

Religious Revival and Social Order

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Abstract

Cultural beliefs usually evolve slowly, but during times of religious revival, beliefs change rapidly. During the two-year Welsh Revival of 1904-5, roughly 6% of the adult population converted to Christianity, after decades of stable religiosity. This religious shock was temporary, with church membership returning to pre-Revival levels five years later. I report three main findings. First, church growth during the Revival was higher in areas with more crime and more mining industry. Second, comparing Wales with neighboring England, the Revival led to a reduction in aggregate crime by 15%. The crime reduction is concentrated among violent crime, and drunkenness, considered a major social ill at the time. Third, despite temporary effects of the Revival on church membership, effects on crime persist, suggesting an enduring shift in social norms. Collectively, these results provide support for Fogel's theory of America's Great Awakenings: social crisis predicts religious revival and revival brings social change.

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1 Introduction

Religious beliefs of individuals and groups are usually slow-moving, but many societies experience religious revivals: periods of time in which religious enthusiasm rapidly increases, with many voluntarily confessing belief in God. While infrequent, there are at least two reasons to study religious revival. First, by studying the origins of revivals we can shed light on why, and how, rapid cultural change happens (Bursztyrn et al. 2020; Fernández and Parsa 2021). Second, even if revivals are rare, historians claim that their effects are long-lasting – through the creation of new religious denominations, and through revival-instigated social and political reforms, like the abolition of slavery in the United States (McLoughlin 1978; Fogel 2000).

In this paper I use the Welsh Revival of 1904 to 1905 to study the origins and consequences of religious revival. During this two-year period, roughly 90,000 people converted to Christianity, accounting for around 6% of the population above the age of 11. I use newly digitized data for two sets of analysis. First, using church-level data on membership growth during the Revival, I study what factors predict spatial variation in the Revival. Second, using a Wales versus England difference-in-difference design, I study the effects of the Revival on social order. These two analyses provide the first quantitative test of the core claim of Fogel (2000): that social crisis drives religious revival, and that revival brings social change.

The Welsh Revival of 1904-5 emerged in a country facing dramatic social change, not least being the industrialisation that saw a large shift of male employment from agriculture into coal mining. These social changes led to a sense of moral decline and cultural crisis, as the Welsh came to terms with new ways of life that no longer fit with the traditions that they had grown up with (Jones 2004). It was in this context of cultural anxiety that church leaders began hoping for a revival of religion, and beginning in early-1904, that revival arrived: many converted at informal meetings held in the west of Wales, and revival fervor quickly spread to the entire country. From 1903 to 1905, at least 87,548 people converted to Christianity, or roughly 6% of the population over the age of 11. This large shock to religiosity was temporary, with church membership in Wales returning to pre-Revival levels in 1909.

To better understand the origins of the Revival, I digitized and geocoded the data for roughly three thousand Welsh churches from the yearbooks of three nonconformist denominations. I use this data to map the Revival. While the Revival spread throughout Wales, its intensity varied, with church membership stagnant in some parishes, and membership growing by more than 50% in others. Supporting Fogel (2000), I find that proxies for social change and crisis predict the intensity of the Revival. First, county-level church membership growth is almost perfectly correlated ($\hat{\rho} = 0.79$) with the pre-Revival aggregate crime rate – while churches grew 36% on average in the county with the highest crime rate,

they grew only 12% on average in the county with the least crime. Second, structural transformation predicts the Revival – a one standard deviation increase in the share of adults working in mining predicts 5% greater growth during the Revival. Collectively, these descriptive facts suggest that the Revival might work as a kind of “cultural correction” – an endogenous religious response to societal breakdown, in turn correcting social problems.

To test for corrective consequences of the Revival, I use a difference-in-difference design, comparing Wales with England.¹ While Wales was “revived”, England was not. Church membership as a percentage of the population remained stable in England both before and after the Revival. Three features strengthen the validity of a difference-in-difference design. First, Wales and England share common national institutions during this period, limiting institutional confounds. Second, though the Revival was not an exogenous event affecting Wales, the historical record suggests that, if anything, social order would be deteriorating in Wales relative to England prior to the Revival, given the claims that moral decline prompted the onset of the Revival. This historical claim suggests that endogeneity of the Revival would push against finding positive effects on social order. Third, in my county-year-level analysis I use two approaches to inference: county-clustered standard errors and randomization inference. For the latter approach I estimate a placebo distribution of treatment effects for contiguous clusters of counties in England, addressing the critique that Wales is effectively just one treated unit.

The total crime rate, digitized from the *Judicial Statistics of England and Wales*, was 31% higher in Wales than in England prior to the Revival. Total crime fell in Wales relative to England from 1904 to 1907, with estimated difference-in-difference effects of up to 15%. Given parallel pre-trends, the timing of these effects is consistent with the Revival causing crime to fall, and similar negative effects beyond 1909 suggest that the temporary religious shock may have had persistent effects. These effects on crime are likely due to changes in actual criminal behavior rather than a fall in reporting in Wales – in particular, there is no similar drop in Welsh police capacity from 1904 onwards, as measured by police presence and police spending per capita. The negative effects are also not likely driven by the deterrence effects of an increasing probability of punishment in Wales – conviction rates evolve similarly in Wales and England following the Revival.

In the absence of changes to reporting and institutional deterrents to crime, the reduction in crime is plausibly due to the Revival increasing intrinsic and social costs of committing crime. To explore what costs the Revival shifted, I estimate difference-in-difference effects separately for different pre-defined categories of crime from the *Judicial Statistics*. The Revival does not shift criminal behavior across the

¹A lack of spatial granularity in the crime data prevents me from estimating effects of the Revival using a within-Wales analysis. However, in ongoing work I am putting together more granular non-crime outcome measures, including from the decennial censuses.

board. While the Revival was followed by a large fall in drunkenness and violent crimes, there is no detectable impact on economic crimes or moral crimes. The null effect on economic crimes suggests that the Revival did not reduce crime through the channel of churches providing social insurance (Chen 2010; Ferrara and Testa 2020). The null effect on moral crimes shows that the Revival did not shift moral values in general towards the normative standards of Christians.

Public drunkenness offences in Wales fell precipitously and durably after the Revival hit. By 1907 I estimate a Revival-induced reduction of 40%, and by 1911 a reduction of 44%. These effects are consistent with a historical record that emphasises the transformative effect of the Revival on drinking norms, as “drunkards forgot the way to the saloons, which in fact were empty in a few nights. All the former inebriates were busy worshipping” (Matthews 2018, p. 21). The effect is also notable for two reasons. First, drunkenness was considered a major problem at the time, with drunkenness offences making up 35% of all crimes reported to the police in Wales in 1903. Second, the large effects contrast with null effects of a landmark piece of legislation passed earlier: the Sunday Closing Act 1881, an Act that required the closure of public houses in Wales on Sundays. In this case, the Revival-induced shift in drinking norms was more effective in ensuring social order than legislative efforts – efforts that were surmounted by a populace that did not share the values that motivated the legislation.

The Revival also led to a decrease in violent crime – I estimate a reduction in assaults of 9% by 1907, and an even larger reduction in a more serious violent crime, felonious wounding, at 53%. A natural question is whether impacts on violence are merely a corollary of impacts on drunkenness – drunks are violent, so less drunkenness means less violence. I find mixed evidence on this point. In particular, while the reduction in assaults can be accounted for by the reduction in drunkenness, the reduction in felonious wounding cannot – since in the pre-period I estimate zero co-movement between felonious wounding and drunkenness. If the two don’t move together, it is not obvious that a fall in drunkenness should be accompanied by a fall in felonious wounding. In this sense, there is some evidence that the Revival reduced violent crime independently of its impact on drunkenness offences.

Together the results support the idea that the Revival reduced antisocial behavior, and perhaps even persistently. That said, other dimensions of social order have been emphasised in academic work on the role of religion in society. In particular, some psychologists have argued that religion is inextricably linked with restrictive reproductive morals (Weeden and Kurzban 2013; Hone et al. 2020). On this point, while the Revival led to fewer brothel-keeping offences, it did not affect prostitution offences or the (non-criminal) illegitimate birth rate. Why did the Revival affect some moral behaviors and not others? Two arguments are plausible. First, based on a qualitative analysis, Jones (2004) writes that sermons would rarely discuss specific sins, with one exception: the sin of drunkenness. Religious revivals may then only change the behaviors that are emphasized from the pulpit, and not those secret sins that are

ignored. Second, and related, the evidence suggests that the Revival affects public morality (brothel-keeping, public drunkenness) more than private morality (prostitution, extra-marital sex). This suggests that the Revival shifted social norms but did not durably change private beliefs.

Revivals are unusual, but not infrequent in Wales, a place that became known as the “Land of Revivals.” I take advantage of this fact to explore the generalizability of my findings. Using more limited data for the last previous national revival in 1859, I find that the main effects replicate – in particular, the Welsh Revival of 1859 also led to a reduction in aggregate crime and in drunkenness offences. These findings bolster external validity, and also reduce the likelihood that my earlier findings are driven by a chance non-Revival confound that affected Wales in 1904 onwards and not England.

In documenting qualitatively and quantitatively the nature of two Welsh Revivals, this paper contributes to work on cultural change, whether gradual (Giuliano and Nunn 2017), or more rapid (Bursztyn et al. 2018, 2020), and more descriptive historical work on the origins and consequences of revivals (McLoughlin 1978; Fogel 2000). More centrally, in using the Revival to estimate effects on social order, I build on a large correlational literature on the religion-crime link in sociology (Hirschi and Stark 1969; Stark 1996; Baier and Wright 2001; Adamczyk et al. 2017). Two notable papers by economists study the link between religion and antisocial behavior. Gruber and Hungerman (2008) find that the repeal of Sunday trading restrictions in the US led to an increase in drinking and drug use, while Medina (2020) finds that US church attendance reduces drug-related, alcohol-related, and white-collar crimes after instrumenting attendance with Sunday-specific weather shocks. My work builds on these two papers by using religious revivals to estimate effects of extensive margin societal-level changes to religion, in which the masses not only attend church more at the margin, but also convert to Christianity. Finally, this paper relates to a much larger body of work on the effects of religion on other outcomes (see Becker et al. (2020) for a review), including effects on human capital and income (Barro and McCleary 2003; Becker and Woessmann 2009; Valencia Caicedo 2019; Squicciarini 2019; Bryan et al. 2020), moral values (Bergeron 2019), innovation (Bénabou et al. 2015), and mental health (Campante and Yanagizawa-Drott 2015; Fruehwirth et al. 2019).

2 Background on the Welsh Revival

Religious Revivals. Christian revivals are relatively short periods of time in which religious beliefs and practices change rapidly. These changes are usually seen in mass conversions to Christianity, and often follow a period of spiritual decline. Such revivals punctuate the history of North America. In the 1730s, large numbers returned to Christianity during America’s “First Great Awakening,” catalysed by the revivalist preaching of Jonathan Edwards and others. Revivalist sermons, exemplified by Ed-

wards' enduringly influential "Sinners in the Hands of an Angry God," emphasised the reality of hell, and the presence of only one escape route: conversion. America's "Second Great Awakening" began some sixty years later, (Fogel 2000), and its "Third Great Awakening" arrived another sixty years or so later (McLoughlin 1978). Waves of revivals have not only reached American shores. The 1859 revival in present-day Northern Ireland reportedly produced 100,000 converts, while the Welsh revivals of 1859 and 1904 produced similar numbers.

It is difficult to pinpoint exactly why each revival occurs where and when it does. McLoughlin (1978) argues that the origins of great awakenings² can be understood using the arguments of Wallace (1956) for how cultures reform. In particular, a great awakening occurs when a society finds that its behaviors have diverged so far from prevailing norms that people are unable to sustain the existing foundation of religious beliefs. The divergence creates personal identity crisis, leading perhaps to increased suicide and alcohol and drug usage. These personal crises become a societal crisis, and are resolved by the appearance of a prophet who undergoes a traumatic religious experience.

The structure of Wallace (1956) is instructive, but perhaps more useful is McLoughlin's overall description of great awakenings as "the results, not of depressions, wars, or epidemics, but of critical disjunctions in our self-understanding. They are not brief outbursts of mass emotionalism by one group or another but profound cultural transformations affecting all Americans and extending over a generation or more. Awakenings begin in periods of cultural distortion and grave personal stress, when we lose faith in the legitimacy of our norms, the viability of our institutions, and the authority of our leaders in church and state." Fogel (2000) echoes this view, arguing that technological change leads to moral crises, which in turn are resolved by awakenings. This theory of revivals has the potential to explain why revivals occur in certain places and during broad time periods, but it does not easily explain why a revival would start in a particular year.

Regardless of how revivals and awakenings start, historians have argued that they bring substantial moral and social change. For America, McLoughlin (1978) argues that "our Second Awakening led to the solidification of the Union and the rise of Jacksonian participatory democracy; our Third Awakening led to the rejection of unregulated capitalistic exploitation and the beginning of the welfare state," while Fogel (2000) makes similarly grand claims, arguing for example that the Second Awakening spurred the abolition of slavery. These arguments for America relate to century-long religious-political cycles that cannot easily be tested empirically. The Welsh Revival of 1904-5 provides more traction – religious enthusiasm built up, and dissipated, rapidly, and I use this sharp variation to estimate shorter term effects

²I use the terms "revival" and "awakening" interchangeably, though strictly speaking McLoughlin (1978) does not. McLoughlin's argument here applies to "awakenings" where to McLoughlin, "Revivals alter the lives of individuals; awakenings alter the world view of a whole people or culture."

on social order.

Social Change and Religion in Wales. Late-nineteenth century Wales was a country beset with social change and cultural crisis. The industrialising Welsh economy saw the share of men employed in agriculture fall from 35 to 10% during 1851 to 1914, and the share in coal mining rise from 10 to 35% over the same period (Davies 2007, p. 445). The cultural crisis was typified by the decline of the Welsh-speaking population, from two-thirds in 1850 to two-fifths in 1914, and the battle of nonconformist Christians to reduce the influence of the Church of England, particularly in the domain of elementary education.

While Christianity pervaded Welsh national culture in the late-nineteenth century, not everyone was involved in organized religion. Using data from the 1851 Religious Census Davies (2007, p. 475) estimates that about 40% of the Welsh population attended a place of worship, while at the height of the revival in 1905, 40% were members of a church, as reported by the *1910 Royal Commission on the Church of England and Other Religious Bodies in Wales and Monmouthshire*. There is little in the historical record on the irreligious in the remaining 60%, though as Davies (2007, p. 475) writes, “[the irreligious element] was much smaller in Wales than it was in England, a fact proudly proclaimed in countless speeches.”

Of the church members in 1905, 26% belonged to the Church of England, 71% to the four major nonconformist denominations (24% Congregationalists, 23% Calvinistic Methodists, 19% Baptists, 5% Wesleyan Methodists), and 3% to other smaller denominations. The dominance of the nonconformists is notable given their history of revival activity. As Jones (2004, p. 38) writes, “Certainly, one of the chief characteristics of Welsh Nonconformity in the nineteenth century was the series of revivals that it experienced. Some of them were fleeting and localized, others, like the Beddgelert Revival (1817-21) and the ‘Temperance’ Revival (1839), extended over large portions of the country and had a profound influence... One revival had hardly ceased when pentecostal expectations were being fired up for another. It was quite generally believed that one could expect a revival every ten years and people began to speak of Wales as the ‘Land of Revivals’.”

The Origins of the Welsh Revival of 1904-5. Structural transformation led to a sense of social dislocation and moral decline as “a substantial proportion of the people of Wales had been cast into a completely new pattern of society in the industrial valleys where the old rural institutions were no longer available, or where they had to adapt rapidly to meet new requirements” (Jones 2004, p. 63). Church leaders saw moral decline in changes to leisure patterns that today have little moral association – the growing popularity of sports, theatre visits, and holidays.³ Such activities reflected “the truth... that social progress

³Football provoked particular consternation, much to the current author’s distress: ...“fierce hatred of football was quite common. . . . The Baptists of Caernarfonshire mourned ‘the harmful tendency of present-day sports, especially football’” (Jones

was enabling more of the common folk to imitate the idle pursuits of the aristocracy”, but clashed with the churches’ moralistic emphasis on thrift and their condemnation of idleness (Jones 2004, p. 73). The spiritual decline was perhaps more directly observed within the churches themselves, which we can see described in a piece in the periodical *Geninen* in 1898 by an anonymous author, “Religious gatherings and prayer meetings in Wales are smaller than previously; people absent themselves from communion, without embarrassment. . . people go from the chapel to the public house, and back, without any shame” (Jones 2004, p. 67).

This set of cultural anxieties fits closely with the view of McLoughlin (1978) that revivals occur when a society experiences distress in finding its behaviors diverging from prevailing norms. Accordingly, church leaders began increasingly to hope and pray for revival. The editorial of *Y Dysgedydd* in 1901 reads “The situation of our country, politically, socially, commercially, and religiously, cries out for submission and fasting before God... We do not recall a time of more insolent and unbridled ungodliness” (Jones 2004, p. 284).

Stories of the Revival. No salient external shock marked the onset of the revival. The revival came first to the inhabitants of New Quay, on the west coast of Wales, in February 1904. Joseph Jenkins, a Calvinistic Methodist minister, had begun several months earlier to run more informal meetings, “where those present would be expected to pray, sing, read or speak according to the inspiration of the moment” (Jones 2004, p. 285). These meetings led to new emotional and spiritual experiences, with young people stirred to evangelise, and “the church was revitalized, people’s morals improved, and Bible reading and family prayer became not the exception but the norm” (Jones 2004, p. 286).

The revival proceeded to spread throughout Wales, with the Calvinistic Methodist weekly newspaper *Y Goleuad* reporting in July 1904 that revival could be seen “in many places”, and the *Caernarvon and Denbigh Herald* writing in December 1904 that the “religious revival appears to be rapidly spreading throughout North Wales. Meetings are held practically at every town” (Pope 2006).

Though no single leader spearheaded the revival, a Calvinistic Methodist named Evan Roberts became particularly well-known. After years of piety, Roberts began to experience unusual times of prayer in the spring of 1904. Several times “he claimed to have seen a person stretching out his hand from the midst of a shining mist and in it there was a paper with the number 100,000 written down.” His interpretation of the vision was that one hundred thousand would be converted in a coming revival (Jones 2004, p. 292). Twenty six year-old Roberts felt called to preach after a meeting near New Quay in September 1904. In his words, “After being humbled, a wave of peace filled my bosom... After this the salvation of souls

2004, p.70). More surprising, the bicycle was also a target of attacks: Reverend W. Oscar Owen “...complained bitterly about the increasing popularity of the bicycle. ‘Our young people cannot go to hell too swiftly on their feet’” (Jones 2004, p.71).

weighed heavily on me. I felt on fire to go through the length and breadth of Wales to tell people about the Saviour” (Jones 2004, p. 292).

Roberts began his public work in October 1904, holding meetings in which he would state the “conditions for revival” as the confession of sin openly before God, the removal of doubt, obedience to the Holy Spirit’s promptings, and public confession of faith in Christ (Jones 2004, p. 295). The meetings would often go on well into the night, with “people... in a wild commotion, some... on their feet, some seated, some on their knees, others at the foot of their seats weeping helplessly and unable to draw breath” (Jones 2004, p. 298). What prompted such emotion? According to Jones (2004, p.299), Roberts “succeeded in causing thousands to agonize over their relationship with God and... warned people of the dire consequences of refusing Christ.” The media began to take interest in the revival in November, with both the *Western Mail* and the *South Wales Daily News* beginning to report regularly on the meetings held by Evan Roberts (Jones 2004, p. 296).

By the end of 1904, the revival had spread to the whole country, with meetings characterised by emotional excitement and a departure from the formal structure of the past. Whenever the revival arrived in a location, it would usually arrive suddenly, “and people could name the day and the hour that this happened” (Jones 2004, p. 311). The revival continued to spread in 1905, with Roberts continuing to travel for several evangelistic campaigns, until his seventh, and last, in December. The revival came to a close in early 1906. By this time a general election proved to be a distracting influence, while in some locations “there were very few converts... for the simple reason that there were so few left to be converted” (Jones 2004, p. 330).

The Revival in Numbers. The revival led to a large increase in membership of the four major nonconformist denominations (top-left panel, Figure 1). Total membership of these denominations grew by only 3.2% from 1901 to 1903, roughly in line with population growth. Departing from the steady growth since 1860, membership grew by 18.3% from 1903 to 1905. The latter growth amounted to 81,958 new members, a number close to the number of 100,000 in the visions of Evan Roberts, and a number reflecting 5.6% of the 1901 population above the age of 11 in Wales.⁴ The *Western Mail* published three lists of converts and reached a similar number: 87,548 converted across Wales by February 1905. This number is a lower bound given that the revival continued after February. The abnormality of these numbers was recognised at the time, with the *1910 Royal Commission on the Church of England and Other Religious Bodies in Wales and Monmouthshire* reporting that the “influence of the Revival of 1904 and 1905, was without a parallel in Wales since the great Revival of 1859, and gave the Nonconformist statistics of full

⁴Witnesses to the *1910 Royal Commission* reported varying ages at which a child could become a member, ranging roughly from 12 to 15. To be conservative, I take the lower bound, and using microdata for the 1901 census I calculate the percentage of the population of eligible age that became nonconformist church members during the Revival.

members... for the year 1905 quite an exceptional character.”

The impact of the revival on the Church of England cannot be understood from the membership figures – the reporting definition for Church of England membership unfortunately changed in 1905. Instead, the *1910 Royal Commission* uses the annual number of confirmations to argue that the Church of England was also impacted (top-right panel, Figure 1). While the number of confirmations in Wales during 1902 and 1903 was only 2.5% higher than the previous two years, the number during 1904 and 1905 was 19.4% higher.

The impact of the revival was temporary, especially for the nonconformist denominations, with membership numbers declining in absolute terms from 1906 onwards. The revival then provided a short, sharp, shock to religiosity in Wales. In contrast, despite the spread of some revival meetings to England,⁵ stable church membership and confirmation figures around 1904-5 suggest that England as a whole did not experience a revival of religiosity (bottom panels, Figure 1). This fact motivates a difference-in-difference approach to estimating the effects of the revival, comparing the evolution of outcomes in Wales relative to England before and after 1904.

Consequences. Historians have primarily emphasised effects of the revival on crime (particularly public drunkenness offences), adultery, and leisure activities. On crime, Jones (2004, p. 366) writes “There were no cases of drunkenness at the petty courts at Wrexham and the courts of Rhayader, Aber-carn and Llandysul had very little work to do. There was a great reduction in the cases before the courts in Tredegar, Abertillery and the Rhymney valley... Sir Marchant Williams joined Judge Gwilym Williams and the chief constable of Flintshire in attributing the reduction in crime to the revival.” On adultery, some held the view that the revival led to an increase – perhaps influenced by the unusual presence of young women as fellow workers at the side of revivalists like Evan Roberts. Jones (2004, p. 366) argues that this effect was unlikely, given that the proportion of illegitimate births was falling in Wales at the time. On leisure, the revival appears to have caused a puritanical reaction against new forms of entertainment, as “football clubs were disbanded either because people did not go to watch the games or because the players refused to have anything more to do with the sport,” “drama companies were forced to disband,” and “eisteddfodau [a Welsh cultural festival] had to be cancelled” (Jones 2004, p. 367). I focus in this paper on the effects on crime, drunkenness-related or otherwise, and adultery. These outcomes capture different dimensions of social order in Wales.

⁵For example, Jones (2004, p. 337) writes “It is well known that the revival touched Welsh people living in England. Some of the events which occurred in Liverpool have already been discussed and similar scenes were witnessed in other Welsh-speaking communities in England.”

3 Origins of the Revival

Church Yearbooks. To better understand the origins of the Revival, I digitized the data for Welsh churches from the 1901, 1903, and 1905 yearbooks for the three nonconformist denominations with church-level data: the Baptists (822 churches, example in Figure A1), the Calvinistic Methodists (1,216 churches), and the Congregationalists (968 churches). These three nonconformist denominations cover 68% of all Welsh church members in 1903 (top-left panel, Figure 1). I geocoded these churches using GENUKI (www.genuki.org.uk), an online portal with the latitude and longitude of historic churches in the UK and Ireland. I matched 92% of these churches to a 1901 census parish, of which there are 1,269 in Wales.

Revival Intensity. I proxy for the intensity of the Revival at the church-level with the growth in church membership from 1903 to 1905. I use the growth rate from 1901 to 1903 as a measure of pre-Revival church growth. While the average church-level membership growth was 5.6% from 1901 to 1903, it was 18.9% from 1903 to 1905. Mapping the growth rate at the parish-level (Figure 2), we see that (i) the Revival spread throughout Wales, (ii) Revival intensity is not visibly correlated with distance to the Revival's origin (New Quay) or the Revival's most prominent preacher's home church (Moriah Chapel), and (iii) Revival intensity varies, with little church growth in some parishes, and over 50% growth in others.

More Crime, More Revival. To understand the spatial variation in the Revival, I first test the hypothesis that moral decline and a breakdown in social order drove the Revival. For this, I use data on the total crime rate in 1903, aggregated to the county-level (more details in Section 4). County-level church growth during the Revival correlates almost perfectly with the total crime rate (left panel, Figure 3). Churches grew by 36% on average in Glamorganshire, the county in Wales with the highest crime rate in 1903. In contrast, churches grew only 12% on average in Cardiganshire, the county with the least crime. This correlation is robust to controlling for 1903 church membership, denomination fixed effects, and 1901-03 church growth (right panel, Figure 3) – churches did not only grow faster in high-crime counties because they started from a lower base, belonged to a particularly fast-growing denomination, or because they were already growing faster. The correlation is also robust to including the parish-level church membership share in 1903 and parish-level population density – churches did not grow faster in high-crime areas only because these areas had fewer church members to begin with, or because population density leads to both crime and revival.

With only thirteen Welsh counties and crime measured at the county-level, I lack the finer spatial variation needed to rule out other confounds of the crime-Revival connection. The result here is then

only a first order descriptive fact: the more crime in the county, the bigger the Revival.

Predicting the Revival. To use finer variation to predict the Revival, I use variants of the church-level specification:

$$\text{Church Growth (\% 1903-05)}_{idpc} = \alpha_{dc} + \beta \mathbf{X}_{i,1903} + \gamma \mathbf{X}_{p,1901} + \varepsilon_{ipc} \quad (1)$$

where i is a church from denomination d (Baptists, Calvinistic Methodists, or Congregationalists) in parish p in county c . α_{dc} are denomination-by-county fixed effects, $\mathbf{X}_{i,1903}$ are standardized church-level covariates, and $\mathbf{X}_{p,1901}$ are standardized parish-level covariates from the 1901 population census, downloaded from I-CeM (icem.data-archive.ac.uk). I winsorize church-level growth at the 1st and 99th percentile. I cluster standard errors at the district-level, with 52 districts in Wales.

With this specification, I test for two main predictors of the Revival emphasized by historians (McLoughlin 1978; Fogel 2000; Jones 2004). To study moral decline, I look at the predictive power of the church member population share of the parish in 1903, complementing the crime analysis above. To study the role of structural transformation as a social change-inducing cause of the Revival, I look at the parish-level occupation share of mining for those aged 15 and above.

Moral decline predicts Revival intensity only weakly (first row, Figure 4). With county-by-denomination fixed effects, a church grows 1.5% less in parishes with a one standard deviation higher church membership share in 1903. The presence of mining is much more predictive, with a one standard deviation increase predicting roughly 5% more growth in membership during the revival (fourth row), and this is robust to other controls and Conley standard errors (Figure A2). By comparison, the share of economically inactive adults is only weakly predictive of the Revival (third row). While structural transformation predicts Revival intensity, the more general measure of economic malaise mostly does not, in contrast to other studies on the predictors of religiosity (Chen 2010; Costa et al. 2019).

Discussion. While this analysis of the origins of the Revival is descriptive, two key correlations are consistent with the theorizing of McLoughlin (1978) and Fogel (2000). First, the Revival is bigger in high-crime counties. Second, structural change, in the form of a transition to mining away from agriculture, predicts the Revival. The Revival may then act as an endogenous “cultural correction” – emerging in a context of social change and crisis, and correcting the social problems that birthed it. But if this is the case, what did the Revival correct?

4 Consequences: Data and Approach

Outcome Data. To study the consequences of the Revival, I digitized a subset of tables from the 1899 to 1913 editions of the *Judicial Statistics of England and Wales*. 1913 is the end date for the analysis given that the police returns on crime are no longer disaggregated by police district from 1914 onwards. While the necessary data exists prior to 1899, an unusually large Wales-specific shock, the Welsh coal strike of 1898, motivates 1899 as the first pre-period year.

My primary outcome measures from the *Judicial Statistics* are the number of crimes known to the police, for each of 151 types of crime, for each of 191 police districts, with 16 of these districts in Wales (from Tables XXIII, XXIV). While I have highly localized measures of Revival intensity, the police district-level outcome data precludes a within-Wales analysis of the effects of the Revival. Instead, I use a difference-in-difference approach, comparing Wales with England. For this approach, since police district boundaries change somewhat over time, I aggregate the data to the county-level, with 13 of 54 counties in Wales (see the map in Figure A3). I normalize the crime numbers by population interpolated from decennial censuses, to create my main set of outcomes: the number of crimes per one thousand people, for each crime type. I introduce and explain the types of crimes as and when they appear for analysis below.

To proxy for the perceived probability of punishment, I digitized the overall conviction rate (from Tables XXI, XXII), though only for 1899 to 1907, which I again aggregate to the county-level. To measure police capacity, I digitized tables from the 1901 to 1907 *Reports of the Inspectors of Constabulary*, to get county-level measures of the number of police constables per one thousand people (from Table II) and the total expenditure on the police force in pounds per one thousand people (from Table III), again normalizing by interpolated census population.

As a non-criminal measure of moral behaviors, I digitized the number of illegitimate births per one thousand births at the county-level from the 1901 to 1907 *Annual Report of the Registrar-General of Births, Deaths, and Marriages*.

Empirical Approach. Church membership as a percentage of the population over the age of 14 was stable in Wales and England prior to 1904, though substantially higher in Wales (Figure 5). The Revival increased Welsh church membership by 5 percentage points by 1905, with a return to 1903 levels by 1909. In contrast, the English church membership percentage was stable throughout. Given these facts, I use a difference-in-difference approach, comparing Wales with England, to estimate the effects of the Revival on social order. Specifically, I use the following specification:

$$y_{ct} = \alpha_c + \alpha_t + \sum_{s=1899}^{1902} \beta_s^{\text{pre}} (\text{Wales}_c \times 1 [t = s]) + \sum_{s=1904}^{1913} \beta_s^{\text{post}} (\text{Wales}_c \times 1 [t = s]) + \varepsilon_{ct} \quad (2)$$

where y_{ct} is some outcome y , for example the total number of crimes per one thousand people, in county c during year t . α_c and α_t are county and year fixed effects. Given the usually slow-moving nature of religiosity, geographic fixed effects are less common in related work, and useful here in fully absorbing time-invariant differences between Welsh and English counties. To estimate pre-trend coefficients (β_s^{pre}), I fully interact a dummy variable equal to one for the Welsh counties with pre-period dummy variables, with 1903 as the omitted year. For the post-period coefficients (β_s^{post}), I interact Wales_c with each post-period dummy variable, from 1904 to a maximum of 1913. Post-period coefficients from 1909 onwards are suggestive of persistent effects of a temporary shock to religion, given that by 1909 the Welsh church membership percentage had returned to 1903 levels. ε_{ct} is the error term, and I weight each observation by census-interpolated county population.

Inference. I use two approaches to inference. First, I report p-values from clustering the standard errors at the county-level. This approach is standard in difference-in-difference settings, but harder to justify in a setting in which the treated counties are contiguous, and are then likely to face spatially correlated unobserved shocks. To address this, my preferred approach modifies the randomization inference approach used in [Cunningham and Shah \(2018\)](#). For this, I randomly select sets of contiguous English counties, subject to the constraint that each set has a population that is within 90 to 110% of the population of Wales, according to the 1901 census. Given that three English counties (London, Lancaster, and York West Riding) each exceed the 110% bound, I drop these three counties from the analysis throughout. I then re-estimate Equation 2 400 times, replacing Wales_c with Placebo Wales_c^d where this new variable is set equal to one for the contiguous set of English counties chosen in random draw d , with $d \in [0, 400]$. I then calculate randomization inference p-values by comparing the magnitude of β_s^{pre} , β_s^{post} with that of the 400 placebo coefficients. A p-value below 0.05 tells us that the true difference-in-difference effect for Wales is larger in magnitude than the difference-in-difference effect for at least 95% of the placebo Waleses formed from clusters of contiguous English counties. More informally, this result tells us that it is difficult to find a cluster of English counties, roughly the same size as Wales, that experienced as large a change in outcomes relative to the rest of England and Wales as Wales itself actually did.

Causality and Interpretation. Though the Revival was not an exogenous event, three facts increase the likelihood that the effects I estimate are due to the Revival rather than omitted factors. First, the history of the Welsh Revival, and the analysis in Section 3, suggests that prior to the Revival, social order was

more likely to breaking down than improving. Improvements to social order after 1904 are then more likely to reflect a break with previous trends than a continuation. This point suggests that in this setting we might not expect parallel pre-trends – instead we might expect that social order was deteriorating in Wales relative to England prior to the Revival. I test for this by looking at whether $\hat{\beta}_s^{\text{pre}} < 0$. Second, the sharp onset of the Revival means that I can use the year-by-year timing of estimated effects to rule out the role of more slow-moving factors and of rapid factors that hit Wales in years other than 1904 and 1905. Third, Wales and England were subject to common national institutions during this period, with Wales waiting until 1997 for devolution. In practice this means that very few Acts of Parliament applied only to Wales during this era, limiting the possibility of institutional causes of estimated difference-in-difference effects.

5 Consequences of the Revival

The Revival and Crime. The aggregate crime rate was 31% higher in Wales than in England during 1899 to 1903, the five years prior to the Revival (left panel, Figure 6). This difference was relatively stable during those five years – social order was not deteriorating in Wales relative to England, nor was crime already falling in Wales prior to the Revival.

The aggregate crime rate fell by 6.8% of the Welsh pre-period mean in Wales relative to England during 1904, the first year of the Revival, with this fall increasing to 15% by 1906 (right panel, Figure 6). Each estimated difference-in-difference coefficient for 1904 to 1907 is statistically significant at at least the 5% level with both county-clustered and randomization inference. The fall in crime for Wales from 1904 onwards is then not likely to reflect chance spatially correlated shocks – very few contiguous clusters of counties in England saw as large a relative change in crime during these years, and strikingly, there does not exist a single placebo cluster of English counties for which I estimate as negative an effect during 1904 to 1907 (as evidenced by the fact that every single grey circle lies above each blue circle). Taking these estimated effects together with their timing and our priors given what historians have written about the Revival, it is likely that the Revival caused the drop in crime.

To better interpret the magnitudes, I can roughly calculate the number of converts per each crime avoided. For this calculation, I take the *Western Mail's* estimate of 87,548 converts, the estimated difference-in-difference effect of -4.28 crimes per one thousand by 1906, and the Welsh population as 2,012,876, as of the 1901 census. The number of converts per crime avoided is roughly 10. This crime-reduction-per-convert exchange rate seems plausible, and it brings with it an additional implication. If the Revival only impacted crime through the behavioral change of converts, to achieve the observed reduction in crime, those converted must have been sufficiently criminal to begin with. In particular, I calculate

that converts must have a baseline crime rate of at least 9.8%,⁶ as compared with the rate for the Welsh population as a whole of 3% from 1899 to 1903. To the extent that the Revival impacted crime primarily through conversion, this accounting exercise suggests that converts were at least 2.6 times more criminal than a random selection from the population.⁷

Considering the period beyond 1907, there is suggestive evidence that the Revival-induced crime reduction was persistent, even once Welsh church membership returned to previous levels. In particular, the difference-in-difference coefficients from 1980 to 1913 all remain negative, with four of six statistically significant, with the largest coefficient in 1911 reflecting a 15% crime reduction in Wales relative to England (right panel, Figure 6). That said, the pattern of effects is also consistent with the effects of the Revival dissipating by 1909, and subsequent non-Revival Welsh-specific shocks causing crime in Wales to fall.

Enforcement. The differential evolution of crime rates in Wales relative to England might reflect actual changes to criminal behavior, or changes to enforcement, with actual behavior unchanged. I explore the enforcement channel by using the same event study specification to check for changes in police force capacity in Wales relative to England around 1904. Neither measure of police force capacity evolves significantly differently in Wales relative to England after the Revival (Figure A4). The number of constables per one thousand fell insignificantly by 2% in Wales relative to England in 1904, though even this small fall rebounded by 1905.⁸ Total police expenditure per one thousand, 74% of which goes to salaries, fell somewhat in Wales relative to England, but not significantly. Furthermore, the pattern of the insignificant fall in expenditure cannot easily explain the pattern of the crime reduction in Figure 6 – crime continued to fall in Wales relative to England throughout 1904 to 1906, whereas expenditure per one thousand did not. Together these results suggest that the Welsh crime reduction after the Revival reflects a fall in actual criminal behavior, and not just a fall in the likelihood that crimes are identified by the police.

Why Did Criminal Behavior Fall? Two cost-related channels might rationalize the relative fall in criminal behavior in Wales around the time of the Revival. Most related to the religious revival, the intrinsic or social cost of committing crime may have increased for the converts, or even for those that

⁶From the estimated fall in crime by 1906 ($= 4.28 \times (2,012,876/1000)$) divided by the number of converts (87,548). The lower bound comes from considering the case where the Revival reduces crime among these converts to zero.

⁷Ideally I would make more concrete statements on the characteristics of converts relative to the general population. However, no microdata on the characteristics of converts exists, to my knowledge, beyond the scattered anecdotes of books and newspaper reports.

⁸Given this fact, crime per *constable* also fell in Wales relative to England, which is arguably a better measure of actual criminal behavior. As Davies (2012) writes, “the chief constable of Carmarthenshire frequently argued that the correct measure of the criminality of a county was not linked to population but with the rate of crimes committed per police constable.”

were already religious but became even more so as a result of the Revival. Less related to religion, the extrinsic cost of committing crime may have increased in Wales, deterring criminal behavior through a greater perceived probability (or severity) of punishment. To explore the latter channel, I use the aggregate conviction rate as a proxy for the perceived punishment probability.

The conviction rate in both England and Wales hovered around 80% before the Revival (left panel, Figure A5), and did not increase in Wales relative to England following the Revival (right panel, Figure A5). If anything, the conviction rate in Wales relative to England fell slightly, by 2 percentage points, in 1906 (RI $p < 0.05$, insignificant with county-clustered inference). To the extent that the conviction rate is a reasonable proxy for the perceived probability of punishment, it seems unlikely that the Welsh crime reduction was due to the deterrent of an increase in the extrinsic cost of crime.

In the absence of an evolving extrinsic cost of crime, it is likely that the Revival increased the intrinsic and social costs (or reduced the intrinsic and social benefits) of committing crime. To shed light on what types of costs the Revival shifted, I use the following specification to estimate a pooled difference-in-difference effect separately for different categories of crime:

$$\text{Crime}_{ct}^x = \alpha_c + \alpha_t + \sum_{s=1899}^{1902} \gamma_s^{\text{pre}} (\text{Wales}_c \times 1[s = t]) + \gamma^{\text{post}} (\text{Wales}_c \times \text{Post}_t) + \varepsilon_{ct} \quad (3)$$

where Crime_{ct}^x is a measure of crimes per one thousand of type x in county c during year t , standardized by subtracting the mean of the outcome and dividing by the standard deviation. Post_t is a dummy variable equal to one for the entire post-period from 1904 to 1913. To avoid ad-hoc categorization of crimes to each type x , I use the categorization found on page 38 of the 1905 edition of the *Judicial Statistics*. These categories, along with their associated percentage of all crime in Wales in 1903, are: (i) Personal Crimes and Offences (10%), (ii) Crimes and Offences Against Morals (2%), (iii) Crimes and Offences of Dishonesty (12%), (iv) Crimes of Mischief and Cruelty (3%), (v) Drunkenness (35%), (vi) Breaches of Police and Municipal Regulations (36%), and (vii) Vagrancy (3%). These categories are mutually exclusive and mutually exhaustive of the 151 specific crimes contained in the judicial statistics.⁹ They also have the advantage of mapping to concepts that we might expect religion to impact, e.g. moral values (category (ii)), and dishonesty (category (iii)).

There is no evidence that the Revival shifted morals across the board. While personal and drunkenness crimes fell significantly, the estimates for the remaining five categories of crime are always statistically insignificant (Figure 7). These null effects rule out two plausible channels by which the Revival might operate. First, churches may provide social insurance (Chen 2010; Ferrara and Testa 2020), reducing the benefits of economic crimes like theft. But economic crimes, contained in the category “Crimes

⁹For the full list of crimes belonging to each category, see Appendix B.

and Offences of Dishonesty”, do not fall in Wales relative to England (see also Figure A6). Second, revivals might shift moral values generally towards the normative standards held by churches. But there is no effect on “Crimes and Offences Against Morals”, a category dominated by sexual crimes.

Two categories were impacted. Personal crimes fell in Wales relative to England by 0.27σ from 1904 to 1913. This category primarily comprises violent crimes, with the most common by far being “Assaults (Non-Indictable)”, making up 83% of this category in 1903 in Wales. This hints that the Revival reduced violence – an idea I explore more thoroughly below. Drunkenness crimes fell in Wales relative to England by 0.94σ , with the estimated coefficient substantially more negative than the nearest placebo estimate. This category comprises three similar offences: drunkenness (in public), habitual drunkenness, and habitual drunkards obtaining drink. 99.8% of crimes in this category in 1903 in Wales belong to the first offence, an offence which I now consider in detail.

Public Drunkenness. Public drunkenness was considered a major social ill in late-nineteenth and early-twentieth century Britain. In his social history of the Welsh county of Carmarthenshire from 1870 to 1920, Davies (2012) writes that “If the historian considers the degree of opposition to an activity by the volume of complaints made against it then probably the most odious and reprehensible offence in the late nineteenth century was drunkenness. Drink was widely seen to be the root of all evil.” Tellingly, drunkenness offences comprise fully 35% of known crimes in Wales in 1903, and unlike other offences, progress on drunkenness is frequently highlighted by county and borough police forces in the *Annual Reports of the Inspectors of Constabulary*. Drunkenness was a particular concern among nonconformist Christians. These nonconformists successfully lobbied for the Sunday Closing Act of 1881 – an Act requiring the closure of public houses in Wales on Sundays, and the first ever Act of Parliament to apply only to Wales.

During the five years prior to the Revival, the public drunkenness crime rate was on average 78% higher in Wales than in England (left panel, Figure 8). Looking at pre-trends, public drunkenness crimes were also increasing somewhat faster in Wales than in England (right panel, Figure 8), consistent with the idea that perceived moral decline precipitated the Welsh Revival. As soon as the Revival hit in 1904, public drunkenness crimes fell precipitously in Wales, while remaining stable in England. By 1907, I estimate a relative drunkenness reduction of 40%, and by 1911 a reduction of 44%. These effects are highly statistically significant with either approach to inference. While these crimes remain higher in Wales than in England throughout the period, by 1911 the pre-period difference of 78% had fallen to 24%.

The timing of these trends suggests that the Revival reduced drunkenness offences substantially and durably, with the far higher levels of drunkenness in Wales almost fully converging with those of England.

Unlike the trends of the overall crime rate, there is no sign of the impact of the Revival dissipating following the return of religious participation to original levels – instead, the evidence supports the idea that the Revival permanently shifted moral values regarding public drunkenness.

Why did the Revival reduce public drunkenness so dramatically? The content of sermons from the era is illuminating. From a qualitative study of 800 sermons, Jones (2004, p. 159) writes that “it was not common practice to devote an entire sermon to the discussion of a specific sin. It was not considered acceptable to attack specific sins even occasionally, apart from drinking or drunkenness.” While the moral standards of the church may have been well known, only the moral deviance of drunkenness was frequently addressed from the pulpit. This emphasis changed behavior accordingly, as “Drunkards forgot the way to the saloons, which in fact were empty in a few nights. All the former inebriates were busy worshipping” (Matthews 2018, p. 21).

Religion vs. Institutions. To put the Revival-induced drunkenness decline in context, I estimate the same difference-in-difference specification for an earlier institutional attempt to address drunkenness: the Sunday Closing Act of 1881.¹⁰ Davies (2012) writes that “The passage of the Welsh Sunday Closing Act on 27 August 1881 marked both the commencement of separate parliamentary legislation for Wales and the zenith of the temperance movement in Wales. The years following the passing of the Act witnessed an immense controversy over the efficacy of the Act, and detailed statistical warfare was waged as to whether the Act resulted in an increase or a decrease in Sunday drunkenness.”

Similar to the years prior to the Revival, public drunkenness offences were more common in Wales than in England prior to the passage of the Sunday Closing Act (left panel, Figure A7). The Act did not meaningfully affect drunkenness offences in the nine subsequent years (right panel, Figure A7) – all the post-period event study coefficients are statistically insignificant when using county-clustered standard errors, and only significant with randomization inference, in 1889 and 1890, with the sign indicating an *increase* in drunkenness. Even allowing for the possibility of some bias, the comparison of Figure A7 with Figure 8 is stark – the evidence that the Revival effectively reduced drunkenness offences is far stronger than the evidence for the effects of legislation.

This analysis of the impact of the Sunday Closing Act fits with historical accounts. Davies (2012) writes that “What is indisputable is that there was a marked increase in the number of clubs in Wales following the introduction of the Act and in the production of flagons and off-licence sales. In addition, the bona fide traveller clause of the Act [an exception for out-of-town visitors to be allowed alcohol] was frequently abused.” In exploiting loopholes, the Welsh undermined the Act’s potency. This case study speaks to a broader point on the impact of institutional reforms on social and moral causes. These impacts

¹⁰I am grateful for Patrick Francois, and his youthful sojourns in Wales, for bringing my attention to this Act.

may be weak if prevailing values conflict with the spirit of the reform, especially when enforcement is limited. In contrast, by shifting the underlying values themselves, religious change may be more effective.

Violence. The impact on drunkenness offences might matter more generally if, as [Davies \(2012\)](#) writes on the views of late nineteenth-century commentators, “drink was the evil which underlay crime and other social evils such as theft, assault and battery.” Supporting this view, violent crime also fell in Wales relative to England after the Revival. The top-left panel of [Figure A8](#) shows the year-by-year estimates on the “Personal Crimes and Offences” category, for which I already discussed the pooled post-period estimate ([Figure 7](#)). The top-right panel shows the same estimates, this time for the modal offence in that category: non-indictable assaults. In each case, crime drops significantly in Wales relative to England during the key Revival years, 1904 to 1906, with an estimated reduction by 1905 of 11% and 14% respectively. The effect dissipates initially, and then returns from 1909 to 1913. As with the effects on aggregate crime ([Figure 6](#)), whether this latter trend is due to the Revival, rather than some other later Welsh-specific shock, is not clear. But the timing of the earlier effects from 1904 to 1906 are plausibly due to the Revival.

The evidence for a Revival-induced violence reduction is even stronger for more serious violent crime, as measured by the rate of felonious wounding. This offence covers, for example, those that shoot someone with the intent and effect of causing grievous bodily harm,¹¹ and is punishable with life imprisonment with hard labor. Felonious wounding fell in Wales relative to England from 1904 onwards (bottom panel, [Figure A8](#)), with a peak reduction of 53% occurring by 1907 ($p < 0.01$ with both approaches to inference).

The most serious violent crimes, murders, were sufficiently uncommon in Wales that I lack statistical power to detect even large effects. For example, there were only ten murders in Wales in 1903, and only three murders during 1905, the peak of the Revival. Given this, I estimate a 70% reduction in murders by 1905 (right panel, [Figure A9](#)), but despite being large, this point estimate is not statistically significant. Given the rarity of the offence, we cannot infer much about the Revival’s impact on murder.

Drunken Violence? The timing of the drop in violent crime in Wales is consistent with the idea that the Revival reduced not just drunkenness, but also violence. Could the violent reduction be a direct consequence of the fall in drunkenness? Without a separate instrument for drunkenness, decomposing this causal chain is difficult. To make some progress, I estimate the co-movement of drunkenness and violent crime prior to the Revival, and use the magnitude of the co-movement to understand whether the

¹¹More specifically, the offence covers, among others, those “who, with intent to maim, disfigure, or disable any person, or to do some other grievous bodily harm to any person, or to resist or prevent the lawful apprehension or detainer of any person, by any means whatsoever wounds or causes any grievous bodily harm to any person, or shoots at any person, or by drawing a trigger, or in any other manner attempt to discharge at any person any kind of loaded arms” ([Stephen 1904](#), Article 257).

drop in drunkenness can account for the drop in violent crime. In particular, I estimate the following specification, using data for England and Wales covering the pre-period of 1899 to 1903 only:

$$\text{Violent Crime}_{ct} = \alpha_c + \alpha_t + \theta \text{Drunkenness Crime}_{ct} + \varepsilon_{ct} \quad (4)$$

where the dependent variable is either the rate of non-indictable assaults (from top-right panel, Figure A8) or the rate of felonious wounding (from bottom panel, Figure A8), and the key right-hand-side variable is the rate of drunkenness crimes (from Figure 8). I cluster the standard errors at the county-level, and again weight by county population.

θ captures the within-county co-movement of drunkenness and violent crime after partialling out nationwide annual variation. If drunks are more likely to commit violent crime, we would expect to see that $\theta > 0$. This is true for non-indictable assaults: $\hat{\theta} = 0.13$ ($p < 0.01$), meaning that when drunkenness crimes increase by one, non-indictable assaults tend to increase by 0.13. The estimated effect of the Revival on drunkenness crimes per one thousand is -2.05 by 1905 (Figure 8). Given the co-movement of these crimes with non-indictable assaults, this effect could account for an effect of $-2.05 \times 0.13 = 0.27$ non-indictable assaults per one thousand. The actual effect is -0.35 (Figure A8), suggesting that the impact on assaults can be reasonably well accounted for by the impact on drunkenness. The same can not be said for felonious wounding, where I find $\hat{\theta} = -0.00014$ ($p = 0.8$). I.e. there is no evidence that, prior to 1904, the rates of felonious wounding co-moved with the rates of drunkenness offences. Despite this, relative rates of felonious wounding fell in Wales following the Revival.

This brief accounting exercise suggests that while the fall in drunkenness offences can account for the fall in non-indictable assaults, it cannot easily account for the fall in more serious violent crimes, given that these more serious crimes did not co-move with drunkenness to begin with. The exercise then supports the idea that the Revival *independently* reduced violent proclivities, and not only through the mechanism of a lower likelihood of drunkenness.

Sexual Mores. Religious belief is tightly linked with restrictive reproductive morals (Weeden and Kurzban 2013; Hone et al. 2020), with no exception for Victorian and Edwardian Britain. Despite this, there are several reasons to expect a limited impact of the Revival on sexual mores. First, as noted above, sermons rarely mentioned specific sins. Second, also noted earlier, there was a suspicion at the time that the Revival led to an *increase* in adultery. Third, regarding sexual mores Davies (2012) writes that “the emphasis on outward respectability resulted in the absence of any serious deterrent against successfully conducted clandestine activity.” Put another way, it is possible that religious revivals might have better success regulating public immorality, like public drunkenness, than private immorality, like clandestine adultery.

I use two criminal outcomes and one non-criminal outcome to estimate effects on sexual mores: brothel-keeping and prostitution offences, and the rate of illegitimate births. The brothel-keeping and prostitution offence rates were 187% and 93% higher, respectively, in Wales than in England in the five years prior to the Revival (left panels, Figure A10). The Revival had only a limited impact on these sexual offences (right panels, Figure A10). Brothel-keeping offences fell in Wales relative to England following the Revival. The considerably more common prostitution offences, if anything, increased more in Wales than in England by 1907. Given that brothel-keeping is more visible than prostitution, the difference in these two effects supports the idea that the Revival shifted public behaviors more than private behaviors.

Building on this, the illegitimate birth rate reflects an even more private form of Victorian sexual immorality – extra-marital sex. While brothel-keeping and prostitution offences were higher in Wales than England prior to the Revival, the illegitimate birth rate was lower (left panel, Figure 9), perhaps reflecting the fact that a more chaste Wales was less tolerant of sexual offences. We can learn more about specific cases of illegitimacy from affiliation orders – court accusations of paternity made by mothers of illegitimate children. In Carmarthenshire, most of these mothers claim that the fathers seduced them with the promise of marriage (Davies 2012). Religious leaders were not immune to temptation, for example, “The Revd Gwilym Nicholas, a Congregationalist Minister of Gowerton, was summoned by Emily Maria Richards of Camarthen for the paternity of her child in October 1918. Their courtship occurred when he lodged with Emily’s mother while he was a student... Despite his claim that ‘I cannot think how it happened’, he was ordered to pay 5s. a week plus costs” (Davies 2012). Nevertheless, chapels did not tolerate philandering. Davies (2012) writes about another case where “in June 1905, Elizabeth Ann Rees, aged nineteen... summoned Joseph Morse, a tinsmith worker... to answer charges of fathering her illegitimate son. The authorities at Bethlehem Chapel, the place where the relationship germinated and grew, responded in a manner sadly too common amongst Nonconformists by expelling him.” More generally, illegitimacy was severely stigmatized, with “concealment of birth, infanticide or suicide... often the only choices that offered themselves to a girl abandoned by her seducer and condemned by her family and by society” (Davies 2012).

The Revival did not impact the illegitimate birth rate in Wales (right panel, Figure 9) – the illegitimate birth rate actually grew more in Wales than in England after 1903, though only by 3 to 4%, and never significantly. Taking the three measures of sexual behavior together, the evidence suggests that the Revival only impacted the most public sexual behaviors.

Summary. The Revival did not provide a wholesale moral transformation, but the evidence does suggest that the Revival provided social order by dramatically reducing the extent of both public drunkenness and violence. These targeted impacts can be partly rationalized by the emphasis of the preaching at

the time: as Jones (2004) wrote, specific sins were rarely mentioned from the pulpit, except for that of drunkenness. Together with the mixed effects on sexual behaviors, the pattern of results suggests that the Revival durably shifted social norms, affecting public behaviors, without durably changing private moral values.

6 A Replication: The Welsh Revival of 1859

The unusual nature of the Welsh Revival of 1904 prompts a natural question: do these effects of the Revival on social order generalize? To shed light on this, I make use of the fact that prior to 1904, Wales last had a nationwide revival in 1859. The 1859 Revival was similarly large, and while data is more limited for this earlier time period, sufficient crime data exists to replicate the core results.

The 1859 Revival. The Welsh Revival in 1859 was preceded, and arguably triggered, by a revival in America from 1857-8 – one that began America’s “Third Great Awakening.” This revival grew from prayer meetings held by businessmen, with attendance swelling in response to the banking crisis and associated recession of 1858 (Randall 2009). Reports from the American revival crossed the atlantic, likely catalysing the spread of the revival to Wales (Brown 2008, p. 221; Holmes 2001, p. 35). Most notably, one minister active in the American revival, Welshman Humphrey Jones, returned home to preach. Jones, along with a convert of his, David Morgan, went on to become leading figures in the Welsh Revival.

Like the 1904 Revival, spiritual change began in Cardiganshire, where thousands converted during the winter of 1858-9. Revival fervor spread to the rest of Wales (Phillips 1860, p. 15), and commentators again remarked on the impact on drunkenness. Phillips (1860) reports on many specific instances, including that “near Bethesda... about twelve public-houses have been closed, partly on account of the change in the views of the parties who held them, and partly because the hope of gain from this quarter had quite disappeared” (p. 96), and from another locality, “drunkenness is scarcely known in the neighbourhood; so much has it decreased that the Mayor of Denbigh has not had a case before him since the 9th of November, except one—and he was a ‘tramp,’ an entire stranger to the town” (p. 97).

The scale of the 1859 Revival was perhaps even larger than that of the 1904 Revival. The Revival reportedly increased church membership by 80,000 (Brown 2008, p. 221), roughly 7% of the population of Wales. The more limited church membership data for the period shows trends similar to those in Figure 1 for the 1904 Revival – Baptist membership in Glamorganshire and Monmouthshire increased by 35.3% from 1858-60 (compared with 29.1% from 1903-5), while Wesleyan Methodist membership for Wales as a whole increased by 32% (16.8% from 1903-5) (Figure 10). While revival activity also

spread to England, it had much less of an impact there than in Wales. [Brown \(2008\)](#) argues that the lack of traction was due to division in English evangelical circles regarding the approach of professional revivalists. Regardless of the reason, the greater impact in Wales than in England motivates a repeat of the previous difference-in-difference analysis to understand the effects of the 1859 Revival.

The 1859 Revival and Crime. Given that the relevant data is available only from 1858 onwards, I can estimate the difference-in-difference specification, but I cannot estimate pre-trends – it follows that causal claims for the 1859 Revival rest on weaker foundations than those for the 1904 Revival.

As with the 1904 Revival, the total crime rate was higher in Wales than in England on the eve of the 1859 Revival (top-left panel, [Figure 11](#)). The total crime rate fell more sharply in Wales than in England in 1859, and especially in 1860. If we can attribute the difference-in-difference estimate to the Revival, the Revival reduced crime by 14.8% by 1861 (top-right panel, [Figure 11](#), significant with randomization inference, but not with county-clustered inference) – similar to the 15% effect of the 1904 Revival by 1906. The reduction in crime in Wales relative to England is relatively persistent, with most post-period coefficients statistically significant at the 5% level with randomization inference, although only significant (at the 10% level) with county-clustered inference in 1860. Despite the larger p-values than for the 1904 Revival, the similar magnitudes suggest that the earlier effects replicate.

As with the total crime rate, public drunkenness crimes started higher in Wales, but converged to levels in England by 1861 (bottom-left panel, [Figure 11](#)). The difference-in-difference effect by 1861 is a crime reduction of 26.5% (bottom-right panel) – similar to the earlier reduction by 1906 of 37.7%. Unlike the 1904 Revival, these effects on drunkenness do not persist, and with county-clustered inference the results are never statistically significant.

With the caveats of this more limited analysis – no pre-period estimates and less statistical power – the analysis of the 1859 Revival largely replicates that of the 1904 Revival. The total crime rate, including public drunkenness, fell in Wales relative to England after 1859, particularly from 1859 to 1860 where we see the largest increase in church membership ([Figure 10](#)). The one inconsistency is that the earlier revival's impact on drunkenness did not persist. It is difficult to say why this lack of persistence might be, though collectively these results at least hint that while revivals might generally increase social order, their ability to do so durably may be more context-dependent.

7 Conclusion

Societies can ensure social order through laws and through norms. Laws deter bad behavior through the state-led threat of punishment. Norms deter bad behavior through the social costs of deviance. This

paper presents evidence for the norms channel. The Welsh Revival of 1904-5 was a large but temporary religious shock, with 6% of the population over the age of 11 converting to Christianity in only two years. This religious shock shifted social norms, reduced violent and public drunkenness crimes in Wales. While the shock was temporary, these crime reductions endure until at least 1913. In contrast, a landmark piece of anti-drunkenness legislation, the Sunday Closing Act of 1881, had no impact on drunkenness crimes. In this case, religion-driven norms trump laws at ensuring social order. And since the Revival itself was larger where there was more crime and more structural transformation, my results together suggest that societies may self-correct, with societal breakdown eventually stymied by an endogenous cultural response.

Nevertheless, my paper leaves two main questions unanswered. First, on the origins of revival: while religion resolves cultural tensions in the case of religious revival, can other non-religious movements play the same role? Could populism and nationalism be a parallel to religious revivals in certain societies? Second, on the consequences of revival: how general are the effects of revivals? While I find similar effects of the Welsh Revival of 1859, did the American Third Great Awakening of the late-1800s, the Azusa Street Revival of the early-1900s, the Hebrides Revival of 1949, and the Toronto Blessing of the 1990s have the same effects?

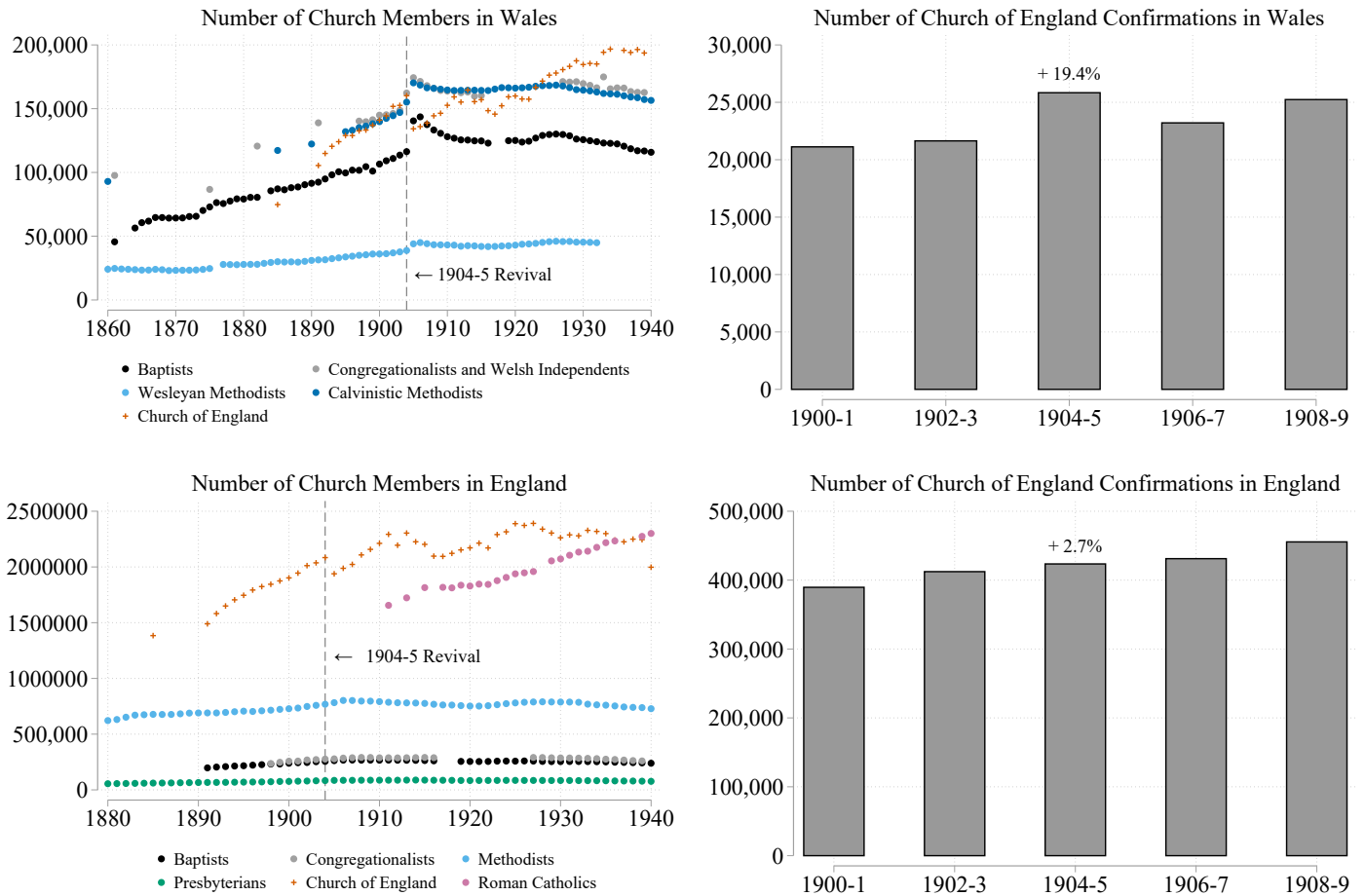
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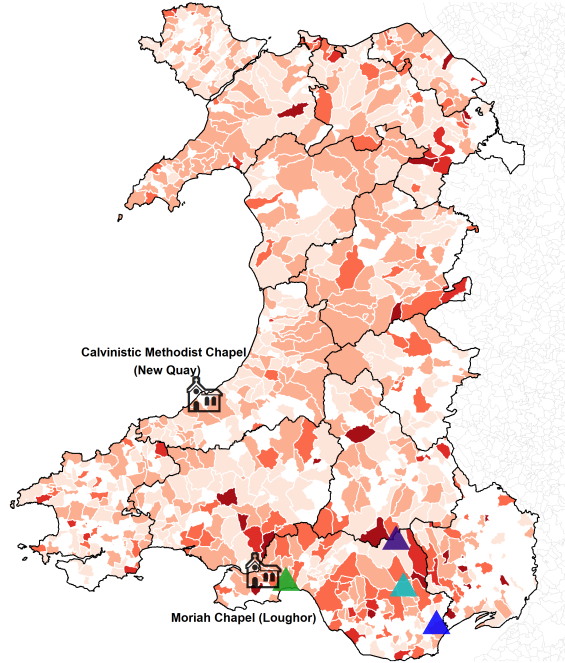
Figure 1: Wales Was “Revived”, England Was Not



Notes: The membership time series for the Church of England drops in 1905 due to a change in measurement – up to 1904 the number is the estimated number of communicants, whereas from 1905 it is the number of communicants on Easter Day. Given this, the effect of the revival on the Church of England in Wales vs. England is better understood using the right-hand-side panels. *Source:* Top-left panel: UK Data Archive No. 4105 – Digest of Welsh Historical Statistics: Religion, 1669-1974, which uses these underlying sources: Baptist Handbooks, Congregational Yearbooks, Minutes of Wesleyan Methodist Conference, Royal Commission on the Church of England and Other Religious Bodies in Wales and Monmouthshire, 1910, vol. VIII, Eglwys Methdistiad Califinaidd Cymru, and Handbook of the Church of England. These sources compile annual statistical reports from individual churches. Top-right panel: Royal Commission on the Church of England and Other Religious Bodies in Wales and Monmouthshire, 1910, vol. I. Bottom-left and bottom-right panels: R. Currie et al. (1977), Churches and Churchgoers: Patterns of Church Growth in the British Isles since 1700.

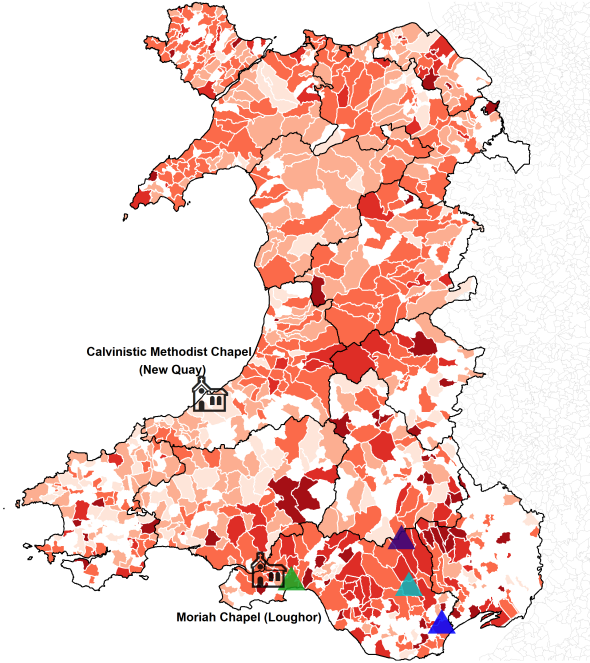
Figure 2: The Revival Spread Throughout Wales

Growth rate: 1901-1903
All denominations



Growth (%) <0 [0,10] [10,30] [30,50] >50
Main churches (☪). Cities (▲): Cardiff, Merthyr Tydfil, Pontypridd, Swansea.

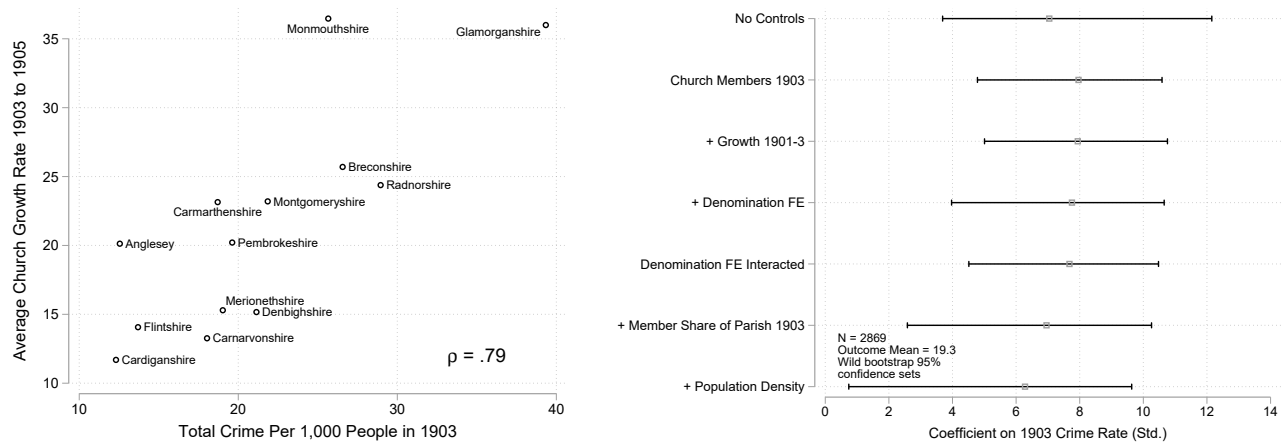
Growth rate: 1903-1905
All denominations



Growth (%) <0 [0,10] [10,30] [30,50] >50
Main churches (☪). Cities (▲): Cardiff, Merthyr Tydfil, Pontypridd, Swansea.

Notes: The figure shows the average growth in church membership at the parish-level separately for the pre-Revival period (1901-1903) and the Revival period (1903-1905). The Calvinistic Methodist Chapel in New Quay is thought to be where the Revival began, while Moriah Chapel in Loughor is the home chapel of Evan Roberts, the most famous revivalist.

Figure 3: The Revival Was Bigger in High-Crime Counties

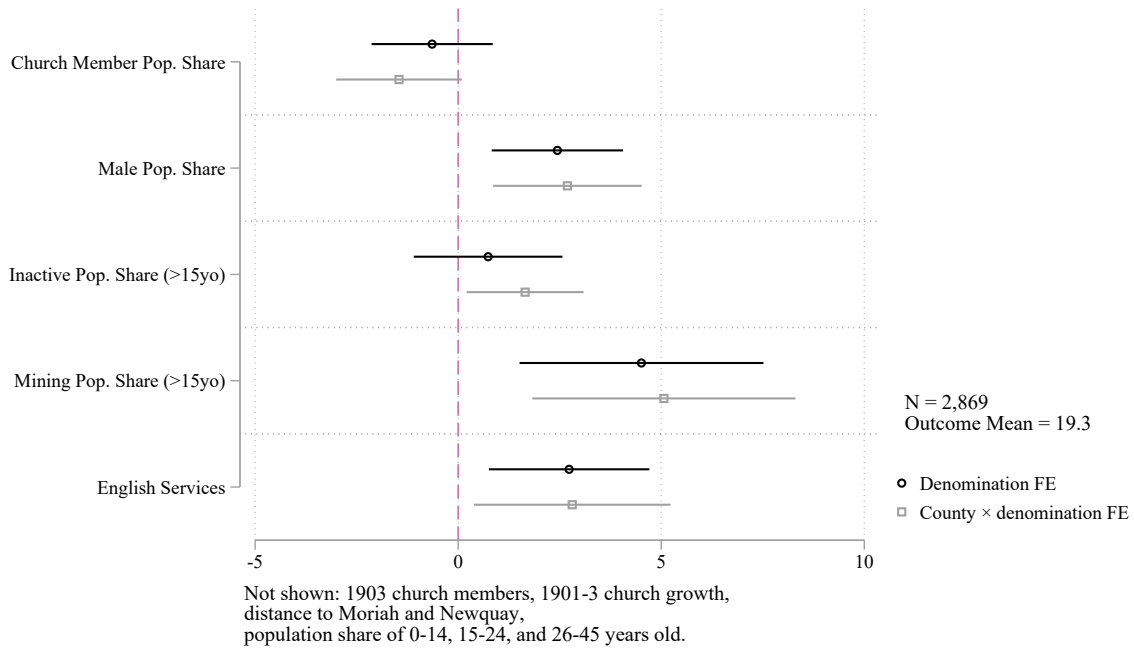


Notes: The left panel plots the average church-level membership growth from 1903 to 1905 at the county-level (using data from nonconformist yearbooks) against the total crime rate in 1903 from the *Judicial Statistics of England and Wales*. ρ denotes Pearson’s correlation coefficient between the two variables. The right panel shows the coefficient on the county-level crime rate from the following church-level specification:

$$\text{Church Growth (\%)}_{1903-05,ipc} = \alpha + \beta \text{Standardized 1903 Crime Rate}_c + \gamma \mathbf{X}_{i,1903} + \theta \mathbf{X}_{p,1901} + \varepsilon_{ipc}$$

where i is the church, p is the parish, and c is the county. The key right-hand-side crime variable is standardized so that point estimates can be interpreted as the increase in Revival intensity associated with a one standard deviation increase in the total crime rate. The first row replicates the correlation in the left panel, while the remaining rows add church-level controls (the number of church members in 1903, the growth of the church 1901-03, three denomination fixed effects, each denomination fixed effect interacted separately with the number of members in 1903 and the growth 1901-03) and parish-level controls (1903 church members as a share of parish population in 1901, population density).

Figure 4: The Revival Was Bigger in Mining Parishes

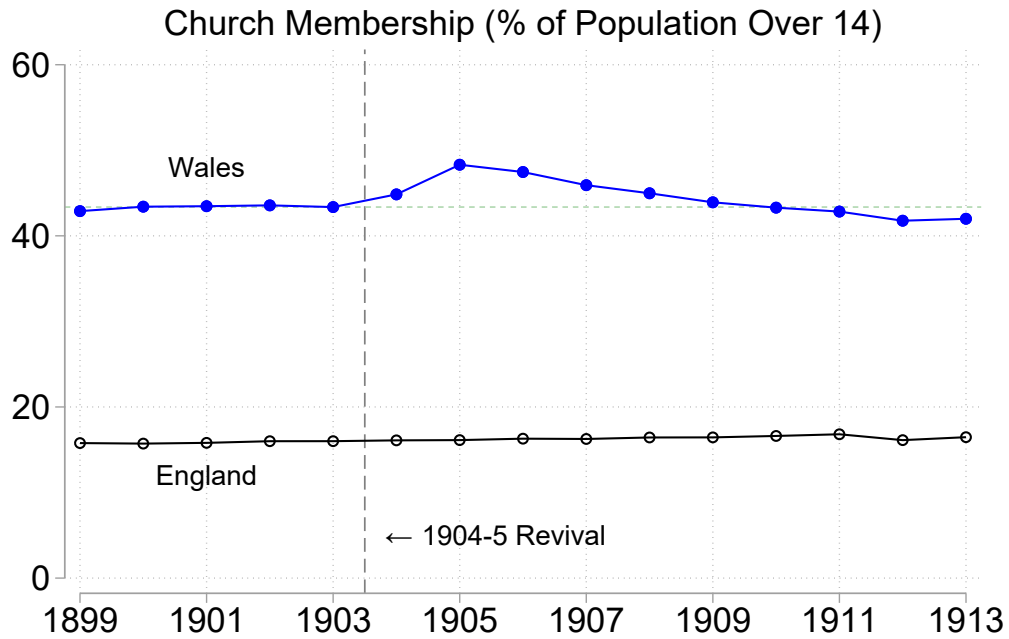


Notes: The figure shows the results from two regressions that differ only in that the first has denomination fixed effects (black lines), while the second has denomination-by-county fixed effects (grey lines). For the second regression, the specification is:

$$\text{Church Growth (\%)} 1903-05_{idpc} = \alpha_{dc} + \beta \mathbf{X}_{i,1903} + \gamma \mathbf{X}_{p,1901} + \varepsilon_{ipc}$$

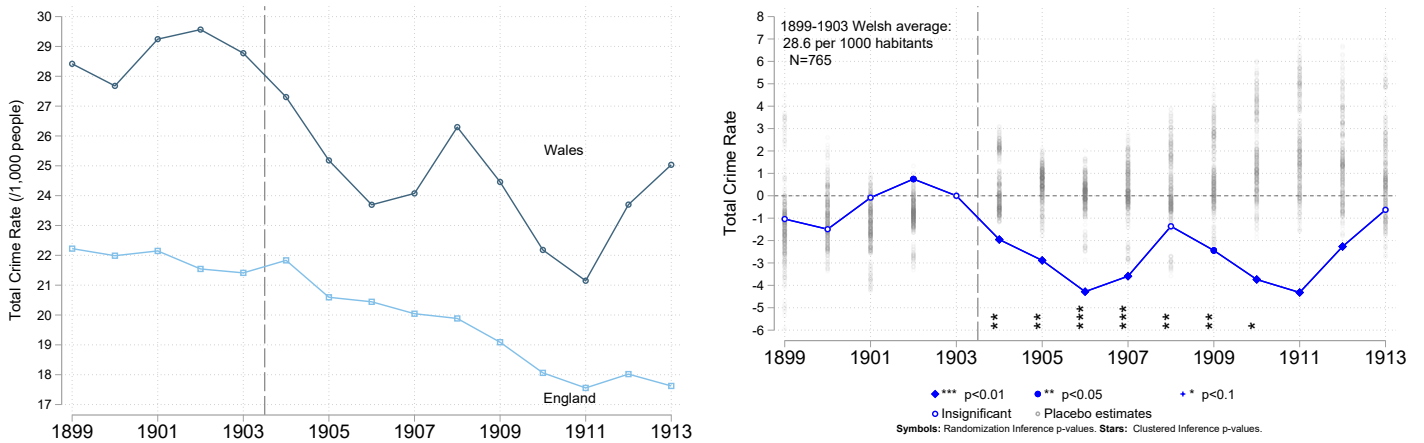
where i is a church from denomination d , in parish p in county c . The church-level covariates ($\mathbf{X}_{i,1903}$) included in both regressions are: an indicator for having services in English, the number of church members in 1903, the growth of church membership from 1901 to 1903, distance to Moriah Chapel, and distance to Newquay. The parish-level covariates ($\mathbf{X}_{p,1901}$) included in both regressions are: number of church members in 1903 as a share of the parish's population in 1901, the male population share, the share of adults economically inactive, the share of adults working in mining, and the population shares of 0 to 14, 15 to 24, and 26 to 45 years old. All church-level and parish-level covariates are standardized so that coefficients can be interpreted as the increase in membership growth associated with a one standard deviation increase in the covariate.

Figure 5: Church Membership Pre-trends Were Parallel



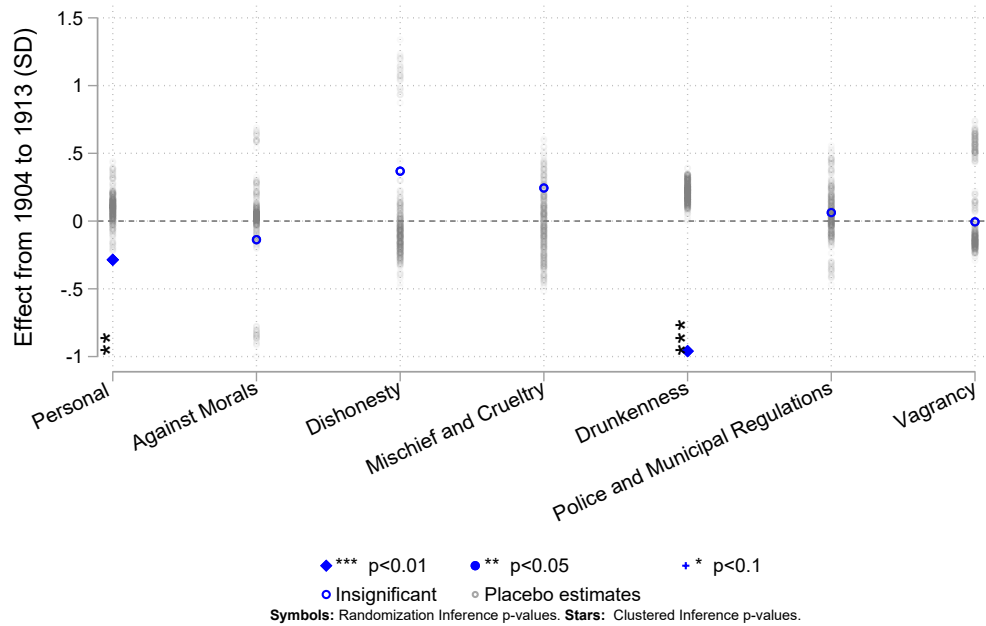
Notes: This figure shows total church membership as a percentage of the population over 14, which is geometrically interpolated using decennial census data. For Wales, total church membership is calculated as the sum of members belonging to five denominations: Baptists, Congregationalists and Welsh Independents, Wesleyan Methodists, Calvinistic Methodists, and the Church of England. For England, the sum is of members belonging to six denominations: Baptists, Congregationalists, Methodists, Presbyterians, Calvinistic Methodists, and the Church of England. Given the change in reporting of members for the Church of England from 1905 onwards, the calculation uses an adjusted series of Church of England membership numbers. Specifically, for each of Wales and England I calculate the growth of Church of England from 1904 to 1905 as the annual membership growth predicted by the actual growth in confirmations that year, using the fitted values from a year-level regression of membership growth on confirmation growth in England from 1892 to 1940, excluding 1905, the year of the reporting change. From 1905 onwards, I keep the membership growth as that recorded in the unadjusted membership data.

Figure 6: Total Crime Fell in Wales Relative to England up to 15% Following the Revival



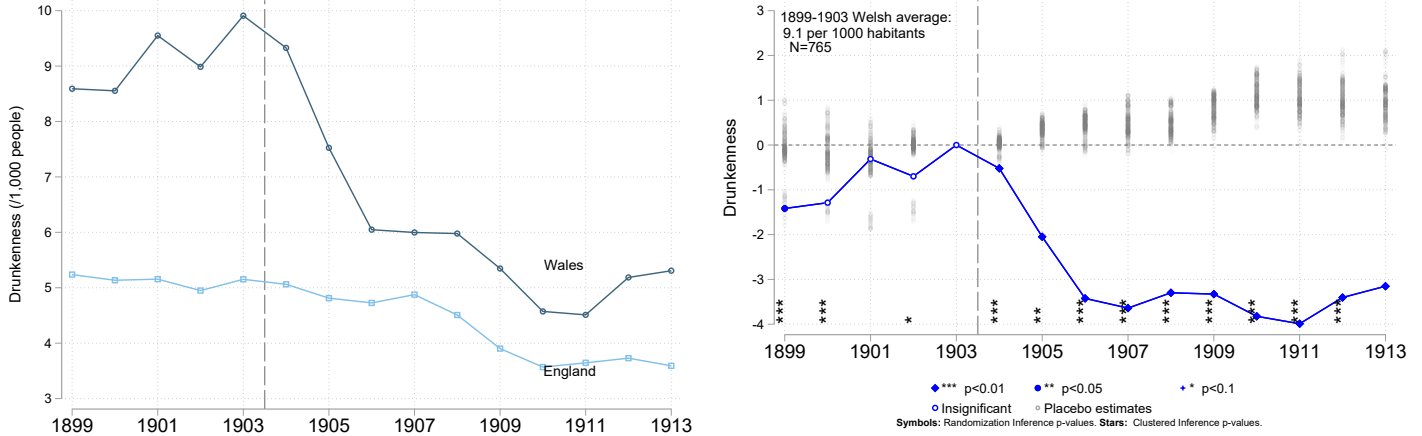
Notes: The left panel plots the raw aggregate crime rate separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The aggregate crime rate is digitized from Tables XXIII and XXIV of the *Judicial Statistics of England and Wales*.

Figure 7: The Revival Only Impacted Drunkenness and Personal, Mostly Violent, Crimes



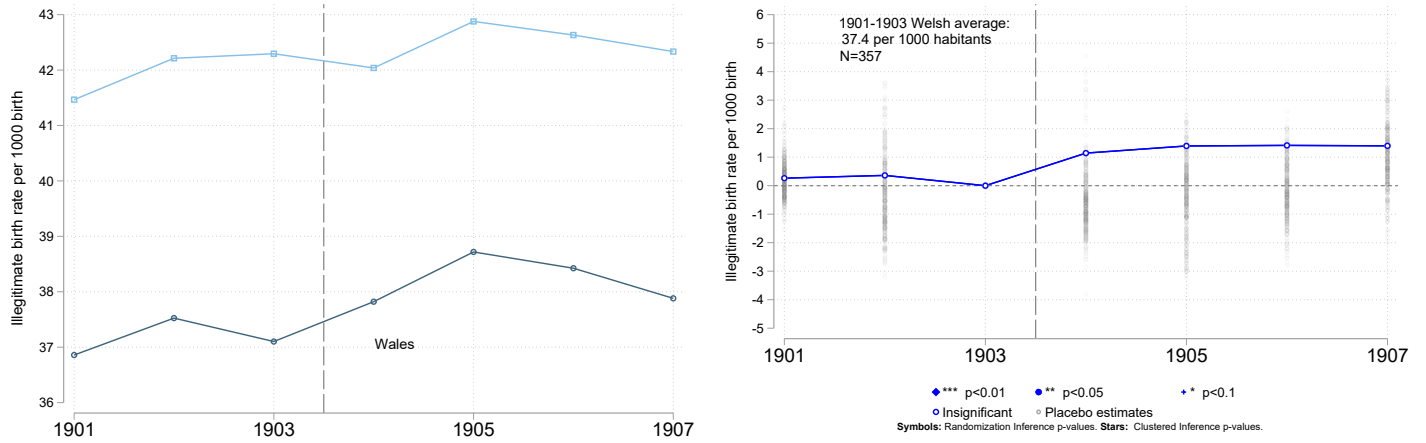
Notes: Each blue dot denotes the estimated coefficient on the $Wales_c \times Post_t$ interaction term of a pooled difference-in-difference specification, with $Post_t$ including the entire post-period from 1904 to 1913. The seven outcomes are measures of crime belonging to pre-existing categories taken from the *Judicial Statistics*. These categories are mutually exclusive and mutually exhaustive of 152 underlying specific crimes. Each outcome is standardized, making each estimate interpretable as an “effect” of the Revival in terms of standard deviations of the outcome. P-values are reported from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The outcomes are aggregated from underlying specific crimes, digitized from Tables XXIII and XXIV of the *Judicial Statistics of England and Wales*.

Figure 8: Drunkenness Offences in Wales Relative to England Fell by Over 40% Following the Revival



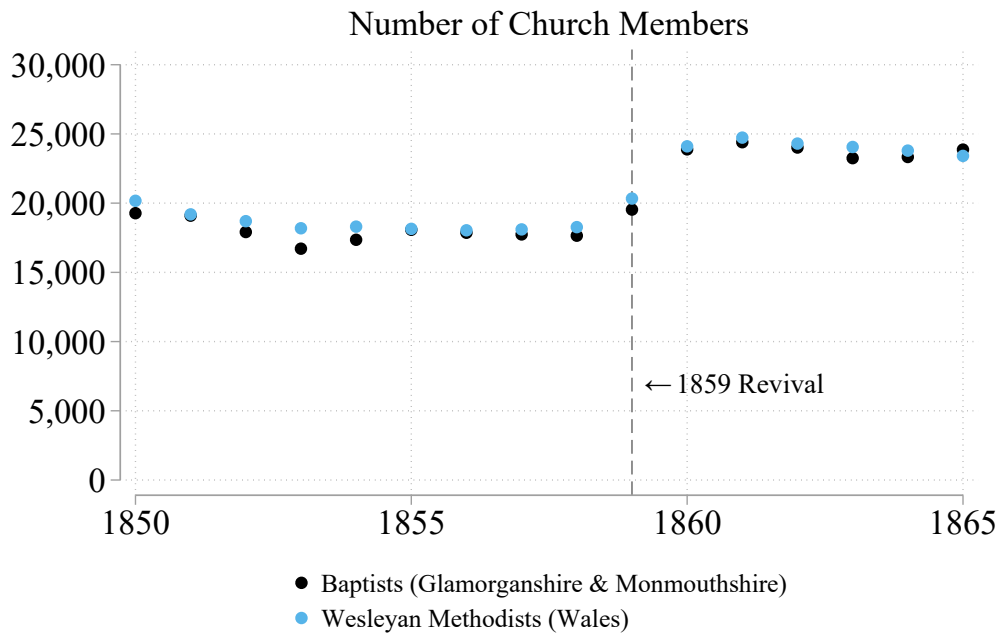
Notes: The left panel plots the drunkenness crime rate separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The drunkenness crime rate is digitized from Table XXIV of the *Judicial Statistics of England and Wales*.

Figure 9: The Revival Did Not Reduce the Illegitimate Birth Rate



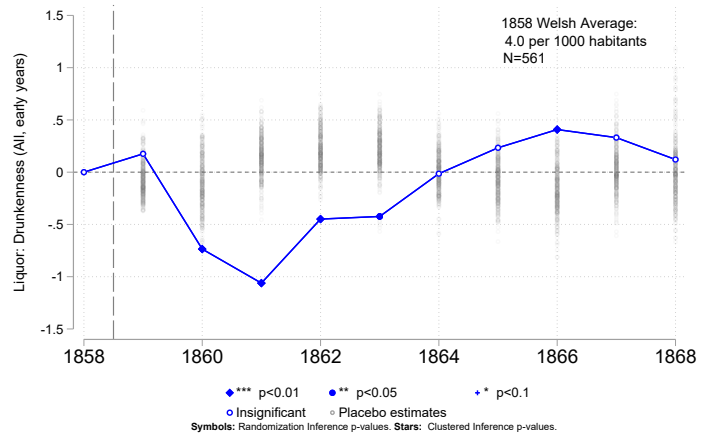
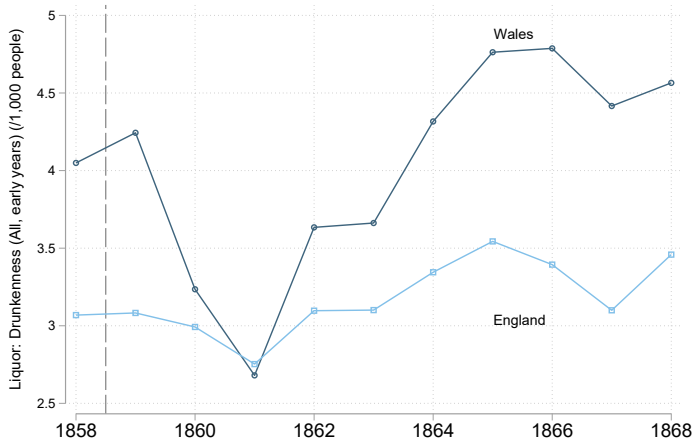
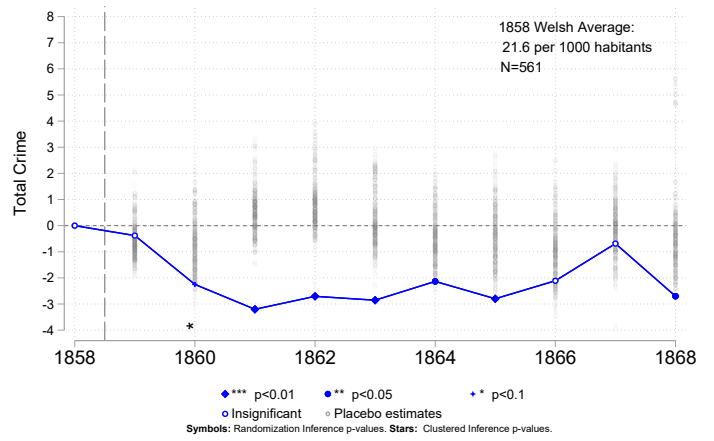
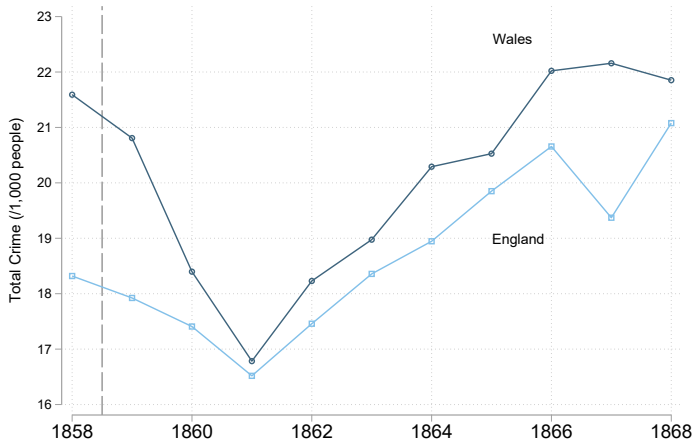
Notes: The left panel plots the illegitimate birth rate separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The illegitimate birth rate is digitized from the *Annual Report of the Registrar-General of Births, Deaths, and Marriages*.

Figure 10: The 1859 Revival Also Increased Welsh Church Membership



Notes: The figure shows the time series for a more limited set of church membership data before and after the 1859 Welsh Revival. *Source:* UK Data Archive No. 4105 – Digest of Welsh Historical Statistics: Religion, 1669-1974, from these underlying sources: Baptist Handbooks, Minutes of the Methodist Conferences, Minutes of Wesleyan Methodist Conference. The reported number of Baptist members for Glamorganshire in each year from 1853 to 1855 is 9045, 1010, 10203. I presume the 1010 number for 1854 to be a typo, and replace it with 10100 for the purpose of the above figure.

Figure 11: The 1859 Revival Also Reduced Crime, Including Drunkenness



Notes: The left panels plot the outcomes separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panels visualise the difference-in-difference estimates from Equation 2, this time for the period 1858-68, with p-values from both county-clustered standard errors and randomization inference. The relevant data begins in 1858, so in this case I cannot estimate pre-trends. The estimates from each of the 400 placebo regressions are plotted as grey circles. The aggregate and drunkenness crime rates are digitized from Tables 4 and 7 of the *Judicial Statistics of England and Wales*.

A Appendix [For Online Publication]

Figure A1: Baptist 1905 Yearbook Example Scan

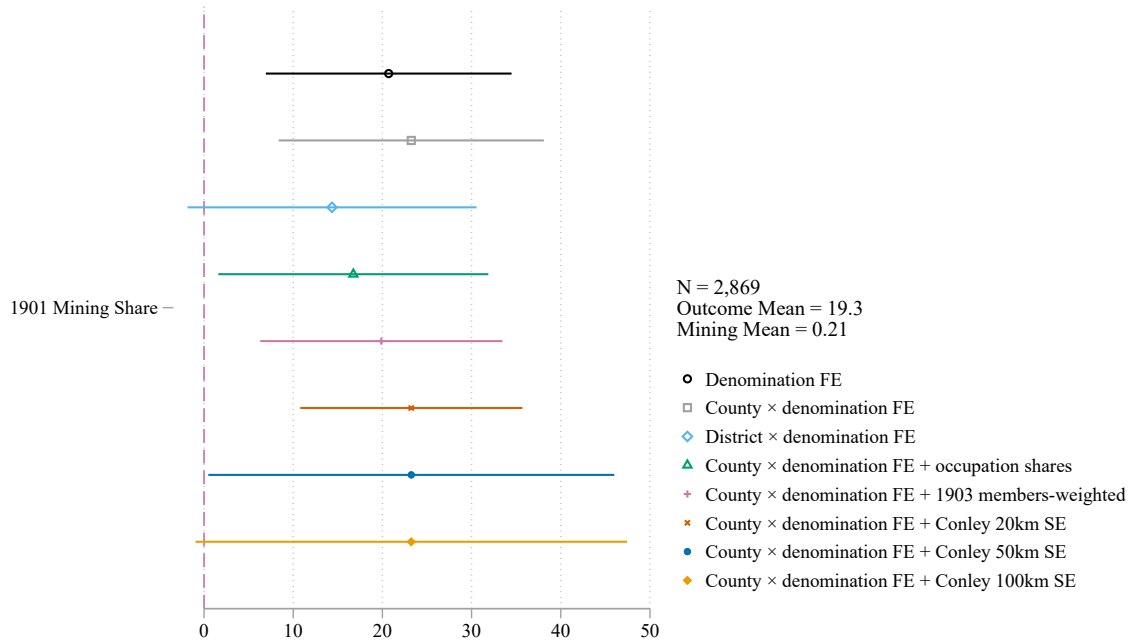
CARMARTHENSHIRE—continued.										
Churches.	Date.	Chapel Seats.	No. of Members.	Sunday School Members.	No. of Scholars.	Local Preachers.	Pastors.	When Settled.	Associations.	Secretary's Name and Address.
*Cwmduad	1871	450	160	10	90	..	D. Richards ..	1881	C.C.	J. Davies, Cilarddu, Conwil Elfet, Carmarthen
*Cwmfelin	1798	500	155	12	100	..	*D. S. Davies ..	1871	C.C.	D. Edwards, Bryndeur, Cwmfelin, Whitland, Carm.
Cwmifor	1774	400	94	8	80	..	*D. J. Davies† ..	1895	C.C.	E. Thomas, Llechwenddery, Manordilo, R.S.O., Cm.
*Cwmsarnddu ..	1814	200	56	4	40	..	*D. W. Waters ..	1893	C.C.	W. Price, Cilposte, Cwmsarnddu, Llandoverly, Carm.
*Drefach (Llandyssl)	1793	600	284	12	200	..	..	..	C.C.	..
*Elim Park	1850	220	56	4	45	..	*J. T. Davies† ..	1902	C.C.	E. Evans, Penddaulwynfach, Llangunnor, Carm.
Felinfoel	1700	950	713	40	450	1	B. Humphreys ..	1889	C.C.	B. Ellis, Berwyn House, Felinfoel, Llanelly
<i>Clochyrie, Pisgah</i>	..	200	..	5	50	..	..	..	..	..
*Felingwm, Sittim ..	1816	250	79	6	60	..	*R. Gimblett ..	1899	C.C.	W. E. Richards, Felingwm, Nantgaredig, Carm.
*Ferry-side, Salem, and	1806	500	104	7	130	..	W. E. Davies ..	1903	C.C.	J. Jones, The Plas, Ferryside, R.S.O., Carmarthen
*Llandefeilog, Ebenezer	1868	250	24	4	20	..	..	..	..	T. Edwards, Penrhiwgrug, Kidwelly, R.S.O., Carm.
*Ffynonhenry	1737	600	179	10	69	..	*W. Lewis ..	1897	C.C.	J. Bowen, Clytau Cochion, Llanpumpsaint, Carm.
*Foelewan, Noddfa ..	1881	250	80	5	50	..	*D. Griffiths† ..	1899	C.C.	J. Edwards, Bryn Farm, Talog-road, Carmarthen
*Glanamman, Bethesda	1844	500	228	25	220	..	J. C. Rees ..	1898	W.G.	J. Evans, Greenfield Cottage, Glanammon, Carm.
*Idole	1900	180	36	3	25	..	*J. T. Davies† ..	1902	C.C.	R. Jones, Penrhiw, Croesyceilog, Carmarthen
Kidwelly, Siloam	1834	550	148	14	94	..	*H. R. Jones† ..	1902	C.C.	D. Reynolds, Water-street, Kidwelly, R.S.O., Carm.
*Llandilo, Ebenezer ..	1831	450	202	13	158	2	*D. James ..	1877	C.C.	T. S. Griffiths, 45, New-road, Llandilo, R.S.O., Carm.
*Llandoverly, Ebenezer	1844	450	122	10	70	..	H. I. James ..	1901	C.C.	W. Price, Caegwyn Farm, Langadock, Carm.
*Llandebie, Saron ..	1814	500	202	17	140	..	D. S. Davies ..	1892	C.C.	W. Thomas, Ysgnborfawr, Llandebie, R.S.O., Carm.
<i>Llanedi, Bethesda</i>	..	..	..	9	70	..	..	..	..	..
*Carmel	1859	400	109	5	65	..	*D. M. Morgan ..	1876	C.C.	M. Morgan, Carmel, Llandebie, R.S.O., Carm.
*Llandyfaen, Zoar ..	1818	400	90	10	60	..	*M. Jones ..	1878	C.C.	D. Morris, Garnfach, Trapp, Llandilo, R.S.O., Carm.
*Llandyssil, Penybont	1776	180	120	10	80	..	..	..	C.C.	D. M. Harries, Pantyporthman, Llandyssil
*Llanedy, Sardis ..	1849	300	70	6	50	..	*R. W. Davies† ..	1901	C.C.	D. Evans, Farmer's House, Pantyffynnon, Carm.

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LIST OF CHURCHES.

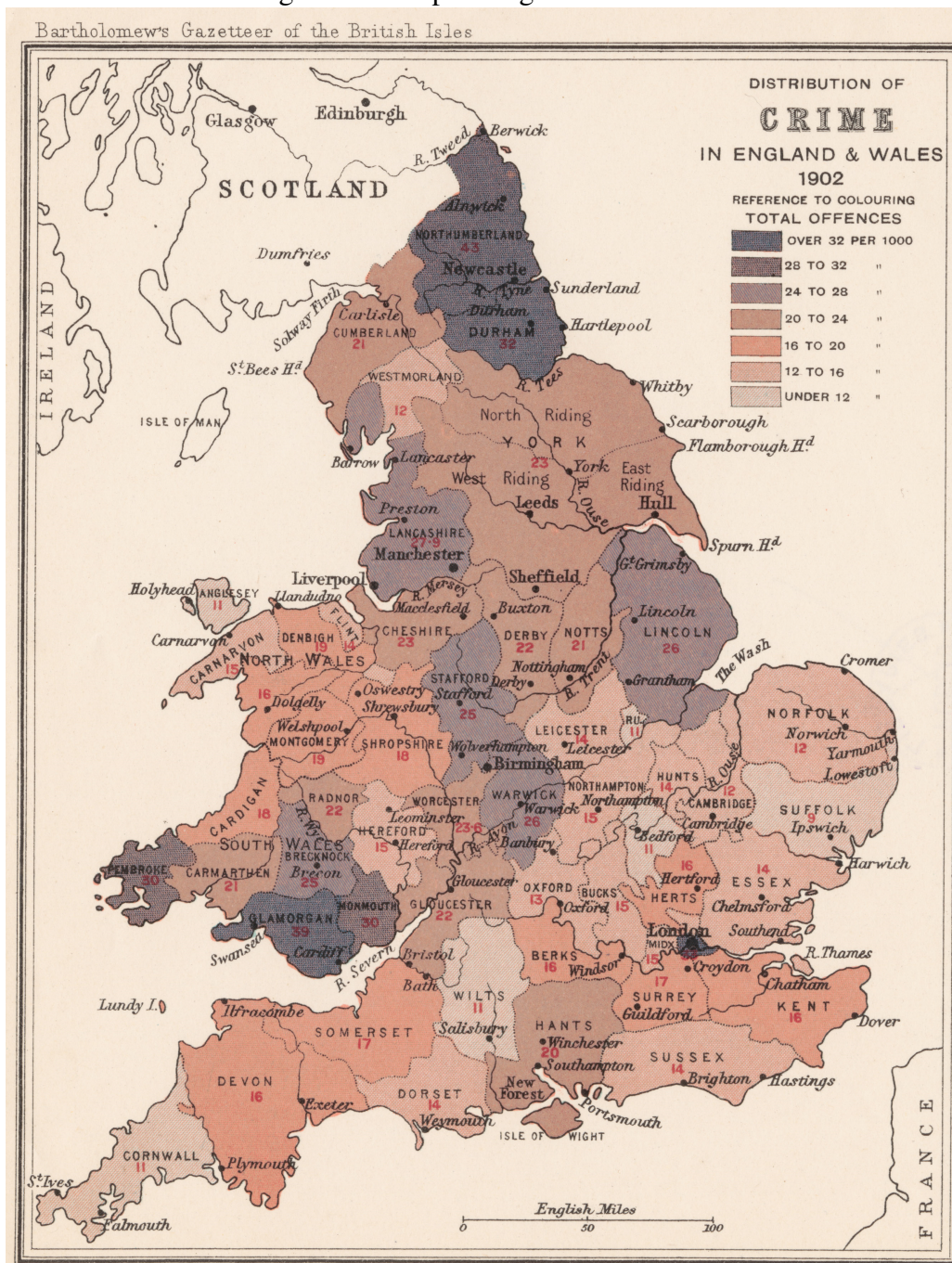
Notes: The scanned page from the 1905 yearbook for Baptist churches in Great Britain and Ireland gives an example of the church-level data I digitized and geocoded. My measure of church growth uses the number of members from the fourth column.

Figure A2: The Revival Is Consistently Bigger in Mining Parishes



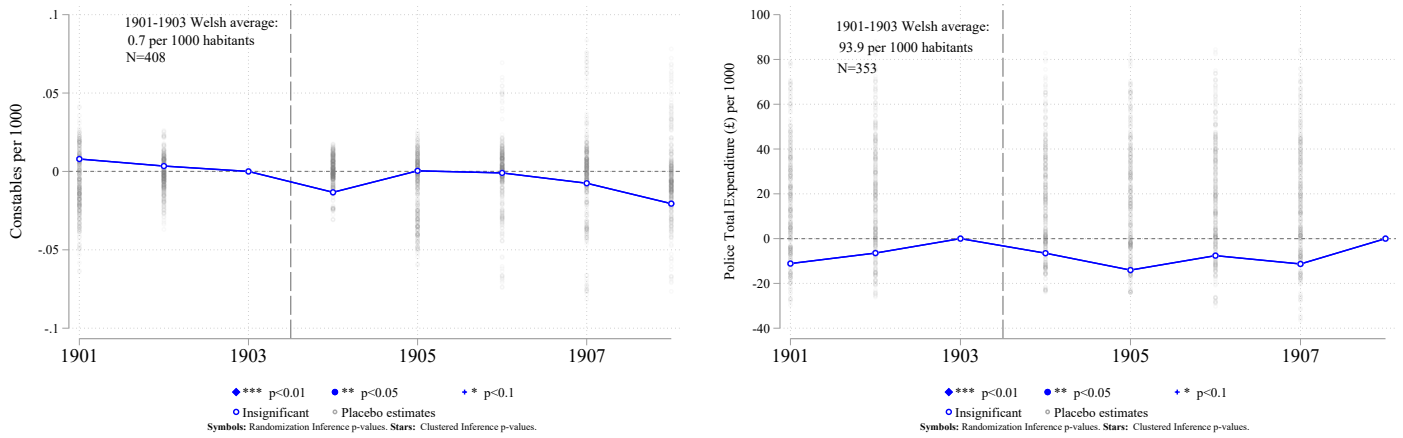
Notes: This figure shows that the coefficient and confidence interval on the mining share (from equation 1) is robust to different specification choices. Unlike Figure 4, the mining share is the raw share, rather than standardized. The first two rows replicate the results in Figure 4. The third row includes district-by-denomination fixed effects. The fourth reverts to county-by-denomination fixed effects, but adds other occupation share variables, making the effect of mining measured relative to agricultural occupations, rather than relative to any non-mining occupation. The fifth weights observations by the number of church members in 1903. The final rows use Conley standard errors with three different distance cutoffs.

Figure A3: Map of England and Wales



Notes: The map shows the county borders of England and Wales, with color-coding as per the total crime rate in 1902. There are 13 contiguous Welsh counties: Anglesey, Carnarvonshire, Denbighshire, Flintshire, Merionethshire (not labelled – contains Dolgelly town), Montgomeryshire, Radnorshire, Cardiganshire, Brecknockshire, Pembrokeshire, Carmarthenshire, Glamorganshire, and Monmouthshire.

Figure A4: Welsh Police Reporting Capacity Did Not Drop Following the Revival



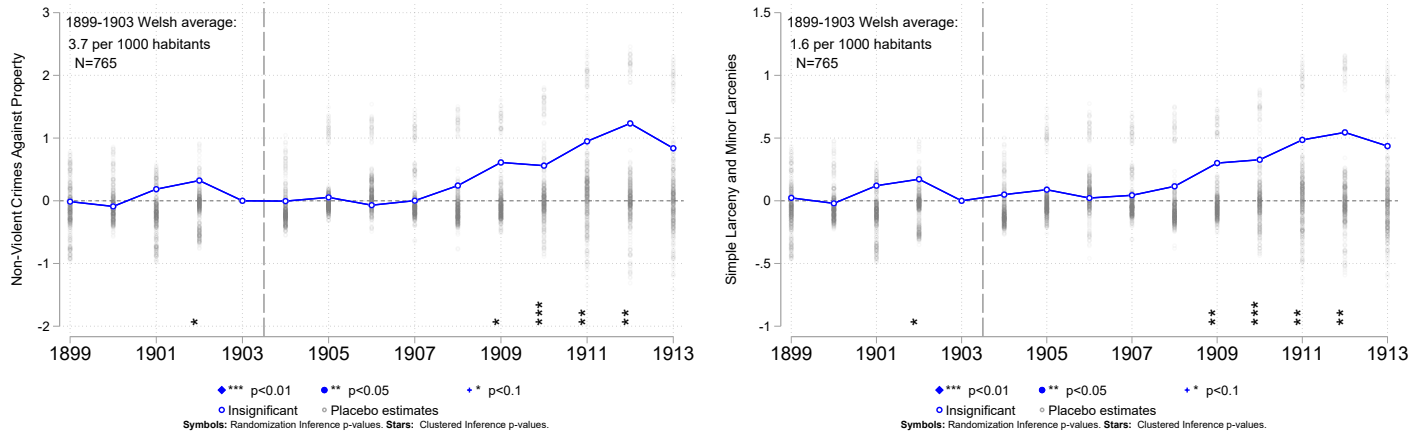
Notes: Both panels visualise the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. Both outcomes are digitized from the *Annual Reports of the Inspectors of Constabulary*. Constables per 1000 is the number of police constables in the county (from Table II) normalized by 1000s of population as of the last decennial census. Police Total Expenditure per 1000 is the gross total cost of the police in pounds in the county (from Table III) normalized by 1000s of population as of the last decennial census.

Figure A5: The Punishment Probability Did Not Increase in Wales at the Time of the Revival



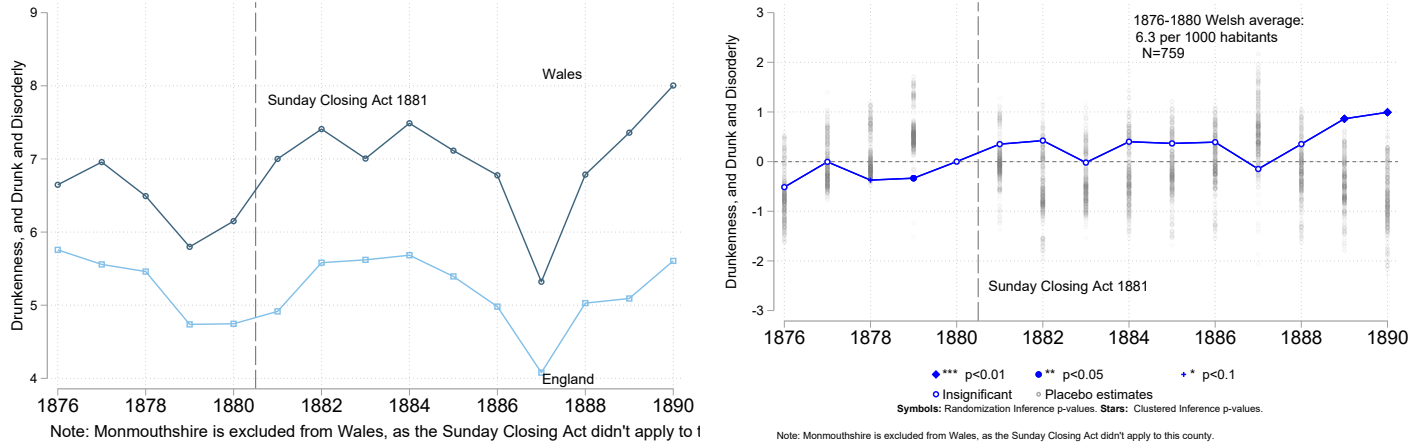
Notes: The left panel plots the raw aggregate conviction rate separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The conviction rate is digitized from Tables XXI and XXII of the *Judicial Statistics of England and Wales*.

Figure A6: The Revival Did Not Reduce Economic Crimes



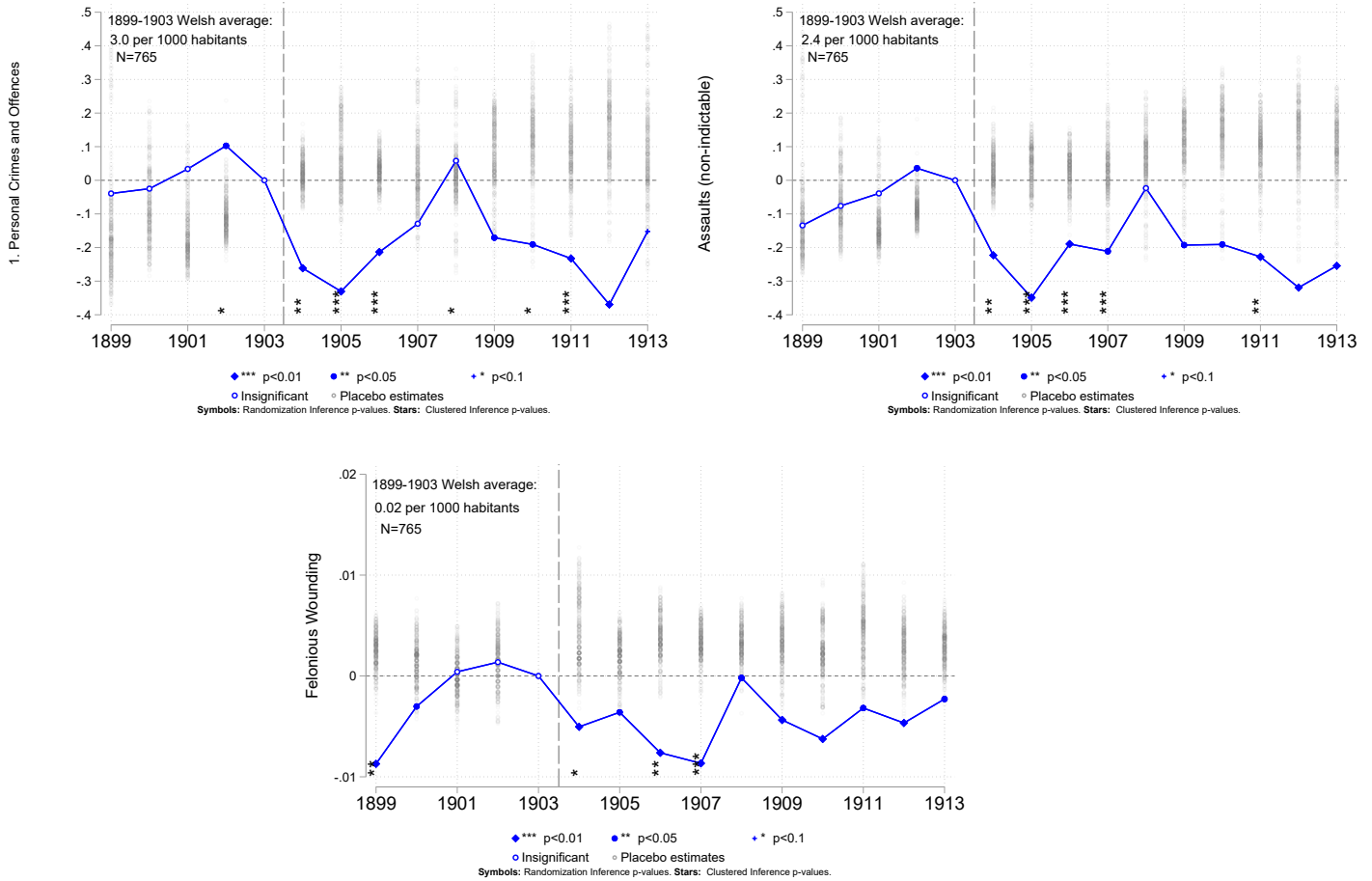
Notes: Each panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. Both outcomes are digitized from Table XXIII of the *Judicial Statistics of England and Wales*. Non-Violent Crimes Against Property (left panel) is a pre-existing category of crime (e.g. see pg136 of the 1905 *Judicial Statistics*) which includes the following offences: Larceny of Horses and Cattle, Larceny from the Person, Larceny in House, Larceny by a Servant, Embezzlement, Larceny of Post Letters, Other Aggravated Larcenies, Simple Larceny and Minor Larcenies, Obtaining by False Pretences, Frauds by Agents Etc., Falsifying Accounts, Other Frauds, Receiving Stolen Goods, and Offences in Bankruptcy. These offences are a strict subset of those included in the category “Crimes and Offences of Dishonesty” (used in Figure 7). Simple Larceny and Minor Larcenies (right panel) is the most common offence within the category of Non-Violent Crimes Against Property.

Figure A7: The Sunday Closing Act of 1881 Did Not Reduce Drunkenness Offences



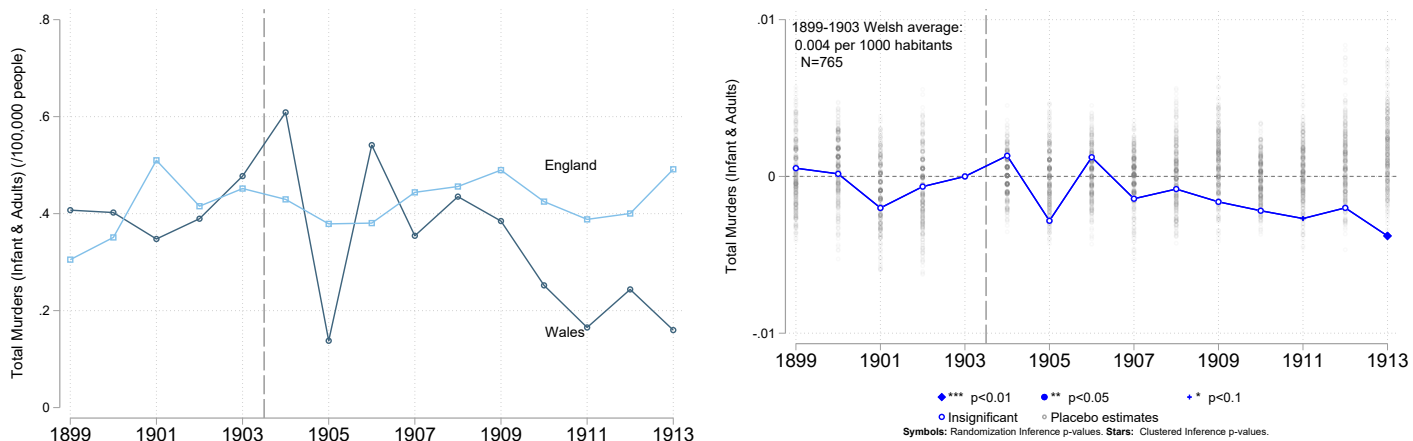
Notes: The left panel plots the drunkenness crime rate for the earlier period 1876 to 1890, with the series for England excluding three large counties (London, Lancaster, and York West Riding), and the series for Wales excluding Monmouthshire, which was exempt from the Sunday Closing Act. The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The drunkenness crime rate is digitized from Table 7 of the *Judicial Statistics of England and Wales*. Prior to 1893 the offence was recorded with the label “Drunkenness, and Drunk and Disorderly”. From 1893 onwards the offence was labelled “Drunkenness”, as in Figure 8.

Figure A8: The Revival Reduced Violent Crime



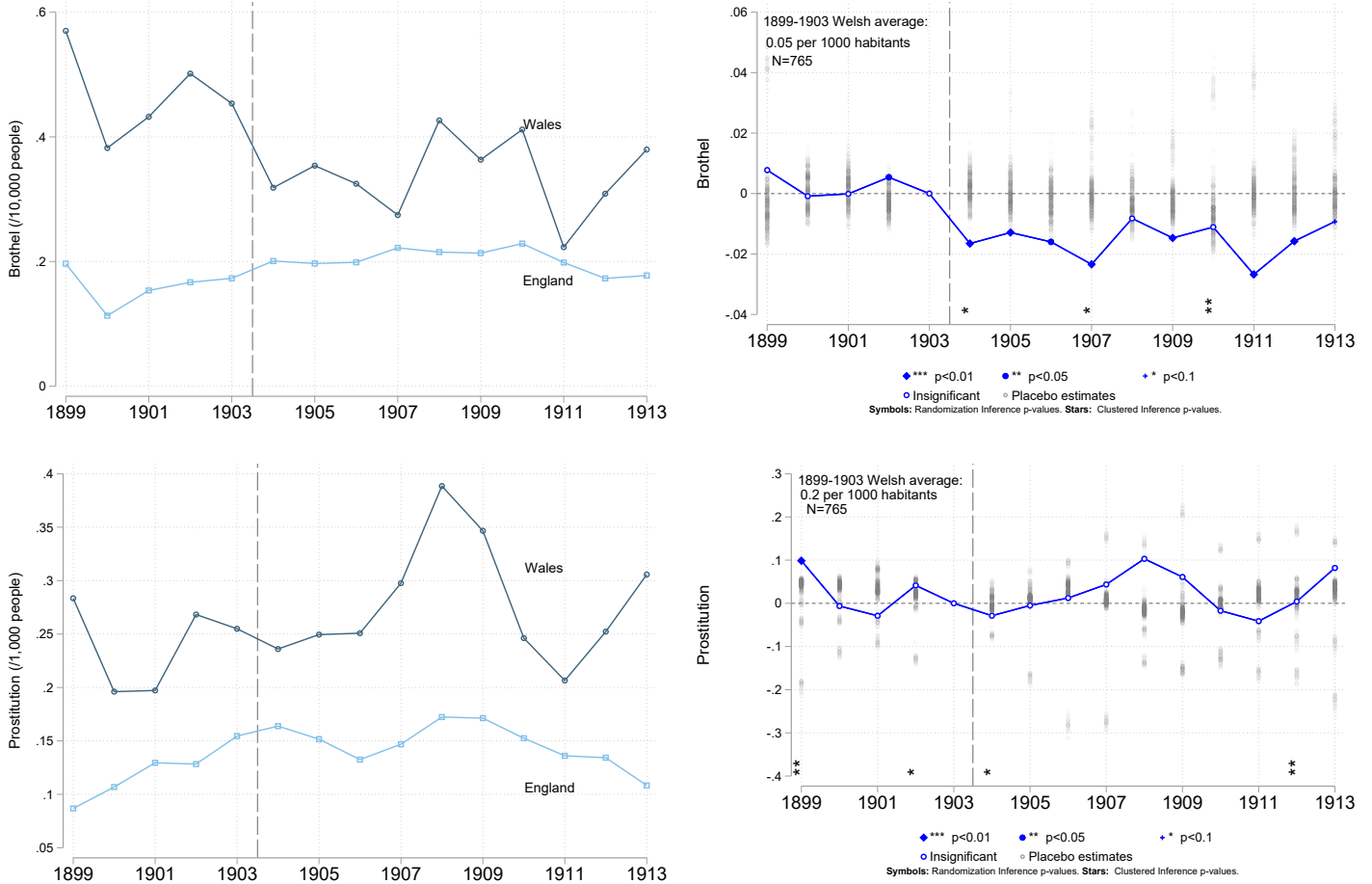
Notes: Each panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The top-left panel outcome is “Personal Crimes and Offences”, one of seven broad categories of crimes. The modal offence within this category is “Assaults (Non-Indictable)”, which is the outcome for the top-right panel. The bottom panel outcome is “Felonious Wounding”, a more serious violent offence within “Personal Crimes and Offences”. The estimates from each of the 400 placebo regressions are plotted as grey circles. The three outcomes are digitized from Tables XXIII and XXIV of the *Judicial Statistics of England and Wales*.

Figure A9: The Revival and Murder



Notes: The left panel plots the murder crime rate separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panel visualises the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. The murder crime rate is digitized from Table XXIII of the *Judicial Statistics of England and Wales*.

Figure A10: The Revival Reduced More Public Criminal Sexual Behaviors



Notes: The top panels consider the rate of brothel-keeping offences, the bottom panels consider the rate of prostitution offences. The left panels plot raw crime rates separately for Wales and England, with the series for England excluding three large counties (London, Lancaster, and York West Riding). The right panels visualise the difference-in-difference estimates from Equation 2, with p-values from both county-clustered standard errors and randomization inference. The estimates from each of the 400 placebo regressions are plotted as grey circles. Both outcomes are digitized from Table XXIV of the *Judicial Statistics of England and Wales*. Data for 1908 is missing due to the poor quality of available scans.

B Data Appendix

The 151 specific crimes belonging to the seven broad categories used in Figure 7 are:

1. Personal Crimes and Offences

- Murder
- Attempt to Murder
- Threats or Conspiracy to Murder
- Manslaughter
- Felonious Wounding
- Endangering Railway Passengers
- Malicious Wounding (Misdemeanours)
- Assault
- Intimidation and Molestation
- Cruelty to Children
- Abandoning Children under two years
- Child Stealing
- Procuring Abortion
- Concealment of Birth
- Offences Against the State and Public Order – Unlawful Assembly
- Offences Against the State and Public Order – Other Offences
- Offences Against Public Justice – Bribery, Etc.
- Offences Against Public Justice – Perjury
- Offences Against Public Justice – Escape and Rescue
- Offences Against Public Justice – Other Offences
- Offences Against Religion – Blasphemy, Etc.
- Libel
- Other Nuisances

- Suicide (Attempting to Commit)
- Assaults (Non-Indictable)
- Cruelty to Children (Non-Indictable)
- Offences Against Housing of the Working Classes Act
- Offences Against Labour Laws – Intimidation
- Offences Against Labour Laws – Breach of Contracts
- Offences Against Labour Laws – Offences Under Special Trade Acts
- Offences Against Labour Laws – Offences Under Truck Acts
- Offences Against Labour Laws – Mines Acts
- Offences Against Labour Laws – Factory Acts
- Offences Against Labour Laws – Shop Acts
- Offences Against Labour Laws – Employment of Children Acts
- Offences Against Labour Laws – Other Acts for Protection of Labour
- Offences Against Merchant Shipping Acts

2. Crimes and Offences Against Morals

- Unnatural Offences
- Attempts to Commit Unnatural Offences
- Indecency with Males
- Rape
- Indecent Assaults on Females
- Defilement of Girls Under 13
- Defilement of Girls Under 16
- Householder Permitting Defilement of Girls
- Procuration
- Abduction
- Bigamy
- Indecent Exposure

- Keeping Disorderly Houses
- Other Misdemeanours
- Brothel Keeping
- Indecent Advertisement
- Indecent Exposure
- Prostitution
- Offences Against Vagrancy Acts – Living On Prostitutes' Earnings

3. Crimes and Offences of Dishonesty

- Sacrilege
- Burglary
- Housebreaking
- Shopbreaking
- Attempts to Break Into Houses, Shops, Etc.
- Entering with Intent to Commit Felony
- Possession of Housebreaking Tools, Etc.
- Robbery
- Extortion by Threats to Accuse
- Extortion by Other Threats
- Larceny of Horses and Cattle
- Larceny From the Person
- Larceny in House
- Larceny by a Servant
- Embezzlement
- Larceny of Post Letters
- Other Aggravated Larcenies
- Simple Larceny and Minor Larcenies
- Obtaining by False Pretences

- Frauds by Agents, Etc.
- Falsifying Accounts
- Other Frauds
- Receiving Stolen Goods
- Offences in Bankruptcy
- Forgery and Uttering (Felony)
- Forgery (Misdemeanour)
- Coining
- Uttering Counterfeit Coin
- Poaching
- Adulteration of Foods and Drugs
- Offences Against Fishery Laws
- Offences Against Game Laws – Night Poaching
- Offences Against Game Laws – Day Poaching
- Offences Against Game Laws – Unlawful Possession of Games, Etc.
- Offences Against Game Laws – Illegal Buying and Selling of Game
- Offences Against Game Laws – Other Offences
- Offences Against Pawnbrokers' Acts
- Offences Against Police Regulations – Unlawful Possession
- Offences Against Revenue Laws
- Stealing Animals, Trees, Fruit, Etc.
- Receiving Stolen Animals, Trees, Fruit, Etc.
- Offences Against Vagrancy Acts – Found in Inclosed Premises Plus Possessing Picklocks Etc.
- Offences Against Vagrancy Acts – Frequenting
- Offences Against Weights and Measures Acts

4. Crimes of Mischief and Cruelty

- Arson

- Setting Fire to Crops, Etc.
- Killing and Maiming Cattle
- Destroying Railways
- Destroying Trees and Shrubs
- Other Malicious Injuries
- Offences Against the State and Public Order - Riot
- Cruelty to Animals
- Malicious Damage
- Offences Against Wild Birds Protection Acts

5. Drunkenness

- Habitual Drunkenness
- Offences Against Intoxicating Liquor Laws – Drunkenness
- Offences Against Intoxicating Liquor Laws – Habitual Drunkards Obtaining Drink

6. Breaches of Police and Municipal Regulations

- Betting and Gaming
- Offences Against Diseases of Animals Act
- Offences in Relation to Dogs
- Offences Against Elementary Education Acts
- Offences in Relation to Explosives
- Offences Against Highway Acts
- Offences Against Intoxicating Liquor Laws, Offences by Licensed Persons – Permit Drunkenness
- Offences Against Intoxicating Liquor Laws, Offences by Licensed Persons – Selling Drink to Habitual Drunkards
- Offences Against Intoxicating Liquor Laws, Offences by Licensed Persons – Selling Drink to Children

- Offences Against Intoxicating Liquor Laws, Offences by Licensed Persons – Offences Against Closing Regulations
- Offences Against Intoxicating Liquor Laws, Offences by Licensed Persons – Other Offence by Licensed Persons
- Offences Against Intoxicating Liquor Laws – Unlicensed Sale of Drink
- Offences Against Intoxicating Liquor Laws – Other Offences
- Offences Against Military and Naval Law – Army
- Offences Against Military and Naval Law – Navy
- Offences Against Military and Naval Law – Volunteers and Territorial Force
- Offences in Relation to Parks, Commons and Open Spaces
- Offences Against Police Regulations – Metropolitan Police Acts
- Offences Against Police Regulations – Town Police Acts and Other Police Acts
- Offences Against Police Regulations – Borough Byelaws
- Offences Against Police Regulations – County Byelaws
- Offences Against Police Regulations – Local Acts and Byelaws
- Prevention of Crime Acts – Offences by License Holders
- Prevention of Crime Acts – Offences by Supervisees
- Prevention of Crime Acts – Special Offences by Twice-Convicted Persons
- Offences in Relation to Railways
- Offences Against Sanitary Law
- Offences Against Stage and Hackney Carriage Regulations
- Streets and Buildings
- Sunday Trading, Etc.
- Offences Against Tramways Act
- Offences Against Vaccination Acts
- Offences Against Vagrancy Acts – Gaming, Etc.
- Other Offences

7. Vagrancy

- Offences Against Poor Law
- Offences Against Vagrancy Acts – Begging
- Offences Against Vagrancy Acts – Sleeping out
- Offences Against Vagrancy Acts – Other Offences