Democratic reform and opposition to government expenditure: evidence from nineteenth-century Britain.*

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Abstract

Several theories have argued that democratic reform will lead to higher government spending. However, these theories have generally focused on expenditure on redistribution rather than expenditure on public goods. This paper presents a model predicting that democratization leads to lower government expenditure on infrastructure if the median pre-reform voter is middle class. This prediction is tested using a new panel dataset of town council infrastructure spending and revenue in nineteenth-century Britain. An 1894 national reform implementing a system of "one-household-one-vote" and the secret ballot is used as the treatment event in a difference-in-difference analysis. The results show that democratic reform led to lower levels of town council spending on public goods, including water supply and other public infrastructure, relative to towns that were democratized at an earlier date. In line with the theoretical prediction, this negative effect was strongest when democratic reform transferred power from the middle class to the poor.

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Many theories of democratization predict that extensions of the right to vote to the poor will be associated with increases in government expenditure. Either poorer citizens demand higher transfer payments since they bear a relatively low share of the tax burden (Meltzer and Richard, 1981; Acemoglu and Robinson, 2000, 2006; Boix, 2003) or an expanded electorate incentivizes parties to offer higher expenditure on public goods (Lizzeri and Persico, 2004). But while the mechanism through which spending increases varies, all these models share the common assumption that government can engage in widespread redistribution.[1]

Yet often, both historically and today, the primary role of government has been to provide public goods when redistribution is not possible. Historically the apparatus of mass redistribution that we know today simply did not exist.[2] Today, on the other hand, the local governments that are tasked with providing public goods are often limited in their ability to raise taxes or provide redistributive transfers (Shah and Shah, 2009). Understanding the willingness of poor citizens to support infrastructure investment in this setting remains important given the recent trend of development agencies passing responsibility for key infrastructure projects—such as clean water—to local governments on the basis that encouraging local participation will encourage more efficient investment (Bonfiglioli, 2003) and the scholarly interest in the effects of local direct democracy on the provision of public goods (Olken, 2010).

In this paper I analyze the effect of democratic reform on government spending in a setting where government can spend tax revenue on public goods but not on redistributive transfers. I adapt the theoretical framework of Chapman (2017) to analyze a society consisting of two classes: the "elite" and the "poor". In this framework individuals require a

[1]Meltzer and Richard (1981), Acemoglu and Robinson (2000, 2006) and Boix (2003) allow only for government spending on lump-sum redistributive transfers. Lizzeri and Persico (2004) allow for parties to offer platforms of spending on public goods alongside any menu of taxes or transfers.

[2]Many governments spent nothing on social transfers in 1900, and even pioneering countries spent less than 2% of national product on this type of redistribution (Lindert, 1994). Redistribution through taxation was also limited, with the top rate of both inheritance taxes and income taxes low at the turn of the twentieth century (Scheve and Stasavage, 2010, 2012; Vélez, 2014).

minimum subsistence consumption and all citizens pay the taxes that fund the public good. The model predicts that the effect of enfranchising the poor depends on the wealth of the elite: if the median income of the elite is relatively low, then democratic reform leads to a *reduction* in tax revenue and government expenditure. Intuitively, the poorest individuals prefer to spend their income on more basic needs such as food, while the wealthiest citizens oppose taxes because of their relatively high tax burden. Public goods investment is thus highest when the middle class have the right to vote but the poor do not.

I then test this prediction using new data from town councils in nineteenth-century England and Wales. During this period these elected town councils began to provide a range of new urban infrastructure and public services—including clean water supply, waste disposal, mass transit systems and electric lighting—but were not engaged in significant redistribution. As such, the empirical setting closely matches the assumptions of the model.

To capture the effects of democratization I take advantage of differences in the governance of town councils both across towns and over time. In particular, I use the fact that, until 1894, towns that were incorporated were governed under a more democratic system than other towns. Town councils in incorporated towns were elected under a secret ballot and under a franchise where each head-of-household held a single vote. In unincorporated towns, in contrast, there was no secret ballot in place, and citizens could receive up to 12 votes depending on the value of the property they owned and occupied.

In the main empirical analysis, I exploit an 1894 national reform that imposed the system of one-household-one-vote and secret ballot on unincorporated towns. After this point in time, all towns were governed under the system previously used in the incorporated towns. This reform is used as the treatment event in a difference-in-difference analysis, where the "control" towns are those incorporated before the reforms and the treatment group consists of the unincorporated towns that were previously governed under the less democratic council system. My main dependent variable is the annual total current expenditure per capita

by local governments. This measure includes spending by town councils on a wide range of public goods and services, with major items including water supply, sewer systems, and street maintenance and cleaning. In addition, the measure also captures growth in infrastructure stock since it includes expenditure on repaying and servicing the loans used to pay for infrastructure improvements.

My approach is complicated by the fact that incorporated and unincorporated towns could potentially be very different since towns were not assigned at random to these groups. I argue that incorporation status is plausibly exogenous since it was determined prior to the period of analysis, and was often a reflection of royal charters received many centuries previously.[3] There is considerable overlap in the characteristics of the groups of towns, including in town size, tax base and population density. The two groups are very similar in terms of the proportion of the workforce engaged in agriculture, providing further evidence that incorporation status was not a reflection of the industrial character of the towns. As a further measure to ensure the comparability of the groups (and hence that the parallel growths assumption is satisfied) I employ a Coarsened Exact Matching procedure (Iacus et al., 2012).

I then test whether the government spending per capita in unincorporated and incorporated towns would have been higher in the absence of the democratic reform, using annual data between 1883 and 1902. The results show that the reform had a negative effect on spending per capita relative to the control group of previously democratic towns. Extending political power to the poor led to a lower level of spending than would have occurred under the less democratic governance system.

This finding indicates that, in contrast to many theoretical models, democratic reform led to a reduction in the growth of government expenditure. However it does not provide any evidence of where the impetus for greater public spending actually came from. To

[3]I exclude towns that became incorporated after 1883.

isolate the mechanism through which expenditure was reduced, I proxy for the degree of middle-class control of each town using the estimated distribution of servants in households in each district. I define a household as "elite" if they contained at least one servant, and then disaggregate between middle-class elites (those with one servant) and upper-class elites (more than one servant)—definitions corresponding to contemporary definitions of social class (Booth, 1903). I then estimate the ratio of middle-class to upper-class households in each district.

I use this ratio to distinguish between councils that were controlled by the "middle class" and those controlled by the "upper class" before the 1894 reform. I find that the reform had a strong negative effect in middle-class-controlled towns but little evidence that it had any effect in the upper-class-controlled towns. These results are robust to different definitions of middle-class control, and to different specifications.

Having established the negative effect of the reform, I examine the dynamics of the reform in more detail. I show that the effects of the reform grew over a number of years following the reform; consistent with an explanation where the newly reformed governments were less willing to start spending on new items. Additional tests show that the results are robust to the inclusion of town-specific time trends as well as allowing for different time trends according to the characteristics of the towns at the beginning of the analysis period.

This paper contributes to a large literature analyzing the expansion of the franchise on the growth of government. Much of that literature has found evidence broadly consistent with the hypothesis that democratic reform leads to larger government spending. Many of these studies study expenditure on either social transfers (e.g., Lott and Kenny, 1999; Aidt et al., 2006; Aidt and Dallal, 2008; Abrams and Settle, 1999; Lindert, 2004) or nationally-funded education services (e.g., Stasavage, 2005; Brown and Hunter, 2004; Baum and Lake, 2003; Harding and Stasavage, 2014), rather than the infrastructure investments and public services that are the focus of this paper. The few studies that have tested the relationship

between democratic reform and expenditure on infrastructure spending have not, however, identified such a clear cut effect of franchise extension on the provision of public goods. Husted and Kenny (1997) find no effect of the expansion of the voting franchise on "non-welfare" services. Similarly, female enfranchisement had no effect on investment in sanitation infrastructure between 1905 and 1930 (Miller, 2008).

The theory in this paper also relates to studies predicting the existence of an "ends-against-the-middle" coalition in government spending. Epple and Romano (1996a,b) show that such a coalition exists where the rich are able to use private services to substitute for publicly goods. I argue that such substitution is not possible in the case of the infrastructure—such as sewer systems, water supply, and roads—examined in this study. In addition, several studies have found empirical evidence that the poor may oppose public spending (e.g., Brown, 1988; Harding and Stasavage, 2014; Bursztyn, 2013). In the nineteenth-century British context, Aidt et al. (2010) find evidence of a "retrenchment" effect, whereby the middle class opposed expenditure on public goods but the poor support spending. However, using a much larger dataset Chapman (2017) finds that public goods expenditure was highest at a franchise of around 50% of the adult male population, indicating that the poor opposed greater spending on public goods. By using the 1894 reform as an exogenous change to council governance, this study is able to provide stronger causal inference than these previous papers.

1 Theory and historical background

In this section I present a simple model to analyze the demand for government spending on public goods when citizens require a minimum subsistence bundle and government is unable to engage in redistribution. Under these conditions, I show that government spending on public goods is highest when the median voter is in the middle class—that is, neither too

rich, nor too poor. As a result democratic reform increasing the power of the poor at the expense of the middle class leads to lower expenditure on public goods. I then explain how the situation in nineteenth-century Britain meets the assumptions of the model both in terms of the institutional structure and the importance of the subsistence constraint.

1.1 Framework

Consider an economy consisting of individuals i with income y_i. There is a continuum of citizens of measure 1. Citizens are divided into two classes, the "poor", denoted P with measure λ and the "elite", denoted E with measure $1-\lambda$. Citizens' incomes in each class are distributed according to continuous cumulative distribution functions F_P, defined over $[\underline{y_P}, \bar{y_P}]$, and F_E, defined over $[\underline{y_E}, \bar{y_E}]$. The median income of poor citizens is denoted y_P and that of elite citizens is y_E. The mean income of the population is denoted as $\bar{y}$. I constrain the degree of overlap in the income distribution between the two groups by assuming that $\bar{y_P} < y_E$ and $y_P < \underline{y_E}$. That is, no citizen in the poor group has an income greater than the median elite citizen, and no citizen in the elite has an income less than the median poor citizen.

Each individual receives utility from private consumption c and from per capita expenditure on a local public good g. To model consumption at low levels of income, utility over consumption is represented by a modified Stone-Geary function (Geary, 1950; Stone, 1954), including a subsistence constraint below which consumption cannot fall.[4] At an extreme, this could reflect an individual requiring food to survive. However, it could also reflect a desire for better quality of food (for instance replacing carbohydrates with meat or vegetables), access to shelter or, more generally, any minimum expected consumption level.

[4]The Stone-Geary utility function has been widely used in the economic literature including, of particular relevance in this context, to examine the relationship between poverty and economic growth. See, for example, Steger (2000); Ravn et al. (2008); Ogaki and Zhang (2001); Kraay and Raddatz (2007). Matsuo and Tomoda (2012) use a Stone-Geary utility to examine investment in education, while Achury et al. (2012) examine the relationship between a subsistence constraint and savings.

The utility of each individual i is assumed to take the following form:

$$U_i = \begin{cases} \frac{(c-\underline{c})^\gamma}{\gamma} + v(g), & \text{if } c > \underline{c}; \\ -\infty, & \text{otherwise.} \end{cases}$$

where $\underline{c} > 0$ represents a subsistence constraint, and $\gamma \in (0, 1)$ is a parameter of the utility function. Utility from the public good is represented by the function $v(\cdot)$, which is assumed to be strictly concave, continuous and twice differentiable. I also assume $v'(x) > 0$ and $\lim_{x \to 0} v'(x) = +\infty$.

The public good is funded through a linear tax rate $\tau \in [0, 1]$, leading to a government budget constraint of $g = \tau \bar{y}$, where $\bar{y}$ is the average income in the population. Individual consumption is thus $c_i = y_i(1 - \tau)$.

The implemented tax rate and level of government expenditure are decided by a two-candidate election in which candidates' promises are binding.

1.2 Democratic reform and public goods expenditure

Democratic reform is modeled as the extension of voting rights to poor citizens. Specifically, I analyze a situation in which before the reform only citizens in the elite have the right to vote. After the reform, in contrast, all citizens have the right to vote.

I start by presenting the proposition derived from the model and then provide more intuition and a sketch of the proof below.

Proposition 1. *Denote the level of government spending per capita before the reform as* g_0 *and after the reform as* g_1*, and denote the change from pre- to post- reform by* $\Delta g = g_1 - g_0$*. Then there exists* $\tilde{y}$ *and* $\hat{y}$*, with* $\tilde{y} > \hat{y}$ *such that:*

1. *If* $y_P < \hat{y}$ *and* $y_E < \tilde{y}$ *then* $\Delta g < 0$*.*

2. *If* $y_P < \hat{y}$ *and* $y_E \geq \tilde{y}$ *then* $\Delta g \geq 0$*, with* $\Delta g > 0$ *if* $y_E > \tilde{y}$*.*

3. *If* $y_P \geq \hat{y}$ *then* $\Delta g \geq 0$*, with* $\Delta g > 0$ *if* $y_P > \hat{y}$*.*

The proposition states that the effect of democratic reform on the level of government spending per capita depends on the incomes of both the elite and the poor. Point 1 states that when both the median income of the poor is relatively low and the median elite voter is not "too rich" then transferring political power to the poor leads to lower government spending on public goods. When the median elite voter is richer, however, the effect of reform is to increase spending (point 2). Similarly, if the median poor citizen is not "too poor" then democratic reform is followed by an increase in spending (point 3). In other words, in the presence of poor voters, spending is highest in the case when the median voter is "middle class" before democratic reform.

Sketch of the proof The proof of the proposition (included in the Online Appendix) proceeds by first analyzing the preferred level of government spending as a function of individual income, before moving on to the election outcomes. In particular, it shows that there is a unique income, $\hat{y}$, at which the preferred level of government spending is maximized. Intuitively, both the wealthy and the poor face a trade-off between the level of public goods provision and their private consumption on items such as food and shelter. Since the tax rate implemented is a proportional tax, the absolute tax burden is increasing in income. However, citizens with a low income will benefit significantly from an additional unit of

private consumption since they are close to the lower bound $\underline{c}$. As such both the rich and the poor have an incentive to desire lower government expenditure than the middle class.[5]

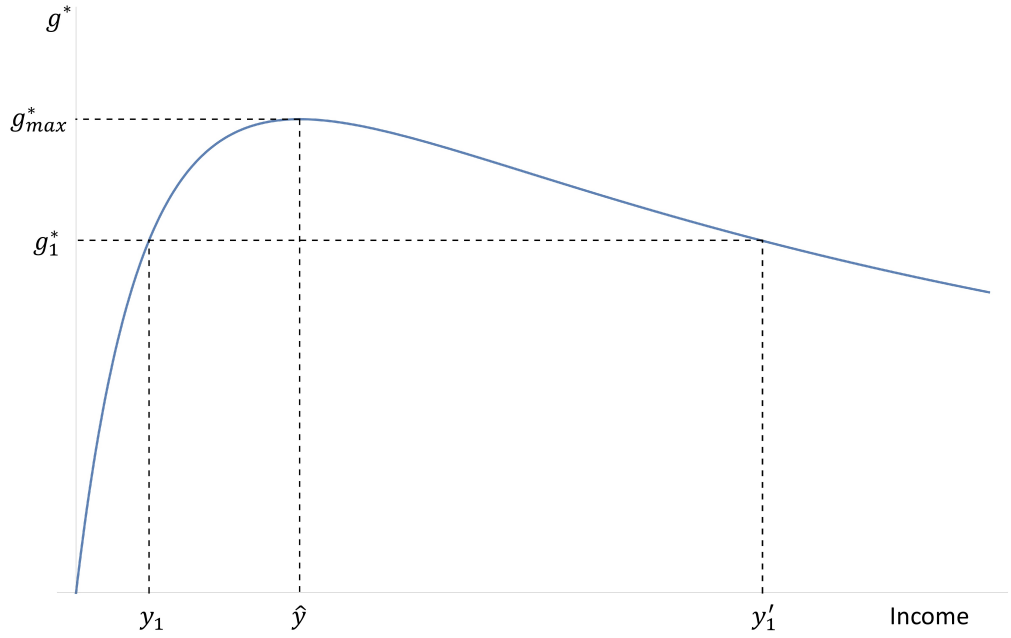
Figure I displays the relationship between the desired level of government expenditure and individual income y_i for an example utility function. As the figure illustrates, there is a level of income, $\hat{y}$, at which the preferred level of government spending is maximized; both poorer and wealthier citizens prefer lower expenditure on public goods. Further, for each level of income $y_i < \hat{y}$ there is a corresponding higher income $y_i^{'}$ at which the tax rate desired is the same. For instance, in the figure an individual of income y_1 desires the same level of government spending as an individual with income $y_1^{'}$.

Having identified the preferred individual outcomes, the proof proceeds by applying the Median Voter Theorem to the elections before and after reform. The relationship depicted in Figure I makes clear that the median voter may not be the same as the citizen with the median income. Case 1 and 2 of the proposition define $\tilde{y}$ as y_P', and then distinguish the cases where the median elite voter prefers a higher or lower tax rate than the median poor voter. In case 1, there is a coalition between the newly enfranchised poor and the wealthy members of the elite that desire lower taxes (those with income greater than y_1' in the figure). In case 2 however, more than half of the poor desire higher spending than before the reform. Thus no such anti-spending coalition is formed. Case 3, in contrast, analyzes the situation in which the median poor citizen is relatively rich. In this case the outcome is a more typical Meltzer-Richard result whereby the result of the reform is to add poorer voters that desire a higher tax rate than

[5]Chapman (2017) shows that the inverted-U-shape relationship feature between the preferred level of spending and income is related to the magnitude and derivative of the coefficient of relative risk aversion of $u(\cdot)$. See Appendix A for further details.

the elite.

Figure I: The model predicts an inverted-U-relationship between individual income and the desired level of government spending per capita.



Note: Figure displays the optimal level of per capita government spending (g^*) according to individual income y_i for the example utility function $U_i = \frac{1}{2}(y_i - 1)^{0.5} + g^{0.5}$, with $\bar{y} = 2$.

Discussion of the model

The tax system in the model is proportional since this closely reflects the nineteenth-century English context, as explained below. However, the insight of the model is not dependent on this assumption: the trade-off between government spending and private consumption is important as long as the poor pay taxation at all. Extending the model to incorporate a simple system of progressive taxation yields the same predictions, as shown in Appendix A.[6] The important assumption is that the marginal utility of consumption increases rapidly at lower levels of income; represented by the existence of the subsistence constraint in the model.

[6]The statement of the proposition remains the same except with an additional condition on the income of the poorest elite voter. See Appendix A for full details.

It is also interesting to consider how the model here relates to that of Lizzeri and Persico (2004) which suggests that elites are willing to extend the franchise in order to induce parties to offer higher spending on public goods. In their model, parties can offer any menu of taxes and transfers meaning that electoral platforms are not affected by the initial income distributions. Limiting the set of possible taxes and transfers, as in this paper, has two effects. First, income heterogeneity matters to vote choices (since it determines final consumption). Since new voters are poorer they also are highly responsive to additional income and hence, lower tax rates—in contrast to Lizzeri and Persico's Assumption 1 that newly enfranchised voters are less politically responsive than the originally enfranchised elites.

The second difference is that the tax system in this paper prevents either group (the elite or the poor) from increasing taxes on the other without paying more taxes themselves. Were they able to do so to some extent then the outcome of democratic reform on spending may be different: the poor may, for instance, choose to "soak the rich".

1.3 Historical background and theoretical assumptions

The British setting is valuable because, as I explain in detail below, it closely meets the model framework. Four assumptions in particular are important. The first two relate to the institutional structure. First, that all voters paid tax and that the progressivity of the tax system cannot be changed following any governance reform and, second, that government revenue could only be spent on the provision of public goods, rather than on redistribution (such as transfers). The final two assumptions relate to the assumed utility function—that government spending was truly a "public" good, in the sense of benefiting all citizens and, finally, that voters' consumption bundles were such that an additional unit of income would be extremely valuable near some baseline level of consumption.

Taxes fell on all citizens Town councils were responsible for funding their own expendi-

ture, with limited financial support from central government.[7] Consequently towns' ability to invest was "closely circumscribed by local wealth and income" (Millward, 2004, p.35). Capital investments had to be funded out of debt; making the cost of borrowing a potential disincentive to greater spending. The primary source of revenue available to towns was local taxation, but councils faced considerable limitations in the tax that could be raised.[8] Taxes could only be raised on "immovable" property, and as such towns were constrained by the "rateable value" of the property in their district, defined according to the rental value of land and buildings in the district. Councils were unable to amend this system which was the well–established basis for local taxation in Britain.

Tax fell on all occupiers of residential and commercial property, with citizens only exempt through poverty. Importantly, councils could impose only a proportional tax rate on the value of that property—there was no opportunity to tax more valuable property at a higher tax rate. In general all property was taxed according to the full rateable value. While a few forms of property which were thought to benefit less from improvements were assessed at a lower rate—including agricultural land, railways, and land covered with water or woodland—in general a 1901 Commission concluded that "differentiation between properties, according to their value, or graduation, seems never to have tried in England" (Royal Commission, 1901, p.5). Furthermore, the exceptions that did exist were determined at a national level and were not controlled by local councils.

The major role of the council was thus to decide the level of taxation as a proportion of the property value. This role meets the assumption of the model of proportional taxation if the percentage of income spent on property was approximately proportional to income. Appendix Table B.2 lends some support to this assumption, with the share of income spent

[7] Appendix B.3 contains more detailed discussion of the revenue sources available to towns, including the sources of support that were available from central government.

[8] The discussion of local taxation in this section is based primarily on the summary provided in Royal Commission (1901), particularly pages 1–6.

on rent falling only gradually as incomes increased. All heads of household were expected to pay taxes and, further, there was a direct connection between voters and payment of taxes since those citizens who were unable to pay were disqualified from voting. As such the assumption of proportional taxation applies well within the population of voters.

Within this broad framework, one complication is that local councils also had the power to implement "compounding" whereby landlords of low-value property paid taxes on behalf of their tenants (Royal Commission, 1901, pp.50–51). The rationale for this system was that collecting taxes from poor renters was costly both due to the small amounts involved and the fact that the poor tended to change address frequently. In return, the landlords received a discount on the taxes due (generally between one-third and one-fifth of the total amount).

The existence of compounding complicates the relationship with the model assumptions in two ways. First, it muddies the question of where the incidence of taxation fell; while occupiers were legally responsible for paying the rates, it could be that landlords were constrained in their ability to pass the tax onto the tenants. The incidence of the taxation was, in fact, disputed at the time (for instance see the conflicting evidence in Royal Commission (1898) articles 6707–6722 as opposed to that in articles 6491–6497), but some evidence presented below indicates that the poor were at least aware of the tax burden associated with greater spending. Further, Rowntree (1901, p165) in his survey of York includes the rates in his calculation of rent expenditure for all households, even where the rates were paid by the landlord, suggesting that these taxes were a burden on all citizens.

The second issue relating to compounding is that, at least in theory, it provided a way that councils could reduce the financial burden on poorer tenants by a small amount. That is, even supposing that the tax was passed on completely by landlords to tenants, the deduction allowed to landlords would mean that poorer tenants paid a lower rate. However, this would be, to an extent, counterbalanced by the fact they paid a higher fraction of their income in rent (see Appendix Table B.2). As such, the assumption of proportional taxation remains

reasonable in this context. Further, the assumption of strictly proportional taxation is not critical to the theoretical predictions; Appendix A.3 shows that a similar proposition holds when the model is extended to include a simple progressive taxation schedule.

Town councils were limited to spending on public goods Town councils, rather than the Westminster parliament, were primarily responsible for expenditure on urban infrastructure in the second half of the nineteenth century. After 1875 councils were able to decide expenditure on a wide range of public goods, including (amongst other items) roads, sewers, water supply, baths, and gas supply (see Appendix B.3 for a more detailed breakdown of council spending).

Equally important to the theoretical argument are the types of expenditure councils could not control. They did not hold responsibility for welfare expenditure (that is poor relief) or expenditure on education (Lizzeri and Persico, 2004).[9]

Public goods were of general benefit Importantly, much of the expenditure on public goods was on items that were of clear value to individuals of all income, since they contributed directly to public health improvements—local government infrastructure investment was responsible for a large share of the decline in mortality rates between 1861 and 1900 (Chapman, 2018; Szreter, 2005). By contributing to public health they were non-excludable; health reformers desired improved sanitation because it improved the overall disease environment of a town, rather than merely improving their own health. At this time, it was very difficult for higher social classes to escape the potential for disease created by poor sanitation since "many elements of sanitary condition—water supply, drains, muck in the streets, odors, facilities for relieving oneself, complexion and stature of the people—were truly public" (Hamlin, 1998, p.281). As a result health investments benefited all social classes within a town, as evidenced by the fact that the life expectancy of different social classes moved

[9]Welfare expenditure was controlled by Boards of Poor Law Guardians, who were elected separately on a graduated franchise, with district boundaries which often differed substantially from those of the town councils. Education spending was also determined separately by local School Boards.

closely together after 1870 (Lizzeri and Persico, 2004).

Additional private consumption was extremely valuable to the poor The final assumption relates to the relative importance of an additional unit of private consumption to the very poorest. Given the benefits of infrastructure such as sewers and water supply, it is important to understand the trade-offs that the poor would have faced if they voted for higher taxes: is it reasonable that voters would have preferred private consumption to these public goods? Gazeley and Newell (2011) estimate that in 1904 26% of all male-headed working households in Britain were in absolute poverty. For these households at least, the cost of additional taxation in terms of consumption would be high. Analysis in Appendix Table B.2 shows that amongst families with incomes up to twice the poverty line, around 50% of income was spent on food and around 85% was spent on food, clothes, rent and fuel combined.[10] For comparison, World Bank data for modern developing countries shows that in 2010 consumers in the lowest consumption segment spent 79% of their consumption on these four categories plus transport.[11]

It is difficult to get data regarding the views of the poor in Victorian Britain. While historians have identified opposition of ratepayers to higher taxation expenditure on public goods (e.g., Hennock, 1973; Offer, 1981; Yasumoto, 2011), noting particularly the role of small property owners, they do not discuss the attitudes of the poorest ratepayers. There is however fragmentary evidence that the poor opposed greater expenditure. Hamlin (1998) states that in one Welsh town "workers were willing enough to admit they were killing themselves, but they saw immediate income as more important than environmental quality" (p.298). In Toxteth in 1877, a pro-expenditure council was elected against the wishes of the popular majority only because wealthier citizens had multiple votes (as per the graduated

[10]This information is based on an analysis of the survey data collected by the United States Commissioner of Labor in 1889 and 1890 obtained from Haines (2006). Additional details of the dataset and construction of the expenditure shares is included in the text surrounding the table in the appendix.

[11]Figures based on download from http://datatopics.worldbank.org/consumption/ on August 31, 2017.

franchise described below).[12] The masses were, at least in some cases, opposed to growing government.

Further, this historical evidence is supported by evidence from modern developing countries showing that citizens are unwilling or unable to spend on sanitation goods while facing severe consumption constraints (Sachs et al., 2004, p.7). Olken (2010, Table 3) asked Indonesian citizens to choose between public goods projects, and found that the demand for sanitation and water was highest amongst the middle two quartiles of the income distribution. The poorest quartile, on the other hand, preferred access the provision of irrigation and roads—goods which could improve income rather than health.

1.4 Democratic reforms to town councils

Each town council across England and Wales was elected by voters within each district, under an electoral system determined at national level. However, the regulations under which councils were elected varied across the country and over time.[13] The key distinction in our case is between the councils of incorporated towns—the so-called "municipal boroughs"—and unincorporated towns. Incorporated towns were, throughout our period, governed by a standardized system of locally elected councils.[14] Councils were elected annually (with one-third of councilors replaced each year) on the basis of one-household-one-vote under a secret ballot, by an electorate consisting of all heads of household subject to residence and

[12]Source: The Liverpool Mercury *Local Board Elections*, April 9 1877. This is the only local council election result I have found with information as to voting breakdown according to the class of voters.

[13]The discussion in this section is based largely on Keith-Lucas (1952) who provides a detailed discussion of the changing local government institutions. See particularly Chapter 3 in relation to the incorporated towns and pp 40–41, 112, 138 and 234 in relation to the unincorporated towns.

[14]Specifically, they were governed under the basic framework established by the 1835 Municipal Corporations Act. It is these councils that are the focus of the discussion in Chapman (2017), Aidt et al. (2010) and Lizzeri and Persico (2004). More discussion of the politics of the growing expenditure in these towns (although focused on the larger incorporated towns) can be found in Hennock (1963, 1973); Wohl (1983) and Waller (1983).

tax-paying requirements.[15]

Unincorporated towns, on the other hand, were elected under a graduated franchise with no secret ballot. Under this system voters could receive up to twelve votes depending on the amount of property occupied and owned. Specifically, voters received 1 vote if the property they occupied was rated for tax purposes at under £50 per annum, 2 votes if it was rated between £50 and £100, continuing up to a maximum of six votes if the property exceeded £250 per annum in rateable value. Similarly property owners would also have the right to vote on the same basis and so those owning *and* occupying property could receive up to twelve votes.

This distinction in electoral practice was maintained until the 1894 Local Government Act, which standardized a system of one-household-one-vote, with the secret ballot, across all towns. This Act is used as the treatment event in the difference-in-difference analysis below.

1.5 Incorporated versus unincorporated towns

Before embarking on the difference-in-difference analysis it is crucial to understand the reasons underlying the difference between incorporated and unincorporated towns. A town was "incorporated" if it held a royal charter. Historically, these charters were granted to market towns by monarchs dating back to the medieval ages. These charters provided a mark of status to a town and granted additional rights that varied across towns (for instance, the right to hold a court). The result was a set of incorporated towns at the turn of the nineteenth century that were extremely varied both in their activities and their scope.

[15]Residents could vote on the basis of occupying (and paying tax on) business, rather than residential, property. If listed as the taxpayer for a property, then women could vote in both incorporated and unincorporated towns throughout the period of analysis. Married women were not legally able to vote in incorporated towns due to an 1872 legal decision (Keith-Lucas, 1952, pp. 166–7). However, this restriction would have affected few married women in any case, since it relied on their owning or occupying their own property separately from their husband (Rover, 1967, p.27). See Appendix B for further discussion of the rights of married women during the period.

However, this situation was changed by the 1835 Municipal Corporations Act. This Act standardized both the set of powers and the system of governance present in incorporated towns. Furthermore, it created a procedure under which towns could apply for incorporated status allowing newer industrial towns a path to incorporation. The result of these changes was that the set of incorporated towns was extremely varied, with most having gained incorporation status for reasons orthogonal to the concerns of citizens in nineteenth-century England. I analyze this variation and compare the characteristics of incorporated and unincorporated towns in section 3.3.

The set of unincorporated towns includes all other towns defined as "urban sanitary districts" under the Public Health Acts of 1872 and 1875. Crucially, these towns held the same powers and responsibilities for infrastructure expenditure as the incorporated towns.[16] However, incorporated towns did have some additional responsibilities (particularly in terms of local policing and justice—see Appendix B for more detail), and consequently *total* expenditure per capita by incorporated town councils was consistently higher.

2 Data

The data consists of two major parts: the financial data relating to annual town revenue and expenditure; and demographic information drawn from decennial censuses. I discuss each in turn below, and define some key variables used in the empirical analysis.

[16]The powers attributed to the largest incorporated towns did change after 1890 and so these towns are excluded from the empirical analysis as discussed in Section 3.3.

2.1 Financial data

2.1.1 Data sources and sample

The main part of the dataset is drawn from the annual accounts of all the town councils ("urban sanitary districts") responsible for sanitary expenditure between 1883 and 1902. These accounts were reported by parliament in the *Local Taxation Returns* throughout this period, and provide a detailed disaggregation of the sources of revenue and types of expenditure in each town.[17] A panel dataset was constructed by hand-matching towns between years to account for variations in place names over time. The financial year for town councils ended in March; for convenience in the charts and tables I often refer to financial years by the calendar year in which they began (and hence in which most of the calendar year occurred). For example, the financial year 1893–94 is thus referred to as 1893.

For the purposes of this paper I include only towns that were reported in the accounts between 1874–75 and 1910–11, in order to avoid any concerns regarding either changes in the composition of the sample during the period, or complications associated with towns that were beginning to spend for the first time and hence involved in a period of "catch up". This decision excludes two major groups of towns: newer industrial towns that became sanitary authorities after 1875, and smaller towns that merged with expanding larger towns (and hence stopped being independent sanitary authorities). Together, the excluded towns reflect a relatively small part of the urban population of England and Wales.[18]

2.1.2 Financial variables

Council expenditure

The main dependent variable is the annual total *current* expenditure per capita by town

[17] The *Local Taxation Returns* form part of the Parliamentary Papers collection; a full list of the papers used is available from the author upon request.

[18] The included towns represent 79% of the population of urban areas reported in the 1881 census, and 73% of the urban population reported in the 1891 census.

councils. Current expenditure is identified as expenditure by councils "not out of loans" in each year. I use current expenditure to avoid issues associated with volatile infrastructure investment, which creates "spikes" in the expenditure data series. Current and investment expenditure are separated in the annual accounts from 1883 onward, and hence this period is used in the analysis.[19]

The current expenditure measure consists predominantly of expenditure on public goods and services including streets, sewer systems, water supply, refuse collection and gas supply. It also includes spending on servicing loans (interest and principal repayment), meaning that the measure captures the ongoing cost of infrastructure expenditure even though the one-off expenditures are not included.

Council revenue

I use four measures of revenue. Tax receipts are measured as the total revenue from property taxes (the "rates") for each town. Second, I include the revenue from property, including both rents and property sales. The third revenue measure includes grants from both the central government and county councils. Finally, I measure revenue from "tolls" which includes revenue from various fees (e.g. from markets), fines, and penalties. See Appendix B.3 for further discussion of the revenue sources available to towns.

Rateable value per capita

The dataset includes the rateable value—that is the value of the property tax base—for the majority of years in the dataset.[20]

[19]Since we are interested in the amount of public goods and services provided, ideally we would adjust for changes in the input prices local governments faced. However, existing price indices during the 1890s are very volatile and hence add extreme fluctuations to the data (for instance, the Rousseaux price index shows a 10% fall in prices between 1893 and 1894). Further, it not obvious which is the most appropriate price series to use in this instance. More detailed discussion of this issue is contained in Appendix C.

[20]Incorporated towns sometimes reported a separate rateable value as municipal borough authorities and as sanitary authorities: I use the maximum of the two.

2.2 Demographic and weather data

Information regarding town population and the number of houses in each town is drawn from the reports of the decennial census between 1851 and 1911. Information for the years 1851–1901 was collected directly for the purposes of this project. For the 1911 census I use the parish-level data coded previously by Southall et al. (2004) and stored at the UK data archive.

In addition to these demographic variables, I use information from the 1881 census to identify the occupational structure of each town. A 100% sample of the 1881 census is available from the North Atlantic Population Project (Minnesota Population Center, 2008; Schürer and Woollard, 2003). This dataset identifies the occupation, age, labor force status and place of birth for each resident. I use this dataset to identify the proportion of the work force in various occupations, including agriculture, domestic service, and industry and mining.

Unfortunately, the census does not identify the current town of residence; rather it identifies the parish and registration sub-district in which each individual lives. I therefore match each town to registration sub-districts in the 1881 census. In some cases, the town falls entirely within a single sub-district, in which case I assign the value in that sub-district to that town. In others, towns were split across registration sub-district boundaries. In those cases I estimate town characteristics by weighting according to the proportion of the town in each of the registration sub-districts.

To control for variation in weather I connect the town-level data to existing datasets containing annual reconstructions of seasonal temperatures and precipitation on a 0.5 degree (approximately 50 kilometer by 50 kilometer) grid.[21]

[21] Seasonal temperature data is taken from Luterbacher et al. (2004) and Xoplaki et al. (2005). Seasonal precipitation data is taken from Pauling et al. (2006). These datasets reconstruct weather patterns using climate proxies (e.g. tree ring series) and historical records.

2.3 Measuring middle-class control

A key part of the paper is to distinguish between the effect of democratic reform in removing control from the rich versus removing control from the middle class. Ideally I would identify the proportion of voters receiving each weighting of votes in each town (from one to twelve), but unfortunately this information is unavailable with few, if any, poll books from elections of town councils available (Gibson and Rogers, 1994). Instead, I approximate the relative power of the middle class using the 100% sample of the 1881 census discussed previously.

In particular, I identify the "elite" in each town as represented by the households with one or more servants living in the household. I then distinguish the "middle-class elite" as households with only one servant (8.2% of households), and the "upper-class elite" as those with more than one servant (4.6% of households). The number of servants employed by a household was used as a contemporary measure of class status: Charles Booth, for instance, defined the "Upper Middle Class" as the "servant-keeping" class in his classic work on London poverty (Booth, 1903).

My measure of the relative power of the middle class is then given by:

$$\begin{aligned} \textit{Middle-class power} &= \frac{\#\text{Middle-class households} - \#\text{Upper-class households}}{\#\text{Elite households}} \\ &= \frac{\#\text{Households with 1 servant} - \#\text{Households with >1 servant}}{\#\text{Households with >0 servants}} \end{aligned}$$

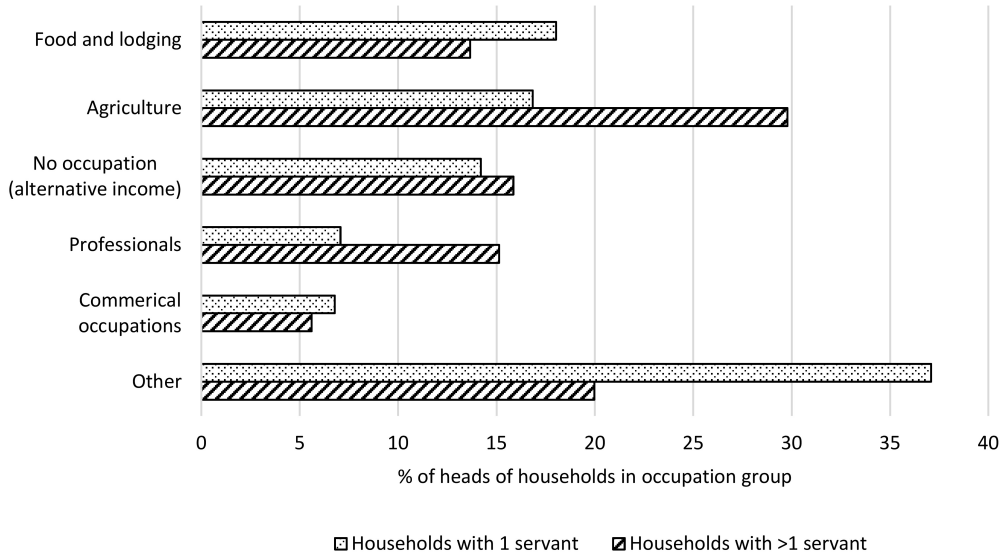
This measure provides an indicator of the relative presence of the middle class within the elite.[22]

Figure II displays the occupational breakdown of the households in each of these two groups (where occupation is defined according to the occupation of the head of household).

[22]Since the number of votes held was graduated at several levels, I could alternatively measure the power of the middle class as the proportion of servants (as a proxy for wealth) in households with one servant. Similar results are obtained using this alternative indicator, as shown in Appendix C.

We can see that, as expected, houses with servants were focused predominantly in agricultural areas, fitting the classic image of a "manor house". This is particularly true of households with multiple servants, as we would expect if the measure is capturing these very wealthy households. It is also notable that a large proportion of households in both groups fall into the category of "no occupation", which captures individuals receiving non-wage income, such as from rent or dividends. We can also see that the group of households with more than one servant is very concentrated within these five occupational categories—around 80% of households are covered, compared to under 65% of the one-servant households. This is likely to reflect the fact that a few successful households in other occupations were sufficiently wealthy to pay for a single servant, but once we reach the higher echelons of society occupations such as the professions represent a much higher proportion.

Figure II: A higher proportion of households with more than one servant were engaged in farming or the professions.



Occupational categories are based on occupational order of head of household in the 1881 census for all households outside of London, using codings reported in Schürer and Woollard (2003). The category "no occupation (alternative income)" refers to the category entitled "Persons without specified occupations" which was predominately composed of those with other sources of income (such as from rent or dividends).

As a further check that the measure is capturing the anticipated differences between

households I examine the occupations where having a servant is particularly common. Table I presents the occupations with the highest proportion of households with 1 servant (top panel) or more than 1 servant (bottom panel). Those with multiple servants are those associated with either the gentry (Peers, MPs, local officials) or the professions (barristers and solicitors) whereas those with only one servant are related to the middle class (such as bank service or brokers).

Table I: The majority of aristocratic and professional households had multiple servants.

Occupation of household head	**% households with**	
	1 servant	**>1 servant**
Bank Service	46	33
Minister, Priest (not established or catholic)	45	12
Roman Catholic Priest	43	44
Chemist, Druggist	40	15
Architect	37	28
Bill Discounter, Finance Agent, Broker	37	22
Pawnbroker	36	12
Accountant	36	13
Banker	10	85
Peer, MP etc	4	82
Clergymen (Established church)	20	72
Army Officer	17	68
Barrister, Solicitor	21	68
Local/county Official	10	67
Physician, Surgeon etc	27	64
East Indian and Colonial Service	16	64

Table indicates the proportion of heads of households in each occupational category that had 1 or more than one servant. The top panel reports the occupations with the highest share of households with one servant. The bottom panel reports the occupations with the highest share of households with more than one servant. Occupational categories are based on occupation of head of household in the 1881 census for all households outside of London, using occupational codings reported in Schürer and Woollard (2003).

3 Empirical approach

3.1 Overview

I use the changes to the electoral system in unincorporated towns implemented by the 1894 Local Government Act to identify the causal effect of the shift of political power to the poor,

using a difference-in-difference approach. As national legislation this Act can be thought of as exogenous to any individual town, particularly since it was not aimed solely at the urban areas discussed here, but also affected Poor Law Unions, rural districts and parish councils.[23] The treatment group in this case is the unincorporated towns while the control group is the incorporated towns that already had a democratic system in place prior to the reforms. The first elections under the new system occurred in November of 1894, leaving little time for the newly constituted council to affect spending expenditure until the following financial year. Consequently, I test whether spending in unincorporated towns was lower, relative to incorporated towns, from 1895 onward. The dataset then comprises twelve pre-reform (1883–1894) and eight post-reform (1895–1902) periods.

The first stage of the analysis is to understand the effect of the reforms on expenditure in all unincorporated towns. I then test whether democratization had different effects in towns controlled by the upper class and those controlled by the middle class using the measure defined in the previous section. After establishing that democratic reform had an effect only in the middle-class-controlled towns, I then examine the dynamic effects of the reform in more detail.

3.2 Specification

The main specifications are of the form:

$$\begin{aligned} y_{it} =& \beta_1 Unincorporated + \beta_2 post1894 + \beta_3 Unincorporated * post1894 \\ &+ \beta_4 X_{it} + \gamma_i + \mu_t + \epsilon_{it} \end{aligned} \tag{A}$$

where i indexes towns and t indexes years. The dependent variables (denoted y_{it}) in the main specifications are the annual current expenditure per capita. $Unincorporated$ is a

[23] See Appendix B for further discussion of the Act including the effects on these other bodies.

dummy variable equaling 1 if the town was not incorporated at the beginning of the period (i.e. 1883)—and hence was affected by the 1894 reforms. The key coefficient of interest is then β_3 which identifies whether the difference between expenditure in unincorporated (and hence undemocratic) towns relative to that in incorporated (democratic) towns changed after the reforms. If, as predicted by classic median-voter models, the shift in power to poorer citizens led to greater expenditure, we would expect $\beta_3 > 0$. If, on the other hand, the poor opposed expenditure because of their desire for greater private consumption, then $\beta_3 < 0$.

In some specifications I include the vector of control variables X_{it}. As discussed below (and displayed in Table II) there are large observable differences in the characteristics of the treatment and control group—particularly in terms of town size and tax base per capita. These differences are a potential concern if they are associated with different rates of expansion in public goods expenditure and consequently a violation of the parallel trends assumption. In particular, large, densely populated cities are more likely to suffer from disease as a result of high contagion in cramped living conditions. Aside from sanitary concerns, there may be other sources of demand for some of the public goods examined here that are also correlated with these town characteristics. Water supply, for instance, was in demand for industrial as well as consumer needs (Hassan, 1985). We might also think that sewer systems (particularly drainage) would be in greater demand in more agricultural areas. Towns may have varied in the cost of public goods provision due to economies of scale. Larger cities may have had lower costs of provision per capita since the fixed costs of (for instance) a water plant would be spread over a wider area. Similarly, there may be cost savings associated with densely populated towns since pipes and streets need to be laid over a smaller area. Higher numbers of people per house mean that several people can be reached for the cost of a single connection to a water main.

To address these issues I include as control variables measures of population, population growth, urban crowding (average number of people per house), and population density. To

allow for a non-linear relationship, each variable is split into "bins" which are entered as a series of dummy variables. I include three variables that may affect town councils' spending capacity: the town tax base ("rateable value") per capita, receipts from property sales and rents per capita, and receipts from government grants per capita. I also control for seasonal temperature and precipitation since warm and dry summers have been identified as causing high infant mortality in the 1890s (Woods et al., 1988). If demand for public goods responded to fluctuations in the mortality rate, then weather patterns may have led to fluctuations in the demand for public spending. Descriptive statistics of the main variables used in the regressions are presented in Appendix Table C.3.

I also include a vector of fixed effects for each year (μ_t) and town (γ_i) in all specifications. The former captures national trends in spending in a flexible way, while the latter captures non-time-varying characteristics of towns that could affect the level of expenditure such as geographical features (e.g. ease of access to a water supply) or the extent of industrial activity within a town. ϵ_{it} is an error term capturing other variables that could affect the level of expenditure—for instance, this could include fluctuations in the local cost of public goods provision.

Specification (A) tests for the effect of democratic reform in reducing the level of spending by the amount β_3 in every year after the reform, relative to the incorporated towns. In practice, however, the short- and long-run effects of reform are likely to differ. Both the size and type of expenditure that local governments were engaged in during this period were expanding rapidly over time, meaning that part of the effect of democratic reform would be to change towns' willingness to take up new public goods. Further, many of the activities undertaken by these governments were likely governed by previous commitments—for instance having built a water system, it would be hard to "turn it off"—meaning that a newly elected council may not have been able to reduce existing expenditure immediately. To examine the dynamics of the effects of the reform I estimate specifications of the following

form:

$$y_{it} = \beta_1 Unincorporated * timePost1894 + \beta_2 Unincorporated * timePost1896 + \delta X_{it} + \gamma_i + \mu_t + [T_{it}] + \epsilon_{it} \quad \text{(B)}$$

where $timePost1894$ takes values of $(year - 1894)$ for all years after 1894, and 0 otherwise. Similarly $timePost1896$ takes values of $(year - 1896)$ for all years after 1896, and 0 otherwise. Whereas specification (A) imposes a discrete shift in annual per capita spending after 1894, specification (B) allows for the effect of the reform to increase (or decrease) over time by allowing for different responses in the two years immediately after the reform and subsequent years.

Specification (B) also has the advantage that it allows me to accurately control for town-specific trends, denoted T_{it}. The differences in observable characteristics between the two groups documented in Table II provide reason to be concerned that the parallel trends assumption could be violated. While tests reported in the following section suggest the assumption is valid, controlling for town-specific time trends provides further reassurance that the findings are, in fact, driven by the 1894 reform and not pre-existing differences in trends. However, in a setting with a non-discrete dynamic response to the treatment it is not appropriate to include time-specific trend variables in a specification such as that in equation (A), since the coefficients will partly capture the dynamic response of the treatment (Wolfers, 2006). That is, the town-specific trends will capture differences in the trend of expenditure both pre- and post-reform. Specification (B), on the other hand, identifies pre-existing trends accounting for any change in trend resulting from the reform.

A further possibility is that the changing pattern of expenditure varies according to the underlying characteristics of towns. For instance, the demand for public goods in denser or more industrial areas may change over time in different ways to that in less dense or more

agricultural areas. To address this issue, in some specifications I allow for complex time trends varying according to a number of town characteristics, measured before the analysis period.

3.3 Identifying assumptions and sample balance in observable characteristics

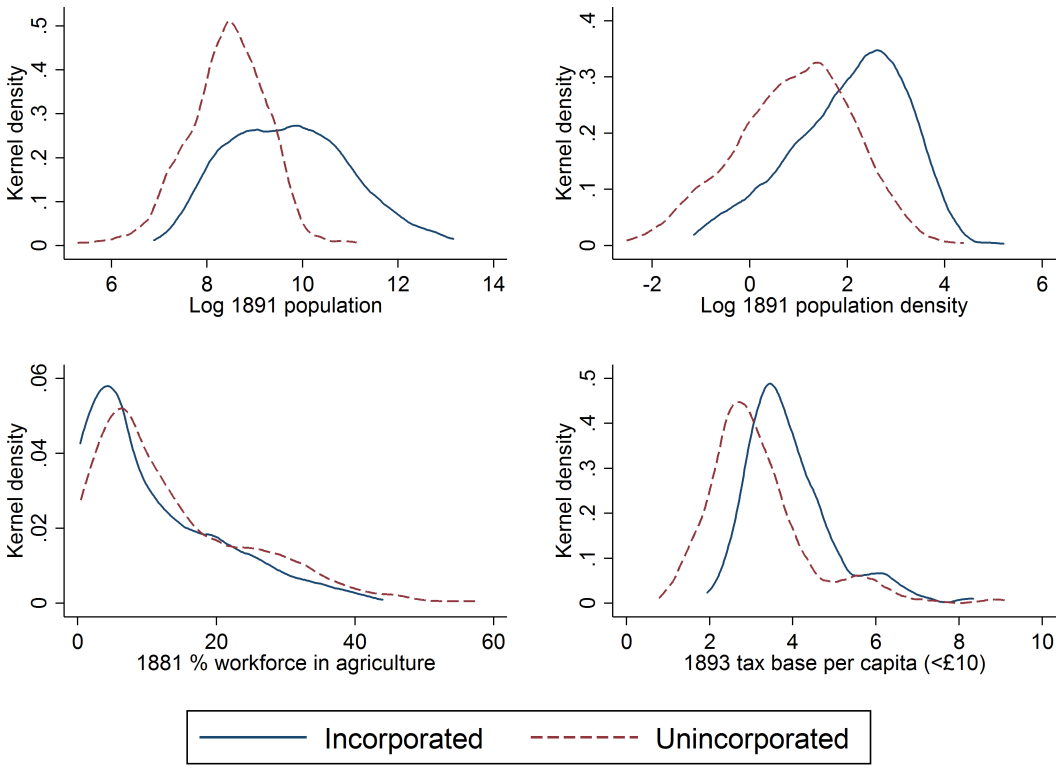
The identifying assumption underlying this approach is that the difference in the level of spending between the two groups of towns would have been constant in the absence of the 1894 reform. Unfortunately, we do not have a clean natural experiment where towns were allocated into different groups at random: towns did not select into incorporation status arbitrarily. However, this does not invalidate the identifying assumption as long as the factors affecting that selection were unrelated to the spending decisions in the 1880s and 1890s.

As explained previously most incorporated towns became incorporated as a result of royal decisions that, in some cases, stretched back to the medieval period. These towns were extremely heterogeneous and, I argue, had become incorporated for a set of reasons that had nothing to do with their situation in 1883 (when our analysis starts). Evidence for this claim is provided by how varied these towns were—ranging from very large industrial towns (such as Liverpool) to extremely small rural towns.

Figure III illustrates the heterogeneity of town characteristics. Each panel in the figure displays the distribution of a different town characteristic for incorporated and unincorporated towns separately. The top two panels indicate that although the incorporated group (the solid blue line) included a higher proportion of both large and very dense towns, there is also a set of incorporated towns that were similar in both size and density to unincorporated towns.

Importantly, the bottom left panel shows that there is very little difference between incorporated and unincorporated towns in terms of the percentage of workforce employed in agriculture. This supports the claim that incorporation status was not a reflection of the industrial status of the town. Finally, the last panel indicates that there was also extensive overlap in the size of the per capita tax base across the two groups.

Figure III: Extensive overlap in the characteristics of incorporated and unincorporated towns.



Note: Including 691 towns of which 259 were incorporated in 1893. For display purposes 5 unincorporated towns with rateable value per capita >10 are excluded.

However, there is a concern that some towns became incorporated during the period of our analysis, leading to an expansion of their spending powers and responsibilities—clearly affecting the trend in spending. Further, the powers of the largest towns were expanded in 1890.[24] Since this change occurred during the period of our analysis and applied only to

[24]Specifically, the largest towns became County Boroughs in 1890, which involved gaining control of different items of spending, including education and funding of roads elsewhere.

previously incorporated towns, it directly violates the assumption of parallel trends. As such I exclude these towns from the sample.[25]

Another potential issue is that even though selection into incorporation status was not directly driven by a desire for greater town spending, it may be correlated with other factors that did affect spending decisions. As demonstrated by the top panel of Table II, there are large differences in the observable characteristics of the incorporated and the unincorporated towns. Incorporated towns tended to be larger on average, and included all the very large towns. They also tended to be wealthier and denser. Although these differences are mitigated by removing those towns which gained additional powers after 1883, there remain clear disparities between the two groups (second panel).

The differences between the two groups are of concern only if they violate the parallel trends assumption. Even if wealthier and larger towns spent more, this is not an issue as long as the difference in spending would have remained constant over time in the absence of the reforms. Although this assumption is plausible, there are some conceptual reasons that could lead to differences in the growth of spending between different types of towns. For example, the parallel trends assumption could be violated if there are types of towns in the incorporated group that are not represented at all in the unincorporated group, since these towns may implement new technologies more quickly, leading to divergences in trend expenditure.

To address these concerns, I improve the sample balance of town characteristics further by constructing a matched sample using Coarsened Exact Matching (Iacus et al., 2012). Specifically, towns are only included in the analysis if there is a match on four characteristics: population (in three categories "<1000", "1000-20000" or ">20000"), per capita rateable value, 1891 population density (each in 4 quantiles) and the estimated proportion of the

[25]The results are similar excluding all towns incorporated after the 1835 Municipal Corporations Act; see Appendix C.7 for details.

Table II: Sub-samples are more similar after matching exercise, but still significant differences in average population and percent of the workforce engaged in industry and mining.

	Unincorporated		Incorporated		t-test	
	N	**Mean**	**N**	**Mean**	**Diff.**	**S.E.**
Whole sample						
1891 population	432	6349	259	39033	-32684	3429
Urban crowding	432	4.91	259	5.00	-0.09	0.05
Population growth	432	1.0	259	0.9	0.1	0.12
Population density	432	4.84	259	13.47	-8.63	0.90
Occupation Service (%)	432	16	259	18	-2.04	0.59
Occupation Agriculture (%)	432	14	259	11	2.96	0.84
Occupation Industrial (%)	432	31	259	19	11.26	1.70
Rateable Value p.c.	432	3.25	259	3.92	-0.68	0.11
Excluding towns changing governance						
1891 population	418	5651	160	13238	-7587	613
Urban crowding	418	4.90	160	4.83	0.07	0.06
Population growth	418	0.9	160	0.6	0.4	0.14
Population density	418	4.54	160	10.21	-5.68	0.95
Occupation Service (%)	418	16	160	19	-2.89	0.69
Occupation Agriculture (%)	418	14	160	13	0.44	1.00
Occupation Industrial (%)	418	31	160	17	13.98	2.03
Rateable Value p.c.	418	3.23	160	3.82	-0.59	0.13
After matching						
1891 population	321	6202	120	7963	-1762	446
Urban crowding	321	4.95	120	4.76	0.19	0.06
Population growth	321	1.1	120	0.5	0.63	0.16
Population density	321	5.48	120	8.69	-3.22	1.18
Occupation Service (%)	321	16	120	20	-3.96	0.81
Occupation Agriculture (%)	321	12	120	16	-3.94	1.07
Occupation Industrial (%)	321	32	120	12	19.53	2.24
Rateable Value p.c.	321	3.28	120	3.80	-0.52	0.14

"Excluding towns changing governance" is the sample excluding towns incorporated that incorporated after 1883, or that became County Boroughs. "After matching" refers to the sample created based on coarsened exact matching on 1891 population, population density, rateable value per capita and 1881 estimated percentage of servants in the workforce. "Occupation industrial" includes those in textiles, machinery and minerals.

workforce engaged in service in 1881 (in two quantiles).[26]

This procedure reduced the sample significantly; removing 40 incorporated towns, and 97 other towns as shown in the bottom panel of Table II. The differences between the groups of towns in terms of both population and population density are much smaller—although they remain statistically significant—as a result of excluding several densely populated large

[26]I match on the proportion of servants in the workforce in order to ensure that there are similarities in the importance of the service industry across the different groups of towns. Large disparities (conditional on other characteristics) could imply that the nature of the service industry varied across the control and treatment group, which would be a concern given the use of the number of servants in constructing the measure of "middle-class power" used extensively below. Matching instead on the proportion of the workforce in agriculture provides similar results (see Appendix C.7).

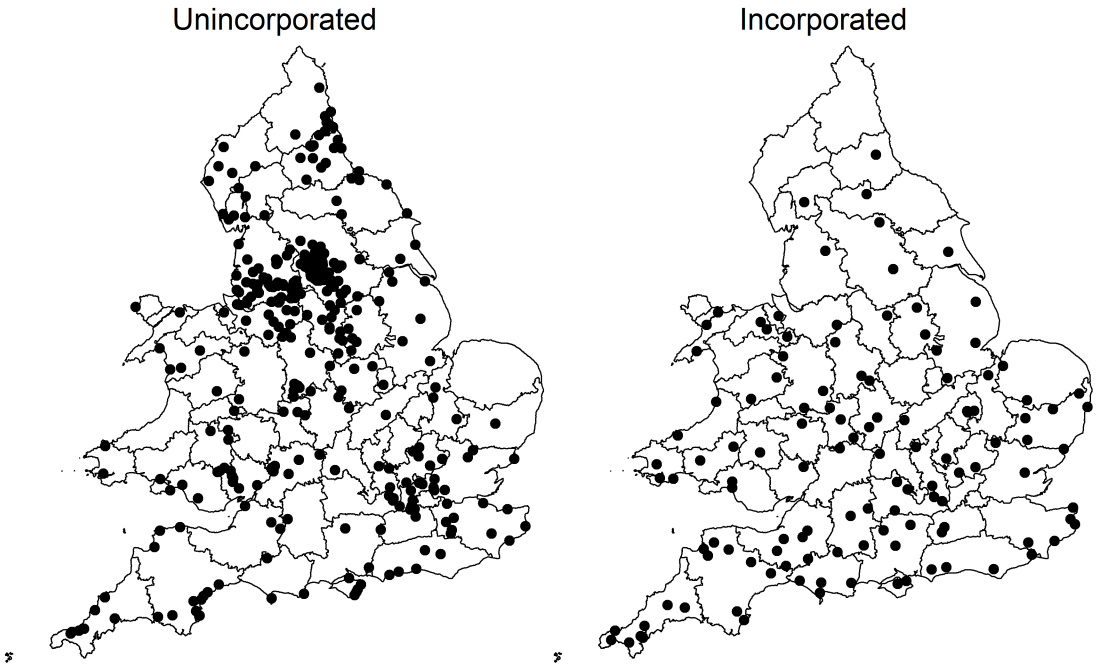
(a population of above 20,000) incorporated towns.

Figure IV displays the geographic distribution of the two groups of towns in the matched sample. The maps show that both groups of towns were distributed widely across the country, illustrating again the heterogeneity in both types of town. However, there is a clear clustering of the unincorporated towns in north-west England (particularly Lancashire and the West Riding of Yorkshire) that is not reflected in the incorporated town sample. This difference is a result of the fact that many of the unincorporated towns were relatively new industrial towns. While there were a number of older, incorporated, industrial towns in the North-West, by the 1880s these tended to be very large and as such were removed from the sample by the matching progress.[27]

As well as these geographic differences, there remain important differences in the observable characteristics of the two groups of towns despite the improvement in observable balance resulting from the matching exercise. Under the difference-in-difference framework, however, this is not of concern as long as the magnitude of any differences in expenditure would have remained constant in the absence of reform. To assess whether this parallel trends assumption is appropriate, Figure V plots the average level of current expenditure per capita before and after the match (excluding towns that changed governance after 1883 in both cases). The top panel displays only years before the reform—to aid visibility—while the bottom panel plots the data for the entire period (with the red vertical line representing the date of the 1894 Local Government Act). We can see that incorporated towns spent consistently more than unincorporated towns across the period—as expected, given both the additional responsibilities they held and the differences in observable characteristics. The difference is lower after the matching exercise as a consequence of the largest towns being excluded.

[27]As shown in Appendix C.6, the main results are similar after excluding these two counties from the analysis.

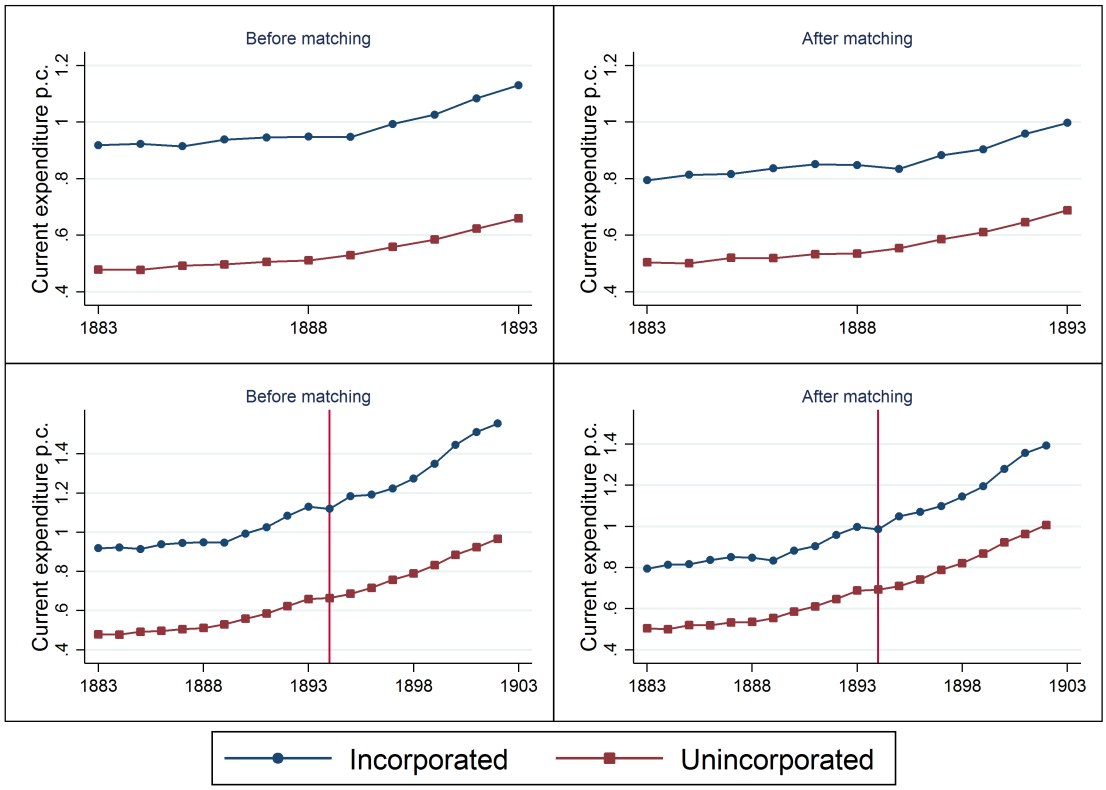
Figure IV: Both incorporated and unincorporated towns were distributed across England and Wales.



Note: Figure includes towns in the matched sample only. Boundaries reflect 1891 registration counties. Maps constructed by the author using geographical data from geonames.org and the GB1900 project data available at www.visionofbritain.org.

The figure also shows some evidence of divergence in the level of expenditure per capita between the different groups when considering the whole sample. After 1889, in particular, there is some indication that spending in incorporated towns began to grow at a faster rate than in unincorporated towns. In the matched sample, on the other hand, there is no evidence of this effect. Apart from a small dip in 1890, the gap between the two groups remains constant across this period. In this group, then, the parallel trends assumption appears to be satisfied. This finding is supported more formally in the results section.

Figure V: Similar pre-trends between incorporated and unincorporated towns in matched sample.



Note: Estimates represent sample mean for each group. Upper panel is identical to the lower panel, but focused on the years pre-reform to assist with inspection of the trends. "Before matching" refers to the group of towns in panel 2 of Table II.

4 Results

The first set of results is presented in Table III, with the main coefficient of interest being that regarding *Unincorporated* Post1894*. All dependent variables are standardized and so the size of this coefficient represents the effect in terms of a one standard deviation of per capita current expenditure.

Specifications (1) and (2) test the effects of reform across the whole matched sample. Both specifications include year and town-fixed effects; while column (2) includes in addition the set of demographic and financial control variables. The effect of democratic reform is negative and statistically different from zero. This results indicates that democratic reform

led to lower expenditure per capita: on average, spending per capita was reduced by around one-tenth of a standard deviation after this point relative to that in incorporated towns.

The estimated effect of democratic reform is similar after including the additional financial and demographic control variables (specification (2)). Reassuringly, the coefficients on both the tax base and grants per capita variables are positive and strongly statistically significant, indicating that these variables are capturing the effects of any other changes that may affect town revenue. However, the coefficient relating to property receipts per capita is not statistically significant, possibly reflecting that it was a relatively small source of revenue for most towns.

These findings indicate that the democratic reforms of 1894 led to lower town spending (relative to the incorporated towns). This is consistent with the model's prediction that the poor opposed spending relative to wealthier individuals. However, it does not distinguish between shifts from control by the upper class to the poor as opposed to shifting control from the middle class to the poor. To address this issue I split the sample into two groups according to the median level of our *middle-class power* measure defined in Section 2.3.[28] Specifications (3) and (4) present the results including only those towns dominated by the upper class, while specifications (5) and (6) include only those towns dominated by the middle class.

The results show very distinct effects across the two groups of towns. In towns with a relatively weak middle class there is little evidence that the 1894 reforms decreased town expenditure: the relevant coefficients are positive and statistically insignificant in each case. In the towns dominated by the middle class, in contrast, the reforms had strongly statistically significant negative effects. Furthermore the effect size is large: the coefficient in specification (6) translates to a magnitude of almost 20% of the mean expenditure per capita across the

[28] I choose to split the sample rather than test the effect through the inclusion of an interaction term to assist comparison with the dynamic results below. The results of the latter model are very similar; interested readers are referred to Appendix C.4.

sample of matched towns.

Table III: Democratic reform led to lower government spending, but only in middle-class dominated towns.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.084	-0.116	0.080	0.010	-0.280	-0.286
	(0.052)	(0.046)	(0.069)	(0.053)	(0.098)	(0.091)
Tax base p.c.		0.236		0.247		0.160
		(0.038)		(0.049)		(0.046)
Property receipts p.c.		0.010		0.004		0.210
		(0.011)		(0.006)		(0.058)
Grants p.c.		0.182		0.197		0.151
		(0.017)		(0.015)		(0.036)
post1894	0.727	0.337	0.688	0.189	0.813	0.721
	(0.049)	(0.162)	(0.059)	(0.226)	(0.096)	(0.242)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	8796	8796	4493	4493	4303	4303

Estimated using annual data 1883–1902. The effect of democratic reform is identified by the interaction between unincorporated and the post-1894 dummy variable. Middle-class dominated and upper-class dominated towns are defined by splitting the towns according to the median of the *middle-class power* measure defined in Section 2.3. Controls include (in 4 quantile bins) population, urban crowding, population growth, and population density, as well as seasonal precipitation and rainfall. All financial variables are standardized. Standard errors are clustered by town and displayed in parentheses.

The finding that the effect of democratic reform was greatest in those towns where the middle class was most powerful tallies with the theoretical prediction that demand for public goods varied according to income. However, an alternative explanation could be that the measure of *middle-class power* is actually capturing some other characteristic of the district. In particular, it is clear from Table I that the occupational characteristics of households with and without servants varied. In turn, these differences could reflect differences in the industrial structure of towns and, in turn, the need for public goods. In fact, the measure of middle-class power is strongly correlated with both the percentage of the 1881 workforce in agriculture (-0.52) and the percentage of the workforce in industry and mining (0.70). It is plausible then that the middle-class power variable is capturing differences in occupational

structure rather than income.

To check whether these occupational characteristics explain the differences in the estimated effects between the two groups of towns I estimate additional specifications allowing for different effects of the reforms in towns classified as "agricultural" or "industrial" towns. The results of these specifications, reported in Appendix C.4, show no evidence that the effects of the reforms varied according to these town characteristics. Further, the inclusion of these additional variables does not reduce the size or the statistical significance of the term capturing the effect of being middle-class-controlled. The middle-class-controlled variable also remains strongly statistically significant (although reduced in magnitude) when allowing for effects to vary according to the population density of the town.

Together these results suggest that the negative effect of the reform was driven by the towns where the middle class was relatively strong. As a result, in the remainder of the main paper I focus on this set of towns.

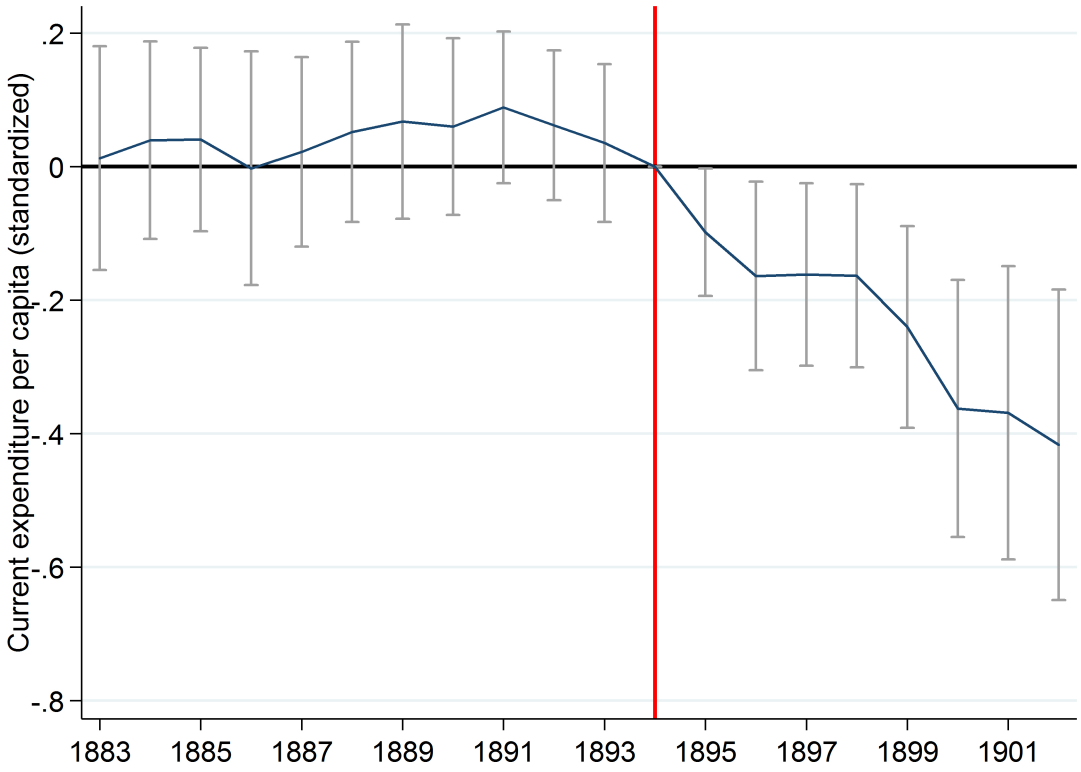
Dynamic response to the 1894 reform and controls for pre-existing trends

Given the differences in the observable characteristics of the two groups of towns shown in Table II, one concern could be that the results are driven by pre-existing differences in the trend expenditure between the groups of towns. The graphical depiction above has provided some evidence of the equality of these trends but to test the parallel trends assumption more formally the analysis above is repeated including dummy variables for each year interacted with the incorporation status of the town. By doing so, I allow for differences in expenditure between the two groups relative to 1894 to emerge in any year before or after the reform.

The results are depicted in Figure VI. There is little evidence of any systematic difference between unincorporated and incorporated towns prior to 1895. However, after that point there is a clear downward trend, with the gap between the two groups growing consistently each year. This dynamic picture suggests that democratic reform reduced the growth of expenditure over time; perhaps tending to slow the development of new projects rather than

reduce the level of expenditure on existing ones.

Figure VI: No evidence of differences in trends between unincorporated and incorporated towns prior to the 1894 reform.



Note: The figure plots the coefficients β_j and β_k, and associated 95% confidence intervals, from the following specification:

$$y_{it} = \sum_{j<1894} \beta_j \left(Unincorp * year_j\right) + \sum_{k\geq 1895} \beta_k \left(Unincorp * year_k\right) + \delta X_{it} + \gamma_i + \mu_t + \epsilon_{it}$$

Estimation including middle-class controlled towns only. The excluded category relates to 1894, and so all results are relative to the gap in the year immediately prior to the reform. X_{it} includes controls for demographic variables (population, urban crowding, population growth, and population density—all in 4 quantile bins); seasonal weather (precipitation and temperature), and financial variables (per capita rateable value, property revenue and tolls revenue). Standard errors are clustered by town.

The figure suggests that the response to the democratic reform grew over time. As a formal test of this hypothesis I estimate specification B, which allows for a more flexible dynamic response to the reform—as well as controlling for the estimated time path that towns would have taken in the absence of reform. This specification tests for a linear response to

the reform that varies over time, by allowing for a different linear response between the first two post-reform years and subsequent years.

The results of these dynamic specifications are reported in Table IV. Each specification reports the coefficients on the two linear trend interactions to test for a change in the trend growth in expenditure after the reform. The bottom panel then reports a test for the joint significance of these two variables, and also reports the estimated post-1896 trend calculated by summing the coefficients on the two trend variables.

Specification (1) suggests that democratization led to a large decline in spending in the two years following the 1894 reform: the coefficient relating to $unincorporated{*}timePost1894$ is large, and accounts (over two years) for more than half the effect size presented in Table III. However, the results suggest that the effect of the reform continued to grow after that point: although the coefficient on $unincorporated * timePost1896$ is positive, the combined time trend (reported at the bottom of the table) continues to be negative and statistically significant (albeit weakly). As shown in specification (2), adding linear town-specific time trends has little impact on the results.

The remaining columns of Table IV add quartic time trends that differ according to the quartile of a number of initial (i.e. at the start of the analysis period) characteristics of towns. By doing so, I account for the fact that growth could have varied according to the characteristics of the town in a way that we are not capturing with the time-varying control variables. For instance, the need for new infrastructure may have changed in industrial towns at a differing rate to those in agricultural towns. Alternatively, it could be that spending trends vary according to the infrastructure towns had in place at the beginning of the period. Such a pattern would be a concern if it were correlated with the democratic status of the town.[29] As such, in specification (6) I allow for differences in time trend according to the

[29]The evidence in Appendix B.4 shows that many towns did invest in public goods before incorporation. Such patterns would be expected if democratization were a hindrance to public investment.

level of loans outstanding per capita (in quartiles) at the start of the analysis period.[30] In all cases the results are similar, with the two post-reform time trends strongly jointly significant, although the support for continuing effects after 1896 is slightly weaker. Together, these results provide strong evidence that the negative effect of the democratic reforms is not an artefact of pre-existing trends.

Table IV: The effect of democratic reform on spending persisted over time and is robust to the inclusion of controls for pre-existing spending trends.

	DV = Current expenditure p.c. (standardized)					
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorp.*timePost1894	-0.085	-0.090	-0.086	-0.093	-0.069	-0.083
	(0.051)	(0.045)	(0.051)	(0.054)	(0.049)	(0.050)
Unincorp.*timePost1896	0.039	0.042	0.041	0.048	0.029	0.041
	(0.061)	(0.057)	(0.062)	(0.064)	(0.060)	(0.061)
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Trends	None	Linear town	Density	Agricul-ture	Tax base	1883 loans
Joint significance						
F-stat	6.68	6.97	6.31	7.41	5.19	6.07
p-value	0.002	0.001	0.002	0.001	0.006	0.003
post-1896 trend	-0.046	-0.048	-0.046	-0.044	-0.040	-0.042
	(0.020)	(0.022)	(0.020)	(0.019)	(0.019)	(0.020)
Obs.	4303	4303	4303	4303	4303	4303

Estimated using annual data 1883–1902, including middle-class controlled towns only. "Linear trends" refers to town-specific linear time trends. The remaining specifications include quadratic time trends according to the quartile of the 1881 population density (3), 1883 tax base (4), 1881 percentage population in agriculture (5) and 1883 loans outstanding (6). Control variables are as in specification (2) of Table III. The rows entitled "joint significance" report the results of testing the joint significance of *unincorp*timePost1894* and *unincorp*timePost1896*. "post-1896 trend" is the sum of the coefficients of *unincorp*timePost1894* and *unincorp*timePost1896*. Standard errors are clustered by town and displayed in parentheses.

[30] Appendix Table C.4 presents the results from additional specifications including time trends according to town population, population growth, urban crowding, and percentage of the town population in industry. These additional specifications also allow for differences in trends before 1894: there is no evidence of any divergence between the two groups before the reform.

Disaggregating the effects of the reform

The previous results indicate that democratic reform led to a reduction in total public spending in the unincorporated towns relative to their incorporated counterparts. It is also interesting to understand the reduction in the size of government in more detail to understand the types of spending opposed by the newly enfranchised citizens. Further, understanding the sources of the decline serves an important further test of the theoretical predictions since the model has emphasized that tax revenue should have fallen after the reform.

I re-estimate the dynamic specification including town-specific linear time trends for a series of different dependent variables. In these specifications I test only for a simple trend change after 1894: I do not allow for the complex dynamic response presented in the previous table. This simpler approach allows for more straightforward comparisons across the dependent variables, and also appears to better fit the data in most cases: results for the fuller specification are presented in Appendix Table C.5.

Table V displays the estimated coefficient on $timePost1894$ for dependent variables relating to spending, revenue and borrowing. The first six rows relate to different elements of current expenditure: water, sewers, streets, gas, loan maintenance, and other public goods. Loan maintenance includes payments for principal and interest on existing loans. The "other public goods" category consists of spending on a range of items including, for example, baths, hospitals, libraries, trams and electric lighting. (Unfortunately these expenditure items are not consistently separated in the annual accounts, precluding their inclusion as separate items.) The point estimates are negative for all but one of these spending items (for streets) although not all are statistically distinguishable from zero.

The next two rows examine different types of revenue; first tax revenue and second per capita revenue from tolls. The latter category includes fees for services such as markets or ferries, as well as fines and license revenue (these categories are not consistently disaggregated

in the accounts).[31] We see differential effects between these two revenue sources: for taxes there is a clear negative trend whereas there is no statistically significant effect on revenue from tolls. Such a finding is consistent with the model which emphasizes the importance of citizens wishing to reduce expenditure in order to avoid taxes. The tolls variable, on the other hand, consists of revenue items that would affect specific groups (e.g. market traders) rather than the whole population. As such the model does not predict this item of spending should necessarily fall.[32]

The penultimate row of Table V includes as the dependent variable the level of outstanding loans per capita. The level of loans held by a town was seen by contemporaries as the best measure of the level of infrastructure investment (Wohl, 1983, p.112) and so allows us to examine the effects of democratic reform on the development of infrastructure rather than ongoing expenditure. As we can see, there is clear evidence of a strong negative effect on the infrastructure stock.

In the final row of Table V, I present the result when using town population as the dependent variable. Population is the denominator in the financial dependent variables, and so one concern could be that the results are driven by differences in this variable rather than changes in actual expenditure. Including this as the dependent variable acts as an important placebo test that the results are not a purely statistical artifact of the way that the intercensal population results are estimated. The results show no evidence of any effect; the estimated coefficient is both very small and statistically insignificant.

[31] In order to differentiate the different types of revenue, the variable does not include service fees related to public works such as water and gas supply that would be directly affected by town spending decisions.

[32] Unfortunately the town accounts do not provide enough detail to identify the nature of the payments within this category in more detail.

Table V: Democratic reform led to lower tax revenue and investment in infrastructure.

	Unincorporated*timePost1894
Spending: water	-0.019
	(0.0315)
Spending: sewers	0.012
	(0.0164)
Spending: streets	-0.035
	(0.0154)
Spending: gas	-0.045
	(0.0270)
Spending: other public goods	-0.050
	(0.0206)
Spending: loan maintenance	-0.036
	(0.0197)
Receipts: taxes	-0.043
	(0.0162)
Receipts: tolls and fees	-0.048
	(0.0387)
Loans outstanding: total	-0.067
	(0.0244)
Town population	0.003
	(0.0028)

Note: The table displays the coefficient β_1 and associated standard errors, from the following specification:

$$y_{it} = \beta_1 \left(Unincorp * timePost1894\right) + \delta X_{it} + T_{it} + \gamma_i + \mu_t + \epsilon_{it}$$

where y_{it} is the variable in each row (all standardized), T_{it} are town-specific time trends, and X_{it} includes the set of control variables included in specification (2) of Table III. Estimated using annual data 1883–1902, including middle-class controlled towns only. Standard errors are clustered by town and displayed in parentheses.

5 Conclusion

Many theoretical models predict that mass democratization will be associated with greater government spending. The model in this paper indicates that this relationship may be different when government is constrained in its ability to redistribute: specifically when all citizens are taxed and government expenditure is on public goods. With these constraints, individuals face a trade-off between higher taxation and more private consumption. The middle class demand higher government expenditure that either the wealthy, who pay more tax, or the poor, who have a high marginal utility from consumption. Democratic reform

that enfranchises the poor can, as a result, reduce government expenditure. This hypothesis is tested with a difference-in-difference analysis of a nineteenth-century reform to the governance of English town councils. Supporting the theoretical prediction, the results show that these democratic reforms led to lower government spending in towns controlled by the middle-class before the reform.

In which settings might we expect to see democratization lead to lower government spending? The model identifies two critical factors: first, that the population is relatively poor—neither the elite nor the poor have high income—and, second, that the poor must contribute to tax revenues. The second factor implies that the effects of democratic reform will be dependent on a country's fiscal capacity; low fiscal capacity states are unable to raise significant amounts of taxes from direct taxation and as a result struggle to collect revenue from elite groups (Dincecco and Prado, 2012). Instead they rely on revenue sources, such as indirect taxes, that place at least part of the burden of taxation on poorer citizens.[33]

Democratic reform is then particularly likely to reduce government expenditure in low income countries which suffer from both severe poverty and, often, from low fiscal capacity (Besley and Persson, 2014).[34] Yet over the past twenty years there has been a movement towards increasing local participation in public goods provision in developing countries. Proponents of local involvement have argued that democratic institutions can avoid elite capture, reduce corruption, improve policy design, and increase the legitimacy of local decisions.[35]

[33]Citizens may contribute through user fees as well as through taxes, particularly in funding public goods such as water supply and sanitation (OECD, 2009). These pricing structures are often regressive and so place a particular burden on the poor (Van Ginneken et al., 2011).

[34]Dincecco and Prado (2012) report that the average share of direct taxes in total tax revenue in the 1990s was 76% in the G-7 rich countries compared to 26% in the least productive seven countries in their sample. In the 2000s, direct taxes accounted for approximately 55% of tax revenues in high income countries compared to approximately 30% in low income countries. In 2009, the average in low income countries was 35%: comparable to the 38% share in British tax revenues between 1881 and 1914 (see McNabb and LeMay-Boucher (2014) for contemporary figures and Aidt and Jensen (2009, Table 1) for Britain).

[35]See Mookherjee (2015) and Olken (2010) for a review of these arguments. Herrera and Post (2014) and Herrera (2014) discuss how enhanced citizen participation has led to political difficulties in raising tariffs to fund water and sanitation investments.

But even if these benefits have been achieved, this paper suggests that local democracy may have inhibited government investment in much needed public infrastructure.

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Democratic reform and opposition to government expenditure: evidence from nineteenth-century Britain.

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ONLINE APPENDIX

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Online Appendix—Not Intended for Publication

A Proofs

A.1 Proof of proposition 1

Proof. I start by considering the preferred taxation rate, denoted τ^*, of a citizen with income y. The citizen faces the following maximization problem:

$$\max_{\tau} \; U_i = \frac{(y(1-\tau) - \underline{c})^{\gamma}}{\gamma} + v(\tau \bar{y})$$

subject to $y(1-\tau) \geq \underline{c}$ and $0 \leq \tau \leq 1$.

The first order conditions for an individual with income y are given by:

$$-y(y(1-\tau^*) - \underline{c})^{\gamma-1} + \bar{y}v'(\tau^*\bar{y}) = 0 \tag{1}$$

The individual's optimal tax rate, τ^*, will be greater than 0 since $\lim_{x\to 0} v'(\cdot) = \infty$. Further, since $u(0) = -\infty$, $\tau^* < \frac{y-\underline{c}}{y} < 1$. Thus we have an interior solution. Further, a unique maximum is ensured by the concavity of u and v.

Equation 1 implicitly defines τ^*. Using implicit differentiation, the derivative of the optimal tax rate with respect to income is given by:

$$\begin{aligned}\frac{d\tau^*}{dy} &= -\frac{-(y(1-\tau^*) - \underline{c})^{\gamma-1} - y(1-\tau^*)\cdot(\gamma-1)(y(1-\tau^*) - \underline{c})^{\gamma-2}}{-y^2(\gamma-1)(y(1-\tau^*) - \underline{c})^{\gamma-2} + \bar{y}^2 v''(\tau^*\bar{y})} \\ &= \frac{(y(1-\tau^*) - \underline{c})^{\gamma-1}[1 - y(1-\tau^*)\cdot(1-\gamma)(y(1-\tau^*) - \underline{c})^{-1}]}{-y^2\cdot(1-\gamma)(y(1-\tau^*) - \underline{c})^{\gamma-2} + \bar{y}^2 v''(\tau^*\bar{y})}\end{aligned}$$

Note that the denominator in this expression is negative (using the concavity of $v(\cdot)$). Then,

since $(1-\gamma)(y(1-\tau^*)-\underline{c})>0$, the sign of the derivative is determined by the expression in square brackets.

Rearranging we have that:

$$\frac{d\tau^*}{dy}>0 \iff y(1-\tau^*)<\frac{\underline{c}}{\gamma} \tag{2}$$

where $\tau*$ is a function of $y, \underline{c}$, and γ.

I denote the income at which $\frac{d\tau^*}{dy}=0$ as $\hat{y}$. For any level of income below $\hat{y}$, optimal consumption (i.e. the consumption at an individual's preferred tax rate) will be lower than $\frac{\underline{c}}{\gamma}$ and poorer citizens desire lower taxation. We now need to show that there exists some y_l such that $y_l(1-\tau^*(y_l))<\frac{\underline{c}}{\gamma}$ and y_h such that $y_h(1-\tau^*(y_h))>\frac{\underline{c}}{\gamma}$. Further, we wish to show that for any income y_1 below the turning point $\hat{y}$ there is a corresponding income $y_1^{'}$ above the turning point so that $\tau^*(y_1)=\tau^*(y_1^{'})$.

To do so, note first that $y_i(1-\tau^*(y_i))<\frac{\underline{c}}{\gamma}$ for any $y_i\leq\frac{\underline{c}}{\gamma}$. Now suppose that there is some $y_l<\hat{y}$, at which the optimal level of taxation is τ_l^*. Then the first order conditions (from (1)) are satisfied at y_l and τ_l^*. We want to show that there is $y_l'>y_l$ at which the equation is also satisfied. Define F as the derivative of the utility function with respect to τ evaluated at τ_l^*; that is:

$$F=-y_i(y_i(1-\tau_l^*)-\underline{c})^{\gamma-1}+\bar{y}v'(\tau_l^*\bar{y})$$

Then it is sufficient to show that i) the first derivative of F with respect to y is greater than 0 at y_l ii) $\lim_{y\to\infty}F(y)=-\infty$ and iii) if $F_y(y_i)<0$ then $F_y(y_k)<0$ for any $y_k>y_i$. The first two conditions show that a solution exists by showing that $F(y_i)$ is zero for some $y_i>y_l$. The third condition is required to show that the solution is unique by showing that $F(y_i)$ does not become zero again after that point.

For conditions i) and iii), I take the first derivative F_y and rearrange:

$$\begin{aligned}
F_y &= -(y_i(1-\tau_l^*) - \underline{c})^{\gamma-1} - y_i(1-\tau_l^*)(\gamma-1)(y_i(1-\tau_l^*) - \underline{c})^{\gamma-2} \\
&= -\tilde{c}^{\gamma-2}(y_i(1-\tau_l^*) - \underline{c} + y_i(1-\tau_l^*)(\gamma-1)) \\
&= -\tilde{c}^{\gamma-2}(-\underline{c} + \gamma y_i(1-\tau_l^*))
\end{aligned}$$

where $\tilde{c} = y(1-\tau_l^*) - \underline{c}$. Thus $F_y(y_i) < 0 \iff y_i > \frac{\underline{c}}{(1-\tau_l^*)\gamma}$, so the first derivative is positive for $y_l < \hat{y}$ and negative for $y_k > \hat{y}$. The latter statement shows that condition iii) is met.

For condition (ii), letting $K = \bar{y}v'(\tau_l^*\bar{y})$:

$$\begin{aligned}
\lim_{y_i\to\infty} F &= \lim_{y_i\to\infty} -y_i(y_i(1-\tau_l^*) - \underline{c})^{\gamma-1} + K \\
&= -lim_{y_i\to\infty}\left(\frac{y_i^{\frac{1}{1-\gamma}}}{y_i(1-\tau_l^*) - \underline{c}}\right)^{1-\gamma} + K \\
&= -\left(lim_{y_i\to\infty}\frac{y_i^{\frac{1}{1-\gamma}}}{y_i(1-\tau_l^*) - \underline{c}}\right)^{1-\gamma} + K \\
&= -\left(lim_{y_i\to\infty}\frac{1}{(1-\tau_l^*)y_i^{1-\left(\frac{1}{1-\gamma}\right)} - \frac{\underline{c}}{y_i^{\frac{1}{1-\gamma}}}}\right)^{1-\gamma} + K \\
&= -\left(lim_{y_i\to\infty}\frac{1}{\frac{(1-\tau_l^*)}{y_i^{\frac{\gamma}{1-\gamma}}} - \frac{\underline{c}}{y_i^{\frac{1}{1-\gamma}}}}\right)^{1-\gamma} + K \\
&= -\frac{1}{0} + K = -\infty
\end{aligned}$$

Finally, note that $\lim_{y\to\underline{c}} \tau^*(y) = 0$. To see this consider any $\epsilon > 0$. Then for any $y < \frac{\underline{c}}{1-\epsilon}$, $\tau^*(y) < \epsilon$ since otherwise $c^* < 0$, which cannot be an optimum.

Implemented tax rates

We can now move on to examining the taxation implemented through elections. First, note

that since the utility function is strictly concave in the relevant range, voters' preferences are single peaked, and so the Median Voter Theorem applies. However, the median voter may not be the voter with the median income—rather, citizens must be ordered according to their preferred tax rate. Let $\tau^*(y_i)$ be the optimal taxation desired by a citizen with income y_i

The proof so far has provided the following facts that we will use:

1. There exists $\hat{y}$ such that:
   (a) $\forall i$ such that $y_i < \hat{y}$, $\frac{d\tau^*(y_i)}{y_i} > 0$
   (b) $\forall i$ such that $y_i > \hat{y}$, $\frac{d\tau^*(y_i)}{y_i} < 0$
   (c) For $y_i = \hat{y}$, $\frac{d\tau^*(y_i)}{y_i} = 0$
2. For any $y_i < \hat{y}$, there exists $y_i' > \hat{y}$ with $\tau^*(y_i) = \tau^*(y_i')$
3. For any i such that $y_i < \hat{y}$, and j with $y_j \in (y_i, y_i')$, $\tau^*(y_j) > \tau^*(y_i)$

The first two facts follow directly from the proof above. The last point follows from the fact that the optimal tax rate is strictly increasing between y_i and $\hat{y}$ and strictly decreasing after that point.

I now consider the three cases in the proposition in turn, and proceed in each case by showing that more than half of voters support the proposed action (i.e. an increase or decrease in spending) after the reform. I focus on tax rates, for the sake of consistency with the proofs above, but this is directly translatable into government spending. In each case, I denote τ_0 as the level of taxation implemented before the reform. The $\tilde{y}$ referred to in the proposition is given by y_P'.

Case 1: $y_P < \hat{y}$ **and** $y_E < y_P'$. First, note that $\tau_0 > \tau^*(y_P)$, using fact 3, and the fact that $y_E < y_P'$. That is, if π^0 is the share of voters desiring a tax greater than or equal to $\tau^*(y_P)$

before the reform then

$$\begin{aligned}\pi_0 &\geq F_E(y'_P) - F_E(y_P) \\ &= F_E(y'_P) - 0 \\ &> F_E(y_E) - 0 \\ &= 0.5\end{aligned}$$

using also the assumption that no member of the elite is poorer than the median poor voter. Thus $\tau_0 > \tau^*(y_P) = \tau^*(y'_P)$. Define $y_k < \hat{y}$ as $\tau^*(y_k) = \tau_0$. That is, the income associated with the pre-reform tax rate.

Now let π_1 denote the share of voters in the expanded electorate desiring a lower tax than τ_0. Since the Median Voter Theorem applies in the pre-reform electorate, this must include one half of the elite voters. Then:

$$\begin{aligned}\pi_1 &\geq \lambda(F_P(y_k)) + (1-\lambda)0.5 \\ &> \lambda 0.5 + (1-\lambda)0.5 \\ &= 0.5\end{aligned}$$

since $y_k > y_P$. Thus more than one half of voters prefer a lower tax after reform, and so the median desired tax rate is strictly below τ_0. Invoking the Median Voter Theorem, the implemented tax will be lower.

Case 2: $y_P < \hat{y}$ **and** $y_E \geq y'_P$. Note that $y_E \geq y'_P \Rightarrow y_E > \hat{y}$. Further $\tau_0 = \tau^*(y_E)$, since $\forall i \in E$ such that $y_i < y_E$, $\tau^*(y_i) > \tau^*(y_E)$. This latter statement follows from the fact that for $y_j \in [y_P, y'_P]$, $\tau^*(y_j) \geq \tau^*(y_P) = \tau^*(y'_P) > \tau^*(y_E)$ and for $y_j \in [y'_P, y_E]$, $\tau^*(y_j) \geq \tau^*(y_E)$ since $y_E > \hat{y}$ and the optimal taxation is strictly decreasing for $y > \hat{y}$.

Denote by y'' the income $y'' < \hat{y}$ such that $\tau^*(y'') = \tau^*(y_E) = \tau_0$. Now, $\tau^*(y_i) \geq \tau_0 \iff$

$y'' \leq y_i \leq y_E$. Note that $y'' \leq y_P$ since $\tau^*(y'') \leq \tau^*(y_P)$, $y_P < \hat{y}$, $y'' < \hat{y}$. Then denoting as π the share of citizens desiring a higher tax rate after the reform:

$$\begin{aligned}
\pi &\geq \lambda(F_P(y_E) - F_P(y'')) + (1-\lambda)(F_E(y_E) - F_E(y'')) \\
&= \lambda(1 - F_P(y'')) + (1-\lambda)0.5 \\
&\geq \lambda 0.5 + (1-\lambda)0.5 \\
&= 0.5
\end{aligned}$$

where the second and third lines follow from the fact that i) all poor citizens have a strictly lower income than the median elite citizen ii) $y'' \leq y_P$ and iii) all elite citizens have a strictly higher income than the median poor voter. The inequality in the third line is strict if $y_E > y'_P$.

Case 3: $y_P \geq \hat{y}$. By assumption $y_j > y_P \geq \hat{y}\ \forall j \in E$. Since $\frac{d\tau_i^*}{y_i} < 0\ \forall y_i > \hat{y}$, $\tau_0 < \tau^*(y_P)$. Further $\tau_0 = \tau^*(y_E)$. Then, denoting as π_1 the share of citizens desiring a tax rate higher than τ_0 we have:

$$\begin{aligned}
\pi_1 &\geq \lambda(1 - F_P(\hat{y}) - (1 - F_P(y_E))) + (1-\lambda)(F_E(y_E) - F_E(\hat{y})) \\
&= \lambda(1 - F_P(\hat{y}) - 0) + (1-\lambda)(0.5 - 0) \\
&\geq \lambda 0.5 + 0.5 - \lambda 0.5 \\
&= 0.5
\end{aligned}$$

where the third inequality is strict in the case that $y_P > \hat{y}$.

This completes the proof.

□

A.2 Utility functions supporting inverted-U-optimal taxation

Chapman (2017) shows that the inverted-U-relationship between taxation and income (as displayed in Figure 1) applies to utility functions over consumption $u(\cdot)$ where the following conditions on the coefficient of relative risk aversion, $r_R(c,u) = -c\frac{u''(c)}{u'(c)}$ hold:

1. $\frac{\partial r_R(c,u)}{\partial c} < 0$.
2. $\lim_{c\to\underline{c}} r_R(c,u) > 1$ and $\lim_{c\to\infty} r_R(c,u) < 1$.

To see this, note that the first order conditions for an individual with income y_i now (compared to equation (1 above) are:

$$-y(u'(c^*)) + \bar{y}v'(\tau^*\bar{y}) = 0$$

where $c^* = y(1-\tau^*)$.

$$\frac{d\tau^*}{dy} = \frac{u'(c^*) + y(1-\tau^*)\cdot u''(c^*)}{y^2u''(c^*) + \bar{y}^2v''(\tau^*\bar{y})}$$

Rearranging the numerator gives that:

$$\frac{d\tau^*}{dy} > 0 \iff R_R(c^*) > 1$$

which is the equivalent to statement (2) in the proof. Condition 2 is then required to ensure that there are incomes satisfying the condition.

A.3 Extension to progressive taxation

Consider a simple schedule of progressive taxation, where all citizens in the poor pay a tax τ and those in the elite pay $A\tau$ where $A > 1$. Further, assume for this case that $\underline{y}_E > \bar{y}_P$:

everyone in the elite is wealthier than everyone in the poor (hence they pay the higher tax rate). A is fixed, and voters vote over τ as before. Any $\tau \in [0,1]$ is assumed to be feasible: the poor are not constrained to implement a tax that leaves the wealthy above subsistence consumption.

Under these conditions, we can re-state proposition 1 as follows

Proposition 1′. *Suppose taxation is progressive in the sense outlined above. Then denote the level of government spending per capita before the reform as g_0 and after the reform as g_1, and denote the change from pre- to post- reform by $\Delta g = g_0 - g_1$. Further let y_P and y_E be the median incomes of the poor and elite respectively.*
Then there exists $\hat{y}$, $\tilde{y}$ and $\underline{\tilde{y}} \in [\hat{y}, \tilde{y})$ such that if $\underline{y_E} > \underline{\tilde{y}}$ then:

1. *If $y_P < \hat{y}$ and $y_E < \tilde{y}$ then $\Delta g < 0$.*
2. *If $y_P < \hat{y}$ and $y_E \geq \tilde{y}$ then $\Delta g \geq 0$, with $\Delta g > 0$ if $y_E = \tilde{y}$.*
3. *If $y_P \geq \hat{y}$ then $\Delta g \geq 0$, with $\Delta g > 0$ if $y_P > \hat{y}$.*

Proof. As in the previous proof, I start by considering the demand for public goods expenditure as a function of income. Now however, we must consider the poor and the elite separately, since they face differing tax incentives.

Define $\tilde{\bar{y}} = \lambda\tau\tilde{\bar{y}}_P + (1-\lambda)A\tau\tilde{\bar{y}}_E$, where $\tilde{\bar{y}}_P$ and $\tilde{\bar{y}}_E$ are the mean incomes of the poor and the elite respectively. Then the problem facing the poor is the same as in the linear taxation case, except with $\tilde{\bar{y}}$ replacing $\bar{y}$. For any given income, the poor will then prefer higher taxation for higher values of A. However, there will still be a turning point after which wealthier citizens prefer lower taxation. I denote this as $\hat{y}_P$.

Turning to the elite, we have that the first order conditions for an individual with income y are given by:

$$-Ay(y(1-A\tau^*) - \underline{c})^{\gamma-1} + \tilde{\bar{y}}v'(\tau^*\tilde{\bar{y}}) = 0$$

Since $A > 1$, this implies that the elite will have a lower optimal τ than in the case of proportional taxation. Now repeating the implicit differentiation from the proof

$$\begin{aligned}\frac{d\tau^*}{dy} &= -\frac{-A(y(1-A\tau^*)-\underline{c})^{\gamma-1} - Ay(1-A\tau^*)\cdot(\gamma-1)(y(1-A\tau^*)-\underline{c})^{\gamma-2}}{-(Ay)^2(\gamma-1)(y(1-A\tau^*)-\underline{c})^{\gamma-2} + \tilde{\tilde{y}}^2 v''(\tau^*\tilde{\tilde{y}})} \\ &= \frac{A(y(1-A\tau^*)-\underline{c})^{\gamma-1}[1 - y(1-A\tau^*)\cdot(1-\gamma)(y(1-A\tau^*)-\underline{c})^{-1}]}{-(Ay)^2(\gamma-1)(y(1-A\tau^*)-\underline{c})^{\gamma-2} + \tilde{\tilde{y}}^2 v''(\tau^*\tilde{\tilde{y}})}\end{aligned}$$

and rearranging gives us

$$\frac{d\tau^*}{dy} > 0 \iff y(1-A\tau^*) < \frac{\underline{c}}{\gamma}$$

which gives the same condition as in equation (2). We can denote the value of income at which this is optimized as $\hat{y}_E$. (We know this exists following the same logic as in the previous proof). Similarly, we define the optimal taxation schedule of the poor as $\tau_P^*(y)$ and $\tau_E^*(y)$ respectively.

Now, define $\hat{y}$ such that $\tau_P^*(\hat{y}) = \tau_E^*(\hat{y}_E)$ and $\hat{y} < \hat{y}_P$. That is, the level of income at which a poor citizen desires the same level of taxation as the highest taxation desired under the elite taxation schedule. Such an income must exist since $\tau_P^*(\hat{y}) > \tau_E^*(\hat{y})$ for $A > 1$.

Now we turn to the definition of $\underline{\tilde{y}}$ and $\tilde{y}$. Consider y_t such that $\tau_E^*(y_t)$=$\tau_P^*(y_P)$ and $y_t < \hat{y}_E$. Note that such an income exists if $y_P < \hat{y}_P$, which is true in case 1 and 2. To see this, consider first that in this case $\tau_P^*(y_P) < \tau_E^*(\hat{y}_E)$ since $y_P < \hat{y} < \hat{y}_P$. Now, since $\lim_{y\to\underline{c}} \tau_E^*(y) = 0$, we can find a citizen with income $y_t < \hat{y}_E$ with $\tau_E^*(y_t) = \tau_P^*(y_P)$.

If y_t exists, then define $\underline{\tilde{y}} = y_t$, and $\tilde{y} = \underline{\tilde{y}}'$. If y_t does not exist, define $\underline{\tilde{y}} = \bar{y}_P$ and $\tilde{y} = \underline{y}_E$.

Now we can examine the electoral outcomes in the three cases. First consider case 1. In this case, by assumption both $\underline{y}_E$ and y_E are contained in the interval $(\underline{\tilde{y}}, \tilde{y})$. Thus $\tau_E^*(\underline{y}_E)$ and $\tau_E^*(y_E)$ are greater than $\tau_E^*(\underline{\tilde{y}}) = \tau_E^*(\tilde{y}) = \tau_P^*(y_P)$. Thus $\tau_0 > \tau_P^*(y_P)$ and so half of the

elite voters and at least half of the poor voters prefer a tax rate lower than τ_0.

Now consider case 2. Since $y_E \geq \tilde{y} > \hat{y}_E$, then the income of the median pre-reform voter is the citizen with y_E. Further $y_E \geq \tilde{y} \Rightarrow \tau_E^*(y_E) \leq \tau_E^*(\tilde{y}) = \tau_P^*(y_P)$. We need to show that $\tau_P^*(y_i) > \tau_P^*(y_P)$ for all poor voters with $y_i > y_P$. First consider $y_i \in (y_P, \hat{y}_P]$. Then by the definition of $\hat{y}_P$, $\tau_P^*(y_i) > \tau_P^*(y_P) \geq \tau_E^*(y_E)$. Now consider $y_i > \hat{y}_P,\ i \in P$. Since $\bar{y}_P < \underline{y_E}, \tau_P^*(y_j) > \tau_P^*(y_k) > \tau_E^*(y_k)\ \forall j \in P, y_j > \hat{y}_P$ and $k \in E$. Thus at least half of poor voters prefer a higher tax rate than τ_0.

Now consider case 3, where $y_P > \hat{y}$. By the same logic as case 2, all poor voters with $y_i > y_P$ must have $\tau_P^*(y_i) > \tau_0$. Thus at least half of poor voters prefer a higher tax rate than pre-reform. This completes the proof. □

This proposition is the same as proposition 1, except that we have imposed an additional condition regarding the poorest citizen of the elite. This condition is necessary because the elite now differ in two ways from the poor; on one hand they have higher income (as in the linear taxation case) and on the other hand pay a higher tax rate. The condition allows us to separate the two; the preferred taxation of the elite citizens below this income level may be lower than that of the median poor voter.

We cannot determine the relative preferred tax rate of elite voters with incomes below $\underline{\tilde{y}}$. However, it remains the case that if the median voter is poor enough, then democratic reform will lead to a reduction in government expenditure. Formally, we state an additional proposition:

Proposition 2′. *For any y_E, there exists $\underline{y}$ such that $\Delta_g < 0$ if $y_P < \underline{y}$.*

Proof. Define $\underline{y}$ such that $\tau_P^*(\underline{y}) = \tau^0$ and $\underline{y} \leq \hat{y}_P$. We know that such a value exists since $lim_{y \to \underline{c}} \tau_P^*(y) = 0$ and since $\tau_P^*(y) > \tau_E^*(y) \forall y$. Then for any value of $y_P < \underline{y}$, $\tau_P^*(y) < \tau_P^*(\underline{y}) = \tau_0$ and the implemented rate of taxation will fall after the democratic reform. □

B Historical background

B.1 Local government in nineteenth-century England

Parliament reacted to the growing sanitary movement in the 1840s by emphasizing the role of local action in combating insanitary conditions. Rather than taking direct action to improve sanitary environments the national government "began a series of legislative measures in which the state became guarantor of standards of health and environmental quality and provided means for local units of government to make the structural changes to meet those standards" (Hamlin and Sheard, 1998, p.587). As a result the nineteenth century saw a gradual broadening of both town councils' powers and their responsibility for the maintenance of their local environment.

The process of devolution began with the 1848 Public Health Act, which established the principle of "localism" in sanitary affairs by offering local taxpayers ("ratepayers") the opportunity to establish a local board of health with both the responsibility for sewers and street cleaning, and the power to ensure a satisfactory water supply.[1] This provided towns with a low cost mechanism through which councils could gain the authority to invest in sanitary improvements. Before 1848 such powers were obtainable only on a case by case basis through private acts of Parliament, which often imposed a prohibitive cost on smaller and poorer towns (Wilson, 1997). But the 1848 Act was not enough to stimulate investment since many towns did very little even if they obtained the power to do so. Faced with this lack of response, Parliament imposed greater mandatory responsibilities on town councils. The Public Health Acts of 1872 and 1875 established a network of urban and rural sanitary authorities covering the entire country, tasked with the responsibility to ensure the provision of sanitary services in their jurisdiction.

[1]The 1848 Public Health Act was extended by the 1858 Local Government Act, and many authorities acquired their powers under the latter legislation. I refer to both as the 1848 Act for simplicity.

The principle of "localism" was extended into many areas of governance, meaning that citizens in nineteenth-century Britain were governed by a multitude of local authorities, dealing with different areas of expertise. In addition to the town councils addressed here, some of the more important bodies included:[2]

1. Poor Law Unions: The 1834 New Poor Law gave responsibility for poor relief expenditure to bodies known as the Guardians of the Poor. Each set of Guardians controlled a local Poor Law Union, of which there were approximately 630 in England and Wales.

2. County councils and county boroughs: The Local Government Act 1888 implemented a system of county councils. These bodies were responsible for items of county spending including policing, maintenance of lunatic asylums, and maintenance of main roads (previously controlled by groups of magistrates). The largest towns—with a population of over 50,000—were declared as "county boroughs", meaning that they acted as counties in themselves and held the powers of county councils in addition to those of the other incorporated towns.

3. School boards[3]: The 1870 Education Act established school boards in areas where there was inadequate provision of elementary education. These boards were directly elected, with each voter having one vote per vacancy on the board. The school boards were abolished under the 1902 Education Act, which passed responsibility for education to the county boroughs and county councils. (The new system did not come into operation until the end of March 1903; and so does not include the period analyzed in the paper (Barlow and Macan, 1903, p.77).)

4. Rural sanitary authorities and district councils: Under the 1875 Public Health Act, the

[2]The discussion of local government draws heavily on Keith-Lucas (1952); specific page references are provided at relevant points in the text.

[3]For a fuller discussion of the system of school boards, see Barlow and Macan (1903, pp.4–36) and Keith-Lucas (1952, pp. 213–214)

country was split into a mixture of urban sanitary authorities—the towns examined in this paper—and rural sanitary authorities. The 1894 Local Government Act denoted these authorities as the urban and rural district councils. In rural areas the Act also established a separate set of parish councils to manage village affairs.

B.2 Electoral system and the 1894 Local Government Act

The 1894 Local Government Act made a number of amendments to the Local Government system in England and Wales including both establishing new government bodies (particularly parish councils in rural areas) and, of particular relevance to this paper, amending the governance structure of some existing bodies. The changes to the electoral system in unincorporated towns have been covered in the main text; in this section I outline other major changes.

Elections in Poor Law Unions were undertaken in the same way as in urban sanitary districts. That is, before 1894 they were undertaken under the graduated voting system, changing to the one-householder-one-vote system discussed in the paper as a result of the 1894 Local Government Act (LGA). The Act also ended the practice whereby Justices of the Peace (magistrates) served as *ex officio* Guardians of the Poor, although in practice this had little effect since by the late nineteenth century these individuals were playing little active role (Keith-Lucas, 1952, p.43). Under the 1894 LGA councilors in rural areas served as Guardians. In the urban areas analyzed in this paper, in contrast, the Guardians were elected separately from the district council.[4]

The Act also implemented some changes to the qualifications to serve both as councilors and as Guardians of the Poor. Prior to 1894 only those owning or occupying sufficiently valuable property could serve on these boards; the LGA changed this for the elections of both

[4]See Section 24(3) of the 1894 Local Government Act and associated note in MacMorran and Colquhuon Dill (1907, pp.105–106).

Poor Law Guardians and councillors in unincorporated towns.[5] The Act also formalized the rights of women to serve on the boards of both Poor Law Unions and town councils although in practice women had acted as Poor Law Guardians since at least the 1870s. Although the law was ambiguous, women also likely had the right to sit on town councils before this date even though none had done so (McClaren, 1987, p.482). In this respect little changed after the Act: there were only 2 women sitting on urban district councils in 1900, and 4 in 1910 (Hollis, 1989, Appendix B).

The Local Government Act also enshrined the right of married women to vote in elections in unincorporated towns but not incorporated towns. Prior to this point the law was somewhat ambiguous in both sets of towns, as a result of the changing status of married women's property following the 1882 Married Women's Property Act. The situation was resolved in the unincorporated towns as part of the 1894 Act, but a similar amendment was not passed for incorporated towns until 1914. This change is not of great consequence to the analysis for two reasons. First, married women qualified separately from their husbands could be registered to vote in town council elections even before 1894 (Hollis, 1989, p.44fn9) and did vote in the Poor Law elections held on the same basis (McClaren, 1987, p.480). As such the difference between the two groups of towns existed before the reform. Further, the group affected by this part of the legislation was very small: since property was generally rated to the husband, only married women either living away from their husbands or keeping a separate business would have been affected.[6]

[5]For details of the requirements before 1894, see Keith-Lucas (1952, p.149) for incorporated towns, and the Public Health Act 1875 Schedule II for non-incorporated towns.

[6]For discussion of the details of the group affected see the Parliamentary debate recorded in Hansard, House of Commons, 21 November 1893, vol. 18 cols. 1380–1472.

B.3 Town council revenue and expenditure

Figure B.1 displays the split of revenue in both groups of towns at the start and end of the analysis period. We can see that taxes were the most important source of revenue throughout the period. They did decline slightly in importance over time, particularly in unincorporated towns, with the difference being made up by a mixture of new grants (discussed in the following paragraph) and growing revenue from town undertakings (e.g. the provision of gas or water).

Figure B.1: Tax was the most important source of non-loan revenue in both incorporated and unincorporated towns throughout the period.

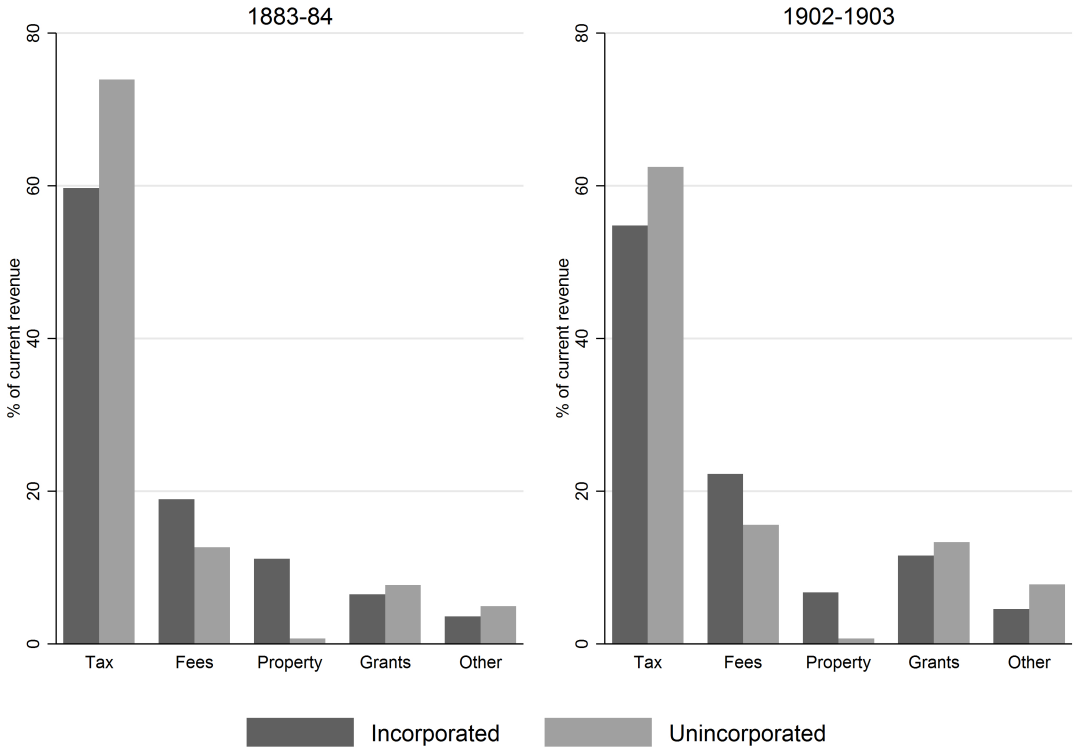


Figure includes revenue not out of loans in sample of towns identified by the matching exercise. "Fees" includes revenue from water, gas, electricity and tramway undertakings, as well as revenue from markets, fines and other penalties. "Property" includes revenue from both rents and sales of property. "Grants" includes transfers from both county councils and the central government.

Councils did receive some grants throughout the period; however before 1890 these related only to those services deemed "national" in character, such as policing and the main-

tenance of "lunatics".[7] After 1890 this changed following the reorganization of the local government system implemented by the 1888 Local Government Act. As a result of the Act, in 1890 new county councils gained responsibility for maintaining "main roads" within their jurisdiction. In particular, these new county councils were expected to bear some of the cost of maintenance and repair of roads within their district, necessitating transfers to town councils within their area.

The size of these transfers, while not huge, were much larger than other forms of external revenue received by councils. The grants were funded largely by sources outside of each individual town, through either a county-wide tax or funding from central government. As such, these grants allowed spending on roads to be funded from a wider tax base than the town's own property. Nevertheless, the grants amounted to less than half of the median town's expenditure on roads.

Figure B.2 displays the breakdown of current spending in incorporated and unincorporated towns in 1883–1884 and 1902–1903. Expenditure on streets—including repairs, maintenance, and street cleaning (scavenging) is the main single item of expenditure in both groups of towns, followed by loan service (including both principal and interest repayment).

The main difference between the two groups is that some incorporated towns had responsibility for some additional expenditure, particularly the provision of police, prosecutions and maintaining prisoners in their jurisdictions.[8] The incorporated town accounts also report some items relating to education; although non-incorporated towns shared some of these functions they are not separated in the accounts. The education spending included consists predominantly of transfers to the local school boards tasked with ensuring the provision of elementary education. The level of these contributions was decided by the school board,

[7]For further discussion of the rationale and use of central government grants during this period see the *Final Report of the Royal Commission on Local Taxation*, **1901** [Cd. 638]XXIV.413.

[8]Unincorporated towns did have some spending on police, but the amounts are very small and so are not split out in the accounts.

but collected by the town council before being transferred. The other major component of the education category (at most 1% of total current expenditure in a single year) relates to spending on manual technical education; under Technical Instruction Acts of 1889 and 1891 both incorporated and unincorporated towns could supply this form of education—although it is not reported separately in the accounts for non-incorporated towns.[9]

B.4 Timing of investments

If it was a shift in the political power of the poor that drove the growth of government spending, we would expect that towns became much more likely to expand their spending responsibilities after they became incorporated and shifted to the more representative governance system. However, a simple investigation of the timing of investments by towns that became incorporated before 1894 shows that this was not the case. As shown in Table B.1, most towns began spending on a range of public goods *before* they became incorporated. Nearly all (91%) of the towns spent money on sewers before they were incorporated, while 76% of towns were engaged in supplying water. Similarly, an equal or higher proportion of towns started operating in burial, baths, gas supply and markets before incorporation than afterward.

B.5 The extent of poverty

What did the poor spend their money on? To gain some insight into this question, I investigate the composition of household expenditure at different levels of income using data from 1889 and 1890 surveys of the United States Commissioner of Labor (USCL).[10] These surveys provide information on the income and expenditure of 1,024 British families headed by industrial workers. These families are not a representative sample since they were chosen

[9] See Barlow and Macan (1903, pp. 31–33, 37–38) for a fuller discussion of the system of technical education.

[10] The data were obtained from the IPCSR (Haines, 2006).

Figure B.2: The pattern of spending was similar across incorporated and unincorporated towns except that some incorporated towns had responsibility for other types of spending.

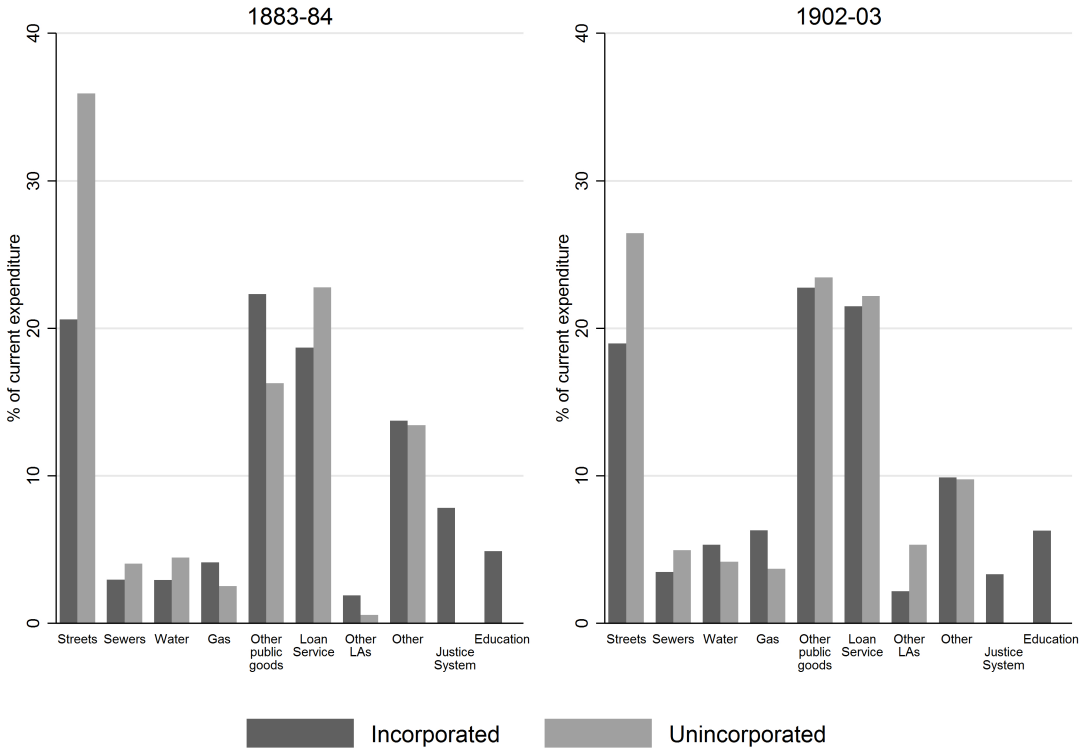


Figure includes expenditure not out of loans in sample of towns identified by the matching exercise. "Other public goods" includes (amongst other items) public lighting, electricity supply, tramways, hospitals, parks and open spaces, baths and wash-houses, collection and destruction of house refuse, fire brigades, housing, public offices and buildings, private improvement works, markets, and libraries. "Loan service" includes interest payments and repayment of principal (including to sinking funds). "Other LAs" includes transfers to other local authorities. "Other" salaries, lunatics and lunatic asylums, maintenance of prisoners and other. "Justice system" includes payment to police, payments to police pension funds, and prosecution. "Education" includes contributions to school boards and school attendance committees, technical and intermediate education.

on the basis of industry (including woolen and cotton textiles, pig iron, bar iron and steel making, coke and glass manufacture, and coal mining).[11] As a result, while the average incomes appear representative of their industries, the average earnings appear much higher than the population as a whole and are "not generally representative of the laboring poor" (Horrell and Oxley, 1999, p. 499). Nevertheless, the budgets can be used to estimate the

[11]For more discussion of the representativeness of the sample, see Horrell and Oxley (1999).

Table B.1: Towns incorporated between 1872 and 1894 were more likely to start providing public goods and services before incorporation than afterwards.

Activity	% of incorporated towns starting provision		
	Before incorporation	After incorporation	Did not start before 1900
Burial	24%	24%	52%
Bath	35%	26%	39%
Gas	26%	13%	61%
Markets	43%	9%	48%
Sewers	91%	4%	4%
Water	76%	7%	17%

Note: Based on 46 towns incorporated between 1872 and 1894. Information for water and sewers is drawn from the *Local Taxation Returns*, based on the first year of spending. Information for burial, baths and markets is drawn from the 1903 Report of the Select Committee on Municipal Trading (House of Lords, 1903).

changes in composition of income at least amongst this class of citizens.

I analyze expenditure among three groups of households, defined according to their proximity to the absolute poverty line. To identify the poverty line I use the estimated equivalence ratios calculated by Gazeley and Newell (2000) to assess the impact of additional children on the needs of the household.[12]

Only 8 families in the sample fall beneath this poverty line reflecting the bias towards richer families discussed above. As such I focus on families relatively close to this poverty line. In particular, I use three definitions of poverty: those with an income of 1.25 times the poverty line, 1.5 times the poverty line, and 2 times the poverty line. Table B.2 displays the share of income spent on different expenditure categories for each of these three groups.

Food expenditure is split into "basic" and "non-basic" categories. Basic foods include butter, bread, condiments, flour, lard, potatoes, rice, tea and other foods. Non-basic foods include meat, poultry, pork, fish, fruit, vegetables, cheese, eggs, coffee, sugar, molasses and milk. We can see that the share of food in expenditure falls across the three income categories,

[12]These estimates identify the minimum income needed for a childless couple, and then identify the multiple of that income needed to maintain a family with different numbers of children—up to families with 6 children. I exclude families with more than two adults or more than 6 children from the analysis, reducing the sample from 1,024 to 921 (all families had at least two adults).

but the share of these non-basic foods increases slightly. Even in the wealthiest category, half of income was spent on food and approximately 85% was spent on food, rent, clothing and fuel. In addition, the table also displays the proportion of households spending more than their income. A significant proportion of households were spending more than their income—approximately 20% even in the most generous poverty definition.

A further point of interest is that even households in the poorest group spent money on both amusements (including reading), liquor and tobacco. At first glance one might think that this discretionary expenditure means that the household is not that poor. However, both contemporary and current evidence suggests that this kind of expenditure is common even amongst the very poorest. Rowntree (1901) argues that much of the secondary poverty he identifies is due to expenditure on alcohol—and that this is was itself an "outcome of the adverse conditions under which many of the working classes live" (p144). A recent modern study shows that those earning less than $1 per day—the modern poverty line—frequently spend a significant proportion of their budget on alcohol, tobacco and festivals even at the expense of more calories (Banerjee and Duflo, 2007).

C Descriptive statistics and additional results

C.1 Descriptive statistics

Table C.3 summarizes the main variables used in the regressions. The demographic variables of population, population growth, urban crowding and population density are derived from the decennial census, meaning that they are only measured in three years. To account for the consequent measurement error, they are included in the regressions as categorical variables representing the quartiles of the underlying variables.

Table B.2: Household budgets for different income groups

	Income $\leq$ 1.25x poverty line	Income $\leq$ 1.5x poverty line	Income $\leq$ 2x poverty line
Share of income			
Food-basics	30%	27%	25%
Food-non-basics	23%	24%	25%
Food-total	53%	51%	50%
Rent	15%	14%	13%
Clothing	14%	15%	15%
Lighting / fuel	9%	8%	7%
Amusements / vacations	1%	2%	3%
Liquor and tobacco	4%	4%	4%
Other	6%	6%	7%
Savings	-2%	0%	1%
Proportion borrowing	34%	26%	19%
N	50	163	447

Basic foods include butter, bread, condiments, flour, lard, potatoes, rice, tea and other foods. Non-basic foods include meat, poultry, pork, fish, fruit, vegetables, cheese, eggs, coffee, sugar, molasses and milk. Clothing is the aggregate of clothing for husband, wife and children. Amusements / vacations includes reading expenditure. Other includes contributions to labor, religious, charitable and other organizations, taxes (except property taxes), property insurance, life insurance, sickness insurance, furniture and other expenditure.
Source: Author's calculations using data from 1889 and 1890 surveys of the USCL.

Table C.3: Descriptive statistics of main variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
Current spending per capita (£p.c.)	8796	.77	.46	.07	4.42
Loans outstanding per capita (£p.c.)	8796	2.44	2.61	0	26.99
Tax base per capita (£p.c.)	8796	3.46	1.31	.8	12.32
Property receipts (£p.c.)	8796	.03	.14	0	11.58
Grant receipts (£p.c.)	8796	.09	.1	0	2.39
Population ('000s)	8796	6.96	4.49	.74	31.33
Population growth (%)	8796	.9	1.48	-3.99	13.07
Crowding (Population/number of houses)	8796	4.9	.63	3.6	10.85
Population density	1306	5.88	8.64	.11	182.19

Note: Includes only towns included in the matched sample and hence in the regression estimations. Data for population density relates to the census years 1881, 1891 and 1901; the regressions include the value from the closest census year. Population and urban crowding are interpolated between census years. Urban crowding data is only available until 1901; for the regressions the 1901 value is applied to the following two years.

C.2 Additional dynamic specifications

Table C.4 presents the results of the dynamic analysis including a fuller set of time trends. In particular, in addition to those in Table 4, this table incorporates complex time trends for population, urban crowding, population growth and percentage of the workforce in in-

dustry. The estimated effect on the trend growth in unincorporated towns (relative to the incorporated towns) is negative and statistically significant in all specifications.

These specifications also allow for differences in trends before 1894, through the inclusion of the variable *unincorporated*post1883*: the associated coefficient variable is very small, and statistically indistinguishable from zero in all specifications.

Table C.4: The results from the dynamic specifications are unchanged when controlling for additional time trends based on pre-analysis characteristics

	DV = Current expenditure p.c. (standardized)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unincorp.*timePost1894	-0.089	-0.090	-0.090	-0.092	-0.086	-0.084	-0.089	-0.089	-0.091	-0.092
	(0.045)	(0.045)	(0.046)	(0.045)	(0.043)	(0.044)	(0.044)	(0.045)	(0.044)	(0.046)
Unincorp.*timePost1896	0.042	0.042	0.044	0.048	0.042	0.042	0.043	0.036	0.047	0.042
	(0.056)	(0.057)	(0.058)	(0.057)	(0.055)	(0.056)	(0.055)	(0.057)	(0.056)	(0.058)
Unincorp.*timePost1883	0.001		0.001	-0.000	0.005	0.000	0.003	0.001	0.001	0.000
	(0.007)		(0.006)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trends	None	Linear town	Density	Agriculture	Tax base	1883 loans	Population	Growth	Crowding	Industry
Joint significance										
F-stat	7.45	6.97	7.24	7.88	7.62	6.60	6.54	8.72	6.99	8.02
p-value	0.001	0.001	0.001	0.000	0.001	0.002	0.002	0.000	0.001	0.000
post-1896 trend	-0.047	-0.048	-0.047	-0.044	-0.044	-0.042	-0.047	-0.053	-0.044	-0.050
	(0.021)	(0.022)	(0.021)	(0.020)	(0.020)	(0.021)	(0.022)	(0.021)	(0.021)	(0.021)
Obs.	4303	4303	4303	4303	4303	4303	4303	4303	4303	4303

This table replicates the specifications in Table 4, and adds additional specifications (7–10) with controls for different complex time trends. Standard errors are clustered by town and displayed in parentheses.

Table C.5 presents additional dynamic specifications for the disaggregated spending, revenue, and borrowing items. Whereas in the main text I test for a single linear response after 1894, in these specifications I test the more complex functional form from specification B. Few of the estimated coefficients are statistically significant, which is likely to reflect the fact that the noisiness of the disaggregated data prevents us from accurately identifying the effects of the reform over shorter periods.

Table C.5: Results of additional dynamic specifications for expenditure and revenue subcategories.

	Unincorporated *timePost1894	Unincorporated *timePost1896	Joint signif. (p-value)
Spending: water	-0.180	0.200	0.388
	(0.1691)	(0.2219)	
Spending: sewers	-0.012	0.030	0.676
	(0.0493)	(0.0582)	
Spending: streets	-0.019	-0.020	0.066
	(0.0382)	(0.0426)	
Spending: gas	-0.024	-0.026	0.253
	(0.0461)	(0.0579)	
Spending: other public goods	-0.106	0.069	0.046
	(0.0640)	(0.0714)	
Spending: loan maintenance	-0.022	-0.017	0.169
	(0.0388)	(0.0533)	
Receipts: taxes	-0.053	0.011	0.029
	(0.0353)	(0.0352)	
Receipts: tolls and fees	0.090	-0.171	0.009
	(0.0558)	(0.0573)	
Loans outstanding: total	-0.000	-0.083	0.023
	(0.0400)	(0.0600)	
Town population	-0.001	0.005	0.316
	(0.0082)	(0.0088)	

Estimated using annual data 1883–1902, including middle class towns only. Each row reports coefficients corresponding to estimating specification B with the (standardized) variable in the left hand column as the dependent variable. The right hand column reports the p-value from a test of the joint significance of the two linear trend interaction terms. Each specification includes the full set of control variables (see the note to Table 3 for details) and town-specific time trends. Standard errors are clustered by town and displayed in parentheses.

C.3 Alternative definitions of middle-class towns

I present two robustness checks to the definition of middle-class power. First, I define the share of middle-class power based on the share of the total number of servants in households with only one servant. Second, I define middle class as having one *or two* servants. The results, displayed in Table C.6, are very similar to those in the main text.

Table C.6: Similar results using measure of middle-class control based on share of total servants in households with 1 servants relative to households with more than one servant.

	Alternative definition 1				Alternative definition 2			
	Upper-class dominated		Middle-class dominated		Upper-class dominated		Middle-class dominated	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unincorporated*post1894	0.072	0.003	-0.280	-0.282	0.038	-0.020	-0.237	-0.250
	(0.069)	(0.053)	(0.097)	(0.091)	(0.067)	(0.053)	(0.092)	(0.086)
Tax base p.c.		0.252		0.152		0.243		0.176
		(0.047)		(0.049)		(0.047)		(0.055)
Property receipts p.c.		0.005		0.196		0.004		0.230
		(0.007)		(0.056)		(0.005)		(0.078)
Grants p.c.		0.202		0.156		0.204		0.152
		(0.017)		(0.029)		(0.018)		(0.031)
post1894	0.661	0.310	0.848	0.565	0.690	0.307	0.799	0.490
	(0.058)	(0.227)	(0.095)	(0.238)	(0.058)	(0.225)	(0.089)	(0.239)
Controls	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	4492	4492	4304	4304	4532	4532	4264	4264

Dependent variable is total current expenditure per capita. "Population controls" include (in quantile bins) population, urban crowding, population growth, and population density. Standard errors are clustered by town and displayed in parentheses.

C.4 Additional controls for town occupational structure

The results in Table 3 show that the effect of democratic reform is most present in those towns where the middle class was most powerful. This finding tallies with the theoretical prediction that demand for public goods varied according to income. However, an alternative explanation could be that the measure of *middle-class-power* is actually capturing some other characteristic of the district. In particular, it is clear from Table 2 that the occupational characteristics of households with and without servants varied. In turn, these differences could reflect differences in the industrial structure of towns and, in turn, the need for public goods expenditure.

In fact, the measure of middle-class power is strongly correlated with both the percentage of the 1881 workforce in agriculture (-0.52) and the percentage of the workforce in industry and mining (0.70). It is plausible then that the middle-class power variable is capturing differences in occupational need rather than income.

To check if this is the case, I estimate additional specifications allowing for differences in the response to the democratic reform according to the occupational structure of the town. In particular, I define "agricultural" and "industrial" towns in the same way as the "middle-class-dominated" towns: by splitting the sample into two according to the percentage of the 1881 workforce in the relevant category. For example, a town is defined as "Agricultural" if they have above the median value of the percentage 1881 workforce in agriculture.

Table C.7 presents the results of these additional specifications, which are estimated on the whole matched sample. Columns (1) and (2) present the results of allowing for a differential response for middle class and upper class towns—as in the specifications in the main paper. As in Table 3 there is clear evidence of a negative response to democratic reform in the middle class towns, but not in the upper class towns.[13]

[13]The effect sizes are not identical because the coefficients relating to the control variables and year fixed effects are not allowed to vary according to whether the town is middle class.

In specifications (3) and (4) I then allow for a different post-1894 response in agricultural towns. We can see that, while spending in agricultural towns grows more slowly, there is no evidence that this is related to the democratic status of a town: the coefficient on the interaction term with unincorporated status is statistically indistinguishable from zero. Further, the coefficient on the interaction term with middle class towns is larger once these additional controls are included. Specifications (5) and (6) show that the results hold once interaction terms with industrial towns are included. Specifications (7) and (8) then include controls for both industrial and agricultural towns: the estimated effect of being controlled by the middle class remains similar in magnitude and strongly statistically significant. Together, these results provide evidence that the effect of democratic reform in middle-class towns is not reflecting the differences in occupational structure.

In columns (9) and (10) I carry out a similar test to assess whether the middle class variable could be capturing differences in town density. A particular concern here is that the very rich could be more able to segregate themselves from the poor. As a result, they would gain less benefit from public goods reducing disease. Their opposition to spending would then not be based purely on their greater expenditure, but also on a lower benefit from the public good.

The results show that the strong effects of being middle-class-dominated remain after including this variable, although they are smaller in magnitude. However the coefficients on the density–unincorporated–post1894 interaction term are indistinguishable from zero, suggesting that it is not differences in the population densities of the middle class towns that are driving the results.

Table C.7: Middle class control remains important after allowing for differing effects according to the occupational characteristics and density of towns.

	DV = Current expenditure p.c. (standardized)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unincorp*post1894*middClass	-0.279	-0.296	-0.343	-0.354	-0.241	-0.264	-0.273	-0.296	-0.169	-0.205
	(0.098)	(0.091)	(0.108)	(0.102)	(0.129)	(0.116)	(0.137)	(0.122)	(0.109)	(0.095)
Unincorp*post1894*upperClass	0.080	0.030	0.022	-0.027	0.095	0.044	0.053	-0.001	0.142	0.085
	(0.068)	(0.056)	(0.120)	(0.103)	(0.068)	(0.059)	(0.119)	(0.102)	(0.077)	(0.062)
Unincorp*post1894*Agricultural			0.065	0.068			0.054	0.060		
			(0.126)	(0.114)			(0.126)	(0.112)		
Unincorp*post1894*Industrial					-0.124	-0.115	-0.151	-0.139		
					(0.162)	(0.145)	(0.160)	(0.142)		
post1894	0.674	0.340	0.840	0.475	0.658	0.298	0.821	0.439	0.594	0.283
	(0.052)	(0.158)	(0.088)	(0.179)	(0.055)	(0.157)	(0.086)	(0.177)	(0.056)	(0.161)
post1894*MiddleClass	0.154	0.161	0.074	0.088	0.126	0.133	0.050	0.063	0.101	0.121
	(0.106)	(0.095)	(0.106)	(0.093)	(0.104)	(0.091)	(0.109)	(0.094)	(0.106)	(0.094)
post1894*Agricultural			-0.208	-0.190			-0.203	-0.186		
			(0.099)	(0.089)			(0.098)	(0.088)		
post1894*Industrial					0.130	0.130	0.121	0.124		
					(0.133)	(0.119)	(0.129)	(0.116)		
Unincorp*post1894*Dense									-0.132	-0.112
									(0.098)	(0.085)
post1894*Dense									0.170	0.132
									(0.083)	(0.071)
Controls	N	Y	N	Y	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	8796	8796	8796	8796	8796	8796	8796	8796	8796	8796

Estimated using annual data 1883–1902. Controls include the full set of demographic and financial control variables included in column (2) of Table 3. Standard errors are clustered by town and displayed in parentheses.

C.5 Overlapping jurisdictions and overall tax burden

As discussed previously, citizens in England and Wales were governed by a large number of local government bodies, each serving a different purpose. While this feature of English governance is valuable—it allows us to isolate the effect of democratization on expenditure on public goods—it also raises some concerns that the complicated structure could affect the results in some way. For instance, we might be concerned that the additional expenditure responsibilities in incorporated towns may have evolved differently over time in a way that biases the results. Alternatively, the spending decisions of town councils could be affected by the decisions of other bodies with overlapping jurisdictions: since each of those bodies had tax raising powers, the level of these taxes could have affected the level of expenditure in the town councils analyzed here. For instance, if the taxes raised for poor relief are high, citizens may be less willing to pay high taxes for public goods. While town councils were by far the largest recipients of local government tax revenue—accounting for approximately 49% of the revenue collected in urban areas (outside London) in 1893-94—the revenue raised by the Guardians of the Poor (around 27%) and to a lesser extent school boards (around 10%) also contributed to the individual tax burden, and so may have affected their preferences over public goods expenditure.[14]

The specifications in the paper provide a great deal of reassurance that these taxes are not driving the results: they rule out any effect that is time-invariant (through the inclusion of town fixed effects), that grows linearly over time (through the inclusion of town-specific time trends), or that grows non-linearly according to observable town characteristics (through the inclusion of complex time trends). However, in this section I include additional

[14]These figures are based on the table on page xxxi of the 1893-94 Local Taxation Returns. The figures presented there include all incorporated and unincorporated towns, and not only those included in the main body of the paper. To estimate the proportions in urban districts, I exclude revenue received by "Highway authorities in Rural Districts" and "Rural Sanitary Authorities" from total government spending. The figures for Poor Law Spending and School Boards, however, cover spending in both urban and rural areas. As such, the proportions are approximations.

specifications to rule out potential interactions. To do so, I proceed in two steps. First, I show that the main results hold when including only spending categories that are directly comparable across the two groups of towns. By doing so, I rule out any direct effect of the additional responsibilities of incorporated towns. Second, I estimate additional specifications controlling for the estimated level of taxation raised by the other bodies that overlapped with the town councils discussed here; the results are largely unchanged in these specifications.

As the starting point, I address the concern that the results could be driven by the different responsibilities of the different types of town. As discussed above, incorporated towns held some functions that unincorporated towns did not and, if this spending on these items grew over time, then the parallel trends assumption would be violated. This concern is mitigated by the fact that, first, the total expenditure in question was only a small part of total expenditure (see Figure B.2) and, second, that the results are robust to the inclusion of town-specific time trends. However, as an additional test, in Table C.8 and Table C.9 I repeat the specifications from the paper, but using as the dependent variable total spending excluding categories of spending that are not directly comparable across towns (differences in the categorization between the reports mean that this is an imperfect comparison). As shown, the results are very similar to those in Table 3, both in size and statistical significance.

Table C.8: The main results are similar when analyzing the effects on only the most comparable spending categories.

	DV = Adjusted Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.101	-0.131	0.085	0.014	-0.307	-0.311
	(0.056)	(0.051)	(0.074)	(0.058)	(0.105)	(0.099)
Tax base p.c.		0.235		0.248		0.142
		(0.040)		(0.052)		(0.048)
Property receipts p.c.		0.016		0.011		0.197
		(0.010)		(0.006)		(0.064)
Grants p.c.		0.171		0.191		0.125
		(0.018)		(0.014)		(0.035)
post1894	0.725	0.267	0.674	0.064	0.819	0.708
	(0.052)	(0.174)	(0.063)	(0.248)	(0.101)	(0.258)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	8796	8796	4493	4493	4303	4303

Estimated using annual data 1883–1902. The table presents the results of replicating Table 3 using as the dependent variable aggregated spending on loan maintenance, water, sewers, streets, and other public goods. See footnote to Figure B.2 for details of these categories, and see the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

Table C.9: Dynamic results are similar when analyzing the effects on only the most comparable spending categories.

	DV = Adjusted Current expenditure p.c. (standardized)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unincorp.*timePost1894	-0.078	-0.080	-0.078	-0.082	-0.077	-0.072	-0.076	-0.074	-0.079	-0.082
	(0.049)	(0.050)	(0.051)	(0.051)	(0.048)	(0.049)	(0.048)	(0.049)	(0.049)	(0.052)
Unincorp.*timePost1896	0.026	0.028	0.027	0.031	0.030	0.025	0.026	0.016	0.031	0.027
	(0.063)	(0.063)	(0.065)	(0.065)	(0.061)	(0.062)	(0.061)	(0.064)	(0.063)	(0.066)
Unincorp.*timePost1883	-0.003		-0.002	-0.001	0.001	-0.003	-0.001	-0.002	-0.002	-0.001
	(0.007)		(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Trends	None	Linear town	Density	Agriculture	Tax base	1883 loans	Population	Growth	Crowding	Industry
Joint significance										
F-stat	6.25	5.89	6.14	6.82	6.25	5.31	5.22	7.03	5.80	6.92
p-value	0.002	0.003	0.003	0.001	0.002	0.006	0.006	0.001	0.004	0.001
post-1896 trend	-0.052	-0.052	-0.051	-0.051	-0.047	-0.047	-0.051	-0.058	-0.048	-0.055
	(0.023)	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)	(0.024)
Obs.	4303	4303	4303	4303	4303	4303	4303	4303	4303	4303

The table presents the results of replicating Table C.4 using as the dependent variable aggregated spending on loan maintenance, water, sewers, streets, and other public goods. See footnote to Figure B.2 for details of these categories. See the note to Table C.4 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

The second set of concerns relates to the possibility that spending by other bodies could indirectly influence expenditure by town councils by affecting the overall tax burden on citizens. To test whether this is biasing the results, I link the town council data to a separate dataset containing annual data on the per capita poor relief expenditure and revenue by Poor Law Unions.[15] To do so I assign each town to the Poor Law Union that contained them in the 1881 census (where a town was split between several Unions, I assign them to the Union containing the largest portion of the town).

I then directly control for whether the level of taxation raised by other bodies affects the results by including a measure of the overall tax burden in each district. The fragmented nature of the local government structure makes directly estimating the level of tax a daunting task, since it would necessitate identifying the taxes raised in every local authority, matching the different authorities together (accounting in some way for the differences in boundaries), and attempting to consolidate the variety of different accounts. However, we can use the information from the Poor Law Union accounts to construct proxies of the overall tax burden.

In particular, I take advantage of the fact that most local tax revenue was collected first by the Poor Law authorities (through the "poor rate")—before being redistributed to the various bodies that decided the level of taxation. Most significantly for our purposes, this included both the Guardians of the Poor that controlled expenditure on poor relief and local school boards. As such, it allows us to measure a large proportion of the local government tax burden. The measure does, however, suffer from two drawbacks. First, the tax measure itself includes some taxation that would not apply to the citizens of town councils. In particular, it contains the tax used to fund rural district councils which governed non-urban areas. However this is not a major issue since the revenue collected was relatively small: across the country, these rural authorities accounted for at most 12% of the total tax revenue collected

[15] I aggregate the expenditure on poor relief in workhouses ("in-maintenance") and outside ("out-relief") and tax revenue. A small number of unions had major boundary changes during this period; in that case I merge them to provide a stable "synthesized" union.

by the Poor Law Unions in 1893-94[16]—and it was likely significantly lower once we restrict the sample to the Poor Law Unions containing an urban area.

The second issue is that the poor rate was also used to collect part of the revenue raised by incorporated towns. The incorporated towns raised approximately 25% of their funding through a "borough rate", of which around 85% was collected through the Poor Law authorities.[17] Unfortunately, the accounts provide no clear way to disentangle this type of expenditure at a town-level from other similar taxes raised directly by the town. Consequently there is an element of "double counting" for these areas that could bias the results.

To mitigate these issues, I construct 3 different measures of the tax burden imposed by the other local authorities. The first is the overall level of taxation (per capita) in the Poor Law Union. The second removes all borough rates in the Poor Law Union, to avoid double counting these taxes.[18] The third measure is the per capita level of spending on poor relief in the Poor Law Union. This latter measure is a good proxy for the level of taxation raised by the Guardians of the Poor directly, since it comprises the major items provided for in relation to poor relief.

The results, displayed in Table C.10 show that there is some evidence that these variables are correlated with the level of town spending. However, compared to the effects of democratic expenditure the effects are small, and nearly always statistically indistinguishable from zero. Further, the inclusion of any of these variables makes little difference to the coefficients on the effect of democratic reform: both the size and statistical significance of

[16]This figure is calculated assuming all rate revenue received by these bodies was collected by the Poor Law authorities, which is almost certainly an over-estimate. Estimated using figures on pxxxi and 2 of the 1893-94 *Local Taxation Returns*

[17]These figures are estimated from the notes to the 1900-01 *Local Taxation Returns*, and relate to all rates collected by municipal boroughs that were not also county boroughs. Unfortunately the notes only provide this breakdown at an aggregate level.

[18]Because not all borough rates were collected by the Poor Law Union, as explained in the previous paragraph, this approach leads to a small number of negative values which are recoded to missing, leading to a smaller number of observations in these specifications.

the coefficients remains similar to that in Table 3: the findings do not reflect changes in the taxation raised by other local authorities.

Table C.10: Results are robust to the inclusion of measures of tax burden from other local government bodies.

	DV = Current expenditure p.c. (standardized)								
	All towns			Upper-class			Middle-class		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unincorporated*post1894	-0.116	-0.109	-0.116	0.012	0.016	0.013	-0.287	-0.279	-0.290
	(0.046)	(0.046)	(0.046)	(0.052)	(0.051)	(0.052)	(0.091)	(0.091)	(0.091)
post1894	0.813	0.824	0.844	0.879	0.883	0.913	0.795	0.821	0.837
	(0.076)	(0.076)	(0.076)	(0.110)	(0.109)	(0.113)	(0.116)	(0.113)	(0.108)
Poor rate p.c.	0.033			0.038			0.029		
	(0.021)			(0.027)			(0.025)		
Poor rate p.c., adjusted		0.030			0.036			0.006	
		(0.021)			(0.029)			(0.025)	
Poor relief p.c.			-0.009			0.027			-0.079
			(0.028)			(0.037)			(0.035)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	8796	8613	8796	4493	4488	4493	4303	4125	4303

The table displays the results of re-estimating the specifications in Table 3, with the addition of control variables for the total district tax burden, as discussed in the text. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

C.6 Robustness to removing North-West counties

Figure 4 indicates that the unincorporated towns were, relatively to the incorporated towns, concentrated in the counties of Lancashire and the West Riding of Yorkshire. This is only an issue if it is associated with differences in trends in spending but as an additional robustness test I repeat the main analysis excluding towns in those two counties. The results, displayed in Table C.11 show that the main findings are unchanged by removing these towns.

Table C.11: The results are robust to removing towns in Lancashire and the West Riding of Yorkshire.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.086	-0.107	0.061	0.006	-0.311	-0.283
	(0.057)	(0.050)	(0.070)	(0.055)	(0.103)	(0.094)
Tax base p.c.		0.256		0.236		0.237
		(0.044)		(0.050)		(0.065)
Property receipts p.c.		0.008		0.003		0.180
		(0.008)		(0.005)		(0.064)
Grants p.c.		0.208		0.195		0.230
		(0.016)		(0.016)		(0.027)
post1894	0.737	0.302	0.703	0.214	0.810	0.612
	(0.051)	(0.178)	(0.057)	(0.236)	(0.099)	(0.265)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	6651	6651	4017	4017	2634	2634

The table displays the results of re-estimating the specifications in Table 3, excluding towns in Lancashire and the West Riding of Yorkshire. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

C.7 Robustness to alternative matching procedures

This section presents the main estimates using a sample obtained via alternative matching procedures. Table C.12 uses the sample obtained from matching on the percentage of the workforce in agriculture in 1881, rather than the percentage employed in service. Table C.13 does the same, but using the sample obtained from matching on the percentage of the

workforce in industry and mining. The results are largely unchanged using these alternative matching procedures.

Finally, Table C.14 uses the same matching procedure but excludes all towns incorporated after 1835. As a result the estimation sample is reduced by approximately 10%. However, the findings are again similar (although the point estimates are slightly smaller).

Table C.12: The results are similar when matching on percentage of population in agriculture rather than in service.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.091	-0.124	0.044	-0.021	-0.279	-0.294
	(0.052)	(0.046)	(0.065)	(0.050)	(0.099)	(0.092)
Tax base p.c.		0.209		0.226		0.124
		(0.035)		(0.047)		(0.045)
Property receipts p.c.		0.010		0.005		0.224
		(0.011)		(0.006)		(0.063)
Grants p.c.		0.177		0.193		0.143
		(0.016)		(0.014)		(0.034)
post1894	0.724	0.278	0.679	0.074	0.815	0.745
	(0.049)	(0.159)	(0.057)	(0.215)	(0.096)	(0.243)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	8955	8955	4952	4952	4003	4003

The table displays the results of re-estimating the specifications in Table 3, using the sample obtained using the matching procedure discussed in Section 3.3 but matching on percentage employed in agriculture in 1881, rather than in service. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

C.8 Adjusting expenditure for changes in the price index

Adjusting for price changes is complicated by the fact that, as shown in Figure C.3, prices fluctuated significantly on a year to year basis during this time period. In some years prices are reported to have changed by over 10% within a single year. As a result, while the series for nominal average expenditure per capita is quite smooth, the series for real average expenditure per capita is much more volatile. It seems unlikely that the actual output of

Table C.13: The results are similar when matching on percentage of population in industry rather than in service.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.086	-0.120	0.061	-0.011	-0.271	-0.280
	(0.052)	(0.046)	(0.067)	(0.052)	(0.098)	(0.091)
Tax base p.c.		0.228		0.229		0.170
		(0.036)		(0.048)		(0.044)
Property receipts p.c.		0.010		0.004		0.210
		(0.011)		(0.006)		(0.057)
Grants p.c.		0.178		0.193		0.147
		(0.016)		(0.014)		(0.034)
post1894	0.714	0.311	0.666	0.139	0.810	0.693
	(0.049)	(0.157)	(0.058)	(0.219)	(0.096)	(0.239)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	9030	9030	4693	4693	4337	4337

The table displays the results of re-estimating the specifications in Table 3, using the sample obtained using the matching procedure discussed in Section 3.3 but matching on percentage employed in industry in 1881, rather than in service. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

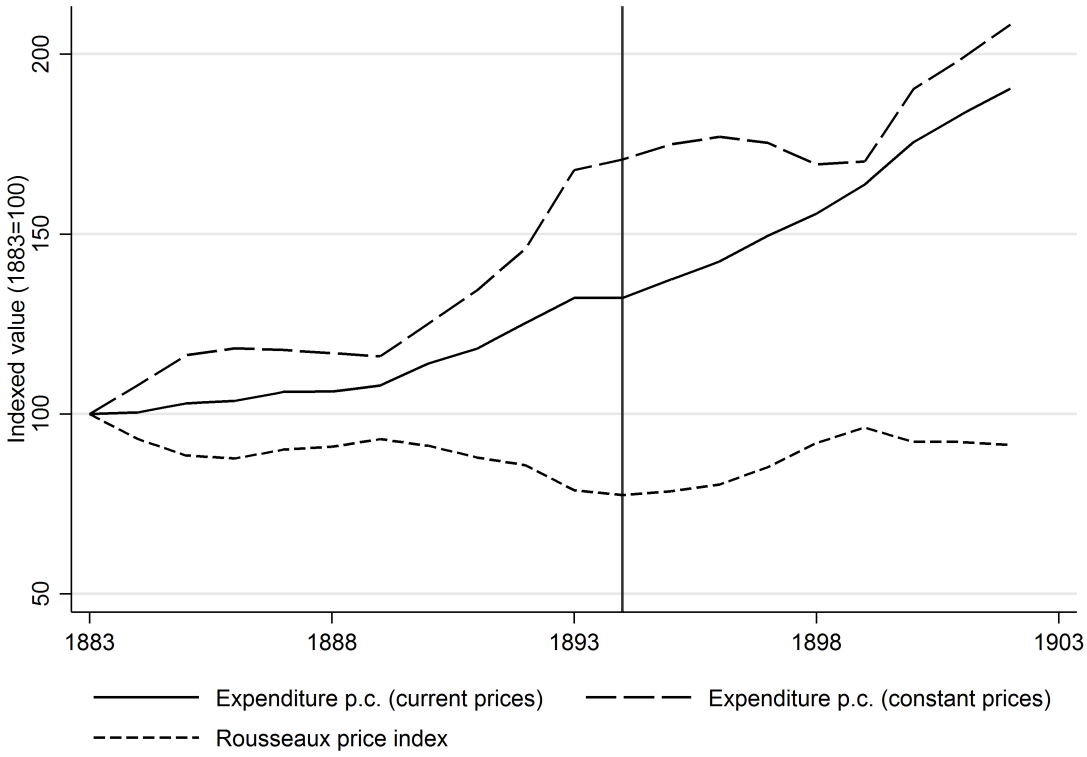
Table C.14: The results are similar when excluding all towns incorporated after 1835.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.051	-0.090	0.083	0.007	-0.229	-0.247
	(0.055)	(0.049)	(0.070)	(0.053)	(0.108)	(0.103)
Tax base p.c.		0.233		0.251		0.143
		(0.040)		(0.053)		(0.049)
Property receipts p.c.		0.008		0.004		0.181
		(0.009)		(0.006)		(0.056)
Grants p.c.		0.183		0.196		0.156
		(0.018)		(0.015)		(0.039)
post1894	0.707	0.230	0.682	0.077	0.777	0.626
	(0.051)	(0.170)	(0.060)	(0.235)	(0.104)	(0.264)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	8119	8119	4393	4393	3726	3726

The table displays the results of re-estimating the specifications in Table 3, using the sample generated by excluding all towns incorporated after 1835 prior to implementing the matching procedure discussed in Section 3.3. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

government goods and services would fluctuate to this extent. Further, some elements of spending—notably debt servicing and to an extent labor costs would not be subject to these price changes.

Figure C.3: Adjusting for price changes leads to volatility in expenditure per capita time series.



Expenditure per capita is the annual average total current expenditure by local governments under current and constant (i.e. adjusted) prices respectively. Rousseaux price index is taken from Mitchell (1971). Vertical red line represents the imposition of the 1894 Local Government Act.

While the figure suggests that the nominal spending series is the most appropriate measure, as a robustness check I re-estimate the main results after translating the variables into real terms. This adjustment changes very little, as shown in Table C.15.

Table C.15: Estimated effect of democratic reform is similar using financial variables converted into real terms.

	DV = Real Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.084	-0.115	0.077	0.009	-0.276	-0.282
	(0.051)	(0.045)	(0.066)	(0.051)	(0.097)	(0.089)
Tax base p.c.		0.250		0.255		0.177
		(0.036)		(0.047)		(0.045)
Property receipts p.c.		0.010		0.004		0.207
		(0.011)		(0.006)		(0.057)
Grants p.c.		0.182		0.201		0.147
		(0.019)		(0.015)		(0.037)
post1894	0.439	0.236	0.366	0.097	0.561	0.598
	(0.048)	(0.153)	(0.058)	(0.215)	(0.092)	(0.224)
Controls	N	Y	N	Y	N	Y
Year FE	Y	Y	Y	Y	Y	Y
Town FE	Y	Y	Y	Y	Y	Y
Obs.	8796	8796	4493	4493	4303	4303

The table displays the results of re-estimating the specifications in Table 3, but with all financial variables translated into real terms using the Rousseaux price index. See the note to Table 3 for further details of the specifications. Standard errors are clustered by town and displayed in parentheses.

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