Blending Top-Down Federalism with Bottom-Up Engagement to Reduce Inequality in Ethiopia

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Abstract

Donors increasingly fund interventions to counteract inequality in developing countries, where they fear it can foment instability and undermine nation-building efforts. To succeed, aid relies on the principle of upward accountability to donors. But federalism shifts the accountability of subnational officials downward to regional and local voters. What happens when aid agencies fund anti-inequality programs in federal countries? Does federalism undermine aid? Does aid undermine federalism? Or can the political and fiscal relations that define a federal system resolve the contradiction internally? This study explores this paradox via the Promotion of Basic Services program in Ethiopia, the largest donor-financed investment program in the world. Using an original panel database comprising the universe of Ethiopian woredas (districts), the study finds that horizontal (geographic) inequality decreased substantially. Donor-financed block grants to woredas increased the availability of primary education and health care services in the bottom 20 percent of woredas. Weaker evidence from household surveys suggests that vertical inequality across wealth groups (within woredas) also declined, implying that individuals from the poorest households benefit disproportionately from increasing access to and utilization of such services. The evidence suggests that by combining strong upward accountability over public investment with extensive citizen engagement on local issues, Ethiopia's federal system resolves the instrumental dissonance posed by aid-funded programs to combat inequality in a federation.

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1. Introduction

Inequality is a large and growing issue in policy debates across both developed and developing nations. One effect of the global financial crisis that began in 2008 was to exacerbate existing levels of inequality across countries as diverse as Brazil, China, France, Greece, India, Mexico, Spain, the United Kingdom and the United States; another effect was to highlight the issue *per se* as not just an economic concern, but a potent threat to political and social stability in societies poor and rich alike. The debate around such issues in both the academic and non-academic literatures has been rich and often forceful (Boix 2008, Boix 2015, Galbraith 2012, Houle 2009, Houle 2015, Krugman 2013, Piketty 2014, Stiglitz 2012, Stiglitz 2015, and Wade 2014a, among many others).

In developed countries, the inequality debate is conducted mainly in terms of taxation, welfare, and wage policy. Anglo-Saxon countries stress *ex-post* redistribution more, meaning taxes, transfers and public investments that reduce the inequality of market outcomes (Meade 1964, Mueller 2003, O'Neill and Williamson 2012, Pontusson and Clayton 1998). Some continental European countries, by contrast, focus modestly more on the pre-tax income distribution, which Wade terms "pre-distribution", via tax, labor market, and other regulatory policies that seek to attenuate extreme market outcomes before they occur (Carlin 2012, Gregg 2012, Hacker 2011, OECD 2012, Wade 2014b). But in both cases the question of inequality has been treated mainly as an issue of incomes policy, with consequences that are important but not fundamental.

The stakes are much higher in developing countries that are poorer and institutionally weaker. Where fiscal resources are scarce, public services fewer and of lower quality, and poverty far deeper, public investment in infrastructure and primary services takes on a primary role among policy responses to inequality. This is attractive for two strong reasons: (i) There is a broad consensus in the political science and economics literatures about the importance of investing in education, health, and basic infrastructure to accelerate economic growth and human development; and (ii) Expanding primary service and infrastructure networks can not only improve government responsiveness to citizens' needs, but also bolster social cohesion and expand the spatial presence of the state in a country, facilitating citizens' identification with their nation, and decreasing the risk of political instability and violence (Barro 1997, Barro, Caselli

and Lee 2013, Landa and Kapstein 2001, Lipset 1959, Przeworski and Limongi 1997, Przeworski, Alvarez, Cheibub and Limongi 2000, Sen 1999, World Bank 2004).

Investment programs that extend primary services and infrastructure networks to poorer, underserved areas of developing countries are thus seen as potential "sweet spot" interventions, capable of decreasing inequality, combating poverty, promoting growth, enhancing political stability, and underpinning young countries' nation-building efforts. Donors and international development agencies, increasingly concerned with inequality, are understandably eager to fund them.

As Faguet (2012, 2014a), Rodden et al. (2003), Treisman (2007) and many others have noted, federalism and decentralization are widely recommended as reforms that can achieve some similar goals: extending public services to areas previously underserved by centralized government, and making the state more responsive to local demand, thereby increasing both public sector effectiveness and political stability in the highly diverse societies typical of many developing countries. Partly as a result, federalism and decentralization have moved from a policy fashion in the 1980s to a broad international movement today, happening in all of the world's regions and most of its countries (Faguet and Pöschl 2015, Rodden 2006, World Bank 1999).

The necessary implication of these two trends is that a number of externally-funded programs to reduce inequality are being undertaken in federal or federalizing countries. This raises the worrying but interesting prospect of instrumental dissonance, as fiscal theory strongly suggests that greater *centralization* is required if the sorts of tax-and-transfer policies necessary for equalization are to succeed. Much the same is true of most externally-funded interventions, in which donors hold host governments to account for the use of aid funds. The sorts of upward accountability that connects the ultimate uses of funds to the foreign source of those funds is facilitated not by a federal structure, with functional and political independence at multiple levels of government, but rather by centralization.

What we see across many countries thus amounts to a grand, mostly unnoticed, probably unplanned, and as far as we know unexplored natural experiment in institutions and incentives. If theory is correct, either federalism will undermine aid programs to combat inequality, or aid programs will undermine developing countries' fiscal federal relations. Either way, the mismatch between intervention and federal structure will prevent such programs from achieving

3

the impacts that might otherwise have been expected. But it is also possible that aid programs have taken this into account, and are designed to overcome this contradiction; or that federal institutions somehow resolve it internally. Alternatively, the theory could simply be wrong. These are intriguing empirical questions with important implications for institutional theory and development policy, about which much evidence is available from a broad range of countries, but which as far as we know are unexplored in the academic literature.

This paper asks: Can an aid-funded program succeed in reducing inequality in a federation? This is an empirically subtle question with powerful implications not just for inequality, but for development more broadly. We seek to answer it with evidence from Ethiopia's Promotion of Basic Services (PBS) program. Jointly financed by the Ethiopian government (50%), and donors (50%) such as the World Bank, the UK Department for International Development, and others, PBS finances basic services in education, health, agriculture, water supply and rural roads. As primary responsibility for such services lies with the country's regional, city and *woreda* (district) governments, PBS funds are channeled through Ethiopia's intergovernmental fiscal transfer mechanism to subnational governments, where they are invested. Its main effect is to pump about $1 billion per year, mostly through woredas, into social investment in Ethiopia, making it the largest donor-supported program in the world.

In addition to hosting PBS, Ethiopia is a particularly good empirical context in which to study issues of accountability and inequality for three reasons: (1) The country's size and recent development experience give it a natural prominence; (2) Its geographic and socio-cultural diversity are among the highest in the world, providing natural sources of variation that a study such as this can exploit analytically; and (3) Its recent political history features dramatic changes in institutional structure and accountability.

Ethiopia has achieved impressive development results in recent years. That progress includes rapid and significant improvements in basic service delivery indicators. An Overseas Development Institute study (2010) found that Ethiopia was making the third-fastest improvements of any country towards reaching the Millennium Development Goals (MDGs). The latest Ethiopia Demographic and Health Survey data show that child mortality has fallen from 123 per thousand in 2005 to 88 in 2010, and primary net enrollment rates rose from 68 percent in 2004/2005 to 82 percent in 2009/2010. Such progress on basic service delivery is coupled with an impressive growth record over the past decade. GDP grew on average 11

percent per year during 2004/5-2009/10, according to official estimates. Initially led by agriculture, growth has become more broad-based, with a rising contribution from the mining, services and manufacturing sectors. While growth has slowed recently, it still remains among the highest in the world. Based on official data, the population below the national absolute poverty line fell from 38.7 percent in 2004/2005 to 29.6 percent in 2011. Ethiopia achieved the MDG 4 and 6 targets (child mortality and combating HIV/AIDS) well ahead of schedule, and appears on track to reach most of its other MDGs later this year.

Ethiopia is also home to a great diversity of ecological zones and ethnic and linguistic groups. Its vast system of mountains and highland plateaus is bisected by the Great Rift Valley, itself surrounded by lowland steppes and semi-deserts. In the east are remote deserts containing some of the hottest human settlements on earth, while to the south there are tropical forests. With 93 officially recognized mother tongues and 98 ethnicities counted by the Ethiopian census, the country is also one of the most ethno-culturally diverse societies on earth. Detailed information on such environmental and social characteristics disaggregated to woreda level makes Ethiopia a rich context for the study of a broad range of development issues.

The rest of this paper is organized as follows. Section 2 discusses theories of accountability in the federalism and aid literatures, focusing on their implications for anti-inequality policies, before turning to empirical evidence on the same. Section 3 presents Ethiopia's fiscal context, our data, and methods used in this study. Section 4 discusses recent trends in horizontal and vertical equity in service delivery, and then analyzes the effects of aid-supported block grants to woredas on horizontal equity across woredas, and vertical equity by wealth group. Section 5 concludes.

1. Upward vs Downward Accountability: Theory and Literature Review

Theory

This paper is located at the confluence of two large academic literatures, on federalism and accountability, and aid and accountability. The size of each literature, and also the fact that many aid recipients are either federations or have recently implemented decentralization (Manor 1999), both imply that we might expect to find a rich discussion taking place at this confluence. Oddly, this is not the case; the literatures acknowledge each other only infrequently and mostly in passing. In so (not) doing, they ignore the deep contradiction inherent in attempting to tackle

inequality in a federation through international aid. This paper helps fill this gap both theoretically and empirically.

The theory of federalism and decentralization holds that devolving power and resources to subnational governments should increase the accountability of public officials to citizens (Faguet 2014b, Putnam 1993, Manor 1999).[5] This happens via the re-orientation of public officials' incentives, from upward-looking, fixed on the objectives of higher-level superiors at the center, to downward-looking, fixed on the opinions and well-being of local voters (Faguet and Ali 2009, Faguet 2012). The end effect of this change is to increase the overall responsiveness of the state to citizens.

But by increasing the identification of citizens with their communities and regions, and increasing politicians' incentives to respond to smaller groups of voters, federalism might have the unfortunate consequence of increasing inequality in a society if it reduces the probability that voters in richer districts choose to tax themselves and transfer revenues to poorer districts. Hence breaking down centralized government into a larger number of smaller subnational units might increase public-sector accountability and at the same time decrease social solidarity. This association of federalism and decentralization with lower redistribution and higher inequality is a well-established theoretical postulate (Oates 1972, Rodden 2006, Treisman 2007, Wildavsky 1984), although the empirical evidence is far less convincing (Carreras 2015).

Where aid is concerned, external interventions in developing countries impose (a very particular form of) upward accountability to donors on developing country governments, often displacing whatever downward accountability to voters there may have been previously (Sachs 2005, Brett 2009, Williamson 2010, World Bank 1998, World Bank 2004). This is very widely held to be corrosive for developing democracies, with a logic that is intuitive and compelling (Easterly 2001, Moyo 2009, Wenar 2006). But it is not necessarily bad for inequality. How aid – and the upward accountability it implies – affects inequality and growth depends on recipient countries' previous quality of governance, as well as the objectives and level of engagement of donors (Burnside and Dollar 2000, Burnside and Dollar 2004, Collier and Dollar 2002).

It is easy to see how aid flows that undermine accountability can exacerbate inequality by insulating politicians from broad societal goals and inuring them to the fate of poorer citizens. In

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[5] This refers to sincere, or 'real' decentralization, as distinct from the partial or rhetorical decentralizations that characterize many countries, where decentralization may be declared but is never adequately implemented.

this case aid acts like a natural resource curse (Boone and Faguet 1998, Djankov et al. 2008, Easterly 2006, Harford and Klein 2005, Morrison 2010), detaching government leaders from their citizens' welfare and focusing their attention on external actors' priorities.

But it is also likely that a developing country with poor governance may see improvements in inequality if donors target aid resources effectively and impose efficient *upward* accountability on government. For such results to obtain, two conditions are necessary: (i) donors fund effective interventions that lessen inequality, for example by expanding education or health services, or income opportunities, for the poor; and (ii) donors' level of engagement is sufficiently high and sustained that the upward accountability they impose represents a binding constraint on public officials' behavior, in effect substituting for inadequate downward accountability. Where both conditions are met, aid programs may lead to investments or policy reforms that reduce inequality and spur growth, rather than disappear into clientelism, corruption, or unrelated public expenditure (Dalgaard and Hansen 2001).

How often these conditions are met is an empirical, not theoretical, question, on which researchers and practitioners sharply divide. Easterly and Moyo are among the most prominent voices arguing that donors' interventions are typically inefficient or ineffective, and their engagement too low and unsustained, to impose binding accountability on developing-country officials with interventions that achieve stated goals. As a result, aid money is often diverted, wasted or stolen, and progress towards development goals, including inequality, is absent. Others, most prominently Sachs, argue that forceful aid interventions achieved dramatic results under the post-war Marshall plan, and could do so again if properly structured and funded. It is fair to characterize this debate as unresolved. It is also fair to note that if conditions (i) and (ii) are individually demanding, they are jointly more demanding still.

Where does this leave us? Federal governments are effective when they nurture strong downward accountability of public officials to voters in local and regional sub-units of the state. But combating inequality requires stronger central government institutions with efficient nationwide tax collection that can redistribute resources from richer to poorer districts. This implies not just technical competence, but comparatively stronger upward accountability of subnational officials to a center that is in effect undermining the resource base, and hence power, they can deploy.

This contradiction is significantly compounded by aid that seeks to reduce inequality. For any aid intervention to succeed in a federation, downward ties of accountability must be replaced with upward accountability to donors, who specify goals, finance specific actions, and measure results; this is all the more so for anti-inequality aid programs. Can aid-funded programs to decrease inequality succeed in a federation? Will upward accountability succeed? Or will the internal logic of federalism be distorted by external demands and extraneous norms insufficient to constrain officials' behavior, undermining the institutional integrity of government and reducing accountability overall?

The Ethiopian Institutional Context

We argued above that Ethiopia is a particularly interesting empirical context in which to explore such issues. Its modern political and institutional history underline this further. Under the Ethiopian Empire (1941-1974), government was highly centralized, with all important decisions originating in Addis Ababa, little citizen participation, and a highly unbalanced pattern of regional development. Provincial governments were run by centrally appointed governors whose central priorities were collecting tax and maintaining law and order, and who themselves held little power. Public service provision was minimal, and the notion of downward accountability to citizens did not exist. The empire was succeeded by the Dergue, a military regime (1975-1991) which retained subnational governments as appendages of the center (Word Bank 2013a). Ethiopia's modern history of autocracy and repression reached its nadir under the Dergue during the Red Terror of 1977-78, when civil repression descended into full-scale war, involving the manipulation of food aid and enforced relocation or villagization, wielded against a starving but recalcitrant population, in the name of counter-insurgency, (Africa Watch 1991, Vaughan and Tronvoll 2003).

The overthrow of the Dergue in 1991 by the Ethiopian People's Revolutionary Democratic Front (EPRDF) saw the reversal of over a hundred years of ethnic homogenization. More than the collapse of a particular regime, this marked the end of a project, dating back to 1889, of creating a 'modern', centralized Ethiopian state around a highland ethnic core (Clapham 1994). The EPRDF began as a federation of regional, ethnically based guerrilla movements that came together to depose the Dergue. Some were stronger than others, but none was predominant, so rebel leaders quickly opted for a federal structure to their new government,

explicitly acknowledging a right to self-determination for Ethiopia's different "nations and nationalities". The country was divided along ethno-linguistic lines into nine regional states, with extensive, constitutionally guaranteed devolution of political, administrative, and fiscal authority to regional and local governments, and systematic affirmative action towards historically disadvantaged regions. This strategy gelled in two waves of decentralization. The first wave, during the transition period (1991-1994), devolved power and resources mainly to regions. A second wave in 2002 pushed decentralization further downwards to woredas, which became primarily responsible for service delivery in education, agriculture, health, water, and roads, paid for out of Woreda Block Grants. Thousands of civil servants were deployed from the center to the regions and woredas.

The new government embarked upon a long-term strategy of economic and state transformation founded in the political leadership's vision of a strong "developmental state" (Zenawi 2012) which intervened extensively in markets and guided the country's development trajectory with a firm hand. The logic underpinning this strategy is that in a poor, backward country like Ethiopia, the economy will tend to be dominated by rent seeking activity, and electoral competition by patronage and clientelism. Significant investments in the activities required for "value creation" that lead to high and sustained growth require an ideologically committed state that rules in the interests of the collectivity, rather than specific interests, and maintains a long time horizon (de Waal 2013). This strategy is expressed in the Growth and Transformation Plan (GTP), which sets explicit, detailed targets, actions, and goals for national, regional, and local-level officials.

Such a developmental state could draw on entrenched traditions of respect for authority, and social relations of command and subordination in Ethiopia (Lefort 2013), greatly facilitating the government's task. For example, the logic of voting in rural areas is often about correctly identifying the candidate who will win, and demonstrating loyalty by casting one's vote accordingly (Lefort 2007 cited in de Waal 2013). This is analytically and sociologically very different from the logic of preference revelation and grass-roots organization that underpins western notions of voting, with entirely different consequences.[6] Similarly, the Ethiopian concept of *mengist*, which elides notions of authority, government, regime, and stability within a single term, reflects Ethiopia's heritage of absolutism. This has strong implications for citizens'

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[6] Faguet 2004 explains the micro foundations of this logic.

conceptions of citizenship and individual agency, and undermines the possibility of leaders' downward accountability to voters (Poluha 2010, World Bank 2013b).

In practice, note Yilmaz and Venugopal (2008), "The progressive features of fiscal federalism in Ethiopia are not accompanied by similar political arrangements. Ethiopian local governments have a high degree of upward accountability mechanisms without the accompanying discretion and downward accountability mechanisms." Decentralization is designed to maximize hierarchical controls over local government finances and administrations, and minimize substantive political competition. The main channel for central control is not constitutional nor legal, but rather the political party structure. The party thus plays a "vanguard" role, maintaining strong revolutionary leadership, mobilizing the "often backward, uneducated" peasantry, keeping them out of the nets of anti-democratic rent seekers, and coordinating their march towards development (Lefort 2013).

This dynamic is most vividly illustrated in the establishment of Ethiopia's Development Army, which reaches down to the family level to organize communities into small groups charged with implementing local elements of the GTP in a harmonized manner. Rural households are grouped into development teams consisting of 20-25 families. These are further divided into groups of 4-5 families, which are led by one "model" family that leads the rest in the acquisition of skills and attitudes conducive to the implementation of official policy (World Bank 2013b). The ultimate aim is popular mobilization for the transformation of Ethiopia's society and economy in an orderly manner.

The reality of Ethiopian federalism resolves the theoretical contradiction of aid-sponsored inequality programs discussed above in favor of upward accountability. Its formal institutions notwithstanding, it would be folly to conceive of Ethiopia as a de facto federation with strong downward accountability of subnational officials to regional and local voters. Though implied in Ethiopia's laws and constitution, in practice this simply does not exist. Hence for the Ethiopian case, there is no contradiction between external interventions and the internal logic of government. Both prioritize upward accountability. And the latter, at least, is not only observable but greatly refined.

Empirical Studies

A small but vibrant and growing empirical literature exploits the rich empirical setting that federal/decentralized countries provide to study why accountability varies across governments, and how this affects different aspects of development. Focusing on subnational variation among Mali's 703 communes, Gottlieb (2015) finds that political parties have a strategic interest in colluding among themselves, rather than competing, to quell opposition, weaken democratic accountability, and so divide public resources among themselves rather than providing public goods for citizens. One view of Ethiopia's ruling EPRDF is as a more advanced expression of this dynamic, where collusion among different – here regionally-based – parties has been institutionalized in a federal political party structure.

This view is supported by Chanie (2007), who finds that clientelistic relations between regional and central political parties in Ethiopia, channeled via intergovernmental fiscal relations, undermine the downward accountability that subnational governments should have to voters, replacing it with upward obedience to national political masters. Likewise, Ishiyama's (2010) political analysis of federal disbursements in Ethiopia is consistent with a top-down strategy of buying off subnational opposition in order to maintain the control of a hegemonic ruling party. And lastly, Caeyers and Dercon (2007) find that poor households well connected to political leaders were significantly more likely to obtain food aid following the 2002-03 Ethiopian drought than villagers who were vertically unconnected.

3. Fiscal Context, Data and Methods

3.1 Fiscal Context

In 2003, the Ethiopian government instituted fiscal and administrative decentralization to the lowest tier of government, woredas. A large part of this decentralization is Intergovernmental Fiscal Transfers (IGFT), also known as block grants, which transfer funds from the center to regions, and from regions to woredas. IGFT allocations to regions are based on a formula that allocates resources according to poverty level, infrastructure gap, population, historical disadvantage, and other agreed criteria. Transfers from regions to woredas are based on similar, regional formulae. At woreda level, funds are used to finance administrative and service delivery expenditures. IGFTs aim to distribute resources equitably and efficiently, and are a key element in the government's strategy to reach the MDGs.

On average, IGTFs account for over a third of the total government expenditure. These transfers are large and growing. Over the past ten years, block grant allocations have grown from around ETB 7 billion in fiscal year 2005/06 to more than ETB 42.5 billion in fiscal year 2014/15, which implies an annual average growth rate of about 25%. In real terms, their value has increased by almost three-quarters (Table 1). At the regional level, IGFTs account for about 80% of total budgetary resources, and more at woreda level.

The fiscal transfer system has supported rapid increases in social sector investment over the past decade. Figure 1 shows the evolution of investment in education and health disaggregated by woreda, regional and national governments. Figures are upwardly cumulative, meaning that regional figures includes investment by woredas, and national figures include investment by regions and woredas. The graphs show accelerating investment in education and health. Investment rises sharply in education after 2008/09, and more evenly in health. Investment in education is dominated by woredas and national government, while regional governments play a large role in health and the center adds relatively little. It is notable that woredas play an important role in both sectors, contributing between 32 and 70 percent of total national investment over the period.

To better manage these increasing fiscal flows and service responsibilities, central government has mandated a number of strategies to enhance citizen engagement with local decision-making at woreda level. These include 'structured social accountability tools', such as community score cards, citizen report cards, participatory budgeting, and interface meetings between local service providers and users, which have been implemented in hundreds of woredas (Khan et al 2014). Formal 'grievance redress mechanisms' are also being implemented nationwide by the Ethiopian Institution of the Ombudsman and Regional Grievance Handling Offices. These allow an impartial third party to review complaints by citizens against woreda officials, typically concerning poor services or benefits withheld, and propose binding solutions. 'Financial accountability tools' disclose information on regional and woreda budgets, service delivery targets, and performance. More than 90 percent of woredas and city administrations post such information publicly, and further disseminate it via radio, television, brochures, printed t-shirts, etc. Such actions have revolutionized local transparency, as such information was not released to the public before 2006 (Khan et al 2014). Lastly, national and regional leaders are notably sensitive to public complaints about local government performance. Woreda officials

are actively monitored by local communities, and those charged with ineffectiveness or corruption are swiftly removed from their posts by the center, and replaced with new officials charged with implementing the GTP more efficiently (Plummer 2012).[7] Compared to Ethiopia's neighbors, local despotism is a relatively unsuccessful strategy for woreda officials to pursue.

Since 2006, external donors have supported the IGFT system through the Promotion of Basic Services (hereafter simply PBS) program. During these periods, donors contributed about half the budget of PBS, with the government financing the rest. Donor finance amounted to some 20-30% of the cost of the total block grant system during this period, and is conditioned on transfers meeting key criteria, including equity, additionality, and efficiency, all of which are actively monitored.

As envisaged at its design, PBS has contributed to large increases in certain types of staff financed through regional and especially woreda budgets, which has in turn led to substantial improvements in basic service delivery indicators. Primary and secondary enrolment rates have shown a steep upward trajectory. Under-5 mortality rate has dropped from 109.5 in 2005 to 88 in 2011. Table 2 shows changes in key indicators since 2006. Starting from a very low base, Ethiopia's improvements over the past decade represent a significant achievement.

3.2 Data

Our data source for horizontal or geographic equity analysis is the Poverty and Social Impact Assessment (PSIA) database (Khan et al. 2014). This includes data from five federal government ministries and agencies including Health, Education, Agriculture, Water and Energy, Finance and Economic Development, and the Central Statistical Agency (CSA). Woreda-level poverty rates are based on small area estimation of poverty levels. [8] Data has been collected for all of Ethiopia's woredas,[9] as delineated at the time of the 2007 census. The database includes information on expenditures by sector and year (2008/09-2011/12) from the Ministry of Finance and Economic Development; key service outcomes in education (enrollment, 2007/08-2012/13)

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[7] Indeed, the GTP sets explicit targets for anti-corruption activities and improvements in governance (Federal Democratic Republic of Ethiopia 2013).

[8] The estimation used data from the 2007 census and the 2010/11 Household Consumption and Expenditure Survey.

[9] In the Ethiopia government structure, woreda is the administrative unit between zone and kebele. Zone is the 3rd level below federal and regional administrations, and kebele is the lowest administrative unit. Woreda-level data is for all regions except Addis Ababa; we have also excluded data from Somali region.

and health (contraceptive acceptance, antenatal care, deliveries by skilled attendants, 2008/09-2011/12) from woreda-level sectoral administrative data; and information on ethnicity, the frequency of droughts, and other control variables. In addition, regional data on capital expenditures and zonal data on crop yields have been linked to woreda data.

An important caveat is that our horizontal equity analysis is based on woreda-level administrative data. The capacity of regional governments to collect this data varies. Some regions that are more adept at collecting it have more reliable data than others. But discrepancies – which do exist – between administrative data and more reliable household survey data affect means and not trends over time. The Ethiopia Demographic Health Survey (DHS), and other internationally accepted surveys, show trends over time similar to those shown by administrative data, albeit with lower means. Hence the direction of our findings, which uses both DHS survey data and administrative data, are reliable.[10] Another limitation of administrative data is its scope. There is no information at the local level for the years before decentralization to woredas, limiting the time scale we can analyze.

By contrast, our vertical equity analysis focuses on households and individuals, and so uses available DHS data, from 2000, 2005, 2011 and 2014. The 2000-2011 surveys are from the DHS program, and the 2014 survey is a mini-DHS implemented by the Central Statistical Agency. These are far more reliable, representative data, generated according to internationally-recognized household survey standards.

One reason an analysis of this sort has not been undertaken for Ethiopia until now is the absence of woreda-level data on local economic, demographic, fiscal and other characteristics. Indeed, it is difficult to overstate the difficulty of doing subnational empirical work on Ethiopia. When we began this project, relatively little subnational data was collected, the data was often of poor quality, and few attempts were made to systematize the results into any obviously

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[10] Questions have been raised about the quality of administrative data in Ethiopia, and discrepancies do exist between data published by the independent Central Statistical Agency (CSA) and line ministries. Some discrepancies can be explained by the way line ministries collect data through establishment reporting; also, in the case of the Ministry of Health, the use of cluster surveys rather than household surveys using more representative census-based samples. Various initiatives have addressed such discrepancies. Recently, an inter-ministerial committee charged the CSA to carry out Data Quality Assessments (DQAs), funded by external donors, to assess data quality and make recommendations for improvement. Administrative data has seemed to improve since.

comparable framework. Building the database on which the following analysis is based was a huge job, and is itself an important contribution of this research.[11]

3.3 Estimation Strategy

The econometric analysis explores the following three propositions for spatial or horizontal equity in service delivery.

Proposition 1: Woreda block grant allocations are pro-poor, implying that $\beta>0$ in the following specification:

$$\Delta G_i = \alpha + \beta P_i + \gamma R + \delta_t + \varepsilon_j \tag{1}$$

where ΔG_i is the deviation of the per capita block grant allocation from the mean (in percent), P_i is woreda poverty level based on the Ethiopia poverty map, and R and t are region and year dummies, respectively. If $\beta>0$, then the higher the woreda poverty level, the higher its allocation, and the proposition holds.

Proposition 2: There is a negative association between woreda headcount poverty rate (P_i) and service delivery in that woreda (Θ_i), i.e., $\eta<0$ in the following equation:

$$\Theta_i = \eta P_i \tag{2}$$

If $\eta<0$, then the poorest woredas are also those where service delivery is lowest.

Proposition 3: Following propositions 1 and 2, a block grant system that allocates proportionally more resources to the poorest woredas will also improve spatial equity in service delivery outcomes. We estimate this using the same approach as Khan et al. (2014), which showed that per capita block grant allocations were directly linked to service delivery outcomes using the following equation:

$$\ln O_i = \alpha + \zeta \ln E_i + \eta \ln K_i + \varepsilon_i \tag{3}$$

where O_i is various outcome variables for woreda i: for education, net primary enrollment rate; and for health, contraceptive use, antenatal care utilization, and births by skilled birth attendant; E is yearly expenditure per capita in the relevant sector; and K is capital expenditure per capita. We additionally control for year, percentage of rural population, and percentage of certain historically disadvantaged ethnic groups, the latter two indexed by woreda.

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[11] The complete database is available at http://governancefrombelow.net

Proposition 4: Increased coverage of services in poor woredas would widen access to, and utilization of services by, the poor. Availability of services in relevant areas would encourage poor households to use them, as distance becomes less of a constraint. The block grant system would thus promote not only horizontal equity, but also vertical equity. For vertical equity, a probit specification is estimated for each outcome assuming different scenarios. For vertical equity, we examine trends in coefficients associated with the lowest and the highest wealth groups, while controlling for other correlates. A negative coefficient on the interaction term (trend and wealth index) would also imply a narrowing gap. Separate regressions investigate trends in the bottom 20% of households vs. the top 20%.

4. Results

4.1 Trends in horizontal and vertical equity in service delivery

In this section, we present trends in horizontal and vertical equity in selected education and health services. These include the net enrollment ratio (NER), contraceptive acceptance rate (CAR), antenatal care (ANC), and delivery by skilled birth attendants (SBA). We compare the values in poorest group (1st quintile, q1) to those of the richest group (5th quintile, q5). We compare in absolute and relative terms. Absolute equity measures differences in values for the top 20% vs. bottom 20% (q5-q1), while relative equity measures their ratio (q1/q5). For horizontal equity analysis, 'groups' refers to the poorest vs. richest woredas. For vertical equity analysis, by contrast, 'groups' are the poorest vs. richest households.

Table 3 presents trends in horizontal and vertical equity in education and health services in Ethiopia, in both absolute and relative terms. Horizontal equity is for 2008-2013, while vertical equity is for 2000-2014.[12] In education (NER), no considerable horizontal inequality is observed between the poorest and richest woredas. But there is vertical inequality, with household-level data showing a much lower net attendance rate for children from the poorest households vs. children from the richest households. But the data also show progress over time towards vertical equity. Relative inequalities improved from 0.31 in 2000 to 0.58 in 2014. Likewise, the absolute difference between richest and poorest declined by 13 percent, from 47

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[12] Information is available for only these periods.

percent to 34 percent. Both relative and absolute inequalities show a narrowing vertical gap in primary enrollment rates between the poorest and the richest groups.

Health service indicators (CAR, ANC and SBA) are slightly more spatially differentiated than education. Coverage of these services in the poorest woredas ranges between 2 and 9 percentage points lower than the richest woredas. Differences are more pronounced at the household level. The difference between ANC utilization by women from the richest vs. poorest households in 2000, for example, was 26 percent. This increased to 46 percent in 2014. Similarly, the gap in SBA rates increased from 20 to 51 percentage points. In relative terms, however, the evidence shows progress towards health equity. The ratio of contraceptive acceptance rate in the poorest vs. richest groups improved steadily from 0.13 to 0.54 between 2000 and 2014. Similarly, relative equity in ANC utilization improved slightly during the same period, from 0.14 to 0.16, as for SBA, from 0.04 to 0.08.

Absolute and relative measures show mixed results for some health service indicators. Moreover the two measures are somewhat limited, presenting only inequalities between the poorest vs. richest extremes. A more comprehensive trend in inequality of service outcomes is presented in Figure 2. The figure shows concentration curves for education and health services. The vertical axis shows the cumulative proportion of beneficiaries receiving a service, while the horizontal axis shows the corresponding cumulative total of the relevant population. The 45-degree line is the equity line. Any deviation from this line shows inequality; a line below the equity line shows pro-rich inequality. Our evidence shows that women in better off households benefit disproportionately from public health services in Ethiopia. Likewise, primary school attendance is higher for children from better off households. While these results are not surprising, the trends are worth noting. For both education and health, the 2014 lines are all much closer to the equity line than those of 2000. In health services this is clearest for contraceptive use, but also visible in ANC and SBA. All cases thus show a progression towards equality.

In sum, all indicators of horizontal equity point to improved access to services across all quintiles. Levels data often show slightly higher levels of access for richer quintiles than poorer ones. The difference between these groups has remained constant or, in the case of health, slightly improved over the period examined. A similar trend is observed for vertical equity. Despite large absolute differences, relative inequality is narrowing. Although progress indicators

in horizontal and vertical equity are substantially different, the overall evidence is clear and shows improvements in equity. In the next sections, we explore the factors behind this development.

4.2 Does the block grant system promote geographic equity in service delivery?

We first estimate equation (1) to investigate whether woreda block grants are positively associated with the poverty headcount. We then examine whether woreda poverty rates are linked to poor service delivery outcomes. If both the relations hold, we infer that the woreda block grant system promotes reductions in geographic inequity.

Are block grants pro-poor?

Table 4 presents results for equation 1. The dependent variable is the deviation from the mean in percent of per capita woreda block grants. The explanatory variable is the head count poverty rate. Control variables include region and time dummies. The results show that head count poverty rate for the woreda is significant in determining the level of the per capita woreda block grant. A 1% increase in the poverty head count is associated with a 0.12% increase in per capita mean expenditure.[13] Aggregated to woreda level and over time, such differences can translate into significant improvements in access to basic services in poorer woredas.

Is poverty headcount linked to poor service delivery?

The second proposition concerns a possible inverse relationship between the poverty headcount and service delivery in a given area. Results are presented in Table 5. We use a Probit regression to estimate each service delivery indicator as a dependent variable, with the poverty headcount rate as our main explanatory variable, and regional and time controls. As expected, the results show clearly worsening service delivery as the poverty headcount increases, in the sense of lower enrollments and utilization of maternal health services.

Can block grants improve results in the bottom 20% of woredas?

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[13] Based on 2011/12 expenditure data; outliers are trimmed at 5% and 95%.

Equations (3) and (4) were tested on the lowest quintile of woredas in terms of poverty headcount. We then compare these results to national level results. he results in Table 6 show that increases in per capita spending are associated with improved outcomes both nationwide and among the poorest woredas. Across the board, education expenditure is associated with higher enrollment rates, and the effect is large. Likewise, access to skilled birth attendants increases substantially as health expenditure increases. Even more strikingly, these associations are greater among the poorest 20% of woredas than in the national sample for both NER variables and SBA. The same trend holds in the national sample for CAR (when lagged by one year) and ANC, but disappears among the poorest woredas for ANC and turns negative and significant for CAR. Overall, these results paint a positive picture of block grant expenditures improving service delivery across Ethiopia and decreasing spatial inequality.

4.3 Does the block grant system promote vertical equity in service delivery?

This section presents multivariate analyses of vertical equity in education and health services. We estimate equations for net primary attendance, contraception use by married women, antenatal care visits, and skilled both attendance. For each outcome we estimate three specifications. The first specification is for all regions in program areas. The second and third are restricted to the poorest and richest wealth groups in program areas. We focus on the wealth index and time trend, controlling for socioeconomic, demographic and regional variables.

Net primary school attendance: Table 7 presents correlates of net primary attendance for school age children (7-14 years old). Among our main variables of interest, the time trend is a more important predictor of child enrollment than household wealth. The interaction term (time trend x wealth status) is significant and negative, implying inequality is falling over time. While both the richest and the poorest households improved, enrollment has risen proportionally more in the poorest households. Results are similar in both full and restricted models, and hence robust to changes in specification. Other important determinants of primary school enrollment include place of residence, age, gender and mother's education, all with expected signs. Children from urban areas have a better chance of being in school that those from rural areas. Boys are more likely to be in school than girls. Children whose mothers have some education are also more likely to be in a school. Other controls in the model include regional dummies. The results

show a mixed profile for historically disadvantaged regions – positive for some regions and negative for others, in a pattern whose interpretation is not obvious.

Modern contraceptive methods: Table 8 presents the determinants of modern contraceptive use by currently married women aged 15-19 years. Results from both full and restricted models show narrowing inequality in the utilization of modern contraception. This is captured in the interaction term in the full model, and stronger associations of trend dummies in model 2 vs. model 1. Contraception use is much higher in urban areas and among younger women with some education. Contraceptive use also appears limited in historically disadvantaged regions.

Antenatal services from skilled health professionals: Table 9 presents results for the correlates of antenatal care visits. The dependent variable is four or more antenatal care visits from a skilled health professional. The wealth index and time trend are significantly associated with ANC. The interaction term also shows a narrowing trend in inequality. As above, falling inequality is also reflected in a comparison of models 2 and 3.

Delivery by an SBA: Table 10 presents probit results for skilled birth attendance. Year dummies show significant improvements over the past fifteen years. But these improvements are stronger for richest quintile compared to the poorest. This suggests there has not been a strong catch-up tendency by poorer woredas. The interaction term of wealth and time is similarly insignificant.

Two broad conclusions can be drawn from our vertical equity results. First, there has been growth in the net attendance ratio as well as access to and utilization of health services across the country. This is true across full models (all program areas) as well as restricted models for the poorest and richest wealth groups. Time trends are significant in most specifications.

Second, the poorest benefited more from this progress. This is captured by negative and significant interaction terms of time trend x wealth index for net attendance ratio, contraceptive use and ANC utilization. Separate estimations for the poorest and the richest quintiles produce similar results. In the latter, at least some trend dummies are significant in all outcomes. The coefficients and significance levels tend to be stronger for the lowest quintile. All of this implies pro-poor progress.

Readers should note that vertical equity results ask only if the lowest quintile benefited, and if relative equity has improved. They do not imply a direct association with the block grant

system. Following on from the horizontal equity analysis that does find a role for block grants in decreasing inequality, however, there is at least a suggestion of causality.

2. Conclusions

We explore the institutional contradiction of implementing aid-financed programs to combat inequality in federal countries by analyzing results from the largest donor-financed program in the world: Ethiopia's Promotion of Basic Services Program. Aid relies on the principle of local officials' upward accountability to higher levels of government, and eventually to donors. But federalism shifts the accountability of subnational officials downwards to regional and local voters. What happens when aid agencies fund anti-inequality programs in federal countries? Does federalism undermine aid? Does aid undermine federalism? Or can the political and fiscal relations that define a federal system resolve this contradiction internally?

We present evidence showing that Ethiopia's woreda block grants system promotes geographic and vertical equity in health and education outcomes. Block grants are positively associated with the poverty level: more resources are transferred to woredas with higher poverty rates. Poverty is negatively associated with basic service sector outcomes: a higher poverty rate implies a lower level of outcomes. And spending at the woreda level increases outcomes for most basic service sector indicators. These results imply that Ethiopia's block grant system is helping narrow the gap between lagging and better-off woredas, and also between poorer and wealthier households. Ethiopia's health and education indicators have shown impressive improvements across the board since the 1990s. But poorer woredas and poorer households have improved faster. These results dominate other cultural and socioeconomic factors that push in the opposite direction.

Our results should be read with two important caveats. First, our evidence concerns service delivery outcomes, not ultimate outcomes, such as increases in students' knowledge or improvements in citizens' health, which cannot necessarily be assumed to follow. Second, decreasing inequality should not obscure the fact that the quality of public services still varies greatly across woredas. The administrative data we use do not permit the measurement of service quality.

What drives these results? Convergence in different health and education indicators, sustained over time and across Ethiopia's remarkably diverse regions and ethnic groups, implies

a powerful process at work. Such a process is unlikely to be driven either by upward or downward accountability alone, but rather by a successful synthesis of the two. As Eaton et al. (2011), Faguet (2012), Smoke (2001), and others point out, a well-designed decentralized system does not *replace* upward with downward accountability any more than it *replaces* central with local government. Decentralization, rather, combines the two in a more complex synthesis that is superior to either independently when it successfully blends central government's superior resources and technical expertise with local government's superior knowledge of the conditions, needs, and voter preferences of a particular locality.

Our evidence suggests that Ethiopia's federal system combines strong upward accountability for public service standards, outcomes, and broader development goals with robust local inputs of what Ostrom et al. (1993) call "time and place information"; this improves the effectiveness of centrally-directed public investment by both adapting services to local conditions, and mobilizing citizens for their use. Compared to other African countries, Ethiopia's system of accountability is notable in two ways. First, nested and cascading federal accountability is strongly enforced and unusually effective, with central government holding regions responsible, and regions holding woredas responsible, for the use of public resources to meet the Growth and Transformation Plan's clearly-specified development targets, which cascade similarly through the federal structure.

Second and more interestingly, Ethiopian decentralization has created significant space for citizen engagement on local service delivery issues, despite limited space for engagement with national decision-making. This is implied in the success of centrally-defined health and education policies across strikingly different woreda contexts, and also evident in the speed and frequency with which woreda officials are changed in response to local complaints of ineffectiveness or corruption. We speculate that this is because, much like China, the government's political legitimacy rests largely on sustaining rapid development. Actively coopting citizens at the grass roots into the Growth and Transformation Plan can not only aid progress towards development targets, but also control the channels and agendas of citizens' engagement with politics in a way that is convenient for the ruling party. The Development Army, described above, provides one obvious example of how the government seeks to graft bottom-up engagement onto top-down accountability.

Ethiopia's blend of upward accountability with downward engagement resolves the instrumental dissonance implicit in aid-funded programs to combat inequality in a federal context. In Ethiopia, donors are not undermining federalism because officials' incentives are not downward-looking, as theory predicts, but rather upward-looking, as the party demands. And yet local inputs do not go missing, but are instead provided by explicit mechanisms of grass-roots engagement. A federal system that is notably closed to citizens at the national level has significantly opened at the local level. And local engagement has facilitated rapid improvements and rising equality in primary service provision.

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Table 1. Growth in block grant transfers to regional governments (billions of ETB)

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Nominal	7.1	9.3	13.5	16.6	19.6	25.5	30.6	35.6	42.5
Real	22.2	25.4	29.3	26.3	30.2	33.4	29.8	30.6	33.8
Grant % of total expenditure	32.4	34.7	39.0	36.9	37.7	36.6	39.9	39.0	37.4

Source: Ministry of Finance and Economic Development (MoFED) and PBS Secretariat
Note: Real amounts based on 2011 prices

Table 2. Evolution of key indicators, 2006–2014

Indicator	Start of PBS (2006)	2014	Source
Child mortality 1-4 per 1,000	72	31	DHS
Contraceptive acceptance rate (modern method)	14%	40%	DHS
Access to antenatal care	28%	41%	DHS
Net enrolment rate for grades 1–8	77.5%	90%	Education Management Information System (EMIS)
Gross gender parity index for grades 1–8	0.84	0.92	EMIS
Improved sanitation	38%	66%	DHS
Cereal productivity in quintals per hectare	15	20	Agriculture Sample Surveys

Table 3. Trends in horizontal and vertical equity in education and health service delivery

Indicators	Quintile groups, ratios & differences	Horizontal/spatial equity trends (Woreda level data: 2009-2013)					Vertical equity trends (household & individual level data: 2000-2014)			
		2009	2010	2011	2012	2013	2000	2005	2011	2014
NER	All groups	80.6	79.1	83.1	83.2	86.3	32.3	45.7	64.2	65.0
	q5 Richest	81.9	80.9	83.4	84.8	86.8	68.1	71.3	86.1	82.7
	q1 Poorest	80.4	79.6	84.4	84.3	84.2	20.8	28.3	51.9	48.3
	q1/q5	0.98	0.98	1.01	0.99	0.97	0.31	0.40	0.60	0.58
	q5-q1	1.5	1.3	-1	0.5	2.6	47.3	43.0	34.2	34.4
CAR	All groups	46.2	-	58.7	61.2		6.4	14.9	29.0	44.7
	q5 Richest	47.7	-	61.5	64.5	-	24.2	33.9	51.6	56.7
	q1 Poorest	38.7	-	52.5	55.5	-	3.2	4.5	14.7	30.9
	q1/q5	0.81	-	0.85	0.86	-	0.13	0.13	0.28	0.54
	q5-q1	9.0	-	9.0	9.0	-	21.0	29.4	36.9	25.8
ANC	All groups	57.7	-	69.1	74.2		9.2	10.7	14.2	22.3
	q5 Richest	59	-	72.2	73.9	-	30.1	34.0	38.5	55.1
	q1 Poorest	55.8	-	68.2	72.2	-	4.1	3.7	5.4	8.6
	q1/q5	0.95	-	0.94	0.98	-	0.14	0.11	0.14	0.16
	q5-q1	3.2		4.0	1.7		26.0	30.3	33.1	46.5
SBA	All groups	14.1	-	19.8	20.1		4.7	4.7	8.6	15.5
	q5 Richest	15.4	-	24.5	23.9	-	20.9	21.2	40.2	55.6
	q1 Poorest	11.6	-	18.6	18.5	-	0.9	0.7	1.7	4.5
	q1/q5	0.75	-	0.76	0.77	-	0.04	0.03	0.04	0.08
	q5-q1	3.8	-	5.9	5.4	-	20.0	20.5	38.5	51.1

Source: Authors' computation from administrative woreda level data and DHS data.
Notes: *Horizontal equity:* Data trimmed at the 1st and 99th percentiles; excludes Somali region. Relative inequality (q1/q5) compares the bottom 20% to top 20% of woredas. Absolute inequality (q5-q1) is their difference. *Vertical equity:* Vertical equity data exclude Addis Ababa. Relative inequality compares the bottom 20% to the top 20% of households. Absolute inequality is their difference.

Table 4. Association of per capita woreda block grant recurrent expenditure and poverty rate (Pooled OLS)

	Coefficient (t-ratio)
Poverty rate	0.0012***
	(3.12)
Region	
Tigray	0.0408
	(0.34)
Afar	-0.1522
	(-1.27)
Amhara	-0.1549
	(-1.31)
Oromiya	-0.2029*
	(-1.72)
Beneshangul Gemuz	0.3131**
	(2.55)
SNNP	-0.2080**
	(-1.76)
Gambella	0.2906**
	(2.08)
Harar	Omitted
Die Dawa	Omitted
Year	
2008/09	Omitted
2009/10	-0.0086
	(-0.60)
2010/11	-0.0049
	(-0.34)
2011/12	-0.0080
	(-0.56)
Number of Observations	2,204

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5. Association of service outcomes with head count poverty

Indicator	Coefficient (t-ratio)
Net enrolment rate 1-8 (1-8NER)	-0.0111**
	(-2.39)
Net enrolment rate 5-8 (5-8NER)	-0.0119*
	(-1.76)
Contraceptive acceptance rate (CAR)	-0.0852***
	(-6.52)
Access to antenatal care services (ANC)	-0.0414***
	(-3.51)
Births assisted by skilled attendants (SBA)	-0.0853***
	(-5.39)

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6. Impact of a one dollar increase in per capita woreda block grants on service outcomes

Indicators	National Pooled OLS	Bottom 20% –Pooled OLS
	Coeff (t-ratio)	Coeff (t-ratio)
Net enrollment rate 1-8	0.3833***	0.4225***
	(12.84)	(6.34)
Net enrollment rate 5-8	0.6630***	0.6413**
	(17.71)	(5.65)
Contraceptive acceptance rate	0.0281	-0.2482**
	(0.79)	(-2.37)
Contraceptive acceptance rate (lagged one year)	0.1321***	-0.2580**
	(3.11)	(-2.29)
Antenatal care	0.0776**	-0.0878
	(2.56)	(-1.47)
Proportion of births attended by SBAs	0.2533***	0.4732***
	(4.00)	(2.65)

Note: *** p<0.01, ** p<0.05, * p<0.1

Table 7. Probit estimation results of correlates of net attendance ratio (primary school)

	Model 1 (All program regions)	Model 2 (Poorest 20%)	Model 3 (Richest 20%)
	Coef (t-ratio)	Coef (t-ratio)	Coef (t-ratio)
Wealth index	0.000*** (4.89)	-	-
Year 2005	0.645*** (13.42)	0.357*** (4.78)	0.255*** (3.58)
Year 2011	1.095*** (20.34)	0.951*** (13.04)	0.628*** (7.19)
Year 2014	1.047*** (15.66)	0.867*** (8.91)	0.606*** (6.17)
Interaction: Time tend X wealth_index	-0.000* (-1.95)	-	-
Rural	-0.743*** (-8.07)	-0.567*** (-3.01)	-0.679*** (-10.81)
Age 7-8 (reference)	-	-	-
Age 9-10	0.569*** (27.95)	0.404*** (9.33)	536*** (9.28)
Age 11-12	0.805*** (33.72)	0.651*** (13.08)	0.790*** (12.14)
Age 13-14	0.791*** (29.29)	0.681*** (13.14)	0.718*** (11.85)
Female	-0.049*** (-2.82)	-0.086*** (-2.67)	-0.78* (-1.79)
Mother's Education	0.281*** (7.52)	0.316*** (3.38)	0.295*** (4.40)
Region dummies (historically disadvantaged)			
Afar	-0.484*** (-6.71)	-0.584*** (-6.21)	0.080 (0.68)
Somali	-0.706*** (-8.75)	-0.617*** (-5.75)	-0.762*** (-5.31)
Benshangul-Gumuz	0.223*** (4.54)	0.138* (1.92)	0.132 (1.47)
Gambella	0.470*** (5.69)	0.632*** (6.97)	0.127 (0.69)
Constant	-0.313*** (-3.31)	-0.647*** (-3.28)	0.331*** (3.94)
Number of observations	56,344	15,826	9,995

Note: *** p<0.01, ** p<0.05, * p<0.1

Table 8. Probit estimation results of correlates of contraceptive use

	Model 1 (Program areas)	Model 2 (Poorest 20%)	Model 3 (Richest 20%)
	Coef (t-ratio)	Coef (t-ratio)	Coef (t-ratio)
Wealth	0.000*** (4.29)	-	-
Year 2005	0.585*** (10.30)	0.245** (2.02)	0.421*** (4.86)
Year 2011	0.970*** (16.86)	0.793*** (7.14)	0.659*** (7.45)
Year 2014	1.331*** (18.13)	1.311*** (10.74)	0.863*** (6.29)
Interaction: Time tend X wealth_index	-0.000*** (-3.09)	-	-
Rural	-0.582*** (-8.63)	-0.116 (-0.32)	-0.510*** (-6.64)
Age	-0.026*** (-3.05)	-0.005 (-0.29)	-0.064*** (-3.21)
Number of children 5 and under	-0.031** (-1.98)	-0.095*** (-2.67)	0.090*** (2.66)
Education	0.281*** (7.52)	0.316*** (3.38)	0.295*** (4.40)
Region dummies (historically disadvantaged)	-	-	-
Afar	-0.576*** (-5.95)	-1.673*** (-8.03)	-0.180* (-1.76)
Somali	-1.345*** (-7.18)	-1.766*** (-8.25)	-0.899*** (-3.28)
Benshangul-Gumuz	-0.008 (-0.15)	-0.116 (-0.86)	0.138 (1.24)
Gambella	0.069 (0.79)	-0.491*** (-3.37)	0.206** (2.25)
Constant	-1.032*** (-12.93)	-1.680*** (-4.31)	-0.633*** (-4.93)
Number of observations	29,971	7,480	6,010

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9. Probit estimation results of correlates of antenatal care visits

	Model 1 (Program areas)	Model 2 (Poorest 20%)	Model 3 (Richest 20%)
	Coef (t-ratio)	Coef (t-ratio)	Coef (t-ratio)
Wealth	0.000*** (4.91)	-	-
Year 2005	0.250*** (3.46)	0.055 (0.39)	0.176 (1.45)
Year 2011	0.447*** (6.48)	0.344*** (2.92)	0.090 (0.77)
Year 2014	0.841*** (11.34)	0.737*** (6.02)	0.655*** (4.28)
Interaction: Time tend X wealth_index	-0.000** (-2.35)	-	-
Rural	-0.530*** (-5.89)	-0.342 (-1.14)	-0.468*** (-4.93)
Age	-0.007 (-0.66)	-0.008 (-0.37)	-0.003 (-0.11)
Number of children 5 and under	-0.072*** (-3.39)	-0.032 (-0.55)	-0.078* (-1.74)
Education	0.426*** (11.28)	0.381*** (4.35)	0.638*** (8.97)
Region dummies (historically disadvantaged)			
Afar	-0.322*** (-4.69)	-0.752*** (-6.52)	-0.056 (-0.51)
Somali	-0.765*** (-7.06)	-1.058*** (-7.08)	-0.395** (-2.05)
Benshangul- Gumuz	0.029 (0.41)	-0.089 (-0.65)	-0.034 (-0.33)
Gambella	0.381*** (5.01)	0.222** (2.11)	0.210 (1.37)
Constant	-0.839*** (-8.12)	-1.353*** (-3.90)	-0.532*** (-3.21)
Number of observations	23,920	6,252	4,360

Note: *** p<0.01, ** p<0.05, * p<0.1

Table 10. Probit estimation results of correlates of assistance from a skilled birth attendant

	Model 1 (Program areas)	Model 2 (Poorest 20%)	Model 3 (Richest 20%)
	Coef (t-ratio)	Coef (t-ratio)	Coef (t-ratio)
Wealth	0.000*** (5.16)	-	-
Year 2005	0.129* (1.90)	-0.084 (-0.53)	0.170 (1.52)
Year 2011	0.349*** (5.12)	0.227 (1.57)	0.449*** (3.99)
Year 2014	0.640*** (8.45)	0.656*** (4.60)	0.804*** (6.35)
Interaction: Time tend X wealth_index	-0.000 (-0.73)	-	-
Rural	-0.866*** (-11.25)	-0.329* (-1.65)	-0.954*** (-10.54)
Age	-0.063*** (-4.48)	-0.043 (-1.27)	-0.078*** (-2.92)
Education	0.452*** (9.63)	0.151 (1.25)	0.695*** (8.18)
Region dummies (historically disadvantaged)			
Afar	-0.178** (-1.96)	-0.662*** (-4.22)	0.016 (0.11)
Somali	-0.147 (-1.24)	-0.098 (-0.69)	0.040 (0.19)
Benshangul Gumuz	0.228*** (3.28)	0.178 (1.07)	0.269** (2.31)
Gambella	0.654*** (8.29)	0.994*** (7.35)	0.585*** (3.90)
Constant	-0.901*** (-10.07)	-1.907*** (-6.98)	-0.620*** (-4.84)
Number of observations	36,387	9,935	6,011

Note: *** p<0.01, ** p<0.05, * p<0.1

Figure 1: Evolution of education and health investment by level of government
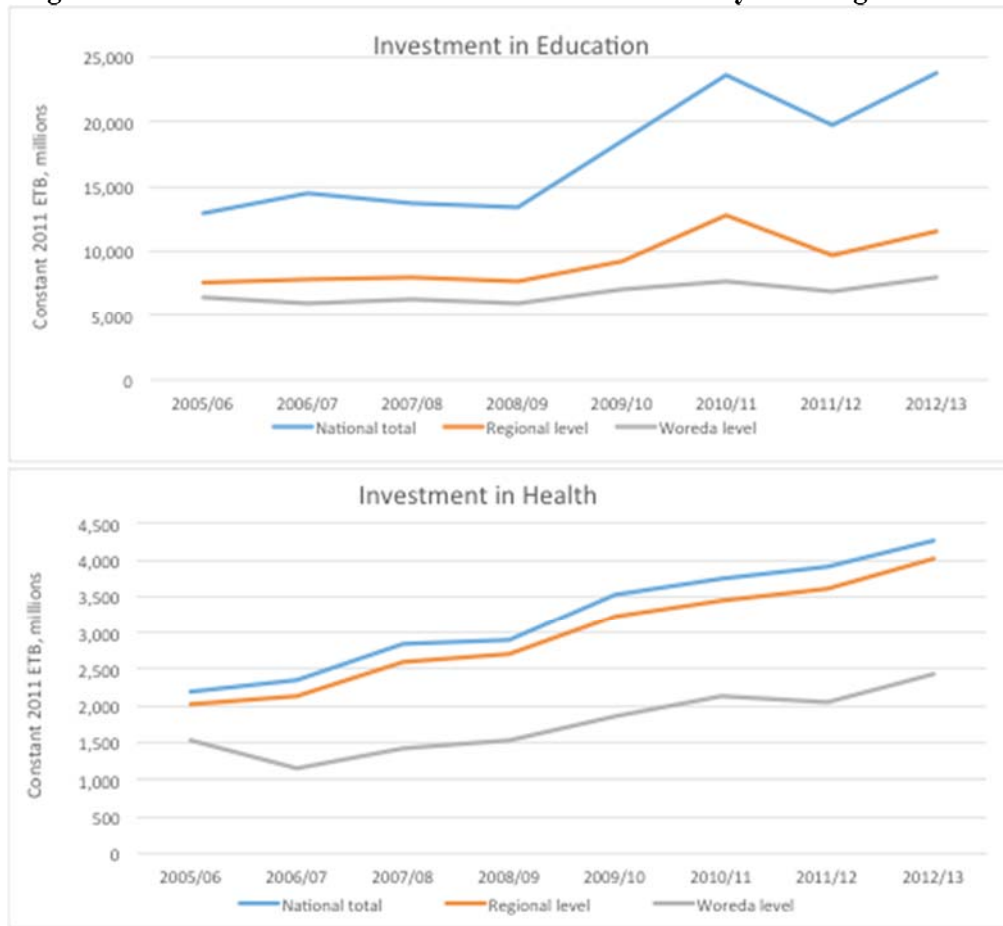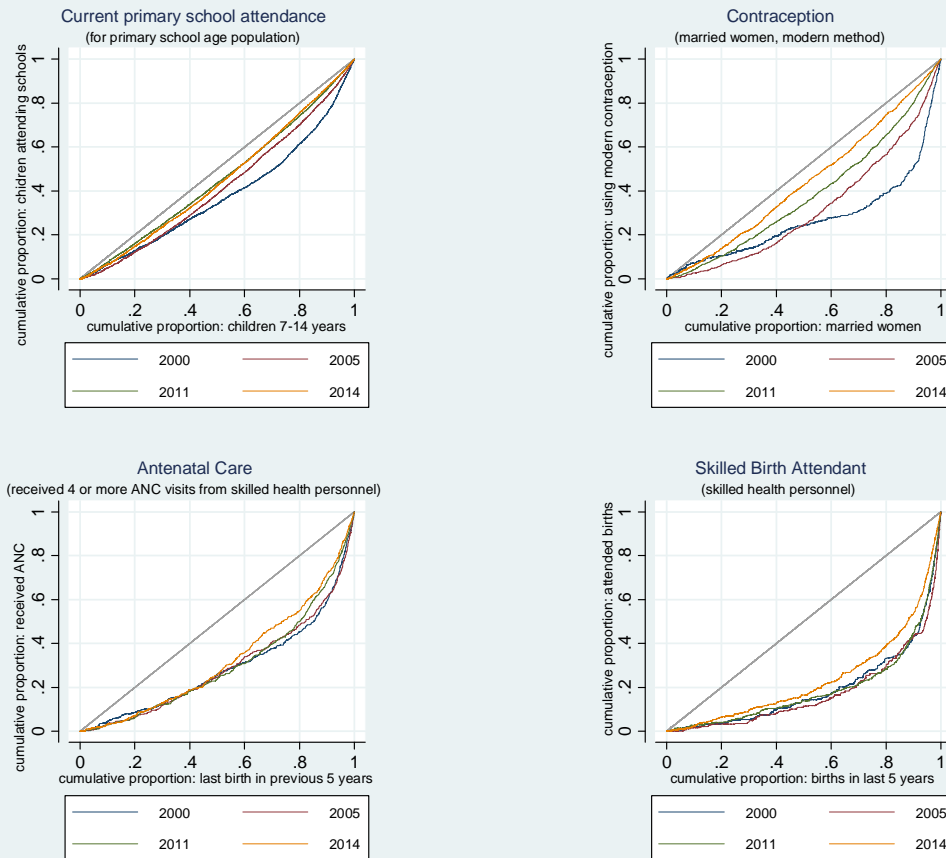
Figure 2: Concentration Curves of Selected Education and Health Services

Note: The diagonal (45 degree line) is the line of equality. The values in the horizontal axis are ranked by wealth.
Source: Authors' computation from the DHS data.The values are for all regions except Addis Ababa.