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**Improving Basic Services for the Bottom Forty Percent:
Results of the Poverty and Social Impact Assessment of
Decentralized Basic Service Delivery in Ethiopia**



Social Protection Sector

Country Department AFCE3

Africa Region

CURRENCY EQUIVALENTS

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ABBREVIATIONS AND ACRONYMS

AGSS	Agriculture Sample Survey
ANC	Antenatal Care
CAR	Contraceptive Acceptance Rate
CSA	Central Statistical Agency
DA	Development Agent also known as Agriculture Extension Worker
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
ETB	Ethiopian Birr
FBG	Federal Block Grant
GDP	Gross Domestic Product
GoE	Government of Ethiopia
GRM	Grievance Redress Mechanisms
GTP	Growth and Transformation Plan
HEW	Health Extension Worker
IGFT	Inter-Governmental Fiscal Transfers
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
MOFED	Ministry of Finance and Economic Development
MOWE	Ministry of Water and Energy
PBS	Promoting Basic Services Program (formerly, Protection of Basic Services)
NER	Net Enrollment Rate
PTR	Pupil-teacher Ratio
SA	Social Accountability
SBA	Skilled Birth Attendant
U5MR	Under-five Mortality Rate
WBG	Woreda Block Grant
WDR 2004	World Development Report 2004

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Summary and Recommendations

Ethiopia's Approach to Basic Service Delivery

- Like the majority of developing countries across Africa, Asia and Latin America (Treisman 2007, Manor 1999), Ethiopia has opted for a highly decentralized approach to service delivery in agriculture extension, basic education, primary health care, rural roads and water supply. This follows a long tradition of theoretical analyses of how decentralizing government could make government more responsive to diverse local needs, and more efficient in the provision of public goods (e.g. Besley and Coate 2003, Faguet 2012, Oates 1972, and Tiebout 1956, to name a few).
- In Ethiopia, these services are primarily managed at the woreda (district) level and mostly financed by Inter-Governmental Fiscal Transfers (IGFTs), though some woredas do raise own revenues. Block grants for decentralized services have been co-financed by development partners through the Promotion of Basic Services (PBS) program, which not only provides development partner resources for service provision, but also supports a variety of measures designed to improve service quality as well local government capacity. Influenced by the idea of an accountability triangle as presented in the 2004 World Development Report¹ (Figure 1), PBS also supports the direct voice of citizens by emphasizing transparency and governance for the block grants through a variety of measures. These range from financial transparency and citizen education on budget issues, to grievance redress mechanisms and specific measures for social accountability.

Overall Findings

- Ethiopia's service delivery model for basic services reflects a successful application of model proposed in WDR 2004 *Improving Services for the Poor*. The WDR linked improved services to improved accountability of service providers – both through a long route where citizens influence services providers through the government and a short route direct accountability between service providers and government. The Ethiopia states holds service providers strictly accountable for results working through local governments where local authorities are held accountable by regional and federal levels. There is a degree of local competition for power and influence which makes local authorities responsible to results and open to feedback from citizens – thus the long route of accountability works well in Ethiopia specially because of decentralization. In addition, the short route of accountability is enforced by three elements – financial transparency and accountability, grievance redress mechanisms reporting directly to the independent Ethiopia Institution of the Ombudsman and finally structured social accountability systems providing direct citizen service provider interaction.
- Woreda-level spending financed through IGFTs, and supported by PBS, have been a very effective way of pushing Ethiopia forward to attaining its MDG goals. Health and education spending account for 80% of PBS-financed woreda spending. Health spending pays for health extension workers while education spending pays for teachers. The link between recruiting personnel and actual delivery of services must be treated with caution, and indeed is being explored further through an on-going Bank study. This study finds evidence of increases in utilization of health services due to the intervention of health extension workers, especially among the poorest quintiles. Econometric results show that a US\$1 increase in woreda health spending per capita could be associated with increases in the contraceptive prevalence rate of 6.4%, and in the percentage of

¹ World Bank, World Development Report 2004: Making Services Work for Poor People, 2003

births delivered by skilled birth attendants of 11.3%². Both of these contribute sharply to reducing maternal mortality, as global evidence shows and recent results from Ethiopia confirm. Similarly, an increase of US\$1 per capita of woreda-level health spending is associated with an increase in coverage of Antenatal care by 3.6%, which can significantly help reduce infant and child mortality. With regard to education, an increase of US\$1 per capita in woreda-level education spending is associated with a 3.6% increase in the net primary enrollment rate within that woreda. In addition, woreda health and education-level spending is pro-poor, with 58% of the incidence accruing to the two bottom quintiles. On-going work on incidence analysis in the Ethiopian part of a multi-country study³ finds the overall incidence of health and education spending on the bottom 40% to be 33% which is not pro-poor compared to woreda spending. The same study finds that primary education spending (which is mostly woreda based) is pro-poor – confirming these findings. These results demonstrate the power of the PBS-financed decentralized approach to improving access to basic services. Similarly, woreda-level agriculture spending, primarily for agriculture extension workers, drives increases in output and the adoption of new, improved methods across all asset quintiles.

➤ Agriculture, education and health account for 97% of woreda spending, which in turn comprises 97% of PBS financed IGFT spending. The remaining 3% supports citizen engagement, improvement of local level capacity to manage resources, and improved national-level information. While it is difficult to provide precise estimates of the impact of the latter activities, the direction of their effect is clear: spending efficiency is improved through better capacity, more transparency, and more citizen accountability.

Objectives

➤ The primary objective of this study is to assess the association of woreda-level expenditures for decentralized service provision on key policy outputs and human outcomes. A secondary objective was to assess the incidence of these expenditures by income quintile, in line with the Bank's new objective of shared growth that targets the bottom 40%. A third objective was to investigate possible ethnic biases in the allocation of woreda-level block grants, and if so, whether any bias is in line with the constitutional objective of providing additional resources to historically underserved populations.

Citizen Voice

➤ The PBS' social accountability program generally increased demand-side opportunities for constructive citizens-state collaborations to improve basic public services in pilot areas. Evidence shows that the program increased citizen awareness of their rights, responsibilities and entitlements to basic services, with over 84% of those surveyed in pilot areas responding positively. Citizens have also become more aware of their government budgeting process, and are intervening more effectively in pushing for their rights as a result of the Financial Transparency and Accountability (FTA) component.

➤ PBS has also improved the efficiency of resource use by improving financial management and procurement capacity at the woreda level via support for accountability to citizens through financial transparency, social accountability, and a formal grievance redress mechanism (under the Ethiopian Institution of the Ombudsman). Even though Woreda's in Ethiopia have to operate under Federal guidelines, they can still exert a significant amount of discretion and can affect the quality of life and services.

² Wang et. al (forthcoming) *Ethiopia Universal Health Care: Case Study*, World Bank

³ Eyasu Tsehaye et. al AFTP1 World Bank (on-going)

Effectiveness

- The analysis finds that woreda-level spending in education, health and agriculture is effective in achieving important results in each sector. It is improving net enrolments in education, access to basic services in health, and increasing productivity in agriculture. These three sectors account for 97% of woreda-level spending, and thus the spending can be considered both effective and well-targeted. The results reported in the summary are based on the log-linear regression estimates. Linear and non-linear regressions were also estimated and the results are presented as an Annex.
- The study considered two **education**-related indicators: the net primary enrollment rate (NER), and the pupil teacher ratio (PTR). These are both included in the PBS 3 Results Framework as direct objectives that the project aims to improve. For both there is a strong, significant relationship with woreda-level per capita recurrent expenditure, when controlling for the effects of rural/urban population and ethnicity. Table 1 shows the relevant regression results. For every additional Ethiopia Birr per capita in woreda education spending, there is an NER increase of 0.19%. Expressed in US dollar terms, a \$1 increase in per capita spending yields a 3.6% increase in the NER. These results are significant at the 1% level, and are robust to different data sources.
- The analysis of woreda-level expenditures in **health** shows a positive association with access to antenatal care, contraceptive prevalence rate, and deliveries by skilled birth attendants. These are primary drivers that reduce child mortality (MDG 4) and maternal mortality (MDG 5). Log-linear regression results using woreda-level data are corroborated using probit regressions on DHS 2011 household data. We find that visits from health extension workers increase the probability of contraceptive use, vaccinations, use of antenatal care and assisted childbirths in both rural and urban areas. Most of these results were found significant for all five DHS wealth quintiles.
- In **agriculture**, the effect of woreda-level spending on agriculture extension workers increases yields for major crops such as cereals, vegetables, enset, coffee and fruits. When the data is divided into plot size quintiles, we find that spending on agriculture extension workers increases the probability of using improved farming techniques across all quintiles.
- Taken together, the results underline that Ethiopia's rapid progress towards its MDG goals is a direct result of the country's highly decentralized approach to basic service delivery.

Equity

- The analysis also considered equity consequences by income/wealth group, gender, ethnicity and geography. Overall the report finds the incidence of PBS financed IGFT expenditure on equity in income/wealth terms to be positive, in that benefits accrued to all quintiles in all sectors. The results are better still in health and education – the incidence of IGFT resources was much higher for the bottom two quintiles, where 58% of total benefit incidence accrues. In agriculture, the magnitude was smaller for the bottom quintile, which could be related to a lack of financing to purchase necessary inputs.
- Gender effect was also positive, especially for education and health. In Ethiopia, 87% of farmers are males. Access to extension services for female farmers was tested and found to favor males. It is not clear whether this bias is driven by a gender difference in choice of crops or quality of land, or some other inherent gender bias.
- An analysis of the regional incidence of PBS-financed IGFT benefits found the two most favored regions to be Gambella and Benishangul-Gumuz –two of the historically most disadvantaged regions in the country. Similarly, ethnic dimensions were analyzed and found to favor some

historically disadvantaged groups, in accordance with constitutional provisions though in the Somali regions even though federal transfers to the region appears to be fine, the region transfers a much smaller share to woredas making woreda level spending lower than would be needed in lagging areas.

Conclusions and Recommendations

- The evidence shows that decentralized spending at the woreda level is both effective and pro-poor. The estimates provided here imply that Ethiopia is far from decreasing returns, and hence there is scope to increase such spending further to accelerate progress towards its MDGs. It should be noted that causality from woreda spending to results is direct for education where teachers help drive enrolments and catalytic in health and agriculture where the health and agriculture extension workers help increase the effectiveness of system wide spending.
- Some of Ethiopia's historically disadvantaged areas are significantly favored under the current regime. The distribution of expenditure across space is broadly equal amongst Ethiopia's woredas, with the striking exception of a small number of woredas concentrated in the country's most disadvantaged regions that receive significantly greater resources. By contrast, the most disadvantaged woredas in terms of resource flows are concentrated in the more developed, historically dominant regions. Five majority-Anyiwak woredas are noteworthy for receiving the most public resources of all woredas in the nation. The one exception to this appears to be the Somali group which is the largest among the historically underserved groups and this could call for revisions to the regional government allocations to the woredas – Somali region (with the exception of single city regions such as Addis Ababa, Dire Dawa and Harar) transferred the smallest share of its federal allocation – 49% - the woredas compared to average for all regions minus Addis Ababa which was 73% during the four years for our data set.
- In contrast to the predictions of some public management theories, the decentralized provision of services in Ethiopia is not increasing regional, ethnic or gender inequalities in terms of investment inputs or service outputs. Indeed, we found the opposite effect in education and health, where the incidence of PBS financed IGFT resources was disproportionately high amongst the bottom two quintiles, and for women. Hence support for decentralized services in Ethiopia appears to be an effective use of development partner resources from both efficiency and equity perspectives.
- The exception to these findings is agriculture, where the effect of expenditures was smaller for the bottom quintile. This could be related to many other factors including access to inputs, quality of land and water management issues which could not be controlled for (except for rainfall).
- Although quantitative evidence is unavailable at present, descriptive evidence implies that structured feedback sessions between citizens and service providers have helped to strengthen citizens' participation in pilot areas under ESAP1, on which basis ESAP2 is being implemented. This experience, combined with the strong recommendations of theories of governance and accountability, point to a need for continued application of social accountability tools, and seeking acceptable policy options for sustainability in the Ethiopian context. This conclusion will be verified when the results of the impact assessment of ESAP-2 are available – currently only data is from the baseline survey.
- It is difficult to overstate the difficulty of doing subnational empirical work on Ethiopia. Creating the database required for this report has required a huge amount of work and improvisation on the part of the research team. A major output of this study is the production of a standardized database of woreda-level expenditures and characteristics, which will be made public.

It is our hope that this dataset will in time become a useful tool for researchers and students elsewhere in Africa and beyond.

Introduction and Background

Country and Sector Background

1. 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 study⁴ noted that Ethiopia is making the third-fastest improvements of any country towards reaching the Millennium Development Goals (MDG). 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. This progress on basic service delivery is coupled with an impressive growth record over the past 10 years. GDP grew on average 11 percent per annum 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. Together, a sharp focus on decentralized basic service delivery, efforts to maintain equity, and rapid growth have led to overall improvements in welfare. 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.

2. These MDG, growth and poverty results spring from a long-term, concerted government commitment to pro-poor development. Building on the Sustainable Development and Poverty Reduction Program 2002-2004/5, and A Plan For Accelerated and Sustained Development to End Poverty 2005-2010 (PASDEP), the government's current development plan, the Growth and Transformation Plan (GTP), aims to achieve the Millennium Development Goals by 2015, and middle-income status for Ethiopia by 2020-2023. Ethiopia achieved the MDG-4 (Child Mortality) target earlier this year, ahead of schedule, and appears to be on track to reach the other MDGs by 2015 according the UN progress reports⁵.

3. The Constitution and legal framework commit the government to maintain the integrity and capacity of decentralized administrations down to woreda level⁶. Within Ethiopia's federal structure, central government provides un-earmarked block grants through regional governments. These in turn provide block grants to woreda administrations, which deliver decentralized services to citizens. This administrative and financial structure has provided timely, predictable financing that supports a steady and impressive increase in basic services throughout the country. This follows a long tradition of theoretical analyses of how decentralizing government could make government more responsive to diverse local needs, and more efficient in the provision of public goods (e.g. Besley and Coate 2003, Faguet 2012, Oates 1972, and Tiebout 1956, to name a few).

4. There is a need to consider whether the approach followed by the government is cost-effective within the decentralized constitutional context. Basic services are primarily the role of local governments, and therefore building local government capacity is an important element in improving basic services for the bottom 40%. Its fiscal architecture additionally makes Ethiopia a rich, promising empirical setting for investigating the effectiveness of decentralization as a tool for improving public sector outputs, in terms of both quality and distribution. The evidence that Ethiopia can offer is especially welcome in light of the inconclusive nature of the empirical evidence that has accumulated over the past four decades.

⁴ Overseas Development Institute, Millennium Development Goals Report Card: Measuring Progress Countries, September 2010.

⁵ UNICEF 2013. *Committing to Child Survival: A Promise Renewed. Progress Report 2013*, New York, UNICEF.

⁶ See Annex C for background and evolution of the modern Ethiopian Federal State

5. Consider the broadest empirical surveys: Rondinelli, Cheema and Nellis (1983) note that decentralization has usually disappointed its partisans. Most developing countries implementing decentralization experienced serious administrative problems. Although few comprehensive evaluations of the benefits and costs of decentralization efforts have been conducted, those that were attempted indicate limited success in some countries but not others. A decade and a half later, surveys by Piriou-Sall (1998), Manor (1999) and Smoke (2001) are slightly more positive, but with caveats about the strength of the evidence in decentralization's favor. Manor notes that the evidence, though extensive, is still incomplete, but ends his study with the opinion that 'while decentralization ...is no panacea, it has many virtues and is worth pursuing'. Smoke, by contrast, finds the evidence mixed and anecdotal, and asks whether there is empirical justification for pursuing decentralization at all. Given the sheer size of this literature, the lack of progress is surprising.

6. It is worth noting that more recent empirical studies, which are often technically more sophisticated as developing-country datasets have improved enormously over recent decades, are generally more positive about decentralization's potential. Five recent studies that address the link between decentralization and substantive outcomes directly and with rigorous quantitative evidence include: Escaleras and Register (Forthcoming), who find that fiscal decentralization is associated with lower natural disaster death rates, implying more effective preparation and/or responses to natural disasters by countries with decentralized governments. Clark (2009) applies regression discontinuity to a natural experiment from Britain to show that schools that opt out of the centralized educational regime – in effect decentralizing themselves – enjoy large increases in student achievement. Galiani, Gertler and Schargrodsky (2008) find that decentralization of school control from central to provincial governments in Argentina had a positive impact on student test scores. The poorest, however, did not gain, and indeed may have lost. And Barankay and Lockwood (2007) find that greater decentralization of education to Swiss cantons is associated with higher educational attainment, especially for boys. This study hopes to add empirical evidence from a low income country with large, important decentralization and public investment programs, where results are potentially significant.

Report Context and Structure

7. This report is part of a programmatic knowledge series which will include future reports which will go further on the issues covered. These reports would include among others studies based on services delivery quality in health and education based on on-going surveys as well detailed survey based impact assessment the Promotion of Basic Services (PBS) program Promotion of Basic Services (PBS) program based on multi-round surveys over the next three years, an impact assessment of the Social Accountability component of Promotion of Basic Services (PBS) program for which baseline survey has taken place and a full report is due in two years – all of these studies will further elucidate the findings in this report. There will also be a further update of this report when the results from the mini-DHS are available next year but this report is being prepared at this time to provide input to the Government's next Growth and Transformation Plan. This programmatic knowledge series complements another programmatic knowledge series in Ethiopia led by the Poverty Reduction Economic Management network which will include a poverty assessment, public expenditure reviews and address growth and employment issues.

8. This report is structured with a section describing the Promotion of Basic Services (PBS) program and inter-government fiscal transfers underlying Ethiopia's decentralized federal structure. That section will be followed by a section on study approach and then a section on the governance and accountability framework underlying the program. After that there will be a section on the

effectiveness of Ethiopia's intergovernmental transfers program (IGFT) on development results in Education, Health and Agriculture which will be followed by a section on the equity impact of the program focusing on income equity, gender equity, spatial equity and ethnic equity. That will be followed by conclusions and annexes including an annex on methodology.

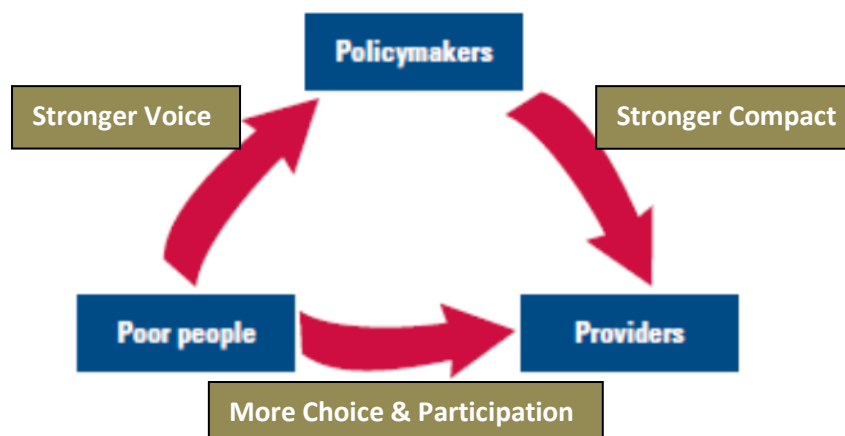
The Promotion of Basic Services Project

9. Block grants for decentralized services have been co-financed by Ethiopia's development partners through the Promotion of Basic Services (PBS) program, although the government share is larger and rising. The block grants are distributed from federal government to regional governments using a formula that adjust for population, and need based on level of development and historic lack of access to services. The funds are transmitted from the regions to woredas using regional formulas based on similar criteria. This program not only provides development partner financial support for block grants to woredas, but also supports a variety of measures designed to improve service quality as well local government capacity to manage basic services. Influenced by the accountability triangle presented in the 2004 World Development Report⁷ (Figure 1) which considers that the long route of accountability between citizens and services providers through government needs to be complemented by the short route which involved direct accountability of service providers to citizens.

10. The Ethiopia states holds service providers strictly accountable for results working through local governments where local authorities are held accountable by regional and federal levels. There is a degree of local competition for power and influence which makes local authorities responsible to results and open to feedback from citizens – thus the long route of accountability works well in Ethiopia specially because of decentralization. In addition, the short route of accountability is enforced by three elements – financial transparency and accountability, grievance redress mechanisms reporting directly to the independent Ethiopia Institution of the Ombudsman and finally structured social accountability systems providing direct citizen service provider interaction.

11. Recognizing the critical role of good information to improve development outcomes, PBS finances a range of surveys and data collection and management efforts. Capacity building efforts include financial management and procurement for local woredas, in addition to other needs based on demand.

Figure 1: The Triangle of Accountability in Service Delivery from WDR 2004



12. Woreda-level block grants primarily support locally-recruited staff in the five decentralized sectors. With some minor exceptions, woredas have very little own revenue and no other regular

⁷ World Bank, World Development Report 2004: Making Services Work for Poor People, 2003

and predictable transfers which can be used for staff. Hence total woreda spending in sectors relevant to the PBS is taken here as a proxy for block grants, which are co-financed by PBS partners and the Government⁸. Health sector spending is focused on health extension workers, education spending on teachers, agriculture spending on agriculture extension workers, roads spending on road maintenance staff, and water sector spending on recurrent costs for water systems. In agriculture, education, and health there is a one-to-one correlation between woreda-level block grant spending and agriculture extension workers, teachers, and health extension workers respectively.

Table 1: Federal Block Grants and PBS Disbursements								
	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Federal Block Grants (FBG) to the Regions (million birr)	7,071.5	9,365.0	13,532.5	16,554.8	19,555.7	25,555.8	30,576.4	35,555.3
Federal Government Expenditures (Treasury source only) (million birr)	21,856.5	26,976.2	34,717.4	41,053.8	53,063.7	67,769.6	83,470.2	89,064.2
<i>FBG as a share of Federal Gov't Expenditures</i>	<i>32.4</i>	<i>34.7</i>	<i>39.0</i>	<i>40.3</i>	<i>36.9</i>	<i>37.7</i>	<i>36.6</i>	<i>39.9</i>
PBS Donors' Contribution to FBG (million USD)	91.0	446.7	477.9	437.2	453.9	542.6	329.5	444.5
Average Exchange Rate (birr/USD)	8.6810	8.7943	9.2441	10.4205	12.8909	16.1081	17.7686	18.1947
PBS Donors' Contribution to FBG (million birr)	790.0	3,928.8	4,417.7	4,556.3	5,851.7	8,741.0	5,855.1	8,087.4
<i>PBS Donors' Contribution to FBG (in %)</i>	<i>11.2</i>	<i>42.0</i>	<i>32.6</i>	<i>27.5</i>	<i>29.9</i>	<i>34.2</i>	<i>19.1</i>	<i>22.7</i>
<i>IDA's Contribution to FBG (in %)</i>	<i>11.2</i>	<i>9.4</i>	<i>12.4</i>	<i>14.7</i>	<i>14.8</i>	<i>12.9</i>	<i>12.1</i>	<i>9.5</i>
<i>FBG as a share of Total Regional Expenditures</i>	<i>76.2</i>	<i>88.5</i>	<i>85.3</i>	<i>86.2</i>	<i>79.8</i>	<i>80.4</i>	<i>62.8</i>	<i>54.4</i>
<i>Source: Ministry of Finance and Economic Development for the data on FBG and Federal Government Expenditures, PBS Donors' for the data on PBS disbursements and National Bank of Ethiopia for exchange rate data</i>								

13. The Promotion of Basic Services Project is primary means by which the World Bank assists Ethiopia to achieve the Millennium Development Goals. At its inception in 2006, Ethiopia had just

⁸ Over a five year period starting from January 2013, the current Phase of PBS finances US\$6.2 billion in basic service block grants which are analyzed here of which the Government share is US\$3.2 billion – the rest coming from development partners.

started to register noticeable improvements in human development indicators, albeit from low absolute levels. The PBS 1 PAD stated clearly the need to maintain this nascent progress in the face of political and economic uncertainty: “These gains represent the first steps on a steep development trajectory that Ethiopia will need to sustain if it is to have a chance to meet any of the MDGs”. Seven years on, it has become obvious that Ethiopia, with the support of the World Bank and other Development Partners through the PBS, has sustained and even over-performed on all of these expectations. The current phase of PBS (Phase 3) costs US\$6.4 billion over five years, of which about half is financed by the government. Table 1 shows the evolution of Federal Block Grants (FBG) to regions from the Federal Government while Table 2 shows the evolution of Woreda Block Grants (WBG) from regions to woredas.

14. While playing a wide role across many of the eight MDGs, the PBS focuses principally on three: Achieving universal primary school education (Goal 2), Reducing child mortality (Goal 4), and Improving maternal health (Goal 5). It also has a direct impact on the eradication of extreme poverty and hunger (Goal 1), and the promotion of gender equality (Goal 3). In order to assist in these goals, the PBS mechanism channels resources to the woreda (local) level to finance recurrent expenditures in five basic-service sectors – education, health, agriculture, water and sanitation, and rural roads. Taking advantage of Ethiopia’s well-developed system of fiscal decentralization, which was well underway when the project began, has allowed PBS to utilize these existing pathways to efficiently deliver and expand services. Once at the local level, the vast majority of funds pay for the deployment of frontline development workers, where this financing has a direct association with meeting MDG targets. Health extension workers, for example, are a cadre of frontline health workers who are trained to promote healthy preventative behaviors and provide basic interventions, such as vaccinations and family planning information. This is directly associated with reducing child mortality and improving maternal health. Additional teachers are directly related to increasing the net enrollment rate in order to achieve universal primary education. Through its first two phases, PBS financed IGFTs helped to hire over 100,000 new primary school teachers, 38,000 health extension workers and 45,000 agricultural extension agents, dramatically expanding the reach of these services to those previously inaccessible.

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Tigray	457.3	556.9	797.6	941.9	1,040.0	1,426.7	1,837.8	2,265.0
Afar	126.9	119.2	191.2	247.9	278.3	371.3	405.5	481.4
Amhara	1,385.4	1,363.1	2,160.2	2,956.2	3,136.5	3,787.2	5,522.7	6,429.4
Oromia	2,056.7	2,109.8	3,070.7	4,312.9	4,401.9	5,866.5	6,957.0	8,887.9
Somali	217.8	232.0	367.2	282.0	459.3	626.9	972.3	1,123.0
Benishangul-Gumuz	100.3	124.1	148.2	167.1	216.7	293.1	452.7	488.7
SNNP	1,250.4	1,539.2	1,910.1	2,097.9	3,012.6	3,950.5	5,161.1	6,279.5
Gambella	69.4	84.2	127.8	140.1	151.3	202.1	286.9	351.0
Harari	0.0	24.2	24.2	33.9	38.3	48.8	60.1	73.7
Dire Dawa	0.0	14.4	27.8	28.3	31.7	31.8	41.4	52.2
Addis Ababa	507.2	534.9	656.9	1,187.0	1,178.9	1,447.3	1,922.9	2,581.0
All Regions	6,171.3	6,702.2	9,481.8	12,395.1	13,945.3	18,052.0	23,620.3	29,012.9
All Regions (Excluding	5,664.1	6,167.3	8,825.0	11,208.1	12,766.5	16,604.8	21,697.4	26,431.8

Addis Ababa)								
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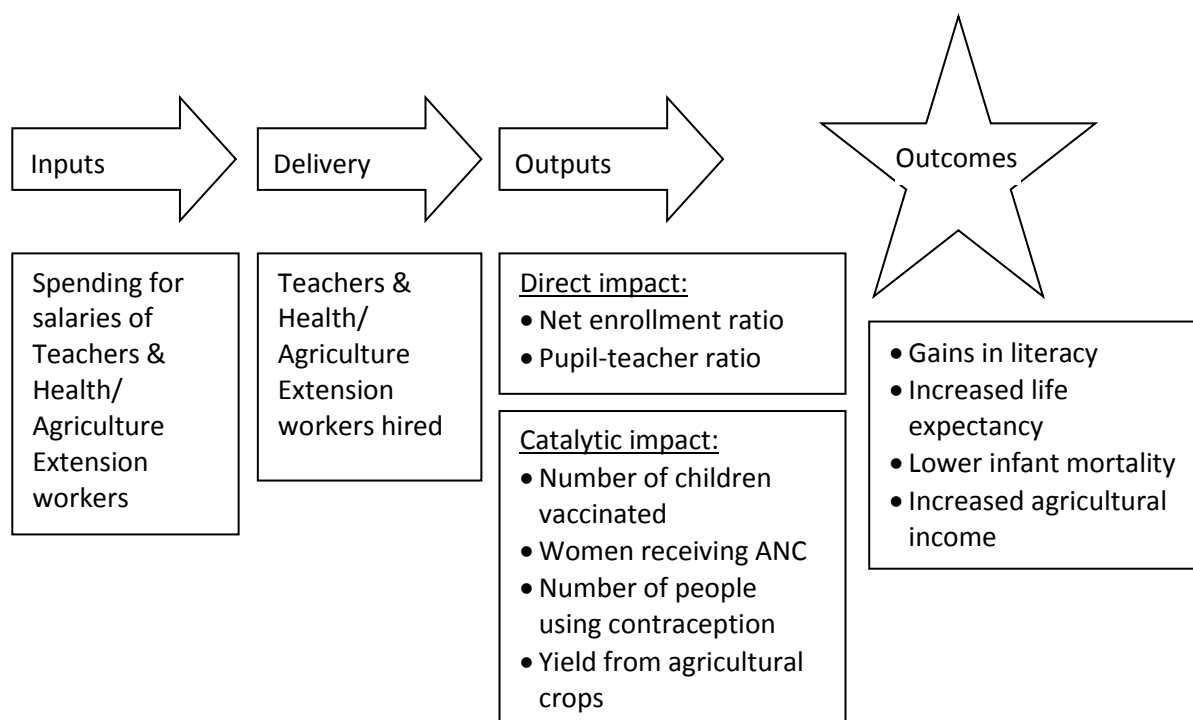
15. Despite this impressive scale of the PBS, up to now there has been no empirical analysis demonstrating the effects of project spending on the outcomes achieved. Partly this has been due to the difficulty of obtaining local-level expenditure and outcome data over time. Compiling comprehensive expenditure data through time and consolidating it into a database with output indicators in health and education (also with the same time period) has been one of this study's accomplishments. This study first addresses the data deficiency, and then provides empirical analysis on the effectiveness of Ethiopia's decentralized approach to basic service delivery.

Study Approach

Conceptual Framework

16. A primary objective of this study is to assess the effect of woreda-level expenditures for decentralized sectors on key sector outputs and *outcomes*.⁹ As noted in the previous section, there is a strong association between woreda-level spending in agriculture, education and health, and key service *outputs*, such as the numbers of agriculture extension workers, teachers and health extension workers respectively.

Figure 2: Conceptual model of the Results Chain of PBS spending



17. This study focuses on such outcomes as the net enrollment rate, rates of vaccination and contraceptive use, and agricultural yields of a variety of crops (see figure 2 for a diagrammatic representation of PBS results chain). It should be emphasized that the link between spending on staff and results cannot be one to one and service availability and use needs to be assessed as well. Unfortunately this data is not available except to a limited extent in health where the DHS data

⁹ The study does not look at quality and service delivery effectiveness issues. PBS-3 is funding service delivery indicator data collection for health and education and future studies are planned on those results.

shows that utilization of services is driven by health extension workers especially for the poor¹⁰. A secondary objective is to assess the incidence of local expenditures by income quintile in line with the Bank's new objective of shared growth targeting the bottom 40%. A third objective is to investigate possible ethnic bias in the allocation of woreda-level block grants, keeping in mind Ethiopia's constitutional objective of providing additional resources to historically underserved populations.

18. ***Caveats to note.*** It should be noted that learning materials are financed separately in education, facilities above the health center are financed separately in health, in agriculture this only include development agent spending, and road maintenance staff spending in roads. Clearly, results found in the sectors are affected by spending from other levels of government, including capital spending and non-salary recurrent costs in education. The results shown in health show the catalytic effect of health extension workers on the results and does not include the contributions of capital spending, spending on medicines etc., which are taken as given. The contribution of health extension workers appears to be extremely important especially for the poor¹¹. The results in agriculture would not be possible without the contribution of other spending both public and private, and only reflects the catalytic effective of agriculture extension workers (or development agents).

19. Another objective of this study, in line with the WDR 2004 triangle of accountability concept, is to assess PBS components designed to strengthen citizen voice as a critical element driving service improvements. Following this causal logic, the study investigates the effectiveness of Citizen Voice aspects of the program before turning to the effectiveness of the spending on outcomes.

20. One caveat should be mentioned. As always, the results presented are subject to the quality of data used. While the management information systems of the education and health systems, especially the former, are fairly reliable and improving (not least through PBS support), there still remains much room for improvement. Fortunately, our results in health and education are confirmed by national level analysis of DHS data. Our agriculture analysis used agriculture sample survey data, which is considered reliable.

Methodology

21. This study relies on a database of woreda-level recurrent expenditure and outcome information for a variety of health and education indicators at woreda level between 2008 and 2011. Also included are woreda demographic characteristics, including the population, ethnicities, rural vs. urban, and other variables drawn from the 2007 census. We use econometric modeling to assess the association of increased local spending with the expansion of basic services and outcomes, and by extension the efficiency of the PBS in meeting its development objective. The study also verifies the woreda level findings in health and education using the household data from DHS 2005 and DHS 2011 including use of limited dependent variable (primarily probit) regressions to predict impact on household behavior resulting from interactions with health extension agents.

¹⁰ Wang et. al (forthcoming) *Ethiopia Universal Health Care: Case Study*, World Bank

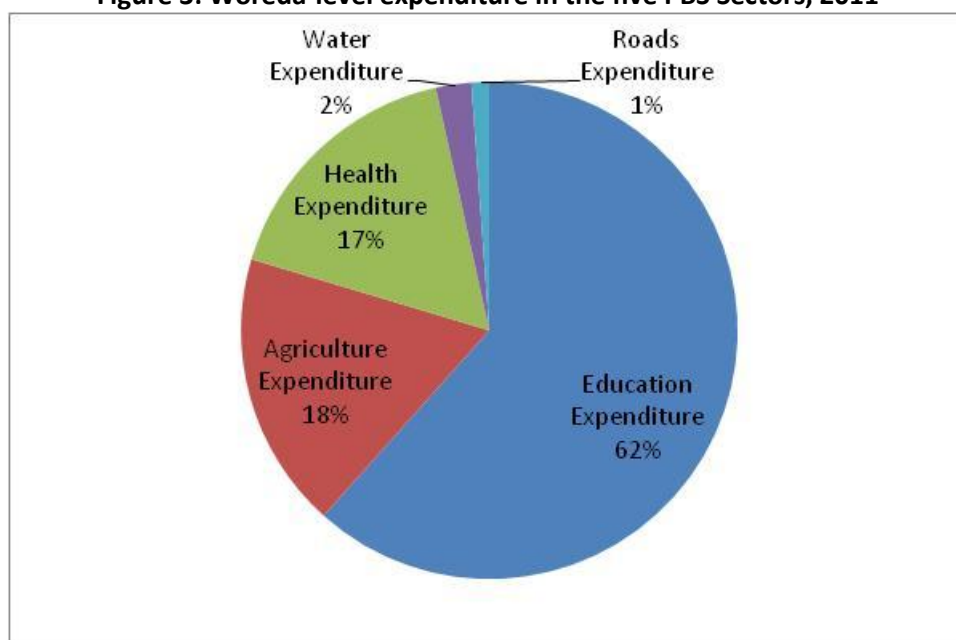
¹¹ *ibid*

22. Cross-time pooled regressions with the log of the outcome variable of interest on the left-hand side were run to evaluate the result of the log per capita sector expenditure, controlling for rural/urban percentage and ethnicity. A variable for time was also included to isolate the time series effects from other effects. Other control variables were percent rural and ethnicity of the woreda (which is a good proxy for historical lags in development). The results presented in the main text are from log-linear regressions, which we prefer because they eliminate the effects of extreme values and allow for declining returns to scale. Linear regressions and quadratic regressions were also estimated but not reported in the main report. They are in the Annex.

23. The indicators evaluated are mostly drawn from the PBS Results Framework. In those sectors for which no reliable outcome data at local level could be gathered – two different approaches are followed one for agriculture and one for water supply and roads. In agriculture, zonal level data is available for outcomes. By taking the average per capita woreda spending on agriculture as a proxy for agriculture extension workers, zonal outcome data can be used to assess the effectiveness of this spending. Data constraints are more severe for water supply and roads, forcing us to revert to desk reviews.¹²

24. It is difficult to overstate the difficulty of doing subnational empirical work on Ethiopia. As far as can be gleaned from official sources, relatively little data is collected, the data is often of poor quality, and few attempts are made to systematize the results into any obviously comparable framework. A few illustrations are telling. Fiscal data on subnational expenditures in health, education, agriculture, water, and roads were until very recently available only for EFY 2003. Their geographic identifying codes and names do not match those of census data, whose geographic codes and names vary in unpredictable but pervasive ways from fiscal data. The last census counted some 740 woredas, zones, and regions, but the fiscal dataset includes more than 850. Consolidating these two yielded a dataset of 989 subnational units, 250 more than in the census.

Figure 3: Woreda-level expenditure in the five PBS Sectors, 2011



¹² Normally, DHS has good water supply data but in the case of Ethiopia due some definitional changes the water supply data between the two rounds of DHS are not compatible. This is also true for national data as revealed in a recent census.

25. The analysis consists of three key stages. Stage I follows the approach of Faguet (2012) and Faguet and Sánchez (2013), examining the relationship between woreda-level spending in each sector and results in those sectors. Ideally we would use first differences on the outcome LHS variables. But unfortunately the few years of data we currently have available make this impractical. So instead we place levels on the LHS and in effect estimate trends.

26. Stage II conducts an incidence analysis of woreda-level spending by quintiles, using the wealth quintile breakdown from the DHS survey. The incidence analysis was done by allocating improvements in health and education outcomes to each quintile by pro-rating the expenditure increases to each quintile by the improvement in outcomes achieved for that quintile controlling for the average improvement for all groups¹³. The results indicator for education was the net enrolment rate which is directly affected by woreda recruited teachers where for health the results indicator is average of three indicators which are directly affected by locally recruited health extension workers. These are: increase use of contraception, increased rates of immunization, increased use of pre-natal care and increased use skilled birth attendants.

27. Stage III uses limited dependent variable regressions to examine the link between woreda expenditure and sectoral results for different wealth quintiles¹⁴ to estimate probabilities of households acting in a certain manner. This three stage analysis was limited to sectors where data on woreda-level results was reliable, and corresponding household survey data on health and education available. In the case of education, the third stage test was not considered necessary due the direct linkage between woreda-level spending, which is mostly for teachers, and the Net Enrolment Rate. This was needed for health because the linkage is more indirect. Woreda-level spending is on health extension workers, and therefore the link between contact with health extension workers and health sector outcomes was tested using DHS data.

28. With regard to agriculture, results (or output data) was not available at the woreda level – only at the zonal level. Incidence analysis was not possible, but the effect of agriculture extension services by land-holding quintile was analyzed. In the case of water supply, a recent national census found that the data was unreliable, and thus analysis was not carried out for this sector either nationally or locally. But as this accounts for only 2% of woreda-level expenditures, this does not really pose a problem. Finally, for roads – which account for only one percent of woreda-level expenditures – this level of in-depth analysis was not possible.

Citizen Direct Voice and Accountability

29. Ethiopia has increased the level of accountability of service providers through decentralization which allows a closer link between the service staff and citizens. This has been complemented with financial transparency, social accountability and a grievance redress mechanism.

Decentralization

30. Decentralization in Ethiopia allows for enforcement of the long route of accountability through the woreda level of government. The Woreda's are held responsible by Federal and Regional Governments for the delivery of basic services and reaching the Growth and Transformation Plan (GTP) targets in these services and woreda leadership who actually recruit and

¹³ This methodology was adopted due to the lack of data on direct use of different services by quintile. This assumes a link between woreda recruited staff and results.

¹⁴ Education and health quintiles were based on DHS quintiles while for agriculture the quintile estimates used land-size quintiles.

manage the teachers, health and agriculture extension workers. There is significant local competition for these positions and office holders are keen to reach their service delivery targets.

31. Unfortunately, woreda-level data from the pre-decentralization period are currently not available. This means that we are unable to estimate the effects of decentralization *per se*, in the sense of the transfer of expenditure and decision-making authority from upper to lower tiers of government, on financial flows, service provision, or substantive outcomes. These are the common questions about decentralization that the literature typically focuses on, which we hope to address in future reports when data permit.

32. But there are other, more micro-level questions that we can examine here. These concern the effects of woreda-level discretion and decision-making on service quality and appropriateness to local conditions. They are distinct from “big discretion” issues such as How should resources be divided between investment and expenditure? How much should be spent on schools? Hospitals? Roads? “Small discretion” questions, instead, concern issues such as On which side of a road or stream should a new school be built? How should a vaccination campaign be targeted? When and how exactly should a road be maintained? Such decisions are the bread and butter of local government. They can increase the efficiency of public services by tailoring them to highly specific local conditions and needs, thus squeezing more “bang” out of each public “buck”.

33. Such issues are relevant in Ethiopia, and our still-limited data allows us to begin to address them. Even though Ethiopia’s administrative decentralization comes with a lot of central directives, decentralization has helped increase accountability – especially of service providers to citizens. Although woredas operate under Federal guidelines, they still exercise a significant degree of “small discretion” that affects the quality of local services and local life. In Ethiopia, while the decision to allocate by sectors may be controlled due to central directives on staffing norms, the actual hiring of staff is at the woreda level. This can be most important for matters such as staff attendance (teachers, health and agriculture extension workers) because the hiring and paying authority is present near where they work. In many countries where teachers are centrally recruited and deployed – absenteeism rates tends to be very high close to 50%. The limited evidence currently available in Ethiopia shows this to be about 15%¹⁵. Similarly the same study reports that only 10.4% of respondents reported frequent absenteeism for health staff including health extension workers whose rule is within community. The study also found that 96% of respondents reporting the presence of agriculture extension workers in their kebele and 95% of them found them to be useful. Absence from work makes the delivery of services impossible while presence allows the services to be offered. This is the effect of small discretion. There is also evidence that a significant percentage of the citizenry do contact their local governments with complaints.¹⁶ The limited evidence is that decentralization does increase accountability and while this may be exercised by a limited section of the population – it can have a positive effect on service delivery quality. Finally, Ethiopia’s decentralization law also allows different ethnic/ language groups to request their own woreda and also education in their own language – the latter can help increase learning effectiveness.

¹⁵ These are based on initial results from baseline survey for Impact Assessment of PBS Social Accountability component. This includes not just absence from school but also absence from the classroom. See Kamurase a and Alibhai (2014)

¹⁶ *ibid.*

Financial Transparency and Accountability (FTA)

34. Over the last five years, the Financial Transparency and Accountability (FTA) tools designed under PBS have been rolled out and used to disclose regional and local-level budget and service delivery information. As a result, more than 90% of all woredas and city administrations across the country now post information on local budgets and service delivery targets and accomplishments publicly. This is a significant change that has revolutionized transparency, as there was no such public release of this key information before 2006. The effect of this has not been even all over the country. In many regions, woreda officials are frequently challenged by citizens whereas in other areas the effect is less. Over time this has been increasing the frequency of citizen's raising issues of budget and spending priorities with their local authorities. (see Annex C for more details).

35. A recently conducted survey¹⁷ shows that 42.5% of respondents have seen FTA templates posted in their jurisdictions, and 37% of those have discussed budget information with their woreda/city officials, while another 26% have discussed the information with other citizens. In addition to posting information, regions use radio and TV programs, brochures, t-shirts, and other innovative means of information dissemination. Budget Literacy Training (BLT) was also delivered for more than 230,000 citizens across the country in all woredas and city administrations. This has contributed to enhance the understanding of citizens on budget process and service delivery issues.

36. These efforts have helped improve citizen direct voice, with 37% of survey¹⁸ respondents indicating that woreda and city officials had sought citizens views on budgetary issues, and 43% revealing that officials had also sought the views of the people on the quality of public services. Citizens have thus started to provide feedback on budget execution and participate in monitoring project implementation. Creating linkage and synergies between FTA and Social Accountability will play a significant role in promoting transparency and accountability in the system in years to come.

Social Accountability

37. As a complement to the financial transparency and accountability results, the Social Accountability program supports civil society organizations that improve opportunities for citizens to provide feedback to local administrators and service providers. The social accountability component piloted Community Score Cards, Citizen Report Cards and Participatory Budgeting. It also promoted interface meetings between citizens and local authorities to provide feedback on service delivery. During the earlier phases of PBS, social accountability was piloted in 86 woredas. During the current phase, social accountability is being implemented in 224 woredas by a total of 49 Social Accountability Implementing Partners (SAIPs) by supporting public service providers to deliver improved quality of services in education, health, agriculture, water and sanitation, and rural roads, in response to feedback from communities and citizen groups. PBS social accountability activities are financed through a programmatic multi-donor trust fund administered by IDA, though without IDA resources. During PBS Phase 3, the program will continue the use of tools piloted in the first phase, including Community Score Cards, Citizen Report Cards, and Participatory Budgeting. Interface meetings between users and providers of services, along with woreda and kebele officials, will also continue, as will the development of agreed joint action plans monitored by joint committees of service users and providers. Other social accountability tools will also be carefully considered based on their value added, including participatory planning and budgeting, budget tracking, gender responsive budgeting, and service charters (see Annex C for more details).

¹⁷ Financial Transparency and Accountability Implementation Assessment Report, September 2013, Addis Ababa, pp34-35

¹⁸ *ibid*

38. The expansion of Social Accountability under the new phase of PBS is based on the findings of an evaluation of the pilot phase.¹⁹ This found that the social accountability program had increased citizen awareness of their rights, responsibilities, and entitlements to basic services, with over 84% of those surveyed in pilot areas responding positively. Evidence showed that basic services improved as a result of the joint service improvement plans drawn up between service providers and users. The quality of engagement between citizens and service providers also improved as a result. These findings bear out the prediction of the WDR 2004 model shown in Figure 1. Assessment was not via formal evaluation, but relied more on recapitulative data; going forward a full evaluation has been built into the design, and a baseline survey has been completed.

39. An additional policy element being explored with the government is how to sustain initiatives currently being implemented under social accountability. Initial thoughts point to a need to strengthen linkages between social accountability and FTA, an evaluation of implementation of recommendations on linkages, and an elaboration of more medium and long term choices based on those evaluations.

Grievance Redress Mechanisms (GRM)

40. A study²⁰ conducted in Ethiopia under the auspices of PBS in 2011 found that GRMs exist in several of the country's regions using different regional level mechanisms established during the past decade under the government's various programs. However, the mechanisms were set up differently and display significant variations in terms of legal underpinnings, government entity responsible, accountability, procedures, and the finality and enforcement of grievance findings.

41. PBS aims to help strengthen existing GRM offices at the regional/state level, including contributing to information and public awareness of the services they provide, delivering technical assistance to develop a common standard of grievance redress procedures, and capacity development and training for grievance officers. PBS supports the opening of GRM offices in all regions, and of Ethiopian Institution of the Ombudsman (EIO) branch offices, through dialogue and by providing technical and financial support. It is currently financing capacity building trainings and workshops conducted by the EIO for regional EIO branch offices and regional GRM officers, and supporting studies and that will aid the standardization and improvement of the GRM system across the country. It is an important contribution that supports the forum on which ordinary citizens can air their complaints.

¹⁹ IPE *Global Evaluation and Design of Social the Social Accountability Component of the Protection of Basic Services Project*, New Delhi 2010

²⁰ *Strengthening Grievance Redress Mechanisms for the Protection of Basic Services Program in Ethiopia*, September, 2011

Effectiveness of Woreda Block Grant Spending

Association between Woreda Block Spending and Results: Education

42. Over half of PBS IGFT resources channeled to local governments are used to hire primary school teachers. According to the Demographic and Health Survey, between 2005 and 2011 the primary net enrollment rate increased from 68 percent to 82 percent, and the primary completion rate rose from 34 to 49 percent. (Secondary education expenditure is split between the woreda and the region, and so has not yet been included in the analysis.) The analysis here focuses on the association between Woreda level per capita education expenditures on enrolment rates and pupil-teacher ratios. It does not consider non-salary recurrent costs in education which come from other levels of government²¹ but this may not matter since in basic education teacher costs are more than 90% of total recurrent costs. The model also considers impact of the capital costs such as school buildings which can drive enrolments. Capital expenditure is based on per capita expenditures at the regional level since most capital spending is done by that level. The data is cross time pooled data and a variable for time was also included to isolate the time series effects from other effects. Other control variables were percent rural and ethnicity of the woreda (which is a good proxy for historical lags in development). The results in Table 3 are from the log-linear regressions, which we consider to be best form because they eliminate the effects of extreme values and allow for declining returns to scale. Linear regressions and quadratic regressions were also estimated but not reported here. They are in Annex-B.

Table 3. Effect of Log of Per Capita Education Expenditure on Log of Education Outcomes

Independent Variable	Dependent Variable/ Indicator	Coefficient/(SE)	Significance
Log of Expenditure	Log of Net Enrollment Rate	0.2705 (.0281)	***
	Log of Pupil-Teacher Ratio	-0.2242 (.0203)	***
Notes: Based on Cross-time pooled dataset from 2008-2011. Standard errors given in parenthesis. Significance is defined as: *** at 1% level. Number of Observations: 2583 for NER and 2695 for PTR.			

43. The study considered two education-related indicators - Net Enrollment Rate (NER) and Pupil Teacher Ratio (PTR). These are both included in the PBS 3 Results Framework as direct objectives the project aims to improve. For both, there is a strong significant relationship with woreda-level per capita recurrent expenditure, when controlling for the effects of rural/urban percentage and ethnicity. Table 3 presents the main coefficients of interest from our regression analysis. Full results are presented in Annex B. For every additional Ethiopia Birr per capita in woreda education spending, NER increases by 0.20%. These results are all significant at the 1% level, as well as robust to changes in specification. Similar results are seen with the PTR.

²¹ For example education quality is supported under GEQIP (General Education Quality Improvement Project funded by the Government, World Bank, DFID, USAID and many others.

Association between Woreda Block Grant Spending and Results: Health

Table 4. Effect of Log of Per Capita Health Expenditure on Health Outcomes

	Indicator	Coefficient/(SE)	Significance
Log of Expenditure	Log of Penta 3 vaccinations	-0.0611 (0.0271)	**
	Log of Penta 3 vaccinations on expenditure lagged one year	0.1050 (.0370)	***
	Log of Antenatal Care	0.0784 (0.0341)	**
	Log of Contraceptive Acceptance Rate	-0.0250 (0.0404)	NS
	Log of Contraceptive Acceptance on expenditure lagged one year	0.1373 (.0487)	***
	Log of Deliveries by Skilled Birth Attendants	0.2438 (0.0732)	***

Notes: Based on cross-time pooled dataset from 2008-2011. Standard errors given in parenthesis. Significance is defined as: *** at 1% level and ** at 5% level. Number of Observations: 1,664 for Penta 3, 2,277 for ANC, 2,243 for Contraceptive acceptance rate and 2,154 for Deliveries by skilled birth attendants.

44. About twenty percent of PBS financed IGFT resources at the local level are used in the health sector, mainly for hiring frontline community health workers called health extension workers (HEWs). HEWs do not provide extensive curative services. Their main purpose is threefold: to promote behavioral change leading to the adoption of healthy lifestyle practices among members in their community; to act as a referral mechanism for complicated cases, such as difficult pregnancies or severe child malnutrition, to be brought to a Health Center for treatment by trained health professionals; and to provide periodically schedulable services, the most important among them are immunization, family planning (insertion of contraceptive implants) and antenatal care. See Box 1 for a full description of HEWs' remit. Regarding maternal health, HEWs are supposed to mobilize women to seek skilled care by "Skilled Birth Attendants". This title is reserved for nurses, health officers, trained midwives and physicians. While taking up a smaller percentage of expenditure, these positions are nonetheless funded from the local level budget.

Box 1. The 16 Health Extension Packages Delivered by HEWs:

- Disease Prevention & control (3)
 - HIV/AIDS and other sexually transmitted infections (STIs) and TB prevention and control
 - Malaria prevention and control
 - First Aid emergency measures
- Family Health (5)
 - Maternal and Child health
 - Family Planning
 - Immunization
 - Nutrition
 - Adolescent reproductive health
- Health Education and communication
- Hygiene & Environmental Sanitation (7)
 - Excreta disposal
 - Solid and liquid waste disposal
 - Water supply and safety measures
 - Food hygiene and safety measures
 - Healthy home environment
 - Control of insects and rodents
 - Personal hygiene

45. This study considered the association of expenditure on four health-related outcomes – the Penta3 vaccination rate, percentage of pregnant women who received Antenatal Care (ANC), Contraceptive Acceptance Rate (CAR), and percentage of Deliveries by Skilled Birth Attendants (DeSBA). The first two of these are included in the PBS 3 Results Framework, while the latter two were included in the Framework for PBS 2. Each is directly related to local-level health expenditure. Table 4 presents the results. As for education, the data is cross time pooled data and variable for time was also included to isolate the time series effects from other effects. Other control variables were per capita capital expenditures (at the regional level) percent rural and ethnicity of the woreda (which is a good proxy for historical lags in development). The results in Table 3 are from the log-linear regressions which we considered to be best form because it eliminates the effects of extreme values and allows for declining returns to scale. Linear regressions and quadratic regressions were also estimated but not reported here. They are in the Annex.

46. The results show that increased health expenditures by woredas improve rates of Penta 3 vaccinations, women receiving antenatal care, contraceptive use, and deliveries by SBAs. All of these results are significant at the 1% level, and all are robust to changes in specification. Again as for education, we only consider per capita woreda level spending which covers health extension workers and health center staff. Non-salary and capital costs are not covered, but clearly can also impact final results. HEWs can convince mothers to immunize their children, but the immunization must also be available; these are financed separately.

47. All of these indicators are directly related to the responsibilities of HEWs, where the majority of local level recurrent health expenditure is directed. In terms of vaccination rates, HEWs are the frontline workers meant to mobilize the community during immunization campaigns. They also are the first source for pregnant women to seek ANC services, as well as being the primary spokespeople informing the community of the importance of contraception in family planning. While not technically “skilled birth attendants”, their focus on referral of pregnancies to those professionals in health centers impacts the proportion of women who are able to give birth with a trained provider.

48. A smaller percentage of local health expenditure is directed to the health center level. By federal mandate, each of the 3,000 health centers is supposed to be staffed by one to three health officers, depending on the characteristics of the host community. Each health officer is backed up by a team of about four nurses. There is also at least one trained midwife at each health center. While each of the indicators assessed could be subject to a mixture of influences between HEWs and health center staff, the majority of the effect for all except deliveries by skilled birth attendant would be expected to come from HEWs. Deliveries by SBAs would be influenced more equally by both HEWs and health center staff.

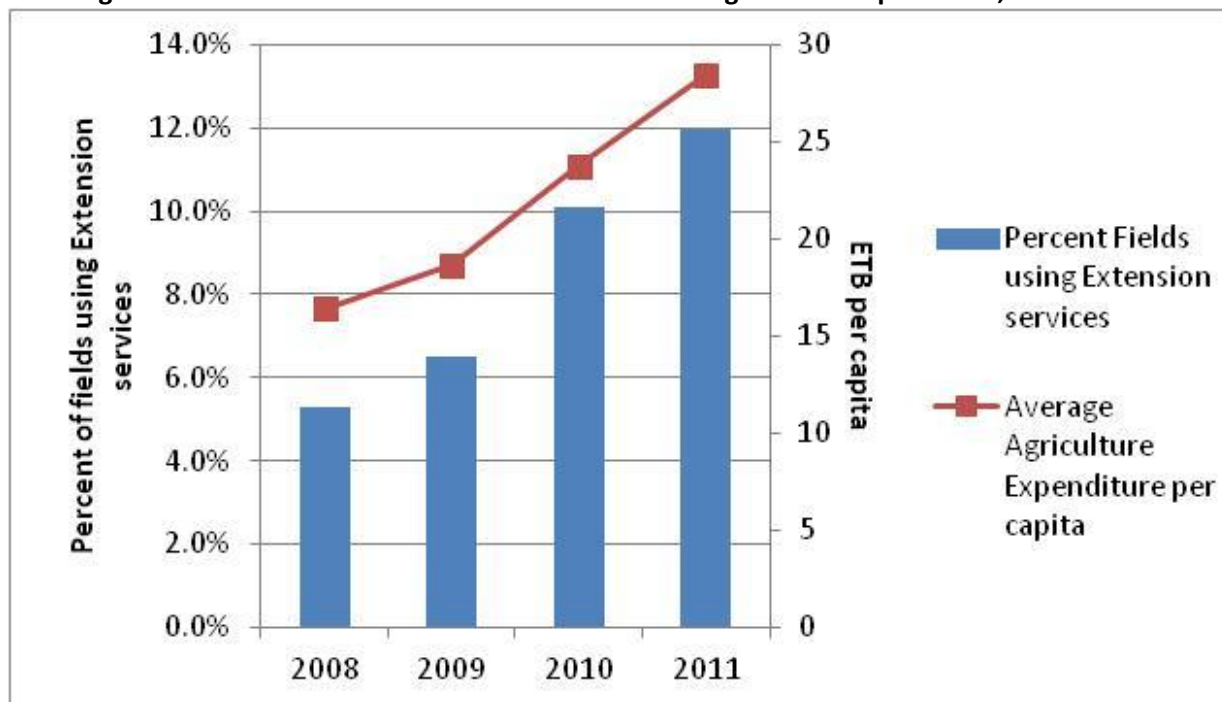
Association between Woreda Block Grant Spending and Results: Agriculture

49. Ethiopia relies heavily on agriculture. It comprises almost half of the country’s GDP and employs around 80% of its people. PBS supports the agriculture sector through financing recurrent costs at woreda level. The majority of these costs are directed towards the employment of development agents (DAs). DAs are trained workers who provide extension services by teaching community members the benefits of improved farming techniques. Such techniques can include the use of improved seeds and fertilizer, and the importance of irrigation and erosion prevention, among others. About twenty percent of PBS funds go to the agriculture sector.

50. As in health and education, agricultural expenditure increased rapidly between 2008 and 2011. Concomitant with this increase, the percentage of fields that use extension services has more than doubled. Figure 4 shows this trend for both variables. The agricultural data here, as well as

much of the data presented in the rest of this section, is collected by the Central Statistical Agency as part of its annual Agricultural Sample Survey (AGSS). This survey collects information from around 45,000 households and includes data from 500,000 fields from across Ethiopia's nine regions as well as Dire Dawa (a city state). In the analysis, the data has been aggregated at zonal level, as it is more representative of the underlying population at this level.

Figure 4: Growth in Extension Services and Woreda Agriculture Expenditure, 2008-2011



Association of Extension Services with Productivity

51. When cross-time pooled regressions are run on AGSS data between 2008 and 2011, there is a significant effect of zonal agriculture expenditure on a variety of improved farming techniques (Table 5). The regressions control for the same aspects as those for health and education – the percentage of the population that is rural, and the ethnic composition of the zone. Here the deviation in rainfall for both the current and previous year from the average rainfall between 1996 and 2011 at zonal level is also included as a predictor. In all regressions where an agricultural variable is included on the left-hand side, both the current year's as well as the previous year's deviation from average rainfall is a significant predictor. Full results are presented in Annex B.

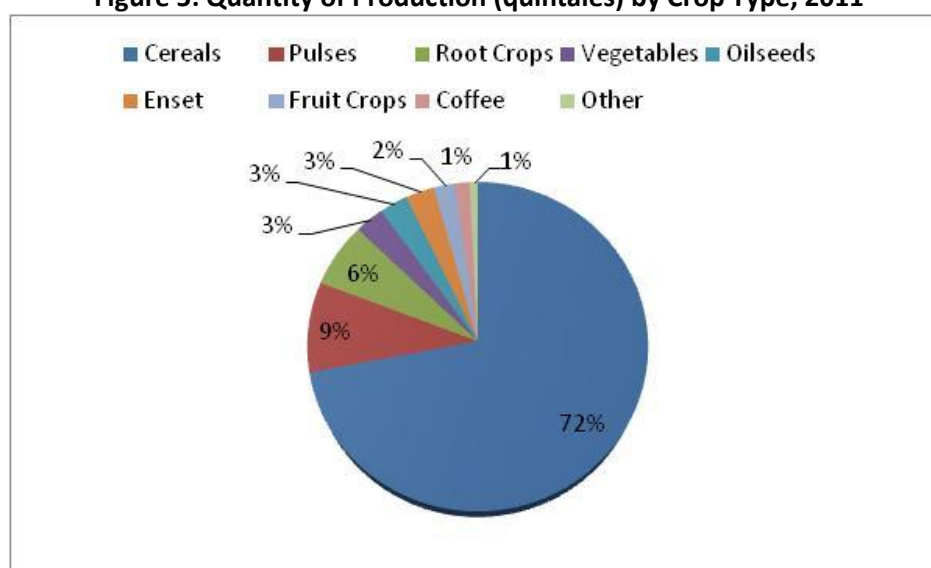
Table 5: Effect of One birr per Capita spending on Agriculture Extension workers on usage of Farmers' Extension Services

Indicator	Coefficient/(SE)	Significance
Field using Extension Services	0.0008 (0.0004)	**
Field using Improved Seeds	0.0002 (0.0001)	*
Field using Fertilizer	0.0007 (0.0003)	**

Notes: Based on Probit models. Cross-time pooled data drawn from Agricultural Sample Survey data from 2008-2011, pooled at zonal level. Number of observations: 191. Controls include current and previous years' deviations from average rainfall (calculated as the average between 1996 and 2011), zonal poverty rate, percentage of the zone's population that is rural, and the same ethnic groupings as used in the regressions above. Standard errors given in parenthesis. Significance is defined as: ** at 5% level and * at 10% level.

52. Although the effects appear to be relatively small, the results show that for several aspects of improved farming techniques there are significant and positive associations with zonal per capita agriculture spending. For every additional USD 1 per capita spent, for example, the probability that a field in that zone will benefit from extension services increases by about 0.2% (assuming an exchange rate of ETB20/USD). Specifically, usage of fertilizer and improved seeds has smaller coefficients but remain positively significant. Irrigation is one technique that is not associated with higher agriculture spending. This could be due to higher capital costs associated with irrigating fields, and would therefore be dependent more on a particular zone's expenditure in the water sector.

Figure 5: Quantity of Production (quintales) by Crop Type, 2011



Notes: Other includes hops and chat. The chart does not include sugar, which is not often grown on private land.

53. The figure (Figure 5) shows the overall basket of crops produced by Ethiopian private farmers in 2011 by production quantity, measured in quintales. Cereals, which include barley, teff, wheat, sorghum, maize, oats, and rice, make up almost three-quarters of production. A further 15% consists of pulses (e.g. beans, chick peas and lentils) and root crops (e.g. potatoes, carrots and onions). Enset, fruit crops and coffee, which are more geographically confined, represent a smaller proportion of overall production.

54. The overall objective of agriculture spending is to increase the productivity of farmers' fields. Productivity is measured by yield, which is the ratio of quintals produced per hectare of land cultivated. Cross-time pooled regressions between 2008 and 2011, with the log of yield of a specific

category of crop as the dependent variable, show strong positive relationships with log per capita recurrent agricultural spending and crop yields. The control variables were - the percentage of the population that is rural, the zone's overall poverty rate, the deviation of the zone's rainfall for the current and past year from the average, and ethnic composition (this latter variable helps account for geographical heterogeneity in crops' production).

55. Of the eight groups of crops grown in Ethiopia, four show positive and significant relationships with agricultural spending (table 6). These five represent about 85% of the production in the country. These results, combined with the effect of agriculture spending on extension services given above, show the important catalytic role PBS IGFTfunds are playing in increasing farmers' productivity levels. A caveat here is the role is only catalytic because the actual productivity increase depends on a range of the private and public spending as well as investments in infrastructure which are not included here. Full results are presented in Annex B.

Table 6: Association of Log of Per Capita spending on Agriculture Extension workers with Yield

Independent Variable	Dependent Variable/Indicator (Yield in Quintales/Hectare)	Coefficient/(SE)	Significance
<i>Log Linear Regression Estimates</i>			
Log of Expenditure	Log of Cereal yield	0.128 (0.0257)	***
	Log of Pulses Yield	0.020 (0.0455)	NS
	Log of Root Crops yield	0.320 (0.1080)	NS
	Log of Vegetables yield	0.583 (0.0674)	***
	Log of Oilseeds yield	-0.118 (0.0851)	NS
	Log of Enset Yield	2.397 (0.2315)	***
	Log of Fruits Yield	1.791 (0.1360)	***
	Log of Coffee Yield	1.267 (0.1302)	***

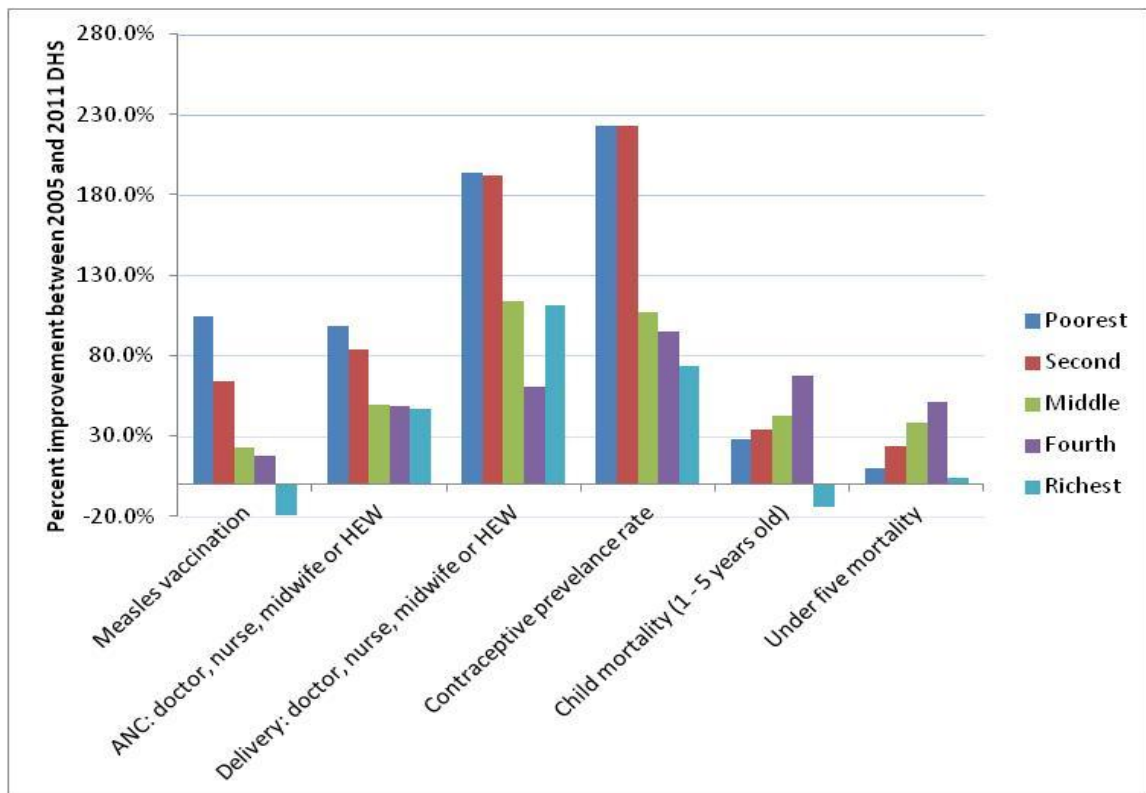
Notes: Cross-time pooled data drawn from Agricultural Sample Survey data from 2008-2011, pooled at zonal level. Number of observations: 167 for cereals, 159 for pulses, 152 for root crops, 167 for vegetables, 151 for oilseeds, 90 for enset, 162 for fruits and 137 for coffee. Standard errors given in parenthesis. Significance is defined as: *** at 1% level and NS is not significant.

EQUITY: Wealth, Gender, Geographic and Ethnic

Results of Woreda Block Grant Health Spending by Wealth Quintile

56. As mentioned above, Ethiopia has already met its MDG Goal 4 of reducing the under-five mortality rate (U5MR) by two thirds. This impressive achievement is due in no small part to rising local health budgets. These increased resources finance staff who provide the services and promote the healthy actions needed to reduce under-five mortality. The improvements seen in U5MR are seen across other health indicators as well. Conveniently, Ethiopia's Demographic and Health Survey was conducted one year prior to PBS and again after five years of implementation, allowing the study to analyze before and after changes by place of residence (urban vs rural) and wealth quintile.

Figure 6: Percent Improvement, by Rural Quintile, between 2005 and 2011 for Selected Health Indicators



Notes: Child and Under five mortality changes are multiplied by negative one to obtain overall improvement.

57. Figure 6 demonstrates that there has been substantial improvement across all six indicators examined between 2005 and 2011, and that – in the majority of cases – the bottom two quintiles have increased most. The table is broken down by rural wealth quintile.²² As the majority of PBS IGFT resources flow to rural areas, this breakdown helps to see the HEWs effect more clearly. Contraceptive rates for the bottom two quintiles rose over 200%, more than twice as much as the top two quintiles. Similarly, for measles vaccination rates, ANC, and delivery by a skilled provider, the poorest quintile showed the largest improvement. All of these outcomes are highly influenced by the presence of health workers in the field, which are financed by PBS IGFT expenditures.

58. There is also improvement for the poorest quintiles in child and under-five mortality, more so than for the richest quintile, but to a lesser degree than other quintiles. Unlike the other variables, these outcomes are particularly susceptible to factors outside the control of local level recurrent health expenditure. Food security, nutritional status, and a mother's education all play a larger role in driving these outcomes, some of which will more directly affect poorer individuals. It is telling that there are larger improvements in child mortality as opposed to under-five mortality. This is notable as it suggests that improvements in services under - through the package provided by HEWs - are more targeted to children rather than infants

²² Given the small urban population in Ethiopia, the sample size of wealth quintiles by urban residence provided too few observations to be representative.

Table 7: Predicted Probabilities for “Successful” Health Outcomes by Place of Residence and Wealth Quintile if HH was visited by an HEW in the Past Year

Residence	Quintile	Contraceptive Use	Measles vaccination	ANC with doctor, nurse midwife or HEW	Delivery by doctor, nurse midwife or HEW
Urban	Total	0.071***	0.176***	0.124***	0.110***
Rural	Total	0.094***	0.144***	0.107***	0.017**
	Poorest	0.043**	0.115***	0.148***	NS
	Second	0.078***	0.106**	0.073***	NS
	Middle	0.069***	0.123***	0.097***	NS
	Fourth	0.108***	0.181***	0.096***	0.022*
	Richest	0.127**	0.189*	0.130**	NS

Notes: Based on Probit models. Significance is defined as: *** at 1% level, ** at 5% level and * at 10% level, and NS is not significant. Number of observations varies by quintile, location and outcome. See annex for details.

59. Based on data in the 2011 DHS, it also is possible to derive estimated rates of improvements in some of these outcomes based on the contacts with HEWs (who are woreda financed). A question in the 2011 survey asked whether a “family planning specialist or HEW” had visited the household in the past year. As many of the outcomes fit nicely into a binomial response, e.g. use of contraception versus no use of contraception, it was possible run a probit model where the response to the question of an HEW visit was the right-hand side variable and the left-hand side was either the “success” or “failure” to achieve the health outcome. This assumed that any contact with an HEW would lead to multiple messages and not just family planning. The model coefficients were then used to determine predicted probabilities for the specific outcome.

60. Table 7 shows that HEWs had a significant effect across place of residence and wealth quintile: a household was more likely to achieve an outcome if they had been visited by an HEW than if they had not. This held across all outcomes for urban and rural location, and for three of the four outcomes examined by wealth quintile, despite the small sample size problems of the latter.²³ For example, the poorest rural households were 15% more likely to have a pregnant woman receive antenatal care and 12% more likely to vaccinate their child against measles if they had received a visit from an HEW than if not. Many of the outcomes are more likely the richer the household is. This is most likely due to unobserved factors, the foremost of which is probably women’s education. Full results are presented in Annex B.

Incidence Analysis of Woreda Block Grant Spending on Health and Education

61. The incidence of woreda level health and education spending by quintile was calculated based on using the results of such spending on education and health outcomes using the DHS 2006 and 2011 data. While this is not the most common form of incidence analysis where there is a reliance more on facility and service information by income group, given the data constraints this was the only method possible. It was nevertheless considered important to carry out the analysis. The basic approach was to allocate the incidence of increase in per capita expenditures in the sectors over the 2006-2011 period by quintile based on the ratio of the improvement in results in that quintile to the average improvement in results (see Annex A, equation 4). In education there was one results variable considered – net enrolment rate whereas in health the average of the following results which can be affected by health extension workers was taken – ante-natal care,

²³ The sample size for any deliveries attended by a doctor, nurse, midwife or HEW was small. There were only 1,000 births delivered by one of these practitioners, making it difficult to obtain reliable estimates when breaking them down by wealth quintile.

vaccination, contraceptive use and births assisted by skilled birth attendants. The DHS 2006 and 2011 almost provide a natural experiment on the impact of Health Extension Workers (HEWs) because the HEW system started between the two. As noted earlier, service use data from the DHS 2011 indicate that HEWs have had a proportionately very strong effect on the utilization of the above services particularly for the bottom quintiles.

62. The study found this woreda level education spending to be pro-poor, with the bottom 40% benefiting from 56% of total spending, and the top quintile benefiting from only 13% of expenditure. The incidence of per capita woreda-level spending on education was more than 2.5 times higher for the bottom quintile than for the top quintile (see Table 4). Similarly for health, the analysis shows that 63% of the incidence of woreda-level health expenditures accrued to the bottom 40%, whereas only 10% accrued to the top quintile²⁴. The benefit incidence of per capita woreda-level health spending for someone in the bottom quintile was more than times that of someone in the top quintile.

Table 8 : Incidence of Woreda-level Spending by wealth quintiles

	Bottom 40% Share	Top 20% Share	Multiple by which Bottom quintile exceed top quintile
- Education	56%	13%	2.7
- Health	63%	10%	3.4
Combined Education and Health	58%	12%	2.9

63. An on-going study²⁵ applying a standard methodology to all countries also found that primary education spending (which is mostly Woreda level) to be pro-poor while overall education spending was not pro-poor. The pro-poor result for primary (woreda level) education spending arrived at using a different methodology corroborates the use of the above less orthodox methodology. That study found that the overall incidence of all public education spending on the bottom 40% to be 33% and the figure is 34% for health. Thus, woreda level spending (PBS financed) is significantly more pro-poor than overall spending in education and health.

Catalytic Effect of Extension Services by Landholding Quintiles

64. Analysis of the catalytic effect of agriculture extension services by land-holding quintiles was carried out using agriculture sample survey data. Data was grouped by land-holding quintiles, and regression analysis was done by group. The dependent variable was the use of improved techniques, defined as improved seeds, irrigation, or fertilizer, to estimate the probability of use of improved techniques for each birr of spending on agriculture extension services. Key findings are provided in Table 9; full results are presented in Annex B.

65. Table 9 clearly shows that agriculture extension spending at woreda level increases the use of improved farming techniques for all groups. The magnitude is relatively low in the bottom quintile, which may reflect financial constraints to purchasing and investing in improved techniques. Research on development constraints for the poor finds that among other things, input prices are a major constraint for poorer farmers in adapting more productive crops²⁶.

²⁴ 35% incidence of woreda health and education expenditures was on the bottom quintile

²⁵ See Tassew Woldehanna, Eyasu Tsehaye and Ruth Hill *The Distributional Impact of Fiscal Policy in Ethiopia* (forthcoming)

²⁶ WIDE-3 Discussion Brief No.1 *Unlocking Agriculture Growth*, World Bank, AFTPR, February 2014

66.

Table 9. Effect of One Birr per Woreda spending on Agriculture Extension workers on Probability of adopting Improved Farming Techniques by Plot Size Quintile, 2011

Plot size quintile	Any improved technique
Smallest and Poorest	0.000322***
Second Smallest	0.000344***
Middle	0.000524***
Fourth	0.000667***
Largest and Richest	0.000818***

Based on Probit models. Standard errors given in parenthesis. Cross section data with 303,242 observations. Significance is defined as: *** at 1% level, ** at 5% level and * at 10% level, and NS is not significant.

Gender Equity Analysis for Woreda Block Grant Spending

67. Another question the study attempted to answer is whether there is a gender bias in PBS expenditure. On the health side, the answer is an obvious yes. Female community members, along with children, are the primary focus of HEW outreach. They benefit from a majority of the packages delivered; see Box 1 above. Another way to answer this question is to look at the association of expenditure on results data disaggregated by gender. This type of data is only available in the education sector, and then only for select indicators.

68. Table 8 provides key coefficients for **education** recurrent expenditure on primary Net Enrollment Rate and Net Intake Rate, disaggregated by gender. Full results are presented in Annex B. The coefficient for female primary school students is slightly higher than that of males for both NER and NIR, but this difference is not significant. The results show there is no negative bias against women in education expenditure, the sector where the majority of PBS IGFT funds are spent.

69. It was already established that much of **health** spending is positively associated with women's access to services, including contraception, pre-natal care, and assisted child births. Access to these services has a strong impact in reducing maternal mortality. Thus, woreda health spending can also be considered pro-women.

Table 10. Effects of Education Expenditure on NER and NIR by Gender

Independent Variable	Dependent Variable/Indicator	Coefficient/(SE)	Significance
<i>Linear Regression Equation Estimates</i>			
<i>Log Linear Regression Estimates</i>			
Log of Expenditure	NER 1-8 Male	0.115 (0.0117)	***
	NER 1-8 Female	0.158 (0.0137)	***
	NIR 1-8 Male	0.340 (0.0240)	***
	NIR 1-8 Female	0.431 (0.0269)	***
Notes: Significance is defined as: *** at 1% level, ** at 5% level and * at 10% level, and NS is not significant. Number of observations: 2,583 for NER and 2,464 for NIR.			

70. By contrast, evidence from the **agriculture** sector implies an apparent bias in outcomes which was also found in the IFPRI study²⁷. The reasons for the difference are not fully clear but could imply a bias or choice of different crops cultivated by women or different quality and size of landholdings. Table 9 shows the predicted probability of a field using improved farming techniques, disaggregated by the head's gender. Full results are presented in Annex B. About 13% of fields are from female-headed households. When the household head is a woman, the household's field is significantly less likely to benefit from extension services, though the effect is relatively small. But some caveats are in order: There will be many other factors influencing adoption of improved farming techniques, the sample size for female headed households is small, and data quality could be improved. Thus, these results only suggest that extension agents might be preferentially targeting male-owned fields. It is an issue that needs to be analyzed, and policy responses developed from such an analysis.

Table 11: Predicted Probabilities a Field using Improved Farming Techniques by Gender, 2011

Gender	Probability of field using improved technique
Male headed	0.000027***
Female headed	-0.000023***

Notes: Based on Probit models. Standard errors given in parenthesis. Significance is defined as: *** at 1% level. Number of observations: 303,242.

Federal System's Role in Helping Lagging Areas and Groups

Regionally disaggregated Analysis for Woreda Block Grant Spending

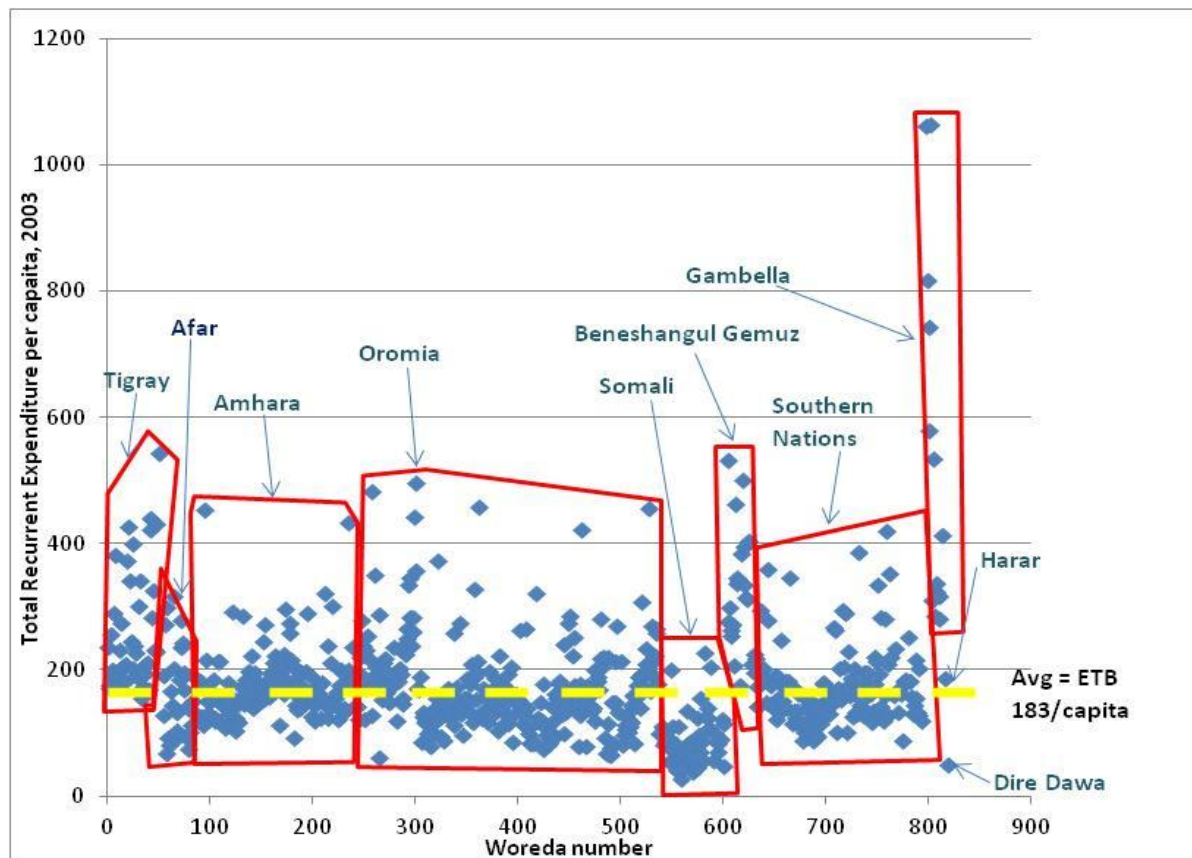
71. It is also possible to examine expenditure allocation across space. Figure 7 is a simple scatterplot of per capita subnational expenditures across Ethiopia's 718 woredas in 2010, where each woreda is represented by a dot. ID numbers assigned by region are on the x-axis, which naturally groups woredas on the chart by region, demarcated in red. The dashed yellow line shows average expenditure in Ethiopia across all woreda, at ETB 183/capita.

72. The majority of woredas are located in a band between ETB 150-250/capita. Lower outliers are clumped near this band, whereas higher outliers range as high as ETB 1000. Where are these outliers? If ETB 385/capita, 110% above the national average, is taken as the cut-off, Table 11 below shows the results.

73. Seven of the most favored woredas, including the five highest observations nationwide, are in Gambella. This means over half of the woredas in Gambella spend more than 110% the national average on the basic service sectors. Six more are in Beneshangul Gemuz, representing 30% of the woredas in that region. These are amongst the historically backwards, economically more deprived regions of Ethiopia. Another six woredas are in Tigray. By contrast, amongst the much larger regions that have dominated government and the economy both now and under the Empire, Amhara has only two woredas above ETB 385, and Oromia has six. The lowest observations appear in Amhara, Oromia and Somali. Hence in terms of expenditure per capita, the current system broadly favors Ethiopia's historically disadvantaged regions at the expense of the historically dominant ones.

²⁷ Ragasa *et. al.*(2012) ESSP Working Paper 49

Figure 7: Woreda Total Recurrent Expenditure Per Capita, 2010



74. The results shown above clearly demonstrate that the Ethiopian state has been successful in implementing its constitutional mandate of giving preference to historically underserved or vulnerable groups. At the same time the federal system also prioritizes underserved areas among the larger more established groups such as the Amhara, Oromo and Tigrayan as demonstrated in Table 12. Thus, the federal system has helped redress historical inequalities, which was the intended objective.

Table 12: Proportion of Woredas Spending 110%+ of the National Average (2010)

Region	No. woredas	No. Woredas above 110% national average	Percent of woredas above 70% national average
Tigray	46	6	13%
Afar	30	0	0%
Amhara	137	2	2%
Oromia	278	6	2%
Somali	48	0	0%
Beneshangul Gemuz	20	6	30%
SNNP	144	2	1%
Gambella	13	7	54%
Harar	1	0	0%
Dire Dawa	1	0	0%

Ethnic disaggregated Analysis for Woreda Block Grant Spending

75. Ethiopia has a complex history²⁸ that can explain some of the differences in regional levels of development. In the late 19th century, areas consisting of today's Beneshangul-Gumuz, Gambella, Southern Nations and Nationalities, Afar, Oromia and Somali regions were brought under the feudal system of the Ethiopian empire based in the highlands of north-central Ethiopia. Relations between the newly integrated areas and the historic center of the empire were troubled. Owing to the structural weakness of the center, successive Ethiopian governments did not command effective control over the peripheries. Similarly, exploitative economic policies caused visible marginalization and relative under-development. This dynamic of center-peripheral relations continued throughout the empire and socialist eras. It was not until 1991 with the ascension of the EPRDF into power that ethnic federalism took root in Ethiopia. One of the primary objectives of this new government was to reverse this policy of ethnic homogenization and to promote "equitable and broadly shared" economic growth among all regions. This involved affirmative action in terms of increased budget allocation to historically less developed regions. This preferential treatment of previously disadvantaged ethnic groups within Ethiopia is helping to create a more equitable distribution for development to take place. However, while the small lagging groups fare well, the largest lagging group the Somali do not get more resources per capita at the Woreda level that their lagging development status would require. This seems to be due to the fact that the Somali region over the four years that are covered in this analysis transferred only 49% of their federal block grant resources to woredas compared to the average of 73% for all others excluding Addis Ababa which is a large city and woredas need to do less.

Table 13: Selected Ethnicities' Influence on Total Woreda Recurrent Expenditure Per Capita²⁹

Indicator: Ethnic percentage	Coefficient/(SE)	Significance
Nuwer	141.5 (36.92)	***
Anyiwak	769.5 (43.82)	***
Gumuz	280.3 (39.03)	***
Konso	-10.5 (71.85)	NS
Somali	-66.5 (14.26)	***
Afar	-0.5 (17.56)	NS
Other Small	32.9 (12.94)	**
Historically Developed Groups (Oromo, Amhara, Gurage, Tigray)	24.9 (10.79)	**

Notes: Significance is defined as: *** at 1% level and ** at 5% level, and NS is not significant.

²⁸ For more details see Annex C.

²⁹ Ethnicities included in Other Small include: Agew Awi, Agew Hamyra, Alaba, Argoba, Ari, Arborie, Bacha, Basketo, Bench, Berta, Bodi, Brayle, Burji, Bena, Chara, Dasenech, Dawuro, Debase Gewada, Derashe, Dime, Dizi, Donga, Fedashe, Gamo, Gebato, Gedeo, Gedicho, Gidole, Goffa, Guagu, Hareri, Hamer, Irob, Kefficho, Kembata, Konta, Komo, Koro, Koyego, Kunama, Karo, Kusumie, Malie, Mao, Mareko, Mashola, Mere, Meenite, Messengo, Mejenger, Mossiye, Mursi, Murle, Nao, Nyanegatome, Oida, Qebena, Qechem, Qewama, Shekecho, Sheko, Shinasha, Silte, Surma, She, Timebaro, Tsemay, Upo, Werji, Yem, Zeyese and Zelmam. Ethnicities in Other Large include: Amara, Oromo and Tigrie.

76. Ethiopia has 91 registered linguistic groups and 93 registered ethnicities, making it impractical to include a full set of dummies for either variable, let alone both, in the econometric estimations. Most of these account for less than one percent of the total population. Also, the five largest ethnicities are heavily concentrated in their five home regions, implying that controlling for region in the regression models is substantially similar to controlling for ethnicity. Hence the econometric models focus on smaller ethnic groups, and in particular a subset of these that have been historically disadvantaged. Using demographic data from the 2007 census, the study focuses on the Nuwer (also spelled Nuer) and Anyiwak³⁰ from Gambella. We combine all other ethnicities representing less than 1.5 percent of the population into a separate grouping, called Other Small. These categories are then compared against the largest ethnicities in the country, omitted from the estimations, for example Amhara, Oromia and Tigrina, in terms of level of total woreda recurrent expenditure per capita between 2008 and 2011. Other estimations not reported here substituted linguistic dummies for ethnic dummies, with no significant change in results. Dummies for Ethiopia's twelve regions also mirror the main findings with respect to large vs. small ethnic/linguistic groups, and did not change any of the other findings substantially.

77. Table 13 provides key results from these regressions; full results are presented in Annex B. We see that ethnicities with a smaller proportion of the population receive a larger share of recurrent expenditure. This is especially true for the Anyiwak ethnic group from Gambella, who spend ETB755 more per capita than larger groups. The Nuwer receive substantially more as well – ETB127. As the positive significant coefficient for the Other Small category shows, overall small ethnic groups, who are also more likely to be at a relative historical disadvantage in terms of development, receive a significantly higher proportion of recurrent expenditure.

78. The Government of Ethiopia has made development of historically disadvantaged groups a priority. Its system of fiscal decentralization transfers funds to local governments through a formula-based system at the federal and regional levels. Of primary consideration in these formulas are relative levels of development. One of this study's main questions is: "Are woredas with a high proportion of historically disadvantaged ethnic groups favored or disfavored by fiscal transfers?" Higher distributions to such groups would indicate that PBS funding is pro-developmental.

Conclusions and Recommendations

79. The evidence implies that decentralized spending at the woreda level is both effective and pro-poor. The high correlation of spending to outputs estimates shown here imply that Ethiopia can increase such spending further to accelerate progress towards its MDGs. In agriculture, increasing access to rural finance for the poorest could help improve the pro-poor impact of PBS spending in this sector. But quadratic forms also show declining returns to scale and therefore there is a limit to what increased spending can achieve. Given the fairly large coefficients, a substantial impact can result from increasing woreda level spending on these sectors.

80. Some caveats are needed to qualify the above findings. In education, spending on materials and other quality drivers is not included in woreda block grants. Teacher salaries, which are included, are usually 80% to 90% of education spending. In health, woreda spending does not drive the results but is more catalytic to increase the effectiveness of results from system wide spending. Similarly, in agriculture development agents who are financed from the block grants play a catalytic role as well to assure effectiveness of system wide spending.

81. Some historically disadvantaged areas are significantly favored under the current regime. The distribution of expenditure across space is broadly equal amongst Ethiopia's woredas, with the

³⁰ This report uses the census spelling for Anyiwak while others spelling can also be used such as Anuak or Anyiwa etc.

striking exception of a small number of woredas concentrated in the country's most disadvantaged regions that receive significantly greater resources. By contrast, the most disadvantaged woredas in terms of resource flows are concentrated in the more developed, historically dominant regions. Four majority-Anyiwak woredas are noteworthy for receiving the most public resources of all woredas in the nation. Resource allocation by itself may not be enough to reduce historic disadvantages but they can contribute to helping these groups catch up.

82. While a lack of pre-decentralization data currently prevents us from analyzing the effects of decentralization *per se* on financial flows, sectoral outputs, or substantive outputs, our post-decentralization woreda-level data does allow us to say something about the effectiveness of woreda-controlled service provision. This appears to be favorable. In contrast to the predictions of some public management theories, the decentralized provision of services in Ethiopia is not increasing regional, ethnic or gender inequalities in terms of investment inputs or service outputs. Indeed, we found the opposite effect in education and health, where the impact of PBS financed IGFT resources was disproportionately high amongst the bottom two quintiles, and for women. Hence support for decentralized services in Ethiopia appears to be an effective use of development partner resources from both efficiency and equity perspectives.

83. The only exception to these findings is agriculture, where the impact of PBS financed IGFT expenditures was smaller for the bottom quintile. This is likely related to many factors which could include inability to pay for enhanced inputs, possibly poorer quality land and other factors.

84. Although quantitative evidence is unavailable at present, descriptive evidence implies that structured feedback sessions between citizens and service providers have helped to strengthen citizens' participation in pilot areas under ESAP1, on which basis ESAP2 is being implemented. This experience, combined with the strong recommendations of theories of governance and accountability, point to a need for continued application of social accountability tools, and seeking acceptable policy options for sustainability in the Ethiopian context.

85. It is difficult to overstate the difficulty of doing subnational empirical work on Ethiopia. Creating the database required for this report has required a huge amount of work and improvisation on the part of the research team. A major output of this study is the production of a standardized database of woreda-level expenditures and characteristics, which will be made public. The data will be combined with new data coming from ongoing data collection being financed by PBS-3 and will also be used to prepare future studies under this programmatic knowledge services task. It is our hope that this dataset will in time become a useful tool for researchers and students elsewhere in Africa and beyond.

Annex A: Detailed Methodology and Sources of Data

Methodology

1. This study relies on a database of woreda-level recurrent expenditure and outcome information for a variety of health and education indicators at woreda level between 2008 and 2011. These are the only years of data available currently, although we hope to extend the dataset over time. Also included are woreda demographic characteristics, including the population, ethnicities, rural vs. urban, and other variables drawn from the 2007 census. We use econometric modeling to assess the impact of increased local spending on the expansion of basic services and outcomes, and by extension the efficiency of the PBS in meeting its development objective.
2. It is difficult to overstate the difficulty of doing subnational empirical work on Ethiopia. As far as can be gleaned from official sources, relatively little data is collected, the data is often of poor quality, and few attempts are made to systematize the results into any obviously comparable framework. A few illustrations are telling. Fiscal data on subnational expenditures in health, education, agriculture, water, and roads were until very recently available only for EFY 2003. Their geographic identifying codes and names do not match those of census data, whose geographic codes and names vary in unpredictable but pervasive ways from fiscal data. The last census counted some 740 woredas, zones, and regions, but the fiscal dataset includes more than 850. Consolidating these two yielded a dataset of 989 subnational units, 250 more than in the census. Many woredas are listed under the same name, and geographic codes in both data sets are not unique. Missing data abounds.
3. Creating the database required for this report has required a huge amount of work and improvisation on the part of the team undertaking the empirical analysis. A major output of this study is the production of a standardized database of woreda-level expenditures and characteristics, which will be made public. It is our hope that this dataset will in time become a useful tool for researchers and students elsewhere in Africa and beyond.
4. Cross-time pooled regressions with the outcome variable of interest on the left-hand side were run to evaluate the impact of per capita sector expenditure, controlling for rural/urban percentage and ethnicity, over the four years. The outcome indicators evaluated are mostly drawn from the PBS Results Framework. In those sectors for which no reliable outcome data at local level could be gathered – two different approaches are followed one for agriculture and one for water supply and roads. In agriculture, zonal level data is available for outcomes. By taking the average per capita woreda spending on agriculture as a proxy for services offered by agriculture extension workers, zonal outcome data can be used to assess the effectiveness of this spending. Data constraints are more severe for water supply and roads, forcing us to revert to desk reviews. But water supply and roads expenditure only account for 3% of total woreda-level spending; agriculture, education and health, which are fully analyzed, amount to 97% of woreda-level spending. Additionally, national surveys such as the DHS and Agriculture Sample Survey are used to complement the analysis from the woreda-level data base.
5. The analysis consists of three key stages. Stage I follows the approach of Faguet (2012) and Faguet and Sánchez (2013), examining the relationship between woreda-level spending (a proxy for service delivery as noted above in paragraphs 6 and 10) in each sector on results in those sectors. We estimate

$$\ln O_{mt} = \alpha + \zeta \ln E_{mt} + \beta R_m + \delta C_m + \eta \ln K_{mt} + \tau_t + \varepsilon_{mt} \quad (1)$$

where $\ln O$ is different outcome variables, such as the net enrollment rate or antenatal care usage, capturing key outcomes in each sector. E is yearly expenditure per capita in the relevant sector; K is capital expenditure per capita, R is the percentage of rural population in each woreda; τ is a variable for the year to control for the time series effect in this cross time pooled data set and C is a vector of demographic controls capturing the population percentage of certain historically disadvantaged ethnicities that the analysis focuses on, all indexed by woreda m and, for expenditure, by year t . “ R ” and “ C ” are taken from the census and do not change over time. The above was also estimated using the quadratic form to check for decreasing marginal returns.

$$O_{mt} = \alpha + \zeta E_{mt} + \lambda E_{mt}^2 + \beta R_m + \delta C_m + \eta K_{mt} + \tau_t + \varepsilon_{mt} \quad (2)$$

6. While Log transformations are one of the most commonly used transformations, interpreting results of an analysis with log transformed data is not straightforward. A log transformation is often useful for data which exhibit right skewness (positively skewed), and for data where the variability of residuals increases for larger values of the dependent variable. When a variable is log transformed, note that simply taking the anti-log of your parameters will not properly back transform into the original metric used. To properly back transform into the original scale it is important to understand some details about the log-normal distribution. In probability theory, a log-normal distribution is a continuous probability distribution of a random variable whose logarithm is normally distributed.³¹

7. Finally, a linear version was also tested.

$$O_{mt} = \alpha + \zeta E_{mt} + \beta R_m + \delta C_m + \eta K_{mt} + \tau_t + \varepsilon_{mt} \quad (3)$$

For all the above equations, it is expected $\delta O / \delta E \geq 0$ and $\delta O / \delta K \geq 0$. Similarly $\delta \ln O / \delta \ln E \geq 0$ (that the first partial derivatives) while in Equation (2) $\delta^2 O / \delta^2 E \leq 0$ (the second partial derivate). The expected results imply positive association of the dependent variable with the independent variable which is per capita woreda expenditures in the sector. Equation (2) also tests whether the association is positive with a declining marginal impact.

8. The form estimated in equation (2) allows us to verify if the returns to scale are declining and the form in equation (1) reduces the effect of extreme values on the results.

9. Stage II conducts an incidence analysis of woreda-level spending by quintiles, using the wealth quintile breakdown from the DHS survey. The incidence analysis was done by allocating improvements in health and education outcomes to each quintile by pro-rating the expenditure increases to each quintile by the improvement in outcomes achieved for that quintile controlling for the average improvement for all groups. That is,

$$\Delta E_i = (\Delta I_i / \Delta I) * \Delta E \quad (4)$$

³¹ This paragraph is drawn from Jing Yang *Interpreting Coefficients in Regression with Log-Transformed Variables*, *StatNews* #83, June 2012. For more details consult the newsletter which was prepared and distributed by the Cornell Statistical Consulting Unit. Information about the Cornell Statistical Consulting Unit and copies of previous newsletters can be obtained at <http://www.cscu.cornell.edu>.

where ΔE_i is the per capita increase in expenditure for quintile “i”, ΔE is the overall increase in expenditure per capita, ΔI_i is the change in outcome change for quintile “i”, and ΔI the outcome change for all quintiles. The results indicator for education was the net enrollment rate which is directly affected by woreda recruited teachers where for health the results indicator is average of three indicators which are directly affected by locally recruited health extension workers. These are: increase use of contraception, increased rates of immunization, increased use of pre-natal care and increased use skilled birth attendants. To illustrate further how this was calculated, the expenditures on health extension workers which is the main woreda level health spending is allocated to each quintile by the improvement made in health outcomes between 2006 and 2011 by that quintile controlling for the average improvement for all quintiles. This method uses changes in results to attribute the incidence of expenditures as opposed to use of facilities which is the more common way. The results here are comparable to that being done for Ethiopia as part of a global study using standard methodology³². Those results also finds that primary education which is primarily funded at the woreda level to be pro-poor.

10. Stage III examines the link between woreda expenditure and sectoral results for different wealth quintiles, using DHS household survey data and limited dependent variable estimations as follows:

$$P_{i,q} = f(\theta, \text{Constant}) \quad (5)$$

11. In equation (5), $P_{i,j}$ is the probability of improvement for household “i” in the quintile “q” and α whether the household has had contact or not with a health extension worker. θ is “yes” or “no” variable, with “yes” being coded 1 and “no” coded 0.

12. This form was estimated using a Probit limited dependent variable regression testing the following form for health:

$$P_{i,j,q} = \alpha + \rho\theta_{i,q} + \varepsilon_{mt} \quad (6)$$

where $P_{i,q}$ is whether housegold “i” in quintile “q” utilizes a particular health services measured as “1” for “yes” and “0” for “no”. $\theta_{i,q}$ is the whether or not household “i” in quintile “q” has had contact with a health extension worker with “yes” being coded 1 and “no” coded 0.

$$P_{i,q} = \alpha + \rho\zeta \ln E_{mt} + \delta \mathbf{V}_m + \varepsilon_{mt} \quad (7)$$

where $P_{i,q}$ is whether housegold “i” in quintile “q” adopts improved techniques measured as “1” for “yes” and “0” for “no”., E_{mt} is per capita expenditure on agriculture extension workers, $\mathbf{V}_{m,t}$ is a vector of control variables including rainfall.

13. This three stage analysis was limited to sectors where data on woreda-level results was reliable, and corresponding household survey data on health and education available.

14. In the case of education, the third stage test was not considered necessary due the direct linkage between woreda-level spending, which is mostly for teachers, and the Net Enrollment Rate. This was needed for health because the linkage is more indirect. Woreda-level spending is on health extension workers, and therefore the link between contact with health extension workers and health sector outcomes was tested using DHS data.

³² See Tassew Woldehanna, Eyasu Tsehaye and Ruth Hill *The Distributional Impact of Fiscal Policy in Ethiopia* (forthcoming)

15. With regard to agriculture, results (or output data) was not available at the woreda level – only at the zonal level. Incidence analysis was not possible, but the effect of agriculture extension services by land-holding quintile was analyzed. In the case of water supply, a recent national census found that the data was unreliable, and thus analysis was not carried out for this sector either nationally or locally. But as this accounts for only 2% of woreda-level expenditures, this does not really pose a problem. Finally, for roads – which account for only one percent of woreda-level expenditures – this level of in-depth analysis was not possible.

The PSIA Database

16. As mentioned in the main text, one reason an analysis of the sort undertaken here has not been undertaken until now is because of the difficulty in pulling together the various sources of data in one, multi-year, easily analyzable woreda-level database. The database that the team has constructed includes data from five ministries – Health, Education, Agriculture, Water and Energy, and Finance and Economic Development – as well as the Central Statistical Agency and the Disaster Risk Management and Food Security Sector of MoA. It also includes woreda-level poverty rates as calculated by CSA with World Bank technical assistance. As standardization of woreda codes and the transliteration of Amharic names into latin script is not yet consistent between ministries in Ethiopia, a lot of time was dedicated to aligning woredas from various sources into one consistent format. For consistency, the team used the Population and Housing Census of Ethiopia (2007) codes as its base.

17. The woreda data base includes information by year on expenditures by sector and key results by sector for health and education. The data includes woreda information on frequency of droughts, ethnicity and several other control variables. In addition, regional on per capita capital expenditures, zonal data on crop yields have been linked to the woreda level data. Moving forward, the team will update the database yearly, with each new sector’s data yearly results incorporated as they become available. Since this report has been written, the team has already incorporated the breakdown of education data by grades 1-4 and 5-8, which had not been available at the time of analysis. Similarly, the team hopes that researchers studying Ethiopia will supplement the database with data collected as part of their own research program. As time goes on, it is expected that the database will be continuously expanded, incorporating other useful sources of data. In the future, for example, the team hopes to incorporate local-level capital expenditure through time. The analysis that can be conducted using this data is a public good and should be available for researchers in Africa and elsewhere to avail themselves of.

Annex B Table: List of Variables by Administrative Level in PSIA Database			
Sector	Variable	Administrative Level	Years
Demographic	Population: total	Woreda, Zone, Region	2007
	Population: urban	Woreda, Zone, Region	2007
	Population: rural	Woreda, Zone, Region	2007
	Religion ³³	Woreda	2007
	Mother tongue ³⁴	Woreda	2007

³³ Orthodox, Protestant, Catholic, Muslim, Traditionalist and Others

³⁴ Afarigna, Agew Awinigigna, Agew Kamyryigna, Alabigna, Amarigna, Anyiwakgna, Arbogigna, Arigna, Arborigna, Bachagna, Basketigna, Benchigna, Bertagna, Bodigna, Brayligna, Burjigna, Benagna, Charigna,

Annex B Table: List of Variables by Administrative Level in PSIA Database			
Sector	Variable	Administrative Level	Years
	Ethnicity ³⁵	Woreda	2007
Expenditure	Approved recurrent budget: Agriculture, Education, Health, Water	Woreda	2008, 2009, 2010, 2011
	Adjusted recurrent budget: Agriculture, Education, Health, Water	Woreda	2008, 2009, 2010, 2011
	Annual recurrent expenditure: Agriculture, Education, Health, Water	Woreda	2008, 2009, 2010, 2011
	Over/under recurrent expenditure: Agriculture, Education, Health, Water	Woreda	2008, 2009, 2010, 2011
	Capital expenditure	Region	2008, 2009, 2010, 2011
Meteorological	Number of years of drought between 1974 and 2007	Woreda	NA
	Deviation from average rainfall between 1986 and 2011	Zone	2008, 2009, 2010, 2011
	Average rainfall between 1986 and 2011	Zone	2008, 2009, 2010, 2011
Poverty	Poverty rate	Woreda, Zone	2011
	Standard error of poverty rate	Woreda	2011
	Gini coefficient	Woreda, Zone	2011
	Depth of Poverty	Woreda, Zone	2011
	Significantly poorer than average	Woreda	2011
Water and sanitation	Safe water access	Woreda, Zone	2011
	Latrine access	Woreda, Zone	2011
	Safe water usage	Woreda, Zone	2011
	Safe water access at health facilities	Woreda, Zone	2011
	Safe water access at schools	Woreda, Zone	2011
	Any latrines at schools	Woreda, Zone	2011
	Improved latrines at schools	Woreda, Zone	2011
Education	Gross enrollment rate: grades 1-8 Total	Woreda, Zone, Region	2007, 2008, 2009, 2010,

Dasenechigna, Dawurogna, Debossigna, Derashigna, Dimegna, Dizigna, Dongigna, Demegna, Felashigna, Fedashigna, Gamogna, Gebatogna, Gedeogna, Gedichogna, Gedoligna, Goffigna, Gumuzigna, Guragiegna, Guagugna, Hadiyigna, Hareriegna, Hamerigna, Irobigna, Kefficho, Kambatigna, Kontigna, Komigna, Konsogna, Koregna, Koygogna, Koyrigna, Kunamigna, Karogna, Kusumegna, Maliegna, Maogna, Marekogna, Mashiligna, Merigna, Me'enigna, Messengogna, Mejengerigna, Mossigna, Mursyigna, Murlegna, Naogna, Nuwerigna, Nyangatomigna, Oromigna, Oydigna, Qebenigna, Qechemigna, Qewamigna, Shekacho, Shekogna, Shinashigna, Sidamigna, Shetagna, Somaligna, Surmigna, Shegna, Tigrigna, Timbarogna, Tsemayigna, Welatigna, Wergigna, Yemsagna, Zeysegna and Others

³⁵ Affar, Agew Awi, Agew Hamyra, Alaba, Amara, Anyiwak, Argoba, Ari, Arborie, Bacha, Basketo, Bench, Berta, Bodi, Brayle, Burji, Bena, Chara, Dasenech, Dawuro, Debase Gewada, Derashe, Dime, Dizi, Donga, Fedashe, Gamo, Gebato, Gedeo, Gedicho, Gidole, Goffa, Gumuz, Guragie, Guagu, Hadiya, Hareri, Hamer, Irob, Kefficho, Kembata, Konta, Komo, Konso, Koro, Koyego, Kunama, Karo, Kusumie, Malie, Mao, Mareko, Mashola, Mere, Meenite, Messengo, Mejenger, Mossiye, Mursi, Murle, Nao, Nuwer, Nyanegatome, Oromo, Oida, Qebena, Qechem, Qewama, Shekecho, Sheko, Shinasha, Sidama, Silte, Somalie, Surma, She, Tigrie, Timebaro, Tsemay, Upo, Welaita, Werji, Yem, Zeyese, Zelman, and Others

Annex B Table: List of Variables by Administrative Level in PSIA Database					
Sector	Variable	Administrative Level		Years	
				2011	
	Gross enrollment rate: grades 1-8 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 1-8 Female	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 1-4 Total	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 1-4 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 1-4 Female	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 5-8 Total	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 5-8 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Gross enrollment rate: grades 5-8 Female	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-8 Total	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-8 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-8 Female	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-4 Total	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-4 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 1-4 Female	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 5-8 Total	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,
	Net enrollment rate: grades 5-8 Male	Woreda, Region	Zone,	2007, 2009, 2011	2008, 2010,

Annex B Table: List of Variables by Administrative Level in PSIA Database				
Sector	Variable	Administrative Level	Years	
		Region	2009, 2010, 2011	
	Net enrollment rate: grades 5-8 Female	Woreda, Zone, Region	2007, 2008, 2009, 2010, 2011	
	Net intake rate: grades 1-8 Total	Woreda	2007, 2008, 2009, 2010, 2011	
	Net intake rate: grades 1-8 Male	Woreda	2007, 2008, 2009, 2010, 2011	
	Net intake rate: grades 1-8 Female	Woreda	2007, 2008, 2009, 2010, 2011	
	Apparent intake rate: grades 1-8 Total	Woreda	2007, 2008, 2009, 2010, 2011	
	Apparent intake rate: grades 1-8 Male	Woreda	2007, 2008, 2009, 2010, 2011	
	Apparent intake rate: grades 1-8 Female	Woreda	2007, 2008, 2009, 2010, 2011	
	Primary schools	Woreda	2008, 2009, 2010, 2011	
	Pupil-teacher ratio	Woreda	2007, 2008, 2009, 2010, 2011	
	Section-student ratio	Woreda	2008, 2009, 2010, 2011	
	Dropout rate: grade 1 Total	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 1 Male	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 1 Female	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 2 Total	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 2 Male	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 2 Female	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 3 Total	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 3 Male	Woreda	2007, 2008, 2009, 2010	
	Dropout rate: grade 3 Female	Woreda	2007, 2008,	

Annex B Table: List of Variables by Administrative Level in PSIA Database			
Sector	Variable	Administrative Level	Years
			2009, 2010
	Dropout rate: grade 4 Total	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 4 Male	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 4 Female	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 5 Total	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 5 Male	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 5 Female	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 6 Total	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 6 Male	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 6 Female	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 7 Total	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 7 Male	Woreda	2007, 2008, 2009, 2010
	Dropout rate: grade 7 Female	Woreda	2007, 2008, 2009, 2010
	Repetition rate: grades 1-8 Total	Woreda, Zone, Region	2007, 2008, 2009, 2010
	Repetition rate: grades 1-8 Male	Woreda, Zone, Region	2007, 2008, 2009, 2010
	Repetition rate: grades 1-8 Female	Woreda, Zone, Region	2007, 2008, 2009, 2010
Health	Number of health posts	Woreda	2011
	Number of health centers	Woreda	2011
	Contraceptive acceptance rate	Woreda	2008, 2010, 2011
	Antenatal care	Woreda	2008, 2010, 2011
	Deliveries by skilled birth attendants	Woreda	2008, 2010, 2011
	PMTCT tested	Woreda	2008, 2010, 2011
	Penta3 vaccination rate	Woreda	2008, 2010, 2011
	Measles vaccination rate	Woreda	2008, 2010, 2011
	Fully immunized rate	Woreda	2008, 2010,

Annex B Table: List of Variables by Administrative Level in PSIA Database			
Sector	Variable	Administrative Level	Years
			2011
	TB detection rate	Woreda	2008, 2010, 2011
	TB treatment rate	Woreda	2010, 2011
	TB cure rate	Woreda	2010, 2011
Agriculture	Total cultivatable area (hectares)	Zone	2008, 2009, 2010, 2011
	Total production (quintales)	Zone	2008, 2009, 2010, 2011
	Number of fields	Zone	2008, 2009, 2010, 2011
	Source of irrigation ³⁶	Zone	2008, 2009, 2010, 2011
	Number of fields irrigated	Zone	2008, 2009, 2010, 2011
	Number of fields using extension services	Zone	2008, 2009, 2010, 2011
	Number of fields using fertilizer	Zone	2008, 2009, 2010, 2011
	Number of fields using improved seeds	Zone	2008, 2009, 2010, 2011
	Cereals ³⁷ : area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Cereals: production (quintales)	Zone	2008, 2009, 2010, 2011
	Pulses: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Pulses: production (quintales)	Zone	2008, 2009, 2010, 2011
	Oilseeds: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Oilseeds: production (quintales)	Zone	2008, 2009, 2010, 2011
	Vegetables: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Vegetables: production (quintales)	Zone	2008, 2009, 2010, 2011
	Root crops: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Root crops: production (quintales)	Zone	2008, 2009, 2010, 2011
	Fruit: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Fruit: production (quintales)	Zone	2008, 2009,

³⁶ River, lake, pond, harvesting, other

³⁷ Yield for each type of agricultural product is the quotient of its production and area.

Annex B Table: List of Variables by Administrative Level in PSIA Database			
Sector	Variable	Administrative Level	Years
			2010, 2011
	Coffee: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Coffee: production (quintales)	Zone	2008, 2009, 2010, 2011
	Chat: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Chat: production (quintales)	Zone	2008, 2009, 2010, 2011
	Enset: area cultivated (hectares)	Zone	2008, 2009, 2010, 2011
	Enset: production (quintales)	Zone	2008, 2009, 2010, 2011

Sources of Data

- ✓ Annual Agriculture Sample Surveys, Central Statistical Agency, 2008 - 2011
- ✓ Education Management Information System Administrative Data, Ministry of Education, 2007 – 2011
- ✓ Ethiopia Demographic and Health Survey, 2005 & 2011
- ✓ Health Management Information System Administrative Data, Ministry of Health, 2007 – 2011
- ✓ Poverty Map with woreda and zonal poverty rates, Central Statistical Agency, 2012
- ✓ Population and Housing Census of Ethiopia (using 10% sample), Central Statistical Agency, 2007
- ✓ Water, Sanitation and Hygiene (WASH) Census, Ministry of Water and Energy, 2012
- ✓ Woreda Annual Progress Reports, Ministry of Health, 2007 – 2011
- ✓ Woreda-level recurrent expenditures in basic services, Ministry of Finance and Economic Development, 2007 – 2011

Annex B: Detailed Regression Results

Stage 1: Education

Linear Regression

Dependent variable: Net Enrollment Rate

Independent variables:

	OLS
Yearly expenditure per capita in Education	0.045 (0.0091)
Yearly regional per capita Capital Expenditure	174.331 (1580.6640)
Percentage of rural population	-12.283* (6.7861)
Ethnicity controls	
Nuwer	-7.387 (24.1886)
Anyiwak	-11.089 (27.8701)
Gumuz	-16.048 (24.4713)
Konso	-48.182 (44.7173)
Hist. Adv.	-0.967 (7.2677)
Somalie	-62.222*** (10.1186)
Affar	77.755*** (11.4409)
Other Small	-13.178 (8.5432)
Time controls	
T zero	-3.548*** (1.2457)
T one	-4.863*** (.9834)
T two	-0.301 (0.6894)
T three	Omitted
Constant	104.449*** (9.4504)

Quadratic Regression

Dependent variable: Net Enrollment Rate

Independent variables:

	OLS
Yearly expenditure per capita in Education	0.025 (0.0223)
Yearly expenditure per capita in Education Squared	-0.00005 (0.00003)
Yearly regional per capita Capital Expenditure	55.277 (1583.27)
Percentage of rural population	-10.394 (6.8810)
Ethnicity controls	
Nuwer	-8.569 (24.1212)
Anyiwak	-13.453 (27.8232)
Gumuz	-18.196 (24.4323)
Konso	-48.041 (44.5685)
Hist. Adv.	-1.193

	(7.2454)
Somalie	-61.075***
	(10.1151)
Affar	-77.279***
	(11.4079)
Other Small	-13.489
	(8.5172)
Time controls	
T zero	-2.438*
	(1.4520)
T one	-3.952***
	(1.1585)
T two	0.087
	(0.7375)
T three	Omitted
Constant	100.071***
	(9.8686)
Log Linear Regression	
Dependent variable: Log Net Enrollment Rate	
Independent variables:	OLS
Log yearly expenditure per capita in Education	0.270***
	(0.0280)
Log yearly regional per capita Capital Expenditure	-35.212
	(23.2644)
Percentage of rural population	0.120
	(0.0830)
Ethnicity controls	
Nuwer	-0.168
	(0.2855)
Anyiwak	-0.545*
	(0.3307)
Gumuz	-0.316
	(0.2900)
Konso	-0.452
	(0.5269)
Hist. Adv.	0.026
	(0.0859)
Somalie	-0.923***
	(0.1215)
Affar	-1.619***
	(0.1357)
Other Small	-0.145
	(0.1007)
Time controls	
T zero	0.098***
	(0.0236)
T one	0.059***
	(0.0185)
T two	0.041
	(0.0111)
T three	Omitted
Constant	3.039***
	(0.1906)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Linear Regression

Dependent variable: Pupil-Teacher Ratio**Independent variables:**

	OLS
Yearly expenditure per capita in Education	-0.024 (0.0199)
Yearly regional per capita Capital Expenditure	8000.899*** (2800.951)
Percentage of rural population	15.676 (4.7215)
Ethnicity controls	
Nuwer	-3.408 (13.6348)
Anyiwak	-32.619* (17.6828)
Gumuz	-21.557 (14.7049)
Konso	-18.551 (26.2358)
Hist. Adv.	-15.588*** (4.1635)
Somalie	39.245*** (6.1928)
Affar	-26.338*** (7.1540)
Other Small	-7.671 (4.7664)
Time controls	
T zero	6.381** (2.6909)
T one	1.990 (2.1899)
T two	4.038** (1.6336)
T three	Omitted
Constant	43.085*** (8.1009)

Quadratic Regression**Dependent variable: Pupil-Teacher Ratio****Independent variables:**

	OLS
Yearly expenditure per capita in Education	-0.110*** (0.0403)
Yearly expenditure per capita in Education Squared	0.0002** (0.00006)
Yearly regional per capita Capital Expenditure	7472.043*** (2805.786)
Percentage of rural population	12.328** (4.9101)
Ethnicity controls	
Nuwer	-0.908 (13.6528)
Anyiwak	-34.057** (17.6673)
Gumuz	-17.969 (14.7562)
Konso	-18.807 (26.1966)
Hist. Adv.	-14.821*** (4.1692)
Somalie	35.936*** (6.3310)
Affar	-28.423*** (7.1947)
Other Small	-7.151 (4.7640)
Time controls	
T zero	3.476

	(2.9395)
T one	-0.288 (2.3785)
T two	3.067* (1.6798)
T three	Omitted
Constant	53.924*** (9.2286)
Log Linear Regression	
Dependent variable: Pupil-Teacher Ratio	
Independent variables:	
	OLS
Log yearly expenditure per capita in Education	-0.224*** (0.0202)
Log yearly regional per capita Capital Expenditure	85.212*** (19.7773)
Percentage of rural population	0.202*** (0.0363)
Ethnicity controls	
Nuwer	0.139 (0.1117)
Anyiwak	-0.718*** (0.1364)
Gumuz	-0.378 (0.1189)
Konso	-0.315 (0.2126)
Hist. Adv.	-0.238*** (0.0334)
Somalie	0.122** (0.0498)
Affar	-0.618*** (0.0582)
Other Small	-0.136*** (0.0386)
Time controls	
T zero	-0.033 (0.0203)
T one	-0.088*** (0.0159)
T two	0.000 (0.0106)
T three	Omitted
Constant	4.914*** (0.1251)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Stage 1: Health

Linear Regression

Dependent variable: Penta3 Vaccination Rate

Independent variables:

	OLS
Yearly expenditure per capita in Education	-0.063*** (0.0233)
Yearly regional per capita Capital Expenditure	-1447.151 (1315.3060)
Percentage of rural population	8.677*** (1.8676)
Ethnicity controls	
Nuwer	-64.966*** (6.4810)

Anyiwak	-53.901*** (8.3259)
Gumuz	-44.426*** (7.3255)
Konso	-50.230** (24.1339)
Hist. Adv.	-9.565*** (2.0970)
Somalie	-51.458*** (2.7817)
Affar	-47.295*** (3.2447)
Other Small	-13.755*** (2.4127)
Time controls	
T zero	-9.362*** (1.2211)
T one	-3.007** (1.2684)
T two	-6.915*** (0.8858)
T three	Omitted
Constant	91.697*** (3.1549)

Quadratic Regression**Dependent variable: Penta3 Vaccination Rate****Independent variables:**

OLS

Yearly expenditure per capita in Education	-0.122*** (0.0395)
Yearly expenditure per capita in Education Squared	0.0003* (0.0001)
Yearly regional per capita Capital Expenditure	-1431.498 (1315.529)
Percentage of rural population	8.152*** (1.8899)
Ethnicity controls	
Nuwer	-64.123*** (6.4999)
Anyiwak	-55.78*** (8.3911)
Gumuz	-43.354*** (7.3510)
Konso	-49.085** (24.1561)
Hist. Adv.	-9.581*** (2.0974)
Somalie	-51.333*** (2.7833)
Affar	-46.810*** (3.2567)
Other Small	-13.546*** (2.4160)
Time controls	
T zero	-9.963*** (1.2633)
T one	-3.535*** (1.2994)
T two	-7.166*** (0.8955)
T three	Omitted
Constant	93.646*** (3.3278)

Log Linear Regression**Dependent variable: Penta3 Vaccination Rate**

Independent variables:	OLS
Log yearly expenditure per capita in Education	-0.061** (0.0270)
Log yearly regional per capita Capital Expenditure	-43.230 (37.8668)
Percentage of rural population	0.182*** (0.0512)
Ethnicity controls	
Nuwer	-1.939*** (0.1816)
Anyiwak	-1.048*** (0.2274)
Gumuz	-0.701*** (0.2067)
Konso	-0.592 (0.6551)
Hist. Adv.	-0.125** (0.0607)
Somalie	-1.048*** (0.0796)
Affar	-1.076*** (0.0915)
Other Small	-0.223*** (0.0694)
Time controls	
T zero	-0.193*** (0.0416)
T one	-0.104** (0.0428)
T two	-0.142 *** (0.0296)
T three	Omitted
Constant	4.689*** (0.1379)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Linear Regression**Dependent variable: Antenatal Care**

Independent variables:	OLS
Yearly expenditure per capita in Education	0.026 (0.0313)
Yearly regional per capita Capital Expenditure	-249.548 (1711.0580)
Percentage of rural population	-10.849*** (2.4200)
Ethnicity controls	
Nuwer	-56.384*** (8.5451)
Anyiwak	-44.982*** (10.2385)
Gumuz	-59.973*** (9.1047)
Konso	-42.666 (30.2839)
Hist. Adv.	-13.034*** (2.5008)
Somalie	-41.722***

	(3.4255)
Affar	-59.354***
	(4.0043)
Other Small	-13.486***
	(2.8967)
Time controls	
T zero	-13.198***
	(1.6319)
T one	-6.886***
	(1.6671)
T two	-4.589***
	(1.2176)
T three	Omitted
Constant	96.300***
	(4.0269)
Quadratic Regression	
Dependent variable: Antenatal Care	
Independent variables:	OLS
Yearly expenditure per capita in Education	0.086
	(0.0532)
Yearly expenditure per capita in Education Squared	-0.0003
	(0.0002)
Yearly regional per capita Capital Expenditure	-238.134
	(1711.9540)
Percentage of rural population	-10.305***
	(2.4525)
Ethnicity controls	
Nuwer	-57.340***
	(8.5779)
Anyiwak	-43.322***
	(10.3145)
Gumuz	-61.090***
	(9.1462)
Konso	-43.918
	(30.3276)
Hist. Adv.	-13.080***
	(2.5029)
Somalie	-41.852***
	(3.4293)
Affar	-59.895***
	(4.0262)
Other Small	-13.747***
	(2.9050)
Time controls	
T zero	-12.542***
	(1.6965)
T one	-6.326***
	(1.7131)
T two	-4.323***
	(1.2316)
T three	Omitted
Constant	94.305***
	(4.2712)
Log Linear Regression	
Dependent variable: Antenatal Care	
Independent variables:	OLS
Log yearly expenditure per capita in Education	0.078**
	(0.0341)
Log yearly regional per capita Capital Expenditure	-36.054
	(47.8480)

Percentage of rural population	-0.011 (0.0671)
Ethnicity controls	
Nuwer	-2.787*** (0.2403)
Anyiwak	-0.807*** (0.2774)
Gumuz	-1.290*** (0.2545)
Konso	-0.579 (0.8457)
Hist. Adv.	-0.156** (0.0700)
Somalie	-0.901*** (0.0961)
Affar	-1.839*** (0.1127)
Other Small	-0.237*** (0.0813)
Time controls	
T zero	-0.232*** (0.0499)
T one	-0.150*** (0.0496)
T two	-0.124 *** (0.0350)
T three	Omitted
Constant	4.249*** (0.1706)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Linear Regression

Dependent variable: Contraceptive Acceptance rate

Independent variables:

	OLS
Yearly expenditure per capita in Education	-0.052* (0.0287)
Yearly regional per capita Capital Expenditure	-1371.507 (1583.1580)
Percentage of rural population	-11.900*** (2.2773)
Ethnicity controls	
Nuwer	-64.900*** (7.8045)
Anyiwak	-45.951*** (9.5779)
Gumuz	-57.212*** (8.3646)
Konso	-10.295 (28.6759)
Hist. Adv.	-5.363** (2.3429)
Somalie	-61.431*** (3.302)
Affar	-53.855*** (3.7462)
Other Small	-12.126***

	(2.7181)
Time controls	
T zero	-14.651*** (1.4963)
T one	-8.743*** (1.4947)
T two	-3.260*** (1.0739)
T three	Omitted
Constant	83.648*** (3.7609)
Quadratic Regression	
Dependent variable: Contraceptive Acceptance rate	
Independent variables:	OLS
Yearly expenditure per capita in Education	-0.012 (0.0493)
Yearly expenditure per capita in Education Squared	-0.00023 (0.0002)
Yearly regional per capita Capital Expenditure	-1351.924 (1583.894)
Percentage of rural population	-11.527*** (2.3092)
Ethnicity controls	
Nuwer	65.492*** (7.8317)
Anyiwak	-45.000*** (9.6311)
Gumuz	-57.931*** (8.4008)
Konso	-11.154 (28.7083)
Hist. Adv.	-5.396** (2.3444)
Somalie	-61.430*** (3.3037)
Affar	-54.207*** (3.7654)
Other Small	-12.297*** (2.7251)
Time controls	
T zero	-14.187*** (1.5666)
T one	-8.350*** (1.5451)
T two	-3.075*** (1.0896)
T three	Omitted
Constant	82.290*** (4.0021)
Log Linear Regression	
Dependent variable: Contraceptive Acceptance rate	
Independent variables:	OLS
Log yearly expenditure per capita in Education	-0.025 (0.0403)
Log yearly regional per capita Capital Expenditure	-59.955 (55.6050)
Percentage of rural population	-0.124 (0.0799)
Ethnicity controls	
Nuwer	-4.864***

	(0.2766)
Anyiwak	-1.777***
	(0.3285)
Gumuz	-1.813***
	(0.2954)
Konso	-0.111
	(1.0139)
Hist. Adv.	-0.073
	(0.0828)
Somalie	-2.786***
	(0.1169)
Affar	-2.134***
	(0.1332)
Other Small	-0.325***
	(0.0963)
Time controls	
T zero	-0.385***
	(0.0579)
T one	-0.258***
	(0.0559)
T two	-0.0938**
	(0.0385)
T three	Omitted
Constant	4.481***
	(0.2021)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Linear Regression

Dependent variable: Delivery by Skilled Birth Attendant

Independent variables:

OLS

Yearly expenditure per capita in Education	0.066***
	(0.0287)
Yearly regional per capita Capital Expenditure	328.600
	(1211.0980)
Percentage of rural population	-22.745***
	(1.7421)
Ethnicity controls	
Nuwer	-15.830***
	(5.9881)
Anyiwak	-19.264***
	(7.4207)
Gumuz	-17.340***
	(6.2405)
Konso	-3.805
	(20.9835)
Hist. Adv.	-4.326**
	(1.7805)
Somalie	-10.021***
	(2.5271)
Affar	-9.327***
	(2.8013)
Other Small	-5.143**
	(2.0568)
Time controls	
T zero	-3.308***
	(1.1900)

T one	-4.626*** (1.2333)
T two	1.012 (0.9168)
T three	Omitted
Constant	40.980*** (2.8922)
Quadratic Regression	
Dependent variable: Delivery by Skilled Birth Attendant	
Independent variables:	OLS
Yearly expenditure per capita in Education	0.068* (0.0389)
Yearly expenditure per capita in Education Squared	-0.00001 (0.0001)
Yearly regional per capita Capital Expenditure	330.274 (1211.889)
Percentage of rural population	-22.726*** (1.7685)
Ethnicity controls	
Nuwer	-15.862*** (6.0100)
Anyiwak	-19.204** (7.4858)
Gumuz	-17.374*** (6.2652)
Konso	-3.847 (21.0059)
Hist. Adv.	-4.327** (1.7815)
Somalie	-10.024*** (2.5288)
Affar	-9.344*** (2.8147)
Other Small	-5.152** (2.0616)
Time controls	
T zero	-3.285*** (1.2422)
T one	-4.607*** (1.2694)
T two	1.021 (0.9270)
T three	Omitted
Constant	40.911*** (3.0919)
Log Linear Regression	
Dependent variable: Delivery by Skilled Birth Attendant	
Independent variables:	OLS
Log yearly expenditure per capita in Education	0.243*** (0.0732)
Log yearly regional per capita Capital Expenditure	-72.666 (98.6972)
Percentage of rural population	-0.705*** (0.1456)
Ethnicity controls	
Nuwer	-2.556*** (0.5012)
Anyiwak	-2.182*** (0.5980)
Gumuz	-1.106**

		(0.5242)
	Konso	-0.223 (1.7985)
	Hist. Adv.	0.019 (0.1486)
	Somalie	-0.758*** (0.2109)
	Affar	-1.310*** (0.2378)
	Other Small	-0.186 (0.1726)
Time controls		
	T zero	-0.123 (0.1011)
	T one	-0.408*** (0.0990)
	T two	-0.000 (0.0700)
	T three	Omitted
	Constant	2.477*** (0.3672)

Probit regressions with robust standard errors in parentheses; Predicted probabilities with unconditional standard errors in parentheses.

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Measles Vaccination Rate

Independent variable: Visit by Health Extension Worker by Wealth Quintile

Quintile		Probit	Predicted Probability
Poorest	Visit	0.328*** (0.1108)	0.121*** (0.0403)
	Constant	-0.429*** (0.0474)	
Second	Visit	0.274** (0.1119)	0.105** (0.0424)
	Constant	-0.305*** (0.0517)	
Middle	Visit	0.318*** (0.1213)	0.123*** (0.0463)
	Constant	-0.259*** (0.0537)	
Fourth	Visit	0.464*** (0.1215)	0.181*** (0.0455)
	Constant	-0.177*** (0.0601)	
Richest	Visit	0.489* (0.2666)	0.188* (0.0984)
	Constant	0.041 (0.1213)	

Probit regressions with robust standard errors in parentheses; Predicted probabilities with unconditional standard errors in parentheses.

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Antenatal Care

Independent variable: Visit by Health Extension Worker by Wealth Quintile

Quintile		Probit	Predicted Probability
Poorest	Visit	0.543*** (0.0986)	0.148*** (0.0310)
	Constant	-1.139*** (0.0423)	
Second	Visit	0.250*** (0.0915)	0.078***

	Constant	-0.914*** (0.0427)	0.073**
Middle	Visit	0.316*** (0.0957)	0.096*** (0.0312)
	Constant	-0.886*** (0.0432)	
Fourth	Visit	0.311*** (0.0917)	0.095*** (0.0298)
	Constant	-0.874*** (0.0445)	
Richest	Visit	0.358** (0.1756)	0.130** (0.0660)
	Constant	-0.599 (0.0829)	

Probit regressions with robust standard errors in parentheses; Predicted probabilities with unconditional standard errors in parentheses.

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Delivery by Skilled Birth Attendant

Independent variable: Visit by Health Extension Worker by Wealth Quintile

Quintile		Probit	Predicted Probability
Poorest	Visit	0.227 (0.1959)	0.010 (0.0103)
	Constant	-2.208*** (0.0860)	
Second	Visit	0.236 (0.0954)	0.078*** (0.0227)
	Constant	-1.057*** (0.0448)	
Middle	Visit	0.266*** (0.1005)	0.069*** (0.0259)
	Constant	-0.964*** (0.0447)	
Fourth	Visit	0.399*** (0.0961)	0.108*** (0.0257)
	Constant	-0.954*** (0.0468)	
Richest	Visit	0.394** (0.1821)	0.126** (0.0574)
	Constant	-0.723*** (0.0842)	

Probit regressions with robust standard errors in parentheses; Predicted probabilities with unconditional standard errors in parentheses.

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Stage 1: Agriculture

Log Linear Regression

Dependent variable: Cereal Yield

Independent variables:

	OLS
Log yearly expenditure per capita in Agriculture	0.128*** (0.0489)
Percentage of rural population	-0.414* (0.2205)
Rainfall controls	
Average rainfall	0.000 (0.0008)
Deviation from average rainfall	0.001** (0.0007)

Deviation from average rainfall (lagged)	0.002*** (0.0007)
Regional dummies	
Tigray	4.576 (9.0103)
Afar	3.544 (8.5370)
Amhara	3.522 (8.9863)
Oromia	3.951 (8.9503)
Somali	11.307 (9.2046)
Beneshangul Gemuz	17.258 (18.0467)
SNNP	3.502 (8.9883)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	0.000 (0.0009)
Afar x Avg RF	Omitted
Amhara x Avg RF	0.000 (0.0009)
Oromia x Avg RF	0.000 (0.0008)
Somali x Avg RF	-0.010*** (0.0027)
Beneshangul Gemuz x Avg RF	-0.011 (0.0128)
SNNP x Avg RF	0.000 (0.0008)
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	-0.020 (0.0182)
Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.003 (0.0058)
Oromia x Poverty rate	0.002 (0.0063)
Somali x Poverty rate	-0.078*** (0.0200)
Beneshangul Gemuz x Poverty rate	-0.036 (0.0438)
SNNP x Poverty rate	0.000 (0.0025)
Gambella x Poverty rate	0.102 (0.2498)
Constant	-1.510 (8.9315)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Pulses Yield

Independent variables:

	OLS
Log yearly expenditure per capita in Agriculture	-0.020

	(0.0645)
Percentage of rural population	0.105
	(0.2456)
Rainfall controls	
Average rainfall	0.001
	(0.0014)
Deviation from average rainfall	0.001
	(0.0010)
Deviation from average rainfall (lagged)	0.001
	(0.0010)
Regional dummies	
Tigray	3.165
	(2.126)
Afar	0.918
	(1.1132)
Amhara	2.115
	(1.9126)
Oromia	3.184*
	(1.8845)
Somali	3.569
	(3.0569)
Beneshangul Gemuz	39.151* (20.4730)
SNNP	2.462
	(1.9117)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	-0.001
	(0.0015)
Afar x Avg RF	Omitted
Amhara x Avg RF	0.000
	(0.0014)
Oromia x Avg RF	-0.001
	(0.0014)
Somali x Avg RF	-0.002
	(0.0036)
Beneshangul Gemuz x Avg RF	-0.030*
	(0.0166)
SNNP x Avg RF	-0.001
	(0.0014)
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	-0.012
	(0.0196)
Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.008
	(0.0063)
Oromia x Poverty rate	-0.010
	(0.0070)
Somali x Poverty rate	-0.027
	(0.0265)
Beneshangul Gemuz x Poverty rate	-0.126**
	(0.0563)
SNNP x Poverty rate	0.002
	(0.0027)
Gambella x Poverty rate	Omitted
Constant	-0.213
	(1.8785)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
 *, **, *** = coefficients significant at the 10%, 5% and 1% levels
 Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Root Crop Yield

Independent variables:	OLS
Log yearly expenditure per capita in Agriculture	0.320 (0.2266)
Percentage of rural population	-0.082 (0.7218)
Rainfall controls	
Average rainfall	0.000 (0.0032)
Deviation from average rainfall	0.002 (0.0039)
Deviation from average rainfall (lagged)	0.010 (0.0039)
Regional dummies	
Tigray	0.739 (5.2598)
Afar	Omitted
Amhara	0.314 (4.4270)
Oromia	0.579 (4.4138)
Somali	-1.041 (5.5139)
Beneshangul Gemuz	4.842 (43.2237)
SNNP	0.626 (4.4447)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	0.000 (0.0036)
Afar x Avg RF	Omitted
Amhara x Avg RF	0.000 (0.0033)
Oromia x Avg RF	0.000 (0.0033)
Somali x Avg RF	0.003 (0.0069)
Beneshangul Gemuz x Avg RF	-0.003 (0.0351)
SNNP x Avg RF	0.000 (0.0033)
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	0.012 (0.0618)
Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.008 (0.0170)
Oromia x Poverty rate	-0.009 (0.0211)
Somali x Poverty rate	Omitted

Beneshangul Gemuz x Poverty rate	-0.006 (0.1203)
SNNP x Poverty rate	-0.016** (0.0074)
Gambella x Poverty rate	Omitted
Constant	2.431 (4.5185)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels
Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Vegetable Yield

Independent variables:

OLS

Log yearly expenditure per capita in Agriculture	0.582*** (0.1330)
Percentage of rural population	-0.110 (0.5548)
Rainfall controls	
Average rainfall	0.001 (0.0021)
Deviation from average rainfall	0.001 (0.0020)
Deviation from average rainfall (lagged)	-0.003 (0.0021)
Regional dummies	
Tigray	32.703 (22.4893)
Afar	34.322 (22.5041)
Amhara	32.568 (22.4326)
Oromia	33.773 (22.3465)
Somali	10.227 (22.9840)
Beneshangul Gemuz	35.983 (43.4964)
SNNP	31.791 (22.4365)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	-0.002 (0.0024)
Afar x Avg RF	-0.005 (0.0042)
Amhara x Avg RF	-0.002 (0.0022)
Oromia x Avg RF	-0.002 (0.0021)
Somali x Avg RF	0.031*** (0.0067)
Beneshangul Gemuz x Avg RF	-0.005 (0.0306)
SNNP x Avg RF	0.001 (0.0021)
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	0.004 (0.0618)

Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.003 (0.0145)
Oromia x Poverty rate	-0.034** (0.0159)
Somali x Poverty rate	0.185*** (0.0490)
Beneshangul Gemuz x Poverty rate	-0.036 (0.1049)
SNNP x Poverty rate	-0.004 (0.0064)
Gambella x Poverty rate	0.919 (0.6237)
Constant	-29.575 (22.3062)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;

* **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Oil seeds Yield

Independent variables:

	OLS
Log yearly expenditure per capita in Agriculture	-0.118 (0.1899)
Percentage of rural population	-0.229 (0.6220)
Rainfall controls	
Average rainfall	-0.008*** (0.0024)
Deviation from average rainfall	-0.001 (0.0034)
Deviation from average rainfall (lagged)	-0.001 (0.0036)
Regional dummies	
Tigray	-43.523* (25.2816)
Afar	-38.156 (24.0540)
Amhara	-42.608* (25.2609)
Oromia	-42.904* (25.1993)
Somali	-41.315* (24.3306)
Beneshangul Gemuz	-52.981 (44.3822)
SNNP	-44.061* (25.2585)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	0.008*** (0.0027)
Afar x Avg RF	Omitted
Amhara x Avg RF	0.008*** (0.0025)
Oromia x Avg RF	0.008*** (0.0025)
Somali x Avg RF	Omitted
Beneshangul Gemuz x Avg RF	0.017*** (0.0025)

SNNP x Avg RF	0.009*** (0.0025)
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	0.017 (0.0450)
Afar x Poverty rate	Omitted
Amhara x Poverty rate	0.001 (0.0144)
Oromia x Poverty rate	0.007 (0.0186)
Somali x Poverty rate	Omitted
Beneshangul Gemuz x Poverty rate	0.012 (0.1041)
SNNP x Poverty rate	0.000 (0.7084)
Gambella x Poverty rate	-1.044* (0.7084)
Constant	45.731* (25.1903)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Enset Yield

Independent variables:	OLS
Log yearly expenditure per capita in Agriculture	2.397*** (0.5766)
Percentage of rural population	-1.091 (1.7449)
Rainfall controls	
Average rainfall	0.000 (0.0011)
Deviation from average rainfall	0.010 (0.0168)
Deviation from average rainfall (lagged)	0.068*** (0.0157)
Regional dummies	
Tigray	Omitted
Afar	Omitted
Amhara	Omitted
Oromia	8.654*** (3.0691)
Somali	Omitted
Beneshangul Gemuz	Omitted
SNNP	1.357 (1.4055)
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	Omitted
Afar x Avg RF	Omitted
Amhara x Avg RF	Omitted
Oromia x Avg RF	-0.005*** (0.0016)
Somali x Avg RF	Omitted
Beneshangul Gemuz x Avg RF	Omitted
SNNP x Avg RF	Omitted
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	Omitted

Afar x Poverty rate	Omitted
Amhara x Poverty rate	Omitted
Oromia x Poverty rate	-0.034 (0.0527)
Somali x Poverty rate	Omitted
Beneshangul Gemuz x Poverty rate	Omitted
SNNP x Poverty rate	0.020*** (4.3094)
Gambella x Poverty rate	-1.044* (0.7084)
Constant	-13.452*** (4.3094)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Fruit Yield

Independent variables:	OLS
Log yearly expenditure per capita in Agriculture	1.790*** (0.2669)
Percentage of rural population	-0.794 (0.9149)
Rainfall controls	
Average rainfall	0.000 (0.0006)
Deviation from average rainfall	0.002 (0.0048)
Deviation from average rainfall (lagged)	0.028*** (0.0050)
Regional dummies	
Tigray	-2.459 (3.3924)
Afar	4.850* (2.8878)
Amhara	-0.309 (0.9558)
Oromia	2.933** (1.2536)
Somali	-5.032 (6.4944)
Beneshangul Gemuz	-108.598** (55.213)
SNNP	Omitted
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	0.001 (0.0019)
Afar x Avg RF	-0.009 (0.0059)
Amhara x Avg RF	0.001 (0.0013)
Oromia x Avg RF	-0.002** (0.0008)
Somali x Avg RF	0.005 (0.0090)
Beneshangul Gemuz x Avg RF	0.087* (0.0448)
SNNP x Avg RF	Omitted
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	0.002 (0.0665)

Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.023 (0.0213)
Oromia x Poverty rate	-0.019 (0.0267)
Somali x Poverty rate	0.113 (0.0727)
Beneshangul Gemuz x Poverty rate	0.288* (0.1537)
SNNP x Poverty rate	0.014 (0.0093)
Gambella x Poverty rate	Omitted
Constant	-4.019*** (1.4968)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels
Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Log Linear Regression

Dependent variable: Coffee Yield

Independent variables:

	OLS
Log yearly expenditure per capita in Agriculture	1.267*** (0.2342)
Percentage of rural population	-0.777 (0.7845)
Rainfall controls	
Average rainfall	0.000 (0.0005)
Deviation from average rainfall	-0.001 (0.0048)
Deviation from average rainfall (lagged)	0.029*** (0.0049)
Regional dummies	
Tigray	Omitted
Afar	Omitted
Amhara	-0.632 (0.8110)
Oromia	2.014* (1.0696)
Somali	1.43** (0.6380)
Beneshangul Gemuz	-18.760 (46.6977)
SNNP	Omitted
Gambella	Omitted
Regional dummies x Average rainfall	
Tigray x Avg RF	Omitted
Afar x Avg RF	Omitted
Amhara x Avg RF	0.000 (0.0011)
Oromia x Avg RF	-0.001*** (0.0007)
Somali x Avg RF	Omitted
Beneshangul Gemuz x Avg RF	0.014 (0.0379)
SNNP x Avg RF	Omitted
Gambella x Avg RF	Omitted
Regional dummies x Poverty rate	
Tigray x Poverty rate	Omitted

Afar x Poverty rate	Omitted
Amhara x Poverty rate	-0.012 (0.0180)
Oromia x Poverty rate	0.004 (0.0228)
Somali x Poverty rate	Omitted
Beneshangul Gemuz x Poverty rate	0.068 (0.1300)
SNNP x Poverty rate	0.007 (0.0082)
Gambella x Poverty rate	Omitted
Constant	-4.095*** (1.3591)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Stage 3: Agriculture

Dependent variable: Any Improved Technique, 2011

Independent variables:

	Probit	Predicted Probability
Yearly expenditure per capita in Agriculture	0.0033 (0.00029)	
Poverty rate	0.0075** (0.00295)	
Rainfall controls		
Average rainfall	-0.00078*** (0.00007)	
Deviation from average rainfall 2011	-0.00306*** (0.00046)	
Deviation from average rainfall 2010	0.0090*** (0.00043)	
Regional dummies		
Tigray	omitted	
Afar	-5.1478*** (0.58951)	
Amhara	-2.8538*** (0.13734)	
Oromia	-0.02614 (0.14042)	
Somali	-1.1050 (2.79749)	
Beneshangul Gemuz	-28.8422*** (5.38058)	
SNNP	-0.9599 (0.14272)	
Gambella	40.0622	
Regional dummies x Average rainfall	-	

Tigray x Avg RF	omitted	
Afar x Avg RF	omitted	
Amhara x Avg RF	0.0031***	(0.00007)
Oromia x Avg RF	-0.00001	(0.00007)
Somali x Avg RF	-0.0025 (0.00408)	
Beneshangul Gemuz x Avg RF	0.0234***	(0.00434)
SNNP x Avg RF	0.0005***	(0.00008)
Gambella x Avg RF	0.0022***	0.00066
Regional dummies x Poverty rate		
Tigray x Poverty rate	omitted	
Afar x Poverty rate	0.1298***	(0.01668)
Amhara x Poverty rate	-0.0027 (0.00304)	
Oromia x Poverty rate	-0.0207***	(0.00307)
Somali x Poverty rate	-0.0016 (0.02692)	
Beneshangul Gemuz x Poverty rate	0.0446***	(0.01563)
SNNP x Poverty rate	-0.0010 (0.00298)	
Gambella x Poverty rate	-1.4040	-
Quintile		
Smallest/Poorest	omitted	0.0003*** (0.00002)
Second/Poorer	0.0445***	0.0003*** (0.00003)
Middle/Middle	0.3727***	0.0005*** (0.00004)
Fourth/Richer	0.5961***	0.0006*** (0.00005)
Largest/Richest	0.8211***	0.0008*** (0.00007)
Constant	-1.7225***	(0.15902)

Gender Issues

Linear Regression

Dependent variable: Net Enrollment Rate – Male

Independent variables:

	OLS
Yearly expenditure per capita in Education	0.0438*** (0.0070)
Percentage of rural population	-7.011 (5.71317)
Ethnicity controls	
Nuwer	6.7239 (6.35115)
Anyiwak	-17.9619 (13.65227)
Gumuz	2.1839 (7.19484)
Konso	-34.8711* (19.43414)
Other Small	0.7764 (3.70825)
Constant	84.8515*** (5.20259)

Quadratic Regression

Dependent variable: Net Enrollment Rate – Male

Independent variables:	OLS
Yearly expenditure per capita in Education	0.095*** (0.0180)
Yearly expenditure per capita in Education Squared	-0.0001*** (0.00005)
Percentage of rural population	-6.474 (5.6910)
Ethnicity controls	
Nuwer	5.652 (6.4082)
Anyiwak	-11.147 (12.9711)
Gumuz	0.707 (7.0657)
Konso	-34.690* (19.6667)
Other Small	0.632 (3.6941)
Constant	81.002*** (5.2059)

Log Linear Regression**Dependent variable: Log Net Enrollment Rate – Male**

Independent variables:	OLS
Log of yearly expenditure per capita in Agriculture	0.115*** (0.0116)
Constant	3.752*** (0.0627)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Net Enrollment Rate – Female

Independent variables:	OLS
Yearly expenditure per capita in Education	0.0476*** (0.00756)
Percentage of rural population	-12.2364** (5.53352)
Ethnicity controls	
Nuwer	-10.2088*** (3.26873)
Anyiwak	-21.4472*** (12.98825)
Gumuz	-22.8067*** (8.07086)
Konso	-37.6488*** (13.07193)
Other Small	-8.2162** (3.91541)
Constant	87.8880*** (5.09835)

Quadratic Regression**Dependent variable: Net Enrollment Rate – Female**

Independent variables:	OLS
Yearly expenditure per capita in Education	0.095*** (0.0180)
Yearly expenditure per capita in Education Squared	-0.0001*** (0.00005)
Percentage of rural population	-11.682** (5.5100)
Ethnicity controls	
Nuwer	-11.325*** (3.3056)

Anyiwak	-14.655 (12.271)
Gumuz	-24.307*** (7.9683)
Konso	-37.462*** (13.3247)
Other Small	-8.355** (3.8904)
Constant	81.002*** (5.2059)

Log Linear Regression**Dependent variable: Log Net Enrollment Rate – Female**

Independent variables:	OLS
Log of yearly expenditure per capita in Agriculture	0.158*** (0.0137)
Constant	3.505*** (0.0746)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Net Intake Rate – Male

Independent variables:	OLS
Yearly expenditure per capita in Education	0.1670*** (0.01702)
Percentage of rural population	31.6473*** (5.71317)
Ethnicity controls	
Nuwer	-74.3077*** (5.43405)
Anyiwak	-95.4275*** (20.37484)
Gumuz	-54.9533*** (11.42498)
Konso	-27.4514 (22.54912)
Other Small	-3.7305 (4.52154)
Constant	43.4391*** (6.55315)

Quadratic Regression**Dependent variable: Net Intake Rate – Male**

Independent variables:	OLS
Yearly expenditure per capita in Education	0.418*** (0.0275)
Yearly expenditure per capita in Education Squared	-0.0006*** (0.00007)
Percentage of rural population	34.070*** (6.8756)
Ethnicity controls	
Nuwer	-81.015*** (4.4688)
Anyiwak	-64.507*** (11.3181)
Gumuz	-61.676*** (11.3097)
Konso	-29.614 (22.6827)
Other Small	-4.308 (4.5489)
Constant	24.648***

Log Linear Regression (6.1562)

Dependent variable: Log Net Intake Rate – Male

Independent variables: OLS

Log of yearly expenditure per capita in Agriculture	0.390*** (0.0240)
Constant	2.420*** (0.1202)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Net Intake Rate – Female

Independent variables: OLS

Yearly expenditure per capita in Education	0.16698*** (0.01642)
Percentage of rural population	0.0476*** (6.51252)
Ethnicity controls	
Nuwer	-71.7297*** (5.09329)
Anyiwak	-93.7788*** (20.3585)
Gumuz	-61.4025*** (9.81233)
Konso	-18.8002 (18.30648)
Other Small	-10.58377** (4.31694)
Constant	44.9443*** (6.10655)

Quadratic Regression

Dependent variable: Net Intake Rate – Female

Independent variables: OLS

Yearly expenditure per capita in Education	0.404*** (0.0273)
Yearly expenditure per capita in Education Squared	-0.0006*** (.00007)
Percentage of rural population	28.551*** (6.2956)
Ethnicity controls	
Nuwer	-78.070*** (4.2173)
Anyiwak	-64.674*** (11.6827)
Gumuz	-67.738*** (9.8523)
Konso	-20.859 (18.5272)
Other Small	-11.122** (4.3080)
Constant	27.221*** (5.7160)

Log Linear Regression

Dependent variable: Log Net Intake Rate – Female

Independent variables: OLS

Log of yearly expenditure per capita in Agriculture	0.430*** (.0269)
Constant	2.183*** (0.1354)

Cross-time pooled regressions with robust standard errors; standard errors in parentheses;
*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dependent variable: Any Improved Technique by gender, 2011

Independent variables:	Probit	Predicted Probability
Yearly expenditure per capita in Agriculture	0.0033 (0.00029)	
Poverty rate	0.0075** (0.00295)	
Rainfall controls		
Average rainfall	-0.00078*** (0.00007)	
Deviation from average rainfall 2011	-0.00306*** (0.00046)	
Deviation from average rainfall 2010	0.0090*** (0.00043)	
Regional dummies		
Tigray	omitted	
Afar	-5.1478*** (0.58951)	
Amhara	-2.8538*** (0.13734)	
Oromia	-0.02614 (0.14042)	
Somali	-1.1050 (2.79749)	
Beneshangul Gemuz	-28.8422*** (5.38058)	
SNNP	-0.9599 (0.14272)	
Gambella	40.0622 -	
Regional dummies x Average rainfall		
Tigray x Avg RF	omitted	
Afar x Avg RF	omitted	
Amhara x Avg RF	0.0031*** (0.00007)	
Oromia x Avg RF	-0.00001 (0.00007)	
Somali x Avg RF	-0.0025 (0.00408)	
Beneshangul Gemuz x Avg RF	0.0234*** (0.00434)	
SNNP x Avg RF	0.0005*** (0.00008)	
Gambella x Avg RF	0.0022*** 0.00066	
Regional dummies x Poverty rate		
Tigray x Poverty rate	omitted	
Afar x Poverty rate	0.1298*** (0.01668)	
Amhara x Poverty rate	-0.0027 (0.00304)	

	Oromia x Poverty rate	-0.0207*** (0.00307)	
	Somali x Poverty rate	-0.0016 (0.02692)	
	Beneshangul Gemuz x Poverty rate	0.0446*** (0.01563)	
	SNNP x Poverty rate	-0.0010 (0.00298)	
	Gambella x Poverty rate	-1.4040 -	
Sex			
	Male	omitted	0.0003*** (0.00002)
	Female	0.0445*** (0.01386)	0.0003*** (0.00003)
	Constant	-1.7225*** (0.15902)	

Probit regressions with robust standard errors in parentheses; Predicted probabilities with unconditional standard errors in parentheses.

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Dire Dawa and Hara omitted due to small scale of agriculture in these regions

Ethnicity Issues

Dependent variable: Recurrent Expenditure per capita by some historically disadvantaged ethnicities

Independent variables:

Ethnicity controls	OLS
Nuwer	126.787*** (41.8062)
Anyiwak	755.291*** (151.9472)
Other Small	19.797** (8.0311)
Constant	156.573*** (3.0163)

Cross-time pooled regressions with robu standard errors; standard errors in parentheses;

*, **, *** = coefficients significant at the 10%, 5% and 1% levels

Annex C: Financial Transparency and Social Accountability under PBS

1. At the start of PBS in 2006, donors were keen to include elements into project design meant to increase the transparency and accountability of its government-delivered services. This idea had been advocated in the 2004 World Development Report – Making Services Work for Poor People – as an effective tool to increase project effectiveness. PBS 1 included two components to that end. Component 3 - Financial Transparency and Accountability – provided about USD11million mainly to promote initiatives that disclosed budget information to the general public at local levels. It also included Component 4 – Social Accountability – which provided about USD6million for piloting innovative methods of improving citizens’ knowledge of their rights and responsibilities vis-à-vis public service delivery. Social Accountability activities were implemented through civil society organizations (CSOs) on the ground where the pilots were located.
2. Due to a lack of familiarity of FTA within the Ethiopian government at the start, activities were slow to get off the ground. However, after additional implementation support was provided, four prototypes for FTA tools were developed, validated and disseminated to regions by the end of PBS 1. These tools included laypersons’ guides understanding the budget processes and three different templates needed to disseminate budget and expenditure information at local level. Use of these tools by citizens was not achieved under PBS I, as initially envisaged, but the groundwork was laid. Also, the baseline FTA Perceptions Survey (FTAPS) was finalized in June 2009.
3. Social accountability work under piloted PBS 1 reached 80 woredas (approximately 12% of the country). The projects focused on the four basic services sectors: education, health, water and sanitation, and agriculture. CSO’s used techniques that were considered new in the Ethiopian context, but represented good international practice, such as: Right Based Approach, Community Score Cards, Citizens Report Cards and Participatory Budgeting as well as Focal Group and Interface Discussions and Participatory Planning and Monitoring. Twelve civil society organizations were engaged for this work. Though these activities were new for most of stakeholders, the projects achieved the expected outcomes by adapting best practices of Social Accountability and creating a learning initiative among participating citizens.
4. Seeing the potential for very promising results, PBS 2 included substantial resources for the scaling up and institutionalization of these initiatives. The activities themselves remained largely unchanged. Under the FTA component during PBS 2, regions started posting their budget appropriations to woredas on their websites. The FTA tools that were developed under PBS 1 were rolled out to all regions, where they were customized to regional languages and local conditions, and disseminated to woredas. Budget Literacy training, which had trained 1,500 people under PBS 1, had expanded to 171,017. And, overall, FTA work became institutionalized in the Government public finance system. By the end of the project, approximately 94 percent of woredas were posting budget and expenditure data using the customized templates, with an average of 53 percent of service facilities using the service delivery templates. Forty-three percent of citizens confirmed that woreda officials had sought their views concerning the quality public basic services. And, the percentage of citizens who reported that they have knowledge about the woreda budget increased from 13 percent in 2008 to 20 percent in 2011.
5. The scaled-up PBS 2 Social Accountability component was designed based on the findings of an independent evaluation of the PBS 1 pilot phase. A key difference between PBS 1 and PBS 2 social accountability activities was the shift away from individual service facilities to taking a sectoral approach that engages institutions and key actors in the community in a more comprehensive strategy. The activities were piloted in 86 woredas, in collaboration with 45 CSO partners. The results from these woreda were strong. Community members were provided training, tools and mechanisms that allowed them and their communities to assess service delivery and budget use and develop joint action plans with service users to improve the quality of the services.

6. PBS 3 is building on the foundations of the Financial Transparency and Social Accountability laid during PBS 1 and 2. FTA activities now have a budget of almost USD12.5million. These activities continue to improve the quality of budget and expenditure information to the public by refining and simplifying the FTA tools. Budget Literacy Training will continue, which will expand information awareness of citizens and of woreda and kebele council members. Other sectors will be engaged so that they can institutionalize the FTA work in their respective offices and support service facilities by disclosing their budget and service information to citizens. PBS 3 will roll-out its social accountability activities to 170 woredas, which should bring the total number of woredas with SA activities to 344 woredas, representing about 4.5million service users. The financing available for this component stands at USD20.5million. The impact of the project will be measured by an experimentally designed impact evaluation. Existing methodologies will be refined, and new social accountability tools will also be carefully considered based on their value added, including participatory planning and budgeting, budget tracking, gender responsive budgeting and service charters. Overall, the progression of FTA and social accountability activities under the PBS has seen a dramatic expansion in the transparency and accountability of government-provided basic services.

Annex D: History of the relationship between central and peripheral areas in Ethiopia – The Evolution of Today’s Federal State

History and Background

1. The ethnic composition of Ethiopia is the result of a turbulent history. As it consolidated itself during the medieval period, the country was comprised primarily of the Tigray, Agaw and Amhara peoples. With Menelik II’s ascension to the throne in 1889, a period of territorial expansion began, whose base was the province of Shoa in the current region of Amhara. Areas consisting of today’s Beneshangul-Gumuz, Gambella, Southern Nations and Nationalities, Afar, Oromia and Somali regions were brought under the feudal system of the Ethiopian empire. Following the battle of Adwa in 1896 and the resulting European recognition of Ethiopian statehood, a series of border treaties with the surrounding colonial powers were signed. The modern Ethiopia state was born.

2. Relations between the newly integrated areas and the historic center of the empire were troubled. Menelik sent governors from the center to administer the periphery, but owing to the structural weakness of the center, successive Ethiopian governments did not command effective control over the peripheries. Similarly, exploitative economic policies caused visible marginalization, relative under-development, and less integration among the border regions within Ethiopia³⁸. This hold of the center over the peripheries continued to increase. According to noted Ethiopian historian Bahru Zewde:

The period after 1941 witnessed the apogee of absolutism. The tentative beginnings in this direction of the pre-1935 years matured into untrammelled autocracy. The power of the state reached a limit unprecedented in Ethiopian history³⁹.

3. The revised constitution of 1955 solidified the absolute powers of the emperor, claiming “His dignity... inviolable and His power... indisputable”. It also entrenched Amharic as sole the official language and the Ethiopian Orthodox Church as the national religion.

4. The period of socialist rule (1974-1991) saw no diminution in the center’s hold over the peripheries and no change in the prevailing economic policies of exploitation. Despite the regime’s appeal to a socialist ideology, the Derg was identified with an “Amhara suppresser” by the nationalist liberation movements⁴⁰. Any conduct promoting ethnic individualism, and thereby challenging the state’s integrity, was outlawed.

5. The victory of the Ethiopian People’s Revolutionary Democratic Front over the Derg in 1991 saw the reversal of over a hundred years of ethnic homogenization. As Chistopher Clapman says:

The overthrow of the Mengistu government in May 1991 amounted to more than the collapse of a particular regime. It effectively marked the failure of a project, dating back to Menelik’s accession in 1889 of creating a ‘modern’ and centralized Ethiopian state around a Shoan core⁴¹.

³⁸ Mulugeta, Allehone, Issues of Security and Conflict, in the Ethiopian Frontiers: Notes on State Policies and Strategies, in Report of Ethiopia National Workshop - Conflict in the Horn: Prevention and Resolution, (OSSREA Publications), (2002).

³⁹ Zewde, Bahru, A History of Modern Ethiopia 1855-1974, Addis Ababa: Addis Ababa University Press, (1991).

⁴⁰ Weldemariam, Alemayehu F, Greater Ethiopia: Evolution of a Pluralist Politico-Legal System in a Pluralist Polity, Department of Polictial Science, Faculty of Social and Behavioural Sciences, Leiden University, (2011).

⁴¹ Clapham, Christopher, Ethnicity and the National Question in Ethiopia, in Conflict and Peace in the Horn of Africa: Federalism and its Alternatives, Peter Woodward and Murray Forsyth (eds.) (Brookfield: Darmouth publishing co.), (1994).

6. Ethnic federalism now came to the fore in Transitional Charter, which allowed the rights to self-determination of the country's various "nations and nationalities". Like the Charter, a new constitution in 1995 recognized the rights of ethnic self-determination up to succession. It also created a federal government with nine regional states divided along ethno-linguistic lines – Tigray, Afar, Amhara, Oromia, Somali, Beneshangul-Gumuz, South Nations, Nationalities and Peoples, Gambella, and Harari.

Ethiopian regional population distribution and ethnic composition

Region	Population	Estimated size in square kilometers	Ethnic composition (%)
Tigray	4,316,988	50,078	96.6 Tigray, 1.6 Amhara, 1.8 others
Afar	1,390,273	96,707	90.0 Afar, 5.2 Amhara, 1.6 Argobba, 1.2 Tigray, 2.0 others
Amhara	17,221,976	159,173	91.5 Amhara, 4.9 Agaw, 2.6 Oromo, 1.0 others
Oromia	27,158,471	353,006	87.8 Oromo, 7.2 Amhara, 0.9 Gurage, 4.1 others
Somali	4,445,219	279,252	96.2 Somali, 2.3 Oromo, 0.7 Amhara, 0.8 others
Southern Nations, Nationalities and Peoples	14,929,548	112,343	19.4 Sidama, 10.6 Welayta, 8.0 Hadiya, 7.5 Gurage, 7.0 Gamo, 5.4 Kafficho, 5.4 Silt'e, 36.7 others
Gambella	307,096	25,802	47.3 Nuer, 21.7 Anyiwak, 8.0 Amhara, 5.2 Opo and Komo, 4.4 Majangir, 13.4 others
Beneshangul-Gumuz	784,354	49,289	25.4 Berta, 21.7 Amhara, 20.9 Gumuz, 13.6 Oromo, 7.7 Shinasha, 4.2 Agaw-Awi, 6.5 others
Harari	183,415	311	56.4 Oromo, 22.8 Amhara, 8.7 Harari, 4.4 Gurage, 3.9 Somali, 1.5 Tigray, 2.5 others

Data from 2007 census conducted by the Central Statistical Agency

7. Economic integration and equitable development become a primary focus of the new government. Meles Zenawi, the president of the Federal Democratic Republic of Ethiopia, declared in 1997 that:

It is only through fast economic growth that is broadly shared by the population that we can hope for sustainable peace. And, therefore, one of the most important pillars of our

program is fast economic growth that is equitable and broadly shared among the population⁴²

7. The government adopted a policy of affirmative action towards developing regions whereby Beneshangul-Gumuz, Gambella, Afar and Somali would be provided preferential treatment in terms of budget allocation and increased enrollment in higher education. Even now, however, developing regions still remain to be fully integrated into the economy of the Ethiopian state. Centralization's legacy left few residents of today's developing regions involved in running the regional administrative structures.

8. Until recently there remained little investment in social and physical infrastructure. Slowly, the emergence of local native elite officially in charge of the regions, better investment in education, health, infrastructure and others have shown the positive outcomes of the federalisation of Ethiopia⁴³. The preferential treatment of previously disadvantaged ethnic groups within Ethiopia is helping to create a more equitable distribution for development to take place.

The Modern Ethiopian Federal State

8. Decentralization of political, administrative and fiscal authority to regional and local governments has been fundamental to this affirmative action strategy. The Government has a strong commitment to decentralization and building a federal state, as enshrined in the 1995 Federal Constitution. While the first wave of decentralization started only 20 years ago, the process should be seen as a work in progress for which the underpinning institutional arrangements for success are evolving and continue to require focused support.

9. To date, Ethiopia has seen two rounds of decentralization. The first round (devolution) took place during the transitional period from 1991 to 1994. This Proclamation devolved state powers to geographically-defined ethno-linguistic groups and associated pieces of legislation were also passed creating regional and woreda (district) councils. As necessary, regions could decide to establish zones as intermediaries between regional and district administrations. In addition to giving them the right to self-determination, these new regional units were granted a range of executive, legislative, and judicial powers within their defined regions, and exercised jurisdiction over matters of social and economic development as well as basic service delivery. Accordingly, regions were to create the necessary internal institutional arrangements, including: a council; an executive committee; a judicial administration office; a public prosecution office; an audit office; a police and security office; and a service and development committee.

10. Proclamation No. 7/1992 stipulated the regional governing units' revenue sources; these included: tax revenues derived within their jurisdictions; fiscal transfers from the central government; domestic borrowing; and other sources of income. The latter category was specified in Proclamation No. 33/1992. However, due to capacity constraints, the regional governments were yet unable to carry out their revenue assignments; as such, they were highly-dependent on grants from the central government to meet their new expenditure obligations in the social sectors.

11. In spite of what appears to be a rather elaborate set of governing arrangements, these new regional governments remained subordinate to the central government. While the regional councils

⁴² Meles Zenawi, "Premier's speech at Butare National University in Rwanda", in *The Ethiopian Herald*, (December 13, 1997).

⁴³ Adegehe, Asnake, *Federalism and ethnic conflict in Ethiopia : a comparative study of the Somali and Benishangul-Gumuz regions*, (2009).

were accountable to citizens living within their regional borders, legally they were also responsible to Council of Representatives of the central government.

12. The promulgation of the 1995 Federal Constitution signified the beginning of Ethiopia's second round of decentralization. The Constitution affirmed the roles and functions of federal vs. regional government. While the federal government retained authority over a broad range of functions and responsibilities (e.g., fiscal and monetary policy, international trade), the regions and woredas were given responsibility for ensuring basic service delivery in their respective jurisdictions. The federal government retained authority over setting policies and standards in each of the major social service delivery sectors.

13. In 2002, decentralization was extended to the woreda level with woreda governments expected to take on the bulk of service delivery responsibilities. Woredas receive block grants from their respective regional governments which, like the federal-regional grants, are also governed by formulas set by the regional governments and using broadly similar methodologies to that used in the federal-regional grant.

14. Decentralization to woreda level is crucial in the context of achieving an equitable distribution of prosperity, as Ethiopian history, sociology, and ethnography, suggest that citizen-state relationships are framed by alternative norms of political culture, power and state-society relations, which are locally evolved, and have arisen in the context of historical processes of state formation⁴⁴. Concurrent with decentralization to woreda levels, budgets allocated for local level expenditures have increased dramatically, and there have been impressive improvements in indicators of human development, for example, in Net Enrollment and vaccination rates. The effects of the economic policies that were in place for over a hundred years are, through the processes of decentralization and affirmative action towards historically disadvantaged areas, resulting in a more broadly-shared economic prosperity.

⁴⁴ Understanding Incentives and Strengthening Accountability: The Political Economy of Decentralized Service Delivery in Ethiopia, World Bank, (2013).

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