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The Size and Distribution of Digital Connectivity Gaps in Sub-Saharan Africa

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ABSTRACT

Access to digital technology in Africa is important to measure accurately given its role in facilitating economic growth, innovation, job creation, and access to services. This note describes the digital connectivity gap in Africa, compiling the most recent nationally representative household surveys from 48 countries across the continent. Overall, access to computers and access to internet greatly lag access to mobile phones. When taking a simple average across sample countries, only 1 in 4 people have access to internet and 1 in 10 have access to a computer, while 3 in 4 have access to a mobile phone. Inequities across socioeconomic groups are large; for example, people in the richest quintile of consumption or assets ownership are 15 times more likely to have access to a computer or tablet than those in the bottom quintile. People in the top 60% of income are more than three times more likely to have access to internet than those in the bottom 40% of income. Similarly, urban residents are over three times more likely to have access to internet than rural residents. These socioeconomic inequalities are less pronounced for access to mobile phones and electricity. The results highlight the importance of efforts to improve access to internet in rural areas and for low-income groups.

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Introduction

Being able to access digital devices and services has become increasingly important for communication, access to information, and productivity. Governments need to find responsive and effective means to deliver services and interact with citizens. Businesses need to harness digitally centered business models to connect with customers previously out of reach because of geography or low income. The onset of the COVID-19 pandemic made digital access even more essential to sustain livelihoods and maintain social contact. Reliable estimates of digital access are crucial if we are to evaluate progress toward the goal of expanding internet access for those in Sub-Saharan Africa. An emerging literature has been examining how digital technologies affect household welfare in developing countries and shows that access to digital technologies may be associated with higher household consumption and lower likelihood of poverty (Masaki et al. 2020; Bahia et al. 2020, 2021).

This note examines the extent of digital access in the African continent from the most recent household surveys available from the World Bank's Global Monitoring Database (GMD) and the Demographic Health Survey (DHS). This note expands on recent World Bank Policy and Equity notes on internet access (Mahler et al. 2019; Frankfurter et al. 2020) in Sub-Saharan Africa by examining more countries and indicators of access to digital technology, including access to internet, computers, tablets, and mobile phones as proxies of digital access in Africa.[1] We also examine access to electricity since it is a prerequisite for accessing many digital devices. Overall, digital access in Africa is relatively low, but it varies significantly across socioeconomic groups. These findings may be helpful in identifying population groups that should be prioritized in connecting the unconnected in the African continent. Future research overlaying information of mobile internet coverage and household characteristics by location could provide even more detailed information to inform policy design to address the uptake gap in areas where internet is available.

1 All connectivity points are included for internet access (on mobile phone, at home, at work, at school, at cybercafé).

>>> DATA AND METHODOLOGY

A major challenge in examining the extent of and inequities in digital access in Africa is the lack of availability of harmonized household surveys. Table A.1 in the appendix provides details of the surveys we use from the GMD and DHS for this analysis[2]. The GMD is a collection of nationally representative household budget surveys, harmonized by the World Bank, conducted by national statistical agencies to measure poverty. DHS surveys are typically conducted every three to five years in many developing countries, with a focus on collecting key demographic and health-related information. We use the GMD as our primary source and supplement it with DHS data where GMD data are outdated or lack variables related to digital access. A key difference between the sources is that the GMD contains data on household consumption, whereas DHS contains data on household assets. We use the asset index available in the DHS to generate asset quintiles, which we use interchangeably with consumption quintiles in GMD data.

The vast majority of African countries use household budget surveys from the GMD. Only 4 of the 48 countries in our final database use the most recent DHS survey (Burundi, Cameroon, South Africa, and Zambia); we used data from the GMD for the remaining 44 countries in our final database. There are no data available for Algeria, Equatorial Guinea, Eritrea, Libya, Somalia, and South Sudan on digital access, so these countries are excluded from our final database.

Survey questions related to digital access are available only at the household level. In other words, these variables indicate whether anyone in the household has access to a device or service. From both the DHS and GMD, we use variables for digital access that indicate whether the household has access to internet, a mobile phone, and electricity. We examine these measures for various socioeconomic characteristics, such as age, gender, and labor market, and the education level of household members. Though we use the most recent household survey with information on consumption or household asset for each country, the average survey in our database was collected in 2016.[3] We also categorize our findings by three survey time periods: 2008–2015 (15 countries), 2016–2017 (15 countries), and 2018–2020 (18 countries).[4] Average differences across periods are not necessarily an accurate measure of trends over time, however, because the countries present in each period differ.

>>> PATTERNS OF DIGITAL CONNECTIVITY GAP IN AFRICA

Access to internet in Sub-Saharan Africa, though growing, remains low. We find that on average, 28.5% of individuals live in households with access to internet. This is slightly higher than the results reported for seven West African Economic and Monetary Union (WAEMU) countries by Masaki et al. (2021), and it is much higher than the 7% average reported across 25 countries by Frankfurter et al. (2020) and the 10% average across 21 countries reported by Mahler et al. (2019). Differences in country coverage, definitions of access,[5] the population considered, and the timing of surveys explain these differing averages.[6] Gabon has the highest rate of internet access, with an estimated access rate of 64.9% of the population, while Zambia has the lowest rate of internet access, with only an estimated 6.9% share of the population having access.

Access to computers and tablets is also very low. On average across countries in the sample, about 11% of individuals live in households with access to a computer. Mauritius and Cabo Verde have the highest rates of computer or tablet access, with 58% and 45%, respectively. Meanwhile, the Central African Republic and the Democratic Republic of Congo have the lowest rates of computer or tablet access, at 0.6% and 1.4%, respectively. On average, only 11.2% of the population lives in a household with

2 Other available surveys for African countries such as Afrobarometer, Research ICT Africa's After Access Survey, or national ICT surveys were not considered for this analysis because they lack comparable information on socioeconomic variables or are not nationally representative.

3 Household budget surveys in Africa are collected by national statistical agencies typically every three to five years, and regular collection of household data has been affected by the COVID-19 pandemic.

4 See table A.6 in the appendix.

5 See table A.4 in the appendix for details on the internet access question included in the surveys.

6 For example, Rodriguez-Castelan et al. (2021) only considers adults age 15 and older.

access to a computer or tablet. Furthermore, 43.9% and 38.6% of individuals access radio and television, respectively, indicating interest in accessing information or entertainment using communication services.

Access to mobile phones and electricity is substantially higher than access to internet and computers. Although only 58.8% of individuals surveyed have access to electricity, 76% of individuals have access to a phone. Senegal and the Arab Republic of Egypt have the highest rates of phone access, with 99.1% and 97.9%, respectively. The Central African Republic has the lowest electricity access rate (9.1%); the Seychelles has the highest electricity access rate (100%). Survey estimates are only partially correlated with International Telecommunication Union (ITU) estimates of mobile penetration, as the correlation coefficient is 0.58 (figure 4). This is partly because the ITU captures mobile cellular subscriptions per 100 inhabitants, which is different from mobile phone access. Access to internet and computers is highly unequal within countries.

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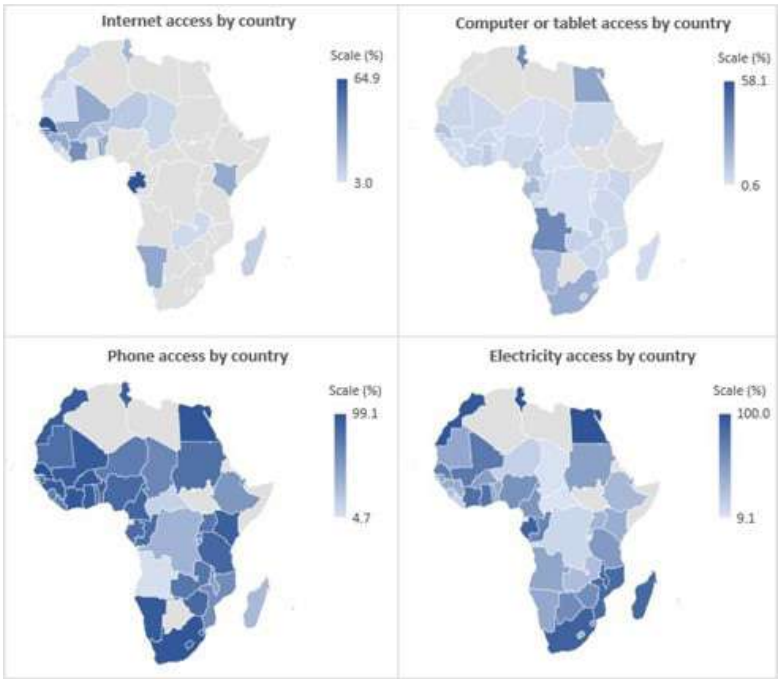
FIGURE 1 - Digital Connectivity in Africa



Note: Countries in gray do not have data on the relevant measure. Only countries in shades of blue represent countries with data.
Sources: Global Monitoring Database, Demographic and Health Surveys.

Table 1 reports access rates for different groups. While the average rate of internet access across Africa is 28.5%, the rate of internet access falls to only 5% for those living under the $1.90 poverty line. Additionally, those in the bottom 40% of income in Africa have a 12% rate of internet access, while those in the top 60% of income in Africa have a 37% rate of internet access. Those in the top 60% of income in Africa are almost five times more likely to have access to a computer (15%) than those in the bottom 40% of income (3%). Compared to internet and computer access, electricity and phone access vary less with income and welfare status. For example, 41% of the bottom two quintiles report having access to electricity, compared with 68% for the top three quintiles. The divide for phone access is also narrower, with 65% of the bottom two quintiles reporting owning a phone as opposed to 82% for the top three quintiles. We do not see a large difference between women and men in digital access in this survey, primarily because access is measured at the household level. However, male-headed households generally have higher access, possibly because of higher incomes or assets compared with female-headed households.

There is also a stark digital divide between rural and urban Africans. Urban residents experience more than triple the rate of access to the internet of rural residents. In urban areas, the rate of internet access is 47%; in rural areas it is only 12%. It follows that computer access is also much lower in rural areas than urban areas. In fact, urban residents are about five times more likely to

have access to a computer than rural residents. While urban residents have a 21% computer access rate, rural residents have a 3.5% rate of computer access. However, the difference between phone access across urban and rural residents is much smaller. In urban areas, 86% of Africans have access to a phone, while in rural areas this rate is 69%.

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TABLE 1 - Access Rates by Group

POPULATION GROUP	INTERNET (MEAN/SE)	ELECTRICITY (MEAN/SE)	MOBILE PHONE (MEAN/SE)	COMPUTER OR TABLET (MEAN/SE)
	ALL COUNTRIES 2008-2020			
ALL COUNTRIES IN DATABASE	28.5(4.03)	58.8(3.83)	76(3.61)	11.2(1.93)
POOR - $1.90 LINE	5.3(0.83)	31.9(5.91)	53.5(5.24)	1.3(0.64)
POOR - $3.20 LINE	10.6(1.87)	39.6(4.39)	64(4.62)	2.5(0.92)
POOR - $5.50 LINE	17.5(2.91)	48.6(3.96)	70.1(4.29)	4.6(1.21)
BOTTOM 40%	12(3.01)	41.1(4.83)	65.1(4.28)	31.(1.06)
TOP 60%	36.8(4.55)	67.6(3.48)	81.6(3.43)	15.3(2.42)
Q1 - BOTTOM QUINTILE	8.3(2.36)	36.1(4.91)	59.9(4.5)	1.8(0.69)
Q2 - SECOND QUINTILE	15.3(3.63)	45.5(4.85)	69.8(4.15)	4.3(1.4)
Q3 - MIDDLE QUINTILE	21(4.3)	53.9(4.51)	75.8(3.85)	7.1(1.93)
Q4 - FOURTH QUINTILE	31.3(4.87)	64.3(3.93)	80.4(3.63)	10.6(2.41)
Q5 - TOP QUINTILE	53.1(4.69)	80.3(2.56)	87(3.18)	25.3(2.94)
URBAN	46.7(5.08)	80.2(2.77)	85.6(3.82)	21.3(3.13)
RURAL	12.1(2.48)	40.1(4.51)	68.7(4.03)	3.5(0.77)
MALE	28.6(3.97)	58.9(3.85)	76.3(3.6)	11.3(1.94)
FEMALE	28.3(4.09)	58.7(3.83)	75.7(3.61)	11(1.92)
EDUCATION - NONE	17(3.35)	45.9(4.68)	66.2(5.52)	4.9(1.3)
EDUCATION - PRIMARY	27.4(3.76)	58.2(3.99)	75(4)	8.4(1.79)
EDUCATION - SECONDARY	47.9(5.05)	75.7(3.32)	85.8(3.7)	18.9(3.58)
EDUCATION - TERTIARY	74.4(5.31)	93.5(1.49)	94.2(1.93)	48.1(4.46)
INDUSTRY - AGRICULTURE	8.1(1.99)	38.1(5.63)	61.5(5.64)	2(0.66)
INDUSTRY - INDUSTRY	31.4(5.65)	70.2(4.46)	84.7(3.04)	12.4(2.47)
INDUSTRY - SERVICE	40.9(5.4)	72.6(3.75)	83.9(4.32)	16(2.66)
INDUSTRY - OTHER	51(5.62)	76.9(2.88)	84.2(4.81)	22.1(2.97)
EMPLOYMENT - PAID EMPLOYEE	45.1(6.75)	76.7(4.52)	85.4(3.38)	23.2(4.37)
EMPLOYMENT - NONPAID EMPLOYEE	12.7(2.83)	41.7(5.98)	65.9(5.53)	2.1(0.42)
EMPLOYMENT - EMPLOYER	37.1(4.96)	78(4.25)	66.5(7.37)	12.5(5.28)

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TABLE 1 - Access Rates by Group

POPULATION GROUP	INTERNET (MEAN/SE)	ELECTRICITY (MEAN/SE)	MOBILE PHONE (MEAN/SE)	COMPUTER OR TABLET (MEAN/SE)
	ALL COUNTRIES 2008-2020			
EMPLOYMENT - SELF-EMPLOYED	21.4(3.34)	46.4(5.04)	68.3(5.44)	5.4(1.25)
EMPLOYMENT - OTHER	55.3(4.51)	56.8(9.08)	82.9(4.41)	7.1(1.82)
FEMALE-HEADED HOUSEHOLD	28(4.93)	56.3(3.76)	72.9(3.86)	8.7(1.31)
MALE-HEADED HOUSEHOLD	26.7(3.79)	57.4(3.99)	76.3(3.77)	10.9(1.99)

Note: The numbers in this table are simple averages of the share of households with access in each group, taken across all countries with available data. Out of 48 countries in the database, data are available on the internet for 23 countries, on computer/tablet for 44 countries, mobile phone for 44 countries, and electricity for 48 countries. Quintiles are defined based on per capita consumption for GMD countries and asset index quintiles for DHS countries. All characteristics refer to individuals, not heads of household. Standard errors clustered on country.

Sources: Global Monitoring Database, Demographic and Health Surveys.

Differences are also large across education groups. People with a tertiary education experience 4.4 times the rate of internet access of those with no education and 2.7 times the rate of internet access of those with a primary education. People with a tertiary education have a rate of computer access (48%) that is close to 10 times the rate of computer access of those with no education (5%). While individuals with higher education levels experience higher rates of digital access than those with lower education levels, this trend is less pronounced for electricity and phone access: 46% of individuals with no education have access to electricity and 66% of individuals with no education have access to a phone. Ninety-three percent of individuals with a tertiary education have access to electricity and 94% of individuals with a tertiary education have access to a phone.

The digital divide is also closely linked with the labor market characteristics of individuals. Out of the industries studied, individuals working in the agriculture sector have the lowest rate of digital access, while individuals working in the service sector have the highest digital access. Employers and paid employees also have the highest digital access, partly because they are more likely to be working in the service sector. Only 8% of agricultural workers have access to internet, yet 41% of service workers have access to internet. Service workers are over five times more likely to have access to a computer than agricultural workers.

Those people who are digitally unconnected are much more likely to be poorer. Only 4% of households with internet access are poor according to the $1.90 line, as opposed to 27% of those without access (see table A.2.a in the appendix, as well as tables A.2.b, A.2.c, and A.2.d for the three survey period groups). The disparity is larger for those with computers or tablets: only 4% of those with a computer or tablet are poor, while more than a third of those without access are poor. Thus, the impoverished are the least digitally connected. Besides the obvious trends in digital access among individuals in different income quintiles—where the higher the income quintile, the greater the rate of digital access among those in that income quintile—urban residence, employment type, sector, and education are also indicative of wealth. Urban residents, paid employees, and people who work in the service or industrial sectors tend to have higher income than those working in the agriculture sector and those who are nonpaid or self-employed. Additionally, individuals with higher levels of education tend to have higher paying jobs, as well as tend to have had greater wealth to begin with. Overall, the results indicate a major digital divide between richer and poorer individuals in the sample.

>>> CORRELATION BETWEEN DIGITAL CONNECTIVITY AND GDP PER CAPITA

Figure 2 shows the expected positive correlation between digital connectivity and GDP per capita. Access to television and access to computer are highly correlated to GDP per capita, with correlation coefficients of 0.79 and 0.73, respectively.

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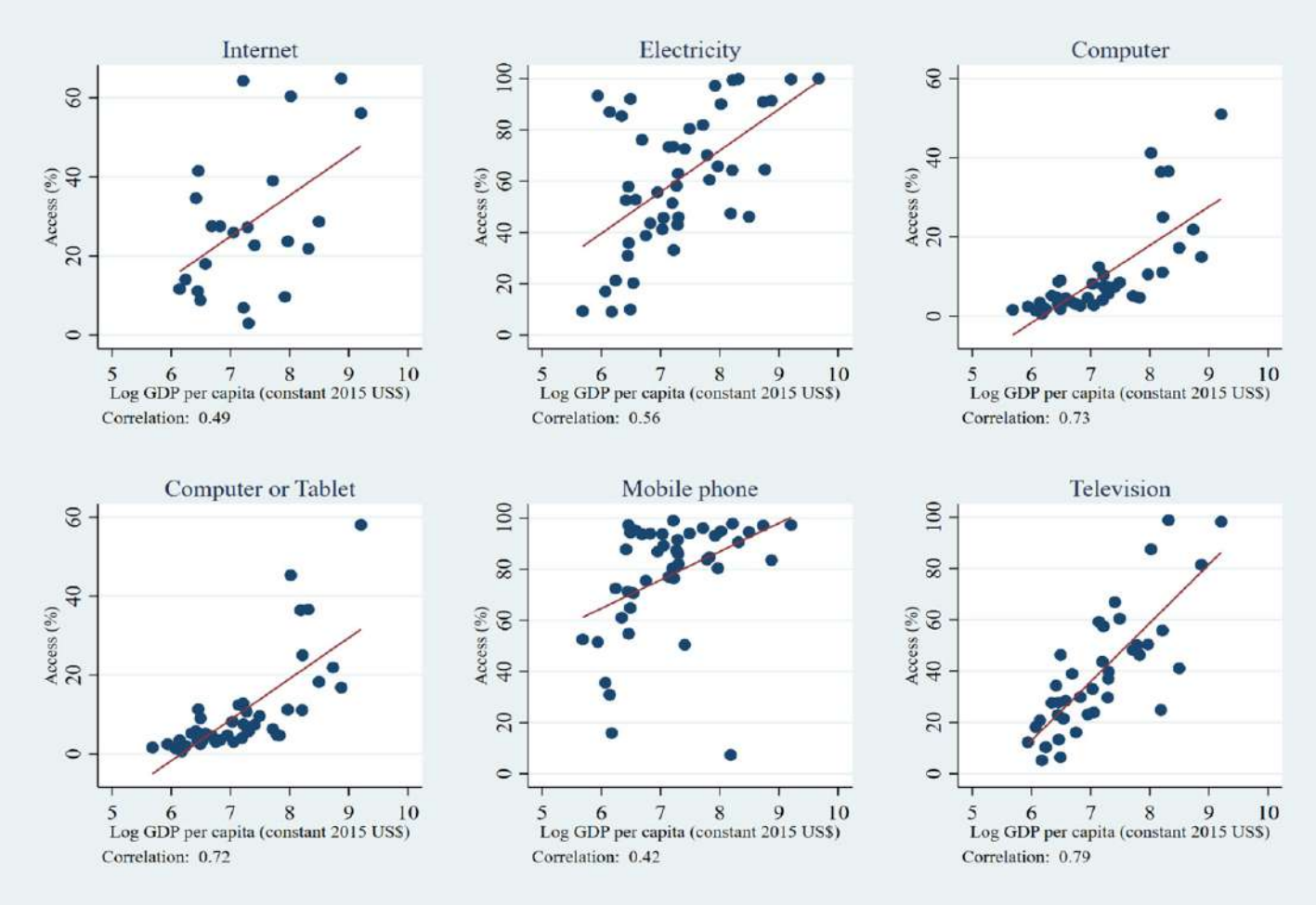
FIGURE 2 - Comparison of GDP Per Capita and Digital Connectivity



Note: GDP per capita and digital access are given for the same year.

Figure 3 shows the correlation between quintile of per capita consumption, or of the asset index in the four DHS countries. Control variables include gender of the head, industry, and education. It confirms that the largest digital divides relate to internet and television, although the wealthiest quintile is also far more likely to own tablets than other quintiles. A similar divide is observed for education. After controlling for other characteristics, workers in other industry occupations are slightly more likely to have access to internet than service sector workers. Finally, female-headed households are modestly less likely to own televisions and mobile phones, but they are no less likely to be connected to internet after controlling for the other included variables. > > >

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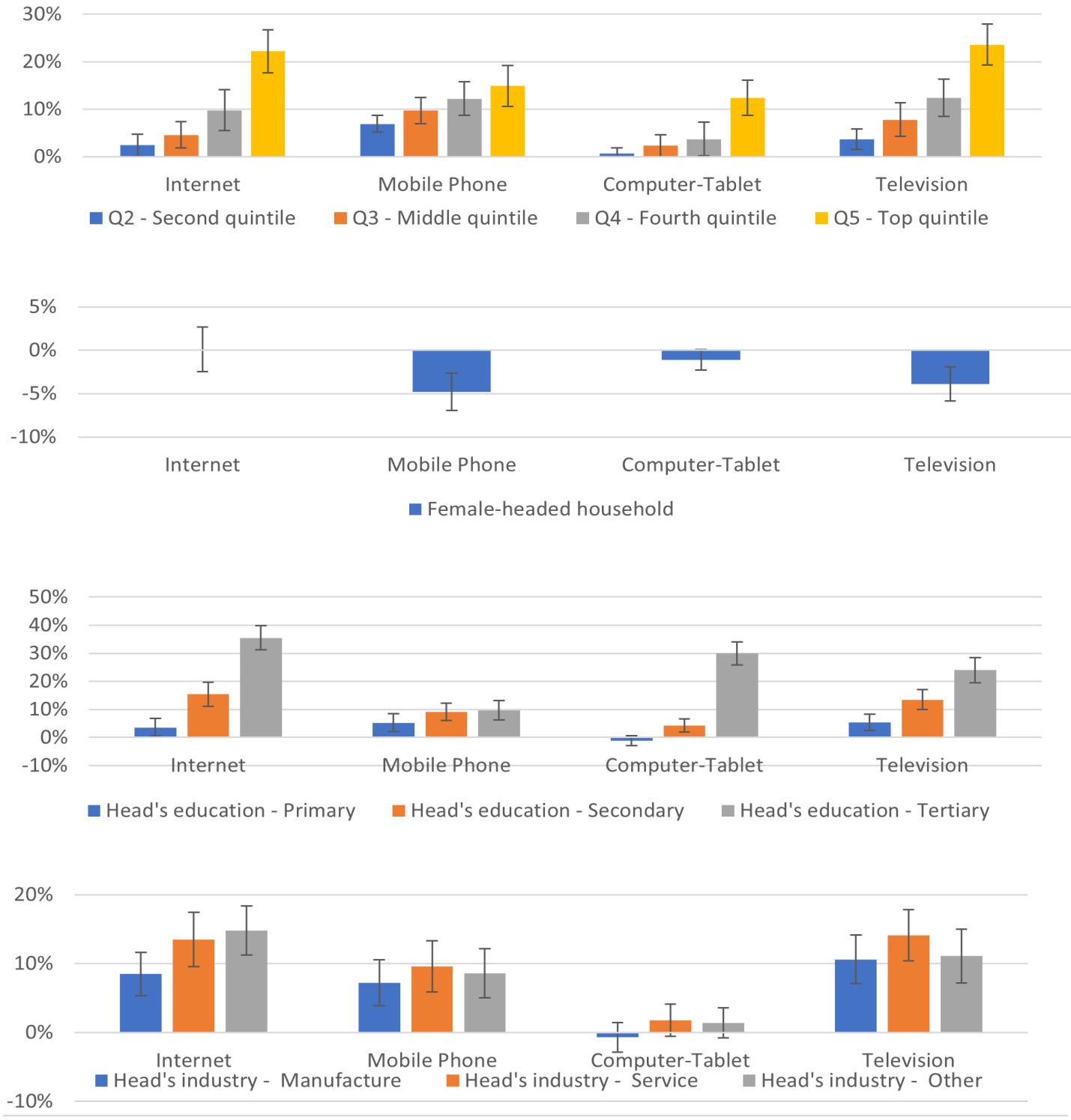
FIGURE 3 - Conditional Correlation, 2008-2020



Note: Robust standard errors clustered at the country level, country and year fixed effects included. Omitted categories: bottom quintile, male-headed households, head has no education, head's industry is agriculture. .

COMPARISON BETWEEN HOUSEHOLD SURVEY AND ITU ESTIMATES

The estimates presented here differ substantially from those presented by the ITU. The correlation of the survey estimates with the ITU estimates is 0.5. Figure 4 compares survey estimates of access to internet and mobile phone to ITU estimates. Both measures are moderately and positively correlated (0.5 for internet and 0.58 for mobile phone). One factor explaining this is the difference in data sources. While the estimates presented here are derived from household survey data on household access, the ITU estimates are generated from a combination of data from telecommunication agencies, household surveys, and projections based on macroeconomic data. Also, for mobile phone access, the ITU estimates capture a different measure than the surveys do. In particular, the ITU estimates give the number of phone subscribers for 100 people, which can exceed 100 in some countries where several subscriptions are possible for the same individual.

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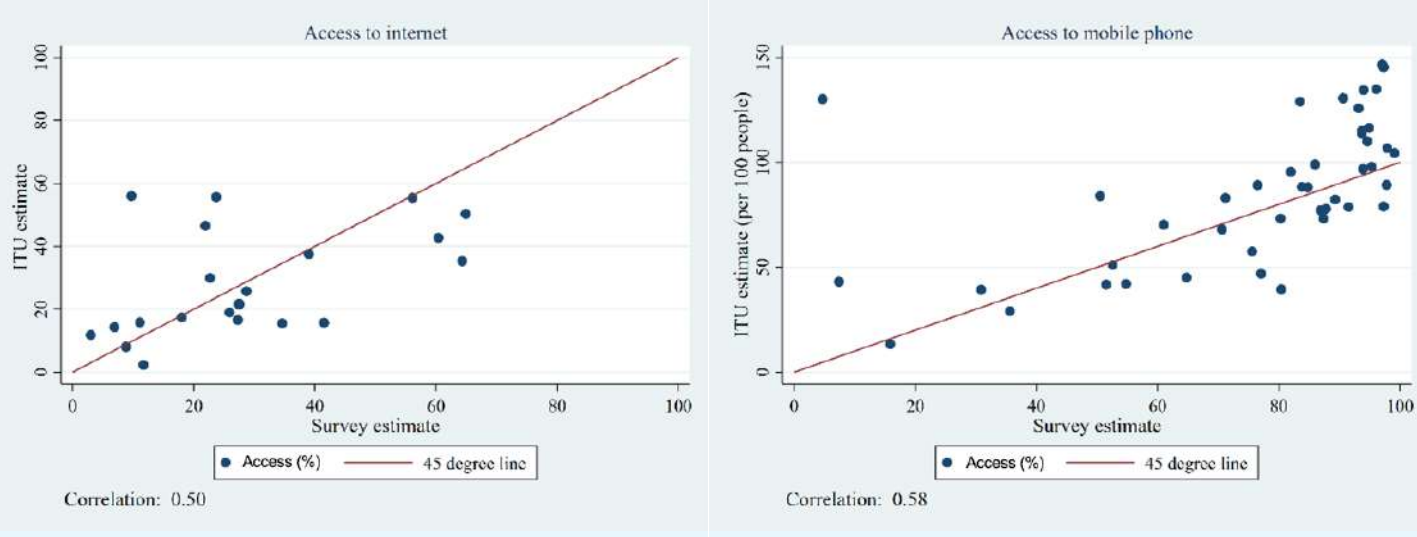
FIGURE 4 - Digital Connectivity in Africa



Note: The ITU estimate for phone captures mobile cellular subscriptions per 100 people. Both estimates are given for the same year.

>>> CONCLUSIONS

Although African countries have made great strides in improving digital access in recent years, much still needs to be done to guarantee digital inclusion, especially to bridge digital divides across socioeconomic groups. Access to digital devices and services is still low across the continent, except for mobile phones. In addition, there is a large digital divide within countries, observed in high rates of inequality in access to internet, computers, and other technologies.[7] The richest 60% in the continent are more than three times more likely to have internet access than the bottom 40%, and people in urban areas are more than three times as likely to have access than those in rural areas. Similar to findings in the past, electricity is still a limiting factor in many countries, with less than 60% of the population with access to electricity on average across countries in the continent (Mahler et al. 2019). Access to internet in the region is generally higher than in previous studies (Mahler et al. 2019; Frankfurter et al. 2020). Unfortunately, however, examining trends is difficult because of the different mix of surveys used in previous studies. Further work could examine trends in the same set of countries in greater detail.

7 Most of these differences are also statistically significant. Full results are available in the Excel files accompanying this note.

Future analysis would benefit from richer and more recent data on digital access. The data set we compiled only has data on internet for 23 countries, which does not paint a complete picture of internet access in Africa. Although we use the most recent household survey in each country with information on digital access, all of the surveys we examine were collected prior to the COVID-19 pandemic and some of the surveys we use were collected nearly a decade ago. Following market dynamics and government interventions in Africa to expand access to digital devices and services is critical to ensure that gains in digital access reach the poor in the future. The World Bank and the international community can make an important contribution by documenting these efforts and systematically using nationally representative household surveys to track their success in expanding access to the poor and vulnerable groups. Furthermore, additional analysis on the characteristics of the unconnected in areas where internet is available would be particularly useful for policy making to reduce the uptake gap. This highlights the benefits of both accurate information on mobile internet coverage and access to location information in household surveys.

>>> REFERENCES

Bahia, Kalvin, Pau Castells, Genaro Cruz, Takaaki Masaki, Xavier Pedros, Tobias Pfutze, Carlos Rodriguez Castelan, and Hernan Jorge Winkler. 2020. *The Poverty Reduction Effects of Mobile Broadband in Africa: Evidence from Nigeria*. Washington, DC: World Bank Group.

Bahia, Kalvin, Pau Castells, Genaro Cruz, Takaaki Masaki, Carlos Rodriguez-Castelan, and Viviane Sanfelice. 2021. "Mobile Broadband Internet, Poverty and Labor Outcomes in Tanzania." Policy Research Working Paper 9749, World Bank, Washington, DC.

Frankfurter, Zoe, Klaudia Kokoszka, David Locke Newhouse, Ani Rudra Silwal, and Siwei Tian. 2020. "Measuring Internet Access in Sub-Saharan Africa (SSA)." Poverty and Equity Note 31, World Bank, Washington, DC.

Mahler, Daniel Gerszon, Jose Montes, and David Locke Newhouse. 2019. "Internet Access in Sub-Saharan Africa." Poverty and Equity Note 13, World Bank, Washington, DC.

Masaki, Takaaki, Rogelio Granguillhome Ochoa, and Carlos Rodriguez-Castelan. 2020. "Broadband Internet and Household Welfare in Senegal." Policy Research Working Paper 9386, World Bank, Washington, DC.

Rodriguez-Castelan, Carlos, Rogelio Granguillhome Ochoa, Samantha Lach, and Takaaki Masaki. 2021. "Mobile Internet Adoption in West Africa." Policy Research Working Paper 9560, World Bank, Washington, DC.

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TABLE A.1 - Rate of Access to Digital Technologies and Electricity by Country

COUNTRY	Survey	Internet	Computer or Tablet	Mobile Phone	Electricity
ANGOLA	IDREA 2018		36.4	7.4	47.4
BENIN	EHCVM 2018	25.9	3.0	89.3	45.7
BOTSWANA	BMTHS 2015				64.5
BURKINA FASO	EHCVM 2018	18.0	5.2	95.3	52.8
BURUNDI	DHS 2016-17		1.6	52.6	9.4
CABO VERDE	IDRF 2015	60.4	45.3	94.9	90.1
CAMEROON	DHS 2018		10.7	87.4	58.2
CENTRAL AFRICAN REPUBLIC	ECASEB 2008		0.6	15.9	9.1
CHAD	EHCVM 2018	8.8	2.5	64.8	10.0
COMOROS	EESIC 2013		12.4	77.1	73.3
CONGO, DEM. REP.	E123 2012		1.4	35.6	17.0
CONGO, REP.	ECOM 2011		4.8	83.8	70.2
CÔTE D'IVOIRE	EHCVM 2018	39.0	6.3	96.1	81.9
DJIBOUTI	EDAM 2017	23.7	11.2	80.4	65.8
EGYPT, ARAB REP.	HIECS 2017		25.0	97.9	99.5
ESWATINI	HIES 2016		11.1	97.8	64.3
ETHIOPIA	HICES 2015			54.8	35.9
GABON	EGEP 2017	64.9	16.8	83.5	91.4
GAMBIA, THE	IHS 2020		34.7	4.7	70.8
GHANA	GLSS-VII 2016		9.6	94.0	80.4
GUINEA	EHCVM 2018	27.5	3.5	93.9	43.6
GUINEA-BISSAU	EHCVM 2018	41.5	11.3	97.3	57.9
KENYA	IHBS 2015	27.3	5.8	91.5	43.1
LESOTHO	CMSHBS 2017		8.2	93.7	41.3
LIBERIA	HIES 2016		3.5	70.6	20.3
MADAGASCAR	ENSOMD 2012	11.7	3.4	30.9	87.0
MALAWI	IHS-IV 2016		2.4	51.5	93.3
MALI	EHCVM 2018	27.5	4.5	93.7	76.2
MAURITANIA	EPCV 2014	3.0	5.7	82.0	45.9
MAURITIUS	HBS 2017	56.1	58.1	97.3	99.8
MOROCCO	ENCDM 2013	9.7		93.2	97.2
MOZAMBIQUE	IOF 2014		5.2	61.0	85.4

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TABLE A.1 - Rate of Access to Digital Technologies and Electricity by Country

COUNTRY	Survey	Internet	Computer or Tablet	Mobile Phone	Electricity
NAMIBIA	NHIES 2015	28.7	18.2	94.6	46.2
NIGER	EHCVM 2018	14.1	2.1	72.5	21.3
NIGERIA	LSS 2018		4.7	84.8	60.6
RWANDA	EICV-V 2016		3.3	71.0	36.1
SÃO TOMÉ AND PRÍNCIPE	IOF 2017	22.7	7.4	50.5	72.6
SENEGAL	EHCVM 2018	64.3	12.8	99.1	73.4
SEYCHELLES	HBS 2018				100.0
SIERRA LEONE	SLIHS 2018	11.1	3.2	71.2	31.0
SOUTH AFRICA	DHS 2016		21.9	97.1	90.9
SUDAN	NBHS 2014		4.0	80.3	51.5
TANZANIA	HBS 2018		4.7	86.9	55.7
TOGO	EHCVM 2018	34.6	5.8	87.8	52.6
TUNISIA	NSHBCSL 2015	21.9	36.6	90.6	99.9
UGANDA	UNHS 2016		3.0	75.6	38.8
ZAMBIA	DHS 2018	6.9	7.5	76.5	33.1
ZIMBABWE	PICES 2017		5.9	86.0	62.9

Note: See table A.4 for details on the internet access question included in the questionnaire.
Sources: Global Monitoring Database, Demographic and Health Surveys

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TABLE A.2.A - Share of Those with or without Access by Category (All Countries 2008-2020)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
POOR - $1.90 LINE	3.8(1)	26.8(5)	14.7(3.3)	46.5(3.6)	3.6(1.6)	34.1(3.6)	21.3(2.4)	56.2(5.6)
POOR - $3.20 LINE	15.7(3)	52.8(6.3)	33.4(4.1)	75.8(2.7)	11.9(3.9)	59.4(3.5)	45.4(3.6)	77.4(4.3)
POOR - $5.50 LINE	39.7(5.7)	75.6(5.3)	58.5(4.5)	92.2(1.3)	30.9(6.6)	81(2.5)	69.7(3.6)	90.4(2.3)
BOTTOM 40%	14(1.7)	40.9(1.1)	23.3(1.4)	47.7(1.5)	9.5(1.8)	36.9(0.6)	29.1(0.7)	49.4(2.6)
TOP 60%	86(1.7)	59.1(1.1)	76.4(1.5)	52.3(1.5)	90.5(1.8)	63.1(0.6)	29.1(0.7)	50.6(2.6)
Q1 - BOTTOM QUINTILE	4.6(0.7)	20.2(0.7)	9.7(0.8)	24.5(1)	2.6(0.6)	17.8(0.4)	12.8(0.4)	27(1.9)
Q2 - SECOND QUINTILE	9.4(1)	20.7(0.4)	13.6(0.7)	23.2(0.6)	6.8(1.2)	19.1(0.3)	16.4(0.3)	22.4(0.8)
Q3 - MIDDLE QUINTILE	14.3(1)	21.3(0.3)	17.6(0.4)	21.4(0.4)	12.2(1.3)	20.2(0.1)	19.2(0.2)	19.5(0.5)
Q4 - FOURTH QUINTILE	23.3(0.6)	20.5(0.4)	23.3(0.4)	18.4(0.7)	20.3(1.2)	21.4(0.2)	22.4(0.2)	17.3(0.9)
URBAN	77.5(3.6)	35.9(4.4)	61.5(3.4)	20.8(2.3)	82.4(3)	38.3(2.6)	48.4(2.9)	25.7(4.8)
RURAL	22.5(3.6)	64.2(4.4)	38.5(3.4)	79.2(2.3)	17.6(3)	61.7(2.6)	51.6(2.9)	74.3(4.8)

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TABLE A.2.A - Share of Those with or without Access by Category (All Countries 2008-2020)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
MALE	48.6(0.3)	48.3(0.2)	48.6(0.2)	48.4(0.2)	49.1(0.3)	48.4(0.1)	48.7(0.2)	47.8(0.3)
FEMALE	51.4(0.3)	51.7(0.2)	51.4(0.2)	51.6(0.2)	50.9(0.3)	51.6(0.1)	51.3(0.2)	52.2(0.3)
EDUCATION - NONE	19.1(2.8)	41.3(4.5)	22.3(2.4)	41.5(3.3)	12.3(2.6)	32.6(2.8)	26.6(2.7)	42.9(3.3)
EDUCATION - PRIMARY	32.5(1.8)	38.1(2.9)	36.6(1.8)	41.6(2.7)	27.8(1.4)	41.6(2.3)	39.5(1.9)	41.6(3)
EDUCATION - SECONDARY	35.3(2.7)	18.4(2.6)	31.1(1.9)	15.8(1.7)	38.5(2.5)	22.6(1.8)	27.3(1.9)	14.3(2.4)
EDUCATION - TERTIARY	13.1(1.4)	2.3(0.6)	10.1(1.5)	1.1(0.1)	21.4(2.1)	3.2(0.4)	6.6(0.7)	1.3(0.3)
INDUSTRY - AGRICULTURE	16.1(2.9)	59.1(5.6)	34.9(4.3)	70.4(2.7)	11.1(2.7)	55.5(3.3)	44.2(3.4)	72.4(4.3)
INDUSTRY - INDUSTRY	17.8(1.1)	12.7(2.5)	15.7(1.9)	8.3(0.9)	15.9(2.3)	11.3(1.3)	14(1.5)	6.6(0.9)
INDUSTRY - SERVICE	39.9(2.1)	19(2.8)	31.7(2.6)	14.8(1.8)	41.9(3.2)	22.1(1.9)	27.3(2.1)	13.8(2.5)
INDUSTRY - OTHER	26.2(2.3)	9.2(1.6)	17.6(1.6)	6.5(1)	31.1(2.3)	11(1.4)	14.6(1.4)	7.2(2.1)
EMPLOYMENT - PAID EMPLOYEE	49.2(6)	21.6(5.5)	40.7(4.6)	15.7(2.9)	65.9(4.3)	24.3(3)	33.2(3.9)	15.3(3)
EMPLOYMENT - NONPAID EMPLOYEE	12.5(2.5)	31.1(4)	16.4(2.7)	29.1(3.2)	5(1.2)	25.8(3.3)	21.6(2.9)	30.3(4.4)
EMPLOYMENT - EMPLOYER	3(0.8)	1.9(0.5)	5.4(2.5)	2(0.7)	5(1.1)	3.9(1.9)	3.4(1.3)	4.7(2.9)
EMPLOYMENT - SELF-EMPLOYED	33.1(4.3)	44.4(2.8)	33.8(3.3)	49.6(3.6)	21.5(3.1)	42.1(3.8)	37.7(3.3)	47.4(5.7)
EMPLOYMENT - OTHER	2.2(1.7)	1(0.6)	3.8(1.3)	3.6(2)	2.7(0.9)	4(1.6)	4.1(1.7)	2.3(0.8)
FEMALE-HEADED HOUSEHOLD	20.5(2.1)	20(2.1)	22.8(1.9)	23.6(1.7)	19.2(1.9)	23.3(1.6)	21.7(1.8)	25(1.5)
MALE-HEADED HOUSEHOLD	79.5(2.1)	80(2.1)	77.2(1.9)	76.4(1.7)	80.8(1.9)	76.7(1.6)	78.3(1.8)	75.1(1.5)

Note: How to interpret numbers in this table: 3.8% of those with internet access are poor under the $1.90 line, while 26.8% of those without internet access are poor under the same line.
Sources: Global Monitoring Database, Demographic and Health Surveys.

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TABLE A.2.B - Share of Those with or without Access by Category (Countries 2008-2015)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
POOR - $1.90 LINE	5.9(3.4)	24.3(13.1)	19.3(8.4)	45.5(9.2)	1.6(0.7)	39.1(8.7)	18.5(4.8)	63.9(8.3)
POOR - $3.20 LINE	15.9(6.8)	40(14)	34.3(9.3)	70.5(7)	6.1(2.2)	59(8.3)	38(7)	81.1(5.8)
POOR - $5.50 LINE	33.8(9.5)	62.2(10.9)	56.2(8.1)	88.3(3.5)	21.1(5.3)	78.5(5.7)	61.8(7)	91.1(3.4)
BOTTOM 40%	13.6(3.5)	38.9(2.3)	25.5(2.7)	42.6(1.4)	9.7(1.9)	36.3(1.2)	28.4(1.5)	46.5(1.9)
TOP 60%	86.4(3.5)	61.2(2.3)	74.5(2.7)	57.4(1.4)	90.3(1.9)	63.7(1.2)	71.6(1.5)	53.5(1.9)
Q1 - BOTTOM QUINTILE	4.7(1.6)	19(1.6)	11.3(1.6)	21.2(1.1)	2.6(0.6)	17.5(0.8)	12.5(1)	24.7(1.6)
Q2 - SECOND QUINTILE	8.9(1.9)	19.9(0.7)	14.2(1.2)	21.5(0.5)	7.1(1.4)	18.8(0.4)	15.9(0.6)	21.8(0.5)
Q3 - MIDDLE QUINTILE	13.2(1.8)	21(0.3)	17.7(0.6)	21.5(0.5)	12.4(1.7)	20.1(0.2)	18.8(0.4)	20.4(0.8)
Q4 - FOURTH QUINTILE	22.8(0.8)	20.9(0.6)	22.7(0.6)	20.1(0.6)	21.8(1.8)	21.4(0.4)	22.3(0.4)	18.8(0.9)
Q5 - TOP QUINTILE	50.4(5.6)	19.3(2)	34.1(2.8)	15.8(1.1)	56.1(5.2)	22.2(1.1)	30.6(1.6)	14.4(1.4)

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TABLE A.2.B - Share of Those with or without Access by Category (All Countries 2008-2015)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
URBAN	72.6(4.4)	40.4(6.7)	59.6(6.3)	24(4)	80.9(2.9)	39.3(3.9)	53.2(3.8)	19.6(3.3)
RURAL	27.4(4.4)	59.6(6.7)	40.4(6.3)	76(4)	19.1(2.9)	60.7(3.9)	46.8(3.8)	80.5(3.3)
MALE	48.7(0.6)	48.8(0.4)	48.7(0.3)	48.8(0.4)	49.4(0.4)	48.7(0.3)	49(0.3)	48.5(0.4)
FEMALE	51.3(0.6)	51.2(0.4)	51.3(0.3)	51.2(0.4)	50.6(0.4)	51.3(0.3)	51(0.3)	51.5(0.4)
EDUCATION - NONE	9.4(2.9)	29.6(8.2)	19.9(3.8)	37.6(6.3)	8.1(2.5)	28.7(5.6)	20.2(4.6)	45.3(4.1)
EDUCATION - PRIMARY	35.8(2.6)	46.8(6.2)	41.3(3.1)	42.9(4.2)	30.7(2.2)	45(4.1)	43(3.3)	42.7(3.8)
EDUCATION - SECONDARY	36(2.5)	20.3(4.1)	28.6(3.4)	18(3.7)	36.2(2)	22.7(3.4)	28.5(2.8)	11.1(3.1)
EDUCATION - TERTIARY	18.8(3)	3.3(1.2)	10.3(1.8)	1.5(0.3)	25.1(2.8)	3.6(0.8)	8.3(1.2)	1(0.4)
INDUSTRY - AGRICULTURE	7.5(2.8)	41.6(14.5)	36.9(9.7)	64.6(6.3)	6.4(1.3)	54.4(7.2)	34.6(5.9)	78.4(3.9)
INDUSTRY - INDUSTRY	21.6(2)	21(7.5)	18.3(4.5)	7.5(1.7)	21.3(4.4)	11.3(3.5)	17.2(3.8)	5.4(1.3)
INDUSTRY - SERVICE	42(3.4)	25.3(7.2)	30.4(5.6)	20.6(4.5)	40.1(3.9)	25.1(4.9)	32.6(4.9)	12.4(3.6)
INDUSTRY - OTHER	28.9(3.8)	12.1(3.2)	14.4(2.8)	7.3(2.7)	32.3(5)	9.3(2.8)	15.6(3)	3.8(1.4)
EMPLOYMENT - PAID EMPLOYEE	64.7(8.2)	39.8(13.6)	42.2(9.9)	16.6(5.6)	72.5(4.8)	24.5(7.2)	40.6(7.1)	9.1(3)
EMPLOYMENT - NONPAID EMPLOYEE	7(3.1)	21.6(9.5)	17.9(6.2)	22.7(3.6)	3.3(1.3)	20.3(5.6)	14.9(3.8)	29.6(5.3)
EMPLOYMENT - EMPLOYER	3.6(2.5)	1.9(0.9)	9.4(7)	3.2(2.4)	7.1(2.2)	8.7(7.1)	6.7(4.7)	7.6(6.7)
EMPLOYMENT - SELF-EMPLOYED	24.5(7.9)	36.5(6.7)	28.2(6.4)	55.6(5.2)	16.4(4.3)	44.8(8.4)	36.3(6.3)	52.8(8.4)
EMPLOYMENT - OTHER	0.1(0.1)	0.2(0.1)	2.3(1.6)	1.9(1.3)	0.7(0.6)	1.6(1.2)	1.6(1.1)	0.9(0.6)
FEMALE-HEADED HOUSEHOLD	23.8(6.8)	23.8(5.5)	21.9(3.5)	26.4(4.3)	18.2(4.9)	23.2(3)	21.6(3.6)	21.6(1.6)
MALE-HEADED HOUSEHOLD	76.2(6.8)	76.2(5.5)	78.1(3.5)	73.6(4.3)	81.8(4.9)	76.8(3)	78.5(3.6)	78.4(1.6)

Note: How to interpret numbers in this table: 5.9% of those with internet access are poor under the $1.90 line, while 24.3% of those without internet access are poor under the same line.
Sources: Global Monitoring Database, Demographic and Health Surveys.

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TABLE A.2.C - Share of Those with or without Access by Category (All Countries 2016-2017)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
POOR - $1.90 LINE	0.8(0.4)	14.2(4.1)	11.3(3.3)	50.8(4)	1.2(0.6)	32.7(5.8)	21.3(4.5)	59.7(8.1)
POOR - $3.20 LINE	5.4(3)	32(8.2)	29.8(6)	78.6(3.6)	6.7(2.6)	56.6(6.7)	43.1(6.7)	80.3(6.3)
POOR - $5.50 LINE	20.2(9.2)	57.5(10)	56.1(7.9)	92.9(1.9)	23.4(8.8)	78.1(5.1)	66.3(7.1)	91.4(3.9)
BOTTOM 40%	19.5(1.7)	42.9(3.5)	24.9(2.2)	50.3(2.3)	11.5(3.7)	38(1.1)	29.2(1.4)	56.6(3.5)
TOP 60%	80.5(1.7)	57.1(3.5)	75.1(2.2)	49.7(2.3)	88.6(3.7)	62(1.1)	70.8(1.4)	43.4(3.5)
Q1 - BOTTOM QUINTILE	6.1(1.2)	22.8(2.8)	10.1(1.2)	27.1(2.3)	3.5(1.3)	18.4(0.7)	12.7(0.9)	31.7(2.5)
Q2 - SECOND QUINTILE	13.4(0.8)	20.2(0.8)	14.9(1.1)	23.2(0.5)	8(2.4)	19.6(0.4)	16.5(0.5)	24.9(1.3)
Q3 - MIDDLE QUINTILE	18.9(1)	19.2(0.2)	18.3(0.6)	20.4(0.7)	13.4(2.6)	20.1(0.2)	19.2(0.2)	19.4(0.8)

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TABLE A.2.C - Share of Those with or without Access by Category (All Countries 2016-2017)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
Q4 - FOURTH QUINTILE	25.3(0.5)	18.4(1.2)	22.8(0.5)	17.9(1)	20.6(1.7)	21.2(0.3)	22.7(0.5)	14.8(1.5)
Q5 - TOP QUINTILE	36.3(2.2)	19.6(2.5)	34(2.5)	11.3(0.9)	54.6(7.7)	20.7(1)	28.9(1.1)	9.2(1.9)
URBAN	95.7(2.9)	70.5(11.4)	64.6(7)	22.5(6.5)	83.5(6.7)	41.3(6.6)	52(7.2)	25.3(9.4)
RURAL	4.3(2.9)	29.5(11.4)	35.4(7)	77.5(6.5)	16.5(6.7)	58.7(6.6)	48.1(7.2)	74.7(9.4)
MALE	49(0.6)	48.6(0.2)	48.6(0.3)	48.5(0.4)	49.7(0.4)	48.3(0.2)	48.8(0.3)	47.4(0.5)
FEMALE	51.1(0.6)	51.4(0.2)	51.4(0.3)	51.5(0.4)	50.3(0.4)	51.7(0.2)	51.2(0.3)	52.6(0.5)
EDUCATION - NONE	15.4(6.5)	31.9(8)	16.7(2.8)	31.4(5.6)	8.5(2.3)	23.5(3.6)	18.9(3)	32.7(6.7)
EDUCATION - PRIMARY	24.4(1.3)	31.3(5.3)	34.9(2.8)	48.4(6.6)	23.3(1.3)	44.5(4.7)	39.6(3.9)	50.9(6.7)
EDUCATION - SECONDARY	45.9(4.7)	32.7(3.7)	38.7(2.1)	19(2.9)	44.1(3.7)	28.5(3.2)	34(2.9)	15.3(4.2)
EDUCATION - TERTIARY	14.4(1.8)	4.2(0.8)	9.7(1.1)	1.1(0.2)	24.1(3.1)	3.5(0.6)	7.5(1.2)	1.1(0.5)
INDUSTRY - AGRICULTURE	7.1(2.1)	37.9(10)	30.8(6)	68.9(6.7)	8.6(2)	49.9(7.5)	41.8(7.2)	66(9.8)
INDUSTRY - INDUSTRY	14.4(4.1)	11.8(1.3)	14.4(1.9)	10.2(2.5)	13.3(1.7)	12.6(2.2)	13.5(2.3)	9.1(1.8)
INDUSTRY - SERVICE	41.6(10.8)	28.2(8.9)	32.9(3.7)	12.8(2.4)	46.2(5.6)	22.5(3.1)	27(3.6)	13.6(3.9)
INDUSTRY - OTHER	37(4.7)	22.2(2.3)	21.9(3.1)	8.1(2.6)	31.9(4.5)	15(3.3)	17.7(3.3)	11.3(4.5)
EMPLOYMENT - PAID EMPLOYEE	68.2(10.8)	35.3(14)	50.9(7)	26.9(6)	73.1(4.4)	34.8(5)	43.4(6.6)	25.8(4.4)
EMPLOYMENT - NONPAID EMPLOYEE	3.2(2.7)	15.6(8.3)	10(3.3)	18.7(6.5)	3.8(1.7)	21.5(7.3)	16(5.3)	31.3(12.5)
EMPLOYMENT - EMPLOYER	4.7(3.2)	4.6(2.4)	4.6(1.5)	1.4(0.6)	4.7(1.8)	2.7(1)	3.3(1.1)	1.8(1.1)
EMPLOYMENT - SELF-EMPLOYED	15.8(1.7)	38.1(6.1)	28.4(5.4)	45.8(10.2)	14.5(1.8)	33.9(8)	29.8(6.6)	37.3(13.4)
EMPLOYMENT - OTHER	8.1(5.6)	6.4(2.6)	6.1(2.7)	7.2(6.1)	3.9(1.7)	7.1(3.7)	7.5(3.9)	3.8(1.7)
FEMALE-HEADED HOUSEHOLD	20.1(5.5)	26.2(2.3)	28.4(3.7)	29.6(2.8)	19.7(3.7)	29.9(2.8)	27.8(3.5)	31.8(1.4)
MALE-HEADED HOUSEHOLD	79.9(5.5)	73.8(2.3)	71.6(3.7)	70.4(2.8)	80.3(3.7)	70.1(2.8)	72.2(3.5)	68.2(1.4)

Note: How to interpret numbers in this table: 0.8% of those with internet access are poor under the $1.90 line, while 14.2% of those without internet access are poor under the same line.
Sources: Global Monitoring Database, Demographic and Health Surveys

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TABLE A.2.D - Share of Those with or without Access by Category (All Countries 2018-2020)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
POOR - $1.90 LINE	4.2(0.7)	32.8(3.5)	12.9(2.8)	44.6(4)	8.8(3.4)	31.1(4)	23.9(3.5)	44.6(7.5)
POOR - $3.20 LINE	21.2(2.3)	69(3.1)	36(5.3)	78.4(2.4)	25.2(7.1)	62.2(3.9)	54.7(4)	71.1(7.6)
POOR - $5.50 LINE	53.8(3.3)	91.3(1.3)	63.5(7.5)	95(0.8)	51.3(8.8)	85.7(2.2)	80.4(2.7)	88.8(4.2)
BOTTOM 40%	11.7(2.2)	41.5(1.1)	19.8(2)	49.5(2.8)	6.9(2.2)	36.4(1.1)	29.6(0.6)	47(5.7)
TOP 60%	88.3(2.2)	58.5(1.1)	79.5(2.5)	50.6(2.8)	93.1(2.2)	63.7(1.1)	70.4(0.6)	53(5.7)
Q1 - BOTTOM QUINTILE	3.9(1)	20.2(0.7)	8(1.2)	25.2(1.7)	1.6(0.8)	17.4(0.6)	13(0.4)	25.9(4.2)

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TABLE A.2.D - Share of Those with or without Access by Category (All Countries 2018-2020)

	Internet		Electricity		Computer or Tablet		Mobile Phone	
SUBGROUP	Yes	No	Yes	No	Yes	No	Yes	No
Q2 - SECOND QUINTILE	7.9(1.3)	21.3(0.5)	12(0.9)	24.3(1.1)	5.3(1.5)	19(0.5)	16.7(0.3)	21.1(1.6)
Q3 - MIDDLE QUINTILE	12.7(1.2)	22(0.4)	17(0.8)	22.1(0.7)	10.5(2.2)	20.3(0.2)	19.6(0.3)	18.5(0.7)
Q4 - FOURTH QUINTILE	22.7(1)	20.7(0.5)	24.3(0.9)	17.6(1.3)	18.5(2.8)	21.5(0.4)	22.3(0.3)	17.6(1.8)
Q5 - TOP QUINTILE	52.9(3.7)	15.7(1)	38.8(1.9)	10.9(1.5)	64.1(6.7)	21.9(0.9)	28.4(0.6)	17(3.9)
URBAN	71.8(3)	23.7(3.2)	60.3(4.2)	17.6(2.4)	82.5(4)	35.1(2.4)	41.6(2.6)	32.4(9.1)
RURAL	28.2(3)	76.3(3.2)	39.7(4.2)	82.4(2.4)	17.5(4)	64.9(2.4)	58.4(2.6)	67.6(9.1)
MALE	48.5(0.5)	47.9(0.2)	48.7(0.5)	48.1(0.2)	48.1(0.7)	48.2(0.2)	48.4(0.2)	47.4(0.2)
FEMALE	51.5(0.5)	52.1(0.2)	51.4(0.5)	51.9(0.2)	51.9(0.7)	51.9(0.2)	51.6(0.2)	52.6(0.2)
EDUCATION - NONE	26.4(2.4)	53.9(4.9)	29.9(4.8)	51.7(4.3)	21.2(4.8)	44.3(3.7)	40.1(3.8)	47.6(6.3)
EDUCATION - PRIMARY	34.9(2)	33.9(2.3)	33.5(2.6)	35.8(2.9)	30.6(1.6)	36(2.5)	36.2(2.6)	33.2(3.1)
EDUCATION - SECONDARY	29.4(2.4)	11.5(2.7)	26.4(2.7)	11.7(1.9)	34(3.6)	17.2(2.2)	19.4(2.3)	17.4(3.8)
EDUCATION - TERTIARY	9.3(1.1)	0.7(0.3)	10.2(3.9)	0.8(0.2)	14.3(3.2)	2.5(0.5)	4.3(0.7)	1.9(0.5)
INDUSTRY - AGRICULTURE	20.3(3.5)	71.7(3.6)	36(4.6)	75.2(2.8)	16.5(5)	60.1(3.9)	52.8(4.2)	67.2(8.1)
INDUSTRY - INDUSTRY	17.6(1.2)	9.1(1.3)	13.9(1.4)	7.8(1.1)	13.3(1.3)	10.5(1.2)	11.9(1.3)	7.1(0.7)
INDUSTRY - SERVICE	39(2.3)	14.2(2.4)	32.3(3)	11.8(1.8)	40.4(6.3)	19.9(2.2)	23.5(2.4)	15.7(4.8)
INDUSTRY - OTHER	23.1(1.5)	5.1(0.8)	17.9(2)	5.2(0.8)	29.7(2.9)	9.5(1.3)	11.7(1.3)	10(4.3)
EMPLOYMENT - PAID EMPLOYEE	35.5(2.2)	8.2(1.4)	26.8(2.4)	7.4(1.3)	49.2(1.8)	13.7(1.9)	17.1(2)	14.7(5.6)
EMPLOYMENT - NONPAID EMPLOYEE	18.5(1.7)	40.2(3.2)	22.2(3)	40.7(2.7)	8.1(2)	34(2.9)	32.3(3)	30.5(6.4)
EMPLOYMENT - EMPLOYER	2(0.3)	1.2(0.5)	1.9(0.5)	1.5(0.6)	3.7(1.4)	1.5(0.4)	1.3(0.3)	3(1.3)
EMPLOYMENT - SELF-EMPLOYED	44(2)	50.3(2.3)	46.6(2)	48.1(2)	36.9(2.7)	48.3(2.1)	47(2.3)	48.8(2.2)
EMPLOYMENT - OTHER	0(0)	0(0)	2.6(2.1)	2.3(2)	2.2(0.9)	2.5(2.1)	2.3(2.2)	3.1(1.7)
FEMALE-HEADED HOUSEHOLD	19.6(2.2)	16.1(1.8)	17.9(1.7)	17.9(1.5)	19.4(1.2)	17.7(1.4)	16.3(1.4)	23.2(2.5)
MALE-HEADED HOUSEHOLD	80.4(2.2)	83.9(1.8)	82.1(1.7)	82.1(1.5)	80.6(1.2)	82.3(1.4)	83.7(1.4)	76.8(2.5)

Note: How to interpret numbers in this table: 4.2% of those with internet access are poor under the $1.90 line, while 32.8% of those without internet access are poor under the same line.
Sources: Global Monitoring Database, Demographic and Health Surveys.

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TABLE A.3 - Comparison of ITU and Survey Estimates of Internet Access

COUNTRY	Year	Survey estimates: individuals with internet access (% of population)	ITU Estimates: individuals using the internet (% of population)
MADAGASCAR	2012	11.7	2.3
MOROCCO	2013	9.7	56.0
MAURITANIA	2014	3.0	11.8
CABO VERDE	2015	60.4	42.7
KENYA	2015	27.3	16.6
NAMIBIA	2015	28.7	25.7
TUNISIA	2015	21.9	46.5
DJIBOUTI	2017	23.7	55.7
GABON	2017	64.9	50.3
MAURITIUS	2017	56.1	55.4
SÃO TOMÉ AND PRÍNCIPE	2017	22.7	29.9
BENIN	2018	25.9	19.0
BURKINA FASO	2018	18.0	17.4
CHAD	2018	8.8	8.0
CÔTE D'IVOIRE	2018	39.0	37.5
GUINEA	2018	27.5	21.8
GUINEA-BISSAU	2018	41.5	15.7
MALI	2018	27.5	21.4
NIGER	2018	14.1	
SENEGAL	2018	64.3	35.3
SIERRA LEONE	2018	11.1	15.8
TOGO	2018	34.6	15.5
ZAMBIA	2018	6.9	14.3

Note: ITU and survey estimates are given for the same year.

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TABLE A.4 - Survey Questions Asked on Internet Access

COUNTRY	Survey	Internet Access	Question
BENIN	EHCVM 2018	25.93	[name]Has access to internet?
BURKINA FASO	EHCVM 2018	18	[name]Has access to internet?
CABO VERDE	IDRF 2015	60.39	has Internet access?
CHAD	EHCVM 2018	8.8	[name]Has access to internet?
CÔTE D'IVOIRE	EHCVM 2018	39.03	[name]Has access to internet?
DJIBOUTI	EDAM 2017	23.7	
GABON	EGEP 2017	64.87	Has access to internet (all connection points included)?
GUINEA	EHCVM 2018	27.52	[name]Has access to internet?
GUINEA-BISSAU	EHCVM 2018	41.53	[name]Has access to internet?
KENYA	IHBS 2015	27.3	Does your household have internet connection (any type)?
MADAGASCAR	ENSOMD 2012	11.67	Does any household member have access to internet?
MALI	EHCVM 2018	27.54	[name]Has access to internet?
MAURITANIA	EPCV 2014	2.99	Does the household or any household member have an internet connection?
MAURITIUS	HBS 2017	56.14	
MOROCCO	ENCDM 2013	9.68	
NAMIBIA	NHIES 2015	28.69	Does your household or any household member have access to internet?
NIGER	EHCVM 2018	14.07	[name]Has access to internet?
SÃO TOMÉ AND PRÍNCIPE	IOF 2017	22.71	Is the accommodation connected to an internet network or netphone?
SENEGAL	EHCVM 2018	64.33	[name]Has access to internet?
SIERRA LEONE	SLIHS 2018	11.11	Have you used internet at all in the past 12 months?
TOGO	EHCVM 2018	34.64	[name]Has access to internet?
TUNISIA	NSHBCSL 2015	21.87	
ZAMBIA	DHS 2018	6.9	Access to internet?

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TABLE A.5 - Inequities in Digital Access in African Countries by Year Group

	Internet (mean/se)			Mobile Phone (mean/se)		
POPULATION GROUP	<=2015	2016-2017	2018-2020	<=2015	2016-2017	2018-2020
ALL COUNTRIES	23.2(7.17)	47.9(11.61)	26.6(4.8)	70.4(7.07)	80(4.5)	77(6.9)
POOR - $1.90 LINE	6.9(1.42)	4.9(2.9)	4.5(1.03)	40.8(8.55)	60.1(6.35)	61.4(8.99)
POOR - $3.20 LINE	10.7(2.7)	13.8(6.21)	10.2(2.64)	52.7(8.43)	69.4(5.57)	69.6(7.94)

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TABLE A.5 - Inequities in Digital Access in African Countries by Year Group

	Internet (mean/se)			Mobile Phone (mean/se)		
POPULATION GROUP	<=2015	2016-2017	2018-2020	<=2015	2016-2017	2018-2020
POOR - $5.50 LINE	14.1(4.71)	24.8(9.43)	18(4.09)	61.8(7.83)	75.4(5.13)	72.9(8.04)
BOTTOM 40%	9.6(5.24)	27.7(10.49)	9.3(3.32)	59.3(8.63)	67.4(7.2)	67.8(6.89)
TOP 60%	30(8.23)	58.2(11.52)	35.4(5.52)	76.1(6.32)	86.8(3.23)	81.6(7.12)
Q1 - BOTTOM QUINTILE	7(4.29)	17.7(8.92)	6.5(2.73)	54.7(8.86)	61.7(8.02)	62.6(7.09)
Q2 - SECOND QUINTILE	11.9(6.14)	37.2(11.48)	11.8(3.87)	63.5(8.48)	72.6(6.51)	72.6(6.89)
Q3 - MIDDLE QUINTILE	16.1(6.87)	47.4(12.48)	17.3(4.7)	68.6(8.21)	79.9(4.83)	78.1(6.72)
Q4 - FOURTH QUINTILE	24.8(8.35)	57.8(11.63)	28.5(5.83)	73.9(7.05)	86(3.54)	80.9(7.27)
Q5 - TOP QUINTILE	44.2(9.4)	66.4(10.86)	55(5.8)	83.5(4.52)	92.7(2.03)	84.9(7.46)
URBAN	35.2(9.13)	51.6(11.46)	52.4(6.84)	86.6(3.95)	89.2(4.25)	81.1(9.64)
RURAL	12.2(4.6)	18.6(11.88)	11.8(3.17)	58.1(8.5)	72.1(6.02)	74.3(5.69)
MALE	23.2(7.01)	48(11.48)	26.8(4.7)	70.6(7.14)	80.5(4.42)	77.4(6.82)
FEMALE	23.3(7.33)	47.8(11.74)	26.4(4.9)	70.2(7.01)	79.6(4.58)	76.7(6.9)
EDUCATION - NONE	9(5.68)	30.3(12.6)	17.7(3.87)	51.5(10.89)	71.7(4.65)	72.8(8.44)
EDUCATION - PRIMARY	19.2(5.62)	40.5(7.46)	31.2(5.03)	70.6(7.36)	77.3(5.41)	77.6(8.32)
EDUCATION - SECONDARY	35.5(7.93)	57.9(9.62)	52.9(6.76)	86(5)	90.7(3.42)	78.1(10.88)
EDUCATION - TERTIARY	63.7(8.15)	80.1(10.83)	85.3(5.12)	95.3(1.25)	96.9(1.55)	88(7.32)
INDUSTRY - AGRICULTURE	3.2(1.39)	23.3(1.81)	8.8(2.42)	41.6(9.03)	74(4.59)	71(7.32)
INDUSTRY - INDUSTRY	15.9(4.16)	57.4(12.02)	40(5.55)	83.8(4.21)	86.9(4.91)	83.9(6.66)
INDUSTRY - SERVICE	23.4(7.16)	50.7(16.64)	48.5(6.1)	80.9(7.3)	89.9(3.57)	82.3(9.15)
INDUSTRY - OTHER	30.6(8.46)	58.8(18.6)	60.8(4.24)	86.9(3.09)	87.6(5.06)	78.5(12.23)
EMPLOYMENT - PAID EMPLOYEE	23.4(4.73)	62(6.41)	59.8(4.08)	87.5(2.63)	86.4(4.97)	79.8(10.79)
EMPLOYMENT - NONPAID EMPLOYEE	5.7(2.72)	54.7(2.86)	13.6(3.33)	44.2(9.6)	65.9(9.06)	78.3(5.84)
EMPLOYMENT - EMPLOYER	26.1(6.18)	47.5(7.39)	36.3(10.45)	58.1(5.28)	87.1(6.53)	60.2(16.43)
EMPLOYMENT - SELF-EMPLOYED	11.2(4.98)	38.7(8.25)	23(4.15)	52(11.47)	75.2(5.14)	76.6(6.79)
EMPLOYMENT - OTHER	14.6(5.02)	57.7(3.98)	6.8(9.36)	74.5(2.38)	88.3(4.22)	71.6(12.97)
FEMALE-HEADED HOUSEHOLD	17(4.51)	42.8(12.51)	30.6(7.69)	68.5(7.33)	77.8(5.54)	70.1(7.62)
MALE-HEADED HOUSEHOLD	17(4.36)	49.4(12.02)	25.8(4.26)	68.6(7.64)	80.9(4.31)	78.5(6.81)
	Electricity			Computer or tablet		
POPULATION GROUP	<=2015	2016-2017	2018-2020	<=2015	2016-2017	2018-2020
ALL COUNTRIES	61(7.54)	62.6(7.76)	54(5.2)	12(4.19)	12.6(3.75)	9.3(2.51)
POOR - $1.90 LINE	39.9(14.12)	29(6.64)	25.8(4.5)	0.5(0.18)	0.6(0.18)	2.8(1.78)
POOR - $3.20 LINE	43.2(10.29)	41(7.1)	35.6(5.2)	1.4(0.4)	1.7(0.55)	4(2.28)
POOR - $5.50 LINE	49.9(8.24)	52.5(7.55)	44.6(5.38)	3.5(1.16)	4.2(1.45)	5.7(2.75)

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TABLE A.5 - Inequities in Digital Access in African Countries by Year Group

	Electricity			Computer or tablet		
POPULATION GROUP	<=2015	2016-2017	2018-2020	<=2015	2016-2017	2018-2020
BOTTOM 40%	48.4(9.76)	45.3(9.32)	32(6.25)	3.5(1.83)	4.2(2.47)	1.9(1.07)
TOP 60%	67(6.68)	71.7(6.96)	64.8(5)	16.2(5.36)	17.1(4.48)	13.1(3.28)
Q1 - BOTTOM QUINTILE	45.6(10.23)	38.3(9.08)	27(6.34)	2(1.07)	2.7(1.68)	1(0.64)
Q2 - SECOND QUINTILE	50.9(9.4)	51.8(9.79)	36.4(6.25)	4.9(2.53)	5.5(3.2)	2.8(1.49)
Q3 - MIDDLE QUINTILE	56.3(8.53)	60(9.14)	47.2(6.23)	7.7(3.58)	8.8(4.17)	5.1(2.39)
Q4 - FOURTH QUINTILE	63.8(7.34)	68.1(8.1)	61.6(5.65)	12.2(5.1)	12.3(4.55)	8.1(3.34)
Q5 - TOP QUINTILE	77.2(5.13)	83.4(4.38)	80.6(3.96)	25.6(6.95)	27.6(4.98)	23.2(4.05)
URBAN	79.6(5.16)	82.8(5.58)	78.3(3.49)	21.9(6.28)	22.6(5.94)	19.5(4.31)
RURAL	45.4(9.81)	43.4(8.93)	33.7(5.54)	4.1(1.77)	3.9(1.36)	2.7(1.08)
MALE	61(7.6)	62.7(7.73)	54.3(5.26)	12.1(4.2)	12.9(3.8)	9.3(2.46)
FEMALE	61.1(7.48)	62.6(7.79)	53.7(5.16)	11.8(4.18)	12.3(3.7)	9.3(2.54)
EDUCATION - NONE	45.9(10.91)	50.1(8.96)	44(6.01)	3.9(2.21)	5.3(1.41)	5.3(2.28)
EDUCATION - PRIMARY	60.7(7.98)	57.6(7.57)	56(4.81)	8.9(3.53)	7.4(3.03)	9(2.92)
EDUCATION - SECONDARY	71.7(6.41)	79.3(5.61)	75.4(4.57)	18.6(5.65)	19.3(6.66)	18.7(5.76)
EDUCATION - TERTIARY	91.8(2.04)	94.2(2.41)	94.8(2.82)	50(8.87)	51.2(6.82)	40.2(5.59)
INDUSTRY - AGRICULTURE	46.8(13.71)	39(6.25)	30.8(6.49)	1.3(0.64)	1.6(0.37)	2.6(1.37)
INDUSTRY - INDUSTRY	79(7.11)	66.8(6.84)	62.4(5.04)	17.1(5.37)	9.3(1.26)	10.9(2.98)
INDUSTRY - SERVICE	69.4(8.16)	78.6(4.38)	71.8(4.66)	15(6.01)	16.6(2.08)	16.4(4.62)
INDUSTRY - OTHER	75.2(6.01)	79.4(5.66)	76.2(3.34)	27.7(7.76)	17(2.01)	23(4.84)
EMPLOYMENT - PAID EMPLOYEE	79.6(7.14)	74.6(8.31)	76.5(3.39)	21.6(6.81)	23.6(7.64)	24.1(4.75)
EMPLOYMENT - NONPAID EMPLOYEE	54.7(14.57)	45.4(8.57)	33(6.36)	1.5(0.61)	2.5(1.04)	2.1(0.58)
EMPLOYMENT - EMPLOYER	81.9(3.13)	83.6(5.61)	53.2(7.83)	7(5.49)	20.3(3.4)	18(6.81)
EMPLOYMENT - SELF-EMPLOYED	43.7(11.77)	49(9.82)	46.6(5.97)	3.3(1.54)	5.9(2.59)	6.3(2.1)
EMPLOYMENT - OTHER	65.5(3.55)	56.6(15.61)	50.4(2.07)	4(1.74)	7.5(1.93)	7.2(6.5)
FEMALE-HEADED HOUSEHOLD	54.3(5.74)	61.6(7.21)	51.3(5.48)	7.1(1.99)	8.7(1.82)	10.1(3.05)
MALE-HEADED HOUSEHOLD	60.3(8.56)	63(8.22)	51.3(4.7)	9.5(3.59)	14.2(4.52)	9.2(2.41)

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TABLE A.6 - Surveys in Each Period

Group 1: 2008 - 2015		Group 2: 2016 - 2017		Group 3: 2018 - 2020	
Country	Survey year	Country	Survey Year	Country	Survey Year
Central African Republic	2008	Burundi	2016	Angola	2018
Congo, Rep.	2011	Eswatini	2016	Benin	2018
Congo, Dem. Rep.	2012	Ghana	2016	Burkina Faso	2018
Madagascar	2012	Liberia	2016	Cameroon	2018
Morocco	2013	Malawi	2016	Chad	2018
Mauritania	2014	Rwanda	2016	Côte d'Ivoire	2018
Mozambique	2014	South Africa	2016	Guinea	2018
Sudan	2014	Uganda	2016	Guinea-Bissau	2018
Botswana	2015	Djibouti	2017	Mali	2018
Cabo Verde	2015	Egypt, Arab Rep.	2017	Niger	2018
Ethiopia	2015	Gabon	2017	Nigeria	2018
Kenya	2015	Lesotho	2017	Senegal	2018
Namibia	2015	Mauritius	2017	Seychelles	2018
Tunisia	2015	São Tomé and Principe	2017	Sierra Leone	2018
		Zimbabwe	2017	Tanzania	2018
				Togo	2018
				Zambia	2018
				Gambia, The	2020

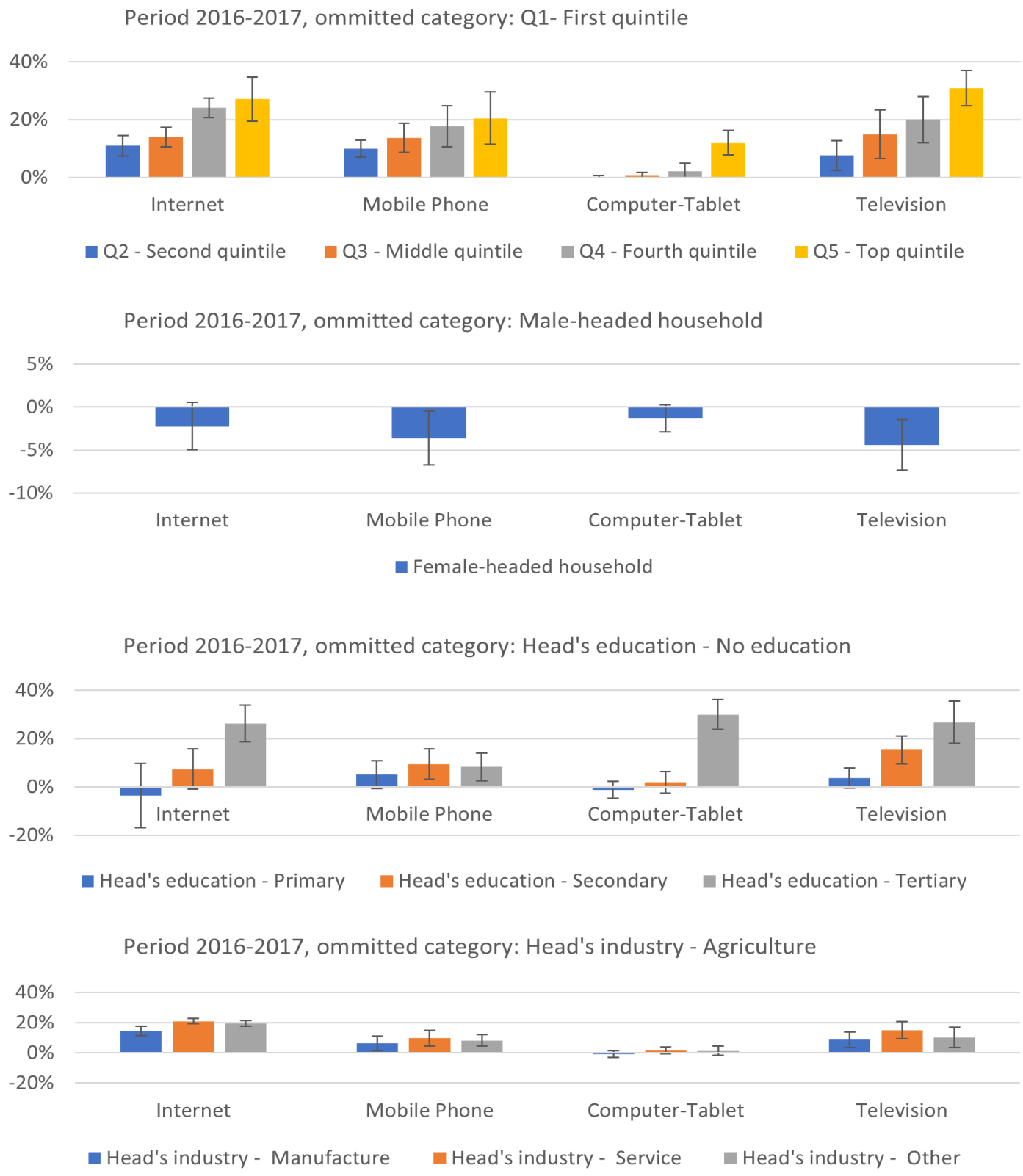
> > >

FIGURE A.1 - Conditional Correlation, 2008-2015

Note: Robust standard errors clustered at the country level, country and year fixed effects included. Omitted categories are bottom quintile, male-headed households, head has no education, head's industry is agriculture.

> > >

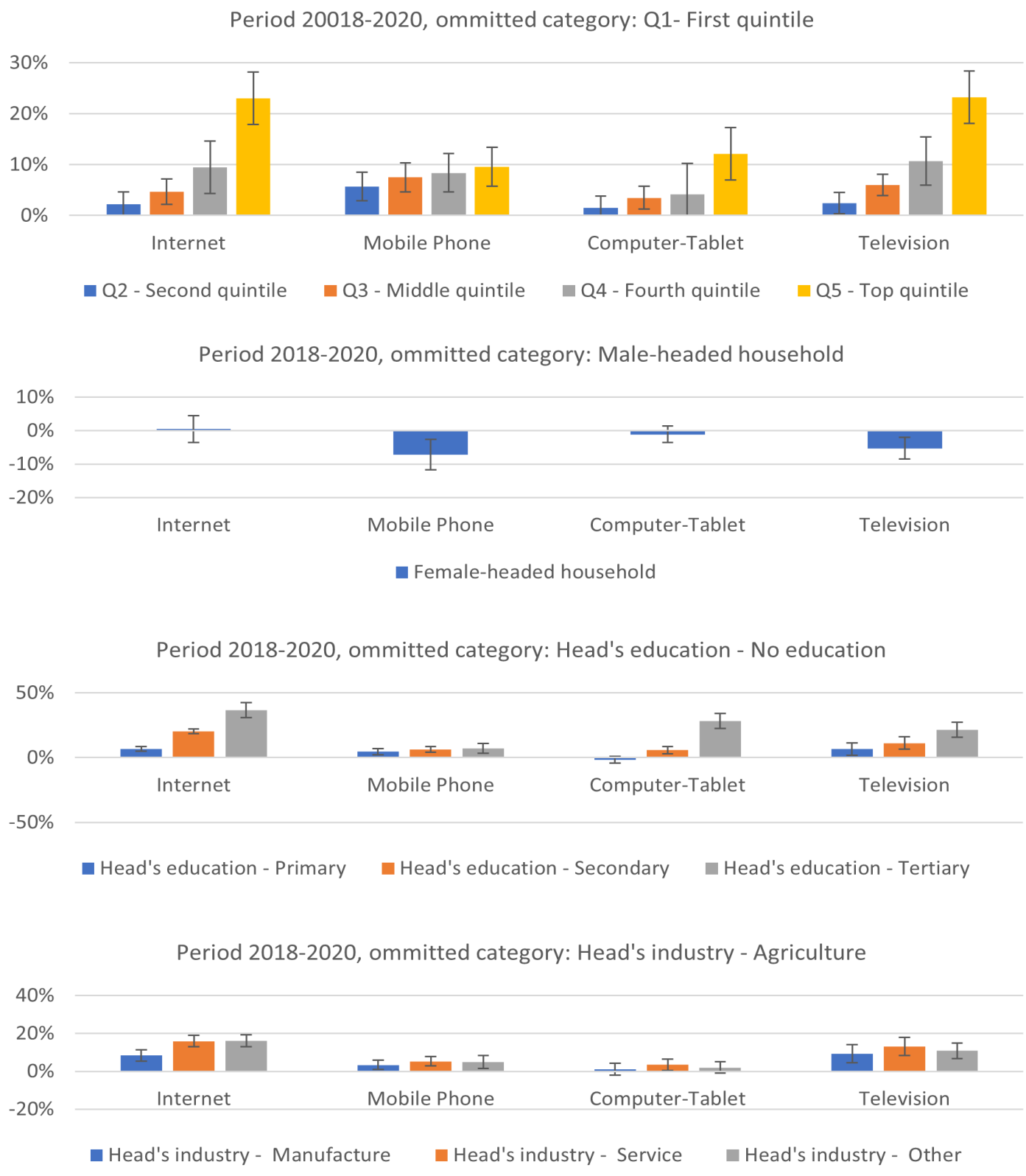
FIGURE A.2 - Conditional Correlation, 2016-2017



Note: Robust standard errors clustered at the country level, country and year fixed effects included. Omitted categories are bottom quintile, male-headed households, head has no education, head's industry is agriculture.

> > >

FIGURE A.3 - Conditional Correlation, 2018-2020



Note: Robust standard errors clustered at the country level, country and year fixed effects included. Omitted categories are bottom quintile, male-headed households, head has no education, head's industry is agriculture.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