

Who wants property rights? Conjoint evidence from Senegal

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2 February, 2024

MOTIVATION

MOTIVATION



Figure 1: "Attention land predators! No parcel from this site is meant for sale!"

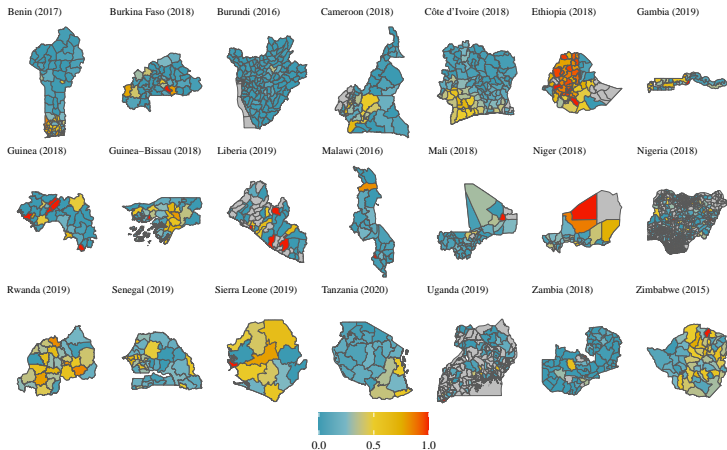


Figure 2: Fraction of landholding households with at least one formal land title Data sources

PREVIEW OF RESULTS:

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PREVIEW OF RESULTS:

- Households who lack confidence in formal institutions place less weight on formal land titles during a hypothetical land dispute.
- No relationship between social proximity to customary elites and trusting formal land titles.
- Where titles are absent, having invested on a parcel serves as an alternative proof of ownership.
- Qualitative work provides additional support for all three results.

METHODS

I use a mixed method approach to show how confidence in formal institutions conditions the perceived returns to titling:

- Field conjoint experiment of 1,164 households in four regions of rural Senegal;
- A text-as-data approach to show how respondents discuss conflict resolution strategies with and without land titles; and
- Three months of qualitative field work in Senegal to contextualize this mistrust of state authorities.

CONTRIBUTION

- Existing research focuses on when states and other elites **supply** formal property rights (Albertus 2020; Boone 2014; Herbst 2014; Honig 2022a; Onoma 2010).
- This project highlights when households **demand** formal property rights (Ellickson 1991; Honig 2017).
- This research advances a growing literature on the political economy of informality: informality as a resource rather than as a constraint (Balan et al. 2023; Baldwin and Ricart-Huguet 2023; Bates 1983; Ferree et al. 2023; Nathan 2022).
- Brings the politics back into the political economy of property rights.

THEORY

THEORY: EXISTING EVIDENCE

- Rising land values drive property formalization:
 - Geospatial measure
 - Coefficient plot
 - Scatter plot
 - Shifts in relative prices can shock the prevailing equilibria and drive institutional change (Besley and Ghatak 2010; Libecap 1989).
 - Some anecdotal evidence that this dynamic is at play in sub-Saharan Africa (Colin, Le Meur, and Leonard 2009; Firmin-Sellers 1995; Hailey 1938).
- Education can help households understand the benefits of land titling.
 - Outcome measures
 - Coefficient plot
 - Most donor-funded land formalization programs focus on educating households.

THEORY

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Figure 3: A chief's residence (indicated by the Senegalese flag)

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Figure 3: A chief's residence (indicated by the Senegalese flag)

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- Chiefs can sell land for private benefit, although systems of accountability render this more difficult (Honig 2022a).
- Customary land is a long-term reservoir of political authority for chiefs (Lund 2008; Nathan 2022).
- Facilitating formalization helps chiefs appear as 'development intermediaries.' (Baldwin 2016).



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Why do only some households pursue land titles?

THEORY

Households weight costs and benefits when deciding whether to pursue formalization.

Land titling is not a 1:1 mapping of existing use onto paper—there will be winners and losers, and households run a risk of losing land (Boone 2018; Colin, Le Meur, and Leonard 2009; Delville and Moalic 2019).

Households also pay a fee to title. In Senegal, this is 5,000 CFA (about USD 8).

THEORY

On the other hand, land titles reduce the risk of losing land, which allows households to invest more in their parcels (Goldstein and Udry 2008; North and Weingast 1989).

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*"The délibération changes our behavior because without one, you're always under threat of land grabs from those with means. People come here to buy land, both westerners and Senegalese with means... **You couldn't plant trees on your parcel if you didn't have a délibération.**"*

THEORY

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 - If the court will ignore your land title, why pay the 5,000 francs?

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 - Formal institutions arbitrate land disputes when applicants are in the formal land regime.
 - If the court will ignore your land title, why pay the 5,000 francs?
- On the other hand, if you are the chief's brother, your land rights are likely already secure, so the marginal security provided by a formal title is less.

HYPOTHESES

- H1.** Individuals with more confidence in formal institutions will perceive land titles to be more useful in a dispute.
- H2.** Individuals who are socially proximate to customary leaders will perceive land titles to be less useful in a dispute.

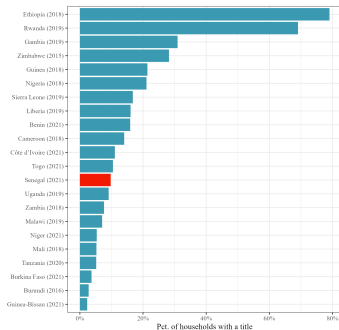
THE SENEGAL CASE

LAND TENURE IN SENEGAL

Senegal has moderate rates of land titling among countries where titling is demand driven.

High titling, low trust in formal institutions, and high trust in chiefs, make Senegal a **least likely** case for my household-level theory. Délibérations Foncières

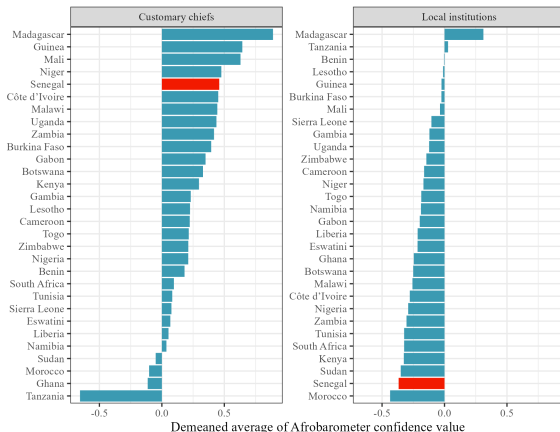
Figure 4: Titling rates across sub-Saharan Africa



Data from the most recent rounds of the LSMS or DHS data collection. All averages use survey weights.

THE SENEGAL CASE

Figure 5: Confidence in customary chiefs and local institutions



Data from wave 7 of Afrobarometer. All averages use survey weights and are demeaned by subtracting the average value of other trust variables for each respondent. **Other Afrobarometer variables**

THE SENEGAL CASE

Most conflicts are resolved using informal mechanisms:

I am the social regulator, I manage the conflicts. One day if the conflicts are too much, I have the numbers for the local authorities like the gendarmes, the sous prefect, and the mayor. [a village chief in Tambacounda]

*I went directly to see the village chief so he could see the other person in the middle of taking my field. **The chief did not do his work, which is why I went to see the mayor.** [a farmer in Matam]*

THE SENEGAL CASE

Having a land title (*délibération foncière*) makes it easier to access the formal resolution fora (i.e. easier to go straight to the municipal council):

"The village chief is doorway to access administrative papers like the deliberations [land titles]. But it's the town hall [i.e. the municipal council] who delivers them and this institution becomes more considered in case of conflict." [a farmer in Saint-Louis]

With the paper, there are those who no longer respect the village chief [village chief in Saint-Louis]

THE SENEGAL CASE

Respondents do not trust the Senegalese government or their local institutions to manage land.

*The primary school is in a lamentable state. A mouride promised to finance a new mosque but the mayor refused to give him a deliberation foncière to build it. He was bad because the village did not vote for him in the last election... **a mayor who refuses to authorize the construction of a mosque will not deliver a paper for your fields!** [a farmer in Tambacounda]*

DESIGN

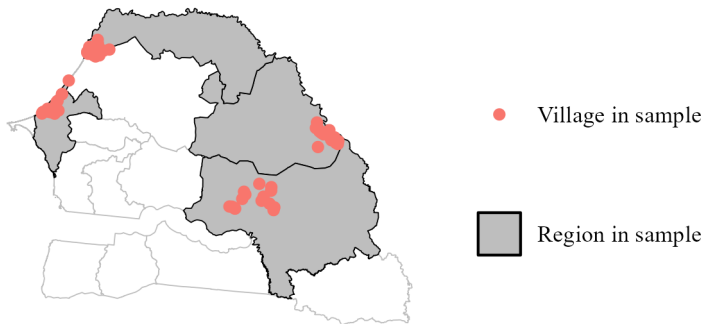
RESEARCH DESIGN

I use a mixed method strategy to show how confidence in institutions and social proximity to chiefs affects the perceived utility of land titles in resolving disputes.

- A forced-choice paired conjoint design administered to 1,164 respondents in Senegal via an in-person field experiment.
- A structural topic model on free response answers to "what would happen in this dispute."
- Qualitative interviews with village chiefs, farmers, and government officials.

RESEARCH DESIGN

Figure 6: Survey areas for field conjoint



Sampling strategy

RESEARCH DESIGN

Each respondent was presented with two fully randomized profiles of parties to a land conflict. The profiles varied randomly across six variables:

- The sex of the party,
- The value of the party's land,
- Whether the party was a farmer or a herder,
- Whether the party has improved the land,
- Whether the party had given the chief a gift, and
- Whether the party possessed a land title (*délibération foncière*) for their land.

Outcome variable: "who do you think would win this land dispute?"













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RESEARCH DESIGN

Arbres plantés 	Arbres plantés 
Cadeau 	Aucune cadeau 
Délibération foncière 	Pas de papier 
Éleveur 	Éleveur 
Homme 	Femme 
Valeur inférieure 	Valeur supérieure 

RESEARCH DESIGN

- Each respondent saw five unique conjoint pairs.
- I use marginal means for hypothesis testing: the probability a profile wins given it has feature level a .

Estimands

- Because each of my variables has two profiles, the marginal means are centered at $MM = \frac{1}{2}$.
- Marginal means are distributed on the interval $MM \in [0.125, 0.875]$.
- The sixth pair was the inverse of the first pair. I use this repeat to calculate the probability of switching error, and apply the appropriate corrections (Clayton et al. 2023).

Specific corrections

Survey weights

STRUCTURAL TOPIC MODEL

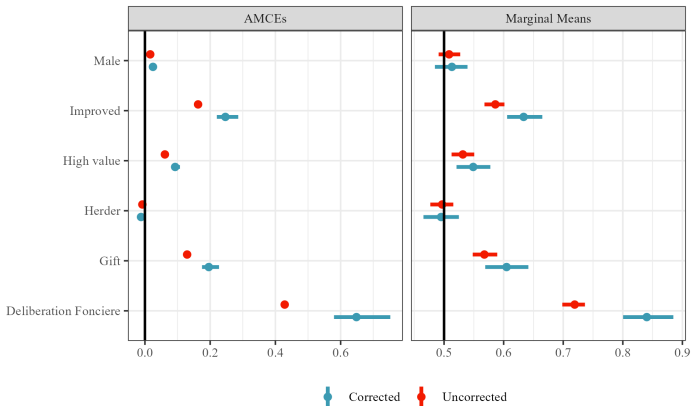
- At the end of each conjoint round, I also asked individuals what they thought would happen in this specific dispute.
- I use these free-responses to estimate a Structural Topic Model (STM). This model explains topic prevalence across responses with reference to the conjoint attributes and the respondent's confidence in institutions. Model diagnostics

Example free responses

RESULTS

RESULTS

Figure 7: Overall AMCEs and marginal means



The reference level for each level are (in order): Woman, did not improve land, low value, farmer, did not give gift, and no deliberation fonciere. Bars represent 95 percent confidence intervals. Standard errors were calculated using a block bootstrap. Confidence in formal institutions here is divided into above/below the median values for this index.

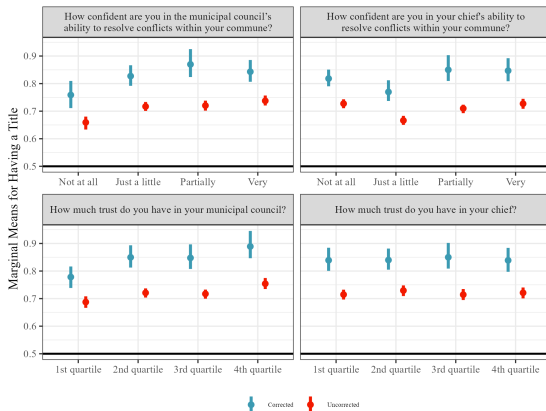
RESULTS

Three key takeaways:

- **Respondents who trust their municipal councils more place greater weight on formal land titles in their hypothetical disputes.**
- Social proximity to village chiefs has no effect on the weight respondents place on formal land titles.
- In the absence of land titles, respondents use having invested in the land as evidence of a land claim.

RESULTS

Figure 8: Confidence in municipal councils increases the weight respondents place on formal land titles



Bars represent 95 percent confidence intervals, calculated using a block bootstrap. For the "how much trust do you have in" questions, I subtract the average of all other "trust" questions, then take the quartiles. **All questions**

Not demeaned By region

RESULTS

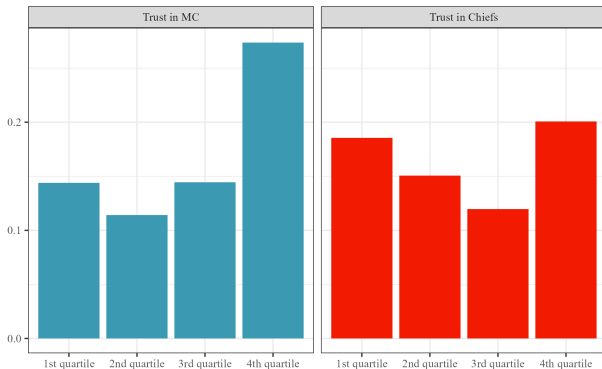
Respondents who distrust their municipal councils express doubts about the usefulness of land titles.

Even the [formal] papers have their limits, there are some behaviors that can overrule the papers: corruption and political connections. [a village chief in Matam]

I am confident that the paper will be respected in 90 percent of cases. The 10 percent that remain mean that if the state needs your land to build or to give to an agrobusiness, the paper will have its limits. [a village chief in Matam]

RESULTS

Figure 9: Titling rates by quartiles of confidence in institutions



For the "how much trust do you have in" questions, I subtract the average of all other "trust" questions, then take the quartiles. The Y axis displays the fraction of households with a title within each subgroup.

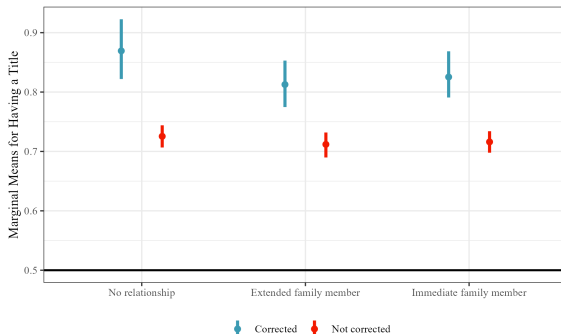
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RESULTS

Figure 10: Social proximity to chiefs does not increase the weight respondents place on formal land titles



Bars represent 95 percent confidence intervals, calculated using a block bootstrap. By region

RESULTS

The null finding for social proximity to chiefs not affecting the weight households place on titles is consistent with chiefs being the lowest rung on the conflict resolution ladder:

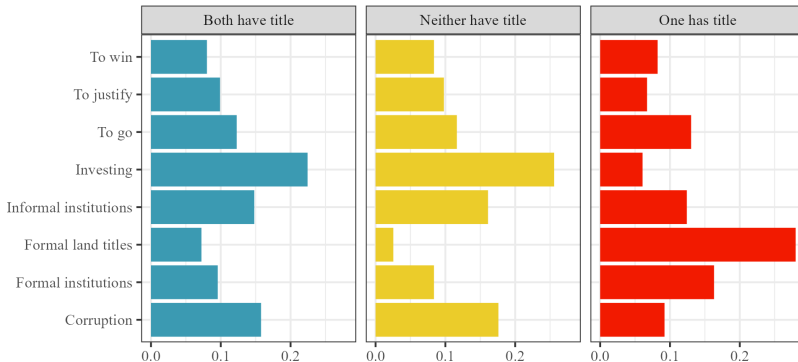
I would speak to the plaintiffs, if they refuse I would consult the wise men of the village and if cannot find a consensus I would continue to the mayor and then to the local brigade of gendarmerie. [a village chief from Matam]

RESULTS

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Figure 11: Topic prevalence by the relevance of formal land titles.



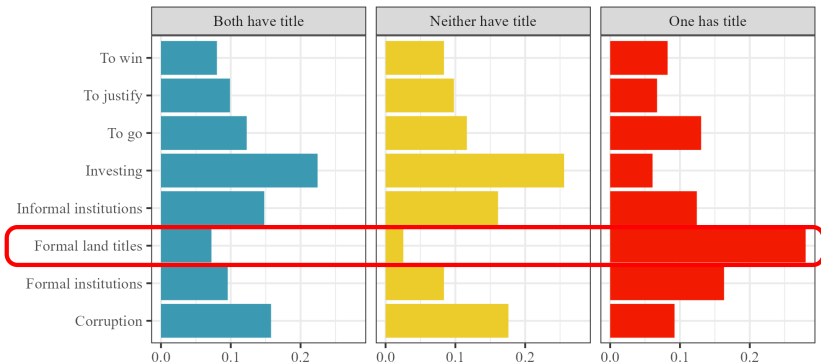
This figure shows the average topic prevalence for all eight topics under different titling conditions.

Example free responses

Example words

By trust in MC

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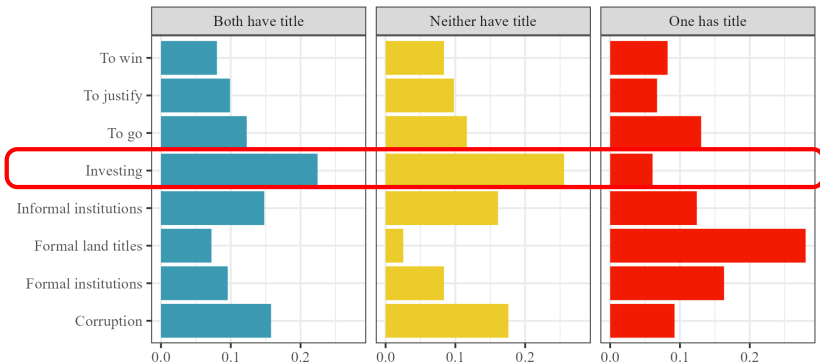
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CONCLUSION

SUMMARY

- I use a forced-choice conjoint design to show how respondents who don't trust their local institutions don't believe that land titles would be useful in a dispute.
- No evidence that respondents who are close to customary chiefs trust titles less.
- An STM also shows that topic prevalence for having invested in the land is decreasing in trust in the municipal councils. Discussion of formal institutions is increasing in trust in the municipal councils.
- Qualitative work supports all three conclusions.

CONTRIBUTION

- Existing literature on property rights focuses largely on the **supply** of property rights (Albertus 2020; Boone 2014; Hassan and Klaus 2023; Honig 2022a; J. B. Murtazashvili and I. Murtazashvili 2021; North and Weingast 1989; Scott 1998).
- In this research, I study the conditions under which households **demand** property rights (Balan et al. 2023; Delville and Moalic 2019; Honig 2017).
- Formal property rights are only one facet of state institutions. If individuals distrust the state, they will distrust property rights as well.



Thank you for listening!

APPENDIX

SOURCES FOR OUTCOME DATA

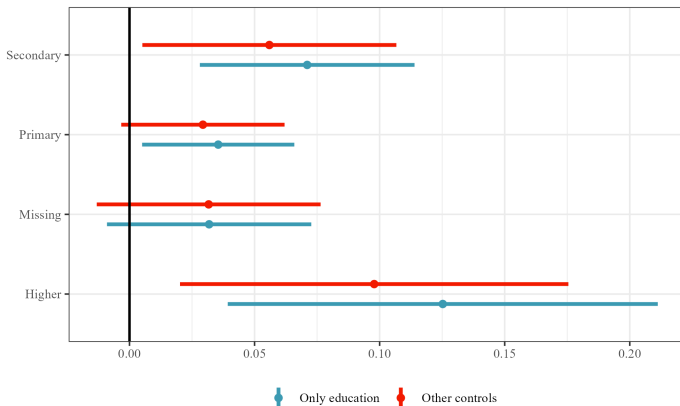
Data are from the most recent round of the Demographic and Health (DHS) or Living Standards Measurement Survey (LSMS). All averages use provided survey weights.

Data for Benin, Burundi, Cameroon, Gambia, Guinea, Liberia, Mali, Nigeria, Rwanda, Senegal, Sierra Leone, Zambia, and Zimbabwe are from the DHS.

Data for Burkina Faso, Cote d'Ivoire, Ethiopia, Guinea-Bissau, Malawi, Niger, Tanzania, and Uganda and from the LSMS.

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EXISTING EXPLANATIONS



The overall titling rate is 0.194. Coefficients from an OLS regression where the outcome variable is a binary indicator of whether a household has at least one land title. All regressions include country wave fixed effects; standard errors are clustered at the country wave level. Control variables include gender, age, marital status, area of administrative division, population density, and an indicator for urban status. [Back](#)

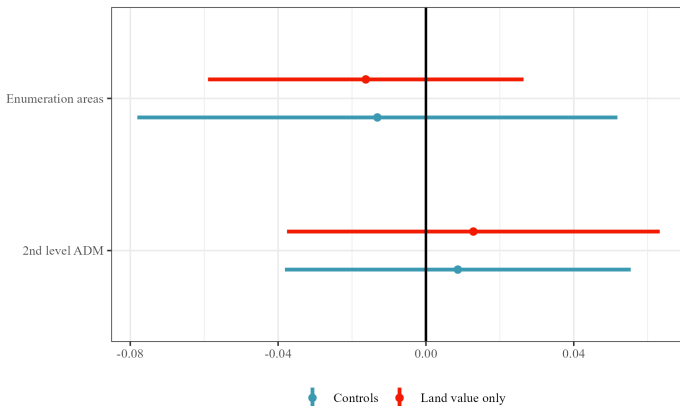
EXISTING EXPLANATIONS

How to measure land values in areas without well-documented land markets? I propose a novel measure of 'total attainable value' per hectare. Interaction of two variables:

- Crop-wise total attainable yield per hectare from the Food and Agricultural Organization (FAO)'s Global Agro-Ecological Zones (GAEZ) dataset.
- Historic commodity price details from the IMF's Primary Commodity Price System.

For each crop and grid cell, I multiply the maximum attainable yield (MT/ha) by the commodity prices in a given year (USD/MT) to obtain the attainable price (USD/ha). I then take the maximum of this vector. [Back](#)

EXISTING EXPLANATIONS



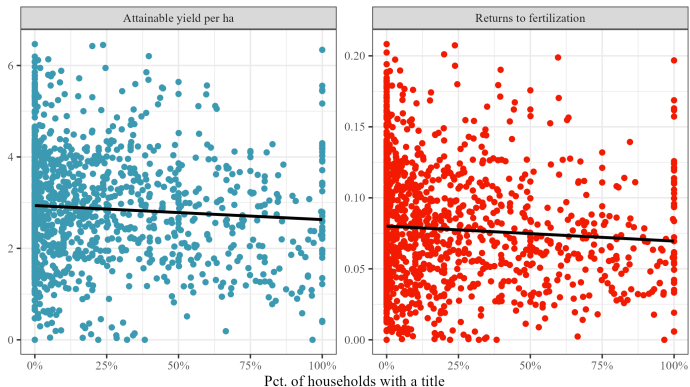
Coefficients from an OLS regression where the outcome variable is a binary indicator of whether a household has at least one land title. All regressions include country wave fixed effects; standard errors are clustered at the country wave level. Control variables include education, gender, age, marital status, area of administrative division, population density, and an indicator for urban status. [Back](#)

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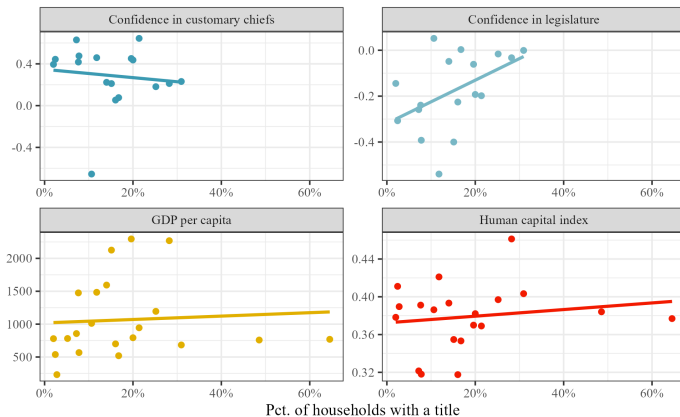
I combine two large scale data collection efforts: the Demographic and Health Surveys (DHS) and the Living Standards Measurement Surveys (LSMS).

- 22 countries;
- 60 country-survey wave dyads;
- 389,529 survey observations;
- 167,479 observations with non-missing observations of land titling.

Outcome variable: whether a household has at least one formal land title. [Back](#)

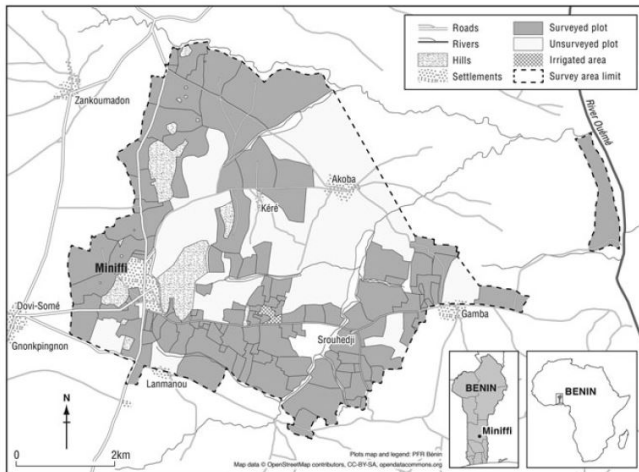


The horizontal axis shows average titling rates for second level administrative divisions from the most recent round of DHS or LSMS. Vertical axis shows the average attainable value per hectare. Lines of best fit are calculated via OLS. [Geospatial measure](#) [Back](#)



This figure shows country-level average titling rates. Titling data are from the most recent round of DHS or LSMS. Confidence data come from round seven of the Afrobarometer survey. GDP per capita and human capital index data come from the World Bank and are calculated in 2019 and 2017 respectively. Titling rates and Afrobarometer data use survey weights; weights are uniform when not provided. Lines of best fit are calculated via OLS. [Back](#)

Figure 12: Customary elites can lead to irregularly formalized boundaries, example from the Département des Collines in Benin



Example of how customary elites can interfere with land formalization. Figure from Delville and Moalic (2019).

THE SENEGAL CASE

Land tenure in Senegal: [Back](#)

- The common form of land documentation in Senegal is a délibération foncière (DF).
- A DF confers long term use rights, but it is not transferable: it cannot be used as collateral for a loan or to sell land.
- Studying land formalization in Senegal isolates the risk of expropriation as a driver for titling (De Soto 2000).

Région de Saint-Louis
Département de Djigaya
Arrondissement de Niakhar
Commune de Diarra

FICHE DE DEMANDE

DATE : _____

Affiliation Déaffectation
 Régularisation Permis d'occuper

1) DEMANDEUR

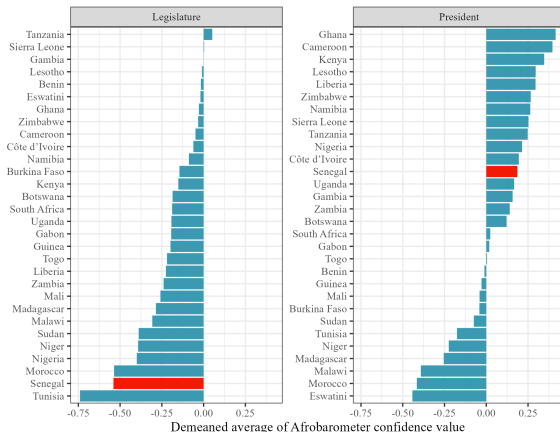
Personne physique	Personne morale
Nom, prénom	Type et dénomination
Date et lieu de naissance	Statut social
Sexe <input type="checkbox"/> Masculin <input type="checkbox"/> Féminin	Date de création
N° de carte d'identité	Type de société <input type="checkbox"/> SARL <input type="checkbox"/> MEKA <input type="checkbox"/> Autre
Nationalité	N° de carte d'identité
Lieu de résidence / Adresse	Statut foncier
Téléphone	Adresse
Adresse (obligatoire)	Téléphone
Statut foncier	Usage <input type="checkbox"/> Agricole <input type="checkbox"/> Commerce <input type="checkbox"/> Habitat <input type="checkbox"/> Industrie
Quartier / Village	<input type="checkbox"/> Hab. à louer
Quartier demande (PFI)	<input type="checkbox"/> Hab. à louer
Référence cadastrale	

Signature du demandeur _____

Appui Technique et Services du Projet de Développement Rural en Grande de Agriculture de Sénégal (PDRS)

Figure 13: Example of a délibération foncière from the Saint-Louis region

RESEARCH DESIGN

Figure 14: Confidence in legislatures and presidents

Data from wave 7 of Afrobarometer. All averages use survey weights and are demeaned by subtracting the average value of other trust variables for each respondent. [Back](#)

SAMPLING STRATEGY

I used a five stage sampling strategy:

- Non-randomly selected regions to ensure variation on ethnicity, state capacity;
- Randomly selected one commune for each region.
- Randomly selected up to three contiguous communes (to ensure travel distances were feasible).
- Randomly selected villages within these (up to four) contiguous communes.
- Random walk within villages.

Sample frame was the 2014 census of locations (*Repertoire des Localités*) [Back](#).

SURVEY WEIGHTS

$$w = \frac{1}{p_h \cdot p_v \cdot p_c}$$

Where:

- p_h is the probability of a household being sampled (n. of realized surveys per village divided by count of households, as per the 2014 RGPH)
- p_v is the probability of a village being selected, conditional on the set of communes being chosen.
- p_c is the probability of a commune being chosen, taking into account the contiguous selection strategy.

All weights are censored to be within the 5th and 95th percentiles. [Back](#)

For the marginal means, the specific correction is $\tilde{m} = \frac{\hat{m} - \tau}{1 - 2\tau}$ where \tilde{m} is the marginal means estimator corrected for switching error, \hat{m} is the uncorrected estimator, and τ is the estimate of IRR.

For the AMCEs, the correction is $\tilde{\pi} = \frac{\hat{\pi}}{1 - 2\tau}$ where $\tilde{\pi}$ is the AMCE estimator corrected for switching error and $\hat{\pi}$ is the unadjusted estimator.

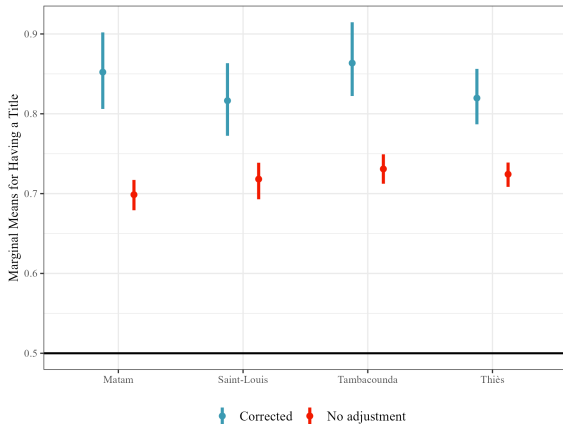
[Back](#)

Marginal means are defined as the fraction of profiles fulfilling condition i which win their disputes: $P(\text{win}|i)$.

Because each variable in this conjoint has two levels, that means that the null hypothesis for each variable is that $MM = 0.5$.

Because I did not exclude the scenario when households possess overlapping property rights, both hypothetical parties will have a DF in approximately 25 percent of conjoint draws. In this case, a profile with a title will lose the dispute by definition. Similarly, in 25 percent of cases, zero profiles will have a DF, and so a household sans DF will win by default. [Back](#)

RESULTS

Figure 15: Marginal means by region of Senegal

Bars represent 95 percent confidence intervals, calculated using a block bootstrap.

[back](#)

Figure 16: Marginal means by quartile for all 11 confidence questions

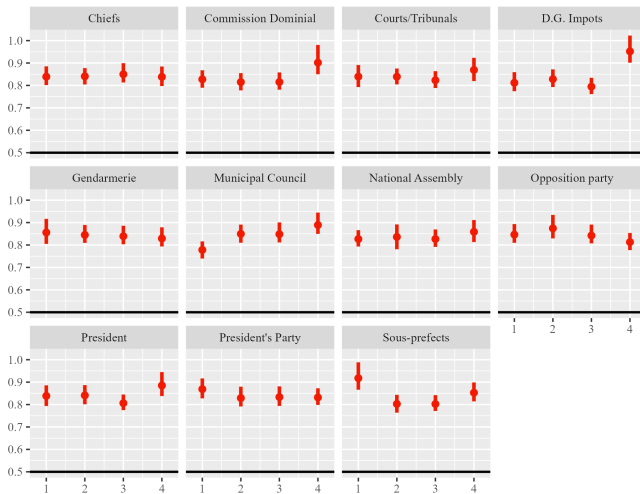
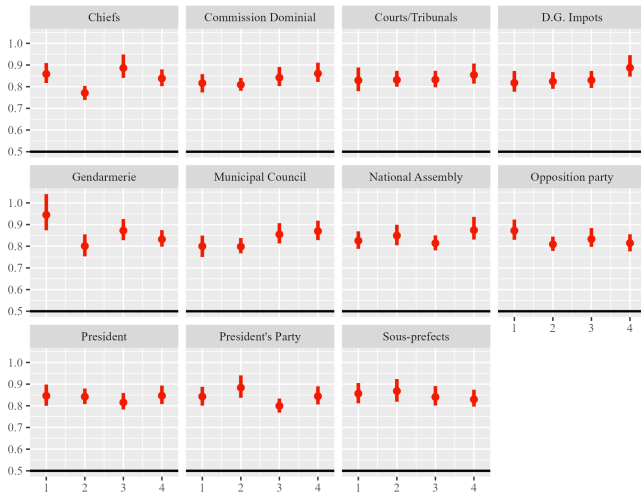


Figure 17: Marginal means by quartile for all 11 confidence questions (not demeaned)



STRUCTURAL TOPIC MODEL

Table 1: Frequent and exclusive words by topic

Topic	Description	Keywords
Topic 1	Corruption	give; gift; receive; activity; wine; pot; corrupt
Topic 2	Informal institutions	chief; direct; village; should; return; thanks; see
Topic 3	Investing	more; value; man; work; put; already; raise
Topic 4	To justify	witness; also; saw; authority; call; law; she
Topic 5	Formal land titles	land; deliberation; proof; possess; current; hold; possess
Topic 6	To win	confirm; witness; should; go; invest; attribute; offer
Topic 7	To go	those; went; to go; problem; went; under; share.
Topic 8	Formal institutions	paper; town hall; 2; 1; profile; municipal; council

Note: Examples chosen based on FREX scores, which is the weighted harmonic mean of the word's rank in terms of exclusivity and frequency (Roberts et al. 2014).

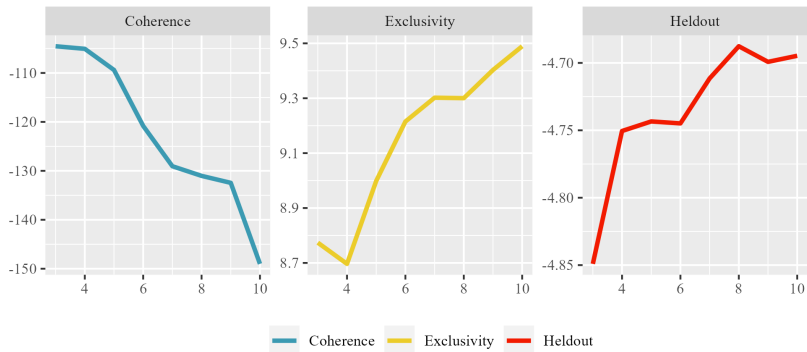
"La première personne aurait montré au chef la valeur de sa terre. Et le chef lui fera gagner." (*The first person will show the chief the value of his land, and the chief will support him*).

"Il a aménagé sa terre, et a une délibération foncière comme preuve à montrer au chef prouvant que la terre lui appartienne mais il n'a pas aussi essayé de corrompre le chef en lui donnant un cadeau comme pot de vin" (*He improved the land and has a land title as proof to show to the chief that the land belongs to him, but he didn't try to corrupt the chief by bribing him*).

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WHY EIGHT TOPICS?

Figure 18: STM diagnostics by topic count

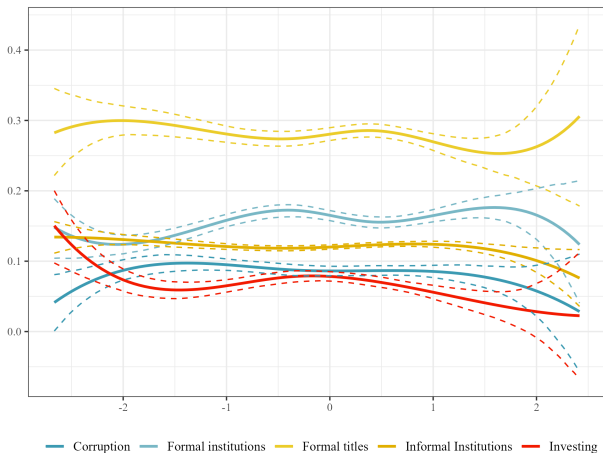


This figure shows diagnostic statistics across different numbers of topics in potential STMs.

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STRUCTURAL TOPIC MODEL: RESULTS

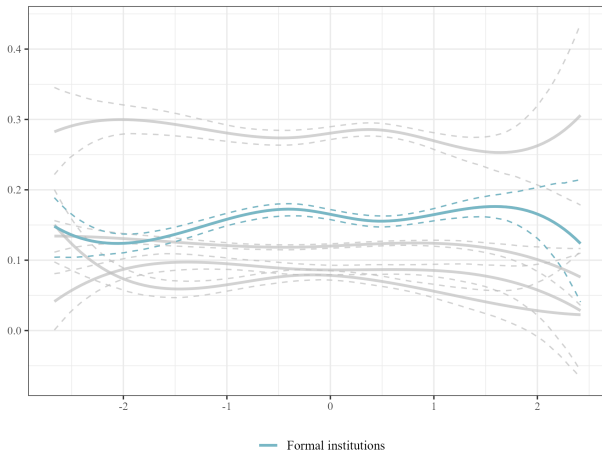
Figure 19: Topic prevalence by confidence in municipal councils.



This figure shows the average topic prevalence across different levels of confidence in municipal councils. Three additional topics are not included in this figure. [Back](#)

STRUCTURAL TOPIC MODEL: RESULTS

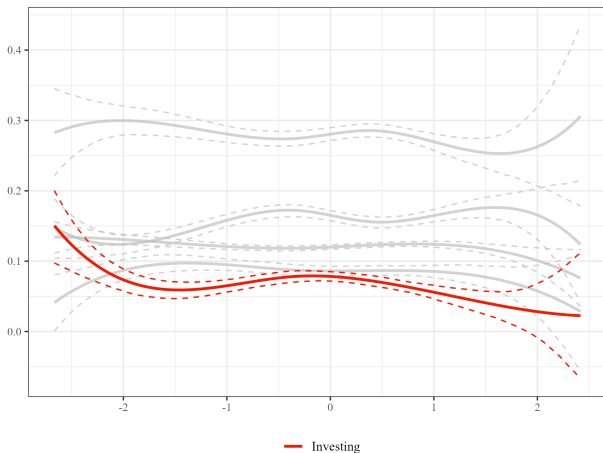
Figure 19: Topic prevalence by confidence in municipal councils.



This figure shows the average topic prevalence across different levels of confidence in municipal councils. Three additional topics are not included in this figure. [Back](#)

STRUCTURAL TOPIC MODEL: RESULTS

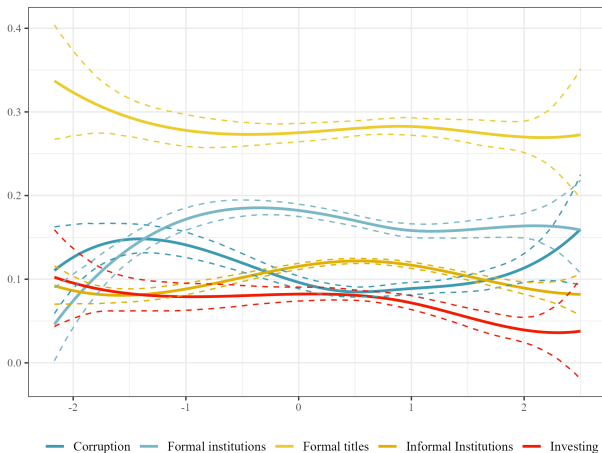
Figure 19: Topic prevalence by confidence in municipal councils.



This figure shows the average topic prevalence across different levels of confidence in municipal councils. Three additional topics are not included in this figure. [Back](#)

STRUCTURAL TOPIC MODEL: RESULTS

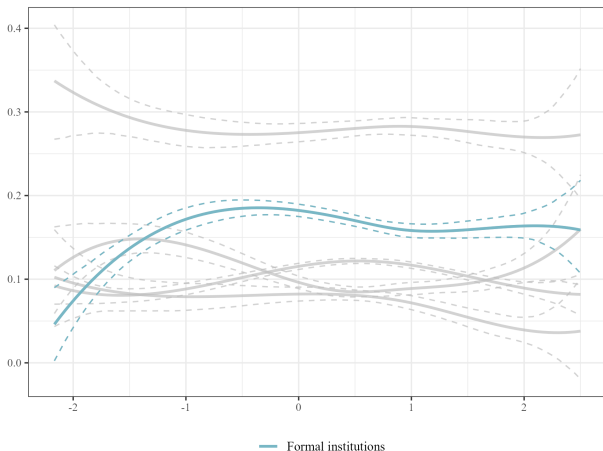
Figure 20: Topic prevalence by confidence in customary chiefs.



This figure shows the average topic prevalence across different levels of confidence in customary chiefs. Three additional topics are not included in this figure. [Back](#)

STRUCTURAL TOPIC MODEL: RESULTS

Figure 20: Topic prevalence by confidence in customary chiefs.



This figure shows the average topic prevalence across different levels of confidence in customary chiefs. Three additional topics are not included in this figure. [Back](#)

CÔTE D'IVOIRE DESIGN

To isolate the role of customary elites in land titling, I will exploit a natural experiment in Côte d'Ivoire.

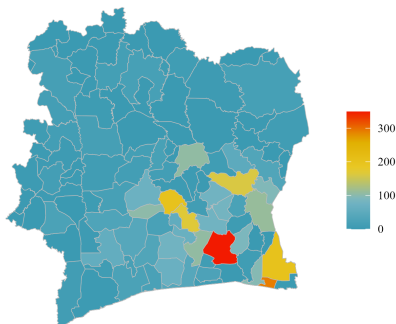
- A village delimitation process precedes land titling: some villages are elevated to administrative status and some are downgraded.
- Bureaucratic discretion and political pressures make this process exogenous to local conditions.



Figure 21: Map of early delimitation project areas (from Boone 2018)

ADMINISTRATIVE DATA

Figure 22: Count of published certificats fonciers by departement in Côte d'Ivoire



Department boundaries come from the GADM dataset. Data on the certificats foncier come from the *Journal Officiel de la République de Côte d'Ivoire* and cover 2014 to November 2022. [Back](#)