

Investing in Angels: The Impacts of Lottery Grants to State Clergy

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- ▶ States frequently try to influence the (religious) values of their citizens
- ▶ Common example: “state religions”
 - Over 1 billion people live in 43 countries classified by Pew Research as having an “Official State Religion”
 - Examples: Saudi Arabia, Cambodia, Israel, Dominican Republic, Norway, UK
- ▶ What is the impact of financial support for favored religions?

- ▶ State support has theoretically ambiguous effects on beliefs
 - Subsidies mean religiosity $\uparrow$ (Barro and McCleary 2003)
 - ...or religiosity $\downarrow$ by promoting monopoly, limiting competition (Finke and Stark 2005)
- ▶ Does financial support motivate clergy?
 - Efficiency wages, positive selection vs. pay-for-performance
 - Intrinsic motivation (money doesn't matter)

Competition from other sects would require a religious teacher to make the “utmost exertion... to increase the number of his disciples”

“The teachers of [religious] doctrine... may either depend altogether for their subsistence upon the voluntary contributions of their hearers; or they may derive it from some other fund to which the law of their country may entitle them . . . Their exertion, their zeal and industry, are likely to be much greater in the former situation than in the latter.”

— Adam Smith, *Wealth of Nations*, Book V, Chapter 1, Part III

What is the impact of financial support for favored religions?

- ▶ State support has theoretically ambiguous effects on beliefs
 - Subsidies mean religiosity ↑ (Barro and McCleary 2003)
 - ...or religiosity ↓ by promoting monopoly, limiting competition (Finke and Stark 2005)
- ▶ Does financial support motivate clergy?
 - Efficiency wages, positive selection vs. pay-for-performance
 - Intrinsic motivation (money doesn't matter)
- ▶ Tough to study these elements causally
 - Finances and laws are a bundle
 - Relationship reflects unobserved political/social factors
 - Ideally: natural experiment

- ▶ Today: 1700s England
 - Anglican church dominant
 - Performs many state functions (taxes/tithes; civil registration)
 - ...but “dissenting” sects beginning to spread:
 - Toleration Act (1689)
 - Mid-century: Evangelical Revival
 - Late-century: Birth and growth of Methodism
- ▶ “Queen Anne’s Bounty” (QAB), 1703-1808
 - Increase parish priest effectiveness
 - Lottery-based salary boosts to poor clergy
- ▶ Examine effects on
 - Size, presence of state religion
 - Effort levels by Anglican clergy
 - Religiosity

► The state and the religious “market”

- Competition/market structure: (Smith 1776; Finke and Stark 1988; Iannaccone 1991; Chaves and Cann 1992)
- Fiscal: (McCleary and Barro 2006a,b; Corbi and Sanches 2025)
- Regulation/governance: (Barro and McCleary 2005; Barro, Dewitte, and Iannaccone 2025; Bentzen, Pizzigolotto, and Sperling 2025)

► Salaries for public employees: (Ferraz and Finan 2011; Dal Bó, Finan, and Rossi 2013; Ashraf, Bandiera, and Jack 2014; Finan, Olken, and Pande 2017; de Pleijt and Koschnick 2025)

► Religion and social/economic outcomes

- Growth, human capital: (Barro and McCleary 2003; Nunn 2011; Cantoni 2015; Cantoni, Dittmar, and Yuchtman 2018; Valencia Caicedo 2019; Bazzi et al. 2020; Desierto, Koyama, and Shera 2025)

► Contributions

- QAB funded state religion, motivated (in part) by competition
- Lotteries for $\sim$ random variation
- 100+ years of data on state religion, religiosity, economics (in progress)

- ▶ Background
 - The QAB lottery, data
 - Balance
 - Stage 0: ≈ 20 years of extra funding
- ▶ State sponsorship $\rightarrow$ market share
 - Anglican presence $\uparrow$
 - Non-Anglican presence $\downarrow$
- ▶ Market share $\rightarrow$ lower quality
 - Religious services $\downarrow$
 - Community's religiosity unaffected or $\downarrow$
- ▶ Evidence against alternatives (time permitting)
 - Clergy quality; selective reporting

- ▶ Unit of analysis: clerical position (“living”)
 - $\approx$ parish
- ▶ Smallest administrative unit of the Church of England
 - $\approx$ 12,500 in total; usually < 1000 people
- ▶ Each living has income sources that the minister has a right to
 - Tithes (on agricultural output), land rents, offerings, voluntary contributions
- ▶ Vast disparities in annual salaries
 - $\approx$ 10% below £10 (\$2,500 today / agricultural labourer in 1771)
 - Median: $\approx$ £50; upper tail $\approx$ £200

▶ Queen Anne's Bounty (QAB)

- Named for Queen Anne, r. 1702-1714

▶ Set aside tax source to raise income floor for “poor” parishes

▶ Motivation:

- Reduce “Pluralism”, where a single priest serves multiple parishes

“The poorest clergy... were forced either to seek extra work outside the church or to become pluralists turning two or three inadequate stipends into a barely adequate living.”

— Evans 1976

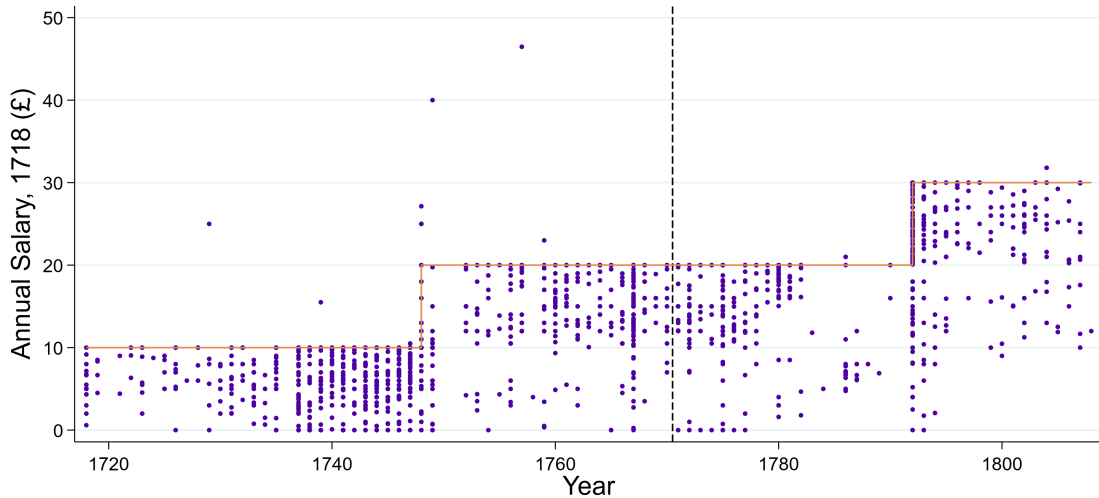
- Protect against spread of Dissenters post Toleration Act (1689)

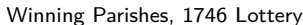
“Queen Anne's Bounty was a product of the strong Anglican resurgence during her reign, caused partly by concern at the apparent progress of dissent [non-Anglicans] since the Glorious Revolution. In 1703 the queen announced that she would devote the income from first fruits... to the relief of poor clergy.”

— Cannon 1997

- ▶ £10-target (1714); £20-target (1748); £30-target (1792)
 - (Almost) every parish boosted eventually
- ▶ Block grants by *lottery*
 - Typically: £200 grant $\rightarrow$ estimated £6/year ($r=3\%$)
 - Land or bank account
- ▶ Alongside non-random matched grants (“benefactions”)
 - Higher income threshold
 - Our sample: lotteries only, 1718-1770, for now

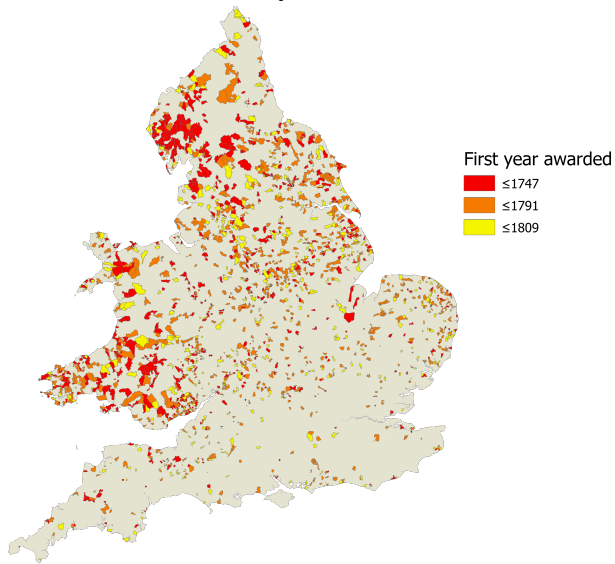
Parish Year of First Win





- ▶ QAB “minute books” list winners
 - Scan, digitize, link
- ▶ Original valuations (1718 document)
 - Original valuations + “augmentations” → current valuations
 - Current valuation → eligibility
- ▶ Some winners rejected ex-post
 - ITT with imperfect-but-high compliance ($\approx 85\%$)

First-time Lottery Winners, 1714-1809



$$y_{p,t} = \sum_{k \neq -1} \alpha_k [\text{Won}]_{p,t} \times (t = k) + \beta_p + \gamma_t + \varepsilon_{p,t} \quad (1)$$

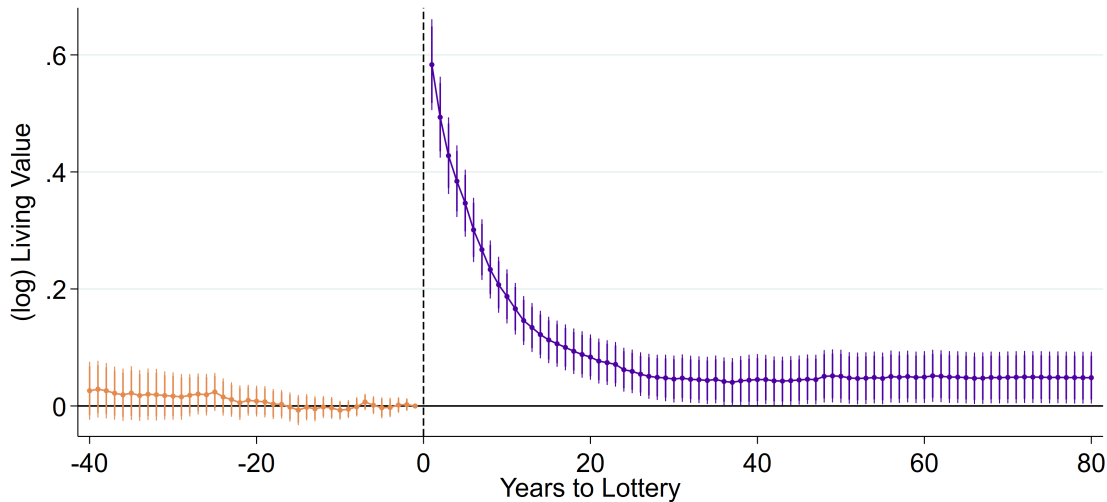
- ▶ $t = 0$: lottery year; $t = -1$ base level
- ▶ β_p : parish FEs
- ▶ γ_t : year FEs
- ▶ $\varepsilon_{p,t}$: robust SEs

$$y_{p,l,t} = \sum_{k \neq -1} \alpha_k [\text{Won}]_{p,l} \times (t = k) + \beta_{p,l} + \gamma_{l,t} + \varepsilon_{p,l,t} \quad (2)$$

- ▶ Stacked design: parish p , lottery l , at time t
 - Parishes stacked across multiple lotteries
- ▶ $t = 0$: lottery year; $t = -1$ base level
- ▶ $\beta_{p,l}$: parish $\times$ lottery FEs
- ▶ $\gamma_{l,t}$: lottery-level time flexible time trend
- ▶ $\varepsilon_{p,l,t}$: clustered by lottery
 - 95 clusters (lotteries)
 - 1,250 parishes; 100+ years $\rightarrow n > 1$ million

Table 1: Balance on pre-Lottery Measures

	(1)	(2)	(3)	(4)	(5)
	Salary (1718)	Salary	Cleric	# Churches (Anglican)	# Churches (Non-Anglican)
Win	0.26 (0.18)	0.024 (0.100)	-0.0075 (0.012)	-0.0018 (0.013)	-0.00049 (0.0083)
N	36,140	36,140	29,574	36,140	36,140
SEs / Clusters	Lottery	Lottery	Lottery	Lottery	Lottery
N (clusters)	95	95	95	95	95
Lottery FEs	Y	Y	Y	Y	Y
$\mathbb{E}[y Win = 0]$	8.6	11	.21	.29	.048

Figure 1: QAB Effect on log Salary ► Property Expenditure

- ▶ Background
 - The QAB lottery, data
 - Balance
 - Stage 0: ≈ 20 years of extra funding
- ▶ State sponsorship $\rightarrow$ market share
 - Anglican presence $\uparrow$
 - Non-Anglican presence $\downarrow$
- ▶ Market share $\rightarrow$ lower quality
 - Religious services $\downarrow$
 - Community's religiosity unaffected or $\downarrow$
- ▶ Evidence against alternatives (time permitting)
 - Clergy quality; selective reporting

Person: Cooper, George Miles (1820 - 1835)

CCEd Person ID: 6666 | [Show all records](#) | [Key to Code Numbers](#) | [View Per](#)

+ Comments

EDUCATION EVENTS

+ BA : Cambridge / St John's

+ MA

ORDINATION EVENTS

+ deacon : 28/05/1820 (Law, George Henry/Chester 1812-1824)

+ priest : 15/04/1821 (Sparke, Bowyer Edward/Ely 1812-1836)

APPOINTMENT EVENTS

+ Perpetual Curate : **Heage** (01/07/1824 - 28/05/1828)

+ Vicar : **Wilmington** (15/04/1835)

- Curate : **West Dean (East Sussex)** (17/11/1835)

TYPE	NAME	DATE
Appt	Cooper, George Miles	17/11/1835

- ▶ Clergy of the Church of England Database (CCEd)
 - Clergy employment, work histories
- ▶ Partial, event-driven
 - e.g., see start but not end date

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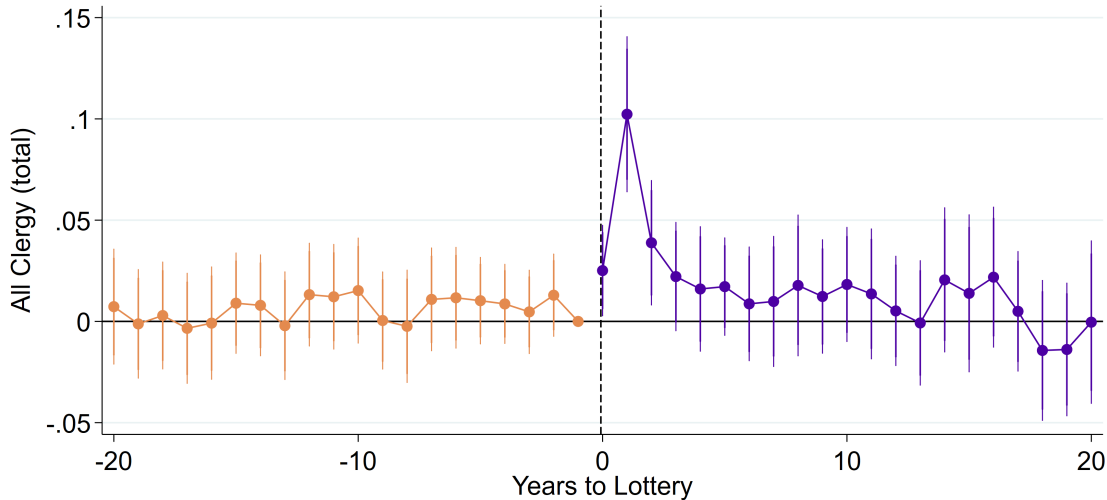
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CCEd — Example history

- ▶ Clergy of the Church of England Database (CCEd)
 - Clergy employment, work histories
- ▶ Partial, event-driven
 - e.g., see start but not end date
- ▶ Anglican & non-Anglican (“dissenting”) churches
 - GENUKI (genealogy repository for UK/Ireland)
 - Foundation years
 - Visitation Returns

Figure 2: QAB Effect on # Clergy



95. **Beswick Chapel,
Harthill.**

- I. We have twenty & two Families in this Chapelry ; of these, three persons are dissenters, being of the People call'd Quakers.
- II. There is not any Licens'd or other Meeting-House in this Place.
- III. There is not any publick or Charity-School, endow'd, or otherwise maintain'd in this Place.
- IV. There is not in this Place any Alms-House, Hospital, or other Charitable Endowment ; neither have any Lands or Tenements (*sic*) for the Repair of our Chapel ; or to any other pious Use.
- V. I do not reside Personally upon this Cure. I am the Minister of S. Johns in Beverley, and do reside there.
- VI. I have not a residing Curate, but I have one who is duly qualified according to the Canons in that Behalf ; The Allowance I do make him, is half of the profits being between seven & eight pounds a-year.
- VIII. confirm'd, will offer themselves to yor. Grace to be confirm'd. The publick Service is not perform'd in this Chapel every Lord's day, but twice in every three Weeks, after this manner ; one Sunday at ten a clock in the morning, the next Sunday at 3 in the afternoon, and the Sunday following not at all. The Reason why it is not oftner done, is, because the Custom to serve it thus hath been of a long time and the Living so very small.
- IX. My Curate catechises in this Chapel the six Sundays in Lent, and the People duly send their Children & Servants that

- ▶ Clerics answer (mostly) standard questions to bishops every 3 years
- ▶ Religious practices; parishioners' outlook
- ▶ LLMs to process semi-qualitative responses
- ▶ Cross-section, ≈ 350 lottery-relevant parishes
 - e.g., York diocese in 1743
 - → no parish FEs
- ▶ Responses consistent with other sources

▶ Dissent Validation

Return to Bishop Herring (York), 1743

$$y_{p,l,t} = \alpha[\text{Won}]_{p,l} + \beta_l + \gamma_t + X_{p,l}\delta + \varepsilon_{p,l,t} \quad (3)$$

- ▶ Can't use parish FEs (no variation)
- ▶ Lean into lottery/randomization — post-lottery data only
 - Baseline: 0-10 years post-lottery
- ▶ Controls (visitation data)
 - Diocese FEs; pre-lottery finance and employment
- ▶ $\varepsilon_{p,l,t}$ still clustered by lottery
- ▶ *Note:* much less data
 - Statistically balanced subsample

Table 2: Any Dissenters, 0/1 (Visitation)

	(1)	(2)	(3)	(4)
	≤10 years	≤10 years	≤20 years	≤20 years
Win	-0.17* (0.094)	-0.17** (0.080)	-0.15** (0.066)	-0.14** (0.060)
N	964	964	1,770	1,770
SEs / Clusters	Lottery	Lottery	Lottery	Lottery
N (clusters)	46	46	71	71
Lottery FEs	Y	Y	Y	Y
Source×Year FEs	Y	Y	Y	Y
Pre-lot Controls		Y		Y
$\mathbb{E}[y Win = 0]$	.63	.63	.57	.57

Figure 3: QAB Effect on Number of Non-Anglican Churches

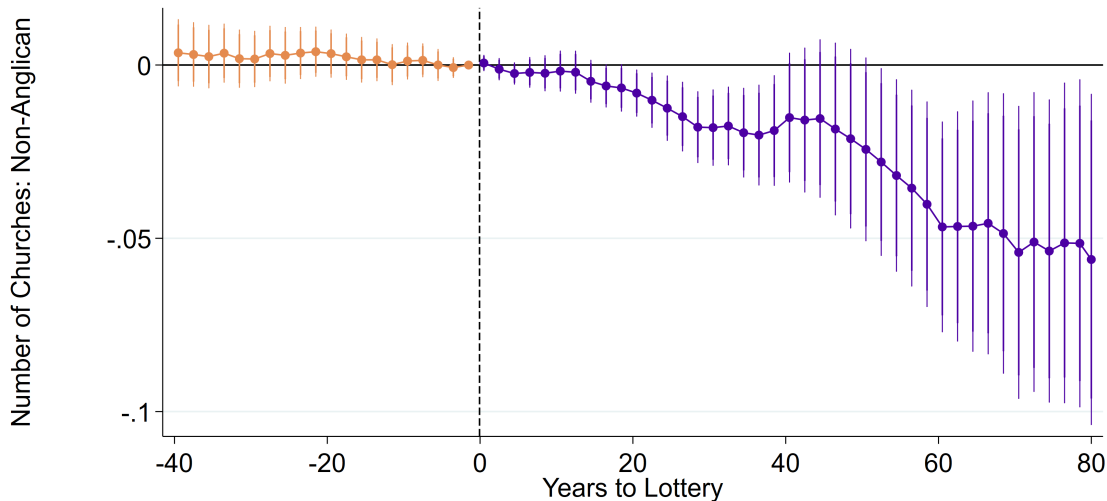
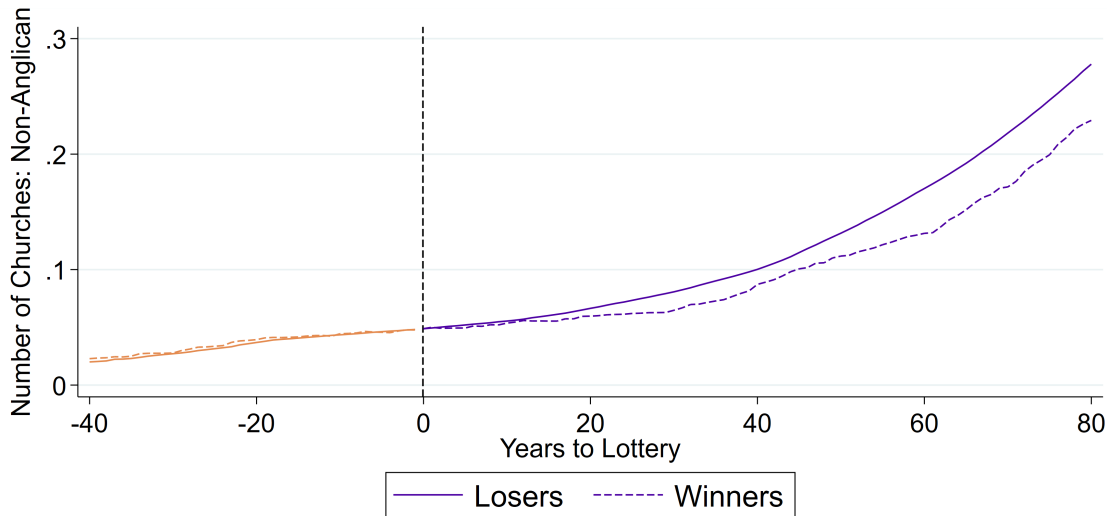


Figure 4: Winner/Loser Means Over Time (within-lottery)



- ▶ Background
 - The QAB lottery, data
 - Balance
 - Stage 0: ≈ 20 years of extra funding
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- ▶ Effort (index of z-scores)
 - Sunday service: “How often is the public Service read in your Church?”
 - Catechism: “How often and at what Times do you Catechise in your Church?”
 - Sacrament: “How often is the Sacrament of the Lord’s Supper administer’d”

► Effort (index of z-scores)

- Sunday service: “How often is the public Service read in your Church?”
- Catechism: “How often and at what Times do you Catechise in your Church?”
- Sacrament: “How often is the Sacrament of the Lord’s Supper administer’d”

► Parishioners

- Catechism: “Do Parishioners send their Children and Servants to be instructed by you?”
- Easter: “How many [parishioners] did communicate at Easter last?”

Table 3: Effort Index, z-scores (Visitation)

▶ Index Components

	(1)	(2)	(3)	(4)
	≤10 years	≤10 years	≤20 years	≤20 years
Win	-0.36** (0.15)	-0.36** (0.15)	-0.27** (0.12)	-0.23* (0.12)
N	943	943	1,745	1,745
SEs / Clusters	Lottery	Lottery	Lottery	Lottery
N (clusters)	42	42	71	71
Lottery FEs	Y	Y	Y	Y
Source×Year FEs	Y	Y	Y	Y
Pre-lot Controls		Y		Y
$\mathbb{E}[y Win = 0]$	-.66	-.66	-.65	-.65

Table 4: Religiosity Measures (Visitation)

	Catechism Cooperation (0/1)		log(Easter Attendance)	
	(1)	(2)	(3)	(4)
	≤ 10 years	≤ 20 years	≤ 10 years	≤ 20 years
Win	-0.16* (0.088)	-0.087 (0.071)	-0.19 (0.14)	-0.28* (0.16)
N	969	1,681	770	1,340
SEs / Clusters	Lottery	Lottery	Lottery	Lottery
N (clusters)	39	61	31	59
Lottery FEs	Y	Y	Y	Y
Source $\times$ Year FEs	Y	Y	Y	Y
Pre-lot Controls	Y	Y	Y	Y
$\mathbb{E}[y \text{Win} = 0]$	.82	.8	3.7	3.6

Results in Parish Baptisms

Your search [Clear All](#)

First name(s)
 [×](#)

☒ Include name variants [i](#)

Last name
 [×](#)

☐ Include name variants [i](#)

Year Of Birth Give or take
 [×](#)

Year Of Death Give or take
 [×](#)

Year Give or take
 [×](#)

Location
 [×](#)

Search radius (miles) [i](#)
 [Exact](#) 5 10 20 50 100

75 results

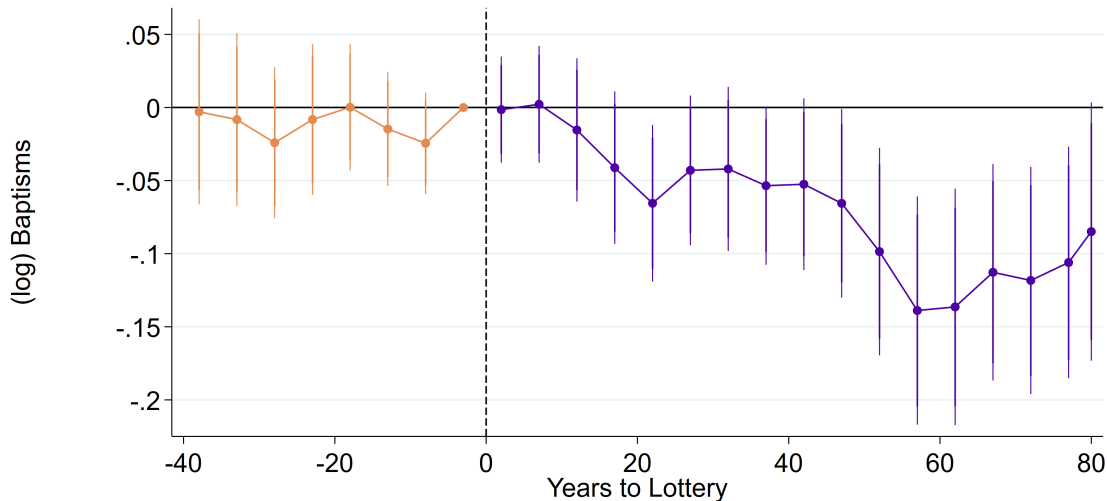
Last name	First name(s)	Year Of Birth	Year Of Death
Free to view	—	Nathaniel	1718
Free to view	Evans	Johis	1718
Free to view	Evans	John	1718
Free to view	Griffith	Elizabeth	1718
Free to view	Griffith	Elizabetha David	1718
Free to view	Hammond	Catherina	1718
Free to view	Hugh	Jana	1718
Free to view	Hugh	Jane	1718
Free to view	Humphrey	Johannes	1718
Free to view	Humphrey	Judith	1718

- ▶ Parish baptism, burial records
- ▶ Panel data (some missing years)
- ▶ Name, year, location

“Families often asked [Parson] Woodforde to name their children privately, thus avoiding the fees and celebratory expenses of a formal christening. He resisted this trend... but was sometimes threatened with the possibility of a Meeting House being used to name a baby if he refused” (Phillips 1989)

Baptisms in Carno, Wales 1718

Figure 5: QAB Effect on (log) Parish Baptisms



- ▶ Income shock reduces competition, but hurts Anglican adherence too
 - State religion $\rightarrow$ competitors $\downarrow$
 - Low competition $\rightarrow$ low incentives
- ▶ Alternatives
 - Clergy selection
 - Recording bias

- ▶ Background
 - The QAB lottery, data
 - Balance
 - Stage 0: ≈ 20 years of extra funding
- ▶ State sponsorship $\rightarrow$ market share
 - Anglican presence $\uparrow$
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 - Community's religiosity unaffected or $\downarrow$
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Table 5: Curate Selection on Education

	(1)	(2)
	Curate (all)	Curate (BA)
Win×Post (< 4 years)	0.045*** (0.011)	0.020*** (0.0069)
Win×Post 4+ years	-0.0063 (0.011)	-0.0053 (0.0082)
N	1,803,587	1,803,587
SEs / Clusters	Lottery	Lottery
N (clusters)	88	88
Parish×Lottery FEs	Y	Y
Lottery×Year FEs	Y	Y
$\mathbb{E}[y Win = 0]$	.13	.062

- ▶ 44% of marginal curates have a BA
 - (coefficient ratio)
- ▶ vs. 53% of all curates
- ▶ Relatively similar & within margin of error

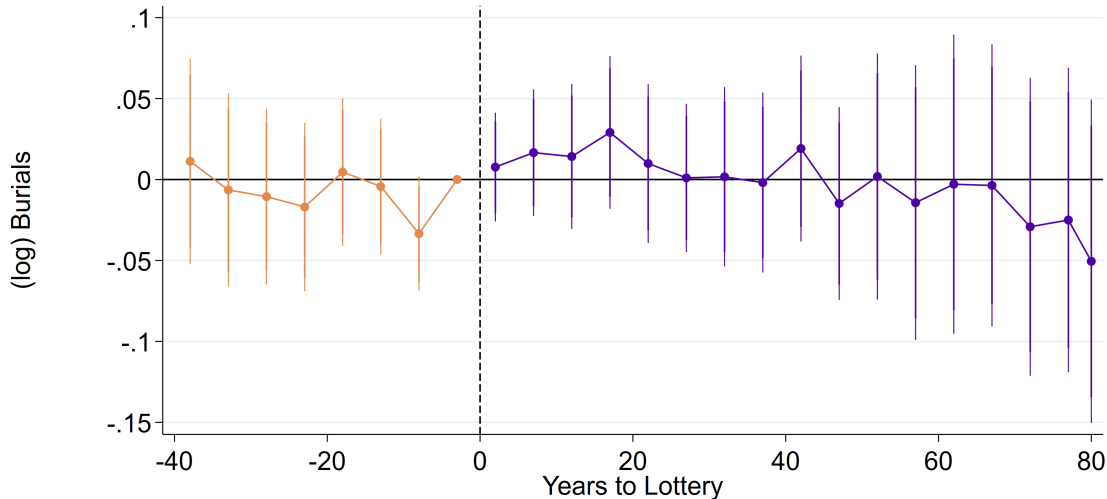
Table 6: Balance on pre-Lottery Measures (Visitation Sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Salary (1718)	Salary	Formal Parish	Any Cleric	Any Curate	# Churches (Anglican)	# Churches (Non-Anglican)
Win	0.20 (0.45)	0.52 (0.43)	0.015 (0.081)	0.032 (0.062)	0.049 (0.056)	0.087 (0.054)	-0.016 (0.0096)
N	1,031	1,031	1,031	1,031	1,031	1,031	1,031
SEs / Clusters	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery
N (clusters)	53	53	53	53	53	53	53
Lottery FEs	Y	Y	Y	Y	Y	Y	Y
$\mathbb{E}[y Win = 0]$	7.2	8.2	.54	.15	.11	.096	.024

Table 7: Differential Reporting, Visitation Returns

	Response Length (words)		log(Population)	
	(1)	(2)	(3)	(4)
	≤ 10 years	≤ 20 years	≤ 10 years	≤ 20 years
Win	-5.13 (16.2)	0.97 (11.8)	0.013 (0.18)	-0.070 (0.14)
N	1,017	1,857	952	1,733
SEs / Clusters	Lottery	Lottery	Lottery	Lottery
N (clusters)	43	71	46	71
Lottery FEs	Y	Y	Y	Y
Source $\times$ Year FEs	Y	Y	Y	Y
$\mathbb{E}[y Win = 0]$	284	270	3.8	3.7

Figure 6: QAB Effect on (log) Parish Burials [◀ Back](#)



- ▶ We explore randomized shocks to the funding of state religion
 - Setting: Anglican Church in 1700s UK
- ▶ Funding → state church market share
 - But without more Anglican practice, religiosity
- ▶ Alternatives
 - Clergy selection (part-time; BA)
 - Recording bias
- ▶ Supports monopolistic competition model of state religion
 - “Market share” at the expense of quality

Table 8: Cleric Residence & Seniority (Visitation) [◀ Back](#)

	Respondent is Curate (0/1)		Respondent is Resident (0/1)		Residing Curate Licensed (0/1)	
	(1)	(2)	(3)	(4)	(5)	(6)
	≤ 10 years	≤ 20 years	≤ 10 years	≤ 20 years	≤ 10 years	≤ 20 years
Win	-0.014 (0.081)	-0.020 (0.062)	-0.030 (0.087)	-0.0022 (0.060)	-0.018 (0.091)	0.037 (0.091)
N	918	1,681	952	1,764	371	658
SEs / Clusters	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery
N (clusters)	42	71	43	71	35	58
Lottery FEs	Y	Y	Y	Y	Y	Y
Source $\times$ Year FEs	Y	Y	Y	Y	Y	Y
Pre-lot Controls	Y	Y	Y	Y	Y	Y
$\mathbb{E}[y Win = 0]$	.84	.8	.19	.21	.77	.78

Figure 7: Reported Dissent and Non-Anglican Churches [◀ Back](#)

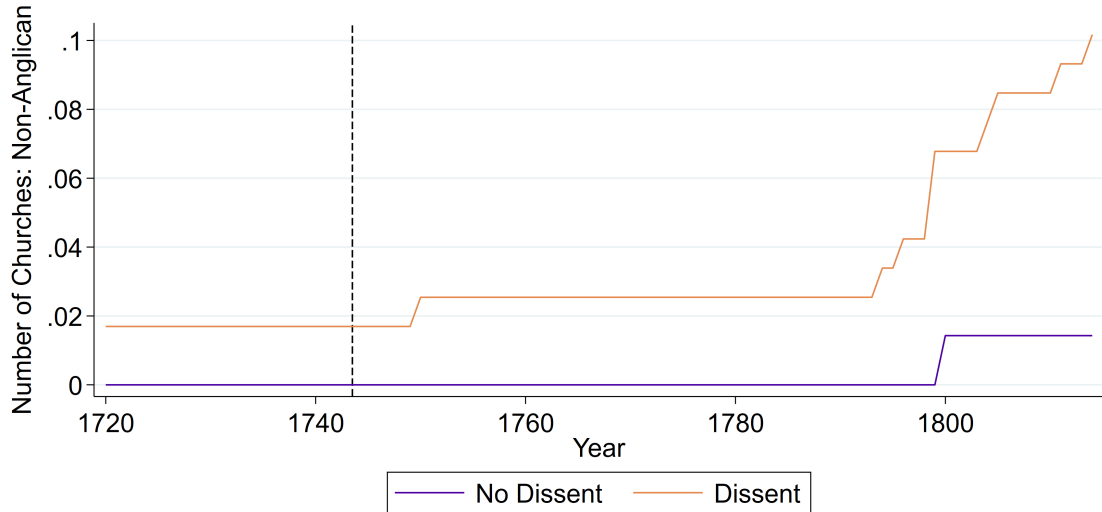


Figure 8: QAB Effect on log Church Property Expenditure [◀ Back](#)

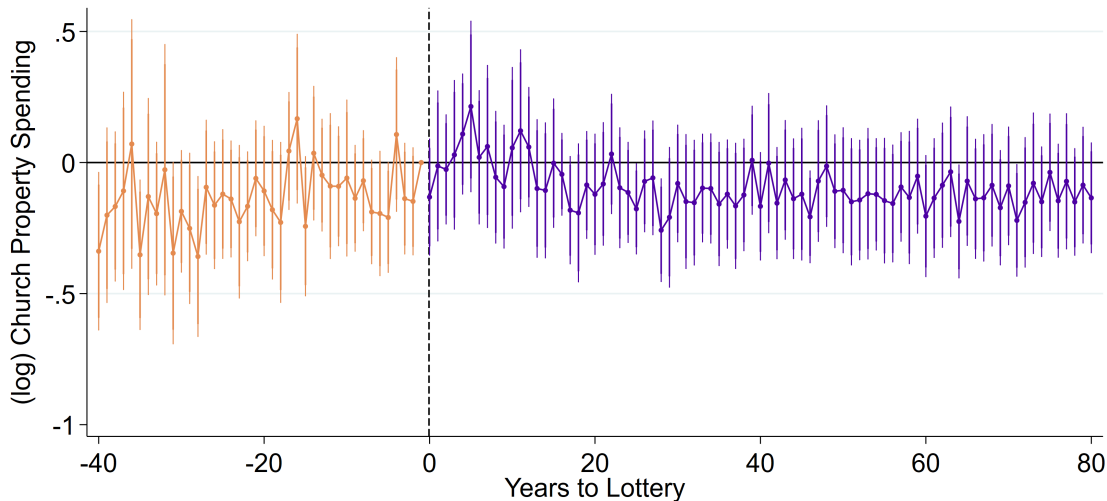


Table 9: Effort Index and Components [◀ Back](#)

	Index (z-score)		Sunday Services / year		Sacraments / year		Catechism (0-3 scale)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Win	-0.36** (0.15)	-0.36** (0.15)	-7.26 (6.30)	-7.14 (5.86)	-0.35 (0.26)	-0.36 (0.26)	-0.29** (0.12)	-0.27** (0.13)
N	943	943	943	943	879	879	909	909
SEs / Clusters	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery	Lottery
N (clusters)	42	42	42	42	37	37	37	37
Lottery FEs	Y	Y	Y	Y	Y	Y	Y	Y
Source×Year FEs	Y	Y	Y	Y	Y	Y	Y	Y
Pre-lot Controls		Y		Y		Y		Y
$\mathbb{E}[y \text{Win} = 0]$	-.66	-.66	49	49	3.7	3.7	1.7	1.7

Figure 9: QAB Effect on Number of Anglican Churches

