The economic effects of the English Parliamentary enclosures

Leander Heldring James A. Robinson Sebastian Vollmer

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Arthur Young's natural experiment

- In 1808 the English agriculturalist Arthur Young stumbled on a natural experiment
- In Childersley "divided only by a hedgerow" from Hardwicke, wheat yields were 50 % higher
- What could explain the difference?
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Introduction:

We study the economic effects of the English parliamentary enclosures (1750-1830):

- Enclosure: Assign private property rights to the commons
- Enclosure: Consolidate scattered strips into contiguous plots
- Two, bottom-up, methods: Informally (unanimity), or through an act of Parliament

Economists: Property rights $\rightarrow$ development. Evidence inconclusive:

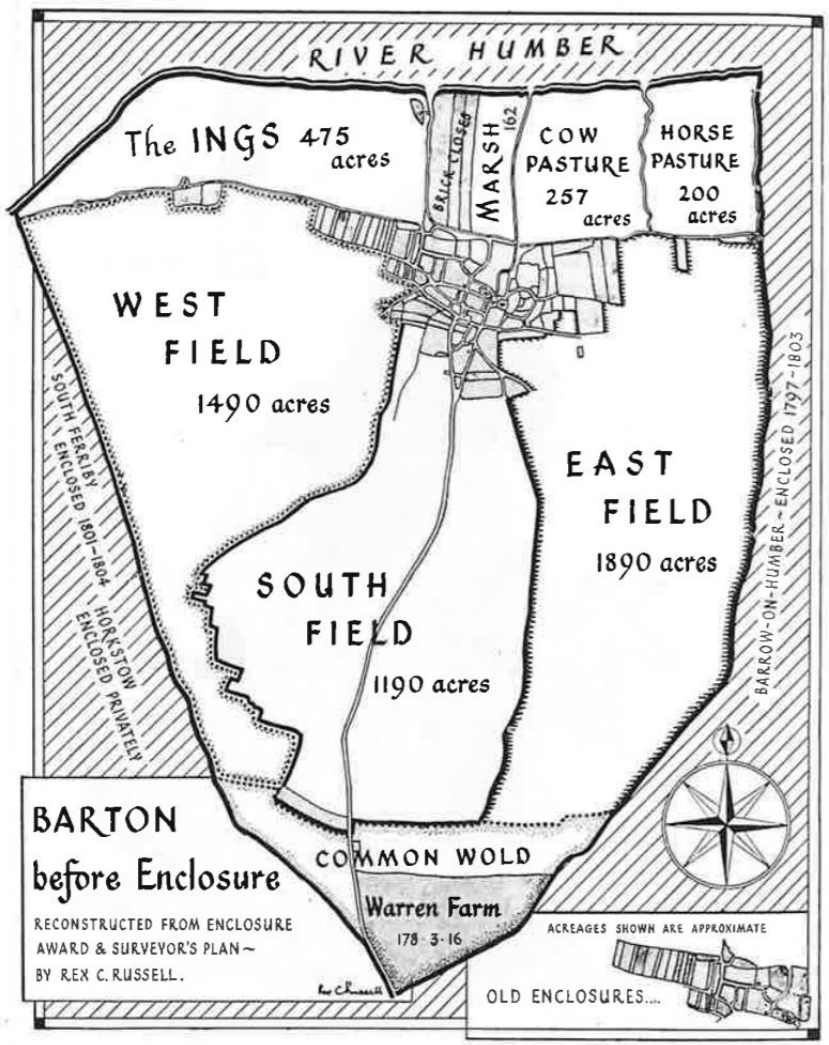
- Most famous statement: Hardin's 'Tragedy of the Commons' (Hardin, 1968)
- Best evidence: Small estimated effects (Allen, 1982)
- Commentators: Enclosure=expropriation (Marx, 1990; Hammond and Hammond, 1911)

Empirical challenges:

- Institutional history and detail is complex
- Difficult to bring together local measures of enclosure, and economic outcomes
- Enclosure is clearly endogenous, need identification strategy

Barton in England

Barton (Lincs.) before enclosure



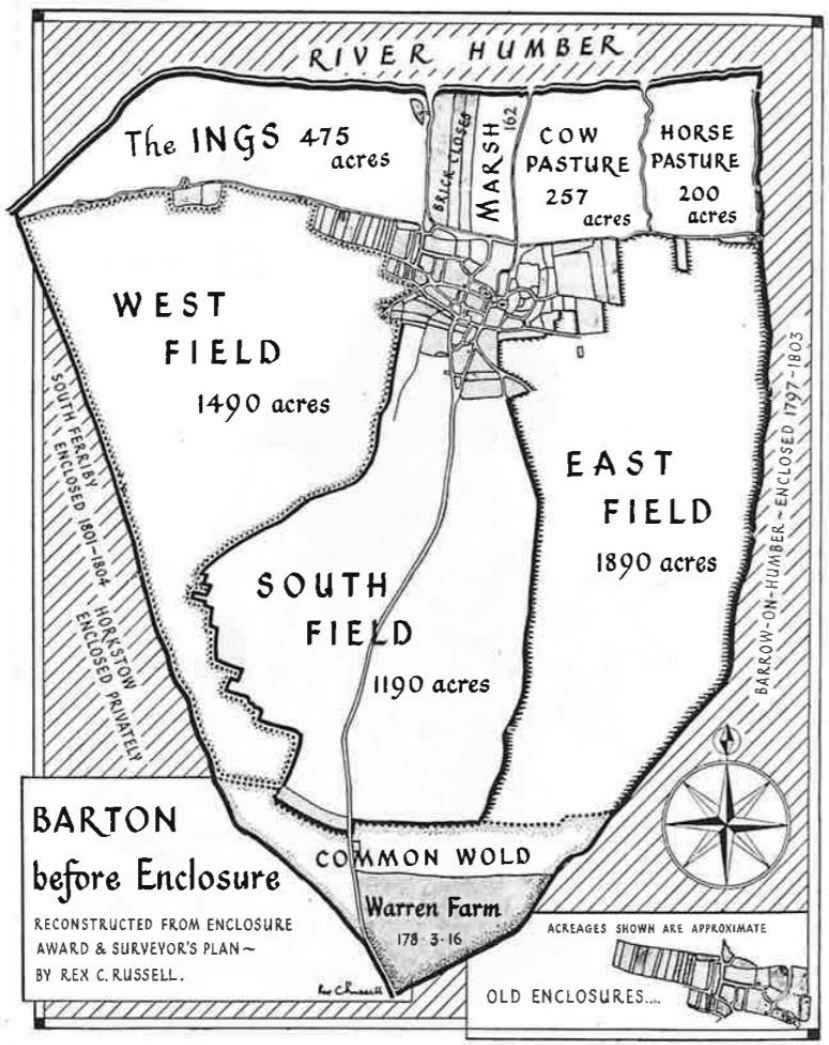
Source: Mingay (1997)

- There are three open fields, and several commons
- There are the Ings, marsh, cow/horse pastures and 'common wold'

"Barton is a dirty village ... It has neither trade nor manufactures. The arable here lets at 4 shillings per acre, though it is good. The reason is that there is very little ... inclosures"
Sir William Burrell's Northern Tour, 1758

- Barton is enclosed in 1793

Barton (Lincs.) before enclosure



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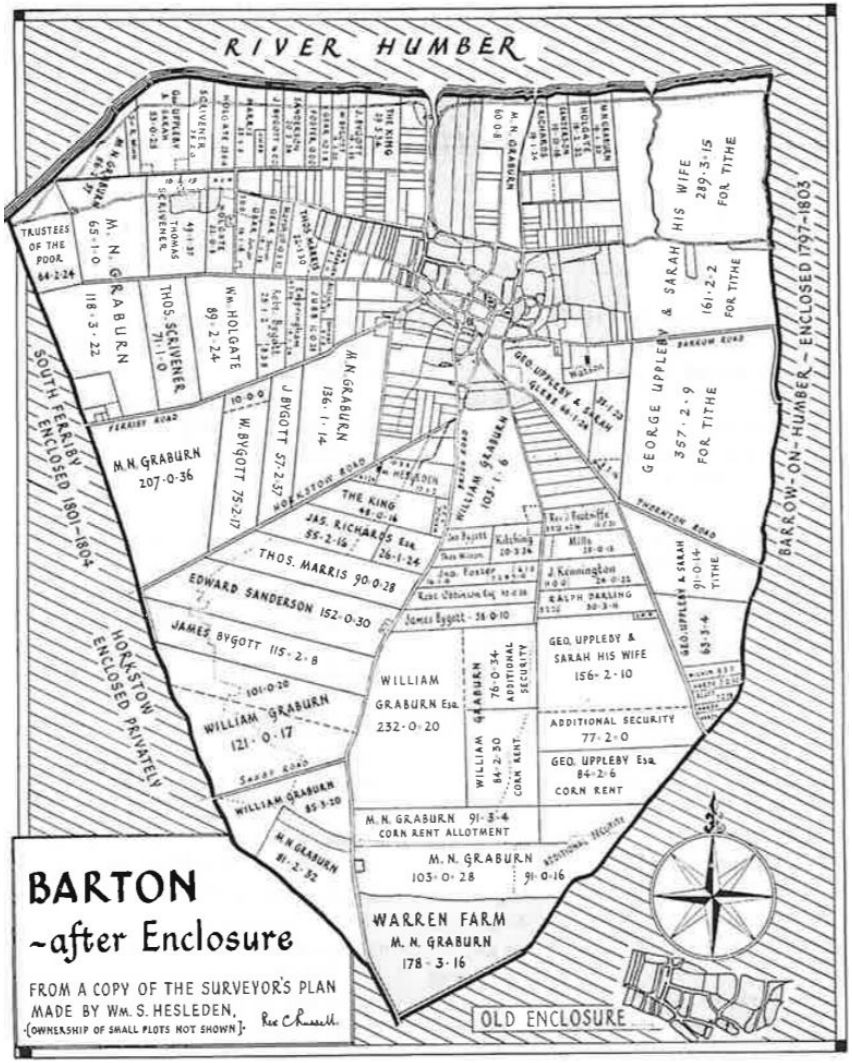
The open fields

Barton (Lincs.) after enclosure



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- Barton petitioned Parliament, with a lawyer
- Parliament passed act enclosing Barton

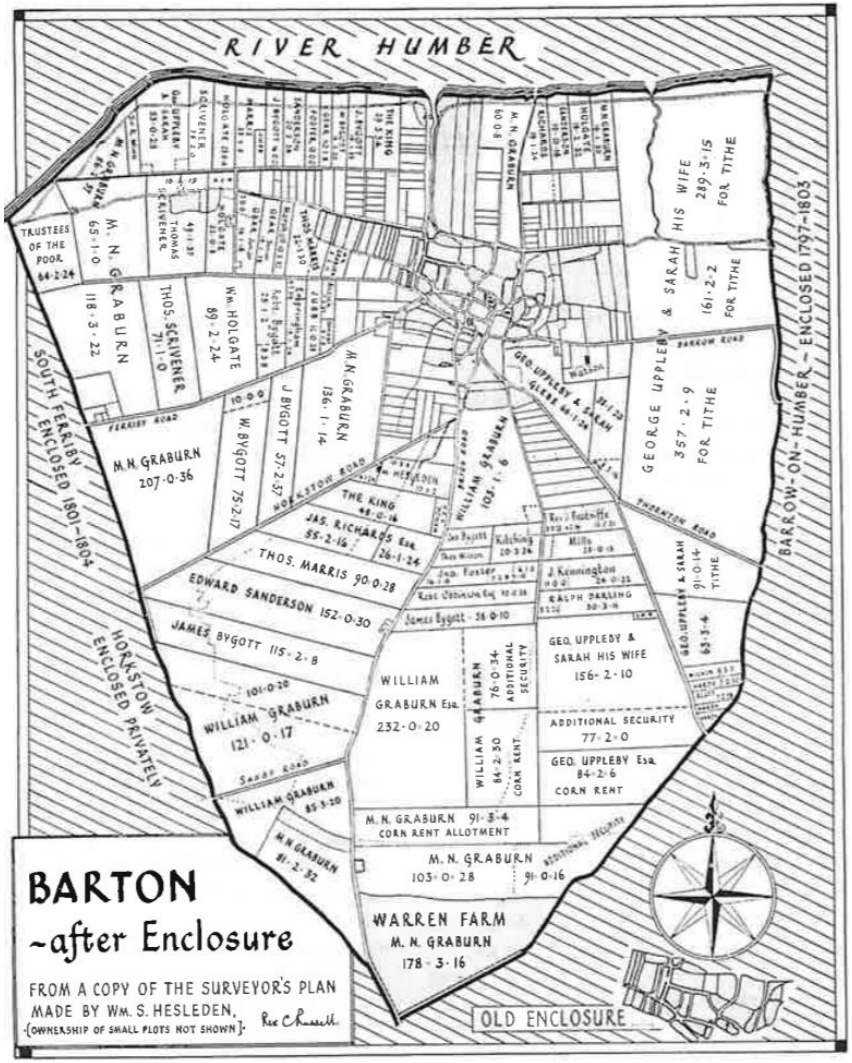
Barton upon Humber Inclosure Bill passed.

Resolved, That the Bill do pass: And that the Title be, An Act for dividing, allotting, and inclosing the Open Fields, Ings, Marshes, and Common Pastures, and other Common and Waste Lands and Grounds, within the Lordship of *Barton upon Humber*, in the County of *Lincoln*.

- Enclosure was very expensive, about 13k pounds (value of parish pre-enlosure, 2k)
- Costs were shared among landowners

- Commons disappear, and strips are consolidated
- Survey: Yield doubles, changed crop mix
- Concentration of land in hands of a few people, Like Marmaduke Nelson and William Graburn

Barton (Lincs.) after enclosure



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This paper:

Data: We gather data on the English economy between 1750 and 1830:

- About 5,500 enclosure acts, enclosing 1/3 of parishes
- We measure Parliamentary enclosure and economic change across these parishes
- We can not measure unanimous enclosure

We test the most important hypotheses from the case study literature:

- Economic effects: Agricultural yield (Allen, 1982; Overton, 1996)
- Social effects: Land inequality (Marx, 1990; Hammond and Hammond, 1911; Thompson, 1963)

Identification: We exploit the legal process of Parliamentary enclosure:

- What distinguishes Parliamentary enclosure is Parliament
- Use (idiosyncratic) variation in the probability of Parliamentary approval
- Main challenge this solves: Selection into unanimous/Parliamentary enclosure
- May help resolve discrepancy between contemporary and modern estimates

Preview of main results:

Parliamentary enclosure transformed agriculture:

- Ag. yield higher in enclosed parishes (IV: 44%)
- Interpretation: Investment incentives and coordination of agricultural practices

Parliamentary enclosure impacted inequality:

- Higher land inequality in enclosed parishes (IV: 30%)
- Interpretation, part I: Common rights of poorer people were less enforcible
- Interpretation, part II: High costs of enclosure implementation led to 'selling out'

Results inconsistent with efficiency of 'private orderings':

- Parliamentary procedure solved inability to coordinate
- Even in small, coherent, communities, like parishes

What was an enclosure:

Parliamentary enclosure was a full reorganization of a parish: (Mingay, 1997, p. 7)

> *"it meant the extinction of common rights which people held over the farm lands and commons of the parish, the abolition of the scattered holdings in the open fields and a re-allocation of holdings in compact blocks, accompanied usually by the physical separation of the newly created fields .. by the erection of fences, hedges and stone walls"*

Two key changes to land ownership structure:

- Assign property rights to common lands
- Consolidate (informal) claims to the open fields
- Other improvements: road building, hedging

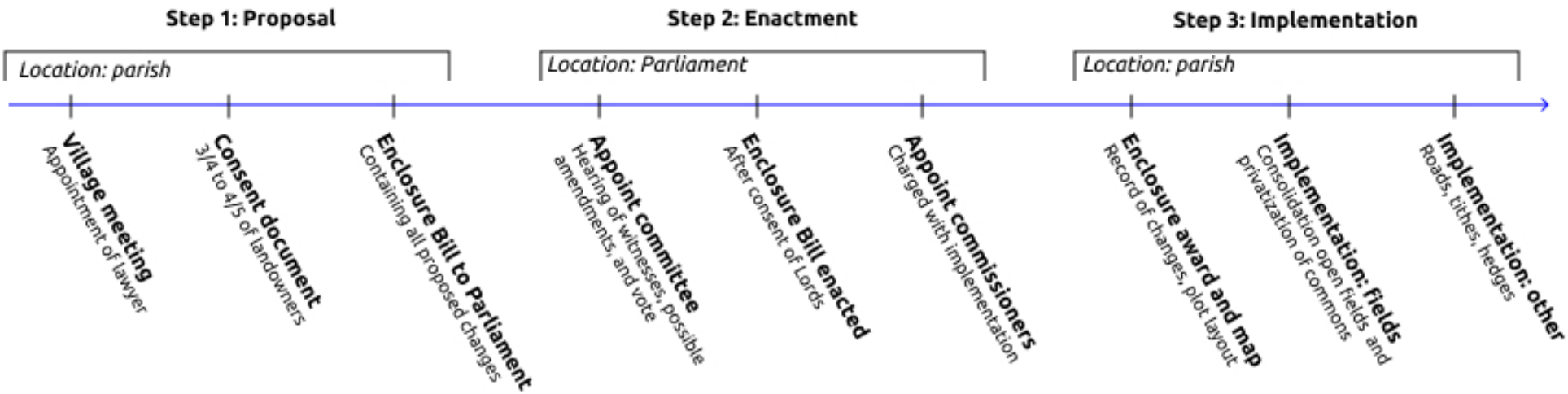
Parliament: decision making mechanism

Forms of enclosure:

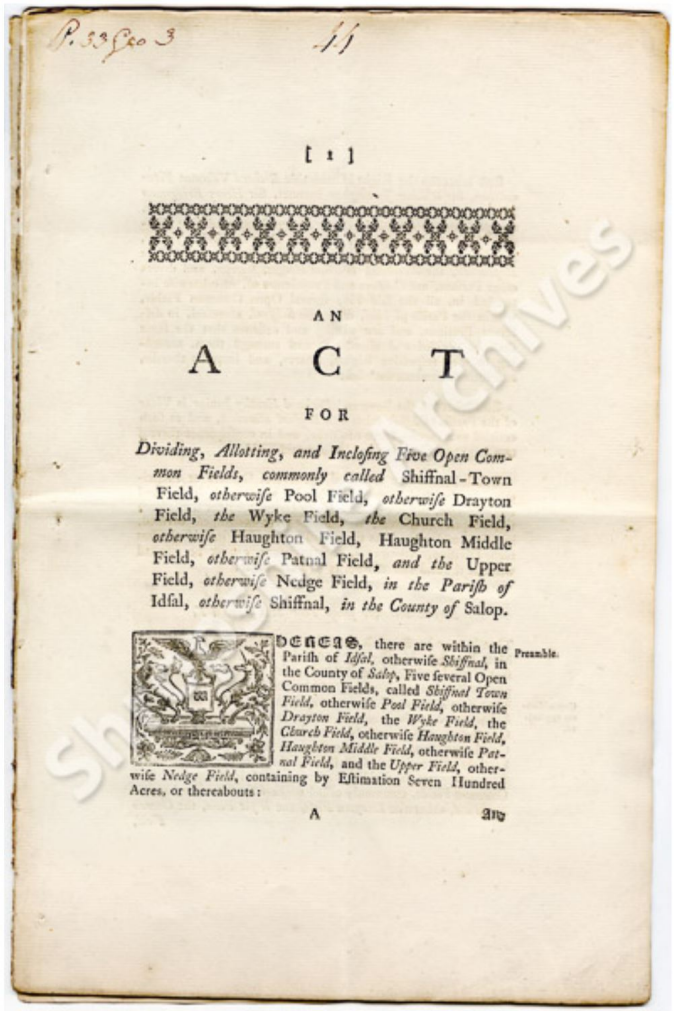
- Enclosure could be done by negotiation, and private agreement
- In practice, parishes with one or a few large landowners did this
- Or, a parish could decide to petition Parliament

Key difference: legislation supersedes previous arrangements, and only 3/4 to 4/5 of landowners need to agree in order to petition Parliament

The Parliamentary enclosure process



Example of an enclosure act



[1]

AN

A C T

FOR

Dividing, Allotting, and Inclosing Five Open Common Fields, commonly called Shiffnal-Town Field, *otherwiſe* Pool Field, *otherwiſe* Drayton Field, *the* Wyke Field, *the* Church Field, *otherwiſe* Haughton Field, Haughton Middle Field, *otherwiſe* Patnal Field, *and the* Upper Field, *otherwiſe* Nedge Field, *in the Pariſh of* Idſal, *otherwiſe* Shiffnal, *in the County of* Salop.

WHEREAS, there are within the Parish of *Idſal*, otherwiſe *Shiffnal*, in the County of *Salop*, Five ſeveral Open Common Fields, called *Shiffnal Town Field*, otherwiſe *Pool Field*, otherwiſe *Drayton Field*, the *Wyke Field*, the *Church Field*, otherwiſe *Haughton Field*, *Haughton Middle Field*, otherwiſe *Patnal Field*, and the *Upper Field*, otherwiſe *Nedge Field*, containing by Eſtimation Seven Hundred Acres, or thereabouts: Preamble.

A

Act for Shifnal, Shropshire. Source: Shropshire county archive

Data:

We assign to each of n=15,000 parishes an enclosure indicator:

- We code enclosure from Tate and Turner (1978)
- Main measure: indicator equal to one if parliamentary enclosure occurred between 1750 and 1830

Data sources for outcomes:

- Agricultural yield: Survey underlying Tithe Commutation Act of 1836
- Inequality: Plot level data from Commissioners' Returns of the same act
- We have data on about 8 million plots, and 800k individuals

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Estimating equation:

$$Y_p = \beta_0 + \beta_1 enclosed_p + X_p^{'}\beta_2 + s + \epsilon_p$$

- Y_p = outcome variable for parish p. We restrict to rural parishes
- $enclosed_p$ = indicator equal to one if Parliamentary enclosure in parish p
- X_p = vector of covariates
- s = fixed effects

- Covariates:
  - *Scale*: Parish area
  - *Geography*: Elevation
  - *Location*: Latitude, longitude, latitude*longitude
  - *Regional differences*: Four region, London indicators (n=5)
  - *Soil characteristics*: Soil type indicators (n=11)

- ϵ_p = Conley standard error, or robust s.e.

- Parameter of interest: $\hat{\beta}_1$ - measured effect of enclosure

Enclosure, yield, and inequality

Dependent variable:	ln(Wheat Yield) in bushels per acre		Gini (land value)	
	(1)	(2)	(3)	(4)
Parliamentary enclosure (yes/no)	0.03	0.03	0.04	0.04
	(0.01)	(0.01)	(0.02)	(0.01)
	[0.007]	[0.007]	[0.007]	[0.007]
Mean dep. var.	3.05	3.05	0.74	0.74
SD dep. var.	0.21	0.21	0.21	0.21
Observations	3641	3641	4446	4446
R^2	0.19	0.32	0.07	0.08
Scale: Parish area	N	Y	N	Y
Geography: Elevation	N	Y	N	Y
Location: Latitude, longitude, latitude*longitude	N	Y	N	Y
Regional differences: Four region, London indicators (n=5)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

Interpretation of the estimated effect size

Starting point: Enclosure was very expensive

- Turner (1989, pp. 60-61), costs: 10 pounds per acre on average
- Mingay (1997, p. 113): For 20 acre farm, costs 4x annual income
- Everyone had to contribute to roads, fences, etc., often in land

Our estimates are in line with historical, but not modern, literature:

- Modern: Allen (1992): 2.5% to 8.4%. McCloskey (1989): 10 and 13%
- Historical: Arthur Young: 50% increase. Surveys: 66% on average

For inequality, we may underestimate the true effect as well:

- Anecdotally, enclosure resulted in 'selling out' (Neeson (1993) case study: 21%)
- Due to high costs and hierarchy of rights:
  - Compensation for customary tax, as much as 20% of land (Turner, 1984)
  - Customary rights were harder to enforce
  - Land given up for compensation was larger share for smaller farmers

Interpretation of the estimated effect size

Our conjecture is that this is due to informally enclosed parishes in the control group:

- **Yield**: Yields higher due to purported efficiency gains
- **Inequality**: Inequality higher since unanimity easier
- Both informally enclosed, unenclosed parishes are control, biasing down estimates

We face essentially a selection on unobservables problem:

- Informally enclosed parishes don't stand to gain from Parliamentary enclosure
- Potential gain from enclosure is not observed (as is informal enclosure status!)
- We therefore need a source of variation in *Parliamentary* enclosure

Identification strategy: Preliminaries

Parishes were part of electoral districts called 'constituencies':

- Either one of 40 rural constituencies or of 170 'boroughs', two MPS each
- MPs represent hundreds of parishes, franchise below 10% of males
- Parishes therefore have little control over the election of MPs

MPs judged a petition as part of a committee:

- In Parliament, local MPs were assigned to a committee for the enclosure petition
- Committee judged legality of a petition, against 'standing orders', 25% fail
- These prescribed, among other things, that all rights were respected

Identification strategy: Idea

Idea: Approximate pass rate of committee that would have judged:

- Leave-one-out mean of enclosure passing as an instrument
  (cf. Kling (2006); Dobbie et al. (2018))
- For nearby parishes, which would have had similar committee composition
- Note: Conditioning on petition 'shifts' the instrument to London

Construction, for a parish, proceeds in two steps:

- Take the 350 nearest parishes to parish p (can be varied)
- Compute the fraction of successful enclosures within this 'committee'
- We remove petitioning parish itself

Identification strategy: idea

Under standard assumptions, following this strategy gives us two things:

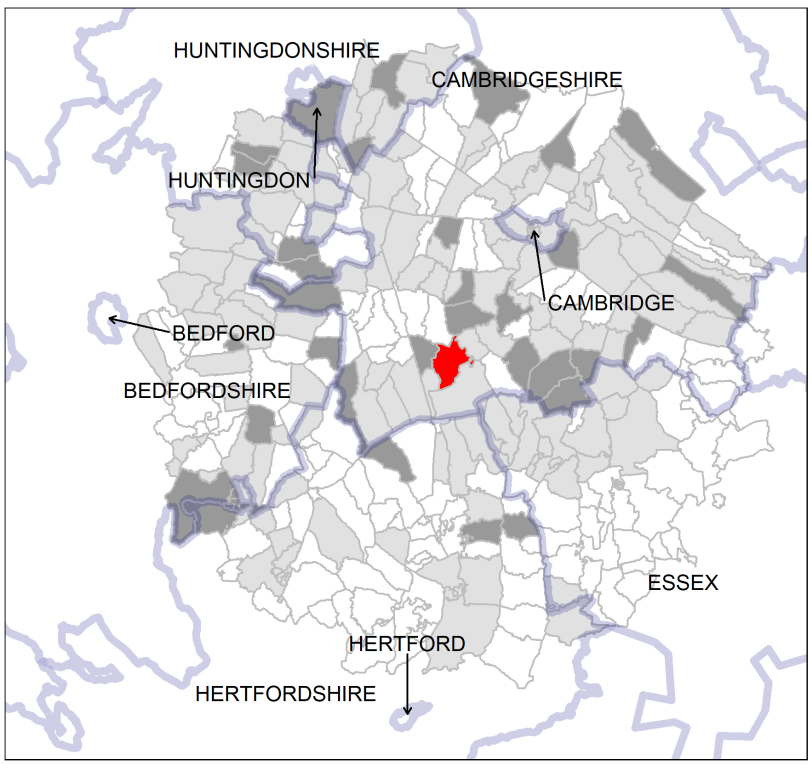
- A causal interpretation of the estimated effects of enclosures
- LATE: For those parishes considering *Parliamentary* enclosure

Now: Example to build intuition for Meldreth

Enclosure of Meldreth, Cambridgeshire

(A) Synthetic committee

(B) Instrument construction



Balance

Dependent variable:	Tax revenue per capita 1525 (1)	Tax revenue 1525 (2)	Suitability for wheat (3)	Population 1525 (4)	Number of MPs 1700 (5)	Number of nobility 1700 (6)
Leave-one-out pass rate nearby Enclosure Bills	0.005	-0.004	-0.004	0.029	0.001	0.004
	(0.010)	(0.011)	(0.030)	(0.020)	(0.004)	(0.012)
	[0.007]	[0.006]	[0.007]	[0.010]	[0.004]	[0.011]
Observations	6791	7581	13919	7581	9339	9339
R^2	0.02	0.08	0.50	0.32	0.01	0.00
Scale: Parish area	Y	Y	Y	Y	Y	Y
Geography: Elevation	Y	Y	Y	Y	Y	Y
Location: Latitude, longitude, latitude*longitude	Y	Y	Y	Y	Y	Y
Regional differences: Four region, London indicators (n=5)	Y	Y	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y	Y	Y

Notes: standardized coefficients

Estimating equations:

We estimate the effect of enclosure in the following system of equations:

Second stage:

$$Y_p = \delta_0 + \delta_1 enclosed_p + X_p^{'}\delta_2 + s + \rho_p + \mu_p$$

First stage:

$$enclosed_p = \gamma_0 + \gamma_1 S_p^{-d} + X_p^{'}\gamma_2 + s + \nu_p$$

- S_p^{-d} = Leave-one-out pass rate nearby Enclosure Bills
- To do inference, we report standard errors adjusted for spatial correlation, in most conservative cutoff (about 70km)
- We also report robust standard errors

The effects of Parliamentary enclosure

Dependent variable:	ln(Wheat Yield) in bushels per acre		Gini (land value)	
	(1)	(2)	(3)	(4)
		Panel I: IV estimates		
Parliamentary enclosure (yes/no)	0.48	0.45	0.16	0.22
	(0.31)	(0.14)	(0.08)	(0.10)
	[0.09]	[0.08]	[0.04]	[0.05]
Mean dep. var.	3.05	3.05	0.74	0.74
SD dep. var.	0.21	0.21	0.21	0.21
Observations	3641	3641	4446	4446
		Panel II: first stage		
		Dep. var.: Enclosed (yes/no)		
Leave-one-out pass rate nearby Enclosure Bills	0.58	0.58	0.77	0.68
	(0.16)	(0.14)	(0.15)	(0.15)
	[0.06]	[0.06]	[0.07]	[0.07]
Conley F-stat of Excluded Instrument	13.27	16.38	24.88	19.77
		Panel III: Reduced Form		
Leave-one-out pass rate nearby Enclosure Bills	0.28	0.26	0.12	0.15
	(0.14)	(0.06)	(0.07)	(0.07)
	[0.04]	[0.04]	[0.03]	[0.03]
Scale: Parish area	N	Y	N	Y
Geography: Elevation	N	Y	N	Y
Location: Latitude, longitude, latitude*longitude	N	Y	N	Y
Regional differences: Four region, London indicators (n=5)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

Vary k Bandwidth

Effect sizes

Our OLS estimates are considerably smaller than our IV estimates:

- Our interpretation: IV downweights informally enclosed parishes
- These parishes are 'never-takers' but did experience change due to enclosure

However, IV estimates may be larger than OLS for other reasons:

- Problem: OLS (ATE) and IV (LATE) are typically not comparable
- We decompose the difference between the OLS and LATE into a part that is due to the different *estimand* and everything else
- Standard application of Marginal Treatment Effects (Heckman and Vytlacil, 2005)

Mechanisms

Yield: We test for investment and coordination as mechanisms:

- Investment: Patenting activity and road improvement
- Coordination: Adoption of techniques that were known: Turnips and fallowing

Inequality: We test for 'selling out':

- We compute the number of 'cottagers' as a fraction of all landowners

Mechanisms

Dependent variable:	Innovation		Coordination		Ownership
	Nr. Agr. Patents	Road quality poor (yes/no)	Turnips grown (acres)	Lands fallow (yes/no)	Cottagers/ Landlord
	(1)	(2)	(3)	(4)	(5)
Enclosed (yes/no)	0.02	-0.11	0.13	-0.09	-0.17
	(0.01)	(0.04)	(0.04)	(0.04)	(0.04)
	[0.01]	[0.03]	[0.04]	[0.03]	[0.03]
Observations	13920	5288	2290	5288	3180
Scale: Parish area	Y	Y	Y	Y	Y
Geography: Elevation	Y	Y	Y	Y	Y
Location: Latitude, longitude, latitude*longitude	Y	Y	Y	Y	Y
Regional differences: Four region, London indicators (n=5)	Y	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y	Y

Midlands

Discussion

We provide evidence that enclosure led to:

- Increased agricultural yields
- Increase in land value inequality

Results and the history support a fascinating political economy story:

- Prior to 1750-1830 agriculture was not organized efficiently but this was impossible to change politically because
  - People recognized that some rights would dominate others in the division of the commons
  - People anticipated that other traditional rights, like tithes, would be heavily compensated
  - People were liquidity constrained so could not take advantage of the productivity benefits
- The Parliamentary process eliminated the power of the veto players resulting in increased productivity at the expense of higher inequality

THANKS

Additional slides

Different crops (OLS)

Dependent variable:	ln(Barley Yield) in bushels per acre		ln(Oats Yield) in bushels per acre	
	(1)	(2)	(3)	(4)
Parliamentary enclosure (yes/no)	0.01	0.02	0.01	0.01
	(0.01)	(0.01)	(0.02)	(0.01)
	[0.007]	[0.007]	[0.012]	[0.012]
Mean dep. var.	3.41	3.41	3.45	3.45
SD dep. var.	0.18	0.18	0.24	0.24
Observations	2701	2701	2283	2283
R^2	0.11	0.18	0.23	0.29
Scale: Parish area	N	Y	N	Y
Geography: Elevation	N	Y	N	Y
Location: Latitude, longitude, latitude*longitude	N	Y	N	Y
Regional differences: Region fixed effects (n=4)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

Back

Inequality measurement (OLS)

Dependent variable:	Gini (land size)		Gini (land value)	
	(1)	(2)	(3)	(4)
Parliamentary enclosure (yes/no)	0.01	0.02	0.04	0.04
	(0.01)	(0.01)	(0.02)	(0.01)
	[0.006]	[0.006]	[0.007]	[0.007]
Mean dep. var.	0.75	0.75	0.74	0.74
SD dep. var.	0.18	0.18	0.21	0.21
Observations	4357	4357	4446	4446
R^2	0.04	0.05	0.07	0.08
Population: Total number landowners	N	N	Y	Y
Scale: Parish area	N	Y	N	Y
Geography: Elevation	N	Y	N	Y
Location: Latitude, longitude, latitude*longitude	N	Y	N	Y
Regional differences: Region fixed effects (n=4)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

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Drainage and turnpikes (OLS)

Dependent variable:	ln(Wheat Yield) in bushels per acre		Gini (land value)	
	(1)	(2)	(3)	(4)
Parliamentary enclosure (yes/no)	0.02	0.03	0.06	0.06
	(0.01)	(0.01)	(0.01)	(0.01)
	[0.007]	[0.007]	[0.007]	[0.007]
Mean dep. var.	3.05	3.05	0.74	0.74
SD dep. var.	0.21	0.21	0.21	0.21
Observations	3641	3641	2745	2745
R^2	0.20	0.32	0.15	0.16
Drainage indicator	Y	Y	Y	Y
indicator	Y	Y	Y	Y
Scale: Parish area	N	Y	N	Y
Geography: Elevation	N	Y	N	Y
Location: Latitude, longitude, latitude*longitude	N	Y	N	Y
Regional differences: Region fixed effects (n=4)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

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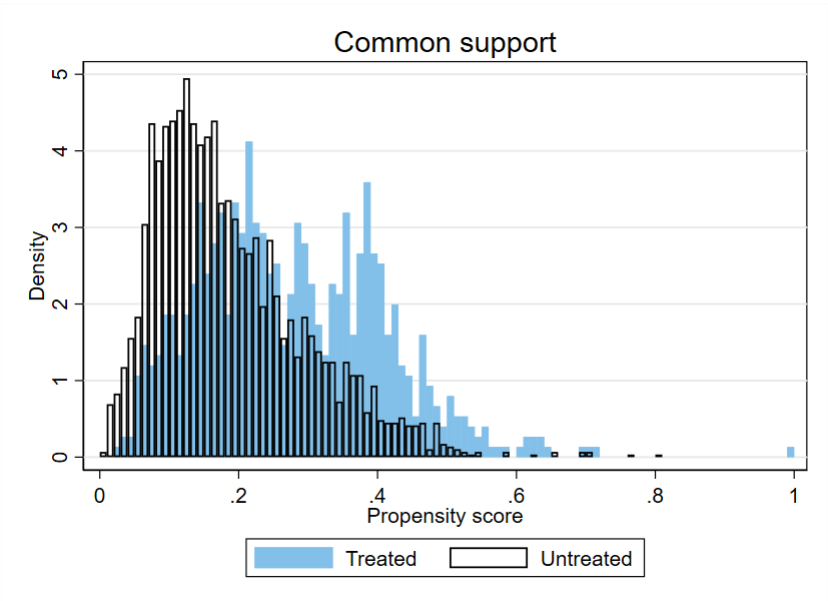
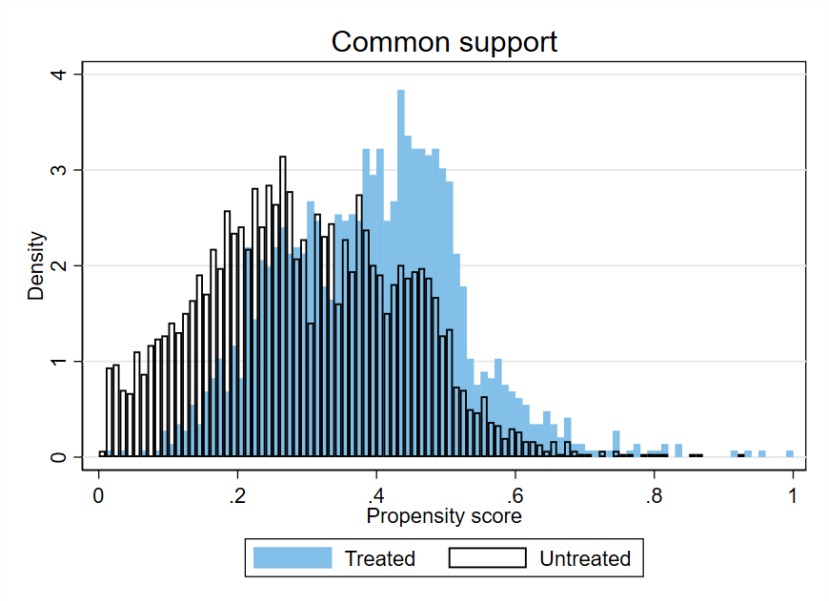
Common support

(A) Yield



(B) Inequality



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Robustness to k (IV)

Dependent variable:	ln(Wheat Yield) in bushels per acre (1)	Gini (land value) (2)
Bandwidth		
20	0.447***	0.218***
	(0.116)	(0.073)
50	0.447***	0.218**
	(0.133)	(0.098)
70	0.447***	0.218**
	(0.137)	(0.105)
100	0.447***	0.218**
	(0.139)	(0.108)
Scale: Parish area	Y	Y
Geography: Elevation	Y	Y
Location: Latitude, longitude, latitude*longitude	Y	Y
Regional differences: Region fixed effects (n=4)	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y

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Robustness to Conley cutoff (IV)

Dependent variable:	ln(Wheat Yield) in bushels per acre (1)	Gini (land value) (2)
Neighbors		
250	0.469***	0.164*
	(0.147)	(0.091)
300	0.463***	0.192**
	(0.142)	(0.094)
350	0.447***	0.218**
	(0.137)	(0.105)
400	0.425***	0.240**
	(0.137)	(0.117)
450	0.424***	0.253**
	(0.140)	(0.125)
500	0.444***	0.259**
	(0.149)	(0.132)
Scale: Parish area	Y	Y
Geography: Elevation	Y	Y
Location: Latitude, longitude, latitude*longitude	Y	Y
Regional differences: Region fixed effects (n=4)	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y

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The Midlands (OLS)

- We test our main results in our sample and Allen's (1982) sample
- His replicate no effect on yield within his sample, but not with more data
- He finds redistribution of surplus to landowners, we find insignificant effect on inequality

Dependent variable:	ln(Wheat Yield)		Gini	
	(1)	(2)	(3)	(4)
	Country	Midlands	Country	Midlands
Parliamentary enclosure (yes/no)	0.03	0.00	0.04	-0.04
	(0.01)	(0.02)	(0.01)	(0.02)
	[0.007]	[0.020]	[0.007]	[0.030]
Mean dep. var.	3.05	3.12	0.74	0.71
SD dep. var.	0.21	0.15	0.21	0.26
Observations	3641	275	4446	390
R^2	0.32	0.09	0.08	0.08
Scale: Parish area	Y	Y	Y	Y
Geography: Elevation	Y	Y	Y	Y
Location: Latitude, longitude, latitude*longitude	Y	Y	Y	
Regional differences: Region fixed effects (n=4)	Y	Y	Y	Y
Soil characteristics: Soil type indicators (n=11)	Y	Y	Y	Y

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