Supplementary Material[8]

In the course of drafting this paper, I also used a number of other methodological tools as robustness checks and for exploratory purposes. In this section, I detail those methods along with some theoretical considerations not suitable for inclusion in the main text:

Other Organizational Reference Sources

There may be some questions to the robustness of the *Encyclopedia of Medical Organizations and Agencies* in regard to overcounting abortion-rights groups and undercounting anti-abortion groups. Intensive research, however, revealed this to be the most comprehensive listing of reproductive rights organizations since the birth of the issue space. Other popular directories, like *Associations Unlimited* (formerly known as the *Encyclopedia of Associations*), have severe data limitations given their publication year. Namely, omission of early organizations. Despite over 35 years of organizational development between the *Encyclopedia of Medical Organizations* and *Associations Unlimited* data, the latter only lists marginally more organizations (and is heavily biased toward those founded in the 1990s or later). Preliminary searches of several other sources revealed similar issues. The table below is an estimate of the total number of organizations listed by each source. Note that the search terms for *Associations Unlimited* were "abortion" and "pro-choice."

Comparison of Organizational Listing Sources Counts

Source	Year	Abortion-Rights	Anti-Abortion
Encyclopedia of Medical Organizations and Agencies	1987	68	35
Associations Unlimited	2023	83	43
The Making of Pro-Life Activists	2002	-	21
The Anti-Abortion Movement	1996	-	45

Additional research on web-based databases, including many that advertised themselves as "Pro-Life" had sparse organizational listings as well. Taken together, these findings led me to select the 1987 encyclopedia as it was the most comprehensive and, therefore, most reliable source.

Other Forms of Competition

One would be apt to point out that reproductive rights groups offer an ideal case study for the principles of interspecific competition outlined in the main text. I agree. Theoretically, it makes sense to directly compare the densities of two populations when the goals of those organizations are diametrically opposed. This type of diametric competition is common among a range of primarily social issues. For example, gun control, the ERA, and same-sex marriage organizations all exhibit this type of competition. Other groups that compete

[8] This section not intended for print publication.

are not diametrically opposed. Consider the interests of environmental rights groups and "big oil." While oil lobbyists often support policy that impacts the environment (initiating competition with the requisite groups), their goal is not to destroy the environment. It is, rather, to advance an economic concern. While it is beyond the scope here, future scholars should look to develop a scalar competition variable that accounts for the partial nature of competition.

Cox Proportional Hazards Model

Another potential approach to the study of two species' effect on one another is a "hazard model." A Cox Proportional Hazards Model can identify factors that affect the odds of survival of a particular group (Cox 1972). In this study, it would estimate how the founding of anti-abortion groups affects abortion-rights groups' survival and vice-versa. However, because this paper is not examining survival rates, instead looking exclusively at founding rates, a hazard model is theoretically incompatible with the data. Therefore, I do not employ one here. If i were to investigate the topic of group death further in the tradition of Nownes and Lipinski (2005), it would make sense to use a hazard model.

Growth Curves

Upon initial data collection I wanted to examine the rate of growth of these organizations. This necessitated fitting a curvilinear function to the data. Calculating this not only revealed the growth rate (r) but also the carrying capacity. I used a non-linear least-squares Levenberg Marquadt algorithm to define these population characteristics. This method was originally developed to study the exponential growth of microorganisms for analysis in *R* statistical software by Sprouffske and Wagner (2016). The resulting graphs for anti-abortion and abortion-rights groups are displayed in Figures 2 and 3. Ultimately, my theoretical and empirical approach made this unnecessary to include in the main body of this paper.

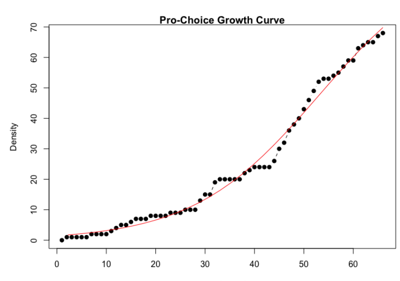

Figure 4

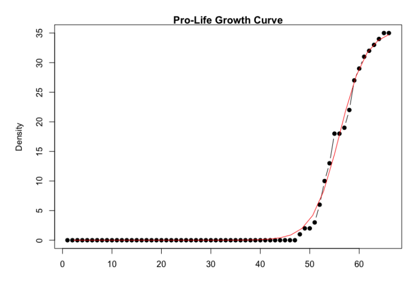

Figure 5

These figures, and the associated growth curves, are no substantively different than the data displayed in Figure 1 despite their higher level of detail.

Serial Autocorrelation

When dealing with count data of organizations, a common question raised is that of serial autocorrelation. The cumulative number of groups at $t = 0$ represents density, but the number of group formations at $t = 0$ will be correlated with formations at $t-1$. The number of groups formed last year – not just the number of groups that have accumulated since the beginning of time – will bias standard errors down. A straightforward remedy for this is to fit a Poisson autoregressive model or PAR(p). This method was developed by Brandt and Williams (2001). Because my dataset is small (n=66), I had to drop the squared covariates from analysis. Nevertheless, the results remain substantively similar to those reported in the paper.

Zero-Inflation

The abortion-rights data has few zero-observations so zero-inflated bias is not a concern. Because the anti-abortion data does not see growth until later in time (1967), there are a significant number of zero-occurrences at the beginning of the data. However, because these zeroes are not randomly distributed across the data, fitting a zero-inflated model would not be appropriate. In theory I could designate a start year of 1800 and have 167 leading zeros. To check for bias in the model, I fit models dropping the leading zero observations. The results are displayed in Table 5. While the few observations in this model specification do not allow for additional variables to be included, the substantive conclusions remain unchanged.

Other Theoretical Considerations

My research interest in this topic was piqued by the study of interspecific competition by Lotka (1925) and Volterra (1926). Their research was a breakthrough in the mathematical specification of species' competition for food. Later research would consider not only competition between Species 1 for resources (e.g., lions vs. other lions) but also the competition between Species 1 and 2 (e.g., lions vs. hyenas). The latter case is "interspecific" competition and is expressed through what is now known as Lotka-Volterra equations. They take the form:

$$\frac{dx_1}{dt} = r_1 x_1 (1 - (\frac{x_1 + \alpha_{12} x_2}{K1})) \text{ and } \frac{dx_2}{dt} = r_2 x_2 (1 - (\frac{x_2 + \alpha_{21} x_1}{K2}))$$

The notation r represents the rate of growth, x is the population size (density), and K is the carrying capacity. α is the effect of one species on another with the subscripts of 1 and 2 representing the two species, respectively.

A direct application of these models did not make it into the final paper as it is more appropriate when you can operationalize a specific resource like membership numbers. Instead, I used density dependence which does not require resource specification.

Table 2

	Dependent variable:	
	Life_founding	
	(1)	(2)
Life_density	0.356	
	(0.231)	
Life_densitysq	−0.007**	
	(0.004)	
Choice_density		0.844**
		(0.420)
Choice_densitysq		−0.008**
		(0.003)
Abortion_ratio	−0.007	−0.00001
	(0.008)	(0.004)
Observations	19	19
Log Likelihood	−28.701	−28.526
Akaike Inf. Crit.	65.402	65.051
Note:	*p<0.1; **p<0.05; ***p<0.01	