007	0.002	-0.020
	(0.003)	(0.002)	(0.005)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	194,897	116,074	78,823
R^2:	0.093	0.138	0.067
Panel B: Women not co-residing with a pensioner			
DID estimator	-0.011	0.002	-0.025
	(0.004)	(0.004)	(0.004)
Year and region FE	Yes	Yes	Yes
Covariates (see note)	Yes	Yes	Yes
N:	1,247,479	738,740	508,739
R^2:	0.108	0.141	0.058

Note: DID estimates of the pension reform, differentiated by households with/without a pensioner. Dependent variable: Dummy, whether a child was born in the last 12 months. Full set of covariates as in Table 3, col. 6. Rural and urban group definition as in Table 2. Panel A: Sample of women co-residing with a pensioner; Panel B: Sample of women not co-residing with a pensioner. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A21: Sensitivity Analysis - Censit Areas: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Only Not Self-Representative Censit Areas						
DID women aged 15-44	-0.006	-0.007	-0.008	-0.006	-0.006	-0.006
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
DID women aged 15-29	0.002	0.002	0.002	0.002	0.002	0.002
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
DID women aged 30-44	-0.022	-0.022	-0.020	-0.019	-0.019	-0.015
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
N:	15-44 (491,454); 15-29 (294,772); 30-44 (196,682)					
R^2: 15-44	0.006	0.011	0.098	0.103	0.112	0.112
R^2: 15-29	0.003	0.006	0.135	0.139	0.145	0.145
R^2: 30-44	0.016	0.024	0.053	0.056	0.065	0.066
Panel B: Only Self-Representative Censit Areas						
DID women aged 15-44	-0.014	-0.012	-0.010	-0.006	-0.004	-0.005
	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)
DID women aged 15-29	-0.005	-0.003	0.001	0.004	0.006	0.006
	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)
DID women aged 30-44	-0.032	-0.029	-0.027	-0.024	-0.021	-0.023
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
N:	15-44 (281,348); 15-29 (168,576); 30-44 (112,772)					
R^2: 15-44	0.004	0.006	0.090	0.096	0.104	0.104
R^2: 15-29	0.002	0.004	0.125	0.130	0.136	0.136
R^2: 30-44	0.006	0.011	0.040	0.044	0.054	0.054
Panel C: Only Metropolitan Censit Areas						
DID women aged 15-44	-0.012	-0.012	-0.008	-0.006	-0.002	-0.006
	(0.005)	(0.005)	(0.006)	(0.006)	(0.008)	(0.009)
DID women aged 15-29	0.004	0.004	0.010	0.012	0.016	0.011
	(0.012)	(0.012)	(0.011)	(0.011)	(0.012)	(0.013)
DID women aged 30-44	-0.038	-0.037	-0.035	-0.034	-0.031	-0.034
	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)
N:	15-44 (15-44 (669,574); 15-29 (391,466); 30-44 (278,108)					
R^2 15-44:	0.002	0.004	0.087	0.094	0.102	0.102
R^2 15-29:	0.001	0.003	0.129	0.135	0.141	0.142
R^2 30-44:	0.003	0.007	0.038	0.043	0.052	0.053
Controls in Panel A, Panel B and Panel C:						
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A22: Sensitivity Analysis - Region-Censit Area Cluster Variable: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
DID women aged 15-44	-0.008	-0.008	-0.010	-0.008	-0.007	-0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DID women aged 15-29	0.004	0.005	0.003	0.004	0.005	0.003
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.029	-0.029	-0.028	-0.026	-0.025	-0.024
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)					
R^2 15-44:	0.006	0.008	0.092	0.098	0.106	0.107
R^2 15-29:	0.003	0.005	0.131	0.136	0.142	0.142
R^2 30-44:	0.011	0.015	0.045	0.048	0.057	0.058

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the level of censit areas by regions in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

Table A23: Sensitivity Analysis - Two-Period Model: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
DID women aged 15-44	-0.008	-0.008	-0.008	-0.008	-0.008	-0.007
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DID women aged 15-29	0.004	0.005	0.005	0.005	0.005	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DID women aged 30-44	-0.029	-0.030	-0.030	-0.030	-0.030	-0.025
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)					
R^2 15-44:	0.750	0.927	0.928	0.928	0.928	0.939
R^2 15-29:	0.661	0.904	0.904	0.904	0.904	0.912
R^2 30-44:	0.711	0.876	0.876	0.877	0.877	0.907

Note: DID estimates of the pension reform in a two-period model: Dependent variable: Dummy, whether a child was born in the last 12 months, reduced into one pre- and one post-treatment mean observation per group and region. Covariates as in Table 3. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the regional level in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99.

B. Computation of Pension Wealth

As the PNAD does not collect information on individual pension entitlements, we impute the pension wealth for the retired and non-retired population. The imputation is based on PNAD data (1981-90, 1992-93, 1995-99). We calculate pre- and post-reform pension wealth as the present value of discounted expected old-age benefit streams before/after the reform adjusted for real interest rates.

In a first step, we compute annual pension benefits. For not-yet eligible individuals, the expected old-age pension benefits (pension entitlements) are determined on the basis of the annual income levels on the main job (the "base income"). For already eligible individuals, we use actual pension benefits.

In the second step, we replace the base income with the annual minimum pension (equaling the legal minimum wage) if the current income from the main job of an individual is smaller than the minimum wage. Before the reform, we set the base income of married rural women to zero as only one person per household, normally the male household head, is eligible for old-age pension benefits. The base income of married rural men equals the flat pension benefit of 50% of the minimum wage before the reform. For urban workers (and the few rural workers with entitlements above the minimum pension level after the reform), we assume a 30 year work history. Given the old-age pension formula (70% of earnings + 1% per year of service with payroll tax contributions) this equalizes the expected pension benefit with the base income, leading to a 100% replacement rate before and after the pension reform.[1]

In a third step, we compute the expected annual pension streams from the date of pension entitlement up to death[2]. These computations make use

1. of the imputed base income (expected annual pension benefits),

2. of regular entitlement ages for males/females and urban/rural individuals (before reform 65 years for male/female rural workers and 65/60 for urban male/female

[1] As PNAD data lack information on each respondent's complete employment history (of which some decisions are only taken in the future), we abstain from adjusting pension entitlements for the number of contribution years (either paid by the individual in urban jobs or paid from other sources on behalf of the individual in rural jobs). Also, we ignore length-of-service pensions (for their necessary overly strong assumptions regarding employment biographies and retirement decisions). The comparably generous benefit level is reflected in the data: According to PNAD data, the average pension benefits of recently retired urban workers (between 65-70 years) are highly comparable with average income levels of urban workers (15-65 years). For rural workers, this is a negligible simplification: over 95% of rural workers receive the minimum pension, as the majority of rural workers is informally employed or earns incomes below the minimum wage level.

[2] For retired individuals, we define pension entitlements from the current year up to death. For non-retired individuals, we define entitlements from regular retirement age to death.

workers; after reform 60/55 years for male/female rural workers and 65/60 for male/female urban workers),

3. of average survival probabilities differentiated by sex and birth cohort (computed using IBGE mortality tables; first time available in 1998), and

4. of a constant discount rate of 12% in the main specification (following Azzoni and Isai (1994)).

Finally, we compute the sum of the annual present values of expected pension benefits from regular retirement age to death. Formally expressed, we compute an individuals expected pension wealth according to the following formula:

$$Pension\ Wealth = \sum_{t=0}^{T-a} s_{a,t} \times \frac{1}{(1+i)^t} \times pension_t, \tag{1}$$

with $s_{a,t}$ denoting the probability of a person of age a in a given year surviving until year t; $T-a$, indicates the remaining maximum lifespan differentiated by sex and birth cohort; i is a constant discount rate (12%); and $pension_t$ denotes the expected old-age pension benefits (base income) in t. A non-retired person receives the pension starting in a future period $t > 0$, defined by the person's age and the regular retirement age; a retired person receives the pension starting in period $t = 0$.

C. The Assignment of Urban vs. Rural Work Status

In the following, we provide details regarding the assignment of urban vs. rural work status and the imputation of missing values.

C.1 Information used for assigning urban vs. rural work status

The PNAD provides detailed information about the activity performed during the reference week (work, education, household chores, job search, retirement etc.) for all respondents aged 10 and above. Individuals who work during the reference week are asked to provide information on all jobs and activities, i.e., main job, secondary job and other jobs: They indicate self-employment (differentiating between professional work and for subsistence), classify the occupation/business activity (occupation and position held in this job) and the type of activity (rural sector: e.g., agriculture, ranching, forestry, fishing, small-scale mining, etc.; urban sector: e.g. manufacturing, service sector, etc.).

Individuals who are unemployed or out of the labor force in the reference week report their occupation/business activity for the preceding four years retrospectively; we assign

their latest employment status. For jobs and activities performed during the reference week, respondents report total working hours and monthly earnings.

Using the type of activity, we identify workers in the rural vs. urban sector.

C.2 Assignment rule for individuals with missing employment information

We are able to assign the vast majority of individuals to rural vs. urban old-age pension schemes by using personal occupational information. In cases with insufficient personal occupational information we assign the rural/urban worker status using the personal occupational information of the family head as proxy. Finally, for individuals with insufficient personal and family head occupational information, we assign the rural/urban worker status using information on the household location as proxy, i.e., rural or urban residence.

C.3 Sensitivity tests

As the correct assignment of workers to rural or urban status is crucial for our analysis, we carefully test the sensitivity of our results with respect to the status imputation. In sum, our results are robust i) to only using location of residence as a proxy for occupation; ii) to only considering individuals assigned by individual occupational information and household location (not considering the occupational information of the family head); and iii) to only considering individuals assigned using personal or family head occupational information (not considering individuals assigned using household location). None of these alternative assignment specifications alters our main results (Table A4); the estimates of all these different specifications are not significantly different from each other. This indicates that family head occupational information and the household location are good proxies to assign the rural/urban worker status.

D. Macroeconomic Environment of the 1980s and 1990s

Brazil displayed serious disequilibria in the public sector in the late 1970s and 1980s: The military government tried to achieve economic diversification through import substitution of industrial production. While the economy slowly diversified from primary

commodities in agriculture and mining into manufacturing, inflation accelerated and became a major factor of economic uncertainty. The main drivers of import substitution were state-owned enterprises, which soon became increasingly indebted.

In the late 1980s, several consolidation plans (1986: Cruzado Plan I and II; 1987: Bresser Plan; 1989: Summer Plan) attempted to reduce inflation, mainly through wage and exchange rate freezes and the creation of a new currency (the Cruzado); however, none of these plans reduced inflation sustainably owing to the lack of a comprehensive public sector reform package. The constitution of 1988 actually exacerbated the public sector disequilibrium as the promise of widespread social security shattered public finance.

After another set of unsuccessful stabilization plans based on the same strategy and using the same instruments as the stabilization plans before (1990: Collor Plan I; 1991: Collor Plan II), president Franco initiated the Plano Real (1994), which included an enforced balanced budget, general price indexation and the introduction of the Brazilian Real as new currency, pegged to the dollar. Breaking with the protectionist policies of the 1980s, the Plano Real was accompanied by a paradigmatic shift towards neoliberalism. The economy opened up, indebted state-owned enterprises were privatized and inflation came under control. At the same time, the government cut agricultural subsidies.

In the following, we assess the potential of the macroeconomic distortions and the subsequent stabilization efforts to affect fertility outcomes in Brazil. First, we test the robustness of our main results by controlling for inflation (technically, by adding the CPI and $CPI \times RURAL$ in the main regression (eq. (1)). All results are fully preserved (Table B1). Second, we analyze in great detail the potential wealth transfers originating from changes in output, external relations, or the labor market during the economic stabilization period.

D.1 Output

GDP per capita remained almost stagnant between 1981 and the period of macroeconomic stabilization. While the final stabilization plan ended a long period of economic uncertainty, economic growth remained modest following the Plano Real (Figure D1). In the Figure, the timing of the seven larger stabilization plans is illustrated with grey vertical lines; they have not fundamentally changed the path of GDP growth or unemployment. The same is true for manufacturing production, which remained also relatively flat over the 1980s and 1990s.

Figure D2 compares value added in industry vs. agriculture (owing to a lack of historical time series for total agricultural production, we use value added as proxy). In line with total manufacturing production, value added in industry grew very modestly

throughout the two decades. Agricultural value added grew stronger, not least owing to the farmland expansion into rainforest areas (Gibbs et al., 2010). This growth, however, was entirely concentrated in the formal 'industrialized' pillar of the agricultural sector and stems from the increasing concentration of large agricultural firms (through M&A) and economies of scales (Jank et al., 1999). Small-scale agricultural production and subsidiary farming, which comprise the largest part of our rural jobs, are poorly reflected in these figures. Overall, the stabilization efforts of the 1980s and 1990s did not dramatically alter the relative economic performance between the urban and rural economic sectors.

Table D1: Controlling for Inflation: Pooled (Women Aged 15-44) and Subgroups (Women Aged 15-29 vs. 30-44)

Dependent Variable	Newborn child under 1 year old (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
DID women aged 15-44	-0.007	-0.008	-0.010	-0.008	-0.007	-0.009
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 15-29	0.005	0.005	0.003	0.004	0.005	0.003
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID women aged 30-44	-0.029	-0.029	-0.028	-0.026	-0.025	-0.024
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year and region FE	No	Yes	Yes	Yes	Yes	Yes
Covariates (see note):						
Individual	No	No	Yes	Yes	Yes	Yes
Job	No	No	No	Yes	Yes	Yes
Household	No	No	No	No	Yes	Yes
Regional/Group	No	No	No	No	No	Yes
CPI and CPIxRURAL	Yes	Yes	Yes	Yes	Yes	Yes
N:	15-44 (1,442,376); 15-29 (854,814); 30-44 (587,562)					
R^2 15-44:	0.006	0.008	0.092	0.098	0.106	0.107
R^2 15-29:	0.004	0.005	0.131	0.136	0.142	0.142
R^2 30-44:	0.011	0.015	0.045	0.048	0.057	0.058

Note: DID estimates of the pension reform. Dependent variable: Dummy, whether a child was born in the last 12 months. Covariates as in Table 3. Additionally we include the CPI and the interaction between the rural treatment indicator and CPI as controls. Rural and urban group definition as in Table 2. Mixed urban-rural couples excluded. Standard errors clustered at the level of censit areas by regions in parentheses.

Data: PNAD 1981-90, 1992-93, 1995-99; World Bank (2021m).

Taken together, GDP growth was weak and, if anything, the development in the agricultural sector was comparatively better. The effects on fertility may be as follows: While GDP has been found to be a (weak) cyclical factor for fertility in Latin America (Adsera and Menendez, 2011), we do not expect a strong growth-fertility link in the relevant period. This stems from the fact that the average annual growth rate of per capita GDP in Brazil was between 0% and 1% in the two decades between 1980 and 2000. Since the value added in the agricultural sector grew stronger than in the manufacturing sector, we expect a comparatively greater growth potential in rural than in urban jobs.

Based on the idea that higher incomes increase the demand for children (defined as normal goods), this would render our estimates more conservative.

Figure D1: Constant GDP per Capita, Total Manufacturing Production and Unemployment Rate, Brazil 1981-1999

Note: Graph shows the development of GDP per capita, total manufacturing production and the unemployment rate (1981=100). Vertical lines (light-gray): Plano Cruzado (February 28, 1986), Plano Cruzado II (November 21, 1986), Plano Bresser (June 12, 1987), Plano Verão ('Summer Plan', January 15, 1989), Plano Collor (March 15, 1990), Plano Collor II (January 31, 1991), Plano Real (July 1, 1994).

Data: OECD (2021a,b); World Bank (2021c).

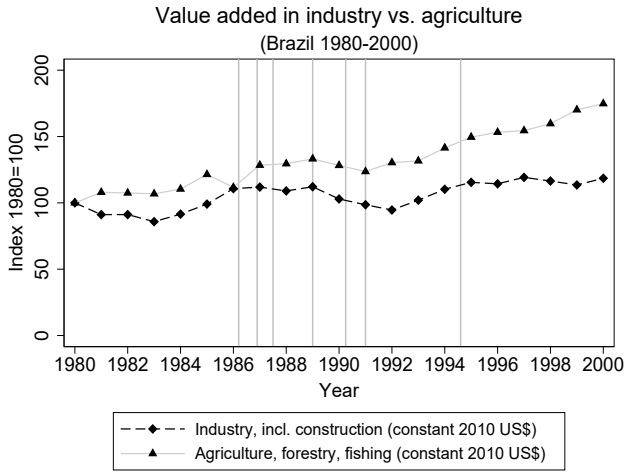

Figure D2: Value Added in Industry vs. Agriculture, Brazil 1980-2000

Note: Graph shows the indexed value added in industry and agriculture (1980=100). Vertical lines (light-gray): Plano Cruzado (February 28, 1986), Plano Cruzado II (November 21, 1986), Plano Bresser (June 12, 1987), Plano Verão ('Summer Plan', January 15, 1989), Plano Collor (March 15, 1990), Plano Collor II (January 31, 1991), Plano Real (July 1, 1994).

Data: World Bank (2021b,l).

D.2 External relations

Trade. Throughout the period of stabilization, Brazil's trade performance remained poor compared to the global average or the Latin American average (Bonelli and Pinheiro, 2008). Unlike, for instance, great performers such as China and Mexico, Brazil's share in total world exports remained stable between 1973 and 2000 and exports as percentage of Brazilian GDP remained constant. In absolute value, goods exports have increased since the beginning of the 1980s. Within merchandise exports, the share of manufacturing exports grew (Figure D3) while agricultural raw material and food exports became only slightly more important over time.

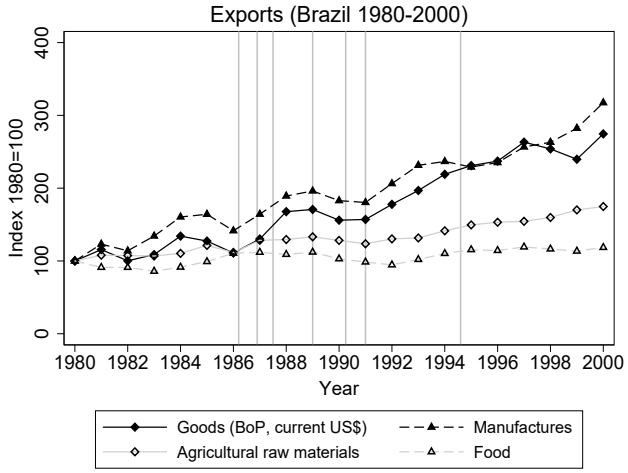

Figure D3: Exports, Brazil 1980-2000

Note: Graph shows the indexed values of goods exports, manufactures exports, food exports and agricultural raw material exports (1980=100). Vertical lines (light-gray): Plano Cruzado (February 28, 1986), Plano Cruzado II (November 21, 1986), Plano Bresser (June 12, 1987), Plano Verão ('Summer Plan', January 15, 1989), Plano Collor (March 15, 1990), Plano Collor II (January 31, 1991), Plano Real (July 1, 1994).

Data: World Bank (2021a,j,k,n).

Exchange rates. Regarding exchange rate fluctuations during the 1980s and 1990s, and its potential impact on redistribution between economic sectors, we would like to stress that Brazil's exchange rate system was quasi-fixed before and after the introduction of the Plano Real in 1994 (Nazmi, 1995). After a brief currency appreciation in 1994, the newly established currency (Brazilian Real) depreciated strongly, culminating in the currency crisis of 1999. While the exchange rate was no longer officially fixed thereafter, regular interventions of the Central Bank continued. The fixed exchange rates, together with widespread price controls mean that external price shocks can only have limited impact on Brazilian consumers before 1994. After 1994, the currency depreciation will make exporting sectors (i.e. manufacturing) more competitive; at the same time, we

observe rising unemployment in formal jobs (see Figure D1 above), making a uniform wealth transfer towards urban jobs very unlikely.

World-market prices. Regarding world-market price fluctuations of basic commodities that are mainly produced in Brazil, such as coffee or soybean (the two most important export crops), we do not expect strong fertility effects: As illustrated in Figure D4, the annual price fluctuations have been quite large and short-lived, making it unlikely that the agricultural sector is affected in a uniform way (apart from the fact that these prices fluctuate even stronger when considering shorter observation periods). The labor share of agricultural producers is quite low (estimated at 10% for coffee according to Bruce-Lockhart and Terazono (2019)), so that it remains unclear how strongly world market price fluctuations affected agricultural workers. It seems, however, unlikely that short-lived price and exchange rate fluctuations can explain the large and persistent fertility patterns.

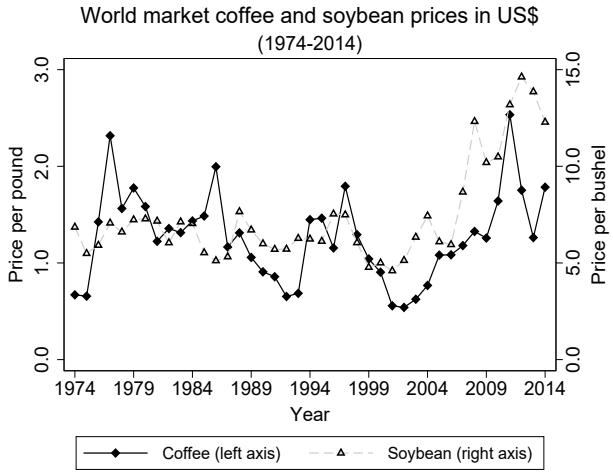

Figure D4: World Market Coffee and Soybean Prices (in USD), 1974-2014

Note: Graph shows world market coffee and soybean prices (in US$). Coffee price per pound, soybean price per bushel.

Data: Macrotrends (2021a,b).

D.3 Labor market

The 1980s were a period of economic uncertainty given the economic imbalances and high inflation rates. While a large literature predicts that aggregate economic uncertainty depresses fertility levels (or leads to a postponement of fertility), the exact mechanisms are complex and uniform fertility responses across (European) countries and different age groups of women are hard to discern (Kreyenfeld, Andersson and Pailhé, 2012). The main analysis on the fertility consequences of the economic crisis in Latin America suggests that times of high unemployment are associated with lower fertility (Adsera and Menendez, 2011).

In a framework in the spirit of Becker, the theoretical effects of unemployment on fertility are ambiguous. While unemployment can reduce the opportunity costs of childbearing (therefore increasing fertility), the income effect leads in the opposite direction. According to relative income generation potentials between partners and the generally low wages of women, the income effect dominates the substitution effects strongly in Latin America (Adsera and Menendez, 2011). Furthermore, lock-in effects (i.e., if women fear not finding re-employment after childbearing), will also make it less likely for women to opt for childbearing.

With more than 14%, official unemployment was highest at the beginning of the 1980s. It declined during the 1980s and started rising again in 1989 (see Figure D1). Within 15 years of the implementation of the pension reform, unemployment fluctuated around 10% and started to decline significantly only after the 2000s.

The recession of the 1980s was more strongly felt among urban residents than among rural settlers (Marichal, 1989). Because official unemployment is mostly a reflection of the formal (urban) labor market and because fertility responses in urban areas were comparably stronger (Adsera and Menendez, 2011), urban fertility should have declined stronger during the 1990s and early 2000s in relative terms. This would, however, run against us estimating significant relative fertility declines in rural jobs.

D.4 Possible redistributive implications

The brief outline suggests three ways in which the macroeconomic environment and the stabilization plans may have affected the distribution of economic opportunities between rural and urban occupations and, consequently, fertility outcomes:

First, the relative rise of urban unemployment should reduce economic prospects in urban occupations and, hence, depress fertility in urban areas, in relative terms; this runs against our findings.

Second, economic sectors more strongly engaged in international trade were also more strongly exposed to exchange rate fluctuations. As shown in Figure D3, this was mainly the case for manufacturing, which had a growing share in total exports. Accordingly, manufacturing faced relatively stronger exchange rate uncertainty and poorer economic prospects. Given that uncertainty should depress fertility, we would expect relative fertility declines in urban occupations; we, however, observe the opposite.

Third, the strong devaluation of the Brazilian currency after 1994 should make exporting sectors (i.e., manufacturing) relatively more competitive. This might imply a wealth transfer towards urban occupations. Such a transfer would comprise an income effect, suggesting that couples can afford more children, as well as a substitution effect from the

relatively more attractive employment prospects in manufacturing for women. According to the economics of fertility in the spirit of Becker (1960), the decision to have a child will depend on both, income and substitution effects.

Substitution effect. Formal sector employment shares in agriculture and industry declined slowly in the years following 1991 (earlier data are not available from the World Bank or the Federal Reserve Bank of St. Louis), while the (largest) service sector became even more important. The employment shares among women developed similar to the overall rates in industrial production and in the service sector. Yet, the employment of women in the agricultural sector remained quite stable over the 15 years period (after an intermittent dip in the late 1990s). As shown in Figure D5, we do not observe growing employment of women in manufacturing, making the substitution effect rather unlikely.

The stability of employment across sectors in the pre- and post-reform period becomes clear when using employment rates from PNAD, which also include informal employment relations (Figure D6, left panel). Employment remained very stable over the two decades following the year 1980, so that we can broadly rule out strong redistributive effects on the labor market.

Figure D5: Employment, Brazil 1991-2005

Note: Graph shows the development of total and female employment in agriculture, industry and services (1991=100).

Data: World Bank (2021d,e,f,g,h,i).

Income effect. If the income effect existed alone, we should observe a relative growth (or recovery) in urban fertility. This, again, seems unlikely given the continued declining trend in urban fertility levels depicted in the main figures of our paper. It is even uncertain whether to expect an income effect at all: This should be reflected in differential movements of hourly wages in agriculture vs. manufacturing. Yet, as depicted in Figure D6 (right panel), hourly wages (taken from PNAD) remained surprisingly flat throughout both decades for both, men and women. Clearly, there is no evidence for

an income redistribution across sectors. Taken together, we observe surprisingly little structural change in Brazil's economy, despite the economic turbulences of the 1980s and 1990s and the associated stabilization plans.

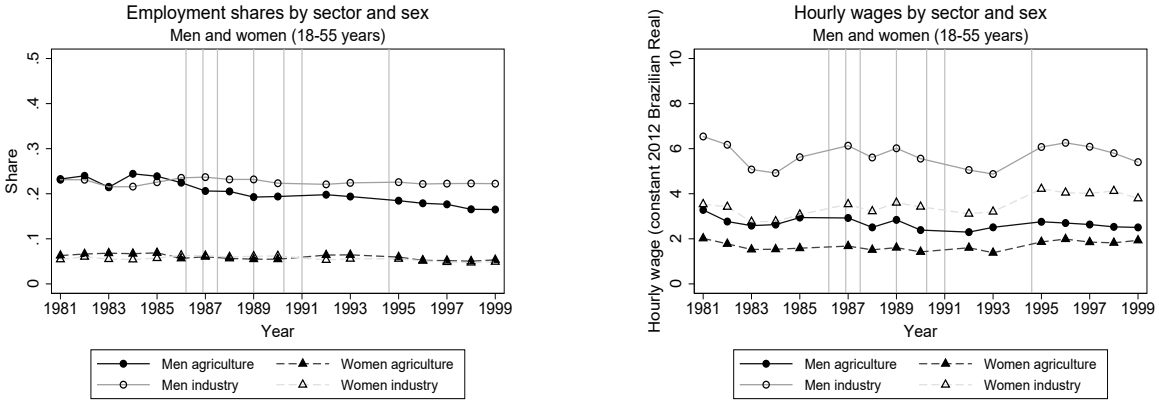

Figure D6: Employment Shares and Average Hourly Wages by Sector, Men and Women Aged 18-55 Years, Brazil 1981-99

Note: Left graph shows the share of the female/male population aged 18-55 years employed in agricultural and extractive production, plant or animal and the primary/secondary industry sector. Right graph shows the average hourly wages of the female/male population aged 18-55 years employed in these sectors. Vertical lines (light-gray): Plano Cruzado (February 28, 1986), Plano Cruzado II (November 21, 1986), Plano Bresser (June 12, 1987), Plano Verão ('Summer Plan', January 15, 1989), Plano Collor (March 15, 1990), Plano Collor II (January 31, 1991), Plano Real (July 1, 1994).

Data: PNAD 1984-85, 1992-93, 1995-99, 2001-09, 2011-14.

References

Adsera, Alicia, and Alicia Menendez. 2011. "Fertility changes in Latin America in periods of economic uncertainty." *Population Studies*, 65(1): 37–56.

Azzoni, Carlos R., and Joao Y. Isai. 1994. "Estimating the costs of environmental protection in Brazil." *Ecological Economics*, 11(2): 127–133.

Barreto de Oliveira, Francisco Eduardo, and Kaizô Iwakami Beltrão. 2015. "Brazilian social security system." IPEA Discussion Paper 97, Instituto de Pesquisa Econômica Aplicada, Brasilia.

Becker, Gary S. 1960. "An economic analysis of fertility." In *Demographic and economic change in developed countries: A conference of the Universities - National Bureau Committee for Economic Research*. Vol. 11, 209–231. Princeton University Press, Princeton.

Bonelli, Regis, and Armando Castelar Pinheiro. 2008. "New export activities in Brazil: comparative advantage, policy or self-discovery?" Research Department Publications 3256, Inter-American Development Bank, Washington DC.

Bruce-Lockhart, Chelsea, and Emiko Terazono. 2019. "From bean to cup, what goes into the cost of your coffee?" *https://www.ft.com/content/44bd6a8e-83a5-11e9-9935-ad75bb96c849*, Financial Times, June 4 2019, Accessed: 2021-05-27.

De Paiva Abreu, Marcelo. 2004. "Trade liberalization and the political economy of protection in Brazil since 1987." Working Paper SITI 8, Inter-American Development Bank: Washington DC.

DHS. 1987. "Demographic and Health Survey [Brazil BR_1986_DHS]." Sociedade Civil Bem-Estar Familiar no Brasil - BEMFAM, Pesquisas Demograficas e de Saúde, and Institute for Resource Development/Macro Systems. 1987.

DHS. 1997. "Demographic and Health Survey [Brazil BR_1996_DHS]." Sociedade Civil Bem-Estar Familiar no Brasil - BEMFAM - and Macro International. 1997. Brasil Pesquisa Nacional Sobre Demografia e Saúde 1996. Calverton, Maryland: BEMFAM and Macro International.

Dix-Carneiro, Rafael, and Brian K. Kovak. 2017. "Trade liberalization and regional dynamics." *American Economic Review*, 107(10): 2908–2946.

Gibbs, Holly K., Aaron S. Ruesch, Frédéric Achard, Murray K. Clayton, Peter Holmgren, Navin Ramankutty, and Jonathan A. Foley. 2010. "Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s." *Proceedings of the National Academy of Sciences*, 107(38): 16732–16737.

Helfand, Steven M., and Luis F. Brunstein. 2001. "The changing structure of the Brazilian agricultural sector and the limitations of the 1995/96 agricultural census." *Revista de Economia e Sociologia Rural*, 39(3): 179–203.

IBGE. 1998. "Tábua completa de mortalidade para o Brasil." Rio de Janeiro: IBGE, Coordenação de População e Indicadores Sociais. Anual (1991-). ID: 3097.

IInglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin and B. Puranen et al. (eds.). 2014*a*. "World Values Survey: Round Three." Country-Pooled Datafile Version. URL: `www.worldvaluessurvey.org/WVSDocumentationWV3.jsp`. Madrid: JD Systems Institute.

IInglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin and B. Puranen et al. (eds.). 2014*b*. "World Values Survey: Round Two." Country-Pooled Datafile Version. URL: `www.worldvaluessurvey.org/WVSDocumentationWV2.jsp`. Madrid: JD Systems Institute.

IPUMS. 2018. "International: Version 7.0 [Brazilian CENSUS]." Minnesota Population Center, Minneapolis. URL: `https://doi.org/10.18128/D020.V7.0.InstituteofGeographyandStatistics`.

Jank, Marcos Sawaya, Maristela Franco Paes Leme, André Meloni Nassar, and Paulo Faveret Filho. 1999. "Concentration and internationalization of Brazilian agribusiness exporters." *The International Food and Agribusiness Management Review*, 2(3-4): 359–374.

Kreyenfeld, Michaela, Gunnar Andersson, and Ariane Pailhé. 2012. "Economic uncertainty and family dynamics in Europe: Introduction." *Demographic Research*, 27: 835–852.

La Ferrara, Eliana, Alberto Chong, and Suzanne Duryea. 2012. "Soap operas and fertility: Evidence from Brazil." *American Economic Journal: Applied Economics*, 4(4): 1–31.

La Ferrara, Eliana, Chong, Alberto, and Duryea, Suzanne. 2012. "Replication data for: Soap operas and fertility: Evidence from Brazil." Nashville, TN: American Economic Association [publisher], 2012. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2019-10-12. ICPSR 113835-v1. URL: `https://doi.org/10.3886/E113835V1`.

MacroTrends. 2021*a*. "Coffee prices - 45 year historical chart." MacroTrends - Charting Global Markets and Economies, URL: `https://www.macrotrends.net/2535/coffee-priceshistorical-chart-data`, retrieved February 22, 2021.

MacroTrends. 2021*b*. "Soybean prices - 45 year historical chart." MacroTrends - Charting Global Markets and Economies, URL: `https://www.macrotrends.net/2531/soybeanprices-historical-chart-data`, retrieved February 22, 2021.

Marichal, Carlos. 1989. *A century of debt crises in Latin America: From independence to the Great Depression, 1820–1930.* Princeton University Press.

Matijascic, Milko, and Stephen J. Kay. 2008. "Pensions in Brazil: Reaching the limits of parametric reform in Latin America." In *S. J. Kay, and T. Sinha (eds.): Lessons from pension reform in the Americas*. Chapter 11, 286–213. Oxford University Press Oxford.

McKenzie, David J. 2005. "Measuring inequality with asset indicators." *Journal of Population Economics*, 18(2): 229–260.

Nazmi, Nader. 1995. "Inflation and stabilization: Recent Brazilian experience in perspective." *Journal of Developing Areas*, 29(4): 491–506.

OECD. 2021*a*. "Total manufacturing production for Brazil [PRMNTO01BRA661N]." Retrieved from FRED, Federal Reserve Bank of St. Louis, Federal Reserve Economic Data, URL: `https://fred.stlouisfed.org/series/PRMNTO01BRA661N`, February 27, 2022.

OECD. 2021*b*. "Unemployment rate: aged 15 and over: all persons for Brazil [LRUNTTTTBRA156S]." Retrieved from FRED, Federal Reserve Bank of St. Louis, Federal Reserve Economic Data, URL: `https://fred.stlouisfed.org/series/LRUNTTTTBRA156S`, February 27, 2022.

PNAD. 1981-2014. "Pesquisa Nacional por Amostra de Domicílios." Rio de Janeiro: IBGE, DPE. Anual (1967-). ISSN 01016822.

Schwarzer, Helmut, and Ana Carolina Querino. 2002. "Non-contributory pensions in Brazil: The impact on poverty reduction." ESS Paper 11, Social Security Policy and Development Branch, International Labour Office, Geneva.

Vyas, Seema, and Lilani Kumaranayake. 2006. "Constructing socio-economic status indices: How to use principal components analysis." *Health Policy and Planning*, 21(6): 459–468.

World Bank. 2021*a*. "Agricultural raw materials exports (% of merchandise exports) - Brazil." World Bank Data. The World Bank Group, URL: `https://data.worldbank.org/indicator/TX.VAL.AGRI.ZS.UN?locations=BR`, retrieved February 27, 2021.

World Bank. 2021*b*. "Agriculture, forestry, and fishing, value added (constant 2010 US$) - Brazil." World Bank Data. The World Bank Group, URL: `https://data.worldbank.org/indicator/NV.AGR.TOTL.KD?locations=BR`, retrieved February 27, 2021.

World Bank. 2021*c*. "Constant GDP per capita for Brazil [NYGDPPCAPKDBRA]." Retrieved from FRED, Federal Reserve Bank of St. Louis, Federal Reserve Economic Data, URL: `https://fred.stlouisfed.org/series/NYGDPPCAPKDBRA`, February 27, 2022.

World Bank. 2021*d*. "Employment in agriculture (% of total employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: `https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=BR`, retrieved March 5, 2021.

World Bank. 2021*e*. "Employment in agriculture, female (% of female employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/SL.AGR.EMPL.FE.ZS?locations=BR, retrieved March 5, 2021.

World Bank. 2021*f*. "Employment in industry (% of total employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?locations=BR, retrieved March 5, 2021.

World Bank. 2021*g*. "Employment in industry, female (% of female employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS?locations=BR, retrieved March 5, 2021.

World Bank. 2021*h*. "Employment in services (% of total employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/SL.SRV.EMPL.ZS?locations=BR, retrieved March 5, 2021.

World Bank. 2021*i*. "Employment in services, female (% of female employment) (modeled ILO estimate) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/SL.SRV.EMPL.ZS?locations=BR, retrieved March 5, 2021.

World Bank. 2021*j*. "Food exports (% of merchandise exports) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/TX.VAL.FOOD.ZS.UN?locations=BR, retrieved February 27, 2021.

World Bank. 2021*k*. "Goods exports (BoP, current US$) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/BX.GSR.MRCH.CD?locations=BR, retrieved February 27, 2021.

World Bank. 2021*l*. "Industry (including construction), value added (constant 2010 US$) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/NV.IND.TOTL.CD?locations=BR, retrieved February 27, 2021.

World Bank. 2021*m*. "Inflation, consumer prices (annual %) - Brazil." World Bank Development Indicators. The World Bank Group, URL: https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=BR.11-BR, retrieved March 11, 2021.

World Bank. 2021*n*. "Manufactures exports (% of merchandise exports) - Brazil." World Bank Data. The World Bank Group, URL: https://data.worldbank.org/indicator/TX.VAL.MANF.ZS.UN?locations=BR, retrieved February 27, 2021.