

Appendix A. Details on survey inclusion, coding consistency across surveys and concurrent programs

Survey inclusion

The DHS program has implemented over 300 surveys in over 90 countries. To identify potential donor regions, we focus on all countries in Eastern Africa, as defined by the United Nations geographic region. Of these, we include all countries with birth data from 2001-2010, allowing us to generate a pseudo-panel of births for our study period. We only include data from the standard DHS and interim DHS rounds, omitting, e.g., DHS-supported Malaria Indicator Surveys (MIS). We exclude Zambia because it has very few births in each region in 2008; in addition, Zambia piloted a PBF program in 2008. We also considered including the Democratic Republic of Congo (Central Africa) since it neighbors Rwanda but exclude it due to insufficient data on births from 2001, 2007, and 2008. In total, we include six donor countries, which each fielded two to three surveys between 2004 and 2015.

Coding consistency

The DHS instruments are generally standardized across countries and waves, allowing researchers to generate comparable estimates across surveys. For this analysis, basic demographic variables and antenatal care outcomes are already consistently defined across surveys. We do some additional data cleaning to generate consistent definitions of institutional deliveries, household health insurance, and the availability of community health workers.

Institutional deliveries

For institutional deliveries, we recode the categorical survey item “Where did you give birth to (NAME)?” into a dichotomous indicator for delivering in any type of health care facility. Specifically, we define an institutional birth as any category that is not “home,” “respondent’s home,” “other home,” “traditional birth attendant (home, premise),” or “other.” The specific health facility categories differ from survey to survey but broadly include all public, private, and religious/volunteer hospitals, health centers, and clinics.

Health insurance

For health insurance, there is a substantial variation from survey to survey on the inclusion of insurance-related questions. This is due to the fact that insurance availability was very low in most of Eastern Africa during the early years of the study period and likely considered irrelevant for the majority of households. For example, coverage was less than 1% in Tanzania’s 2004 survey. However, at the beginning of the period, health insurance coverage in Rwanda was relatively high (53%) and increased over the period. Since health insurance is an important factor for service utilization, we include it in our analysis despite the associated data concerns.

Specifically, we use a very broad definition of insurance availability, compiling information on all insurance-related questions and aggregating insurance availability up to the household level, since different items were only asked in individual surveys. We searched all datasets within the DHS instruments (household roster, individual recode, female recode, birth recode, male recode, child recode, and couple recode) for all insurance related variables (Stata command: lookfor_all insurance, vlabs). These variables included dichotomous indicators for insurance, categorical variables for insurance type, and use of insurance to pay for various types of care. Some surveys (Uganda 2006, Kenya 2003, Malawi 2010, and Ethiopia 2005) do not include any insurance-related questions, so we treat all births from those surveys as having no health insurance.¹ While this is a strong assumption, the coverage trends within each country are plausible. For example, in Uganda, we assume that coverage is 0% in 2006, and coverage is less than 2% in 2011 when insurance-related questions are first included.

Community Health Workers

There is also substantial variation between surveys on questions related to community health workers. Again, we use a very broad definition of availability of community health workers, compiling information on all items related to community health workers and aggregating availability up to the level of the primary sampling unit, since community health workers are available at the village level. Specifically, we search the birth recode data files for the following keywords: “community,” “worker,” “field,” “comm.,” “wrkr,” “chw,” “hsa,” and “hew,” and manually identify all relevant results. The identified variables contain information on whether community health workers provided services or information related to family planning, antenatal care, delivery care, postpartum care, and treatment of various issues including fevers, diarrhea, and sexually transmitted infections. Using this definition, the overall availability levels are high for most countries, ranging from 59% (Rwanda 2005) to 100% (Tanzania 2009). While Rwanda’s availability levels were among the lowest in the early years, they increased to among the highest in the later years.

Socioeconomic status

To control for socioeconomic status, we include eight variables as controls, adapting from Rutstein and Staveteig (2014) to identify variables that are likely to represent the same levels of wealth across different countries and years. These variables are: having a television, having a landline phone, having a refrigerator, having a car/truck, and the number of unsatisfied basic needs (four separate indicators for the total number within a household). The basic needs are defined as 1) having non-dirt flooring, 2) having an adequate toilet (an improved latrine or better), 3) having adequate drinking water (piped or bottled for urban areas, any protected water for rural areas), and 4) low economic dependency (three or fewer household members per working individual).

¹ We confirmed that these survey do not contain insurance variables using the IPUMS-DHS, which harmonizes DHS surveys. See <https://www.idhsdata.org/idhs>

Concurrent programs in Rwanda

Rwanda's PBF program was implemented in the context of large and ongoing governance reforms. Specifically, the country underwent a process of decentralization, with various phases (2000-2003, 2004-2008, and ongoing) (MINALOC, 2006), where redistricting in late 2005/early 2006 affected the definition of Rwanda's arm 1 and arm 2 districts (Basinga et al., 2011)².

In line with this effort, Rwanda implemented a large multi-sector program of performance-based contracting in early 2006, formalizing a traditional practice referred to as *imibigo*. Under *imibigo*, local governments made public commitments to particular actions, including improving health-related indicators (Bucagu et al., 2012). Concurrently, there were concerted efforts to increase health insurance coverage. Many mutual health insurance schemes were created between 2000 and 2003, there was an effort to scale up in 2005 with external funding, and coverage was legally mandated in 2008 (Saksena et al., 2011).

To the extent that Rwanda's PBF program was rolled out concurrently with these policies, the results that we observe when comparing Rwanda to other countries are the combined effects of PBF and these programs. We control for health insurance in our regressions, which attenuates the coefficients in our second set of analyses (Table 3).

Similarly, the 2006 effects we observe for arm 1 and arm 2 relative to the synthetic control (i.e., the counterfactual state of "no intervention") are the combined effects of *imibigo* and monetary performance incentives and *imibigo* and unconditional financing, respectively. In other words, we observe effects for a broader program of performance-based contracting, which consisted of public commitments and monetary incentives.

We focus on and highlight the monetary incentives for two reasons. First, observational evaluations of *imibigo* suggest that within the health sector, the main target was increased health insurance coverage, which we discuss above and control for. Moreover, studies suggest that *imibigo's* effectiveness was limited due to lack of financial resources and lack of sufficient accountability mechanisms (Hasselskog, 2016; MINALOC, 2012, 2011, 2010).

Given the formal monetary accountability and large influx of financial resources associated with PBF (an average increase in expenditures of 22% above 2006 levels (Basinga et al., 2011)), we consider it plausible that a large fraction of the effects we observe are associated specifically with the financing aspect of the treatment. This is also in line with studies in Cameroon and Zambia, contexts without the public commitments component, that find sizable positive effects of performance incentives and unconditional financing for various outcomes (de Walque et al., 2015; Friedman et al., 2017).

² We account for the redistricting in our analysis, using the new district definitions in our arm 1 and arm 2 classifications.

Concurrent health policies in the control countries

We conducted a systematic search for health policies and reforms in the study countries, including Rwanda. The overall process is described in Figure A.1.

First, we conducted a keyword search on the PubMed database in April 2018. This search consisted of four categories of keywords: program keywords, outcomes keywords, countries, and further restrictions (see below for the full list of keywords in each category). We conducted two searches, both searching only in titles and abstracts and both restricted by publication dates between 2000 and 2017. In the first, the search looked for the presence of either a program keyword or an outcome keyword, in addition to the presence of the country and further restriction. To make the review process more manageable, we conducted a second search, which instead looked for the presence of both a program keyword and an outcome keyword.

Second, to check the credibility of this second search, we randomly selected thirty articles from the first search and reviewed. We compared these articles against the second search and reviewed, with only one article meriting further consideration. Based on this search, we added one keyword to the original program keywords list. We repeated this step once and added eight additional terms.

Third, we conducted the two searches again using the expanded list of keywords.

Fourth, we repeated the randomized process and again reviewed thirty articles. In these random articles, one was determined as relevant to review and was added to the list returned from the second search.

In the fifth step, we reviewed the titles and abstracts of this second search list for relevance. In this case, we defined relevance as whether the article had the potential to mention health-related policies or reforms during the period of question in its text. The two most common reasons for exclusion were 1) too isolated of a sample size (for instance, at the single district or facility level) and 2) a focus on trials and experimentally imposed conditions rather than policy-related situations.

Lastly, we obtained and reviewed the full texts of the relevant articles. We collected and consolidated all mentions of policies in the countries of interest and initiated in the period between 2000 and 2017 in Table A1 below. Table A2 shows the corresponding sources.

Keywords used for search

Program Keywords

Decentralization
Health care financing
Pay for performance
Performance based payment
Results based financing
Health insurance
Conditional cash transfer
Voucher
Community health worker
Health plan benefits
Universal health coverage
Co-payments
Out of pocket costs
User fee

Outcome Keywords

Family planning
Antenatal care
Prenatal care
Tetanus
Facility delivery
Institutional delivery
Assisted Delivery
Co-payments
Out of pocket costs
Out of pocket payments

Countries

Rwanda
Uganda
Kenya
Tanzania
Malawi
Ethiopia
Zimbabwe

Further restrictions

Policy
Reform
Intervention
Project
Evaluation
Evaluate
Trial
Experiment

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Figure A.1. Search flow and results.

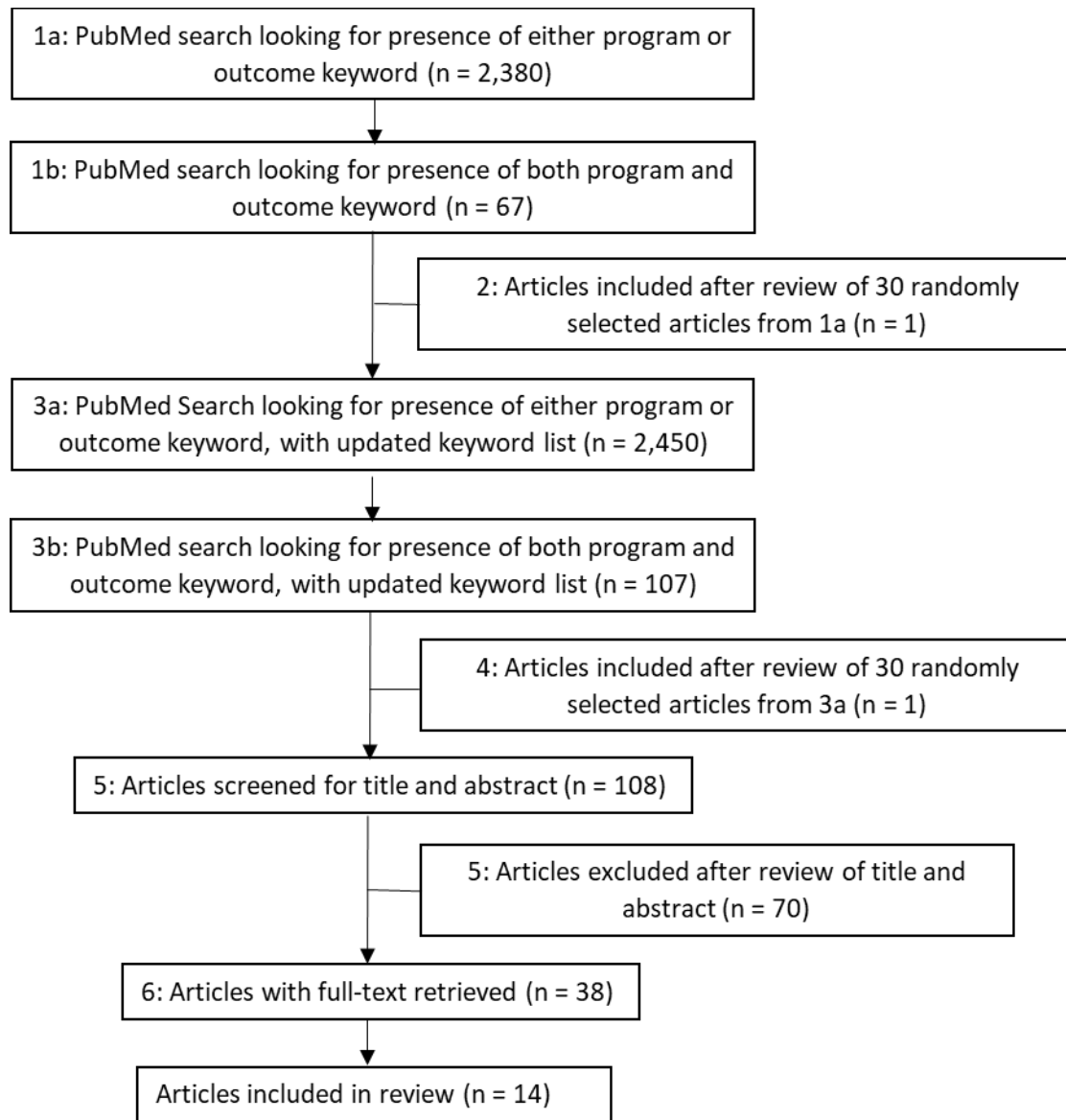


Table A1. Overview of concurrent health policies in the control countries

Country	Program Description	Year Initiated	Year Updated	Geographical Coverage	Source
Ethiopia	Health care financing reforms	2005		Regional	1
Kenya	Output-based-aid (OBA) voucher program for safe motherhood (SF), family planning (FP), and Gender-Violence Recovery Services (GBVRS)	2006	2014 program end (expected)	Regional	2
Kenya	Policy emphasis on community health	2007		National	3
Malawi	Community-based maternal and newborn care package	2008	Still active in 2011	National	4
Malawi	Service level agreements, similar to pay-for-performance	2006	Expanded 2015	Regional	5
Rwanda	Pay for performance	2006		National	6
Rwanda	Community-based health insurance scheme	2000		National	7
Rwanda	Government subsidized benefit package of health insurance	2008		National	7
Tanzania	Transfer of community health insurance programs (voluntary, informal) to national insurance program (mandatory, formal)	2009		National	8
Tanzania	Pay for performance	2011		Regional	9
Tanzania	Decentralization	2000	2013 program end (expected)	National	10
Tanzania	Antenatal care (ANC) program	2002	Guidelines revised 2012	National	10
Tanzania	Life-saving skills program	2000		National	10
Tanzania	Maternal and perinatal death reviews (MPDR) program	2006	Guidelines revised 2013	National	10
Tanzania	Kangaroo mother care (KMC) program	2008		National	10
Tanzania	Essential newborn care (ENC) program	2007		National	10
Tanzania	Integrated management of childhood illness (IMCI) program	2000	Program revision to include neonatal illnesses in 2006	National	10
Tanzania	Insecticide-treated bednet (ITN) program	2003		National	10
Tanzania	Insecticide-treated bednet (ITN) voucher	2004		National	10
Tanzania	Prevention of mother-to-child transmission of HIV (PMTCT) program	2006	Revisions in 2010	National	10

Tanzania	Eliminating mother-to-child HIV transmission (EMCT) program	2012	Expanded in 2013	National	10
Tanzania	Oral rehydration salts (ORS) and zinc program	2010		National	10
Tanzania	Maternal and child health (MCH) user-fee exemption	At least by 2003		National	11
Uganda	Vaccine (Gavi Vaccine introduction grant)	2002	2006 program end (expected)	National (?)	12
Uganda	Reproductive health (RH) voucher	2006	Expanded in 2008, 2012 program end (expected)	Regional	13
Uganda	Essential health services package	1999	Second version in 2010	National	14

Table A2. Articles included in review

Citation

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Appendix B. Figures and Tables

As robustness checks, we generate synthetic controls separately using each outcome. Specifically, we generate six different synthetic controls groups. We generate one synthetic control using institutional deliveries as the outcome and annual lagged institutional deliveries as the predictor. We generate another synthetic control using institutional deliveries as the outcome and 2001-2003/2004-2005 institutional deliveries and covariate averages as predictors. We generate analogous controls using the other two outcomes. The respective weights are shown in the right columns of Table A.1

Compared to the maternal services synthetic controls, the outcome-speci_c synthetic controls generate better matches with respect to pre-intervention outcome levels (right panels of Figures A.1, A.2, and A.3). The regression results in Tables A.5 and A.6 are similar to those in the main Tables 2 and 3.

Figure B.1: Institutional deliveries by year

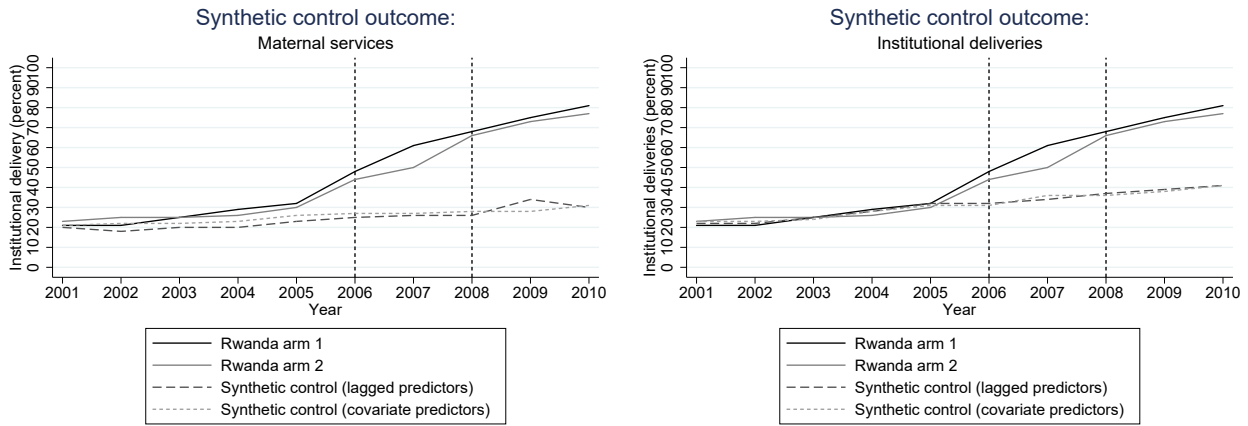


Figure B.2: Four antenatal visits by year

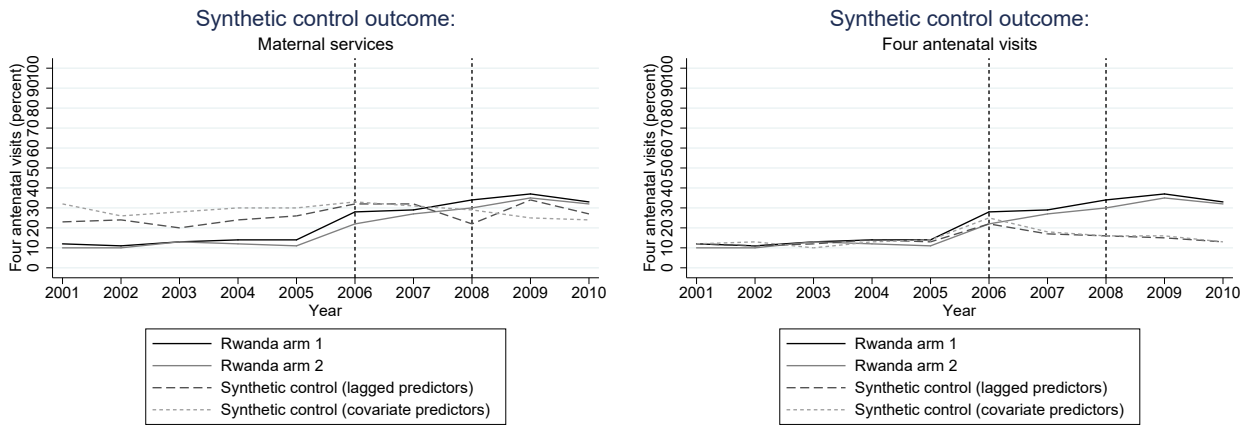
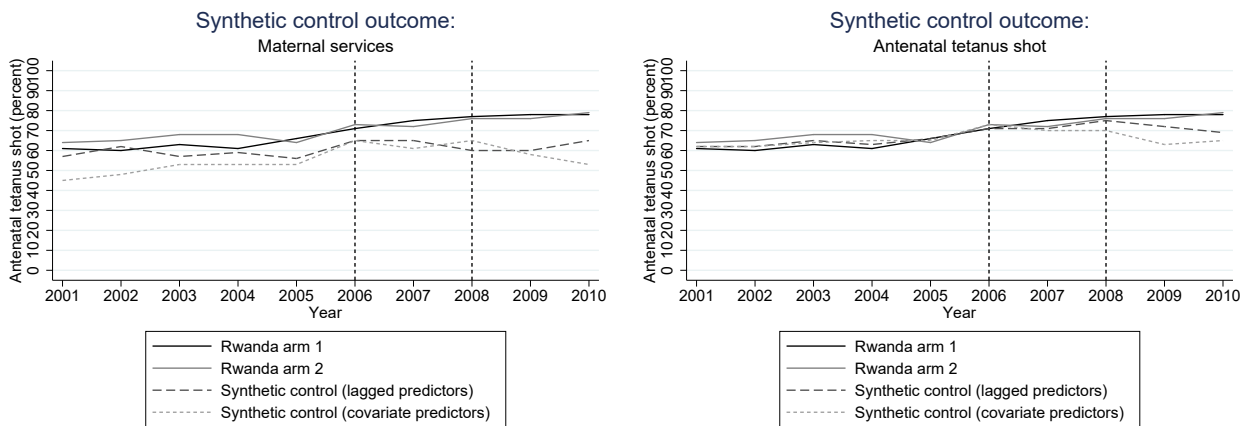


Figure B.3: Antenatal tetanus shot by year



Note: The maternal service rate is defined as the simple average of the rates of institutional deliveries, four antenatal visits, and antenatal tetanus prophylaxis.

Table B.1: Synthetic control weights

Country	Region	Synthetic control outcome							
		Maternal services		Institutional deliveries		Four antenatal visits		Antenatal tetanus shot	
		Lagged	Covars	Lagged	Covars	Lagged	Covars	Lagged	Covars
Ethiopia	Tigray	-	-	0.005	-	-	-	0.017	-
	Afar	-	-	0.005	-	0.207	-	0.015	-
	Amhara	0.594	0.090	0.009	-	-	0.764	0.012	0.080
	Oromiya	-	-	0.008	-	-	-	0.015	-
	Somali	-	0.151	0.004	-	0.241	0.043	0.096	-
	Ben-Gumuz	-	-	0.008	0.415	0.399	0.050	0.019	-
	Southern Nations	-	0.352	0.010	-	-	-	0.031	0.384
	Gambela	-	-	0.110	-	-	-	0.014	-
	Harari	-	-	0.002	-	-	-	0.008	-
Kenya	Addis Abeba	-	-	0.002	-	-	-	0.043	-
	Dire Dawa	-	-	0.022	-	-	-	0.009	-
	Nairobi	-	-	0.002	-	-	-	0.009	-
	Central	-	-	0.002	-	-	-	0.009	0.251
	Coast	-	-	0.003	-	-	-	0.019	-
	Eastern	0.319	-	0.002	-	-	-	0.008	-
	Nyanza	-	-	0.004	0.055	-	-	0.008	-
	Rift Valley	-	-	0.002	-	-	-	0.011	-
	Western	-	-	0.002	-	-	-	0.009	-
Malawi	North Eastern	-	0.085	0.313	-	0.117	0.090	0.087	-
	Blantyre	-	-	0.001	-	-	-	0.008	-
	Kasungu	-	-	0.002	-	-	-	0.023	-
	Machinga	-	-	0.031	-	0.036	-	0.014	-
	Mangochi	0.088	-	0.005	-	-	-	0.010	-
	Mzimba	-	-	0.002	-	-	-	0.007	-
	Salima	-	-	0.001	-	-	-	0.006	-
	Thyolo	-	-	0.003	0.128	-	-	0.012	-
	Zomba	-	-	0.001	-	-	-	0.007	-
	Lilongwe	-	-	0.002	-	-	-	0.031	-
	Mulanje	-	0.192	0.002	-	-	-	0.010	-
Tanzania	Other Northern	-	-	0.001	-	-	-	0.008	-
	Other Central	-	0.080	0.003	-	-	-	0.014	-
	Other Southern	-	-	0.001	-	-	-	0.009	-
	Central	-	-	0.002	-	-	-	0.011	-
	Northern	-	-	0.002	-	-	-	0.009	-
	Eastern	-	-	0.002	-	-	-	0.008	-
	Southern	-	-	0.065	0.071	-	-	0.006	-
	Southern Highlands	-	-	0.002	-	-	-	0.007	-
	Western	-	-	0.001	-	-	-	0.011	-
Uganda	Lake	-	-	0.005	-	-	-	0.008	-
	Zanzibar	-	-	0.027	-	-	-	0.008	-
	Central 1	-	-	0.002	-	-	-	0.007	-
	Central 2	-	-	0.002	-	-	-	0.013	-
	Kampala	-	-	0.002	-	-	-	0.006	-
	East Central	-	-	0.002	-	-	-	0.009	-
	Eastern	-	-	0.002	-	-	-	0.007	-
	North	-	-	0.294	0.294	-	-	0.011	-
	West Nile	-	-	0.003	-	-	-	0.009	-
Zimbabwe	Western	-	-	0.003	-	-	-	0.007	-
	Southwest	-	-	0.002	-	-	-	0.163	-
	Manicaland	-	-	0.001	0.036	-	0.053	0.016	0.198
	Mashonaland Central	-	0.050	-	-	-	-	0.017	-
	Mashonaland East	-	-	0.001	-	-	-	0.009	-
	Mashonaland West	-	-	0.001	-	-	-	0.007	-
	Matabeleland North	-	-	0.002	-	-	-	0.013	-
	Matabeleland South	-	-	0.001	-	-	-	0.006	0.087
	Midlands	-	-	0.001	-	-	-	0.008	-
	Masvingo	-	-	0.001	-	-	-	0.014	-
Harare	-	-	0.001	-	-	-	0.007	-	
Bulawayo	-	-	0.001	-	-	-	0.006	-	

Table B.2: Individual level predictor balance, maternal services synthetic controls

Outcome/covariate	Year	Rwanda	Lagged synth	Covar synth	Rwanda - Lagged synth, Diff (p-val)	Rwanda - Covar synth, Diff (p-val)
Institutional deliveries	2001	0.22	0.20	0.21	0.02 (0.33)	0.01 (0.53)
	2002	0.23	0.18	0.22	0.05 (0.03)	0.01 (0.79)
	2003	0.25	0.20	0.22	0.05 (0.03)	0.03 (0.11)
	2004	0.28	0.20	0.23	0.07 (0.00)	0.05 (0.01)
	2005	0.31	0.23	0.26	0.08 (0.00)	0.05 (0.03)
	Annual trend	0.02	0.01	0.01	0.01 (0.05)	0.01 (0.08)
Four antenatal visits	2001	0.11	0.23	0.32	-0.12 (0.00)	-0.21 (0.00)
	2002	0.11	0.24	0.26	-0.14 (0.00)	-0.15 (0.00)
	2003	0.13	0.20	0.28	-0.07 (0.01)	-0.15 (0.00)
	2004	0.13	0.24	0.30	-0.10 (0.00)	-0.17 (0.00)
	2005	0.12	0.26	0.30	-0.14 (0.00)	-0.17 (0.00)
	Annual trend	0.00	0.00	0.00	-0.00 (0.96)	0.00 (0.68)
Antenatal tetanus shot	2001	0.63	0.57	0.45	0.05 (0.30)	0.18 (0.00)
	2002	0.63	0.62	0.48	0.01 (0.81)	0.15 (0.00)
	2003	0.66	0.57	0.53	0.08 (0.01)	0.13 (0.00)
	2004	0.64	0.59	0.53	0.06 (0.09)	0.12 (0.00)
	2005	0.65	0.56	0.53	0.09 (0.01)	0.13 (0.00)
	Annual trend	0.01	-0.01	0.02	0.01 (0.35)	-0.01 (0.20)
Birth order	2001	4.03	3.90	4.15	0.13 (0.39)	-0.12 (0.33)
	2002	4.01	3.80	3.99	0.22 (0.12)	0.02 (0.83)
	2003	3.86	3.71	3.91	0.15 (0.31)	-0.05 (0.64)
	2004	3.94	3.82	4.01	0.12 (0.39)	-0.07 (0.53)
	2005	3.80	3.64	3.88	0.17 (0.21)	-0.07 (0.51)
	Annual trend	-0.05	-0.05	-0.05	-0.00 (0.97)	0.00 (0.98)
Age under 20	2001	0.07	0.14	0.13	-0.07 (0.00)	-0.06 (0.00)
	2002	0.06	0.16	0.14	-0.10 (0.00)	-0.08 (0.00)
	2003	0.04	0.15	0.14	-0.11 (0.00)	-0.10 (0.00)
	2004	0.04	0.15	0.14	-0.11 (0.00)	-0.10 (0.00)
	2005	0.05	0.14	0.13	-0.09 (0.00)	-0.09 (0.00)
	Annual trend	-0.01	-0.00	0.00	-0.00 (0.39)	-0.01 (0.15)
Age over 35	2001	0.21	0.14	0.14	0.07 (0.00)	0.07 (0.00)
	2002	0.18	0.13	0.11	0.05 (0.01)	0.07 (0.00)
	2003	0.17	0.12	0.11	0.04 (0.02)	0.05 (0.00)
	2004	0.19	0.15	0.13	0.04 (0.07)	0.06 (0.00)
	2005	0.18	0.13	0.10	0.05 (0.01)	0.08 (0.00)
	Annual trend	-0.01	-0.00	-0.01	-0.01 (0.39)	-0.00 (0.86)
Primary education	2001	0.66	0.41	0.36	0.25 (0.00)	0.31 (0.00)
	2002	0.69	0.45	0.38	0.24 (0.00)	0.31 (0.00)
	2003	0.69	0.41	0.36	0.28 (0.00)	0.33 (0.00)
	2004	0.69	0.43	0.38	0.26 (0.00)	0.31 (0.00)
	2005	0.71	0.44	0.40	0.27 (0.00)	0.31 (0.00)
	Annual trend	0.01	0.00	0.01	0.01 (0.50)	0.00 (0.96)
Household size	2001	5.79	6.02	6.21	-0.23 (0.05)	-0.42 (0.00)
	2002	5.78	6.00	5.96	-0.22 (0.08)	-0.19 (0.05)
	2003	5.47	5.91	5.74	-0.43 (0.00)	-0.27 (0.00)
	2004	5.55	5.71	5.90	-0.16 (0.15)	-0.36 (0.00)
	2005	5.54	5.87	6.01	-0.33 (0.01)	-0.47 (0.00)
	Annual trend	-0.07	-0.06	-0.05	-0.01 (0.72)	-0.03 (0.37)
Health insurance, household	2001	0.53	0.00	0.00	0.53 (0.00)	0.53 (0.00)
	2002	0.49	0.00	0.00	0.49 (0.00)	0.49 (0.00)
	2003	0.57	0.00	0.00	0.57 (0.00)	0.57 (0.00)
	2004	0.59	0.03	0.00	0.56 (0.00)	0.59 (0.00)
	2005	0.65	0.01	0.00	0.64 (0.00)	0.64 (0.00)
	Annual trend	0.03	0.01	0.00	0.03 (0.00)	0.03 (0.00)
Urban	2001	0.07	0.06	0.06	0.01 (0.24)	0.01 (0.31)
	2002	0.08	0.04	0.07	0.04 (0.00)	0.01 (0.32)

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Outcome/covariate	Year	Rwanda	Lagged synth	Covar synth	Rwanda - Lagged synth, Diff (p-val)	Rwanda - Covar synth, Diff (p-val)
Has comm. health worker	2003	0.08	0.05	0.08	0.03 (0.02)	-0.00 (0.90)
	2004	0.07	0.06	0.06	0.01 (0.43)	0.01 (0.12)
	2005	0.08	0.10	0.10	-0.01 (0.50)	-0.02 (0.16)
	Annual trend	0.00	0.01	0.01	-0.01 (0.10)	-0.01 (0.14)
	2001	0.56	0.68	0.71	-0.12 (0.00)	-0.15 (0.00)
	2002	0.58	0.68	0.72	-0.10 (0.00)	-0.14 (0.00)
	2003	0.58	0.70	0.70	-0.12 (0.00)	-0.12 (0.00)
	2004	0.57	0.72	0.70	-0.15 (0.00)	-0.13 (0.00)
	2005	0.62	0.79	0.78	-0.18 (0.00)	-0.17 (0.00)
Has television	Annual trend	0.01	0.03	0.01	-0.02 (0.07)	-0.00 (0.78)
	2001	0.00	0.05	0.02	-0.04 (0.00)	-0.01 (0.01)
	2002	0.01	0.03	0.02	-0.02 (0.01)	-0.01 (0.02)
	2003	0.01	0.05	0.02	-0.04 (0.00)	-0.01 (0.06)
	2004	0.01	0.07	0.02	-0.06 (0.00)	-0.02 (0.00)
	2005	0.01	0.08	0.04	-0.06 (0.00)	-0.02 (0.00)
	Annual trend	0.00	0.01	0.00	-0.01 (0.05)	-0.00 (0.20)
	2001	0.00	0.00	0.01	-0.00 (0.18)	-0.01 (0.04)
	2002	0.00	0.01	0.01	-0.00 (0.25)	-0.00 (0.16)
Has refrigerator	2003	0.00	0.00	0.00	0.00 (0.28)	-0.00 (0.43)
	2004	0.00	0.01	0.00	-0.01 (0.42)	0.00 (0.95)
	2005	0.00	0.01	0.02	-0.00 (0.23)	-0.01 (0.00)
	Annual trend	0.00	0.00	0.00	-0.00 (0.81)	-0.00 (0.57)
	2001	0.00	0.02	0.01	-0.02 (0.01)	-0.00 (0.10)
	2002	0.01	0.01	0.00	0.00 (0.66)	0.00 (0.36)
	2003	0.00	0.01	0.00	-0.01 (0.48)	0.00 (0.95)
	2004	0.00	0.02	0.00	-0.02 (0.12)	-0.00 (0.93)
	2005	0.01	0.02	0.01	-0.01 (0.12)	-0.00 (0.84)
Has landline phone	Annual trend	0.00	0.00	-0.00	-0.00 (0.74)	0.00 (0.63)
	2001	0.01	0.03	0.01	-0.03 (0.00)	-0.00 (0.28)
	2002	0.00	0.02	0.02	-0.01 (0.01)	-0.01 (0.01)
	2003	0.01	0.01	0.01	-0.01 (0.23)	-0.01 (0.16)
	2004	0.00	0.01	0.01	-0.00 (0.47)	-0.00 (0.23)
	2005	0.01	0.01	0.01	-0.01 (0.20)	-0.00 (0.90)
	Annual trend	0.00	-0.00	-0.00	0.01 (0.01)	0.00 (0.17)
	2001	0.09	0.05	0.06	0.04 (0.01)	0.03 (0.04)
	2002	0.07	0.04	0.05	0.03 (0.00)	0.02 (0.06)
1 unsatisfied basic need	2003	0.12	0.07	0.06	0.05 (0.00)	0.06 (0.00)
	2004	0.12	0.09	0.07	0.03 (0.06)	0.05 (0.00)
	2005	0.16	0.08	0.07	0.08 (0.00)	0.09 (0.00)
	Annual trend	0.02	0.01	0.00	0.01 (0.07)	0.02 (0.00)
	2001	0.33	0.39	0.33	-0.06 (0.04)	-0.00 (0.84)
	2002	0.30	0.44	0.37	-0.14 (0.00)	-0.07 (0.00)
	2003	0.37	0.41	0.35	-0.04 (0.22)	0.02 (0.31)
	2004	0.37	0.41	0.38	-0.04 (0.14)	-0.01 (0.73)
	2005	0.41	0.34	0.31	0.07 (0.01)	0.10 (0.00)
2 unsatisfied basic needs	Annual trend	0.02	-0.01	-0.00	0.03 (0.00)	0.03 (0.00)
	2001	0.49	0.47	0.45	0.02 (0.51)	0.04 (0.15)
	2002	0.53	0.44	0.47	0.09 (0.00)	0.06 (0.00)
	2003	0.42	0.42	0.49	0.00 (0.91)	-0.07 (0.00)
	2004	0.42	0.38	0.45	0.04 (0.18)	-0.02 (0.25)
	2005	0.36	0.46	0.47	-0.11 (0.00)	-0.11 (0.00)
	Annual trend	-0.04	-0.01	0.00	-0.03 (0.00)	-0.04 (0.00)
	2001	0.08	0.07	0.13	0.01 (0.69)	-0.05 (0.00)
	2002	0.08	0.07	0.09	0.01 (0.50)	-0.02 (0.15)
3 unsatisfied basic needs	2003	0.07	0.08	0.07	-0.02 (0.37)	-0.00 (0.67)
	2004	0.07	0.08	0.10	-0.01 (0.38)	-0.03 (0.02)
	2005	0.06	0.08	0.11	-0.02 (0.11)	-0.05 (0.00)
	Annual trend	-0.00	0.00	-0.00	-0.01 (0.08)	-0.00 (0.84)

Table B.3: Coefficient differences using different models from Table 2

	2005, 2007			2001-2008		
	Rwanda only - lagged synth	Rwanda only - covar synth	Lagged synth - covar synth	Rwanda only - lagged synth	Rwanda only - covar synth	Lagged synth - covar synth
Institutional deliveries						
Difference (Arm 1 x post 2006) (p-value)	0.4 (0.94)	0.5 (0.92)	0.1 (0.98)	0.0 (0.99)	0.2 (0.96)	0.1 (0.97)
Four antenatal visits						
Difference (Arm 1 x post 2006) (p-value)	0.6 (0.92)	-0.1 (0.99)	-0.7 (0.91)	0.2 (0.97)	0.2 (0.97)	-0.0 (1.00)
Antenatal tetanus shot						
Difference (Arm 1 x post 2006) (p-value)	-0.3 (0.97)	0.3 (0.97)	0.6 (0.93)	-0.3 (0.93)	-0.3 (0.94)	0.0 (0.99)

Note: Models refer to results from Table 2 in the main text, where Rwanda only (2005, 2007) refers to specification (2), lagged synth (2005, 2007) refers to specification (3), covar synth (2005, 2007) refers to specification (4), Rwanda only (2001-2008) refers to specification (5), lagged synth (2001-2008) refers to specification (6), and covar synth (2001-2008) refers to specification (7). P-values refer to tests of coefficient equality.

Table B.4: Coefficient differences using different models from Table 3

Coefficient	Lagged synth - covar synth (p-val)		
	Institutional deliveries	Four antenatal visits	Antenatal tetanus shot
β_1 : Arm 1 x post 2006 (initial incentive effect)	-2.2 (0.51)	-7.6 (0.10)	5.0 (0.21)
β_2 : Arm 2 x post 2006 (uncond. finance effect)	-2.3 (0.61)	-7.6 (0.06)	5.0 (0.18)
β_3 : Arm 1 x post 2008 (med. run incentive effect)	-1.9 (0.58)	1.2 (0.75)	-2.4 (0.50)
β_4 : Arm 2 x post 2008 (scale-up effect)	-1.8 (0.64)	1.1 (0.67)	-2.3 (0.59)

Note: Models refer to results from Table 3 in the main text, where institutional deliveries refers to the difference between specifications (1) and (2), 4 antenatal visits refers to the difference between specifications (3) and (4), and antenatal tetanus shot refers to the difference between specifications (5) and (6). P-values refer to tests of coefficient equality.

Table B.5: Robustness using outcome-specific synthetic controls, effects of incentives versus unconditional finance, comparison with RCT (percentage points)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2005, 2007				2001-2008		
	Basinga RCT	Rwanda only	Lagged synth	Covar synth	Rwanda only	Lagged synth	Covar synth
Institutional deliveries							
Arm 1 x post 2006 (incentives vs. uncond. finance)	8.1** [$p = 0.02$]	9.1** (3.7)	8.6** (3.4)	8.9** (3.6)	8.1*** (2.6)	8.0*** (2.5)	8.1*** (2.6)
Observations	2,108	3,064	24,028	5,327	11,184	82,897	18,967
2005 mean (Rwanda arm 1)	35	32.2	32.2	32.2	32.2	32.2	32.2
Four antenatal visits							
Arm 1 x post 2006 (incentives vs. uncond. finance)	0.8 [$p = 0.83$]	1.6 (4.5)	1.5 (4.4)	1.2 (4.4)	2.6 (3.3)	1.9 (3.3)	2.5 (3.3)
Observations	2,223	2,173	3,050	3,429	6,749	9,628	10,471
2005 mean (Rwanda arm 1)	18	13.4	13.4	13.4	13.4	13.4	13.4
Antenatal tetanus shot							
Arm 1 x post 2006 (incentives vs. uncond. finance)	5.1* [$p = 0.06$]	-2.1 (5.3)	-2.1 (5.2)	-2.0 (5.3)	4.3 (2.6)	4.7* (2.5)	4.7* (2.6)
Observations	2,856	2,156	14,584	3,699	6,698	51,133	11,223
2005 mean (Rwanda arm 1)	71	66.5	66.5	66.5	66.5	66.5	66.5

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Data from column (1) were independently collected by Basinga et al.; all other columns use DHS data. Coefficients are from difference-in-differences regressions, multiplied by 100 for exposition. All specifications include covariates, regional fixed effects, and birth month-year fixed effects. Standard errors are clustered at the regional level and are shown in parenthesis.

Table B.6: Robustness using outcome-specific synthetic controls, differential effects by arm and phase based on synthetic control method, 2001-2010 (percentage points)

	(1)	(2)	(3)	(4)	(5)	(6)
	Institutional deliveries		4 antenatal visits		Ante tetanus shot	
	Lagged	Covar	Lagged	Covar	Lagged	Covar
β_1 : Arm 1 x post 2006 (initial incentive effect)	19.3*** (1.9)	18.7*** (3.6)	10.4*** (3.0)	8.2*** (2.6)	-1.8 (2.8)	2.3 (3.2)
β_2 : Arm 2 x post 2006 (uncond. finance effect)	11.3*** (2.5)	10.6** (4.1)	8.6*** (2.6)	5.8** (2.1)	-6.3** (2.7)	-2.3 (3.1)
β_3 : Arm 1 x post 2008 (med. run incentive effect)	9.8*** (2.4)	8.8*** (2.3)	7.9*** (2.7)	10.4*** (2.7)	2.1 (2.8)	7.5*** (2.4)
β_4 : Arm 2 x post 2008 (scale-up effect)	14.2*** (2.8)	13.4*** (2.8)	10.7*** (1.6)	13.5*** (1.9)	3.0 (3.1)	8.3*** (2.8)
Observations	115,205	24,745	13,782	14,658	77,034	15,529
2005 mean (full sample)	31.3	31.2	12.4	13.1	65.4	65.0
Hypothesis testing						
$\beta_1 - \beta_2 = 0$ (incentives. vs. uncond. financing)	8.0 p-value [0.00]	8.1 p-value [0.01]	1.9 p-value [0.56]	2.3 p-value [0.47]	4.5 p-value [0.07]	4.6 p-value [0.09]
$\beta_1 + \beta_3 = 0$ (med. run incentives, total)	29.1 p-value [0.00]	27.5 p-value [0.00]	18.3 p-value [0.00]	18.5 p-value [0.00]	0.3 p-value [0.92]	9.8 p-value [0.01]
$(\beta_1 + \beta_3) - (\beta_2 + \beta_4) = 0$ (arm 1 vs. 2, post 2008)	3.6 p-value [0.15]	3.5 p-value [0.20]	-1.0 p-value [0.77]	-0.8 p-value [0.81]	3.7 p-value [0.15]	3.8 p-value [0.17]

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Coefficients are from difference-in-differences regressions, multiplied by 100 for exposition. All specifications include covariates, regional fixed effects, and birth month-year fixed effects. Standard errors are clustered at the regional level and are shown in parenthesis.