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Bringing Power to the People or the Well-Connected?

Evidence from Ethiopia on the Gendered Effects of Decentralizing Service Delivery

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Bringing Power to the People or the Well-Connected? Evidence from Ethiopia on the Gendered Effects of Decentralizing Service Delivery

Katrina Kosec Jie Song Hongdi Zhao *

December 30, 2020

Abstract

Decentralization is often motivated by its potential to make service delivery more responsive to citizens' preferences. However, women's ability to influence policy outcomes may vary across levels of government. This paper considers how decentralization affects both women's and men's access to government-provided services. We exploit the partial roll-out of decentralization in Ethiopia during 2000–01 and employ a spatial regression discontinuity design to identify its impacts. Decentralization improves access to public services for both women and men, but the benefits for men are greater, widening the gender gap in access. We find no evidence that this is due to reduced participation of women in local elections. However, decentralization disproportionately increases men's interactions with local government officials and influential civil society leaders—who wield more power under decentralization. The results are consistent with non-electoral channels of political influence at the local level, dominated by men, contributing to policy outcomes favoring men.

JEL Classification: H11, H42, H76, H77
Keywords: Decentralization, gender, local government expenditures, publicly-provided goods, federalism

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1 Introduction

Decentralization, or the devolution of authority to lower levels of government, has become widely popular in recent years (O'Neill, 2003; Gadenne and Singhal, 2014)—possibly as much so as democracy itself (Treisman, 2007). In theory, decentralization makes public service delivery more efficient as well as more responsive to citizens' preferences. Taxable but mobile factors of production can sort themselves into localities providing their preferred package of taxes, services, laws, and regulations, inducing inter-jurisdictional competition (Tiebout, 1956; Bewley, 1981; Edwards and Keen, 1996; Hatfield and Kosec, 2013; Hatfield, 2015). Further, decentralization can bring about "yardstick competition," whereby voters can better assess their own jurisdiction's service provision levels and quality given the presence of neighboring jurisdictions with similar mandates (Besley and Case, 1995; Seabright, 1996). Even in non-democratic settings, decentralization allows the central government to benchmark localities' performance against one another and reward or sanction accordingly (Jia, Kudamatsu, and Seim, 2015). Finally, giving more discretion to local officials helps exploit their informational advantages (Hayek, 1945; Kosec and Mogues, 2020*b*).

The empirical literature offers some measure of support for the broad benefits of decentralization across a variety of country contexts and publicly-provided goods. While the assumptions of formal models of decentralization are not always met in developing country settings (Bardhan, 2002; Bandiera and Levy, 2011; Pepinsky and Wihardja, 2011; Gadenne and Singhal, 2014; Banerjee et al., 2018; Kosec and Mogues, 2020*a*),[1] a systematic review of the empirical literature reveals over twice as many studies finding positive compared to negative impacts of decentralization on public service delivery (Kosec and Mogues, 2020*a*).

Despite overall benefits of decentralization, it is important to consider distributional issues. Decentralization fundamentally alters the accountability relationships incentivizing government service providers. While it in theory brings decision-making and discretion

[1]For example, these models often assume mobile labor and capital; high state capacity; a high degree of political competition; and minimal information symmetries between citizens and policymakers.

closer to the people, this raises the critical question of *which* people. In particular, women's and men's policy priorities diverge over certain goods and issues (Svaleryd, 2009; Morgan, 2013; Hessami and da Fonseca, 2020). Further, even if women and men have similar policy priorities, as they often do (Gottlieb et al., 2016), they may compete over rival goods and services. Women's ability to influence policy outcomes may vary across levels of government given mobility restrictions that women but not men face, or differences in the characteristics of their social networks. Additionally, the tendency for decentralization to reduce information asymmetries between service users and providers about everything from the demands of specific groups to who is actually utilizing services, could allow for finer-tuned targeting of services under decentralization—potentially affecting women and men differently. However, we know of no rigorous empirical evidence on the gendered effects of decentralization.

In this paper, we study the impacts of a fiscal and administrative decentralization reform carried out in Ethiopia on women's and men's access to publicly-provided goods and services and political engagement. Ethiopia is a predominantly poor and agrarian country which holds elections but is not a consolidated democracy—like many developing country contexts. Estimating causal effects is challenging as decentralization is typically pursued in response to favorable combinations of political capacity, political support, and preferences of citizens and leaders (Boone, 2003; O'Neill, 2003; Amat and Falcó-Gimeno, 2014). Further, as it requires elaborate institutional restructuring, decentralization does not typically lend itself to randomization at the level of some sub-national geography, and it is typically deployed across an entire country at once—resulting in no control areas. A common approach in the existing literature is to use a continuous variable such as locally generated revenues as a share of total revenues, or the number of local governments, to capture the degree of decentralization. However, these capture effects distinct from those of a discrete and large-scale change in the accountability relationships incentivizing service delivery.

We exploit the partial roll-out of decentralization in Ethiopia during 2000–01, where the government piloted the reform in four of its nine recently-formed regions. During 2008–09,

after the effects of the reform were fully consolidated, we sampled rural households within 75 km of three different borders between decentralized and non-decentralized regions. We then employ a spatial regression discontinuity design to identify decentralization's causal impacts eight years later. We gathered detailed data on the delivery of agricultural services, which is one of the most important public expenditure items in our study context. We also gathered data on various forms of political engagement, including meeting with local government officials and civil society leaders as well as voting. Prior to decentralization, we show balance on individual and household characteristics at future policy change borders.

We find that decentralization frequently improved access to agricultural services, consistent with its theorized efficiency improvements. However, the benefits for men were generally significantly greater than those for women. Men, but not women, became significantly more likely to attend government-organized community meetings to discuss agricultural issues, which are important for information exchange and learning. Men further became more likely to participate in a broad array of agricultural programs, whereas women saw fewer improvements. That decentralization favored men may reflect local social norms that service providers should predominantly cater to men (Cohen and Lemma, 2010)—which had less influence over public service decisions under more centralized provision, which tends to be more formulaic and less dependent on local social networks. Possibly as a result of men's (but not women's) increased participation in meetings and trainings, women realized significantly smaller increases in access to modern agricultural inputs (which government provides) compared to men. This accords with Aizer's (2007) finding that information and administrative costs are key barriers for vulnerable groups to taking up government benefits.

Altogether, this significantly widened the gender gap in access to agricultural services, favoring men. In keeping with women benefiting relatively less from decentralization, women experience a drop in satisfaction with government-provided agricultural inputs not experienced by men. We shed light on the mechanisms delivering these gendered benefits by considering how decentralization affects two aspects of political engagement: meeting with local

government officials and influential civil society leaders (non-electoral political participation), who wield more power and discretion related to service delivery under decentralization, and participating in elections at different levels, which is a lower-cost activity.

We find no robust evidence that women increased their engagement with local government officials or civil society leaders, though men increased their engagement with both. Women did increase their participation in local (though not federal) level elections, but men did not. In a non-consolidated democracy, women's greater turnout as a group may be insufficient to motivate government to increasingly target them for receipt of publicly-provided services. The results are instead consistent with non-electoral channels of political influence at the local level, dominated by men, contributing to policy outcomes favoring men. They shed light on potential pitfalls of decentralized service delivery from a gender equality perspective.

Our main contribution is to the literature on policies and interventions affecting women's access to publicly-provided goods and services. Much of this literature centers on the effect of women serving in political office, finding that it increases public expenditures on goods and services preferred by women, including childcare (Bratton and Ray, 2002; Svaleryd, 2009), education (Svaleryd, 2009; Beaman et al., 2012), public health (Clayton and Zetterberg, 2018), drinking water (Chattopadhyay and Duflo, 2004), sanitation (Lee and Lemieux, 2010), and foreign aid (Hicks, Hicks, and Maldonado, 2016), and lowers military spending (Clayton and Zetterberg, 2018). Women as voters also affect policy; women's suffrage laws in the U.S. immediately increased local public health spending (Miller, 2008),[2] and overall declines in voter turnout have led policymakers to explicitly pursue women's votes by advocating policies they prefer (Morgan, 2013). Targeted provision of information can also potentially increase women's access to public services by increasing their civic participation—though possibly in unexpected ways. For example, Gottlieb (2016) shows that providing civic education to women can actually widen the gender gap in civic participation by threatening social norms in ways that lead women to self-impose limits on future participation. And Cheema et al.

[2]Related work shows that *de facto* enfranchisement of less educated citizens through electronic voting technology shifted government spending in Brazil toward health care (Fujiwara, 2015).

(2021) show that door-to-door canvassing intended to increase turnout by women voters is more effective if the women's husband is targeted. However, the literature on effective interventions and policies improving women's access to publicly-provided goods and services is under-developed, with few rigorous impact evaluations. We expand on this literature by considering the effects of a popular reform not targeted at women—decentralization—and studying the channels through which it influences access to services.

We also contribute to the broader empirical literature on the effects of decentralization on public service delivery.[3] A number of studies consider the impacts of local governments having marginally more budgetary discretion (Lindaman and Thurmaier, 2002; Enikolopov and Zhuravskaya, 2007; Barankay and Lockwood, 2007; Faguet and Sanchez, 2008; Su, Li, and Tao, 2019; Sanogo, 2019), of having more local governments (Dowding and Mergoupis, 2003; Hatfield and Kosec, 2013; Grossman, Pierskalla, and Dean, 2017; Hatfield and Kosec, 2019), or of more robust political competition within a decentralized system (Stansel, 2005; Kosec, Haider, Spielman, and Zaidi, 2018; Gottlieb and Kosec, 2019). We instead focus on a policy change affecting the fiscal and administrative functions of different levels of government, using a clear control group. Most studies analyzing the effects of decentralization as a policy employ a case study methodology (Francis and James, 2003; Heller, Harilal, and Chaudhuri, 2007; Linder, 2009; Faguet, 2013); exceptions include Malesky, Nguyen, and Tran (2014), Li, Lu, and Wang (2016), and Kosec and Mogues (2020*a*). We extend this literature by disaggregating the impacts of decentralization on women and men; we are aware of no empirical studies analyzing the gendered effects of decentralization.

Finally, our analysis is related to a broad literature on mechanisms for empowering women. Global gender gaps persist in health, education, economic, and political outcomes—especially in developing countries (World Economic Forum, 2017). Within households, gender inequality in access to assets and productive resources is widely documented and harmful for productivity (Quisumbing, Maluccio et al., 2000; Deere and Doss, 2006; Goldstein and

[3]For good summaries, see Manor (1999), Ahmad and Brosio (2009), Faguet (2012), Gadenne and Singhal (2014), Mookherjee (2015), and Kosec and Mogues (2020*a*).

Udry, 2008; Doss, 2013; Croppenstedt, Goldstein, and Rosas, 2013; Seymour, 2017; Dillon and Voena, 2018). An extensive literature identifies numerous drivers of women's empowerment. These include providing women with resources and information (Valdivia, 2015; Roy et al., 2019), expanding education opportunities for girls (Geddes and Lueck, 2002; Spohr, 2003), raising aspirations (Kosec et al., 2019; Edmonds, Feigenberg, and Leight, 2020), and legal reforms enhancing women's inheritance rights (Ali, Deininger, and Goldstein, 2014; Bhalotra, Brulé, and Roy, 2018; Bose and Das, 2017). We show that a policy reform not explicitly targeting women, but altering accountability relationships between citizens and government—decentralization—can also impact women's empowerment.

The paper is organized as follows. Section 2 provides background information on decentralization, rural public service delivery, and women's empowerment in Ethiopia. Section 3 outlines our empirical strategy and data sources. Section 4 presents tests of baseline balance at policy change borders (prior to the reform). Section 5 outlines our conceptual framework. Section 6 presents the results from our spatial RD analysis. Section 7 describes a number of robustness checks. Finally, Section 8 discusses our findings and their policy implications.

2 Background

2.1 Decentralization in Ethiopia

Ethiopia is a federal republic with multiple sub-national administrative tiers: regions, zones, weredas (i.e., districts), and kebeles (i.e., villages). At the time of our 2008–09 survey, Ethiopia had nine regions,[4] 736 districts, and over 16,000 villages (CSA, 2007). The average village had a population of around 5,000. At the time of our study, Ethiopia was ruled by the Ethiopian People's Revolutionary Democratic Front (EPRDF). Despite elections taking place every five years since 1995, election observers have regularly denounced their legitimacy (Kalandadze and Orenstein, 2009; US Department of State, 2014). Ethiopia thus resembles many developing countries that are non-consolidated democracies.

[4]There are also two city states, one being the capital.

During 2000-01, the Ethiopian government carried out a fiscal and administrative decentralization reform down to the district level in four of its nine regions (Amhara, Oromia, SNNP, and Tigray). District governments existed prior to decentralization, and comprised a district administrator, district sectoral offices (e.g., the District Office of Agriculture and Rural Development), and a district council (World Bank, 2014). However, the reform expanded district governments' control over their budgets as well as their decision-making power over provision of publicly-provided goods and services (Adem, 2004; Garcia and Rajkumar, 2008). On the budgetary front, the central and regional governments provided block grants to district governments (World Bank, 2007), and districts were granted substantially more freedom to internally generate revenues. On the decision-making front, districts in decentralized regions acquired authority to hire and deploy district government bureaucrats and frontline service providers previously selected and placed in districts by higher levels of government (Gebre-Egziabher and Berhanu, 2007). This led to a 54 percent increase in the number of district-level civil servants during 2001–04 (Garcia and Rajkumar, 2008).

Beyond changes to budgetary control and staffing discretion, district governments also newly acquired control over service delivery content and the means of targeting it. Prior to decentralization, the central government passed orders to the districts, who provided them to front-line workers. The result was often poor project selection, as the supply of services was highly standardized and ignored spatial differences in demand. Taking agricultural services—a key expenditure item—as an example, a flagship agricultural extension program launched in the mid-1990s forced agricultural extension agents to distribute fixed quotas of particular inputs, even when highly diverse agronomic conditions resulted in heterogeneity in demand for each (Adem, 2004; Belay and Abebaw, 2004). Prior to decentralization, the central government also dictated the timing, location, and specifics of targeting and deployment of trainings and other services—thus circumventing the potential influence of local elites who often wield considerable control under decentralization (Khemani, 2010).

Decentralization was deferred until an unspecified future date in the remaining five

regions—Afar, Beneshangul-Gumuz, Gambella, Harari, and Somale (Gebre-Egziabher and Berhanu, 2007; Cohen and Lemma, 2010). The stated goal was to first learn from a pilot in the first four regions whose infrastructural conditions were more conducive to service delivery. This is a selection mechanism we address with our empirical strategy. While the central government indicated its plans to eventually decentralize the remaining five regions, this had not occurred by the time of our study. This is not because decentralization was unsuccessful; in fact, the United Nations suggested raising funds for a 2007–2011 program to further support Ethiopia's decentralization, noting the failure to decentralize the remaining five regions as a motivating factor (UNCDF/UNDP, 2007). Figure 1 depicts decentralized regions in dark (also blue) shade and non-decentralized regions in light (also yellow) shade.

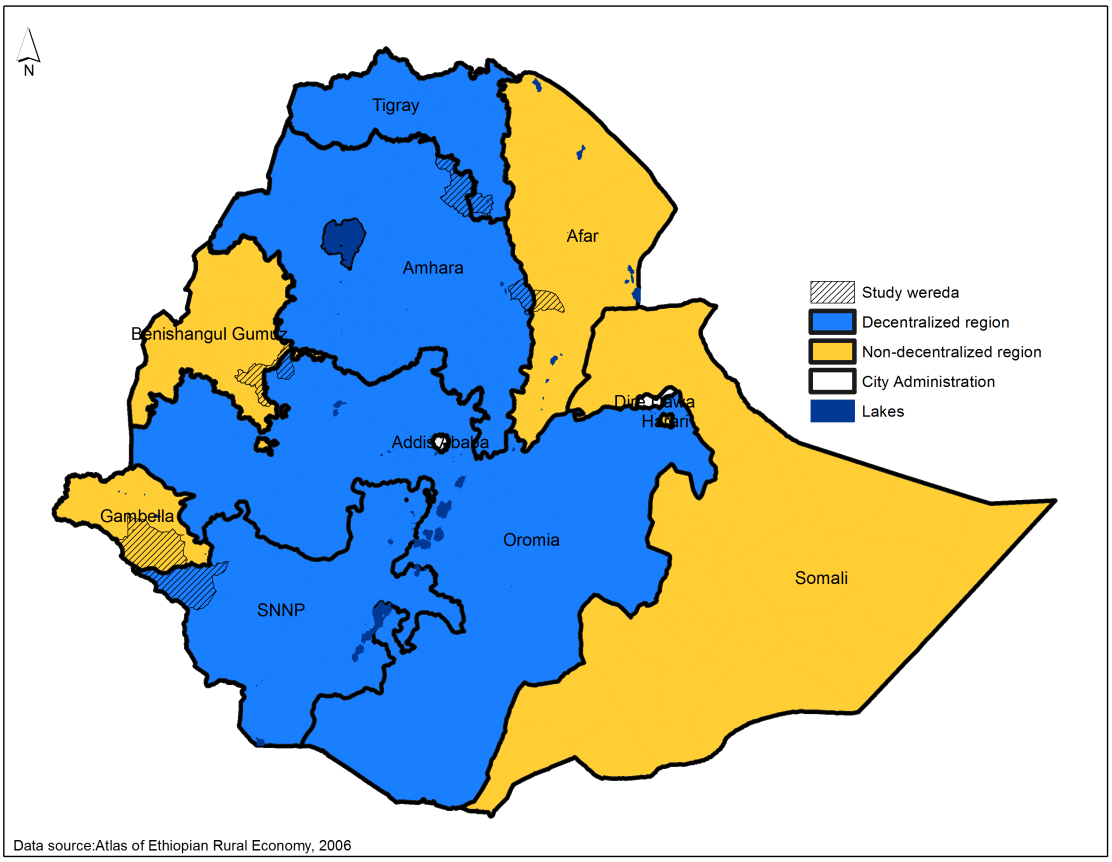


Figure 1: Map of regions of Ethiopia and their decentralization status as of 2001

2.2 Agricultural service delivery in rural Ethiopia

The Ethiopian government's economic development strategy since 1993 has been "Agricultural Development–Led Industrialization" (MOPED, 1993). This has stimulated significant public investment in agriculture—equal to about four percent of agricultural gross domestic product in 2008, the second highest in the world (World Bank, 2008). Ethiopia's public expenditure on agriculture as a share of total expenditures was among the four highest in Africa during 2005–2010 (Benin and Yu, 2012). In 2008, 61 percent of total employment and almost 50 percent of GDP in Ethiopia was from agriculture (World Bank, 2018).

Given its central importance as a service sector, we focus on the impacts of decentralization on agricultural services—the near exclusive focus of our main dataset. Agricultural services in Ethiopia include both information (provided through meetings and visits with government officials) and agricultural inputs (the proper use of which is discussed in meetings and visits). All aspects of agricultural service provision are almost exclusively provided by government.[5] There is substantial variation in farmers' information and input needs across the country (Anderson and Feder, 2004). Service delivery is more efficient when tailored to local demand (e.g., soil, climate, and preferred crops and farming practices). This means that local information is critical, and thus decentralization has the potential to significantly affect how services are provided. However, with (potentially efficiency-enhancing) local discretion comes the possibility of elite capture (Platteau, 2004; Khemani, 2010).

One important district government official for agricultural services delivery, employed by the District Agricultural Department, is a development agent (DA). DAs staff farmer training centers in each kebele (i.e., village), and their central role is developing the capacity of farmers through agricultural extension services (Spielman et al., 2006).[6] During 2004–2010

[5]For example, by the early 2000s, the public sector accounted for 80 percent of improved seed sales (Spielman et al., 2010) and 100 percent of fertilizer imports and domestic distribution (Abegaz, 2013).

[6]The World Bank defines extension services as training that "helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare" (Purcell and Anderson, 1997). Gebremedhin, Hoekstra, and Tegegne (2006) more broadly define it as provision "of information, knowledge, and skill development to enhance adoption of improved agricultural technologies and facilitation of linkages with other institutional support services (input supply, output marketing and credit)."

alone, over 60,000 DAs graduated from "Agricultural Technical and Vocational Education and Training" (ATVET) colleges with three-years diplomas. Dercon et al. (2009) find that consumption grew by 7 percent and poverty fell by 10 percent for farmers receiving at least one visit from a DA in the last cropping season, compared to receiving none.

Agricultural cooperatives in Ethiopia are an important means of providing agricultural services *other than* extension, and a key organizational vehicle for rural poverty reduction and food security enhancement (Tefera, Bijman, and Slingerland, 2017). They provide input services, marketing services for their members' products, and also supply consumer goods to members at prices that compete with local traders (Woldu and Tadesse, 2015; Spielman et al., 2006).[7] While, in theory, they are autonomous, government cooperative offices dominate decision-making in practice in order to achieve agricultural policy objectives (Kodama, 2007). Women are often marginalized from participating in and benefiting from cooperatives; they account for only 20 percent of members, and only 18 percent of cooperatives report at least one woman in a leadership position (Woldu and Tadesse, 2015). Cooperatives also reportedly favor the educated, household heads, and landowners (Woldu and Tadesse, 2015).

2.3 Women's empowerment in Ethiopia

Ethiopia has among the lowest gender equality performance indicators in Sub-Saharan Africa. Hausmann (2009) ranks the country 122nd out of 134 countries in terms of gender equality. Although the federal government has implemented a range of strategies to promote gender equality, including the introduction of the National Policy on Women (NPW) in 1993, National Action Plans on gender in 2000 and 2006,[8] and provisions in the federal constitution and regional land proclamations guaranteeing women equal land rights (Holden and Tefera, 2008; Tefera, 2013), these have not challenged systemic gender bias (Gebre-Egziabher and Berhanu, 2004; Cohen and Lemma, 2010). Women in Ethiopia have worse access to land (Cohen and Lemma, 2010; Kosec, Ghebru, Holtemeyer, Mueller, and Schmidt, 2018) and

[7] The number, size, and capital of cooperatives in Ethiopia are growing (Getnet and Anullo, 2012).

[8] The purpose is to enhance rural women's access to and control over land, credits, and extension services.

credit (Aregu et al., 2010) compared to men. They also have relatively less decision-making power about how they farm (Gebre et al., 2019; Tiruneh et al., 2001).

Harmful social norms discourage women from participating in public activities, including attending community meetings and interacting with agricultural extension agents (Meinzen-Dick et al., 2010; Cohen and Lemma, 2010; Puskur, 2013). There is a perception that "women do not farm" (Cohen and Lemma, 2010; Meinzen-Dick et al., 2010), or are merely "helpers" (Doss, 2018). Agricultural extension agents also have lower incentives to meet with women compared to men; they are typically evaluated by the number of farmers they can convince to adopt new technologies, leading them to work with the primary decision-maker and those with the greatest access to credit—usually men (Meinzen-Dick et al., 2010; Buehren et al., 2019). While in theory men may make production decisions jointly with their wife, and share information, they often fail to do so, or only obtain information useful for their (but not their wife's) crops and production priorities (Meinzen-Dick et al., 2010).

2.4 Elections in Ethiopia

There are three main types of elections in Ethiopia: national, or general elections; regional elections; and local elections. General elections are held every five years to elect one representative per constituency by plurality vote to the House of People's Representatives, the lower chamber of the Parliament (Freedom House, 2020). Members of the upper chamber, the House of Federation, are indirectly elected by regional councils (Freedom House, 2020). In regional elections, usually held at the same time as the general elections, members of regional councils are directly elected to represent the weredas in each region (African Election Database, 2012). Wereda (or district) council members are elected directly through local elections (Ayele, 2011).[9] Decentralization predominately affected the balance of power between the central government and the regions, on the one hand, and the weredas, on the other—shifting more responsibilities to the latter officials.

[9]The general and regional elections were conducted in 1995, 2000, 2005, 2010, and 2015, while the local elections were held in 1998, 2001, 2008, and 2013 (Ayele, 2011; Freedom House, 2015).

3 Empirical Strategy and Data

3.1 Data

Our main data source is the IFPRI–EEPRI Governance and Rural Services Survey, collected in rural Ethiopia during late 2008–early 2009.[10] It includes sex disaggregated, individual-level data from six districts in six of Ethiopia's nine regions. Survey implementers attempted to interview both household heads and their spouses in each household. These districts have a mean population of about 51,000 (88 percent rural). They comprise three district pairs, each straddling two regions, indicated with stripes in Figure 1. In all three cases, one district comes from a non-decentralized region while the other is from a decentralized region, and all individuals live within 75 km of the regional border. (Our analysis omits a fourth district pair for which both districts are decentralized). Underscoring Ethiopia's low population mobility, no individual in our dataset ever moved from one district in the pair to the other.

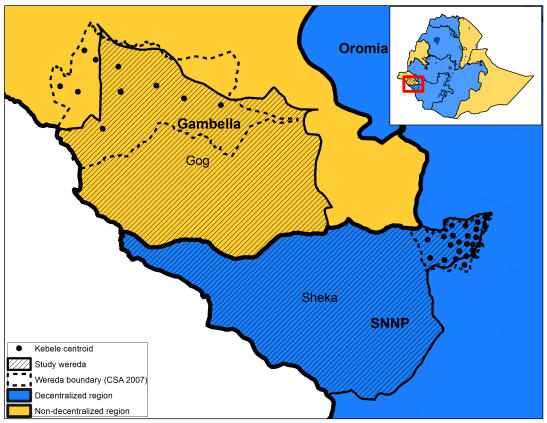
Our study districts include 24 villages, 838 households, and 1,440 individuals (773 women, and 667 men) that are proximate to one of our three policy change borders. Figure 2 shows a detailed map of each district pair, with village centroids.[11]

Questions from the IFPRI–EEPRI (2008–2009) dataset on individuals' access to publicly-provided goods and services focus nearly exclusively on the agricultural sector, given survey implementers' interests. A benefit of this narrow focus is the level of detail we have not only on access, but also satisfaction, and engagement with government around them.

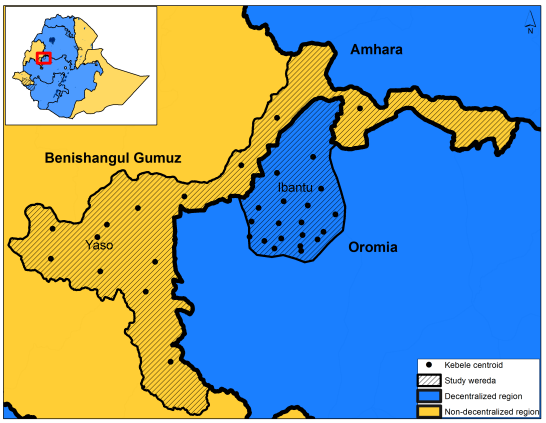
Summary statistics of outcome and control variables, by gender, are presented in Table 1. We see that 54 percent of men and 51 percent of women live in decentralized regions. The literacy rate for men of 50 percent is large compared to a rate of only 15 percent for women. Further, while 14 percent of men have some secondary education, only 2 percent of women do. That women are less literate and less educated may be one factor lowering their access to

[10] The International Food Policy Research Institute (IFPRI) collected the data jointly with the Ethiopian Economic Policy Research Institute (EEPRI).

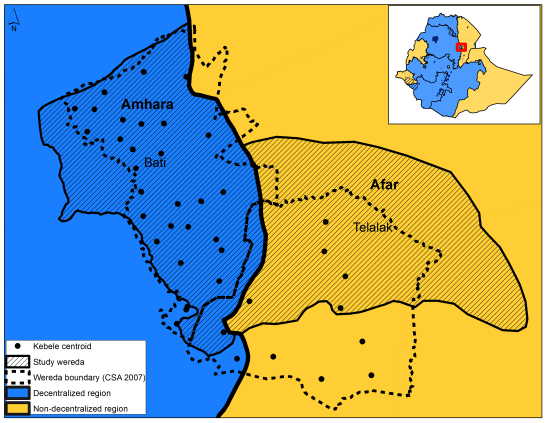
[11] A very small number of villages changed districts between 2001 and 2007 (see Figures 2a and 2c). However, this generally did not alter their decentralization status. We use the boundaries in place in 2001.



(a) Border 1: Sheko and Gog districts



(b) Border 2: Yaso and Ibantu districts



(c) Border 3: Bati and Telalak districts

Figure 2: Maps of region boundaries included in analysis

government services. Women also tend to be younger, with an average age of 37 compared to 42 for men. Household characteristics are similar for women and men—reflecting the survey's attempt to interview a woman and a man from each household. Both come from households with an average of 6 members; 82 percent of women and 86 percent of men are from land-owning households; and 46 percent of women and 48 percent of men come from households with a multi-room house. Men are slightly more likely to come from households owning large livestock, at 64 percent of men compared to 61 percent of women.

We use data from a large, nationally representative survey carried out just prior to decentralization—the Demographic and Health Survey (DHS, 2000)—to conduct a pre-decentralization balance test.

Table 1: Summary statistics by gender, main sample for analysis (2008–09)

	Men			Women			
	Mean	SD	N	Mean	SD	N	Total N
Panel A: Main outcomes							
Attended community meeting to discuss agricultural issues (last year)	0.325	0.469	665	0.095	0.293	770	1435
Attended community water users meeting (last year)	0.148	0.356	660	0.047	0.211	769	1429
Participated in any of the 5 programs (within one year)	0.366	0.482	664	0.166	0.372	772	1436
Visit by DAs to your farm or home	0.187	0.390	664	0.130	0.336	772	1436
Group and community meetings organized by DAs	0.235	0.424	665	0.071	0.257	772	1437
Visit to demonstration plots	0.045	0.208	665	0.008	0.088	772	1437
Services by cooperatives	0.089	0.285	665	0.017	0.129	772	1437
Credit received for purchasing agricultural inputs	0.024	0.153	664	0.004	0.062	772	1436
Used any modern input	0.340	0.474	667	0.060	0.237	773	1440
Used fertilizer	0.178	0.383	667	0.025	0.155	773	1440
Used pesticide	0.180	0.384	667	0.026	0.159	773	1440
Used improved seed	0.087	0.282	667	0.023	0.151	773	1440
Used a new farming practice	0.069	0.254	662	0.025	0.155	770	1432
Very satisfied with gov-organized meetings (agri issues)	0.823	0.383	175	0.696	0.464	56	231
Very satisfied with gov-provided agricultural inputs	0.477	0.501	214	0.700	0.462	70	284
Visited a government office of agriculture	0.155	0.362	665	0.016	0.124	772	1437
Local government officials engagement index	0.566	1.804	663	-0.491	1.289	765	1428
Civil society leader engagement index	0.265	1.357	663	-0.228	1.347	769	1432
Voted in last kebele election	0.886	0.319	664	0.741	0.438	772	1436
Voted in last wereda election	0.880	0.326	664	0.738	0.440	772	1436
Voted in last federal election	0.577	0.494	662	0.441	0.497	769	1431
Politically connected	0.331	0.471	664	0.204	0.403	771	1435
Panel B: Characteristics of individuals and their households							
Decentralized region	0.540	0.499	667	0.512	0.500	773	1440
Literate	0.504	0.500	667	0.151	0.359	773	1440
Secondary education	0.138	0.345	667	0.016	0.124	773	1440
Age	42.243	14.919	667	36.643	12.692	773	1440
Number of household members	6.336	2.492	667	6.203	2.469	773	1440
Land ownership (household-level)	0.855	0.353	667	0.818	0.386	773	1440
Home ownership (household-level)	0.972	0.166	667	0.965	0.184	773	1440
Having a multi-room house (household-level)	0.481	0.500	667	0.464	0.499	773	1440
Large livestock ownership (household-level)	0.639	0.481	667	0.607	0.489	773	1440
Head's ethnicity's share of the kebeles population	0.843	0.265	667	0.857	0.258	773	1440

Notes: Sample sizes reflect use of a 75km bandwidth. Large livestock includes cattle, camels, horses, mules, or donkeys.
Sources: IFPRI–EEPRI (2008–2009).

3.2 Empirical Strategy

We identify the effects of decentralization by employing a spatial regression discontinuity (RD) approach. We examine what happens to rural service delivery outcomes for women and for men (separately) as one crosses a regional border between a decentralized and a non-decentralized region. At regional borders, we expect many factors likely to affect service delivery, beyond decentralization, to change smoothly. These might include gender norms, women's level of empowerment, the sectors in which women and men work, the prevalence of migration, access to machinery and mechanized agriculture, food security, road quality, availability of various forms of transportation, soil quality, climate, and suitability for farming. We account for such factors empirically by estimating a semi-parametric regression discontinuity using a quadratic polynomial in longitude and latitude.[12]

Table 2: Allocation of main sample households by distance to a regional border with opposite decentralization status

Distance to the	Number of Households in:		
regional border (km)	Full sample	Decentralized regions	Non-decentralized regions
10	142	36	106
15	350	141	209
20	559	316	243
25	664	386	278
50	733	420	313
75	838	420	418

Source: IFPRI–EEPRI (2008-09).
Notes: Includes only households on policy change regional borders (i.e. appearing in Figures 2a, 2b, and 2c).

This specification, which follows Dell (2010), allows covariates influencing service delivery to change smoothly in each cardinal direction (i.e., in X–Y space). If decentralization impacts rural service delivery, service delivery outcomes should change abruptly at the border, despite controlling for smooth changes in this way. If decentralization has no impact, then we should find no such abrupt change. While all sample households are within 75 km of the regional border, Table 2 shows that 42 percent are within 15 km, 79 percent are within 25

[12] Gelman and Imbens (2016) note that high-order polynomial regressions are a poor choice in RD analyses.

km, and 87 percent are within 50 km. We estimate the following empirical specification:

$$Y_{ikq} = \beta_1 D_q + \beta_2 D_q M_{ikq} + \left\{\sum_{b=1}^{3}[\theta_b B_b]\right\} + \left\{\sum_{b=1}^{3}[\delta_b B_b M_{ikq}]\right\} + f(location)_{ikq} + \mathbf{X_{ikq}}\alpha + \mathbf{X_{ikq}} M_{ikq}\gamma + \epsilon_{ikq} \quad (1)$$

where

$$f(location)_{kq} = \eta_1 L_{kq} + \eta_2 A_{kq} + \eta_3 L_{kq}^2 + \eta_4 A_{kq}^2 + \eta_5 L_{kq} A_{kq} + \pi_1 L_{kq} M_{ikq} + \pi_2 A_{kq} M_{ikq} + \pi_3 L_{kq}^2 M_{ikq} + \pi_4 A_{kq}^2 M_{ikq} + \pi_5 L_{kq} A_{kq} M_{ikq} \quad (2)$$

and i indexes individuals, k indexes villages, q indexes regions, and b indexes border segments. We denote by Y_{ikq} a service delivery outcome for individual i in village k in region q, and by D_q a dummy for decentralization in region q. B_1, B_2, and B_3 are border fixed effects for the three distinct regional boundaries separating decentralized and non-decentralized areas, depicted in Figures 2a, 2b, and 2c.[13] M_{ikq} is an indicator for an individual being male. L_{kq} indicates the latitude of village k and A_{kq} indicates its longitude. Finally, X_{ikq} constitutes a vector of 10 controls for characteristics of individual i and their household. These include an individual's demographic characteristics (gender, literacy, education, and age), household size, measures of household socio-economic status (dummies for land ownership, home ownership, having a multi-room house, and owning large livestock), and a measure of the prevalence of co-ethnics in one's village (the head's ethnicity's share of the village population). We estimate Eq. (1) using ordinary least squares, with standard errors clustered at the village level.

Our key identifying assumption is that, conditional on the location of one's village in X–Y space, fixed effects for region-border segments, the interactions of these variables with gender, and other observable individual and household characteristics, individuals in de-

[13] These borders separate, respectively, villages in: Sheko and Gog districts, Yaso and Ibantu districts, and Bati and Telalak districts. They are discussed in detail in Section 3.1.

centralized and non-decentralized regions have the same potential outcomes in expectation. This assumption is strengthened by an appealing feature of our setting for a spatial RD: when decentralization occurred, the current regional boundaries in Ethiopia had been in place for only six years. During 1942–1995, Ethiopia was comprised of 14 provinces—at the time, the country's top-tier sub-national unit.[14] In 1995, provinces were eliminated and regions became the new top-tier sub-national unit. As a result, regions had little time to form regional identities before decentralization occurred.

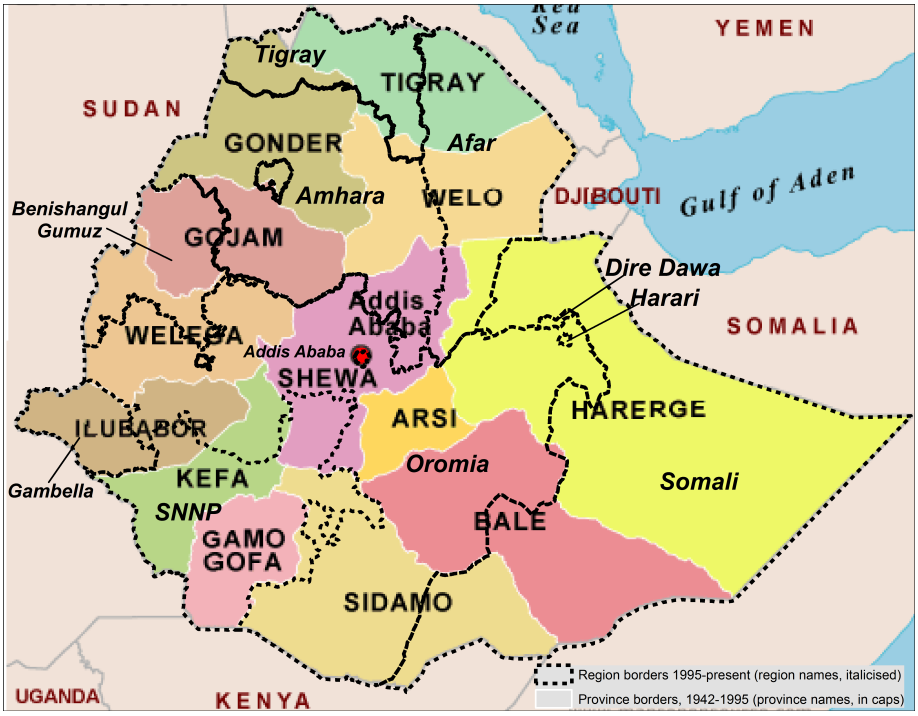


Figure 3: Map of historic administrative divisions of Ethiopia

Figure 3 maps the old provinces and the new regions, revealing little overlap. Further, we see that for two of our three border segments, both districts were in the same region up until 1995. Specifically, the districts in our sample that are from the modern-day Afar and Amhara regions were both in Welo province up until 1995. And until 1995, both districts in our sample that are from the modern-day Oromia and Benishangul-Gumuz regions were in

[14]Thirteen not counting Eritrea, which gained independence as a country in 1993.

Welega province. Thus, for 53 years, two of our three regional boundaries and the individuals we consider (living within 75 km of the boundary) shared the same provincial government regulations, investments, and institutions. In Section 7.5, we show the robustness of our main results to using *only* these two district pairs.

4 Balance at policy change borders

If our econometric model is valid and allows us to draw causal inference, there should be smooth changes in characteristics of individuals and households at regional boundaries separating decentralized and non-decentralized regions. Finding significant, discrete changes in these characteristics as one crosses a regional border would invalidate the assumption that units adjacent to the border but on opposite sides are comparable other than in exposure to decentralization. We check for balance using DHS data from 2000 (i.e., a year before decentralization came fully into effect) for our three policy change borders. The DHS dataset has an even larger sample size within 75 km of our same three regional policy change boundaries, increasing our power to detect statistically significant effects relative to our main dataset.

This analysis broadly supports the assumption of balance at policy change borders, and thus the validity of our econometric model. As Table 3 shows, there is little evidence that household characteristics change discontinuously as one crosses a border between a decentralized and a non-decentralized region. The household characteristics we consider include the 10 that comprise our vector of controls, X_{ikq} from Eq. (1) (we take the value for the household head); an asset wealth index and its four constituent variables (dummies for having electricity, a radio, a bicycle, and a car or truck); and dummies for the household having an improved floor (i.e., polished wood, tile, cement, etc) and an improved roof (i.e., iron or concrete). Estimating Eq. (1) for each of these 17 variables, Table 3 reveals that for only two (head age and land ownership) is the effect of decentralization significant at conventional levels. As balance is imperfect, we present specifications both with and without controls, and generally find our results are not sensitive to their inclusion (shown in Section 6).

Table 3: Balance on household characteristics prior to decentralization (in 2000)

	Non-decentralization Mean [SD] (1)	Coeff. on decentralization (S.E) (2)	N (3)
Male head	0.800	-0.027	1883
	[0.400]	(0.043)	
Literate head	0.276	0.033	1882
	[0.447]	(0.056)	
Secondary educated head	0.061	-0.030	1879
	[0.240]	(0.027)	
Head age	40.816	4.065***	1883
	[14.529]	(1.166)	
Household size	4.690	0.365	1883
	[2.476]	(0.353)	
Land owner	0.617	0.206***	1882
	[0.486]	(0.063)	
House owner	0.889	0.022	1882
	[0.314]	(0.047)	
Multi-room house	0.200	0.128	1883
	[0.400]	(0.079)	
Larger livestock owner	0.538	0.107	1882
	[0.499]	(0.097)	
Asset index	-0.018	0.007	1882
	[1.367]	(0.210)	
Owns electricity	0.001	0.038	1883
	[0.029]	(0.028)	
Owns radio	0.146	-0.031	1883
	[0.353]	(0.036)	
Owns bicycle	0.004	0.001	1883
	[0.065]	(0.005)	
Owns car/truck	0.001	-0.005	1882
	[0.029]	(0.004)	
Improved floor	0.012	-0.003	1883
	[0.108]	(0.011)	
Improved roof	0.101	0.134	1883
	[0.302]	(0.098)	
Ethnicity share	0.810	0.091	1527
	[0.271]	(0.068)	

Notes: We check balance using the sample of all rural household within 75km of the same three policy change borders we employ in our main analysis. All regressions include border segment fixed effects and location variables (latitude, longitude, latitude squared, longitude square value, and latitude interact with longitude). Because our outcomes are household characteristics, we do not control for these in any regressions. Asset ownership is created using principal component analysis with the four assets listed in the table (electricity, radio, bicycle, and car/truck). Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: DHS (2000).

5 Conceptual Framework

Receipt of agricultural services is critical for individuals' livelihoods and welfare. While many individuals simply "do what they know" when farming, learning new techniques and accessing modern inputs from government can expand production possibilities. Further, receipt of services from cooperatives or access to credit may facilitate new investments and raise productivity.

Individual access to agricultural services in Ethiopia has a bi-directional character, whereby receipt of services may involve either individuals approaching providers or government officials, or providers initiating contact. Examples of individual-initiated contact include attendance of government-organized community meetings, participation in agricultural programs (e.g., traveling to meet a DA or visit a government office of agriculture, visiting a demonstration plot to learn new farming techniques, or requesting services from a cooperative), and requests for government loans to purchase agricultural inputs. Individuals may also reach out to government officials or powerful civil society actors to influence either the character of service delivery broadly (e.g., when and where meetings are held, and to whom they are directed) or to ask directly for publicly-provided private goods (e.g., agricultural inputs). Individual decisions to approach providers and other influential individuals reflect a cost benefit analysis by the individual, but are also influenced by access to information and prevailing gender and social norms, which affect women and men differently. Citizens also choose whether or not to participate in elections; voting is a relatively low-cost activity (compared to directly contacting government officials or civil society leaders), and local elections are especially important under decentralization (which expanded district government authority).

Beyond individuals approaching government officials, DAs also often visit individuals' farms or homes. Local government officials or service providers may also reach out directly to family members, friends, or local elites to ensure they are happy with and have access to services and meetings.

6 Results

In this section, we consider how decentralization has influenced various nodes in the process of service delivery for individual women and men. We test for effects on each gender, as well as whether differences in effect sizes across genders are statistically significant.

6.1 Attendance of government-organized community meetings

We first examine whether decentralization impacted individual attendance of government-organized community meetings. Specifically, we consider whether the individual attended (in the last year) a community meeting to discuss agricultural issues, and a community water users' meeting (focused on water use within agriculture), respectively. Such meetings are organized by either the district or village government. The meetings focus on service delivery, provide information about broader best practices in agriculture and water management, and generally offer a forum for community engagement with government and other citizens.

Table 4 shows the results from estimating Eq. (1) with and without our full set of controls. Results are not particularly sensitive to the inclusion of controls. Column (2) shows, using the set of household- and individual-level controls, that decentralization increases the probability that a man attended a meeting to discuss agricultural issues in the last year by 72 percentage points. For women, in contrast, we find no statistically significant impacts of decentralization; if anything, decentralization adversely affected women's attendance, but this estimate is far from being statistically significant. Further, we can reject that the effects of decentralization on men are the same as those on women at the 0.01 level of confidence. In column (4), we instead consider attendance at community water users' meetings. Here, we find no impacts of decentralization for either gender; while the coefficient on decentralization is positive for both genders (indicating, if anything, more meeting attendance) and is over five times larger in magnitude for men compared to women, it is never statistically significant, and nor is the difference of the effect between genders.

Table 4: Impact of decentralization on attendance of government-organized community meetings

	Attended community meeting to discuss agricultural issues in last year		Attended community water users' meeting in last year	
	(1)	(2)	(3)	(4)
Effect of decentralization on women	-0.051	-0.069	0.027	0.047
	(0.145)	(0.129)	(0.062)	(0.064)
Effect of decentralization on men	0.788***	0.721***	0.227	0.243
	(0.159)	(0.147)	(0.141)	(0.163)
R-squared	0.172	0.203	0.071	0.086
Mean for women	0.095	0.095	0.047	0.047
Mean for men	0.325	0.325	0.148	0.148
P-Value of Difference	0.000	0.000	0.125	0.197
N	1435	1435	1429	1429
Full HH control set	No	Yes	No	Yes

Notes: Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Our results suggest that either the benefits of meeting attendance increased, the costs decreased, or both in the case of men—with no change in net benefits for women. If meeting attendance became increasingly necessary to obtain agricultural inputs, meetings allowed more opportunities to signal agricultural needs and investment priorities to government, or the usefulness and quality of meeting content improved, one could imagine their perceived benefits increasing. Costs might lower if meetings became more frequent (making attending at least one less likely to conflict with other activities) or held closer to one's home. That attendance increased for men but not women is consistent with meetings becoming increasingly oriented toward men's information and input needs. It is also possible that decentralization led providers to encourage men's but not women's increased attendance.

6.2 Participation in agricultural programs

Table 5 considers as outcomes five indicators of accessing and learning from public sector providers of agricultural services within the last year: 1) a development agent (DA) visiting one's farm or home; 2) participating in group or community meetings organized by DAs; 3) visiting a demonstration plot; 4) receiving services from an agricultural cooperative (e.g., cooperatives can buy and sell agricultural products from members, negotiate prices on behalf of members, and purchase and loan out tractors for members to use); and 5) receiving credit from the government for purchasing agricultural inputs. We further code an indicator for participation in any of the five programs—permitting a single hypothesis test for each gender.

We find that decentralization has large, positive, statistically significant impacts on all of these individual program participation outcomes with the exception of access to credit (where neither gender benefits), but the effects most often appear only for men.

For women, decentralization modestly increases participation in group and community meetings organized by DAs (by 12.7 percentage points) and receipt of services from cooperatives (by 7.0 percentage points), but neither participation in any of the other three programs nor our indicator of participation in any of the five programs are affected. Further, for both of these two statistically significant results, we cannot reject that women and men experience the same improvements (and men's point estimates are in both cases larger in magnitude).

For men, in contrast, decentralization predicts a 36.3 percentage point increase in the likelihood of a DA having visited their farm or home—an outcome unaffected by decentralization for women. Further, the effect on men is statistically significantly larger. Men also experience an 18.8 percentage point increase in the likelihood of having visited a demonstration plot; the estimate for women is nearly 0 and statistically insignificant, and we can further statistically reject that the effects on women and men are the same. Overall, men are 56.6 percentage points more likely to have participated in at least one program; the same estimate for women is less than a quarter of this size (13.1 percentage points) and statistically insignificant. We can also statistically reject that the two estimates are the same.

Table 5: Impact of decentralization on participation in agricultural programs

			Programs									
	Participated in any of the 5 programs (within one year)		Visit by DAs to your farm or home		Group and community meetings organised by DAs		Visit to demonstration plots		Services by cooperatives		Credit received for purchasing agricultural inputs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)	(12)
Effect of decentralization on women	0.219	0.131	0.169	0.088	0.158***	0.127**	-0.010	-0.007	0.083**	0.070**	0.007	0.008
	(0.151)	(0.106)	(0.150)	(0.114)	(0.052)	(0.056)	(0.025)	(0.024)	(0.035)	(0.034)	(0.016)	(0.016)
Effect of decentralization on men	0.699**	0.566**	0.431**	0.363**	0.401*	0.306	0.214***	0.188**	0.157	0.095	0.049	0.023
	(0.268)	(0.246)	(0.164)	(0.158)	(0.216)	(0.185)	(0.061)	(0.068)	(0.153)	(0.146)	(0.053)	(0.044)
R-squared	0.146	0.178	0.085	0.105	0.113	0.148	0.056	0.088	0.107	0.132	0.043	0.060
Mean for women	0.166	0.166	0.130	0.130	0.071	0.071	0.008	0.008	0.017	0.017	0.004	0.004
Mean for men	0.366	0.366	0.187	0.187	0.235	0.235	0.045	0.045	0.089	0.089	0.024	0.024
P-Value of Difference	0.049	0.060	0.087	0.075	0.257	0.339	0.003	0.013	0.573	0.852	0.432	0.728
N	1436	1436	1436	1436	1437	1437	1437	1437	1437	1437	1436	1436
Full HH control set	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Participated in any of the 5 programs is a dummy equal to 1 if an individual participated in at least one of the programs offered by the Government Office of Agriculture listed in columns 3–12 within last one year. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

We take this as broad evidence that decentralization may favor men by providing additional access to information conveyed via meetings and various useful agricultural programs. It is unclear whether these differences across genders are due to the supply or the demand side; that is, does decentralization lead to less targeting of women for services, or do women in decentralized settings require fewer such services? However, it is perhaps telling that for the one program that involves government approaching individuals directly rather than individuals coming to government—a visit by a DA to your farm or home—men are significantly more likely to benefit from decentralization, and women realize no gains.

6.3 Access to government-provided agricultural inputs

We next consider whether increased exposure to agricultural service providers and programs due to decentralization, which broadly favored men, additionally increased access to modern agricultural inputs. These are known to increase farm yields and are supplied by government service providers to farmers for a fee (as noted earlier, the private sector is severely restricted by government, and thus plays a minimal role in provision of agricultural inputs). We consider three: fertilizer (either diammonium phosphate (DAP) or urea), pesticide (including both insecticide and herbicide), and improved seed.[15]

Table 6 shows that both women and men are more likely to report using at least one of these three modern agricultural inputs as a result of decentralization, as shown in columns 1–2. Results vary little with our inclusion of controls and are always statistically significant at the 0.01 level for both genders. However, the effects for men are statistically significantly greater than those for women; decentralization leads to an 18.2 percentage point increase in use of modern inputs by women, and a much larger, 75.4 percentage point increase in use of modern inputs by men. Improvements in use of modern inputs for women are primarily due to increased use of improved seed (columns 7–8); effects on fertilizer and pesticide use are comparatively smaller in magnitude and statistically insignificant. For men, however, we

[15]Improved seeds tend to increase crop yields and improve crop uniformity, color, and disease resistance.

Table 6: Impact of decentralization on the use of modern agricultural inputs and new farming practices

	Modern Inputs									
	Used any modern input		Used fertilizer		Used pesticide		Used improved seed		Used a new farming practice	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Effect of decentralization on women	0.192***	0.182***	0.077**	0.075	0.023	0.019	0.149**	0.138**	0.155**	0.138**
	(0.060)	(0.062)	(0.036)	(0.052)	(0.035)	(0.031)	(0.069)	(0.066)	(0.065)	(0.066)
Effect of decentralization on men	0.846***	0.754***	0.263***	0.217**	0.449***	0.463***	0.563***	0.506***	0.238*	0.201
	(0.115)	(0.122)	(0.088)	(0.083)	(0.074)	(0.096)	(0.178)	(0.160)	(0.135)	(0.133)
R-squared	0.592	0.611	0.728	0.746	0.468	0.474	0.166	0.209	0.072	0.092
Mean for women	0.060	0.060	0.025	0.025	0.026	0.026	0.023	0.023	0.025	0.025
Mean for men	0.340	0.340	0.178	0.178	0.180	0.180	0.087	0.087	0.069	0.069
P-Value of Difference	0.000	0.001	0.057	0.127	0.000	0.000	0.011	0.015	0.323	0.461
N	1440	1440	1440	1440	1440	1440	1440	1440	1432	1432
Full HH control set	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Used any modern input is a dummy for using either fertilizer (whether DAP or urea), pesticide, or improved seed. Columns 3–8 consider these three modern inputs individually. Used a new farming practice is a dummy for using at least one of the following new farming practices: Improved crop variety, new crop type, new crop management practice, new crop protection practice, new livestock type, improved livestock breed, new livestock management practice, soil fertility management, soil and water conservation, or post harvest handling. Pesticide use includes use of insecticide or herbicide. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

identify statistically significant, robust increases in use of all three modern inputs (columns 3–8). We find similarly-sized improvements in the likelihood of using a new farming practice for women and for men which are statistically indistinguishable (columns 9–10).

Overall, the results suggest that individuals did get increased access to modern inputs due to decentralization, but these disproportionately went to men, widening gender gaps in access to government-provided agricultural inputs. That decentralization increased men's participation in government-organized meetings and agricultural programs more than that of women may have increased the gender gap in knowledge and input access. This finding is in keeping with Aizer's (2007) finding that information and administrative costs are important barriers for vulnerable groups to take up government benefits.

6.4 Satisfaction with government services

We have two measures of satisfaction with services; results are shown in Appendix Table A1. These are dummies for being very satisfied with the majority of government-organized meetings to discuss agricultural issues (columns 1–2), and being satisfied with government-provided agricultural inputs (columns 3–4). Our sample size for these two outcomes (231 and 284, respectively, out of 1,440 individuals in our survey) is appreciably smaller than those for other outcomes (for which it is always above 1420) as they are non-missing only among those who actually utilized the services. Thus, our statistical power is reduced.

We find no evidence of increases in satisfaction for either gender. In fact, we identify statistically significant decreases in satisfaction with government-provided agricultural inputs for women (columns 3–4) that are statistically different from the (much smaller in magnitude) impacts on men. This is consistent with women observing the growing gap between their own access to modern inputs and that of men and accordingly becoming disgruntled at their own service provision levels. However, we take these results as only suggestive given our sample size.

6.5 Engagement with government and civil society leaders

Decentralization is a policy meant to bring governance down to the local level (Faguet, 2004); the value of contacts with local government officials is increased given their increased autonomy over decision-making. Interactions with civil society leaders may be complementary given the influence such leaders often wield over local officials (Platteau, 2004; Khemani, 2010). At the same time, women may face higher barriers and costs of increasing their contacts with government officials and civil society leaders compared to men. For example, restrictions on women's mobility or ability to meet with non-related men may result in a ceiling effect on interactions, reducing the likelihood of an increase in such interactions in response to decentralization.

We consider the impacts of decentralization on interactions with government officials and civil society leaders in Table 7. Columns 1–2 consider whether the individual visited a government office of agriculture in the last year. The remaining columns are indices of engagement with local government officials (columns 3–4) and civil society leaders (columns 5–6). They are obtained from a principle components analysis considering dummies for having met with six local government leaders, and with four civil society leaders, respectively. (Results considering dummies for interaction with each of the 10 actors individually can be found in Appendix Table A2.)

We identify no robust evidence that women's interactions with government are increased due to decentralization. Considering our preferred specification with our full set of controls (column 2), women in fact became 7.9 percentage points less likely to have visited a government office of agriculture—potentially due to better opportunities to meet with local officials in other settings (e.g., at community meetings) following decentralization. We see a similarly-sized, negative coefficient on decentralization for men, but it is not statistically significant. While the coefficient on decentralization for women is positive for both the index of engagement with local government officials (column 4) and that for engagement with civil society leaders (column 6), these effects are not statistically significant. In contrast, for men,

Table 7: Impact of decentralization on engagement with local government officials and civil society leaders

	Visited a government office of agriculture		Local government officials engagement index		Civil society leaders engagement index	
	(1)	(2)	(3)	(4)	(5)	(6)
Effect of decentralization on women	-0.083***	-0.079***	0.909	0.800	0.511**	0.409
	(0.020)	(0.022)	(0.636)	(0.647)	(0.186)	(0.243)
Effect of decentralization on men	-0.067	-0.132	2.506**	1.946**	0.922**	0.667**
	(0.189)	(0.187)	(0.923)	(0.873)	(0.339)	(0.311)
R-squared	0.101	0.128	0.350	0.409	0.439	0.460
Mean for women	0.016	0.016	-0.491	-0.491	-0.228	-0.228
Mean for men	0.155	0.155	0.566	0.566	0.265	0.265
P-Value of Difference	0.929	0.774	0.016	0.042	0.201	0.425
N	1437	1437	1428	1428	1432	1432
Full HH Control	No	Yes	No	Yes	No	Yes

Notes: The local government officials engagement index is created using principal components analysis; the index is the first principle component from an analysis considering six local government officials: the head of the agricultural cooperative, development agent (DA), kebele chair, wereda council member, kebele council member, and local party leader; results for each of these individuals can be found in Appendix Table A2, columns 2–7. The civil society leaders engagement index is also created using principal components analysis; the index is the first principle component from an analysis considering four civil society actors: water committee member, head of iddir (i.e., funeral group), shimagile (i.e., elder), and village religious leader; results for each of these individuals can be found in Appendix Table A2, columns 8–11. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

we see robust increases in engagement with both local government officials (a three-fold increase over the mean level of engagement) and civil society leaders (a two-fold increase over the mean level of engagement). In the case of engagement with local government officials, we can further statistically reject that the effect for women is the same as that for men.

We take this as evidence that women's engagement with local government officials and civil society leaders was largely unchanged, and they may have actually made fewer efforts to visit government offices, following decentralization. In contrast, men's engagement increased substantially—especially with government. This is consistent with decentralization raising

the benefits and lowering the costs of engagement with government officials and civil society leaders for men, but not for women, ultimately increasing the gender gap in engagement.

6.6 Participation in elections at different levels

Our final analysis considers the electoral implications of decentralization. Specifically, are individuals more ore less likely to participate in elections at different levels as a result of decentralization—a reform increasing the relevance of local government officials (in our context, kebele, or village, officials and wereda, or district, officials) and thus of local elections? There are many forms of political participation, including directly contacting government officials or contacting powerful civil society actors who wield influence over them. The latter may also be relatively more important in a context that is not fully democratic, like that of Ethiopia. However, at the very least, increased local election participation reflects a belief that the costs of voting, however small, are worth the perceived benefits (psychic or otherwise) of participating.

In Table 8, we identify statistically significant increases in women's participation in local elections that are not seen for men. Specifically, women became 22.8 percentage points more likely to have voted in the last kebele election, and 20.7 percentage points more likely to have voted in the last wereda election; these effects sizes are further statistically distinguishable from those for men. For both genders, we also observe decreases in participation in federal elections; these are only statistically significant for men, and we cannot reject that they are the same across genders.

These results are interesting in light of null effects of decentralization on other forms of political engagement by women, including contacting local government officials. Further, it suggests a narrowing of the gender gap in participation in local elections as a result of decentralization—which nonetheless has not prevented men from reaping disproportionate gains from the reform. Women may consider voting in local elections as a low-cost activity, and the salience of its importance is heightened by decentralization. However, in this not

Table 8: Impact of decentralization on voting in the most recent elections at different levels of government

	Voted in last kebele election		Voted in last wereda election		Voted in last federal election	
	(1)	(2)	(3)	(4)	(5)	(6)
Effect of decentralization on women	0.165	0.228**	0.147	0.207*	-0.142	-0.132
	(0.108)	(0.099)	(0.117)	(0.107)	(0.204)	(0.207)
Effect of decentralization on men	0.012	0.027	-0.041	-0.037	-0.252*	-0.307**
	(0.089)	(0.093)	(0.109)	(0.124)	(0.143)	(0.140)
R-squared	0.167	0.218	0.161	0.210	0.523	0.535
Mean for women	0.741	0.741	0.738	0.738	0.441	0.441
Mean for men	0.886	0.886	0.880	0.880	0.577	0.577
P-Value of Difference	0.055	0.035	0.024	0.014	0.325	0.107
N	1436	1436	1436	1436	1431	1431
Full HH control set	No	Yes	No	Yes	No	Yes

Notes: Voted in the most recent year is a dummy indicate if the individual reported she/he voted and the year is the most recent year of election in the kebele/wereda/federal. Majority of individuals reported the most recent kebele and wereda election were in 2007. However, majority of the respondents reported federal level election hold in Gog and Sheko wereda in 2007, but individual respondents from the rest of wereda reported 2004. Column (5) and (6), voted in the most recent year at federal election is equal to one if respondent's voted and the voted year is 2007 in Gog and Sheko wereda, or the year is 2004 in the rest of wereda, and 0 otherwise. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

fully democratic context—and given the importance of a broader array of forms of political participation in any context—women's increased electoral participation in local elections does not appear to translate into policy and service delivery gains.

6.7 Local political connections as a mechanism

We find that decentralization has expanded gender gaps in access to rural services and increased men's (but not women's) local political engagement. But are these increased political connections in fact what is driving men's disproportionate benefits from decentralization? One observable implication of political connections serving as an important causal channel would be a finding that the benefits of decentralization are larger for those with greater

pre-existing political connections. Such individuals have access to and influence over local policymakers, and only need exploit them once decentralization makes doing so more lucrative. Unfortunately, we lack data on pre-decentralization local political connections. However, we do have individual-level data on having politically-connected relatives; specifically, an indicator variable for having any living relative (excluding one's self and their spouse) who has ever held an official position.

Using this measure of being politically connected, Appendix Table A3 considers the effects of decentralization on four distinct groups: unconnected men (column 1), connected men (column 2), unconnected women (column 3), and connected women (column 4). In the subsequent six columns, we test whether the differences between the coefficients on decentralization in each set of two columns are statistically significant.

First considering women—20 percent of whom indicate being politically connected—we see that decentralization increases voting in local elections only for the politically unconnected, but increases direct engagement with local government officials only for the politically connected. This is consistent with women broadly aiming to expand their political influence, but tailoring their methods of doing so to their pre-existing social capital. Despite efforts to increase their political influence, however, we find limited evidence that decentralization improves service delivery outcomes for either connected or unconnected women. The effects of decentralization on utilizing services provided by cooperatives, and using fertilizer, are statistically significantly higher for politically connected women compared to unconnected women—though for improved seed, it is actually unconnected women that benefit more. Decentralization is also more likely to result in dissatisfaction with government-organized meetings for politically connected women compared to unconnected women—possibly reflecting higher expectations for improvements among connected women. Overall, political connections do not consistently increase the returns to decentralization for women.

Next considering men—33 percent of whom indicate having political connections,[16] on

[16]That this number is higher for men suggests that women may not personally count connections enjoyed via their husband's family as often as men personally count connections enjoyed via their wife's family.

average—we find no evidence of increased participation in local elections for either politically connected or unconnected men, though we do see increases in non-electoral political engagement. Decentralization predicts both greater engagement with local government officials (statistically significant for unconnected men) and with civil society leaders (statistically significant for connected men), though the differences in effect sizes for connected vs. unconnected men are not statistically significant for either outcome. Considering access to services and comparing the coefficient on decentralization for unconnected vs. connected men, we see that it is generally larger for connected men, but not always statistically significantly so. And as for women, decentralization is more likely to reduce satisfaction with government-organized meetings for connected compared to unconnected men.

Can political connections help overcome the disadvantage of being a woman? We find that for most service delivery outcomes, decentralization favors politically unconnected men over politically connected women—often statistically significantly so. That is, political connections do not even allow women to benefit from decentralization on similar footing with politically unconnected men—much less men with political connections.

This evidence is not definitive, but at least consistent with political engagement—which we identified as increasingly significantly for men, but not for women, due to decentralization—being a channel through which decentralization increases gender gaps in access to services.

7 Robustness Tests

In this section, we consider the robustness of our findings to a number of modifications to our estimation framework. First, we consider the effects of decentralization on a household-level outcome capturing the gap in outcomes between spouses; this analyzes the 72 percent of households for which we have data on both the husband and wife. Second, we correct our results for multiple hypothesis testing using two different methods of correcting for the family-wise error rate (FWER), conservatively pooling all hypotheses in every table in the main text into a single grouping. Third, we employ a logit model for our binary dependent

variables, computing marginal effects. Fourth, we use alternate, narrower bandwidths around borders separating decentralized from non-decentralized regions. Finally, we focus on a more geographically restricted set of observations that are situated along regional borders that were drawn only in 1995 (six years prior to decentralization). We find that our main conclusions are fundamentally unchanged by all of these modifications to our estimates.

7.1 Household-level gender gap outcomes

So far, we have considered the separate effects of decentralization on women and on men by estimating a model in which all independent variables are interacted with gender. Our first robustness check restricts our analysis to households for which both a husband and his wife could be interviewed (as opposed to one being deceased, away, or otherwise unavailable for interview).[17] We run a household-level regression in which the outcome is the husband's outcome minus his wife's—that is, the gap between the two. While this reduces our sample size and statistical power, it allows us to assess whether the expansion of the gender gap in access to services resulting from decentralization (estimated in Section 6) reflects real differences in the impacts of decentralization within a single household, as opposed to being simply due to differences in the composition of households in the male vs. female samples.

As Appendix Table A4 shows, we indeed find strong evidence that decentralization widens the within-household gender gap in access to services. For nearly every outcome for which we previously estimated an effect of decentralization on men that was statistically significantly larger than its effect on women, we again find a positive and statistically significant coefficient on decentralization reflecting a similarly-sized gap.

7.2 Corrections for multiple hypothesis testing

Our analysis includes a wide variety of public service delivery and political participation outcomes, and further examines heterogeneous treatment effects by respondent gender for

[17] Of 838 total sample households, 601 had data from both spouses for at least one of our outcomes.

all outcomes—making it essential to correct our findings for potential false positives that could result from testing so many hypotheses. Two popular methods for controlling for the false discovery rates are those due to Benjamini and Hochberg (1995) (BH) and Benjamini, Krieger, and Yekutieli (2006) (BKY). We compute the q-values (i.e., p-values corrected for multiple testing) for each of these methods.

Correction for multiple hypothesis testing is sensitive to how hypotheses are grouped. We conservatively pool all hypotheses—three for each outcome (men, women, and the difference)—into a single group. Our original (unadjusted) p-values for all of these tests appear alongside the two corresponding q-values (BH and BKY) in Appendix Table A5.

Our results are generally preserved for both correction methods. For women, while there were previously nine statistically significant results (i.e., for which the p-value was under 0.10), the BH method yields three q-values under 0.10 (though there are six that are between 0.10 and 0.12) and the BKY method yields eight. For men, while there were previously 11 statistically significant results, the BH method yields six q-values under 0.10 (though there are five that are between 0.10 and 0.12) and for the BKY method, all 11 remain significant.

7.3 Use of logit model

We next considered whether our results hold using a nonlinear regression model; Appendix Table A6 presents results from estimating a logit model, showing marginal effects. Despite some convergence problems for outcomes comprising individual components of our indices (which we have thus omitted), the broad pattern of our results is again preserved.

7.4 Use of alternate bandwidths

We next show that our results are robust to using alternate, narrower bandwidths: 50 km from the regional border and 25 km of the border; see Appendix Table A7. Our main analyses employ a 75 km bandwidth in order to use the full sample, as this was a bandwidth we selected to balance comparability of units and representativeness of the population. One

might worry that individuals further from the cutoff are inherently less comparable, possibly in ways not captured by our semi-parametric regression discontinuity. However, we find that across all 21 of our main outcomes, our point estimates are largely unchanged by use of narrower bandwidths—both in statistical significance and magnitude. That results survive both the restriction of analysis to inherently more comparable units and the reduction in sample size further supports our causal interpretation of the estimates.

7.5 Use of only recently-drawn regional boundaries

In Appendix Table A8, we show robustness to focusing on only two of our three district pairs: specifically, the two for which both districts in the pair were in the same province during all of 1942–1995, and which were separated into distinct regions only six years prior to decentralization, when provinces were abolished and regions formed. For these two pairs, both districts in the pair accordingly share much of the same fiscal, political, and administrative history, and are therefore especially comparable. We indeed show that our results are highly robust to using only these two pairs.

8 Conclusion

This paper examines the impacts of a fiscal and administrative decentralization reform carried out in Ethiopia on women's and men's access to public services and political engagement. We exploit the partial roll-out of decentralization during 2000–01, where the government piloted the reform in four of its nine recently-formed regions. During 2008–09, after the effects of the reform were fully consolidated, we sampled rural households within 75 km of three different borders between decentralized and non-decentralized regions. We then employ a spatial regression discontinuity design to identify decentralization's causal impacts eight years later. We collected rich data on delivery of agricultural services, which is one of the most important public expenditure items in our study context. While our survey provided almost no information about other goods and services, it provides a rich amount of detail on this

centrally important sector. We also gathered data on various forms of political engagement, including meeting with local governments officials and civil society leaders as well as voting. Prior to decentralization, we show balance on individual and household characteristics at future policy change borders.

We find that decentralization frequently improved access to agricultural services for at least one gender. However, the benefits for men were generally significantly greater than those for women. Men, but not women, became significantly more likely to attend government-organized community meetings to discuss agricultural issues, which are important for information exchange and learning. Men further became more likely to participate in a broad array of government agricultural programs, whereas women saw improvements in participation in a smaller set. Possibly as a result of men's (but not women's) increased participation in meetings and trainings, women realized significantly smaller gains in access to modern agricultural inputs (which government provides) compared to men; the coefficient on decentralization for men is four times that for women.

Altogether, this contributed to a widening of the gender gap in access to agricultural services, favoring men. In keeping with women benefiting relatively less from decentralization, women experience a drop in satisfaction with government-provided agricultural inputs not experienced by men. We shed some light on these gendered benefits by considering how decentralization affects two aspects of political engagement: meeting with local government officials and influential civil society leaders (non-electoral political participation), who wield increased power and discretion related to service delivery under decentralization, and voting in elections at different levels (electoral participation), which is a lower-cost activity.

We find no robust evidence that women increased their engagement with local government officials or civil society leaders, though men increased their engagement with both. Women did increase their participation in local (though not federal) level elections, but men did not. In a non-consolidated democracy, women's greater turnout as a group may be insufficient to motivate government to increasingly target them for receipt of publicly-provided services.

The results are instead consistent with non-electoral channels of political influence at the local level, dominated by men, contributing to policy outcomes favoring men.

This study considers only a single area of service delivery—specifically, agricultural services, which is a productive service. This was of central interest in the Ethiopian context given the priority placed on it by government and high levels of demand from individuals. However, future work is needed to consider whether our findings extend to other areas of service provision, including social services. We also lack panel data surrounding the reform, and thus cannot consider outcomes relative to their pre-reform levels. Obtaining data from both before and after decentralization on our broad range of outcomes would permit weaker identifying assumptions. Additionally, more work is needed to consider how women's empowerment—socially, economically, and politically—moderates the effects of decentralization. If women have greater mobility and voice, might they be able to similarly reap the benefits of decentralization in the way (largely) men did in the Ethiopian context? Finally, our work on the mechanisms explaining the widening of the gender gap in access to services is necessarily preliminary given data limitations. More work is needed, for example, to understand the relative importance of supply and demand side factors influencing women's take-up of information- and input-related services, as well as the potential mediating roles of having rich pre-existing social networks.

Our findings highlight the potential pitfalls of decentralized service delivery from a gender equality perspective, and provide policy recommendations for ensuring women's equitable access to services. Importantly, bringing service delivery "closer to the people" through decentralization may selectively benefit individuals. Much existing literature has warned of the potential for elite capture (Platteau, 2004; Khemani, 2010). Our findings provide a cautionary tale about the potential for male capture. More centrally-managed service delivery may, by necessity (e.g., incomplete information about the characteristics of recipients, or how to effectively target services to a subset of them), be more gender-neutral then locally-managed service delivery. Under local management, an individual's social and political capital may be

more important in determining whether services are targeted to them. Ensuring that such reforms are at least gender neutral, or at best advance gender equality, involves ensuring that local decision-makers have incentives to serve vulnerable groups, including women.

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Supplementary Material

The Gendered Effects of Decentralizing Service Delivery

Katrina Kosec, Song Jie, Hongdi Zhao

Table A1: Impact of decentralization on satisfaction with government-provided agricultural services

	Very satisfied with the majority of ...			
	government-organized meetings to discuss agricultural issues		government-provided agricultural inputs	
	(1)	(2)	(3)	(4)
Effect of decentralization on women	0.833	0.811	-1.164***	-1.363***
	(1.178)	(1.410)	(0.307)	(0.305)
Effect of decentralization on men	-0.080	-0.013	-0.419	-0.314
	(0.795)	(0.824)	(0.288)	(0.361)
R-squared	0.229	0.320	0.228	0.332
Mean for women	0.696	0.696	0.700	0.700
Mean for men	0.823	0.823	0.477	0.477
P-Value of Difference	0.425	0.548	0.006	0.049
N	231	231	284	284
Full HH control set	No	Yes	No	Yes

Notes: Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A2: Impact of decentralization on engagement with different types of local government officials and civil society leaders

	In the last year, have you spoken personally with the following?									
	Local government officials						Civil society leaders			
	Head of agricultural cooperative	Develop. agent (DA)	Kebele chair	Wereda council member	Kebele council member	Local party leader	Water committee member	Head of Iddir (funeral group)	Village elder	Village religious leader
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Effect of decentralization on women	0.357**	0.107	-0.206	0.165***	0.150	0.016	0.114*	0.326***	-0.083	-0.016
	(0.154)	(0.163)	(0.154)	(0.058)	(0.112)	(0.144)	(0.057)	(0.084)	(0.132)	(0.098)
Effect of decentralization on men	0.661***	0.214	-0.133	0.329*	0.351*	0.144	0.306**	0.374***	-0.146	0.033
	(0.184)	(0.147)	(0.131)	(0.168)	(0.183)	(0.187)	(0.130)	(0.099)	(0.109)	(0.139)
R-squared	0.225	0.304	0.471	0.175	0.185	0.243	0.117	0.562	0.356	0.287
Mean for women	0.077	0.258	0.477	0.036	0.091	0.082	0.057	0.193	0.548	0.541
Mean for men	0.155	0.447	0.764	0.176	0.309	0.196	0.130	0.274	0.696	0.661
P-Value of Difference	0.001	0.452	0.615	0.199	0.284	0.203	0.094	0.552	0.650	0.747
N	1435	1435	1436	1435	1435	1432	1432	1436	1436	1436

Notes: Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A3: Heterogeneous treatment effects by gender and political connectedness of relatives

	Coef (SE) Politically...				P-value Difference					
	Unconnected	Connected	Unconnected	Connected						
	Men		Women							
Outcomes	(1)	(2)	(3)	(4)	(1) = (2)	(1) = (3)	(1) = (4)	(2) = (3)	(2) = (4)	(3) = (4)
Attended community meeting to discuss agri issues (last year)	0.676***	0.986***	-0.109	0.099	0.155	0.000	0.049	0.000	0.003	0.280
	(0.182)	(0.205)	(0.141)	(0.202)						
Attended community water users meeting (last year)	0.150	0.656***	0.044	0.149	0.013	0.510	0.997	0.005	0.039	0.378
	(0.184)	(0.203)	(0.067)	(0.116)						
Participated in any of the 5 programs (within one year)	0.581***	0.438	0.133	0.283	0.550	0.014	0.259	0.402	0.707	0.388
	(0.195)	(0.369)	(0.115)	(0.188)						
Visit by DAs to your farm or home	0.422**	0.018	0.140	0.012	0.069	0.051	0.110	0.575	0.986	0.522
	(0.161)	(0.230)	(0.118)	(0.212)						
Group and community meetings organized by DAs	0.265	0.371	0.107	0.267	0.575	0.362	0.996	0.280	0.723	0.394
	(0.162)	(0.247)	(0.065)	(0.182)						
Visit to demonstration plots	0.161*	0.288**	-0.029	0.082	0.305	0.043	0.401	0.031	0.122	0.163
	(0.079)	(0.124)	(0.030)	(0.063)						
Services by cooperatives	0.035	0.187	0.044*	0.218**	0.510	0.944	0.180	0.571	0.880	0.061
	(0.130)	(0.258)	(0.024)	(0.099)						
Credit received for purchasing agricultural inputs	0.021	0.033	0.004	0.005	0.810	0.737	0.779	0.625	0.692	0.983
	(0.049)	(0.065)	(0.018)	(0.031)						
Used any modern input	0.771***	0.721***	0.190**	0.217	0.847	0.011	0.013	0.004	0.030	0.863
	(0.171)	(0.152)	(0.070)	(0.142)						
Used fertilizer	0.121	0.483***	0.064	0.235**	0.020	0.541	0.397	0.003	0.153	0.097
	(0.082)	(0.138)	(0.048)	(0.110)						
Used pesticide	0.425***	0.640***	0.019	0.050	0.141	0.000	0.003	0.001	0.000	0.742
	(0.083)	(0.171)	(0.033)	(0.094)						
Used improved seed	0.624***	0.165	0.162**	0.004	0.039	0.013	0.002	0.978	0.298	0.057
	(0.176)	(0.138)	(0.077)	(0.031)						
Used a new farming practice	0.270	-0.045	0.125*	0.170*	0.191	0.230	0.391	0.306	0.264	0.524
	(0.170)	(0.148)	(0.066)	(0.092)						
Very satisfied with gov-organized meetings (agri issues)	0.981	-1.013*	-0.065	-2.058**	0.005	0.329	0.062	0.237	0.329	0.005
	(0.902)	(0.488)	(0.723)	(0.905)						
Very satisfied with gov-provided agri inputs	-0.626	-0.551**	-0.574	0.068	0.912	0.954	0.456	0.967	0.403	0.545
	(0.679)	(0.239)	(0.426)	(0.673)						
Visited a government office of agriculture	-0.108	-0.048	-0.076**	-0.070	0.702	0.892	0.889	0.852	0.928	0.970
	(0.235)	(0.162)	(0.031)	(0.144)						
Local government officials engagement index	2.194**	1.787	0.806	2.009*	0.726	0.036	0.906	0.381	0.813	0.384
	(1.011)	(1.089)	(0.763)	(1.107)						
Civil society leader engagement index	0.496	1.316**	0.727**	-0.814	0.248	0.491	0.212	0.386	0.013	0.133
	(0.367)	(0.602)	(0.273)	(0.915)						
Voted in last kebele election	-0.084	0.114	0.311***	-0.262	0.263	0.003	0.441	0.261	0.199	0.020
	(0.110)	(0.170)	(0.102)	(0.206)						
Voted in last wereda election	-0.164	0.051	0.298***	-0.294	0.225	0.001	0.608	0.125	0.232	0.018
	(0.139)	(0.167)	(0.102)	(0.218)						
Voted in last federal election	-0.379**	-0.193	0.030	-0.890***	0.523	0.000	0.093	0.458	0.131	0.006
	(0.173)	(0.187)	(0.187)	(0.312)						
Mean [SD] of politically connected indicator		0.331 [0.471]		0.204 [0.403]						
N		664		771						

Notes: Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A4: Impact of decentralization on a household-level variable indicating the gap in the outcome between spouses

	Decentralization dummy					
	Without HH Controls		With HH Controls			
Within household gender gap indicators	Coef. (1)	S.E (2)	Coef. (3)	S.E (4)	Mean (5)	N (6)
Attended community meeting to discuss agri issues	0.702***	(0.149)	0.681***	(0.152)	0.296	598
Attended community water users meeting	0.145	(0.137)	0.177	(0.155)	0.098	594
Participated in any of the 5 programs	0.481*	(0.247)	0.458*	(0.238)	0.233	598
Visit by DAs to your farm or home	0.278*	(0.155)	0.317*	(0.155)	0.071	598
Group and community meetings organized by DAs	0.261	(0.230)	0.174	(0.208)	0.210	599
Visit to demonstration plots	0.180**	(0.070)	0.144**	(0.069)	0.042	599
Services by cooperatives	0.073	(0.148)	0.024	(0.141)	0.078	599
Credit received for purchasing agricultural inputs	0.067	(0.063)	0.045	(0.055)	0.035	599
Used any modern input	0.651***	(0.149)	0.564***	(0.154)	0.338	601
Used fertilizer	0.152	(0.105)	0.108	(0.102)	0.204	601
Used pesticide	0.403***	(0.078)	0.429***	(0.096)	0.163	601
Used improved seed	0.454***	(0.156)	0.411***	(0.141)	0.097	601
Used a new farming practice	0.051	(0.078)	0.025	(0.079)	0.092	595
Visited a government office of agriculture	-0.109	(0.219)	-0.168	(0.216)	0.147	599
Local government officials engagement index	1.248*	(0.606)	0.958*	(0.538)	1.175	593
Civil society leader engagement index	0.293	(0.291)	0.231	(0.261)	0.592	597
Voted in last kebele election	-0.243**	(0.112)	-0.152	(0.097)	0.157	598
Voted in last wereda election	-0.270**	(0.109)	-0.200*	(0.098)	0.153	598
Voted in last federal election	0.028	(0.138)	0.048	(0.132)	0.149	593

Notes: Within household gender gap indicators equal the man's outcome minus the woman's outcome for all main outcomes (we omit the outcomes from Table A1 due to insufficient observations), and thus positive coefficients on decentralization reflect a gap that favors men. By construction, most outcomes have three values: -1 (men better off), 0 (no gap), and 1 (women better off); exceptions include the local government officials engagement index and the civil society leader engagement index which are continuous variables. Households in which only one individual answered a question are omitted. Estimates in columns 1–2 only include geographic controls, and estimates in columns 3–4 include our full set of controls. Standard errors clustered at the village level. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A5: Multiple hypothesis testing for all main outcomes

	P-values								
	Women			Men			P-value diff		
Outcomes	Unadj. (1)	BH Adj. (2)	BKY Adj. (3)	Unadj. (4)	BH Adj. (5)	BKY Adj. (6)	Unadj. (7)	BH Adj. (8)	BKY Adj. (9)
Attended community meeting to discuss agri issues (last year)	0.597	0.697	0.382	0.000	0.001	0.001	0.000	0.001	0.001
Attended community water users meeting (last year)	0.470	0.630	0.352	0.150	0.256	0.160	0.197	0.319	0.193
Participated in any of the 5 programs (within one year)	0.228	0.352	0.218	0.031	0.107	0.088	0.060	0.131	0.111
Visit by DAs to your farm or home	0.451	0.630	0.352	0.030	0.107	0.088	0.075	0.153	0.120
Group and community meetings organized by DAs	0.032	0.107	0.088	0.112	0.208	0.131	0.339	0.509	0.297
Visit to demonstration plots	0.775	0.801	0.466	0.011	0.063	0.056	0.013	0.068	0.060
Services by cooperatives	0.048	0.111	0.092	0.524	0.668	0.361	0.852	0.866	0.493
Credit received for purchasing agricultural inputs	0.632	0.711	0.394	0.608	0.697	0.382	0.728	0.801	0.466
Used any modern input	0.007	0.045	0.040	0.000	0.001	0.001	0.001	0.008	0.008
Used fertilizer	0.159	0.264	0.161	0.016	0.068	0.060	0.127	0.229	0.146
Used pesticide	0.559	0.678	0.368	0.000	0.001	0.001	0.000	0.001	0.001
Used improved seed	0.048	0.111	0.092	0.004	0.028	0.026	0.015	0.068	0.060
Used a new farming practice	0.047	0.111	0.092	0.143	0.251	0.157	0.461	0.630	0.352
Very satisfied with gov-organized meetings (agri issues)	0.572	0.680	0.370	0.988	0.988	0.543	0.548	0.677	0.368
Very satisfied with gov-provided agri inputs	0.000	0.001	0.001	0.395	0.579	0.334	0.049	0.111	0.092
Visited a government office of agriculture	0.001	0.008	0.008	0.489	0.642	0.358	0.774	0.801	0.466
Local government officials engagement index	0.229	0.352	0.218	0.036	0.108	0.090	0.042	0.111	0.092
Civil society leader engagement index	0.105	0.205	0.129	0.043	0.111	0.092	0.425	0.609	0.344
Voted in last kebele election	0.031	0.107	0.088	0.772	0.801	0.466	0.035	0.108	0.090
Voted in last wereda election	0.066	0.139	0.119	0.770	0.801	0.466	0.014	0.068	0.060
Voted in last federal election	0.530	0.668	0.361	0.038	0.109	0.091	0.107	0.205	0.129

Notes: Un-adjusted p-values for all the main outcomes are presented in column (1), (4), and (7). Column (2), (5), and (8) use BH (1995) q-values as described in Anderson (2008) which are introduced in Benjamini and Hochberg (1995). Column (3), (6), and (9) use BKY (2006) sharpened two-stage q-values as described in Anderson (2008) which are introduced in Benjamini, Krieger, and Yekutieli (2006).
Source: IFPRI–EEPRI (2008-09).

Table A6: Robustness of results to use logistic regression for all main outcomes

	Original specification					Logistic regression (marginal effect reported)				
	Women	S.E	Men	S.E	P-value	Women	S.E	Men	S.E	P-value
Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Only geographic controls										
Attended community meeting to discuss agri issues (last year)	-0.051	(0.145)	0.788***	(0.159)	0.000	-0.043	(0.119)	1.144***	(0.158)	0.000
Attended community water users meeting (last year)	0.027	(0.062)	0.227	(0.141)	0.125	-0.029	(0.067)	0.275	(0.174)	0.118
Participated in any of the 5 programs (within one year)	0.219	(0.151)	0.699**	(0.268)	0.049	0.274**	(0.137)	0.862***	(0.297)	0.130
Used any modern input	0.192***	(0.060)	0.846***	(0.115)	0.000	0.244***	(0.000)	0.464***	(0.119)	0.414
Used a new farming practice	0.155**	(0.065)	0.238*	(0.135)	0.323	0.441***	(0.000)	0.258*	(0.138)	0.011
Visited a government office of agriculture	-0.083***	(0.020)	-0.067	(0.189)	0.929	-0.015	(0.028)	-0.082	(0.175)	0.842
Voted in last kebele election	0.165	(0.108)	0.012	(0.089)	0.055	0.094	(0.103)	-0.080	(0.072)	0.046
Voted in last wereda election	0.147	(0.117)	-0.041	(0.109)	0.024	0.075	(0.111)	-0.128	(0.092)	0.024
Voted in last federal election	-0.142	(0.204)	-0.252*	(0.143)	0.325	0.062	(0.000)	-0.837***	(0.000)	0.000
Panel B: Full control set										
Attended community meeting to discuss agri issues (last year)	-0.069	(0.129)	0.721***	(0.147)	0.000	-0.061	(0.107)	1.095***	(0.182)	0.000
Attended community water users meeting (last year)	0.047	(0.064)	0.243	(0.163)	0.197	-0.016	(0.068)	0.292	(0.190)	0.237
Participated in any of the 5 programs (within one year)	0.131	(0.106)	0.566**	(0.246)	0.060	0.128	(0.092)	0.718***	(0.277)	0.025
Used any modern input	0.182***	(0.062)	0.754***	(0.122)	0.001	0.141	(0.118)	0.399***	(0.130)	0.220
Used a new farming practice	0.138**	(0.066)	0.201	(0.133)	0.461	0.582***	(0.000)	0.213	(0.148)	0.006
Visited a government office of agriculture	-0.079***	(0.022)	-0.132	(0.187)	0.774	0.020	(0.033)	-0.151	(0.164)	0.214
Voted in last kebele election	0.228**	(0.099)	0.027	(0.093)	0.035	0.072	(0.090)	-0.056	(0.088)	0.093
Voted in last wereda election	0.207*	(0.107)	-0.037	(0.124)	0.014	0.051	(0.099)	-0.115	(0.116)	0.050
Voted in last federal election	-0.132	(0.207)	-0.307**	(0.140)	0.107	-0.193	(0.000)	-0.779***	(0.182)	0.006

Notes: Panel A regressions include only geo controls, and panel B regressions include full set of controls (geo controls and household cotnrols). Standard errors clustered at the village level are located in parentheses. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A7: Robustness of results to use of narrower bandwidths

	Original specification					Within 50 km					Within 25 km				
	Women	S.E	Men	S.E	P-value	Women	S.E	Men	S.E	P-value	Women	S.E	Men	S.E	P-value
Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Attended community meeting to discuss agricultural issues	-0.069	(0.129)	0.721***	(0.147)	0.000	0.136	(0.084)	0.811***	(0.139)	0.000	0.134	(0.084)	0.833***	(0.136)	0.000
Attended community water users meeting	0.047	(0.064)	0.243	(0.163)	0.197	0.102	(0.060)	0.362**	(0.172)	0.120	0.092	(0.060)	0.487***	(0.117)	0.000
Participated in any of the 5 programs	0.131	(0.106)	0.566**	(0.246)	0.060	0.140	(0.147)	0.560*	(0.291)	0.119	0.125	(0.162)	0.563*	(0.314)	0.125
Visit by DAs to your farm or home	0.088	(0.114)	0.363**	(0.158)	0.075	0.032	(0.155)	0.334*	(0.172)	0.063	0.041	(0.171)	0.304	(0.188)	0.109
Group and community meetings organized by DAs	0.127**	(0.056)	0.306	(0.185)	0.339	0.161**	(0.062)	0.305	(0.219)	0.502	0.119***	(0.039)	0.333	(0.233)	0.322
Visit to demonstration plots	-0.007	(0.024)	0.188**	(0.068)	0.013	0.034*	(0.017)	0.172**	(0.068)	0.040	0.041**	(0.016)	0.227***	(0.063)	0.007
Services by cooperatives	0.070**	(0.034)	0.095	(0.146)	0.852	0.086*	(0.043)	0.140	(0.165)	0.715	0.105**	(0.045)	0.186	(0.168)	0.601
Credit received for purchasing agricultural inputs	0.008	(0.016)	0.023	(0.044)	0.728	0.008	(0.020)	0.021	(0.052)	0.797	-0.003	(0.016)	0.008	(0.049)	0.835
Used any modern input	0.182***	(0.062)	0.754***	(0.122)	0.001	0.226***	(0.075)	0.847***	(0.139)	0.005	0.255***	(0.065)	0.824***	(0.134)	0.005
Used fertilizer	0.075	(0.052)	0.217**	(0.083)	0.127	0.096	(0.067)	0.239**	(0.089)	0.181	0.128*	(0.069)	0.304***	(0.085)	0.104
Used pesticide	0.019	(0.031)	0.463***	(0.096)	0.000	0.022	(0.040)	0.494***	(0.107)	0.000	0.017	(0.043)	0.515***	(0.109)	0.000
Used improved seed	0.138**	(0.066)	0.506***	(0.160)	0.015	0.176*	(0.087)	0.623***	(0.176)	0.010	0.197**	(0.080)	0.577***	(0.181)	0.015
Used a new farming practice	0.138**	(0.066)	0.201	(0.133)	0.461	0.169*	(0.082)	0.250	(0.162)	0.436	0.153**	(0.071)	0.200	(0.151)	0.639
Very satisfied with gov-organized meetings (agri issues)	0.811	(1.410)	-0.013	(0.824)	0.548	-3.303	(2.348)	-1.117	(0.775)	0.392	-0.041	(1.498)	-1.246	(0.775)	0.508
Very satisfied with gov-provided agri inputs	-1.363***	(0.305)	-0.314	(0.361)	0.049	-1.363***	(0.305)	-0.314	(0.361)	0.049	-1.330***	(0.155)	-0.316	(0.310)	0.015
Visited a government office of agriculture	-0.079***	(0.022)	-0.132	(0.187)	0.774	-0.064***	(0.022)	-0.116	(0.213)	0.807	-0.062***	(0.021)	-0.226	(0.199)	0.413
Local government officials engagement index	0.800	(0.647)	1.946**	(0.873)	0.042	1.109*	(0.559)	2.337**	(0.905)	0.063	0.822	(0.510)	2.032**	(0.875)	0.061
Civil society leader engagement index	0.409	(0.243)	0.667**	(0.311)	0.425	0.642***	(0.210)	0.959***	(0.267)	0.304	0.476**	(0.173)	1.000***	(0.264)	0.093
Voted in last kebele election	0.228**	(0.099)	0.027	(0.093)	0.035	0.275**	(0.120)	0.069	(0.100)	0.013	0.216	(0.134)	0.072	(0.108)	0.061
Voted in last wereda election	0.207*	(0.107)	-0.037	(0.124)	0.014	0.250*	(0.135)	-0.009	(0.139)	0.004	0.186	(0.148)	-0.007	(0.150)	0.021
Voted in last federal election	-0.132	(0.207)	-0.307**	(0.140)	0.107	-0.134	(0.262)	-0.273	(0.160)	0.311	-0.181	(0.277)	-0.308*	(0.158)	0.355

Notes: All coefficient reflect the coefficient on a dummy of decentralization in a regression of the listed outcome variable on the decentralization dummy and the full set of control variables. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

Table A8: Robustness of results to inclusion of only border segments that were drawn recently (in 1995, only 6 years prior to decentralization)

	Original specification					Considering only the two very recently drawn (in 1995) border segments				
	Women	S.E	Men	S.E	P-value	Women	S.E	Men	S.E	P-value
Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Attended community meeting to discuss agri issues (last year)	-0.069	(0.129)	0.721***	(0.147)	0.000	-0.001	(0.085)	0.611***	(0.124)	0.000
Attended community water users meeting (last year)	0.047	(0.064)	0.243	(0.163)	0.197	0.115	(0.072)	0.479**	(0.179)	0.027
Participated in any of the 5 programs (within one year)	0.131	(0.106)	0.566**	(0.246)	0.060	-0.104	(0.177)	0.020	(0.231)	0.707
Visit by DAs to your farm or home	0.088	(0.114)	0.363**	(0.158)	0.075	-0.181	(0.204)	-0.044	(0.094)	0.520
Group and community meetings organized by DAs	0.127**	(0.056)	0.306	(0.185)	0.339	0.054	(0.049)	-0.041	(0.187)	0.660
Visit to demonstration plots	-0.007	(0.024)	0.188**	(0.068)	0.013	0.030	(0.019)	0.139**	(0.052)	0.042
Services by cooperatives	0.070**	(0.034)	0.095	(0.146)	0.852	0.105*	(0.057)	-0.017	(0.190)	0.500
Credit received for purchasing agricultural inputs	0.008	(0.016)	0.023	(0.044)	0.728	-0.010	(0.018)	-0.054	(0.065)	0.527
Used any modern input	0.182***	(0.062)	0.754***	(0.122)	0.001	0.251***	(0.060)	0.574***	(0.096)	0.004
Used fertilizer	0.075	(0.052)	0.217**	(0.083)	0.127	0.151	(0.089)	0.139**	(0.065)	0.849
Used pesticide	0.019	(0.031)	0.463***	(0.096)	0.000	-0.053	(0.038)	0.537***	(0.154)	0.001
Used improved seed	0.138**	(0.066)	0.506***	(0.160)	0.015	0.223**	(0.081)	0.555**	(0.246)	0.075
Used a new farming practice	0.138**	(0.066)	0.201	(0.133)	0.461	0.041	(0.035)	-0.088	(0.071)	0.156
Very satisfied with gov-organized meetings (agri issues)	0.811	(1.410)	-0.013	(0.824)	0.548	2.042	(3.202)	-2.484***	(0.371)	0.183
Very satisfied with gov-provided agri inputs	-1.363***	(0.305)	-0.314	(0.361)	0.049	-1.388***	(0.145)	-0.343	(0.346)	0.017
Visited a government office of agriculture	-0.079***	(0.022)	-0.132	(0.187)	0.774	-0.068**	(0.024)	-0.522**	(0.197)	0.043
Local government officials engagement index	0.800	(0.647)	1.946**	(0.873)	0.042	-0.052	(0.347)	0.232	(0.521)	0.658
Civil society leader engagement index	0.409	(0.243)	0.667**	(0.311)	0.425	0.455	(0.297)	1.052***	(0.287)	0.254
Voted in last kebele election	0.228**	(0.099)	0.027	(0.093)	0.035	-0.010	(0.165)	-0.102	(0.127)	0.390
Voted in last wereda election	0.207*	(0.107)	-0.037	(0.124)	0.014	-0.033	(0.182)	-0.194	(0.175)	0.177
Voted in last federal election	-0.132	(0.207)	-0.307**	(0.140)	0.107	-0.538	(0.314)	-0.480**	(0.191)	0.687

Notes: All regressions include full set of controls. Standard errors clustered at the village level are located in parentheses below the coefficient. Statistical significance of coefficient estimates at the 1, 5, and 10 percent levels is indicated with ***, **, and *, respectively.
Source: IFPRI–EEPRI (2008-09).

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