

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:

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

The individual's optimal tax rate, τ^* , will be greater than 0 since $\lim_{x \rightarrow 0} v'(\cdot) = \infty$. 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:

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

where τ^* 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) $\lim_{y \rightarrow \infty} F(y) = -\infty$ and iii) if $F(y_i) < 0$ then $F(y_k) < 0$ 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 $K = \bar{y}v'(\tau_l^*\bar{y})$:

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

Finally, note that $\lim_{y \rightarrow \underline{c}} \tau^*(y) = 0$. 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:

$$(a) \forall i \text{ such that } y_i < \hat{y}, \frac{d\tau^*(y_i)}{dy_i} > 0$$

$$(b) \forall i \text{ such that } y_i > \hat{y}, \frac{d\tau^*(y_i)}{dy_i} < 0$$

$$(c) \text{ For } y_i = \hat{y}, \frac{d\tau^*(y_i)}{dy_i} = 0$$

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 $\frac{d\tau_i^*}{dy_i} < 0 \forall y_i > \hat{y}$, $\tau_0 < \tau^*(y_P)$. 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. $\lim_{c \rightarrow \underline{c}} r_R(c, u) > 1$ and $\lim_{c \rightarrow \infty} r_R(c, u) < 1$.

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

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

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:

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

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

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

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 $\lim_{y \rightarrow \underline{c}} \tau_E^*(y) = 0$, 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 $\tilde{y} = \tilde{y}'$. 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. \square

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 \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 $\lim_{y \rightarrow \underline{c}} \tau_P^*(y) = 0$ 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. \square

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.

¹The 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 boards³: 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

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

³For 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

⁴See Section 24(3) of the 1894 Local Government Act and associated note in MacMorran and Colquhoun 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

⁵For 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.

⁶For 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.

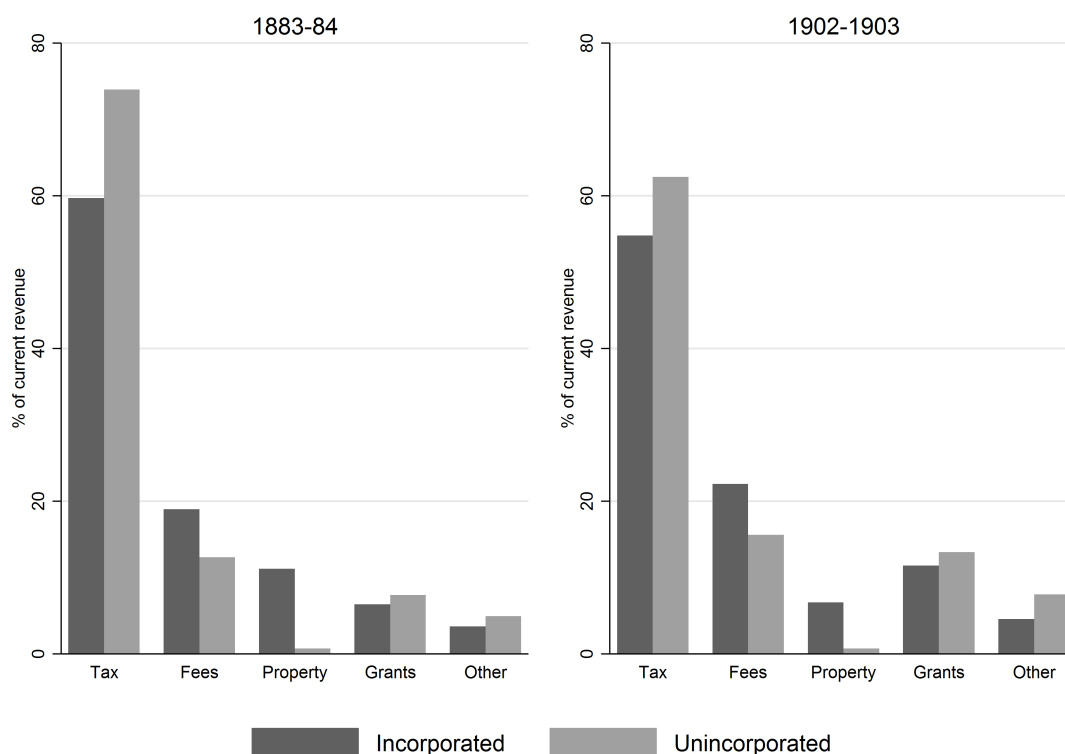


Figure includes revenue not out of loans in sample of towns identified by the matching exercise. “Fees” includes revenue from water, gas, electricity and tramway undertakings, as well as revenue from markets, fines and other penalties. “Property” includes revenue from both rents and sales of property.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

⁷For 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.

⁸Unincorporated 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

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

¹⁰The 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.

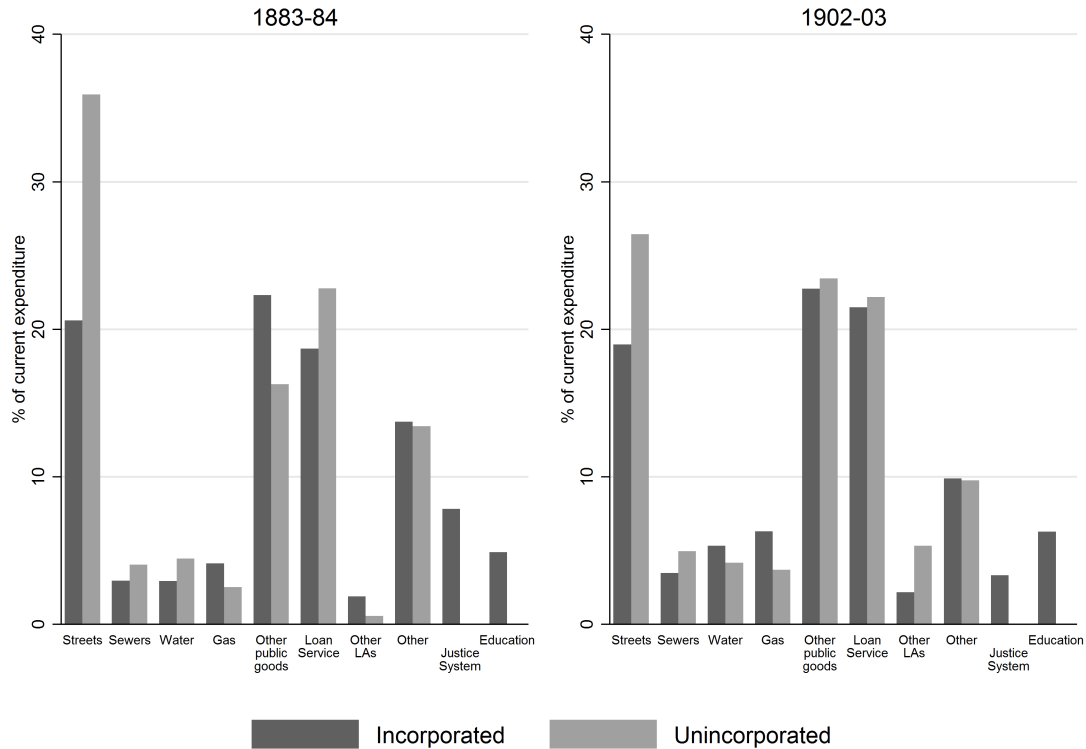


Figure includes expenditure not out of loans in sample of towns identified by the matching exercise. “Other public goods” includes (amongst other items) public lighting, electricity supply, tramways, hospitals, parks and open spaces, baths and wash-houses, collection and destruction of house refuse, 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

¹¹For 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,

¹²These 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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	DV = Current expenditure p.c. (standardized)									
Unincorp.*timePost1894	-0.089 (0.045)	-0.090 (0.045)	-0.090 (0.046)	-0.092 (0.045)	-0.086 (0.043)	-0.084 (0.044)	-0.089 (0.044)	-0.089 (0.045)	-0.091 (0.044)	-0.092 (0.046)
Unincorp.*timePost1896	0.042 (0.056)	0.042 (0.057)	0.044 (0.058)	0.048 (0.057)	0.042 (0.055)	0.042 (0.056)	0.043 (0.055)	0.036 (0.057)	0.047 (0.056)	0.042 (0.058)
Unincorp.*timePost1883	0.001 (0.007)		0.001 (0.006)	-0.000 (0.007)	0.005 (0.007)	0.000 (0.007)	0.003 (0.006)	0.001 (0.007)	0.001 (0.007)	0.000 (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	Agricul- ture	Tax base	1883 loans	Popula- tion	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 (0.021)	-0.048 (0.022)	-0.047 (0.021)	-0.044 (0.020)	-0.044 (0.020)	-0.042 (0.021)	-0.047 (0.022)	-0.053 (0.021)	-0.044 (0.021)	-0.050 (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 (0.1691)	0.200 (0.2219)	0.388
Spending: sewers	-0.012 (0.0493)	0.030 (0.0582)	0.676
Spending: streets	-0.019 (0.0382)	-0.020 (0.0426)	0.066
Spending: gas	-0.024 (0.0461)	-0.026 (0.0579)	0.253
Spending: other public goods	-0.106 (0.0640)	0.069 (0.0714)	0.046
Spending: loan maintenance	-0.022 (0.0388)	-0.017 (0.0533)	0.169
Receipts: taxes	-0.053 (0.0353)	0.011 (0.0352)	0.029
Receipts: tolls and fees	0.090 (0.0558)	-0.171 (0.0573)	0.009
Loans outstanding: total	-0.000 (0.0400)	-0.083 (0.0600)	0.023
Town population	-0.001 (0.0082)	0.005 (0.0088)	0.316

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 (0.069)	0.003 (0.053)	-0.280 (0.097)	-0.282 (0.091)	0.038 (0.067)	-0.020 (0.053)	-0.237 (0.092)	-0.250 (0.086)
Tax base p.c.		0.252 (0.047)		0.152 (0.049)		0.243 (0.047)		0.176 (0.055)
Property receipts p.c.		0.005 (0.007)		0.196 (0.056)		0.004 (0.005)		0.230 (0.078)
Grants p.c.		0.202 (0.017)		0.156 (0.029)		0.204 (0.018)		0.152 (0.031)
post1894	0.661 (0.058)	0.310 (0.227)	0.848 (0.095)	0.565 (0.238)	0.690 (0.058)	0.307 (0.225)	0.799 (0.089)	0.490 (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

¹³The 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*middlClass	-0.279 (0.098)	-0.296 (0.091)	-0.343 (0.108)	-0.354 (0.102)	-0.241 (0.129)	-0.264 (0.116)	-0.273 (0.137)	-0.296 (0.122)	-0.169 (0.109)	-0.205 (0.095)
Unincorp*post1894*upperClass	0.080 (0.068)	0.030 (0.056)	0.022 (0.120)	-0.027 (0.103)	0.095 (0.068)	0.044 (0.059)	0.053 (0.119)	-0.001 (0.102)	0.142 (0.077)	0.085 (0.062)
Unincorp*post1894*Agricultural			0.065 (0.126)	0.068 (0.114)			0.054 (0.126)	0.060 (0.112)		
Unincorp*post1894*Industrial					-0.124 (0.162)	-0.115 (0.145)	-0.151 (0.160)	-0.139 (0.142)		
post1894	0.674 (0.052)	0.340 (0.158)	0.840 (0.088)	0.475 (0.179)	0.658 (0.055)	0.298 (0.157)	0.821 (0.086)	0.439 (0.177)	0.594 (0.056)	0.283 (0.161)
post1894*MiddleClass	0.154 (0.106)	0.161 (0.095)	0.074 (0.106)	0.088 (0.093)	0.126 (0.104)	0.133 (0.091)	0.050 (0.109)	0.063 (0.094)	0.101 (0.106)	0.121 (0.094)
post1894*Agricultural			-0.208 (0.099)	-0.190 (0.089)			-0.203 (0.098)	-0.186 (0.088)		
post1894*Industrial					0.130 (0.133)	0.130 (0.119)	0.121 (0.129)	0.124 (0.116)		
Unincorp*post1894*Dense									-0.132 (0.098)	-0.112 (0.085)
post1894*Dense									0.170 (0.083)	0.132 (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

¹⁴These 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 (0.056)	-0.131 (0.051)	0.085 (0.074)	0.014 (0.058)	-0.307 (0.105)	-0.311 (0.099)
Tax base p.c.		0.235 (0.040)		0.248 (0.052)		0.142 (0.048)
Property receipts p.c.		0.016 (0.010)		0.011 (0.006)		0.197 (0.064)
Grants p.c.		0.171 (0.018)		0.191 (0.014)		0.125 (0.035)
post1894	0.725 (0.052)	0.267 (0.174)	0.674 (0.063)	0.064 (0.248)	0.819 (0.101)	0.708 (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 (0.049)	-0.080 (0.050)	-0.078 (0.051)	-0.082 (0.051)	-0.077 (0.048)	-0.072 (0.049)	-0.076 (0.048)	-0.074 (0.049)	-0.079 (0.049)	-0.082 (0.052)
Unincorp.*timePost1896	0.026 (0.063)	0.028 (0.063)	0.027 (0.065)	0.031 (0.065)	0.030 (0.061)	0.025 (0.062)	0.026 (0.061)	0.016 (0.064)	0.031 (0.063)	0.027 (0.066)
Unincorp.*timePost1883	-0.003 (0.007)		-0.002 (0.007)	-0.001 (0.008)	0.001 (0.007)	-0.003 (0.007)	-0.001 (0.007)	-0.002 (0.007)	-0.002 (0.007)	-0.001 (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	Agricul- ture	Tax base	1883 loans	Popula- tion	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 (0.023)	-0.052 (0.024)	-0.051 (0.023)	-0.051 (0.023)	-0.047 (0.023)	-0.047 (0.023)	-0.051 (0.024)	-0.058 (0.024)	-0.048 (0.024)	-0.055 (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

¹⁵I 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 1893-94¹⁶—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

¹⁶This 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 pxxxii and 2 of the 1893-94 *Local Taxation Returns*

¹⁷These 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.

¹⁸Because 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 (0.046)	-0.109 (0.046)	-0.116 (0.046)	0.012 (0.052)	0.016 (0.051)	0.013 (0.052)	-0.287 (0.091)	-0.279 (0.091)	-0.290 (0.091)
post1894	0.813 (0.076)	0.824 (0.076)	0.844 (0.076)	0.879 (0.110)	0.883 (0.109)	0.913 (0.113)	0.795 (0.116)	0.821 (0.113)	0.837 (0.108)
Poor rate p.c.	0.033 (0.021)			0.038 (0.027)			0.029 (0.025)		
Poor rate p.c., adjusted		0.030 (0.021)			0.036 (0.029)			0.006 (0.025)	
Poor relief p.c.			-0.009 (0.028)			0.027 (0.037)			-0.079 (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 (0.057)	-0.107 (0.050)	0.061 (0.070)	0.006 (0.055)	-0.311 (0.103)	-0.283 (0.094)
Tax base p.c.		0.256 (0.044)		0.236 (0.050)		0.237 (0.065)
Property receipts p.c.		0.008 (0.008)		0.003 (0.005)		0.180 (0.064)
Grants p.c.		0.208 (0.016)		0.195 (0.016)		0.230 (0.027)
post1894	0.737 (0.051)	0.302 (0.178)	0.703 (0.057)	0.214 (0.236)	0.810 (0.099)	0.612 (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 (0.052)	-0.124 (0.046)	0.044 (0.065)	-0.021 (0.050)	-0.279 (0.099)	-0.294 (0.092)
Tax base p.c.		0.209 (0.035)		0.226 (0.047)		0.124 (0.045)
Property receipts p.c.		0.010 (0.011)		0.005 (0.006)		0.224 (0.063)
Grants p.c.		0.177 (0.016)		0.193 (0.014)		0.143 (0.034)
post1894	0.724 (0.049)	0.278 (0.159)	0.679 (0.057)	0.074 (0.215)	0.815 (0.096)	0.745 (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 (0.052)	-0.120 (0.046)	0.061 (0.067)	-0.011 (0.052)	-0.271 (0.098)	-0.280 (0.091)
Tax base p.c.		0.228 (0.036)		0.229 (0.048)		0.170 (0.044)
Property receipts p.c.		0.010 (0.011)		0.004 (0.006)		0.210 (0.057)
Grants p.c.		0.178 (0.016)		0.193 (0.014)		0.147 (0.034)
post1894	0.714 (0.049)	0.311 (0.157)	0.666 (0.058)	0.139 (0.219)	0.810 (0.096)	0.693 (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.

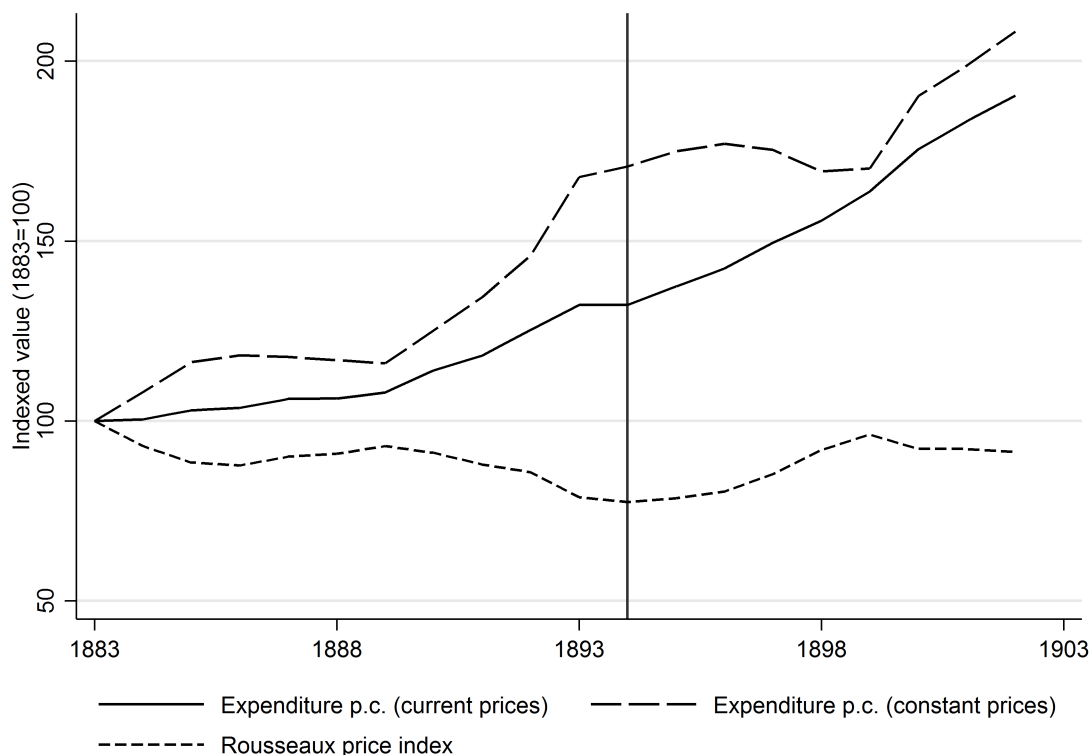
Table C.14: The results are similar when excluding all towns incorporated after 1835.

	DV = Current expenditure p.c. (standardized)					
	All towns		Upper-class		Middle-class	
	(1)	(2)	(3)	(4)	(5)	(6)
Unincorporated*post1894	-0.051 (0.055)	-0.090 (0.049)	0.083 (0.070)	0.007 (0.053)	-0.229 (0.108)	-0.247 (0.103)
Tax base p.c.		0.233 (0.040)		0.251 (0.053)		0.143 (0.049)
Property receipts p.c.		0.008 (0.009)		0.004 (0.006)		0.181 (0.056)
Grants p.c.		0.183 (0.018)		0.196 (0.015)		0.156 (0.039)
post1894	0.707 (0.051)	0.230 (0.170)	0.682 (0.060)	0.077 (0.235)	0.777 (0.104)	0.626 (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 (0.051)	-0.115 (0.045)	0.077 (0.066)	0.009 (0.051)	-0.276 (0.097)	-0.282 (0.089)
Tax base p.c.		0.250 (0.036)		0.255 (0.047)		0.177 (0.045)
Property receipts p.c.		0.010 (0.011)		0.004 (0.006)		0.207 (0.057)
Grants p.c.		0.182 (0.019)		0.201 (0.015)		0.147 (0.037)
post1894	0.439 (0.048)	0.236 (0.153)	0.366 (0.058)	0.097 (0.215)	0.561 (0.092)	0.598 (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.

References

- Banerjee, A. V. and E. Duflo (2007). The economic lives of the poor. *Journal of Economic Perspectives* 21(1), 141.
- Barlow, M. and H. Macan (1903). *The Education Act, 1902, with notes* (Second revised ed.). London, England. Butterworth and Co., Shaw and Sons.
- Chapman, J. (2017). Extension of the franchise and government expenditure on public goods: evidence from nineteenth-century England. *Working paper, downloadable at www.jnchapman.com/research*.
- Gazeley, I. and A. Newell (2000). Rowntree revisited: poverty in Britain, 1900. *Explorations in Economic History* 37(2), 174–188.
- Haines, M. R. (2006). Cost of living of industrial workers in the United States and Europe,

- 1888–1890 [computer file]. ICPSR07711-v4. Hamilton, NY: Michael R. Haines, Colgate University [producer], 2006. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].
- Hamlin, C. and S. Sheard (1998). Revolutions in public health: 1848, and 1998? *BMJ: British Medical Journal* 317(7158), 587.
- Hollis, P. (1989). *Ladies Elect: women in English local government, 1865–1914*. Oxford University Press.
- Horrell, S. and D. Oxley (1999). Crust or crumb?: Intrahousehold resource allocation and male breadwinning in late Victorian Britain. *Economic History Review* 52(3), 494–522.
- House of Lords (1903). *Report from the Joint Select Committee of the House of Lords and the House of Commons on Municipal Trading* Parliamentary Papers 1903 (270).
- Keith-Lucas, B. (1952). *The English local government franchise: a short history*. Blackwell.
- MacMorran, A. and T. Colquhuon Dill (1907). *The Local Government Act 1894, and the subsequent statutes affecting parish councils, with notes and index* (Fourth ed.). London, England. Butterworth and Co., Shaw and Sons.
- McClaren, E. (1987). The civil rights of women. In J. Lewis (Ed.), *Before the Vote was Won*. Routledge and Kegan Paul: New York and London.
- Mitchell, B. R. (1971). *Abstract of British historical statistics*. CUP Archive.
- Rowntree, B. S. (1901). *Poverty: A study of town life*. Macmillan.
- Wilson, J. F. (1997). The finance of municipal capital expenditure in England and Wales, 1870–1914. *Financial History Review* 4(01), 31–50.