The Foundations of Cooperation in Societies

MARCO CASARI

University of Bologna

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Outline

- Task description
- Long-enduring institutions
- **Trentino: an overview**
- **Trentino: clearly defined boundaries**
- **Trentino: survival model (econometrics)**
- **Trentino: inheritance systems**

Trentino: an overview

Trentino, Italy

COMMUNITY-MANAGEMENT

- My interest on cooperation began with a field study about the traditional management of common property resources in the Alps (Italy)

Journal of Economic History, 2007

Behavioral and Brain Sciences, 2012

COMMUNITY-MANAGEMENT

- How groups of about 50-500 people coped with the tragedy of the commons on pastures and forest
- Study with a long-run horizon (six centuries: 1200-1800)
- More than two hundreds communities

How to carry out these type studies: Data Sources

1) Cadastral registers (1780 and 1897)

2) **Community Charters (1202-1800)**

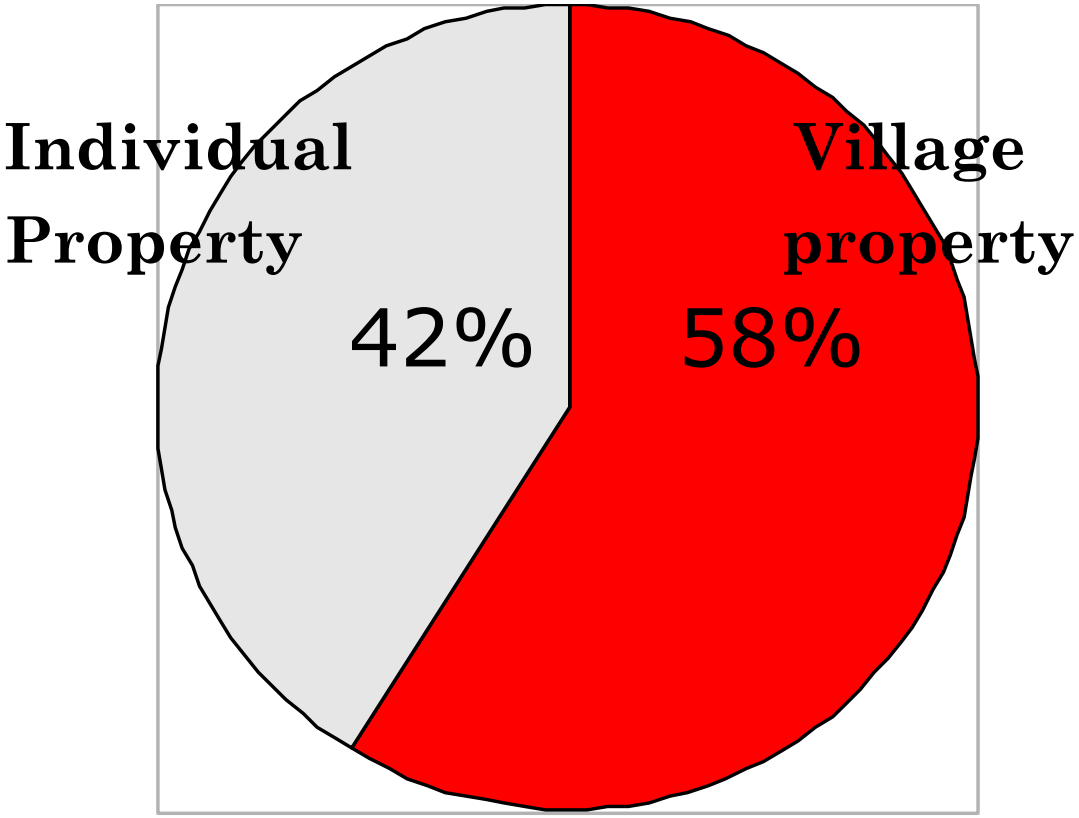
3) Population estimates (1810 Census and older)

Source 1: LAND OWNERSHIP

Individual Property

Village property

LAND OWNERSHIP

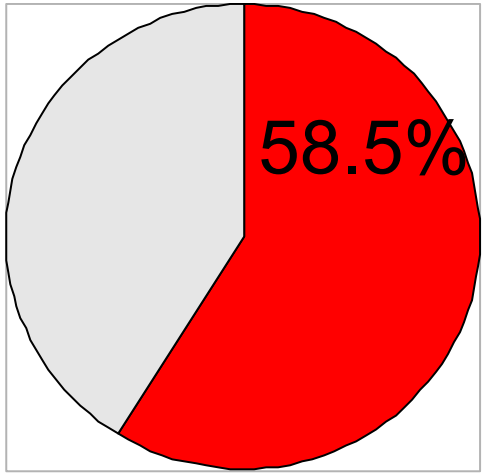


Hectars. Source: 1780 Land registers.
Based on a sample of 32 communities

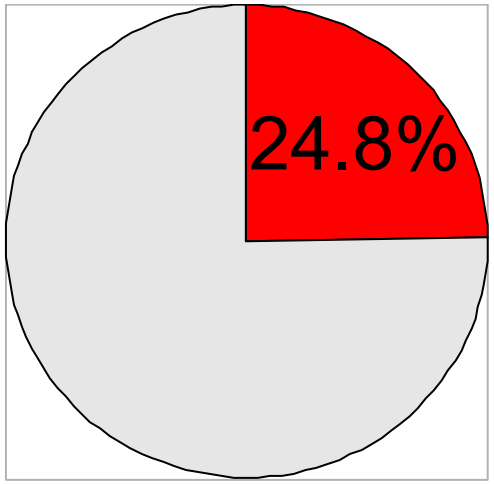
Source 1: 1780 cadastral registers

Economic importance of the commons:
the average fraction of common property was
(sample of 32 communities, about 10% of total):

Surface



Value (rent)

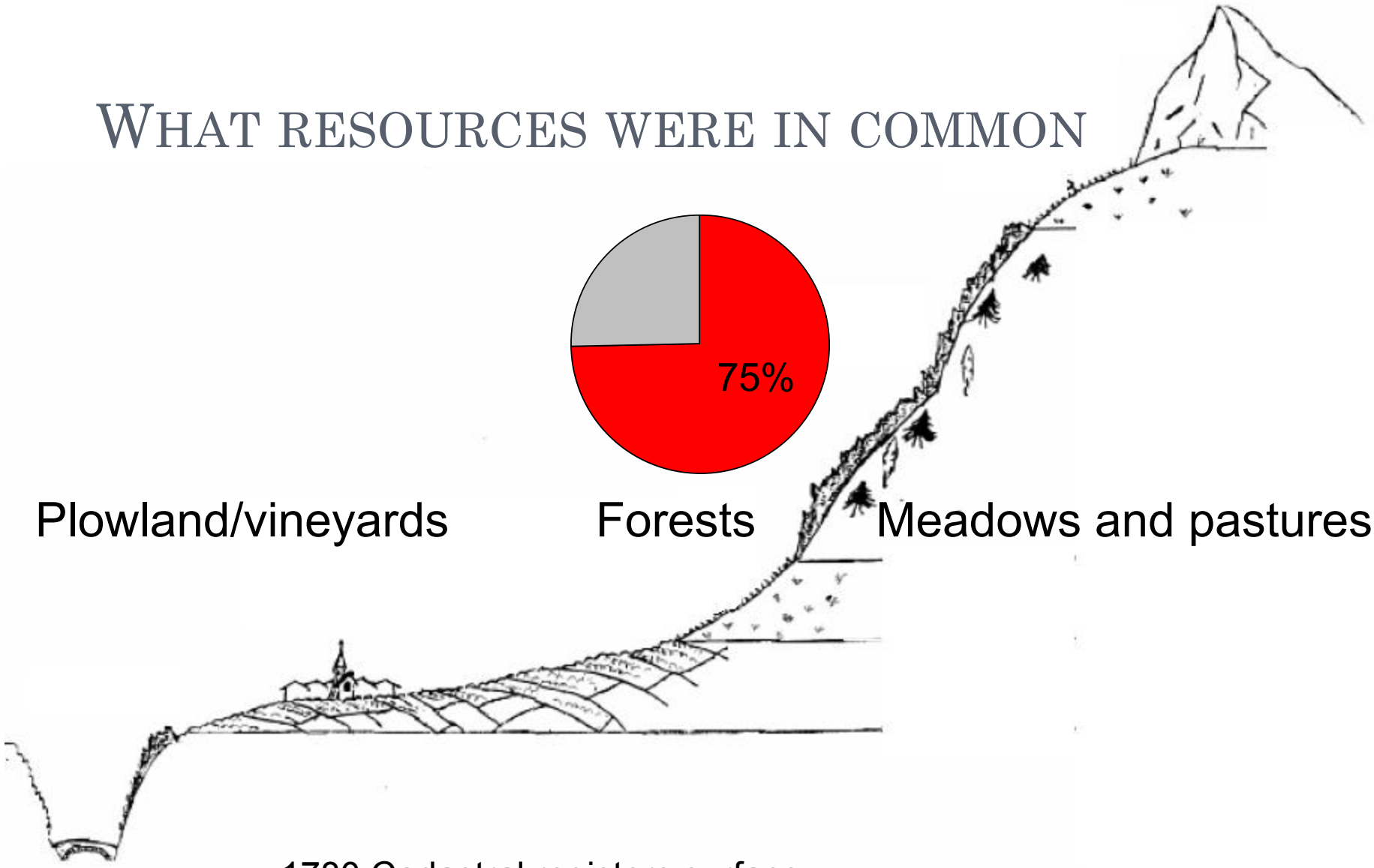


SOURCE 1: LAND OWNERSHIP

Individual Property	**Village property**
Mostly vineyards and arable land	Mostly forests and pastures

What resources were in common

Plowland/vineyards Forests Meadows and pastures



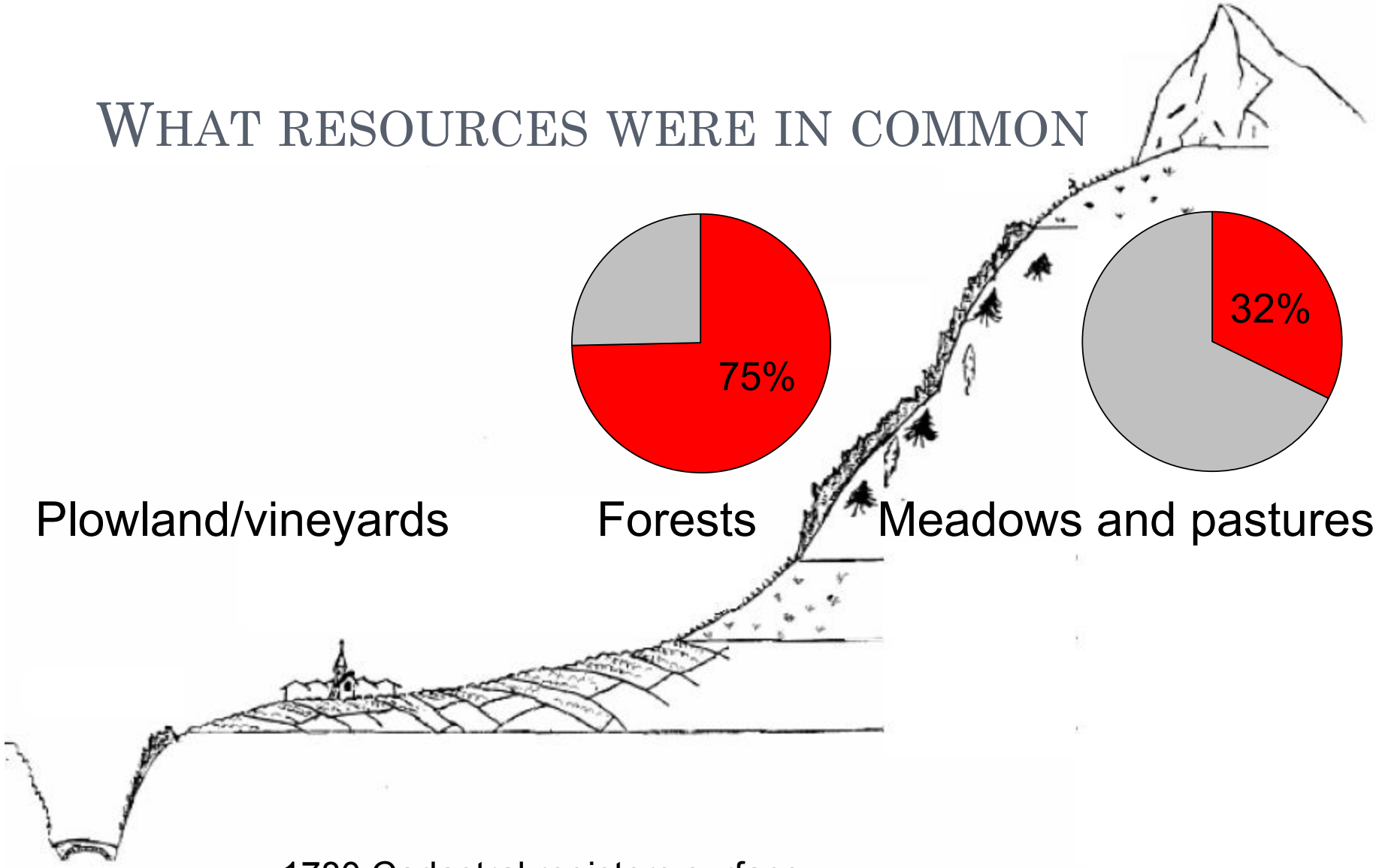
1780 Cadastral registers surface

What resources were in common

Plowland/vineyards

Forests

Meadows and pastures



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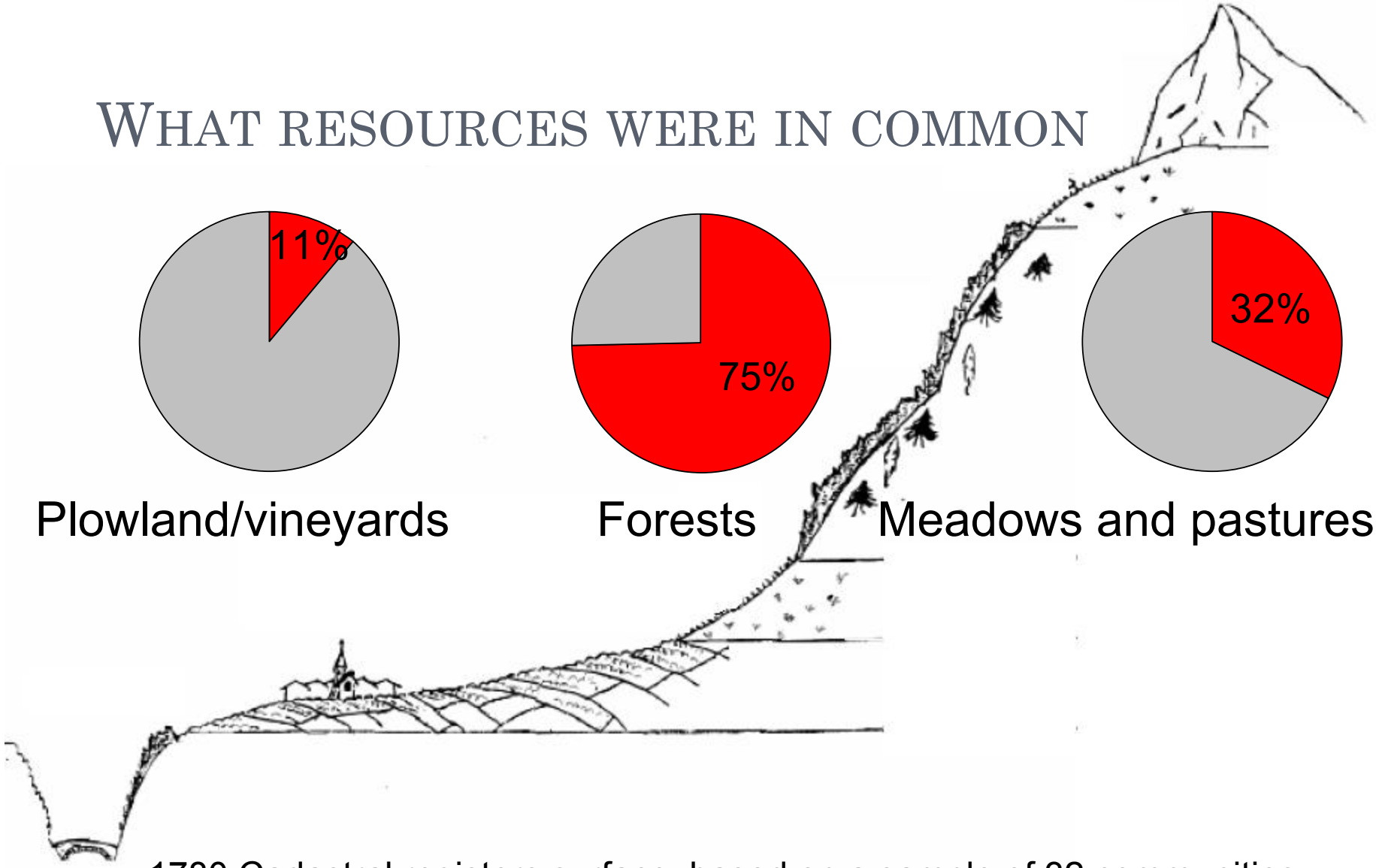


1780 Cadastral registers surface: based on a sample of 32 communities

Source 2: Community Charters

A charter is a formal community document that established a private-order governance regime for the management of the commons

(e.g. avoiding the tragedy of the commons)

Year range: **1202 - 1801**

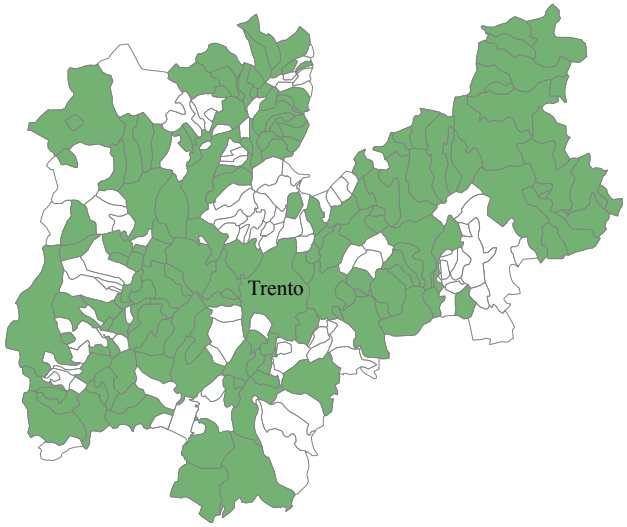
Available Charters: **306** (we read and coded them all)

Number of villages: **290**

Source 2: Community Charters

- Contract negotiated among the users
- Approved by the central government (Prince of Trent)
- Local self-governance in economic affairs, e.g. Decentralized choice of institution

Mapping charters in Trentino



VIDEO HERE

Trentino:
Clearly defined boundaries

How to avoid the tragedy of the commons

Safeguards to limit overexploitation:

- Stop trespassing (open access → **common property**)
- Stop moving into the community (**membership right** only for a selected group of families)
- Discourage immigration through marriage (**inheritance systems**)
- Limit endogenous population growth

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MEMBERSHIP RIGHT

- **Right to use the common resources according to the regulations established by the community**, including: Grazing, Mowing grass, Cutting timber, Collecting firewood and litter, Hunting and fishing,…

- **Participation and voting rights**, including the rights
  a) to live in the community
  b) to participate and speak at community meetings
  c) to appoint community officers
  d) to vote on common resource alienation and use regulations

- **Inheritance rights**
  to transmit community membership rights according to regulations

Achieving a stable community favors cooperation

A stable community: ensuring long-term interaction

- Mobility out of the group was restricted because of property rights on village land
- Settling into a new community, or cheating and immediately leaving the community carried implicit and explicit penalties.
- The charter had provisions to raise those penalties in order to make the group more stable over time

A STABLE COMMUNITY

- Endogenous closure of the community (social and legal norms to promote in-group orientation)
- Increased ability to sanction insiders in case of defection (Folk theorems)
- Incentives for "voice" over "exit" (i.e. commitment to the community)

The peasants shaped the rules of the game in order to promote cooperation both in the appropriation of the commons and in ***building institutions***

Trentino: A survival model (econometrics)

Survival model: introduction

- Widely used in medicine to study effect of drugs
- It considers **which** villages adopted a charter and **when** they adopted it (here: > 200 villages)

- It estimates the probability that the event (=charter adoption) occurs in a time interval conditional on the village not having experienced the event before. (**risk set**)

- When the event happens (=charter adoption) the village exits the dataset

SURVIVAL MODEL: PREPARE THE DATASET

Year	village A	village B	village C	village D
1200	0	0	0	0
1205	0	0	0	0
1210	0	0	1	0
1215	0	0		0
1220	1	0		0
1225		0		0
1230		0		1

- 5-year intervals (you decide interval length)
- Each village appers a different number of times
- Example: Risk set in 1220 is A, B, D

SURVIVAL MODEL: DISCRETE VERSION

The discrete version of a survival model is called "Event history model" and uses a logit estimator

Dependent variable:

Zi(t) = Likelihood that a village i has adopted a Charter in the 5-year-time interval given that it has not adopted it before

$$Zi(t) = \log \frac{P_i(t)}{1 - P_i(t)}$$

SURVIVAL MODEL: REGRESSORS

$$Z_i(t) = \beta_0 + \beta_1 R_i + \beta_2 S_i + \beta_3 N_i(t) + \beta_4 C_i(t) + \beta_{5-17} L_i + \beta_{18-22} h(t) + \mu_i(t)$$

Time invariant regressors:

Ri Remoteness (-)

Si Common resource endowment (+)

Li Fixed effects, regional dummies

Time variant regressors:

Ni Community population (- or +)

Ci(t) Contagion (+)

h(t) Baseline hazard function, century dummies

TABLE 3
EVENT HISTORY MODEL OF CHARTER ADOPTION: DYNAMIC MODEL
(dependent variable: first adoption of a charter by a community in a specific time interval)

Specifications:	General	(1)	(2)	(3)
Remoteness				
Linear distance from local town	–0.03106	–0.03911**	–0.03889**	–0.03704**
	(0.02115)	(0.01756)	(0.01751)	(0.01754)
Altitude difference from local town	–0.00059	—	—	—
	(0.00063)			
At regional border	–0.23464	—	—	—
	(0.24597)			
L1 (vineyard, plowland, fruit garden)	–0.00012	—	—	—
	(0.00055)			
L3 (forest, alp, grazing land)	0.00007	—	—	—
	(0.00005)			
High endowment of common resources – (dummy for *L3* above median)	0.47930**	0.57688***	0.57213***	0.54562***
	(0.20810)	(0.19191)	(0.19187)	(0.19330)
Community size – Population	0.00063**	0.00075***	0.00075***	0.00073***
	(0.00027)	(0.00012)	(0.00012)	(0.00012)
Contagion				
(1) *Number of charters adopted in the region* (lagged)	0.01729*	0.01827**	—	—
	(0.00959)	(0.00926)		
(2) *There is at least a community with a charter in the administrative district* (lagged)	0.20640	—	0.24548	—
	(0.21107)		(0.20685)	
(3) *There is at least a*	0.11462			0.25107

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(2) *There is at least a community with a charter in the administrative district* (lagged)	0.20640		0.24548	
	(0.21107)	—	(0.20685)	—
(3) *There is at least a*	0.11462			0.25107

Possible effects of a larger village:

i) **Reaching an agreement is more difficult (-)**

ii) **Gains from formal coordination through a charter are higher (+) THIS EFFECT PREVAILED**

L3 (forest, alp, grazing land)	0.00007	—	—	—
	(0.00005)			
High endowment of common resources – (dummy for *L3* above median)	0.47930**	0.57688***	0.57213***	0.54562***
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Contagion				
(1) *Number of charters adopted in the region* (lagged)	0.01729*	0.01827**		
	(0.00959)	(0.00926)	—	—
(2) *There is at least a community with a charter in the administrative district* (lagged)	0.20640		0.24548	
	(0.21107)	—	(0.20685)	—
(3) *There is at least a physical neighbor with a charter* (lagged)	0.11462			0.25107
	(0.27948)	—	—	(0.26929)
Black death	–0.24611	—	—	—
	(0.55434)			
Peasant war	–1.63731	—	—	—
	(1.02016)			
Council of Trento	–0.09703	—	—	—
	(0.36221)			
Crisis of first half of seventeenth century	0.41544	—	—	—
	(0.47950)			
Constant	–6.15912***	–6.15738***	–4.00266***	–4.04029***
	(1.27686)	(1.24369)	(0.37034)	(0.41706)
Log likelihood	–754.0698	–759.5016	–760.6324	–760.9890
Number of observations	20,861	20,861	20,861	20,861

Trentino: Inheritance systems

How to avoid the tragedy of the commons

Safeguards to limit overexploitation:

- Stop trespassing (open access → **common property**)
- Stop moving into the community (**membership right** only for a selected group of families)
- Discourage immigration through marriage (**inheritance systems of membership right**)
- Limit endogenous population growth

Inheritance systems in Trentino: a taxonomy

- EGALITARIAN
  all sons and all daughters
- SOFT PATRILINEAL
  all sons; if no sons, one daughter only
- PATRILINEAL
  all sons
- PRIMOGENITURE
  one pupil only

Inheritance systems in Trentino

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Stramentizzo, Trodena, 1605
widespread in South Tyrol

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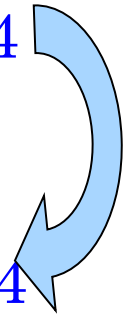

Inheritance systems in Trentino

- EGALITARIAN — Fiemme, 1314
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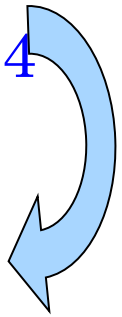
  all sons; if no sons, one daughter only
- PATRILINEAL — Fiemme, 1738
  all sons
- PRIMOGENITURE — Stramentizzo, Trodena, 1605
  one pupil only — widespread in South Tyrol



Inheritance systems in Trentino

inheritance systems on the commons
changed over time through decentralized decisions

All changes were unidirectional:

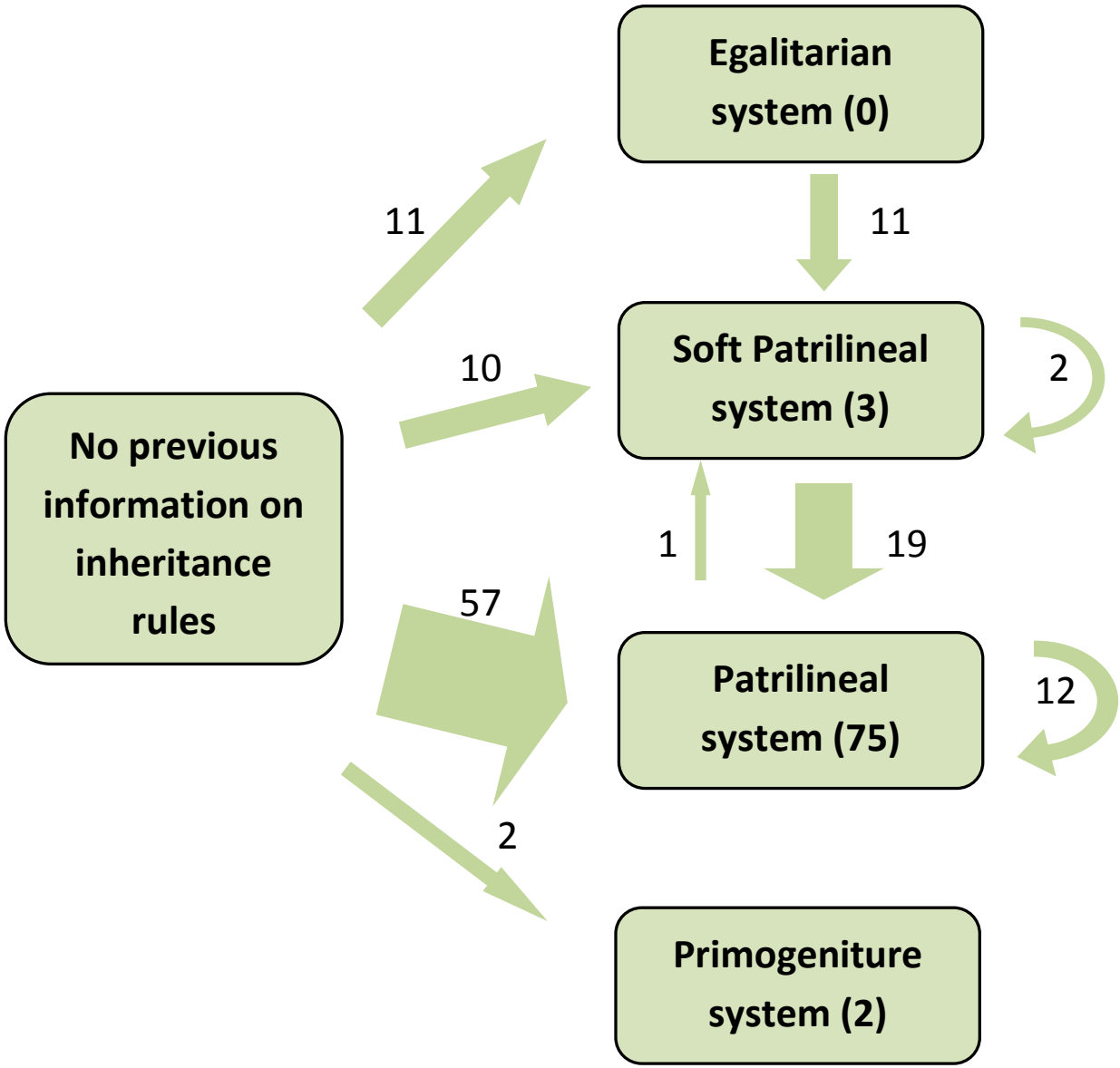
Erosion of women rights.

In 1800 most communities were patrilineal

Casari and Lisciandra (2013) argue that

it is not simply and ideological shift

Changes in inheritance regulations over six centuries



Why Fiemme restricted women rights in 1583

- “Essendo che in la Comunità nostra de Fieme fori qua se ha osservato, che maritandose le done vicine della Comunità in forestieri hereditarono la vicinanza et godevano in Comuni et Boschi tanto quanto che un altro vicino nativo della valle.

- “Et perchè da uno tempo in qua molti foresteri se maridano in done de Fieme solamente per haver detta Vicinanza… “

- “pertanto …. ha deliberato et determinato de Comun Consenso … che da qui in poi per l'avenir tutto le done vicine della valle maritandose in foresteri che non siano vicini della valle non debano haver ne hereditar alcuna vicinanza.”

Why Fiemme restricted women rights in 1583

- “Up to now in our Fiemme Community we followed the rule that when women who are members of our Community married outsiders, they inherited membership rights and used the commons and the woods as much as any other member who was born in the Community.

- “Given that lately many outsiders marry women from the Fiemme Community for the only purpose of acquiring membership rights,…”

- “as a consequence, [...] our Community has consensually convened that from now on women members of our Community will not have nor inherit membership rights should they marry an outsider.

The Egalitarian system was replaced by a Patrilineal system to discourage immigration through marriage.

migratory pressure (with egalitarian systems)

Lowering of the per-capita endowment of common property

A way to avoid this was to stop sharing the commons with outsiders who married insiders

This could be achieved by adopting a stricter inheritance system (i.e., soft-patrilineal, patrilineal, majorat)

such that insider women could be discouraged from marrying outsiders if they planned to stay in their original community.

Symmetric effect with a matrilinal system!

Table 4. Regulations about inheritance on the commons by 1800 (static model)

Dependent variable (1= regulation, 0=otherwise)	Inheritance regulation
	(1)
Remoteness from Trento: walking distance	-0.0112
	(0.0067)*
Remoteness from Trento: altitude difference	-0.0020
	(0.0005)***
per-capita common land value	0.2564
	(0.1230)**
per-capita village land value	
ratio commons/individual	
Constant	-0.3107
	(0.3103)
Wald test of exogeneity (Prob>χ^2)	0.0125
log likelihood	-637.8
Number of observations	289

Instrumental variable probit

Population can be endogenous, hence per capita regressors were instrumented with “common land value” or “village land value”

Table 4. Regulations about inheritance on the commons by 1800 (static model)

Dependent variable (1= regulation, 0=otherwise)	Inheritance regulation	Inheritance regulation
	(1)	(2)
Remoteness from Trento: walking distance	-0.0112	-0.0091
	(0.0067)*	(0.0063)
Remoteness from Trento: altitude difference	-0.0020	-0.0011
	(0.0005)***	(0.0005)**
per-capita common land value	0.2564	
	(0.1230)**	
per-capita village land value		0.3324
		(0.0455)***
ratio commons/individual		-2.5567
		(0.5812)***
Constant	-0.3107	-1.3245
	(0.3103)	(0.3453)***
Wald test of exogeneity (Prob>χ^2)	0.0125	0.0022
log likelihood	-637.8	-821.4
Number of observations	289	289

Table 5. Regulations about inheritance on the commons (dynamic model)

Dependent variable: *event*=1 if adopted regulation in the time period, =0 if not yet adopted	Inheritance regulation (1)
Community size (population)	0.0001
	(0.0001)**
Regional population trend (0,1)	0.2818
	(0.1309)**
Remoteness from Trento: walking distance	-0.0025
	(0.0030)
Remoteness from Trento: altitude difference	-0.0006
	(0.0002)**
per-capita common land value	-0.0024
	(0.0270)
per-capita village land value	
ratio commons/individual	
Frequency of near villages with inheritance regulation	0.8518
	(0.2395)***
Constant	-3.0122
	(0.1881)***
Pseudo-R2	0.086
log likelihood	-510.3
Number of observations	31,618

Event history model to estimate the probability that the event (=regulation) occurs in a 5-year time interval conditional on the village not having experienced the event before. (risk set)

$$\Phi^{-1}[P(t)] = a(t) + b_1X_1 + b_2X_2(t) + u(t)$$

Max 120 observations for each village (1200-1800)

Time varing regressors

Time invariant regressors

Thank you