Inheritance Systems and the Dynamics of State Capacity in Medieval Europe

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Inheritance and State Capacity

State Capacity: none"the ability of a government to administer its territory effectively" (Walder, 1995). Typically proxied by tax collection because "effective political system should be able to extract resources, aggregate them, and use them for national purposes".

Male-cognatic primogeniture: a daughter can only inherit if she has no brothers.

Absolute primogeniture: the first born child inherits.

Historical background

- Women's rights:
  - Under the Roman Law: man and woman had equal access to inheritance.
  - Salic Law (before 466): complete ban on woman receiving any lands.
  - Chilperic Edict (561-584): a woman can inherit if she had no brothers. Otherwise, men are preferred.
- Role of women:
  - Transmit property to their husbands and children: noneheiresses "brought [their] lands to [their] husband[s] and ultimately to [their] children" up to the point that a "maiden unbetrothed [...] was a wasted resource" (Holt, 1985).
  - Banning women avoids lineage extinction.

Historical background

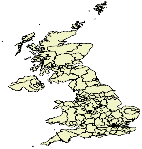
- Importance of family name:
  - Hicks (1998): "[the] preservation of the line and the family name really mattered".
  - Strategies to avoid a heiress:
    1. 1390: Lord Basset of Drayton named heir his kinsman in preference to his common-law heir, with the condition that the former bear his arms and surname.
    2. 1458: Constance, heiress of Henry Green of Drayton was married to John, a younger son of Humphrey Stafford, Duke of Buckingham. Constance did not receive the main estate. With this arrangement, Green's lands were not integrated into Buckingham's.
    3. 1687: Marquess of Halifax left his properties to his great-nephew William Luckyn (instead of his daughter) with the condition that he adopt his surname.

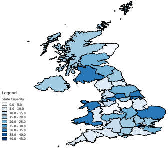
Research question and methodology

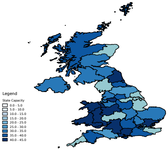
- Compare inheritance rules in terms of state capacity development.
- Build a theoretical model to explain the evolution of state capacity.
- Compare the outcome of the model under two inheritance systems:
  - male-cognatic primogeniture: discriminates against women,
  - absolute primogeniture: gender-egalitarian rule.
  - We take inheritance rules as exogenously given.
- Relative advantage of each system:
  - discriminating women increases the certainty that lands will belong to one's family name. Directly encourages state capacity development.
  - equal rights in inheritances favor marriages between heirs. Larger counties are more likely to invest in state capacity.

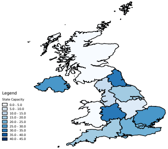
Potential effects

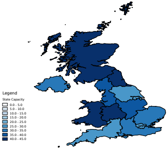
- Given the initial situation, which outcome is more likely?
  - Fragmented or unified country? With high or low state capacity?











Some evidence

- British Heptarchy:
- From 20 kingdoms in the 5th century to 1 kingdom in 927 under thelstan.
  - Marriages:
    - c.437 - Triffyn Farfog, the Irish chieftain and resident of West Wales, marries Princess Gwledyr, heiress of the Kingdom of Dyfed.
    - c.650 - King Cloten of Dyfed marries Princess Ceindrech of Brycheiniog and unites the two kingdoms.
  - And wars:
    - In 604, Aethelfrith of Bernicia conquered Deira, creating Northumbria.
    - In 654, East-Anglia fell under the control of Mercia.
    - In 819, King Egbert of Essex conquers Mercia.

Literature review

- State capacity and war:
  - Lagerlf (2014): regional fragmentation and investments in state capacity.
  - Gennaioli and Voth (2015): centralization as response to threat of war.
  - Besley and Persson (2008, 2009): war and state capacity; likelihood of continued rule and state capacity.
- Empirical findings:
  - Dincecco (2009): centralized countries extract more taxes per capita.
  - Kokkonen and Sundell (2014): countries relying on primogeniture developed more.
- State capacity and the number of countries:
  - Alesina and Spolaore (1997, 2006).

Set-up

- OLG framework. A big region is divided in sub-regions called counties, $i = 1, 2, \ldots I_t$. The region $\mathcal{L}_t = \{i_j\}_{j=1}^{I_t}$.
- Two types of individuals living for two periods: commoners and counts. Idle when young, active when adult.
  - Do not model commoners: they are passive, immobile, supply one unit of labor when adults and reproduce at a constant rate π_n.
  - Commoners are immobile.
- x_t^i : county surface;
- n_t^i : number of adult commoners in a county.
- Production: $Y_t^i = {n_t^i}^{\alpha} {x_t^i}^{1-\alpha}$.

Set-up

- Count's preferences:
  $\log\left(c_t^i\right) + \pi\eta \log\left(x_{t_c}^i\right)$, the sub-index c means post-war period.
- π : psychological discount rate; we set $\pi = 1$.
- η : probability that next period the county belongs to the current count's dynasty.
- Value of η depends on the inheritance rule:
  - Absolute primogeniture: $\eta = 0.5$.
  - Male-cognatic primogeniture: $\eta = 1 - 0.5^{children}$.

Territorial expansion

- From utility: all the counts want to increase the lands they own: so each period they battle all-against-all.
- Use a contest function to model the outcome of war:
  - $x^i_{t_c} = \frac{\left(1+A^i_t+g^i_t\right) {b^i_t}^{\phi}}{\sum_i \left(1+A^i_t+g^i_t\right) {b^i_t}^{\phi}} \sum_i x^i_t.$
  - Two possibilities to influence the result of the battle:
    - $A + g$: current state capacity plus investment;
    - b : weapons
  - Post-war county size depends on the relative effort put into war.

Assumption

Counts take the behaviour of competitors as given.

Budget constraint

- Count's income:
  - Part of production he takes for himself under a cropping-share rule: ψ.
  - Taxes on commoners. Tax rate: $\frac{A_t^i + g_t^i}{1 + \left(A_t^i + g_t^i\right)\kappa}$.
    - Proportional to state capacity.
    - κ : inverse of the maximum tax rate
- Budget constraint:

$$\psi Y_t^i + (1 - \psi) Y_t^i \frac{A_t^i + g_t^i}{1 + \left(A_t^i + g_t^i\right)\kappa} = c_t^i + p_b b_t^i + p_g g_t^i.$$

Optimal choices

- Optimal choices:

$$b_t^i = B\left(g_t^i\right) = \begin{cases} \dfrac{\left(p_g\left(1+\left(A_t^i+g_t^i\right)\kappa\right)^2 - Y_t^i(1-\psi)\right)\phi\left(1+A_t^i+g_t^i\right)}{\left(1+\left(A_t^i+g_t^i\right)\kappa\right)^2 p_b} & \text{if } g_t^i > 0 \\ \dfrac{Y_t^i\eta\phi\left(A_t^i+\psi+A_t^i(\kappa-1)\psi\right)}{p_b\left(1+A_t^i\kappa\right)(1+\eta\phi)} & \text{if } g_t^i = 0 \end{cases}$$

$$g_t^i = G\left(g_t^i\right) = \max\left\{0,\, g_t^i \middle|\, G_1\left(g_t^i\right) = 0\right\}, \text{ where}$$

$$G_1\left(g_t^i\right) = \frac{\eta}{1+A_t^i+g_t^i} + \frac{\left[p_g\left(1+\left(A_t^i+g_t^i\right)\kappa\right) - Y_t^i(1-\psi)\right][1+\eta\phi]\left(1+\left(A_t^i+g_t^i\right)\kappa\right)^{-1}}{g_t^i\left(p_g\left(1+A_t^i+g_t^i\right)\kappa - Y_t^i\right) - Y_t^i\left(\psi\left[\left(A_t^i+g_t^i\right)(\kappa-1)+1\right]+A_t^i\right)}.$$

- Comparative statics
  - b_t^i and g_t^i are increasing in η and Y_t^i.
  - g_t^i is decreasing in A_t^i, but
    - if $A_t^{i\prime} > A_t^i \implies 1 + A_t^{i\prime} + g_t^{i\prime} > 1 + A_t^i + g_t^i$.
  - An initially rich county will eventually conquer all lands.

Timing

- Each period of time is divided in 3 sub-periods: we want to avoid the theoretical possibility of alliances through marriages.

1. Counts' decide. Production takes place and commoners reproduce at a constant rate.
2. War takes place between all counties.
3. Post-war:
   - 3.1 Counts have children. The number of children is constant and exogenous for all counts.
   - 3.2 Counts receive the amount of land conquered (with the commoners living there). Counties that are too small disappear.
   - 3.3 Heirs and heiresses marry.

Marriages

- Preferences to marry:
  - a heir of the opposite gender, the richer the better,
  - someone else.
- Restrictions:
  - distance between spouses should be below a threshold.
- Outcome: positive assortativeness, weakened by restrictions.
- When a marriage takes place:
  - two counties merge.
  - the new county has size $x_{t+1} = x^i_{t_d} + x^j_{t_d}$, population $n_{t+1} = n^i_{t_d} + n^j_{t_d}$ and state capacity $A_{t+1} = \frac{n^i_t\left(A^i_t+g^i_t\right)+n^j_t\left(A^j_t+g^j_t\right)}{n^i_t+n^j_t}$.

The effects of inheritance systems

- There are two effects derived from inheritance systems:
  - A direct effect on the discount rate: $\eta^M > \eta^A$ and counts are more willing to invest under male-cognatic primogeniture.
  - Indirect effect of county size: county size also influences investments. Under absolute primogeniture there are more marriages so counties can be larger because more of them merge. This, in subsequent periods, leads to larger investments.
- From the analytical model it is not clear which one dominates.
- We resort to simulations to determine it.

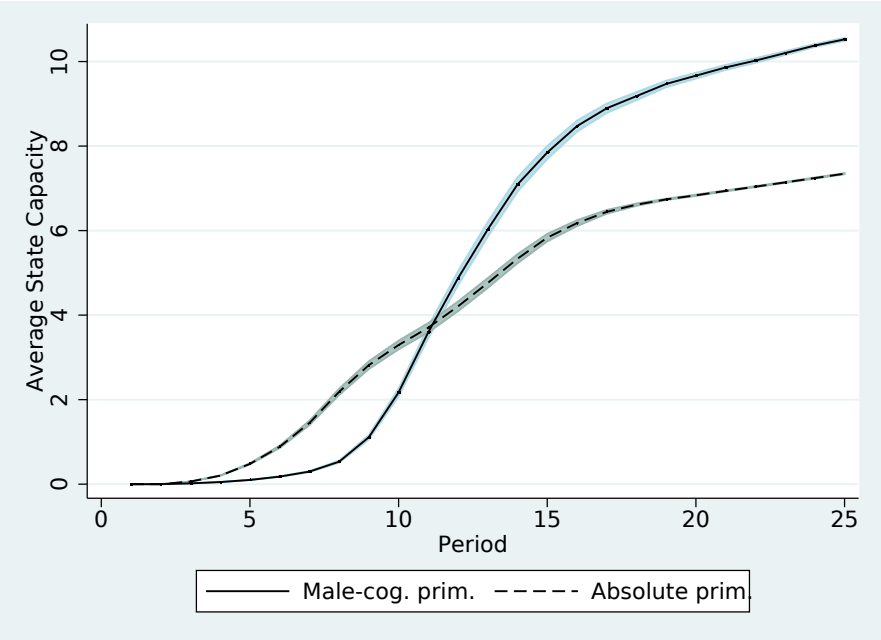
Simulating the model

Parameter	Value	Source
α	$1/2$	Tintner et al. (1944) and Mundlak et al. (1997, 1999).
ψ	$5/12$	Slicher van Bath et al. (1966)
g_n	1.026	Russell (1958).
Φ	3	Russell (1958).
ϕ	$1 + 1/10^{11}$	Arbitrarily set to have slow transitions.
p_b	1.375	Comparison between noble food expenditures: Banegas Lpez (2010) and soldier wages: Sanchez Martnez et al. (2003).
p_g	1.2	Comparison between noble food expenditures: Banegas Lpez (2010) and auditor wages: Verds Pijuan (2004).
κ	4	Tax burden imposed to pay Richard's ransom, Bartlett (2000).
η^M	$7/8$	Computed using $\eta^M = 1 - 0.5^{\Phi}$.
η^A	$1/2$	Computed using $\eta^A = 1 - 0.5$.
π	1	Arbitrarility decided.

Results

- Male-cognatic inheritance system generates higher average state capacity levels in the long run.

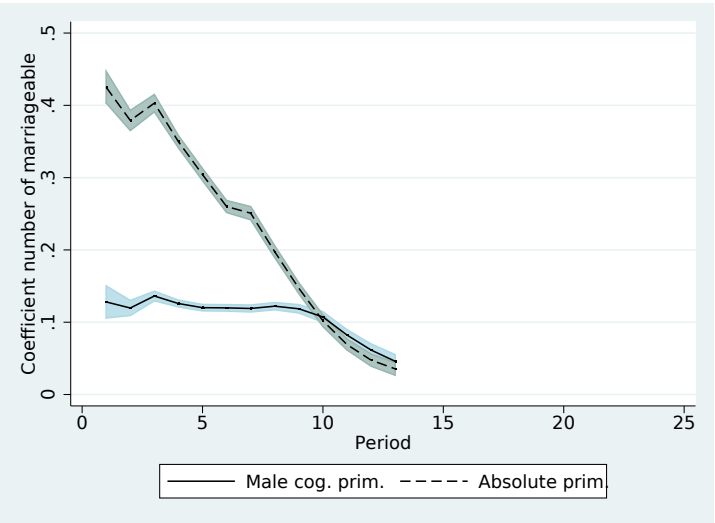
Figure: Evolution of average state capacity



Results: marriages

- Absolute primogeniture: genders are equally represented in the marriage market.
- Leads to a higher ratio of marriages per heir.
- Decreasing ratio of marriages to marriageable.

Figure: Regression coefficients



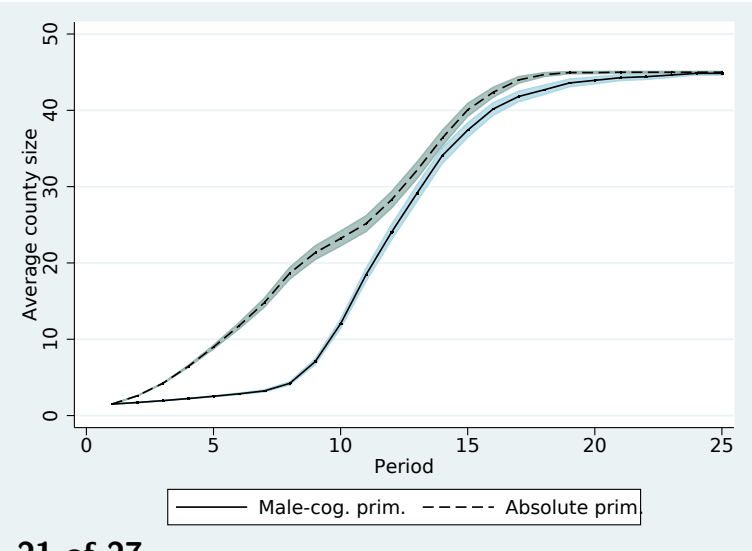
▸ Details

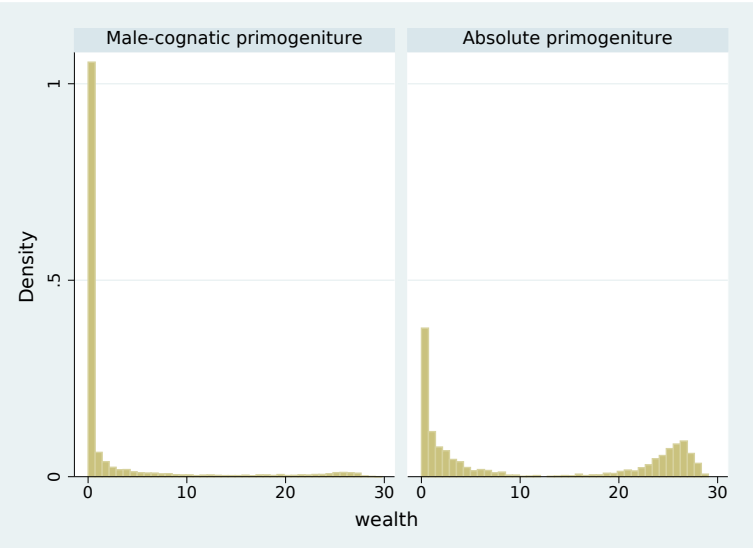
Results: county size and state capacity

- More marriages $\rightarrow$ larger and more populated counties.
  - Production is increased.
  - Higher likelihood that counties invest in state capacity (not considering differences in η)

▸ Details

Figure: County size and distribution of Y, period 8

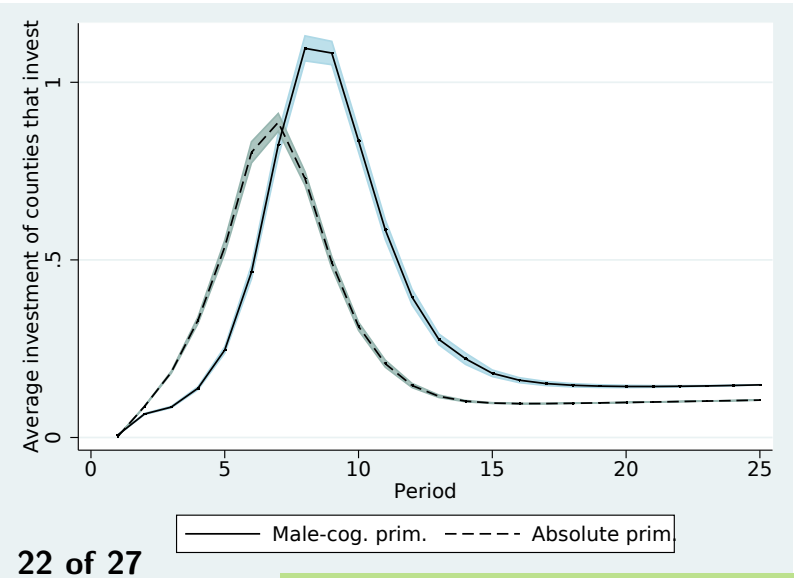


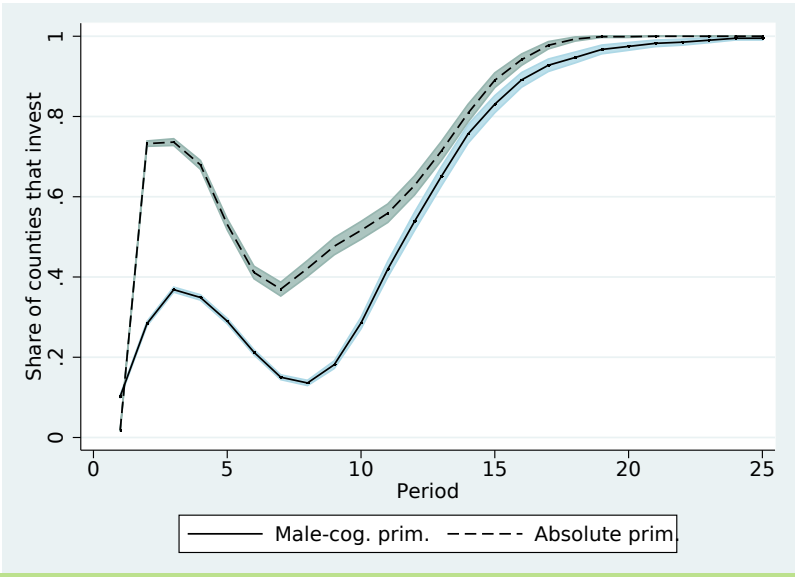


Results: investment in state capacity

- The amount invested in state capacity depends on:
  - wealth: the initial advantage under absolute primogeniture vanishes as counties that can invest become more and more similar across regimes.
  - state capacity level: counties with high levels of state capacity invest less.

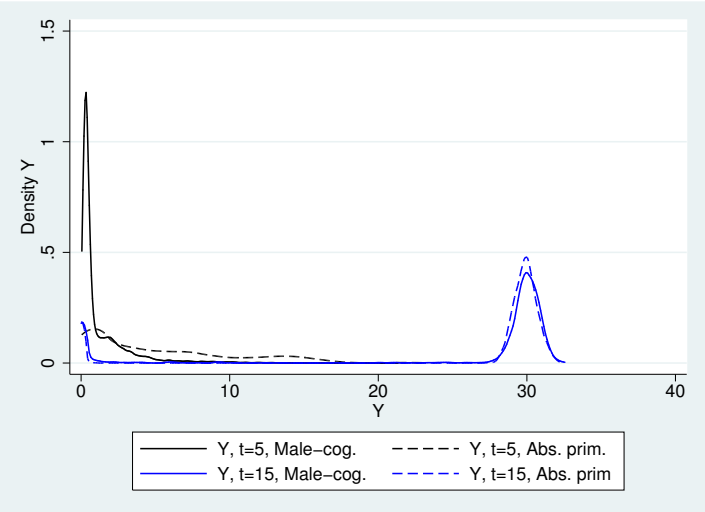
Figure: Investments in state capacity





Investments in state capacity

- Why male-cognatic catches up?
  - War: similar in both regimes.
  - Marriages: less likely under male-cognatic primogeniture **but** given enough time they can take place.
  - Consequence: with enough time, the distribution of country production is similar across regimes.
  - Since $\eta^M > \eta^A$, higher investments under male-cognatic primogeniture.



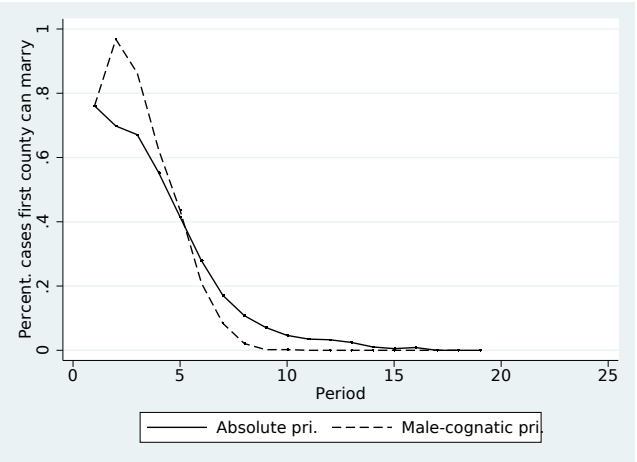
Conclusions

- We built a model that links state capacity development with inheritance systems.
  - Decreasing number of regions: regional unification.
  - Male-cognatic primogeniture outperforms absolute primogeniture in the long run.
  - Important role of marriages.
- Future plans:
  - In the model, higher certainty of having a male heir leads to higher state capacity.
  - Test this prediction using European data.

Results: marriages

- Why are coefficients decreasing?
  - $\mathbb{E}(m|x)/x = 2 \times \frac{0.5^x}{x} \sum_{j=0}^{x/2} \binom{x}{j} \times j$ is low for low values of x.
  - Wealthiest count is unlikely to marry: the ratio $\downarrow \frac{marriages}{marriageables}$.
  - Integer effect.

Figure: Marrying the wealthiest count and frictionless market



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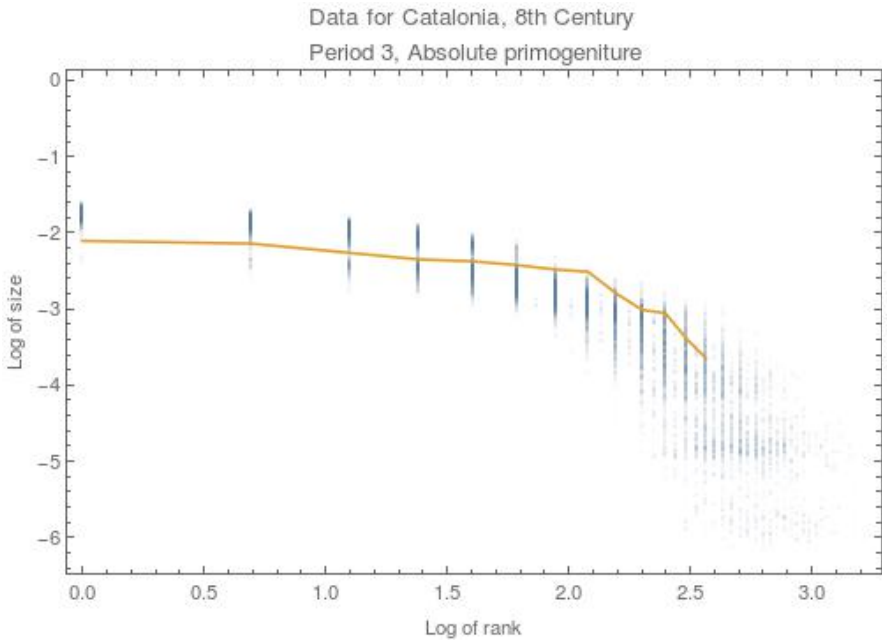
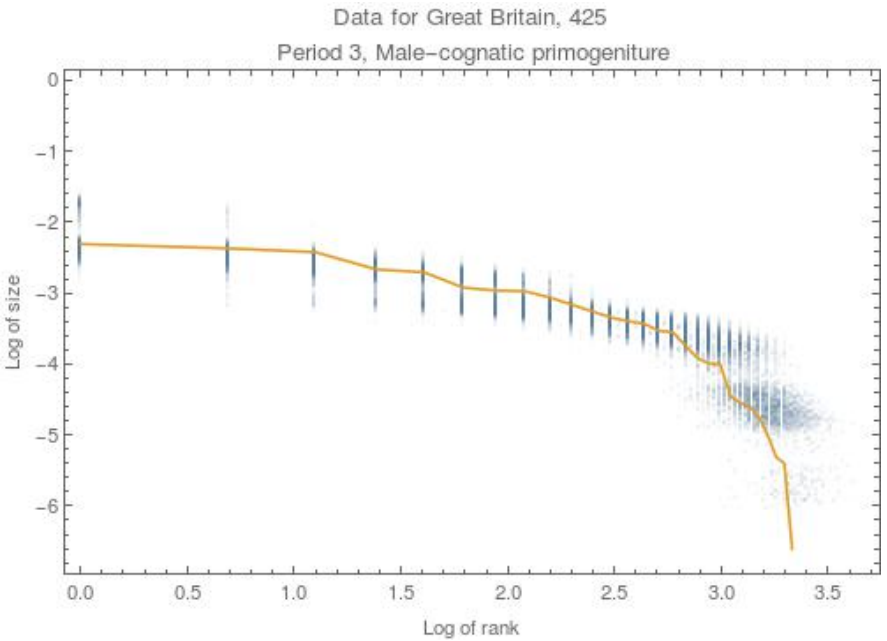
County size: comparison with real data





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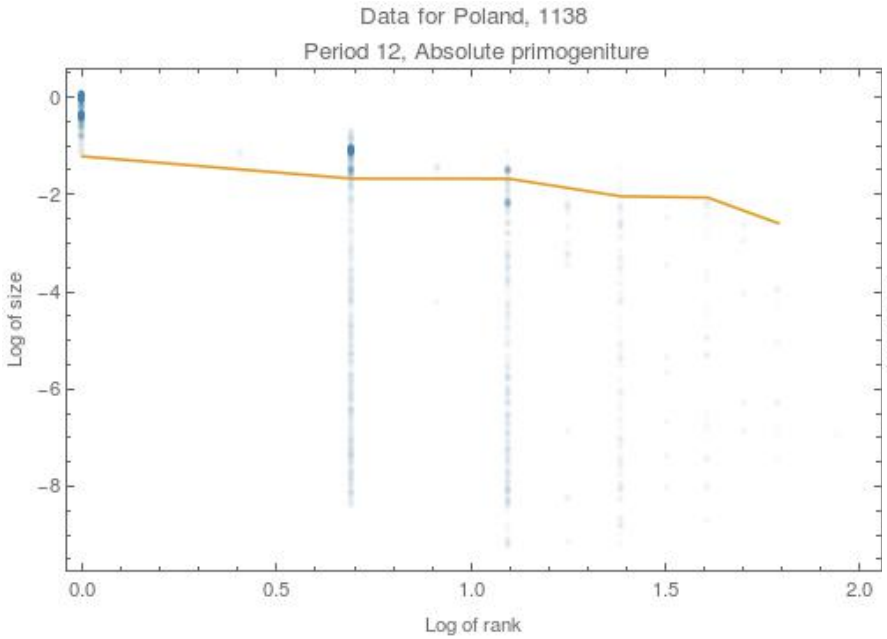

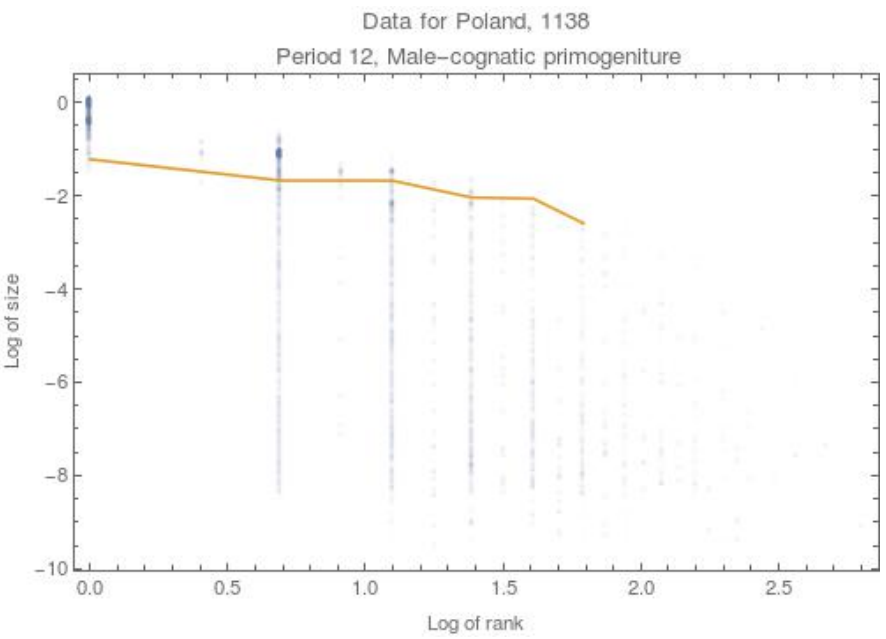

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