Does Decentralization of Health Systems Improve Maternal and Child Health? Evidence from Rural Honduras

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Introduction

One of the greatest challenges to improving health in low resource settings is the quality and effectiveness of the health system. Without efficient and equitable systems, countries cannot scale up health programs that are required to meet global and national health goals, and provide continuous and quality care to women and children. A good health system delivers high-quality services to the entire population in a timely and effective manner. The exact configuration of services varies from country to country, but in all cases requires a robust financing mechanism; a well-trained and adequately paid workforce; reliable information on which to base decisions and policies; well-maintained facilities and logistics to deliver quality medicines and technologies. Many health systems in low resource settings, however, are unable to prevent basic health disparities and ameliorate human suffering.

Decentralization reforms, premised on the idea that local institutions better provide public services, are a ubiquitous response to this problem. Decentralization is fundamentally about a transfer or reallocation of political powers between the central government and actors or institutions at lower levels of government. Over the last three decades, these types of reforms have been incentivized by international donors and implemented in developing countries as a strategy to improve the provision of public services, especially in rural communities. Despite extensive support, theoretical arguments for health sector decentralization are weak and empirical results on whether reformed systems produce healthier communities are extremely mixed.

The process of decentralization fundamentally alters the structure of the health system, thus affecting the way care is provided to the community. This not only affects the provision of and access to basic maternal and child health services, but may affect the ways in which vertical programs, often disease-specific interventions, are managed and implemented. Decentralization is a large-scale health intervention which seeks to fundamentally alter the ways in which basic health care is provided. However, when power over the health system is given to local authorities, significant within-country variation is created in how the systems are run, what health issues gain priority, and the quality and effectiveness of health care delivery. We hypothesize that this contributes to the mixed results around the efficacy of health systems decentralization and necessitates examination of the local context of health systems. The objective of the study is to explain how the local context of decentralization affects variation in health system performance and, ultimately, impacts child and reproductive health and access to care.

Background on Decentralization

International donors have touted the decentralization of political power to subnational and local governing units as a strategy for improving the provision of public services in developing countries (Burki et al. 1999, World Bank 1999). This is one significant response to the problem that poor, rural citizens have access to fewer health services and experience worse health outcomes than their richer, urban counterparts (Braveman & Tarimo, 2002). Decentralization was first introduced as a strategy for health sector reform after the World Health Organization (WHO) emphasized the importance of community participation and local resources for primary healthcare in its 1978 Alma-Ata Declaration (Section VII). The aim of decentralization reforms is to improve health system performance through changes in the vertical distribution of power across levels of government and between the public, private, and non-

governmental sectors. The academic literature on decentralization varies widely in its theoretical bases, geographical coverage, and themes, and is characterized by significant disagreement.

Proponents of decentralization argue that local actors are better positioned to make decisions and implement policies because they have access to superior information relative to their national counterparts and because they are more directly accountable to local constituents (Hayek 1945, Oates 1977, Diamond & Tsalik 1999). Skeptics of decentralization, however, highlight that devolving political decision-making can reinforce and entrench existing local power dynamics to the detriment of the poor (Crook & Manor 2000, Agrawal & Ribot 1999). This perspective focuses on the relative weakness of institutions generally, and local institutions especially, in many countries where decentralization reforms have been implemented. Finally, a third group of scholars emphasize that implementing decentralization reforms does not automatically translate into outcomes, positive or negative. Instead, they argue that it is crucial to analyze the processes in the middle of a causal chain linking interventions with outcomes, such as popular participation in local government decision-making (Singleton 1998, Blair 2000, Larson 2002, Andersson & van Laerhoven 2007, Agrawal & Ribot 1999, Agrawal & Ostrom 2001), downward accountability to citizens (Crook & Manor 1998, Smoke 2003, Ribot 2002, Yilmaz & Serrano-Berthet 2008), technical capacity of the local unit to which governance responsibilities are devolved (e.g., Andersson 2004, World Bank 1988, Pacheco 2000, Flores & Ridder 2000, Contreras & Vargas 2001), and secure funding (Fiszbein 1997, de Mello 2000, Kaimowitz et al. 2000, Pacheco 2000).

Moving beyond these theoretical claims and empirical findings from the broader literature, studies focusing specifically on decentralization and health outcomes have especially inconsistent results and suffer from severe research design and data limitations. Authors have argued that decentralization has no significant impacts on health services (Bossert et al. 2003a, Jeppson & Okuonzi 2000), negative consequences for service delivery (Campos & Hellman 2005), mixed results for medicine logistics systems (Bossert et al. 2007), and positive impacts for equity and infant mortality rates (Bossert et al. 2003b, Robaline et al. 2005, Guanais & Macinko, 2009). In short, we still know relatively little about what makes health sector decentralization work and existing findings are limited by selection and endogeneity issues related to the assignment of the governance reform. In this project we implement a quasi-experimental research design, a theory-driven data collection effort, and diverse analytic methods to make significant contributions to the ongoing debate about the effectiveness of decentralization policies for improving community health (Bardhan & Mookherjee, 2006; Treisman, 2007).

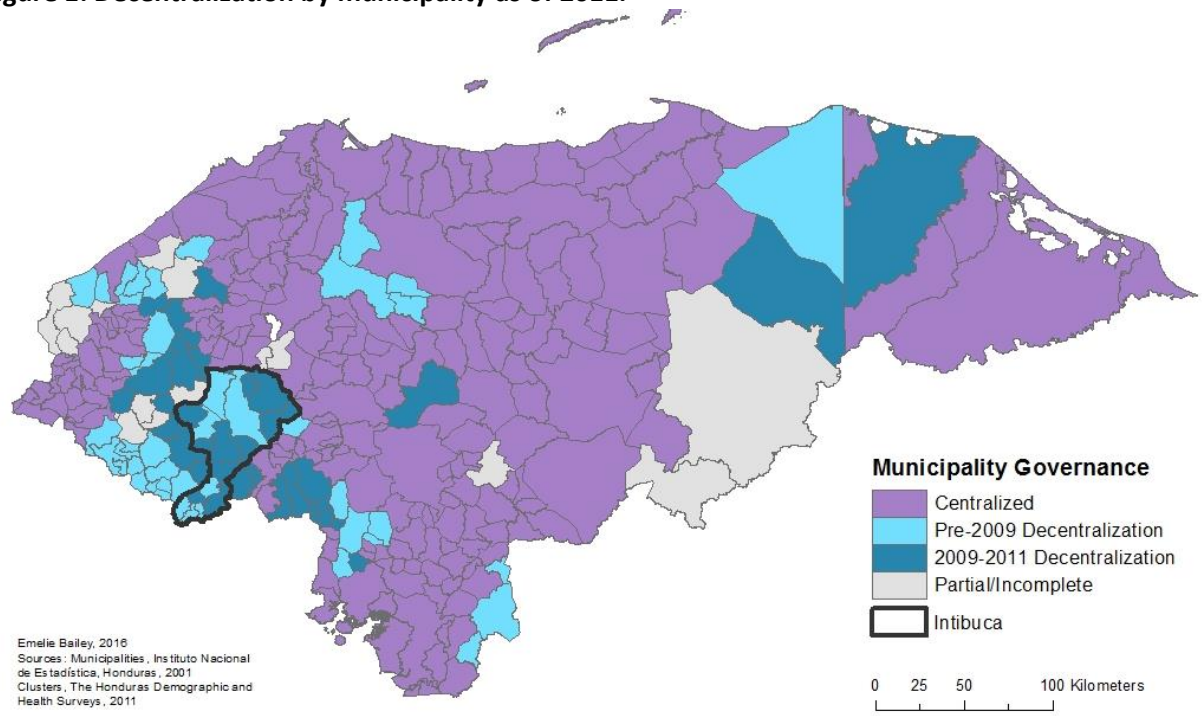
Thus, we are left with a rather bizarre paradox. After more than 50 years of policy experimentation and hundreds of studies, we still know very little about whether decentralization has positive or negative effects on both health outcomes and the health systems which serve the health needs of the population. In this study we shift the question away from simply asking if decentralization improves the health of children and women. Rather our guiding research questions are: 1) Is there spatial variation in child health outcomes and maternal/child health service provision? 2) Why do some local health systems perform better than others?

Health Systems Decentralization in Honduras

Honduras is the second poorest country in Central America, with low rates of education, high unemployment and significant inequalities (World Bank, 2015). In spite of significant progress made in achieving global health targets, Honduras faces significant challenges, largely due to the country's political instability and the challenges in strengthening and legitimizing the national health authority (PAHO, 2015). The country's national policies focus on maternal and child health, sexual and reproductive health, nutrition, and mental health. The Honduran Ministry of Health (MOH) began implementing decentralized health service delivery models at the regional and local levels in 2005. This governance reform is a blend of deconcentration and delegation; the MOH passes specific authorities and responsibilities for health system management and health services provision to a local government

or community-based organization while retaining an oversight role as regulator and financier through the relevant Regional Health Authority. As of 2011, over 200 health centers, or 15% of the country's health units, were decentralized in over 70 municipalities and provide health services to approximately one million Hondurans. There were 3 models for decentralization: devolution to the municipality, to an NGO, or to a Mancomunidad (local community organization). Figure 1 shows the geographic distribution of decentralization as of 2011.

Figure 1: Decentralization by municipality as of 2011.



There are several unique characteristics of the decentralization process in Honduras which make it an optimal case through which to generate knowledge about the institutional conditions that shape variation in local health system performance. First, focusing our analysis on a single country minimizes the confounding risks of historical and cultural factors. Second, the partial implementation of decentralization allows for a quasi-experimental design in which we can compare municipalities that have been decentralized to other municipalities that are still under central control. Third, there is important local variation on key institutional and organizational factors which enables us to distinguish among possible mechanisms which work to improve child health.

Methods

Study Design

The Encuestas de Salud y Gobernanza (ENSAGO) study employed 4 data collection strategies: 1) Compile data on health services/socio-economic attributes from administrative sources (e.g., MOH, Census, DHS), 2) A health personnel survey, 3) A community survey, and 4) A household survey which examines individual health and access to care. The data from administrative sources allowed us to develop our sampling strategy by providing information on demographics and socioeconomics, measures of the provision of critical services provided by the local health system, comprehensive measures of overall system performance, and the health status of the population. The health personnel survey provided contextual information on the local health system such as types of services provided,

availability of health resources (e.g., vaccines, birth control), and opinions about the ability of the health system to provide care. The community survey provided information on the linkages between community organizations that might affect the local health system's ability of provide care. Finally, the household survey examined individual-level health outcomes and perceptions of the availability and accessibility of key health services for women and children. This paper focuses on the household survey, though uses data from the health personnel survey and administrative sources to examine the local context of decentralization impacts on child health and maternal care outcomes at the community level.

Sample Selection

The ENSAGO study took advantage of the gradual roll-out of decentralization that began in Honduras in 2005 which set up a de facto quasi-experimental design in which we could compare decentralized municipalities to non-decentralized municipalities. We included all municipalities with at least 4 years under decentralization by 2016 (42 of 79 treated municipalities). Our rational was that a 4-year buffer was necessary in order to allow sufficient time for restructuring to take effect and for institutional changes to have an impact on early childhood health. We excluded a few early pilot cases and partial decentralization cases (15 municipalities), and two remote states in the eastern portion of the country that were not feasible to visit as part of field work (the Mosquito Coast, 9 municipalities).

We matched the remaining 42 municipalities to centralized controls using standard propensity score methods. We modeled the treatment (decentralization) for municipalities as a function of politics, health outcomes, supply of health services, demographics and socioeconomics (Appendix A has the complete propensity score equation). A total of 23 controls were selected. There was a higher ratio of cases to controls because we wanted to examine the potential effect of several different decentralization models (governance strategies) during our analyses. Our final sample included 65 municipalities. Post-matching data was reasonably balanced. The overall distance for the treated group was 0.62 and for the control group was 0.59.

Data Sources

The 2016 ENSAGO household survey piggy-backed on the Demographic and Health Survey (DHS) which were administered in Honduras in both 2005/06 and 2011/12. Since the 2005/6 survey was administered prior to decentralization reforms, and 2012 was the last year a municipality could have been decentralized and included in our sample, we rationalized that if we used a shortened version of the DHS survey, and the same sampling methodology, we could compare data across three waves. This created a pre-/post-intervention study with comparable data at the municipality level.

The ENSAGO household survey sampled approximately 9,000 households in 65 municipalities, or about 140 households per municipality. As with the DHS surveys, we interviewed the head of household and collected anthropometrics from all children <5 years of age in the household. DHS interviewed all women in the household who were aged 18 to 45; for cost reasons, we randomly chose one woman in this age group for interview. We then constructed a longitudinal dataset using the 2005/2006 and 2011/2012 Honduras Demographic and Health Surveys and the 2016 ENSAGO Household Survey.

Outcome measures

Given that the Honduran MOH focused on maternal and child health services, this study focused on 4 domains that represent these priorities: prenatal care, birth and delivery care, postnatal care, vaccination and overall child health. The specific outcomes used to examine each of these domains are outlined in Table 1. We weighted all analyses using survey weights that reflected the probability that the

municipio was included in our sample and the probability that the household was selected and the woman within the household was chosen for interview. All models specified the municipio as a cluster.

While the propensity score matching technique ensured that municipality characteristics were similar at baseline, we add a series of control variables to our models to correct for potential imbalances in household characteristics between centralized and decentralized areas. These controls included household size and number of children, maternal education, and a household wealth index. We explored marital status, paternal age, literacy, among other variables, which did not improve overall model fit.

Domain	**Variable**
Prenatal care	4 or more Antenatal Care visits Iron Supplementation Vitamin A Supplementation Maternal Tetanus Vaccine
Birth/Delivery Care	Home Delivery MCH Center Delivery Birth with Skilled Attendant (doctor or trained nurse)
Postnatal Care	Mother Received a Checkup <2 Weeks after Delivery Infant Received a Postnatal Checkup Child in Weight Control Program Child Breastfed
Vaccination	Full Vaccination (BCG + DPT + Polio + Measles) BCG DPT Polio Measles
Child Health	z-score for Weight-for-Age z-score for Length-for-Age z-score for Weight-for-Length z-score for BMI

Table 1. Domains and Outcomes Use to Examine Maternal and Child Health

Statistical methods

Analyses were conducted using either the municipality or the individual as the unit of analysis. We first perform a simple trend analysis to examine the change in health outcomes over time and between centralized and decentralized municipalities, using the two DHS waves and the ENSAGO survey. This allowed us to test the assumption that treatment and control municipalities had parallel trends in outcomes prior to decentralization. We next conducted simple difference-in-difference models which examine whether the improvements in health outcomes and access to key services differ between centralized and decentralized municipalities. Finally, we explore how different categorizations of the treatment affect results (e.g., decentralized/not vs. governance type). We represent this relationship using the following equation:

$$y = \mu + \gamma D + \delta T + \alpha(D * T) + \varepsilon$$

The coefficient on the interaction term estimates the average treatment effect. We use two observations per municipality, one for the pre-treatment period (from DHS 2005) and one for the post-treatment period (ENSAGO 2016).

Results

	2005			2016			Difference (2016-2005)	
Variable	Centralized	Decentralized	p	Centralized	Decentralized	p	Centralized	Decentralized
Prenatal Care	%	%		%	%			
4+ Antenatal Care visits	83.4	86.5	0.968	**88.9**	**92.9**	**0.009**	5.5	6.4
Iron Supplementation	**24.9**	**17.2**	**0.002**	**91.6**	**87.6**	**0.020**	66.7	70.4
Vitamin A Supplementation	55.0	50.6	0.204	58.9	58.9	0.992	3.9	8.4
Maternal Tetanus Vaccine	89.8	90.5	0.719	83.7	85.0	0.527	-6.1	-5.5
Birthing Care								
Home Delivery	**45.7**	**53.8**	**0.008**	**19.6**	**15.3**	**0.021**	-26.1	-38.6
MCH Center Delivery	6.3	4.9	0.236	**8.3**	**18.2**	**0.000**	2.0	13.3
Birth with Skilled Attendant	52.8	45.7	0.021	82.8	85.0	0.286	30.0	39.3
Postnatal Care								
Maternal Checkup <2 Weeks	15.7	18.9	0.290	93.3	92.4	0.585	77.6	73.5
Infant Postnatal Checkup	70.7	72.4	0.736	71.7	73.7	0.554	1.1	1.3
Child in Weight Control Program	**13.1**	**18.4**	**0.037**	**32.5**	**45.6**	**0.000**	19.5	27.2
Child Breastfed	92.7	94.4	0.476	96.5	95.3	0.167	3.8	0.9
Vaccines								
Full Vaccination	56.2	57.7	0.787	83.0	85.2	0.400	26.8	27.5
BCG	79.5	78.3	0.631	87.8	89.3	0.429	8.3	11.0
DPT	80.2	80.9	0.663	85.9	87.9	0.375	5.8	7.0
Polio	74.7	74.9	0.522	87.8	88.5	0.740	13.2	13.6
Measles	57.3	59.5	0.995	85.1	87.2	0.361	27.8	27.7
Child Health								
Weight-for-Age	-0.74	-0.85	0.090	**-0.48**	**-0.67**	**0.029**	0.3	0.2
Length-for-Age	**-1.51**	**-1.71**	**0.016**	**-0.73**	**-1.01**	**0.006**	0.8	0.7
Weight-for-Length	0.21	0.18	0.737	-0.21	-0.12	0.313	-0.4	-0.3
BMI	0.36	0.36	0.990	-0.13	-0.02	0.220	-0.5	-0.4

Table 2. Weighted descriptive statistics of outcomes by treatment and time.

Improvement of health in Honduras is a success story: Nearly all health measures show improvement over the 2005-2016 period, improvement that took place in both centralized and decentralized municipios. Of particular note is the sizeable shift away from home delivery (to hospital or MCH Center deliver) and toward the presence of a skilled birth attendant and maternal postpartum checkups. The increases in full vaccination and enrollment of children in weight control (growth monitoring) programs speak to Honduras' success in working toward international maternal and child health goals.

	Models where treatment is decentralized vs. centralized			*Models where treatment is decentralized governance type vs. centralized*								
				Mancomunidad			**NGO**			**Municipio**		
Variable	**DiD Estimate**	**SE**	**p-value**	**DiD Estimate**	**SE**	**p-value**	**DiD Estimate**	**SE**	**p-value**	**DiD Estimate**	**SE**	**p-value**
Prenatal Care												
4+ Antenatal Care visits	0.34	0.33	0.302	-0.06	0.37	0.877	1.10	0.63	0.080	0.69	0.42	0.103
Iron Supplementation	-0.03	0.29	0.916	-0.06	0.35	0.869	0.31	0.40	0.432	0.05	0.36	0.898
Vitamin A Supplementation	0.16	0.23	0.480	-0.09	0.26	0.728	0.53	0.29	0.072	0.47	0.28	0.091
Maternal Tetanus Vaccine	-0.09	0.30	0.770	-0.23	0.33	0.477	-0.26	0.48	0.592	0.24	0.38	0.529
Birthing Care												
Home Delivery	-0.66	0.21	**0.002**	**-0.90**	**0.24**	**0.000**	**-1.24**	**0.31**	**0.000**	-0.30	0.28	0.280
MCH Center Delivery	1.05	0.39	**0.007**	**1.59**	**0.47**	**0.001**	**1.64**	**0.55**	**0.003**	0.21	0.45	0.641
Birth with Skilled Attendant	0.48	0.24	**0.047**	**0.64**	**0.26**	**0.016**	**1.08**	**0.35**	**0.002**	0.13	0.31	0.673
Postnatal Care												
Maternal Checkup <2 Weeks	-0.72	0.42	0.088	-0.83	0.49	0.089	-0.51	0.54	0.351	-0.61	0.50	0.220
Infant Postnatal Checkup	0.24	0.31	0.442	0.24	0.36	0.505	0.34	0.41	0.398	0.35	0.38	0.353
Child in Weight Control Program	-0.08	0.25	0.760	0.01	0.28	0.975	-0.48	0.30	0.104	0.31	0.31	0.322
Child Breastfed	-0.53	0.37	0.150	-0.39	0.43	0.365	-0.31	0.57	0.582	-0.89	0.52	0.087
Vaccines												
Full Vaccination	0.24	0.28	0.398	0.46	0.32	0.152	0.50	0.40	0.217	-0.08	0.33	0.800
BCG	0.08	0.29	0.777	0.15	0.33	0.656	0.46	0.42	0.275	-0.05	0.34	0.894
DPT	0.28	0.30	0.351	0.32	0.34	0.341	0.40	0.43	0.352	0.28	0.34	0.410
Polio	0.29	0.29	0.324	**0.69**	**0.34**	**0.038**	0.11	0.41	0.786	0.10	0.33	0.759
Measles	0.25	0.28	0.379	0.41	0.32	0.201	0.37	0.40	0.355	0.08	0.32	0.798
Child Health												
Weight-for-Age	-0.02	0.13	0.893	-0.06	0.16	0.695	0.04	0.16	0.794	-0.03	0.15	0.862
Length-for-Age	-0.03	0.15	0.835	0.02	0.17	0.894	0.14	0.17	0.411	-0.23	0.17	0.181
Weight-for-Length	0.12	0.16	0.462	0.00	0.19	0.980	0.09	0.19	0.638	0.25	0.18	0.162
BMI	0.13	0.16	0.404	0.02	0.19	0.910	0.00	0.19	0.986	0.32	0.19	0.089

Table 3. Results from DiD models exploring the effect of decentralization on health outcomes.

Note: Estimates are year*treatment interaction terms from logistic or linear models.

When we considered differences in change between treatment and control areas between 2005 and 2016, there were no significant differences in the key child health outcomes.

However, improvements in maternal care stand out. The decrease in home delivery (and concomitant increase in health facility delivery) and the increase in the presence of a skilled birth attendant were greater under decentralization than centralized administration of health services.

Further, the type of decentralized administration mattered. Significantly greater improvement took place in municipios under Mancomunidad or NGO administration but not in those municipios that administered health care on their own.

Discussion

Child health and health services have improved in Honduras over the past decade!

Our analysis was restricted to those municipios that were included in ENSAGO, but the trend observed here is also apparent in the full 2005 and 2011 DHS datasets in both urban and rural areas.

While decentralization does not appear to have affected several key child health outcomes, it is important to note that this change in administration did no harm. Decentralized municipios were not worse off than centralized municipios on any health indicator included here.

It does appear that decentralization had an effect on the provision of important health services, specifically full vaccination of children and maternal health services. But this conclusion has to be tempered. All decentralization is not the same. Thus far, we have identified Mancomunidad and NGO administration as responsible for greater improvement in health services.

Next Steps

We plan to add other health indicators and fertility to the set of outcomes examined thus far.

A major goal of our overall study is to find out whether and which types of decentralization differ in their impact on population health. Our results so far, based only on the household survey portion of ENSAGO, show differential impacts of type of administration. Our next step is analysis of the other three parts of our study (administrative records, facility survey, community survey) to see where the types of administration differ and whether those differences help explain the variations in health improvement demonstrated in the household surveys.

We expect to include results from these further analyses in the final PAA paper and presentation.