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DOES TELEVISION KILL YOUR SEX LIFE? MICROECONOMETRIC EVIDENCE FROM 80 COUNTRIES

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ABSTRACT

The canonical consumer demand model predicts that as the price of a substitute decreases, quantity demanded for a good decreases. In the case of demand for sexual activity and availability of alternative leisure activities, popular culture expresses this prediction as "television kills your sex life." This paper examines the association between television ownership and coital frequency using data from nearly 4 million individuals in national household surveys in 80 countries from 5 continents. The results suggest that while television may not kill your sex life, it is associated with some sex life morbidity. Under our most conservative estimate, we find that television ownership is associated with approximately a 6% reduction in the likelihood of having had sex in the past week, consistent with a small degree of substitutability between television viewing and sexual activity. Household wealth and reproductive health knowledge do not appear to be driving this association.

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Nicholas Wilson Department of Economics Reed College 3203 SE Woodstock Blvd Portland, OR 97202 nwilson@reed.edu "Don't think that I am saying this in a lighter vein. I am serious. TV will have a great impact.

It's a great medium to tackle the problem . . . 80 per cent of population growth can be reduced

through TV." - Ghulam Nabi Azad, India Health and Family Welfare Minister (Blakely 2009)

"No TV in the bedroom. I've always assumed it would completely kill my sex life and sense of

intimacy." - Jessica Herman, Journalist, Cosmopolitan (Herman 2013)

1 Introduction

The canonical consumer demand model predicts that as the price of a substitute decreases

quantity demanded for a good decreases. In the case of sexual activity and alternative leisure

activities, popular culture expresses this prediction as television kills your sex life. This paper

examines the association between television ownership and coital frequency using data from

nearly 4 million individuals in national household surveys in 80 countries from 5 continents.

Whether and how fast coital frequency decreases with expansion in television ownership

has several major implications for understanding human behavior and for policymaking. If coital

frequency is highly responsive to television ownership, this would suggest that humans are

willing to substitute electronic media for intimate human companionship. Policymakers in high

¹ For example: Herman, Jessica. 2013. "Is the Boob Tube a Buzz Kill?" Cosmopolitan.com, March 7, 2013,

https://www.cosmopolitan.com/sex-love/news/a11969/TV-in-the-bedroom/

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https://www.brides.com/story/having-a-tv-in-bedroom

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(low) fertility countries that are concerned with fertility rates may wish to consider subsidies, taxes, information campaigns, and other methods to promote (curtail) television ownership.

Existing economic studies in developing countries focus on the effects of television content, not television ownership, on behavior and opinions. For example, two studies provide evidence that the content of television programming affects gender norms, including those determining fertility. Jensen and Oster (2009) found that the introduction of cable television in India improved women's status and reduced fertility. They argued that the mechanism linking cable television and women's status was the "modern" content of cable television, which changed household norms about female autonomy. La Ferrara et al. (2009) found that the expansion of soap operas in Brazil reduced fertility and also argued that the "modern" gender norms in these soap operas was the mechanism linking soap operas to fertility. A third paper randomized whether Nigerian respondents saw a television series with an educational message about HIV/AIDS or a non-educational program. Those who saw the program with an educational message had increased likelihood of HIV testing and reduced likelihood of testing positive for a sexually transmitted infection at follow-up (Banerjee et al. 2017).

Focusing on the availability of electronics more widely, Burlando (2014) found that a large power outage in Zanzibar increased births in the short term. As this power outage eliminated access to television as well as other production and consumption technologies, including lighting, one cannot conclude that television was the mechanism linking the power outage to sexual activity.

In the United States, economic analyses of the causal effect of television ownership has used the historical expansion of television (e.g., Gentzkow 2006, Campante and Hojman 2013), which occurred during a period in which data on sexual behavior was not widely collected.

Today, television ownership is nearly universal in high-income countries, making these countries an unfavorable setting for an analysis of the relationship between television ownership and coital frequency.

We build on the existing studies to explicitly examine the association between television ownership and coital frequency in 80 lower income countries. Television ownership is a highly relevant "treatment" margin, with approximately 1 out of every 2 households in our data owning televisions. Coital frequency is both a leisure activity and reflects fertility intentions. Even as a leisure activity, more frequent intercourse increases the risk of pregnancy and sexually transmitted infections. Therefore, understanding this relationship is crucial for family planning and disease reduction or elimination.

A fundamental barrier to measuring the causal effect of television ownership on coital frequency is the endogeneity of material and sexual consumption decisions. Consumer theory predicts that income, relative prices, information, and tastes simultaneously determine television ownership and coital frequency. Another major barrier is the lack of data on sexual behavior from settings where television ownership is less than universal.

We use several strategies to address these barriers. While our estimates will not be causal, we take a number of steps to limit confounding factors. First, we use data from 80 countries collected as part of the Demographic and Health Surveys (DHS). This standardized national household survey collected in low- and middle-income countries contains detailed information on sexual behavior, reproductive health knowledge, consumer durables (including television) ownership, sociodemographic characteristics, and geographic location. By using comparable data across so many countries, we can include country level fixed effects—controlling for any time invariant differences between countries about preferences or television availability. Therefore,

our empirical strategy compares people within the same country. Second, these data provide substantial variation in television ownership, with approximately 50% of households in the data owning a television. Third, we directly control for individual level potential confounding variables such as income (or wealth) and sociodemographic and geographic characteristics associated with heterogeneity in relative prices, information, and tastes. Finally, we include information on other consumer durables ownership (e.g., refrigerator, radio, bicycle). Therefore, while not strictly causal, the wealth of controls allows for a detailed understanding of the nature of the relationship between television ownership and coital frequency.²

Our analysis yields evidence indicating that while television may not kill your sex life, it is associated with some sex life morbidity. Put slightly differently, the results of the analysis are consistent with a small amount of substitutability between television viewing and sexual activity. We find that television ownership is associated with approximately a 5% reduction in sexual activity, a statistically significant yet not particularly large association. This finding is robust to including a variety of controls. Household wealth does not appear to be driving the main result, casting doubt on a prime omitted variables bias concern. Knowledge about reproductive health does not appear to be driving the main result either.

These findings make four main contributions to the existing economic literature. First, we provide what appears to be the first microeconometric evidence on the association between television and sexual activity, complementing existing economic literature on television and fertility (e.g., Jensen and Oster 2009, La Ferrara et al. 2012, Burlando 2014). Second, the analysis complements the economic analysis of the effects of television on other behaviors, including voting (e.g., Gentzkow 2006), educational achievement (e.g., Zavodny 2006, Gentzkow and Shapiro 2008), divorce (Chong and La Ferrara 2009), social capital (Olken 2009),

² We discuss limitations of this package of strategies in further detail in the discussion section.

political polarization (e.g., Campante and Hojman 2013), mental health (Waldman et al. 2014), fast food/soft drink consumption (Chou et al. 2008, Andreyeva et al. 2011, Grossman et al. 2012), and general consumption behavior (Bursztyn and Cantoni 2016). Third, the analysis provides suggestive evidence on a mechanism—a decline in sexual activity—possibly underlying the negative association between television viewing and happiness documented in previous economic research (Bruni and Stanca 2008). Fourth, we study access to television—a highly relevant "treatment" margin in low- and middle-income countries over the past thirty years—whereas the majority of the aforementioned studies focus on television programming content.

The rest of the paper is organized as follows. Section 2 presents a conceptual framework. Section 3 characterizes the data and presents the statistical methods. Section 4 reports the results. Section 5 discusses the main findings and concludes.

2 Conceptual Framework

To conceptualize the threat of television killing one's sex life, we use the lens of the standard consumer demand model. In this model, prices and income determine the choice set, which interacts with tastes to determine the optimal consumption bundle of sex and television. We may expand the model to include uncertainty, which means that beliefs (or information) also affect choice. Alternative theories, such as television having a direct epidemiological effect on libido through a biochemical pathway, are ruled out *a priori*.

Both sexual activity and television watching are normal leisure goods. Therefore, as income increases, people will likely want to consume more of both via income effects, but increased wage income also increases the opportunity cost of the activities. Regardless of the

relative magnitudes of these countervailing effects, they should move in the same direction for both activities. To better understand this income channel we will explicitly control for it in our models.

The relationship between television and sexual activity might also occur through specific television programming: the content of television programming may convey information about the benefits and costs of sexual activity. To illuminate the empirical relevance of this mechanisms, we examine the sensitivity of the results to controlling for reproductive health knowledge.

Ruling out the above pathways, we will focus our findings on the extent to which, as leisure activities, the two activities are potentially substitutes for each other. Owning a television reduces the price of television viewing, which may cause you to substitute television viewing for sexual activity. We will not be able to determine whether owning a television reflects a lower preference for sexual activity or causes it.

3 Data and Statistical Methods

3.1 Data

The data in this analysis are all available Demographic and Health Surveys (DHS) as of January 2018.³ We define the study sample to include individuals with complete responses to the main outcome of interest (i.e., timing of last sex), television ownership, and the standard sociodemographic covariates (e.g., age, years of schooling, and married). Our sample includes nearly 4 million respondents from 80 low- and middle-income countries across five continents. The DHS contain data on self-reported sexual frequency, asset ownership, and other demographic characteristics. Table 1 presents descriptive statistics for the study sample. Coital frequency is

³ See Appendix Table A1 for a list of countries and survey rounds in our study sample.

approximately 0.30 acts per week (Panel A). Approximately 1 out of every 2 households own a television (Panel B). Females are overrepresented in this sample because the DHS started as a fertility survey and in many countries surveys more females than males (Panel C).⁴ Average age is around 30 years old.

3.2 Statistical methods

The primary conceptual difficulty in understanding the relationship between television ownership and sexual activity are confounding factors that could simultaneously affect both. Therefore, we use multivariate regression analysis to control for many, but admittedly not all, of these factors. The main regression equation is:

$$sex_{ict} = \gamma + \beta \ television_{ict} + X'_{ict} \ \theta + \gamma_c + \mu_t + \varepsilon_{ict}$$
 (1)

where sex_{ict} is an indicator for a particular sexual activity of individual i surveyed in country c in year t, $television_{ict}$ is an indicator variable for household television ownership, X'_{ict} is a vector of sociodemographic controls (discussed below), γ_c are country fixed effects, μ_t are survey year fixed effects, and ε_{ict} is an idiosyncratic error term. We use ordinary least squares (OLS) regression with heteroscedasticity-robust standard errors clustered at the country level to estimate the parameters of Equation (1).

Our specification controls for potential omitted variables in three ways. First, country fixed effects (γ_c) control for any time invariant preferences or television availability differences across countries. Second, survey year fixed effects (μ_t) control for worldwide changes in

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⁴ To address concerns about sample composition driving the main result, we examine the association between television ownership and sexual activity separately by female/male.

preferences or television availability. Finally, we include additional individual level survey responses in the vector X'_{ict} that control for potential changes in preferences over the lifecycle (i.e. age and marital status), income (i.e. education, urban residence, and wealth), and the ownership of other consumer durables to alleviate concerns outlined in Section 2. Despite this inclusions, we cannot control for all omitted variables and in our discussion we outline the limitations of the study.

To understand whether the findings are correlations of general television watching or specific content gleaned from watching television, we also include knowledge of reproductive health.

4 Results

4.1 Main results

Table 2 presents the main results. All specifications include country fixed effects and survey year fixed effects. Panel A displays results for the full sample. Column 1 presents the results of regressing an indicator variable for sex in the past week on an indicator variable for television ownership and indicator variables for country of residence and survey year. The point estimate, -0.025, suggests that television ownership is associated with approximately a 2.5 percentage point reduction in the likelihood of having had sex in the past week (statistically significant at the 1% level). A 2.5 percentage point reduction is approximately 10% compared to the sample mean, a substantial although not particularly large association.

In Column 2, we control for total consumer durables owned, a prime omitted variables bias concern in the specification in previous column. The point estimate remains negative, statistically significant (at the 1% level), and nearly doubles in magnitude in absolute value,

suggesting that wealth is not driving the main result. In Column 3, we control for number of contraceptive methods known instead of total consumer durables owned and find a similar pattern. This would seem to indicate that reproductive health knowledge is not the mechanism driving the association between television ownership and sexual activity. In Column 4 we further include a full set of socio-demographic controls (i.e., age indicator variables, indicator variables for years of schooling, an indicator variable for married, and an indicator for urban residence). The point estimate for television is somewhat attenuated, but remains statistically significant (at the 1% level). On the whole, the results suggest that owning a television is associated with a lower likelihood of having had sex in the past seven days, a decline of 5.7% in our most conservative estimate (column 4).

In Panels B and C, we present results estimated separately for females and for males, respectively. The results suggest that females are driving the association in Panel A. Although the association between television ownership and sexual activity for males is negative and often statistically significant, when we include the full set of socio-demographic controls the estimated association is a relatively precisely measured 0 for males.

4.2 Do other consumer durables kill your sex life?

Given the findings thus far one could ask, "do other consumer durables kill your sex life?" Table 3 explores this research question by examining the associations between several of the other main consumer durables asked about in the DHS and sexual activity using the same specification as Column 4 in Table 2.6 Consistent with modes of transportation making sexual

⁵ As mentioned in the Introduction, other authors have noted the impact that television content can have on sexual behaviors. That does not appear to be the primary mechanism here.

⁶ Recall that Table 2 columns 2 and 4 included consumer durables as controls. Therefore, the effects presented in that table were net of any effects presented here.

activity easier, the ownership of a motorcycle or car are associated with increases in sexual activity.

4.3 Does television kill your risqué lifestyle?

Television may substitute for characteristics of your sex life other than coital frequency or may influence which characteristics are preferred. In that sense, television may kill your risqué lifestyle if not your entire sex life. Table 4 examines this question by regressing three additional measures of sexual behavior on television ownership: an indicator variable for multiple partners in the past 12 months, an indicator variable (for males) for paying money for sex in the past 12 months, and an indicator variable for not using a condom at last sex in the past 12 months. Overall, the coefficient estimates suggest little overall association between television ownership and risqué behavior with small and statistically insignificant point estimates. The one exception is that for males the association for lack of condom use is negative and statistically significant—men with televisions are more likely to have used a condom during their last sexual encounter.

4.4 Robustness checks

Table 5 displays the results of a variety of robustness checks. In Columns 1-5, we examine sexual activity at 2 days, 14 days, 31 days, 3 months, and 12 months, respectively. The point estimates are roughly similar for each of these outcomes, although the estimates become somewhat attenuated at longer durations (e.g., 3 months and beyond).

In Column 6, we return to examining sexual activity within the past week, but condition the regression sample to be equal to those who have had sex in the past year. In Column 7, we

limit the regression sample to the more recent DHS survey rounds (i.e. 2006-2016). In both of these robustness checks, the point estimate on television remains approximately -0.02 (statistically significant at the 1% level).

5 Discussion and Conclusion

Does television kill your sex life? Popular culture claims "Yes." Evidence from nearly 4 million individuals in 80 countries from five continents suggests "a little." We find that television ownership is associated with approximately a 6% reduction in sexual activity, a statistically significant yet not particularly large association. These results are robust to controlling for household wealth, suggesting that a prime omitted variables bias hypothesis—wealthier households are simultaneously more likely to own a television and have lower levels of sexual activity—seemingly is not a concern. In addition, the results suggest that knowledge about reproductive health is not driving the association between television ownership and sexual activity. Despite controlling for many of the potentially confounding factors, ultimately this finding is not causal as we cannot rule out that people who prefer less frequent intercourse are more likely to own a television.

More recently, popular culture has claimed that smartphones are killing peoples sex lives. Our study population resides in low- and middle-income countries and were surveyed largely around 2010, before the widespread availability of smartphones. In countries with ubiquitous smartphones, the smartphone might be the real sex life killer. Future research might examine this question.

Conflict of Interest Disclosure

Conflict of Interest: The authors declare that they have no conflict of interest.

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Table 1: Descriptive Statistics

Sample:	Full Sample	Females	Males
	(1)	(2)	(3)
Panel A: Sex life	0.30	0.30	0.33
Sex in past week	(0.46)	(0.46)	(0.47)
G			
Sex in past 2 days	0.16 (0.37)	0.16 (0.37)	0.18 (0.39)
~			
Sex in past 14 days	0.40	0.39	0.43
	(0.49)	(0.49)	(0.50)
Sex in past 31 days	0.47	0.46	0.51
	(0.50)	(0.50)	(0.50)
Sex in past 3 months	0.56	0.55	0.63
	(0.50)	(0.50)	(0.48)
Sex in past year	0.64	0.63	0.70
	(0.48)	(0.48)	(0.46)
Multiple partners	0.02	0.01	0.10
	(0.15)	(0.09)	(0.30)
Money for sex	-	-	0.02
•	-	-	(0.13)
No condom at last sex	0.48	0.47	0.54
- 10 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	(0.50)	(0.50)	(0.50)
Panel B: Consumer durables			
Television	0.48	0.49	0.41
	(0.50)	(0.50)	(0.49)
Refrigerator	0.28	0.29	0.22
	(0.45)	(0.45)	(0.42)
Radio	0.61	0.61	0.60
	(0.49)	(0.49)	(0.49)
Improved floor	0.47	0.47	0.49
-	(0.50)	(0.50)	(0.50)
Car	0.09	0.09	0.08
	(0.28)	(0.29)	(0.27)
Motorcycle	0.15	0.15	0.17
	(0.36)	(0.36)	(0.37)
Bicycle	0.30	0.30	0.33
Bicycle	(0.46)	(0.46)	(0.47)
Total consumer durables	1.91	1.93	2.30
Total consumer durables	(1.44)	(1.43)	(1.71)
Panel C: Other covariates	(1.1.1)	(1.13)	(1.71)
Female	0.83	1.00	0.00
	(0.37)	0.00	0.00
Age	29.96	29.67	31.42
	(9.97)	(9.58)	(11.60)
Married	0.69	0.70	0.60
	(0.46)	(0.46)	(0.49)
Years of schooling	5.93	5.77	6.70
	(4.84)	(4.86)	(4.69)
Urban	0.43	0.44	0.41
O. Carrier	(0.50)	(0.50)	(0.49)
Observations			
Observations	3,817,006	3,176,850	640,156

Notes: Data come from Standard Demographic and Health Surveys. Entries are sample means. Standard deviations are in parentheses.

Table 2: Does Television Kill Your Sex Life?

Dependent variable:	Sex in the past week (yes=1, no=0)			
	(1)	(2)	(3)	(4)
Panel A: Full Sample				
Television	-0.025***	-0.040***	-0.051***	-0.017***
	(0.007)	(0.007)	(0.008)	(0.005)
Observations	3,817,006	3,817,006	3,817,006	3,817,006
Panel B: Females				
Television	-0.025***	-0.043***	-0.048***	-0.017***
	(0.007)	(0.008)	(0.008)	(0.005)
Observations	3,176,850	3,176,850	3,176,850	3,176,850
Panel C: Males				
Television	-0.018*	-0.014*	-0.053***	0.000
	(0.009)	(0.007)	(0.009)	(0.005)
Observations	640,156	640,156	640,156	640,156
Country fixed effects?	YES	YES	YES	YES
Survey year fixed effects?	YES	YES	YES	YES
Control for total consumer durables?	NO	YES	NO	YES
Control for reproductive health knowledge?	NO	NO	YES	YES
Additional socio-demographic controls?	NO	NO	NO	YES

Observations

Notes: Data come from Standard Demographic and Health Surveys (DHS). "Sex in the past week" is an indicator variable. "Television" is an indicator variable. "Additional socio-demographic controls" include the full set of indicator variables for age, married, years of schooling, urban residence, and interview month. Parameters estimated using ordinary least squares (OLS) regression. Robust standard errors in parentheses are clustered at country level.

^{***} Significant at the 1 percent level, ** Significant at the 5 percent level, * Significant at the 10 percent level.

Table 3: Do Other Consumer Durables Kill Your Sex Life?

Dependent variable:	Sex in the past week (yes=1, no=0)		
Sample:	Full sample Females		Males
	(1)	(2)	(3)
Regressor:			
Refrigerator	-0.010	-0.012**	0.009
	(0.005)	(0.005)	(0.006)
Radio	-0.004	-0.006	-0.006
	(0.007)	(0.006)	(0.004)
Bicycle	0.001	0.001	0.003
	(0.004)	(0.004)	(0.003)
Motorcycle	0.011**	0.013***	0.017**
	(0.005)	(0.004)	(0.005)
Car	0.018***	0.018***	0.014**
	(0.006)	(0.006)	(0.004)
Improved floor	-0.008	-0.012	-0.020***
	(0.008)	(0.009)	(0.003)
Country fixed effects?	YES	YES	YES
Survey year fixed effects?	YES	YES	YES
Control for total consumer durables?	YES	YES	YES
Control for reproductive health knowledge?	YES	YES	YES
Additional socio-demographic controls?	YES	YES	YES
Observations	3,817,006	3,176,850	640,156

Notes: Data come from Standard Demographic and Health Surveys (DHS). Each coefficient estimate comes from a separate regression. Improved floor is an indicator variable equal to one if the respondent's household's floor is wood, brick, concrete, tile, or other improved material. "Additional socio-demographic controls" include the full set of indicator variables for age, married, years of schooling, urban residence, and interview month. Parameters estimated using ordinary least squares (OLS) regression. Robust standard errors in parentheses are clustered at country level.

^{***} Significant at the 1 percent level, ** Significant at the 5 percent level, * Significant at the 10 percent level.

Table 5: Additional Robustness Checks

Sample:			Full sample			Had sex in past 12 months	Surveyed in 2006-2016
	Sex in past	•	Sex in past	•	Sex in past	Sex in past	Sex in past
Dependent variable:	2 days (1)	14 days (2)	31 days (3)	3 months (4)	12 months (5)	7 days (6)	7 days (7)
	(1)	(2)	(3)	(4)	(3)	(0)	(7)
Panel A: Full sample							
Television	-0.011***	-0.016***	-0.015**	-0.012**	-0.014**	-0.016***	-0.017***
	(0.004)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)
Observations	3,817,006	3,817,006	3,817,006	3,817,006	3,817,006	2,455,564	2,011,505
Panel B: Females							
Television	-0.011***	-0.015***	-0.013***	-0.009*	-0.011**	-0.019***	-0.020***
	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)
Observations	3,176,850	3,176,850	3,176,850	3,176,850	3,176,850	2,004,717	1,554,577
Panel C: Males							
Television	0.000	0.004	0.006	0.004	0.002	-0.001	-0.002
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.008)	(0.006)
Observations	640,156	640,156	640,156	640,156	640,156	450,847	456,928
Country fixed effects?	YES	YES	YES	YES	YES	YES	YES
Survey year fixed effects?	YES	YES	YES	YES	YES	YES	YES
Control for total consumer durables?	YES	YES	YES	YES	YES	YES	YES
Control for reproductive health knowledge?	YES	YES	YES	YES	YES	YES	YES
Additional socio-demographic controls?	YES	YES	YES	YES	YES	YES	YES

Notes: Data come from Standard Demographic and Health Surveys (DHS). "Sex in past X days" is an indicator variable. "Television" is an indicator variable. "Additional socio-demographic controls" include the full set of indicator variables for age, married, years of schooling, urban residence, and interview month. Parameters estimated using ordinary least squares (OLS) regression. Robust standard errors in parentheses are clustered at country level.

^{***} Significant at the 1 percent level, ** Significant at the 5 percent level, * Significant at the 10 percent level.

Table 4: Does Television Kill Your Risque Behavior?

Dependent variable:	Multiple partners	Money	No condom
	(1)	(2)	(3)
Panel A: Full sample			
Television	-0.002	-	0.001
	(0.001)	-	(0.007)
Observations	3,817,006	-	3,817,006
Panel B: Females			
Television	-0.001	-	-0.004
	(0.001)	-	(0.009)
Observations	3,176,850	-	3,176,850
Panel C: Males			
Television	-0.002	0.000	-0.008***
	(0.003)	(0.001)	(0.004)
Observations	640,156	640,156	640,156
Country fixed effects?	YES	YES	YES
Survey year fixed effects?	YES	YES	YES
Control for total consumer durables?	YES	YES	YES
Control for reproductive health knowledge?	YES	YES	YES
Additional socio-demographic controls?	YES	YES	YES

Notes: Data come from Standard Demographic and Health Surveys (DHS). "Sex in the past week" is an indicator variable. "Television" is an indicator variable. "Additional socio-demographic controls" include the full set of indicator variables for age, married, years of schooling, urban residence, and interview month. Parameters estimated using ordinary least squares (OLS) regression. Robust standard errors in parentheses are clustered at country level.

^{***} Significant at the 1 percent level, ** Significant at the 5 percent level, * Significant at the 10 percent level.

Appendix Table A1: Countries, Sample Sizes, and Survey Rounds

Country	Survey rounds	Sample size
Afghanistan	2015	40,149
Albania	2008	10,597
Armenia Azerbaijan	2000, 2005, 2010 2006	20,497 10,995
Azeroaijan Bangladesh	1993, 1996, 1999, 2004, 2007	60,033
Benin	1996, 2001, 2006, 2011	60,295
Bolivia	1989, 1994, 1998, 2003, 2008	77,732
Brazil	1986, 1991, 1996	27,672
Burkina Faso	1993, 1998, 2003, 2010	53,873
Burundi Cambodia	1987, 2010 2000, 2005, 2010, 2014	17,609 68,434
Cameroon	1991, 1998, 2004, 2011	45,423
Central African Republic	1994	7,613
Chad	1996, 2004, 2014	40,789
Colombia	1986,1990,1995,2000,2005,2010,2015	193,402
Comoros	1996, 2012	10,514
Cote d'Ivoire Democratic Republic of the Congo	1994, 1998, 2011	27,204 42,125
Dominican Republic	1991, 1996, 1999, 2002, 2007, 2013	84,689
Ecuador	1987	4,713
Egypt	1988, 1992, 1995, 2000, 2005, 2008, 2014	116,001
El Salvador	1985	4,861
Ethiopia	1992, 1997, 2003	68,696
Gabon	2000, 2012	22,247
Gambia Ghana	2013 1988, 1993, 1998, 2003, 2008, 2014	10,232 46,284
Ghana Guatemala	1988, 1993, 1998, 2003, 2008, 2014 1987, 1995, 1998, 2014, 2015	46,284 60,635
Guinea	1999, 2005, 2012	28,948
Guyana	2009	8,504
Haiti	1994, 2000, 2005, 2012	45,367
Honduras	2005, 2011	49,885
India	1992, 1998, 2005, 2015	385,780
Indonesia Jordan	1987, 1991, 1994, 1997, 2002, 2007, 2012 1990, 1997, 2002, 2007, 2012	226,975 50,345
Kazakhstan	1995, 1999	8,570
Kenya	1989, 1993, 1998, 2003, 2008, 2014	93,497
Kyrgyz Republic	1997, 2012	14,457
Lesotho	2004, 2009, 2014	30,366
Liberia	1986, 2007, 2013	31,647
Madagascar	1992, 1997, 2003, 2008	47,186
Malawi	1992, 2000, 2004, 2010, 2015	95,085
Maldives Mali	2009 1987, 1995, 2001, 2006, 2012	8,611 63,283
Mexico	1987	3,401
Moldova	2005	7,439
Morocco	1987, 1992, 2003	32,000
Mozambique	1997, 2003, 2011	43,827
Namibia	1992, 2000, 2006, 2013	41,901
Nepal	1996, 2001, 2006, 2011, 2016	51,399
Nicaragua Niger	1998, 2001 1992, 1998, 2006, 2012	29,596 45,749
Nigeria	1990, 1999, 2003, 2008, 2013	105,961
Nigeria (Ondo State)	1986	4,208
Pakistan	1990, 2006, 2012	34,618
Paraguay	1990	5,819
Peru	1986, 1991, 1996, 2000, 2003-2012	257,120
Republic of the Congo	2005, 2011	23,012 90,201
Rwanda Sao Tome and Principe	1992, 2000, 2005, 2010, 2014 2008	90,201 4,910
Senegal	1986, 1992, 1997, 1999, 2005, 2010-15	89,149
Sierra Leone	2008, 2013	34,499
South Africa	1998, 2003	11,734
Sri Lanka	1987, 2006	5,862
Sudan	1989	5,850
Swaziland	2006	9,114
Tajikistan Tanzania	2012 1991, 1996, 1999, 2004, 2010, 2015	9,654 69,109
Thailand	1987	6,757
The Philippines	1993, 1998, 2003, 2008, 2013	77,108
Timor-Leste	2009	17,213
Togo	1988, 1998, 2013	29,683
Trinidad and Tobago	1987	3,801
Tunisia	1988	4,184 25,099
Turkey	1993, 1998, 2003 1988, 1995, 2000, 2006, 2011	25,099 45,083
Uganda Ukraine	1988, 1995, 2000, 2006, 2011 2007	45,083 10,017
Uzbekistan	1996	4,415
Vietnam	1997, 2002	11,329
Yemen	1991	5,649
Zambia	1992, 1996, 2001, 2007, 2013	69,310
Zimbabwe	1988, 1994, 1999, 2005, 2010, 2015	69,400

Notes: Data come from Standard Demographic and Health Surveys (DHS) publicly available as of early 2017.