

September 11, 2018.

# Appendix: For Online Publication

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## A Some More Context On Danish Municipalities

There have been two large reforms of local politics in the last 50 years. The first was conducted in 1970 as the Danish welfare state started to expand. Here the number of municipalities were reduced from more than 1000 to 275 (Ingvartsen, 1991). (Although it was 277 the first two years.) The second reform was conducted in 2007 and further reduced the number of municipalities from 275 to 98. Once again, the increasing complexity of public service provision was a key argument for the reform (Christiansen and Klitgaard, 2008). Since both of these reforms were comprehensive in terms of amalgamations and changes to the relative power of national ctr. local government, we let them be the bookends of our analysis, examining the relationship between citizens policy views and the ideological flavor of municipal policy between the two reforms.\* Because of data availability we further limit our study period, so that it goes from 1978 and 2008.

In the period we study, Danish municipalities are governed by small city councils (between 9 and 29 members) which are elected at proportional elections and with a multi-party system which, to a large extent, mirrors the party system at the national level (Blom-Hansen et al., 2009). Elections are fixed to take place every four years and do not usually coincide with elections at the national or EU level.<sup>†</sup> Turnout is high with an average of around 70 percent since 1970.

Following each municipal election, a majority in the city council elects a mayor, and the chairmen of the various committees (Serritzlew et al., 2008). Mayors are the only full time professional politicians in the city councils and have a number of formal obligations (Kjaer, 2015). Mayors are also responsible for the day-to-day business of the administration and chairs the important economic committee which sets taxes and the budget. The work in the city council is structured by a a number of committees. The number and size of the committees is determined by the council. Committee membership is allocated proportionality between the political parties which means that there is broad political representation in all committees. The committees can decide on matters in their area and the administrative responsibility across areas is therefore essentially divided.

\*In this study, we exclude the municipality of Copenhagen and Frederiksberg, as these were governed in a different way.

<sup>†</sup>There was only three years between the elections of 1981 and 1978

## B Overview of Policies Included in Our Measure

**Table B1:** Indicators of Fiscal Policy Conservatism

Policy	Availability (number of years)	Do Higher or Lower Values Imply Conservatism?
<i>Tax policy</i>		
Income tax (pct.)	29	Lower
Property tax (per mille)	29	Lower
Commercial real estate tax (per mille)	14	Lower
<i>Spending policy</i>		
Spending pr. capita (DKK)	29	Lower
Spending pr. pupil in school (DKK)	7	Lower
<i>Organization of public service delivery</i>		
Public Employees (pr. 1,000 citizens)	9	Lower
Privately operated services (pct.)	14	Higher
Purchases with a private supplier (pct.)	14	Higher
<i>Co-payment for public services</i>		
Average cost of day care (DKK)	16	Higher
Price of relief stay (DKK)	7	Higher
Food delivery for the elderly (DKK)	7	Higher
Stay in nursing home (DKK)	7	Higher
<i>Extent of Public Services</i>		
Public housing (pct.)	14	Lower
Class size in public schools	14	Lower

Notes: There was a change in how certain parts of social spending was measured in 1994. We adjust for this in our analysis, subtracting the average difference between '78-'93 and '94-'05 from the spending variable after '94.

## C Details about Estimation of Municipal Fiscal Policy

We parameterize fiscal conservatism using the following measurement model, which allows us to estimate it across time and space:

$$\begin{aligned} F_{itk} &\sim N(F_{itk}^*, \phi) \\ F_{itk}^* &= \beta_k C_{it} - \alpha_k \end{aligned}$$

Where  $F$  is the level of the observed fiscal policy variable  $k$  in municipality  $i$  at time  $t$ . the distribution of each of these observed variables is drawn from a normally distributed latent variable  $F^*$ , which has variance  $\phi$ .  $C$  is the quantity of most interest – the latent fiscal conservatism in that municipality.  $\beta$  is the discrimination parameter, which captures how strongly each observed policy variable loads onto the latent dimension. Finally,  $\alpha$  represents each item's difficulty parameter, which measures how fiscally conservative a municipality is, if it were to score 0 on the policy variable  $k$ .

This parameterization is in many ways similar to frequentist factor analysis. However, a major advantage to using Bayesian techniques when making inferences about the latent trait is that the simulations will impute missing data during the estimation, which allows us to include items with different numbers of observations in the model – the variables with missing observations will simply supply less information to the estimation. Furthermore, we can use the Bayesian priors to introduce dynamics into the model, thus allowing quantities to not only vary across time, but also directly model temporal autocorrelation. Additionally, the estimation is simulation based, which allows us to directly estimate uncertainty around all model parameters. Finally, constraining prior distributions offers a flexible way of identifying the policy space. More on this final point later.

We include the 14 policy variables listed in table B1 in the model. Before we do so, all variables are rescaled to have mean zero and variance one. Furthermore, all variables where higher values imply a more left-wing fiscal policy are reversed. This implies that when estimating policy conservatism, higher values on all variables indicate a more conservative policy. This is strictly speaking not necessary, but it makes interpretation of the model parameters simpler.

To identify the direction of the policy space, we constrain the  $\beta$ 's to be positive, so that municipalities scoring higher on our observed policy variables will be estimated to be more conservative. Location and scale is identified by placing standard normal priors on the distributions of all model parameters. All precision parameters are estimated using uninformative gamma priors.

Estimation is done by initiating a random walk over the parameter space defined by the model using the Gibbs sampler. We run 25,000 iterations of the model, where the first 2,500 are burn in. We run three parallel chains. To reduce autocorrelation within the chains of sampled values and improve convergence, we set a thinning interval of five, meaning that we

only retained every fifth sampled value. Together, this specification ensured convergence of the model and provided well-behaved, normal posterior distributions.

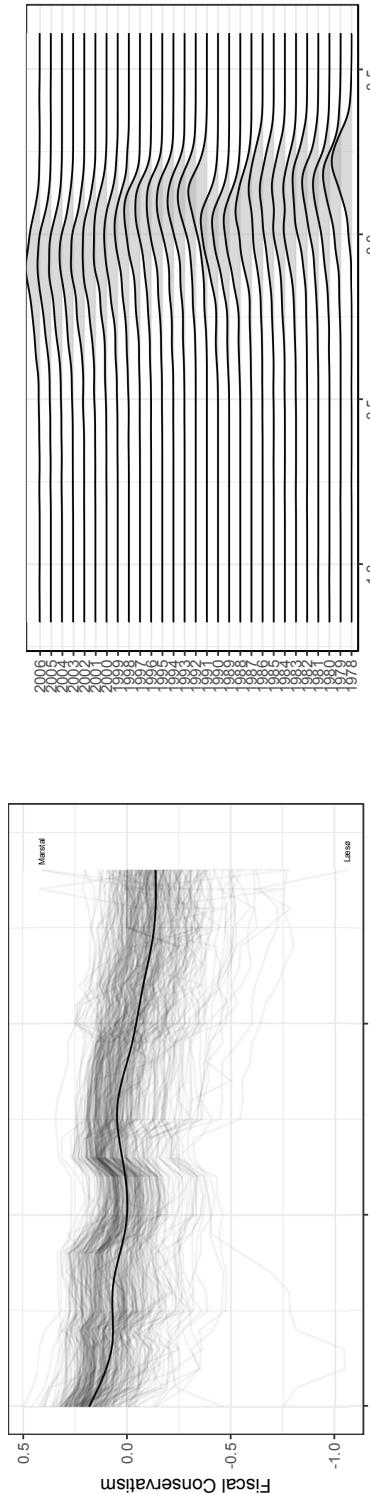
## D Some Descriptive Features of Municipal Fiscal Policy

Figure D1 presents some descriptive features of the annual measure of fiscal policy conservatism. In particular, it looks at how the measure is distributed across time and space, revealing some interesting patterns in municipal fiscal policy.

Fiscal policy conservatism dropped slightly in the period. The drops are located in '78 to 81 and from 93 to 2000: periods where the Social Democratic Party was in power nationally. This makes sense as liberal national fiscal policies are likely to spill over into local politics through intergovernmental grants etc.

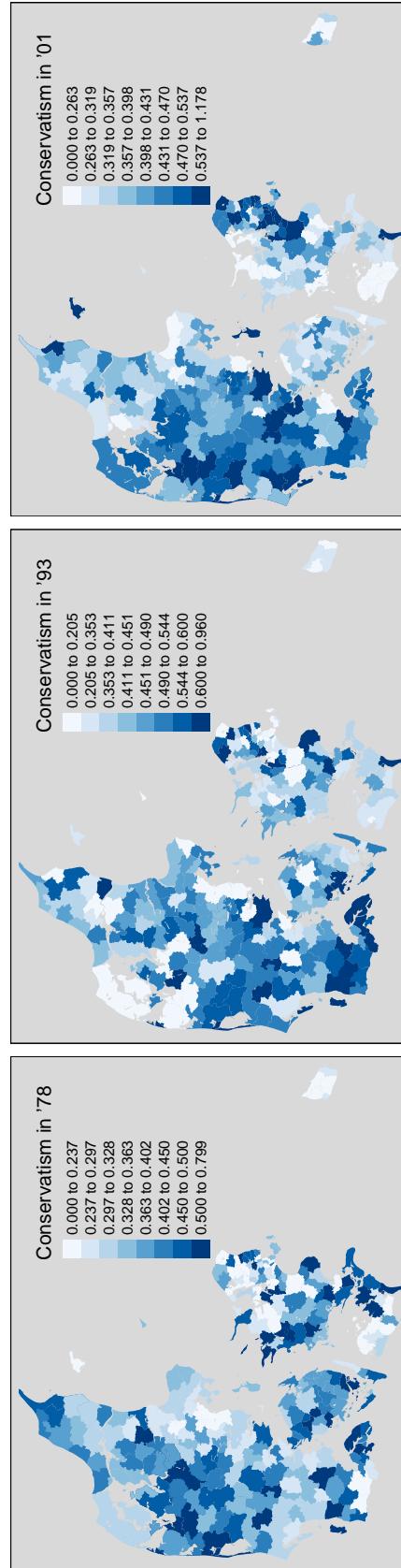
Aside from the national trends, however, the most notable feature of the time series seems to be the large variation we identify in fiscal policy. Some municipalities are, apparently, very fiscally conservative while others are very liberal. Although the within-differences are less dramatic, we also see some municipalities start out more conservative and then become more liberal and vice versa.

Further, the geographic spread of fiscal conservatism matches what most observers of Danish politics would expect. The most conservative municipalities are in Western Jutland and North of Copenhagen whereas the most Liberal (or Socialist) municipalities are west of Copenhagen and in and around the other large cities (Aalborg, Aarhus, Odense). Figure D2 presents an overview of the most and the least conservative municipalities across the entire period.



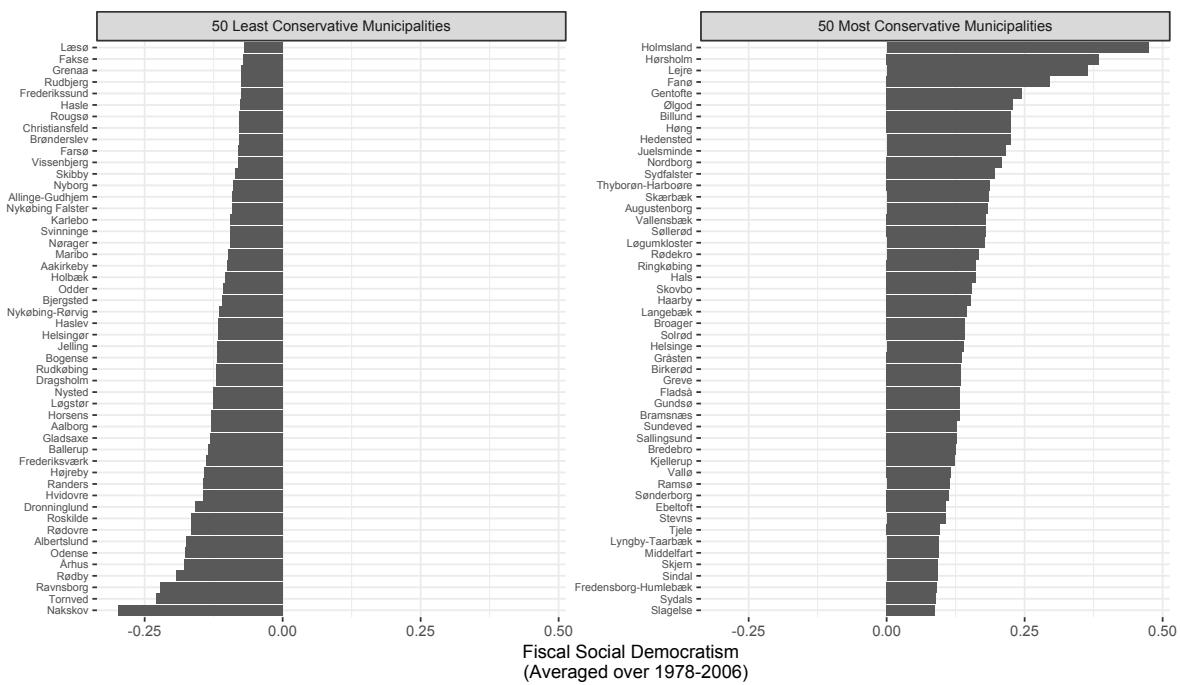
(a) Average Municipal Fiscal Policy Conservatism (dark line) and Municipal Fiscal Policy Conservatism for Individual Municipalities (grey lines) from 1978 to 2006.

(b) Distribution of Municipal Fiscal Policy Conservatism from 1978 to 2006 (densities).



(c) The Geographic Distribution of Municipal Fiscal Policy Conservatism at Three Points in Time.

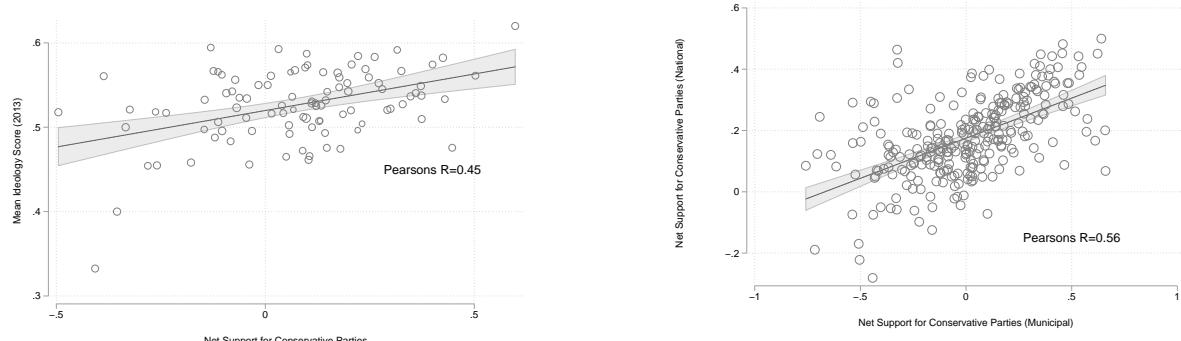
**Figure D1:** How has Municipal Fiscal Policy Conservatism Developed from 1978 to 2006?



**Figure D2: The Most and Least Conservative Municipalities**

## E Validating Our Measure Of Citizens' Policy Preferences

How well does this electoral measure capture voters underlying preferences? To get an indication of this, we look at the 2013 Danish Municipal Election Survey Elklit et al. (2017). In this survey, more than 30 respondents (avg. 46) from each municipality were asked to place themselves on an eleven point ideology scale going from left to right. We calculate the municipality-specific mean of these responses and correlate these with the municipality-specific net support for conservative parties in the 2013 municipal election. As can be seen from figure E3a, the two are strongly correlated, which suggests that we are in fact tapping into relevant variation in policy views, when we measure citizens preferences over parties. Further, its important to note that the correlation is biased downwards, because we have random measurement error in our sample based measure of policy views.<sup>‡</sup>



**(a)** Does the electorates preference over parties reflect preferences over policy? Data from the 2013 municipal election.

**(b)** How strongly correlated are the electorate's preferences at municipal and national elections? Data from the 2005 municipal and national elections.

**Figure E3:** How does our measure of local policy preferences perform?

Our measure of local policy preferences do not simply reflect the overall ideological mood in the municipality, but the ideological mood expressed by the electorate at municipal elections. This is potentially significant, because unlike previous research, which relies on electoral data from national or regional elections, we do not risk misidentifying electorates who might differ in their policy views across domains (i.e., who want more liberal fiscal policies locally and more conservative policies nationally). Why might there be a divergence between the electorate's preferences at a local and at a national election? For one, the electorate at municipal elections might be differently composed than electorates in national elections, as different types of people participate in different types of elections (Anscombe and Schaffner, 2015; Hansen, 2017) In addition to this, voters might have preferences over which levels of government should be smaller or larger.

In figure E3b, we try to gauge the extent to which it matters that our measure relies on

<sup>‡</sup>The reader should also note that due to the municipal reform of 2006 (cf. the section on empirical context) we can only have 98 observations corresponding to the 98 (amalgamated) municipalities.

data from municipal rather than national elections. To do this, we correlate municipal-level net support for conservative parties at the 2005 municipal election with municipal-level net support for the same conservative parties at a national election held six months earlier. This analysis reveals a strong, but in no way deterministic, correlation of 0.56. Accordingly, we might miss meaningful variation, if we used election returns from national, rather than local, elections to estimate local policy preferences.

## F An Alternative Measure of City Policy Preferences

## G Effects on Individual Policy Indicators

## H Models With Controls

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