

From phone access to food markets: How mobile connectivity is transforming rural livelihoods in West Africa

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BACKGROUND

- **Market failures and low productivity in African agricultural sectors represent a critical obstacle to structural transformations**, and a cause of premature deindustrialization in some cases (Rodrik, 2016; Suri & Udry, 2022)
- **Reducing information search, distance, and other transaction costs is a major challenge for rural livelihoods in West-Afr**, a region plagued with missing or remote infrastructures, underdeveloped financial systems, and strong exposure to rising climatic, geopolitical, and socio-political risks (Bouët et al., 2023; McGuirk & Nunn, 2023, 2024)
- By bringing together **information/communication and financial functions (mobile money)** in a simple and affordable device at large scale, "feature phones" connectivity may have a transformative impact across markets and on rural livelihoods (Aker & Mbiti, 2010; Aker & Cariolle, 2023; Suri et al., 2023).

LITERATURE & RESEARCH QUESTION

- **Mobile connectivity reduces agricultural price dispersion**, often through rising farm-gate and market prices (Jensen, 2007; Goyal, 2010; Aker, 2010; Courtois & Subervie, 2015; Aker & Fafchamps, 2015; Soldani et al., 2023)
- **Standard interpretation: supply-driven integration** — better spatial allocation of farm output and stronger bargaining power through improved information access and reduced transport/storage/marketing costs (Tack & Aker, 2014; Aker & Fafchamps, 2015; Von Cramon-Taubadel, S. & Goodwin, 2021).
- **Demand-side channel: rural demand as a driver of price convergence**. Connectivity boosts household consumption and welfare in under-priced rural areas by expanding access to off-farm/non-ag income, remittances, and mobile money—raising local prices and narrowing rural–urban gaps (Wantchekon & Riaz, 2019; Masaki et al., 2020; Jack & Suri, 2014; Bahia et al., 2023, 2024; Suri et al., 2023; Batista & Vicente, 2025).

Research Questions

Does mobile connectivity spur food price convergence at the regional scale and across a broad range of food products?

If so, could this process be driven by local demand rather than supply-side integration?

CONTRIBUTION

- **Large-scale empirical analysis of the impact of mobile network connectivity on food price dispersion and HH consumption patterns** across 8 WAEMU countries, 5,000 EAs, and for 146 food products.
- **Disentangles supply- and demand-side mechanisms** behind reduced price dispersion, highlighting **localized rural–urban price catch-up**, driven by **greater HH food demand**, supported by **financial inclusion** and **income source diversification** in rural areas.
- **Bridges three strands of the digital-for-development literature:** (1) *higher commodity price and reduced dispersion* (Jensen, 2007; Aker, 2010; Goyal, 2010; Soldani et al., 2021), (2) *greater household food consumption and security* (Nakasone & Torero, 2016; Wantchekon & Riaz, 2019), and (3) *off-farm income diversification* (Chiplunkar & Goldberg, 2022; Bahia et al., 2023, 2024).
- **Introduces harmonized unit conversion factors** for non-standard local measures, allowing granular analysis at regional scale of prices and (self-)consumed quantities across wide range of commodities.

OUTLINE

- 1 Introduction
- 2 Empirical framework
 - Hypothesis testing
 - Data & empirical approach
- 3 Baseline results
- 4 Mechanisms and robustness checks
- 5 Concluding remarks

HYPOTHESES

Mobile network access is expected to **reduce food price dispersion** through supply and demand-side mechanisms.

Supply effects connectivity should play *across distant connected markets* and for *perishable/semi-perishable goods* (limited storability).

Demand effects of connectivity should play *locally, across all product types*, leading to a *rural–urban price catch-up*.

- ④ **H1 (Supply-side integration):** Connectivity reduces spatial price dispersion.
- ② **H2 (Demand-side transformation):** Connectivity raises rural prices, narrowing rural–urban gaps.
- ③ **H3 (Scale differentiation):** Supply effects play across distant markets; demand effects play locally.
- ④ **H4 (Product scope):** Supply effects stronger for perishables and non-perishables.

DATA

- **WB's harmonized cross-section LSMS-EHCVM** collected in 2018-2019, covering **59,319 households (HHs)**, **146 food products**, **4,983 enumeration areas (EAs)**, **481 districts**, **106 regions** in the 8 member states of the West African Economic and Monetary Union (WAEMU) :

Country	# HHs	# EAs	# Districts	# Regions
Benin	8,012	670	77	12
Burkina Faso	7,010	585	45	13
Côte d'Ivoire	12,992	1,084	108	33
Guinea-Bissau	5,351	450	46	9
Mali	6,602	551	55	11
Niger	6,024	504	62	8
Senegal	7,156	598	45	14
Togo	6,172	541	43	6
Total	59,319	4,983	481	106

EMPIRICAL APPROACH

① EA-level analysis:

- Network connectivity and food-product price dispersion
- Network connectivity and rural-urban food price catch-up

② HH-level analysis:

- Mobile connectivity and HH food consumption
- Mobile connectivity and HH income sources

ESTIMATION FRAMEWORKS

1. Dyadic model: does joint connectivity narrow price gaps between EAs?

$$|\Delta Y_{zz'j}| = \delta \text{CON}_{zz'} + \theta X_{zz'} + \mu_{ij} + \mu_{aa'} + \mu_z + \mu_{z'} + \varepsilon_{zz'j}$$

2. IV approach: does mobile connectivity raise food price, HH food demand, and income ?

$$Y_{z/h,j} = \alpha \text{CON}_{z/h} + \Gamma X_{z/h} + \sum_{f \in \mathcal{F}} \eta_f + \mu_t + \varepsilon_{z/h,j}$$

$$\text{CON}_{z/h} = \beta Z_{z/h} + \Lambda X_{z/h} + \sum_{f \in \mathcal{F}} \eta_f + \mu_t + u_{z/h}$$

- $Y_{z,j}$: EA food-prod price P_{zj} in XOF/g, 1n
- $Y_{h(,j)}$: HH food spending pc, non-ag income pc, quantities of prod. j consumed/purchased/self-cons pc.
- CON_z : EA network proximity || $\text{CON}_h = \text{CON}_z \times \text{AD}_h$, with AD_h the # of mob. phones in the HH.
- Z_z : population-weighted daily lightning strikes (1998–2013) || $Z_h = Z_z \times \text{AD}_h$.
- $X_{z/h}$: controls; μ_t : survey-wave FE; $\sum_{f \in \mathcal{F}} \eta_f$: fixed effects with $\mathcal{F} \in \{a, j, a \times j\}$ (e.g., district, product, or district $\times$ product).

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- 3 Baseline results**
 - Network connectivity and food product market prices
 - Mobile connectivity and HH demand for food products
- 4 Mechanisms and robustness checks
- 5 Concluding remarks

PRICE DISPERSION - DYADIC EST.

Mobile network coverage and price dispersion in the WAEMU: Dyadic estimations.

Dep. var.: $\ln \Delta p_{zz'} $	(1)	(2)	(3)	(4)	(5)
Within variation :		Country		Region zz'	District zz'
$CON_{zz'} (<2\text{km}, 0/1)$	-0.0239*** (0.0019)	-0.0092*** (0.0009)	-0.0168** (0.0051)	-0.0126*** (.0034)	-0.0134** (0.0029)
$CON_{zz'} \times \text{Bilateral dist.}$			-0.0049*** (0.0009)	0.0008 (0.0006)	0.0013*** (0.0005)
Bilateral dist. (km, ln)		0.0207*** (0.0006)	0.0230*** (0.0007)	0.0058*** (0.0006)	0.0071*** (0.0013)
$ \Delta \text{Nightlights} $		0.0001*** (0.00003)	0.0001*** (0.00003)	0.0002*** (0.00002)	0.0002*** (0.00002)
Same district (0/1)		-0.0324*** (0.0047)	-0.0349*** (0.0046)	-0.0187*** (0.0023)	- -
Admin. unit zz' FE	No	No	No	Region zz'	District zz'
Observations	20,201,454	19,154,484	19,154,484	19,154,484	19,154,484
EAs	4,916	4,709	4,709	4,709	4,709
R^2 (adj.)	0.440	0.444	0.445	0.448	0.450

Notes: Robust standard errors in parentheses, clustered by origin z and destination z' enumeration areas (EAs) and their paired district zz' . $CON_{zz'}$ is a dummy variable indicating that EA z and z' are both located within a 2km-distance from the closest 2G+ cell-tower. All regressions include $EA_{zz'}$, $EA_{zz'}$ FEs, and country $\times$ product FEs. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

PRICE DISPERSION - DYADIC EST.

Dep. var.: $\ln \Delta p_{zz'} $	(1)	(2)	(3)	(4)	(5)	(6)
Within variability:	Country		Region zz'		District zz'	
	Panel A: Perishable products					
$CON_{zz'} (<2\text{km}, O/1)$	-0.0138*** (0.0026)	0.0241** (0.0118)	-0.0113*** (0.0023)	-0.0241*** (0.0088)	-0.0053*** (0.0019)	-0.0022 (0.0077)
$CON_{zz'} \times \ln \text{Dist}_{zz'}$		-0.0071*** (0.0021)		0.0024 (0.0016)		-0.0006 (0.0014)
$\ln \text{Dist}_{zz'}$	0.0315*** (0.0014)	0.0345*** (0.0017)	0.0119*** (0.0016)	0.0105*** (0.0016)	0.0080*** (0.0027)	0.0084*** (0.0026)
Observations	1,737,072	1,737,072	1,737,072	1,737,072	1,736,764	1,736,764
R ² (adj.)	0.383	0.383	0.404	0.404	0.427	0.427
	Panel B: Semi-perishable products					
$CON_{zz'} (<2\text{km}, O/1)$	-0.0101*** (0.0028)	0.0691*** (0.0140)	-0.0074*** (0.0022)	-0.0297*** (0.0098)	-0.0019 (0.0020)	-0.0324*** (0.0093)
$CON_{zz'} \times \ln \text{Dist}_{zz'}$		-0.0151*** (0.0025)		0.0042** (0.0017)		0.0058*** (0.0017)
$\ln \text{Dist}_{zz'}$	0.0339*** (0.0022)	0.0418*** (0.0023)	0.0073*** (0.0017)	0.0045** (0.0019)	0.0095*** (0.0027)	0.0048* (0.0027)
Observations	1,477,602	1,477,602	1,477,602	1,477,602	1,476,924	1,476,924
R ² (adj.)	0.542	0.542	0.570	0.570	0.591	0.591
	Panel C: Non-perishable products					
$CON_{zz'} (<2\text{km}, O/1)$	-0.0048*** (0.0011)	0.0019 (0.0050)	-0.0037*** (0.0010)	0.0003 (0.0037)	-0.0033*** (0.0010)	-0.0052 (0.0040)
$CON_{zz'} \times \ln \text{Dist}_{zz'}$		-0.0013 (0.0009)		-0.0007 (0.0007)		0.0004 (0.0008)
$\ln \text{Dist}_{zz'}$	0.0102*** (0.0006)	0.0108*** (0.0007)	0.0020*** (0.0006)	0.0025*** (0.0005)	0.0034*** (0.0011)	0.0032*** (0.0008)
Observations	3,309,354	3,309,354	3,309,354	3,309,354	3,309,232	3,309,232
R ² (adj.)	0.506	0.506	0.514	0.514	0.520	0.520

RURAL-URBAN PRICE GAP - IV EST.

Does connectivity foster the spatial convergence of food prices between rural and urban areas?

Network connectivity and the rural-urban food price gap, 2SLS

Dep. Var.:	(1)	(2)	(3)	(4)
	Food price level (XOF, ln)		Abs. dev. from avg district urban prices (%)	
			Gap < 0	Gap > 0
2G+ <2km (0/1)	0.0402*** (0.0125)	0.053*** (0.016)	-0.047** (0.019)	0.207*** (0.060)
2G+ <2km × urb.		-0.066*** (0.020)	0.004 (0.026)	-0.533*** (0.072)
Controls	Yes	Yes	Yes	Yes
Observations	346,377	356,546	147,104	159,209
KP Wald F-stat	1453	802.8	407.4	450.5
KP rank LM-stat	384.5	659.3	315.3	362.6

Std errors robust to heteroskedasticity and clustered at the district-product level. C/NC stands for converted/non converted. Controls include the nighttime light density, the population density, the EA population size, rainfall variables, and an urban dummy, *** p<0.01, ** p<0.05, * p<0.1.

HH FOOD DEMAND - IV EST.

Mobile connectivity and HH food spending (HFS), 2SLS.

Dep. var.: HFS / HH mem. (XOF, ln)	(1)	(2)	(3) All HHs	(4)	(5)	(6) Agr. HHs	(7) Urban	(8) Rural
$CON_z \times \# \text{ mob. (A)}$	0.181*** (0.042)	0.129*** (0.029)	0.129*** (0.032)	0.1139*** (0.0309)	0.1130*** (0.0330)	0.423** (0.188)	0.112** (0.047)	0.370*** (0.143)
# mobile phones (B)	-0.142*** (0.028)	-0.078*** (0.021)	-0.077*** (0.021)	-0.0622*** (0.0207)	-0.0613*** (0.0219)	-0.127** (0.061)	-0.093** (0.045)	-0.123** (0.049)
$CON_z (<2\text{km}, 0/1)$				-0.278* (0.147)	-0.281** (0.114)			
Farm sales / HH mem.						0.004*** (0.001)		
Marginal effect: (A) + (B)	0.039	0.053	0.051	0.052	0.052	0.296	0.019	0.247
Other controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Admin FEs	EA	EA	EA	District	Region	EA	EA	EA
Survey wave FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	EA	EA	District	EA	EA	EA	EA	EA
Observations	56,819	56,234	56,234	54,886	54,886	30,421	23,135	33,099
KP Wald F-stat	101.6	104.2	34.77	14.60	29.08	10.69	47.57	12.20
LM-weak	66.71	67.77	18.87	19.78	33.39	8.439	21.64	9.801

Notes: Standard errors robust to heteroskedasticity and clustering in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. CON_z refers to 2G+ network distance variables. Endogenous regressor ($CON_z \times \# \text{ mobiles}$) instrumented by population-weighted lightning strike density interacted with the number of mobile phones in the household. Second-stage estimates reported. Food spending and farm sales per household member are expressed in XOF, deflated, and transformed in logarithm. Controls additionally include non-food spending per household member (XOF, ln), but results are not affected by this variable exclusion.

HH FOOD DEMAND - IV EST.

Mobile connectivity and quantities of food (self-)consumed, 2SLS.

Dep. var.:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Quantity of commodity per HH member (grams, ln):								
	All EAs			Urban EAs			Rural EAs		
	Cons.	Purch.	Self-Cons	C	P	SC	C	P	SC
CON $z \times \# \text{mob. (A)}$	0.198*** (0.023)	0.290*** (0.037)	-0.088*** (0.027)	0.235*** (0.041)	0.303*** (0.075)	-0.029 (0.041)	0.397*** (0.074)	0.601*** (0.138)	-0.183** (0.086)
# mobile phones (B)	-0.136*** (0.017)	-0.222*** (0.029)	0.067*** (0.020)	-0.213*** (0.040)	-0.282*** (0.072)	0.027 (0.039)	-0.156*** (0.031)	-0.270*** (0.071)	0.080** (0.036)
Marginal effect (A) + (B)	0,062	0,068	-0,021	0,022	0,021	-0,002	0,241	0,331	-0,103
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EA FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey wave FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Product-unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	941,659	731,57	1,153,711	479,068	414,111	554,037	462,163	337,035	588,709
KP Wald F-stat	329	99.38	318.8	153.1	39.83	153.3	59.77	90.38	37.53
KP rank LM-stat	216.3	73.88	215.4	92.40	19.04	87.80	48	16.95	31.85

Notes: Standard errors in brackets, robust to heteroskedasticity and clustered by household. Results are also robust to clustering at the EA level and can be provided upon request. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Reported first-stage statistics are robust to heteroskedasticity and clustering. C, P, and SC denote consumed, purchased, and self-consumed, respectively.

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 - Income sources diversification
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Mobile money (MM) and food spending

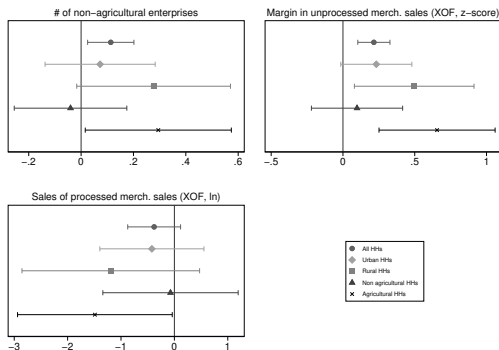
	(1)	(2)	(3)	(4)	(5)
Dep. Var:	Food spending per HH member (XOF, ln)				
	All HHs		Urban		Rural
Dist. 2G+ <2km (0/1) × nb. tel	0.128*** (0.029)		0.098*** (0.029)	0.094** (0.048)	0.301* (0.182)
Dist. 2G+ <2km (0/1) × MM		0.202*** (0.068)	0.165** (0.068)	0.054 (0.104)	0.305** (0.134)
MM account owner (0/1)		−0.170*** (0.039)	−0.147*** (0.039)	−0.091 (0.092)	−0.161** (0.064)
# Mobile phones	−0.073*** (0.020)	0.015*** (0.003)	−0.052*** (0.019)	−0.074 (0.046)	−0.093** (0.047)
HH controls	Yes	Yes	Yes	Yes	Yes
EA & Survey wave FEs	Yes	Yes	Yes	Yes	Yes
Observations	56,211	56,211	56,211	23,116	33,095
KP Wald F-stat	103.9	108.7	51.20	24.49	5.813
LM-weak	67.66	69.33	66.82	21.94	9.316

Notes: Standard errors in parentheses, robust to heteroskedasticity and clustered by EA. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Control variable estimates not reported. Control variables additionally include non-food spending per household member, but results are robust to its exclusion.

Same results with food quantities of food consumed/purchased by HHs, but no signif. effect on self-consumption.

AGRICULTURAL AND NONAGRICULTURAL REVENUES - IV EST.

Marginal Effects (2SLS)



Increase in food demand is associated with **non-agr. enterprise creation** and **greater margins in unprocessed merch. sales**, but **reduced sales of processed merch.** for rural and agricultural HHs.

Suggests a **substitution effect** → shift from value-added processing toward simpler but more profitable trade activities.

ADDITIONAL EVIDENCE AND ROBUSTNESS CHECKS

Results are robust to a wide range of robustness checks:

- Using alternative connectivity variables, informing on **the long term** and **quality effects** of network connectivity. [▶ LT](#) [▶ Quality](#)
- Testing overid assumption [▶ Exclusion](#) [▶ Placebo](#) [▶ SUTVA](#)
- Sensitivity tests [▶ here](#)
- Using spatial extraction approaches robust to anonymization (Michler et al., 2022) [▶ here](#)
- Reduced-form estimations [▶ here](#)

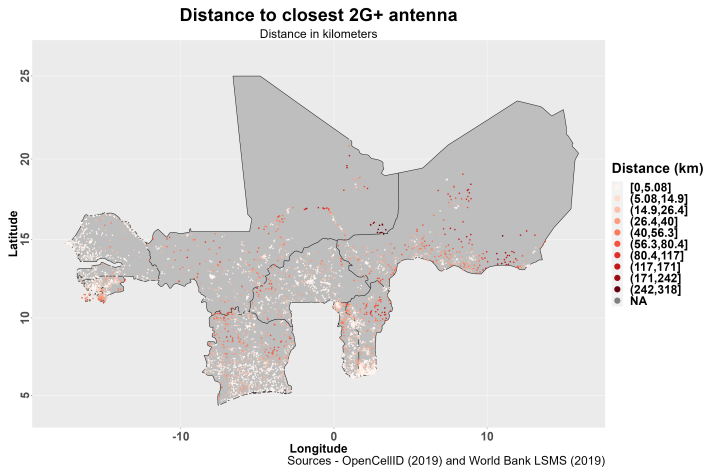
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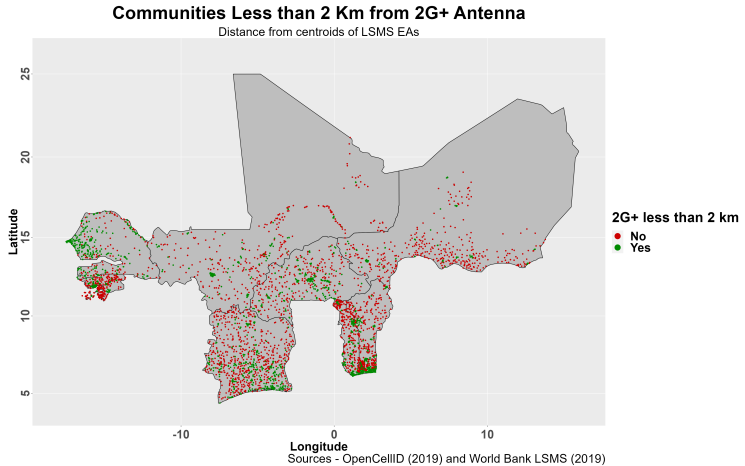
CONCLUDING REMARKS

- ❶ **Mobile network expansion reduces food-product price dispersion** by inducing a food-price catch-up in rural areas.
- ❷ Food price patterns are driven by **greater market demand for food-product and lower reliance on self-consumption** by rural connected HHs.
- ❸ Increase in food market demand, partly explained by **greater financial inclusion through mobile-money adoption**.
- ❹ ... and concomitant to **income diversification into unprocessed merchandise trade activities**.
- ❺ However, **negative externality of mobile connectivity on unconnected HHs**, since the latter face food prices increase without benefiting from digitalization.

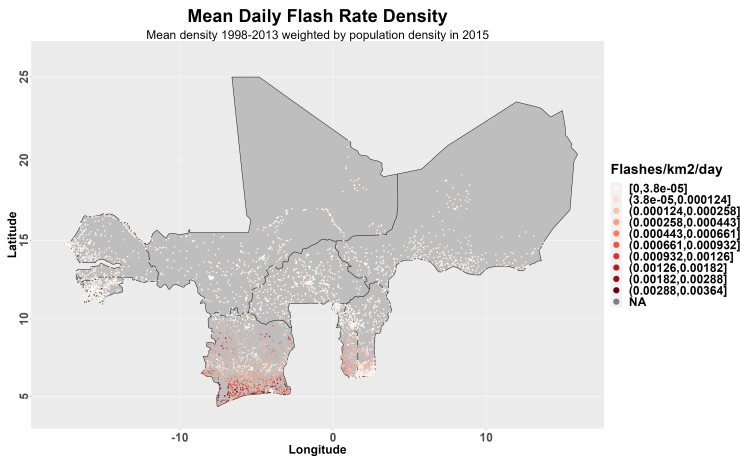
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IDENTIFICATION STRATEGY



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LONG TERM EFFECT

Dep. Var:	(1)	(2)	(3)	(4)	(5)	(6)
	NC prices (XOF, ln)		C price (XOF / gram)		C price gap (%)	
					Gap < 0	Gap > 0
Network earliness (years)	0.028*** (0.007)	0.042*** (0.009)	0.040* (0.021)	0.090* (0.046)	-0.030*** (0.005)	-0.005 (0.011)
Netw. earliness × urb (0/1)		-0.036*** (0.010)		-0.108* (0.065)	0.031*** (0.006)	0.013 (0.012)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
EA FEs	Yes	Yes	Yes	Yes	Yes	Yes
Survey FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	129,140	129,140	355,600	355,600	190,239	163,108
AR F-stat	0.000141	1.05e-05	0.0617	0.137	1.37e-07	0.418
KP Wald F-stat	1476	585.2	2064	808.1	529.3	429.9
LM-weak	468.1	619.1	489	547.3	448.4	404.5

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DEALING WITH SPATIAL ANONYMIZATION (MICHLER ET AL., 2022)

	(1)	(2)	(3)	(4)
Dep var: Non converted price (XOF, ln)	Bilinear extraction		Polynomial extraction	
Distance 2G+ <2km (0/1)	0.110*** (0.035)	0.150*** (0.039)	0.108*** (0.033)	0.150*** (0.036)
Distance 2G+ <2km (0/1) x urban		-0.119*** (0.046)		-0.133** (0.054)
Controls	Yes	Yes	Yes	Yes
District-prod-unit FE	Yes	Yes	Yes	Yes
Survey wave FEs	Yes	Yes	Yes	Yes
Observations	129,670	129,670	121,477	121,477
AR F-stat (p-val)	0.00081	5.31e-05	0.00027	4.0e-07
KP Wald F-stat	47.59	23.22	46.13	21.25
LM-weak	31.62	37.23	32.92	45.49

Standard errors in parentheses, robust to heteroskedasticity and clustered by EA. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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REDUCED FORM ESTIMATIONS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ln P		CVP	Food spend. pc	Div. cons.	Div. self-cons.	Quant. cons	Quant. purch.	Quant. self-cons.
Lightning risk	-30.345*** (8.797)	-36.746*** (8.991)							
Lightning risk × urban		29.793** (12.234)							
Unweighted lightning risk			0.002** (0.001)						
Lightning risk × # mob				-50.313*** (11.534)	-740.15** (172.70)	683.413*** (103.481)	-94.741*** (10.666)	-143.660*** (12.053)	39.522*** (12.397)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Spatial & prod FEs	District-prod.	District-prod.	Region-prod.	EA	EA	EA	EA; Prod	EA; Prod	EA; Prod
Observations	129,740	129,740	19,450	56,829	56,829	56,829	950,617	757,895	1,153,952
R2	0.968	0.968	0.500	0.705	0.622	0.631	0.758	0.815	0.393

Standard errors in brackets, robust to heteroskedasticity and clustered at differing administrative levels. Survey wave FEs included in all estimations.

* p < 0.1, ** p < 0.05, *** p < 0.01.

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TESTING THE EXCLUSION RESTRICTION

Dep. Var (ln, XOF):	(1)	(2)	(3)	(4)	(5)	(6)
	EA food spending			EA farm sales		
	OLS	OLS	2SLS	OLS	OLS	2SLS
IV - lightning	-288.983** (127.32)	34.024 (128.56)		516.143*** (179.08)	-52.603 (169.46)	
Dist. 2G+ (ln, km)		-0.260*** (0.023)	-0.233** (0.102)		0.503*** (0.065)	0.457*** (0.141)
Observations	4,643	4,643	4,643	3,783	3,783	3,783
AR F-stat			0.0237			0.00413
KP F-stat			64.80			51.07
LM-weak			17.33			20.49

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Dep. Var: Food spending pc (XOF, ln)	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline sample		Early adopters		Late adopters	
	2nd-stage	1st-stage	2nd-stage	1st-stage	2nd-stage	1st-stage
Dist 2G+ (km, ln) $\times$ # mob.	-0.051*** (0.012)		7.048 (74.356)		-0.076*** (0.018)	
IV $\times$ # mob.		989.935*** (119.301)		-8.084 (85.323)		857.302*** (106.296)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
EA FEs	Yes	Yes	Yes	Yes	Yes	Yes
Survey wave FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56,829	56,829	12,798	12,798	43,164	43,164
AR F-stat	1.24e-05		0.00411		2.31e-05	
KP Wald F-stat	68.85		0.00898		65.05	
LM-weak	55.81		0.00904		43.93	

F&D

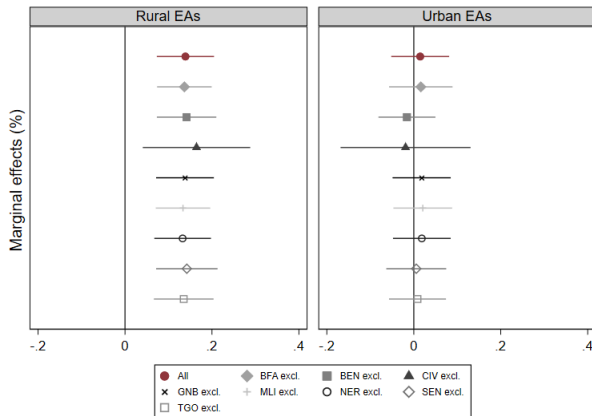
DOES THE SUTVA HOLD?

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var (ln):	HH food spend pc (XOF)			HH food-prod consump. pc (ln, grams)		
(A) Dist. 2G+ <2km (0/1) × # mob. cell	0.128*** (0.030)	0.153*** (0.039)	0.140*** (0.045)	0.196*** (0.032)	0.228*** (0.043)	0.233*** (0.054)
(B) Dist. 2G+ <2km (0/1)			-0.302* (0.180)			-0.347** (0.137)
(C) Mobile incidence × # mob. cell		-0.236*** (0.076)	-0.181** (0.078)		-0.353*** (0.090)	-0.304*** (0.094)
(D) Mobile incidence			0.271*** (0.099)			0.372***
(E) # mob. cell	-0.076*** (0.020)	0.131*** (0.050)	0.088* (0.048)	-0.076*** (0.020)	0.131*** (0.050)	0.132** (0.055)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
EA FEs	Yes	Yes	No	Yes	Yes	No
District FEs	No	No	Yes	No	No	Yes
Prod-unit FEs	No	No	No	Yes	Yes	Yes
Survey wave FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56,817	56,817	55,466	950,458	950,458	923,548
AR F-stat (p-val)	1.29e-05	2.32e-05	0.00168	1.15e-08	2.03e-08	1.15e-06
KP Wald F-stat	102.3	74.82	13.24	99.05	80.22	6.991
LM-weak	67.66	44.51	9.420	66	44.34	5.227

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SENSITIVITY TESTS

Rural-urban price catchup(Eq. 1, var dep: $\ln P_{z,j}$), 2SLS, marginal effects.



FOOD DEMAND VS FARM SALES

The moderating effect of food demand, dyadic estimations

Dep. var.: $\ln \Delta p_{zz'} $	(1)	(2)	(3)	(4)	(5)	(6)
	Demand channel ($ \Delta$ Food spending)			Supply channel ($ \Delta$ Farm sales)		
Within variability:	Country	Region	District	Country	Region	District
$CON_{zz'}$ (<2km, O/1)	0.0044 (0.0041)	0.0035 (0.0036)	0.0033 (0.0034)	-0.0028 (0.0020)	-0.0050*** (0.0016)	-0.0038** (0.0016)
$CON_{zz'} \times \Delta$ Food spending	-0.00055*** (0.00020)	-0.00047*** (0.00018)	-0.00040** (0.00017)	— —	— —	— —
$CON_{zz'} \times \Delta$ Farm sales	— —	— —	— —	-0.00023** (0.00010)	-0.00007 (0.00008)	-0.00005 (0.00008)
$ \Delta$ Food spending (XOF, ln)	0.00054*** (0.00011)	0.00047*** (0.00010)	0.00035*** (0.00009)	0.00044*** (0.00010)	0.00038*** (0.00009)	0.00028*** (0.00008)
$ \Delta$ Farm sales (XOF, ln)	0.00039*** (0.00007)	0.00017*** (0.00006)	0.00014*** (0.00005)	0.00048*** (0.00008)	0.00020*** (0.00007)	0.00016*** (0.00006)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Region _{zz'} FE	No	Yes	No	No	Yes	No
District _{zz'} FE	No	No	Yes	No	No	Yes
Observations	10,939,828	10,939,828	10,939,810	10,939,828	10,939,828	10,939,810
Adj. R ²	0.4627	0.4668	0.4683	0.4627	0.4668	0.4683

Notes: Robust standard errors in parentheses, clustered by origin EA_z , destination $EA_{z'}$, and their paired district zz' . Dependent variable is the log absolute converted price difference between EA_z and $EA_{z'}$. All regressions absorb EA_z and $EA_{z'}$ fixed effects and country $\times$ product fixed effects. $|\Delta$ Food spending| is the absolute difference in total food spending (log XOF) between the two EAs. $|\Delta$ Farm sales| is the absolute difference in total farm sales (log XOF) between the two EAs. Food spending and farm sales are local demand and supply proxies, respectively computed as the product between the average food spending/farm sales per household member in a given EA (applying household sampling weight), and the z 's population size. $CON_{zz'}$ is an indicator that both EAs lie within 2km of 2G+ network. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.