Thyne, Clayton L., and Ryan D. Schroeder. 2012. "Social Constraints and Civil War: Bridging the Gap with Criminological Theory." *Journal of Politics* 74(4):1066-1078.

Online Appendix

As noted in footnote 4, a plethora of analyses were run to assure the robustness of the results presented in our manuscript. Below we provide a more thorough description of these efforts.

I. Dependent Variables

I.a. Civil War onset (macro-level): We began building our dependent variable using Strand's (2006) list of armed conflicts. A new onset is coded after two years of inactivity. This dataset ends in 2004, so we updated our dependent variable using Version 4_2009 of the Uppsala/PRIO Armed Conflict Dataset, using rules consistent with Strand (2006). We followed Powell and Thyne (2011) in removing instances of armed conflict that are better specified as bloody coups than civil wars.

We ran two additional tests to assure that our results were insensitive to how we operationalized civil war onset. First, the measure used in the paper includes both intrastate and externalized intrastate conflicts. We limited this to intrastate conflicts only, which did not provide an appreciable difference in our findings. Second, the measure used in the paper codes a new civil war following a two-year break in fighting. Alternative specifications included coding a new civil war following both 1 and 3 year breaks in findings. Neither of these specifications produced appreciable differences in our primary findings.

I.b. Taste for revolt (micro-level): While we operationalize 'taste for revolt' using a dichotomous indicator in the paper, the responses could also be considered as an ordinal measure. Thus, we also ran analyses using ordered logit with the following specification:

3 = "The entire way our society is organized must be radically changed by revolutionary action"
2 = "Our society must be gradually improved by reforms"
1 = "Our present society must be valiantly defended against subversive forces."

This alternative specification provided results that were substantively identical to those presented in the paper.

II. Independent Variables

II.a. Social Controls Index: The indices in the manuscript are common factor indices, which uses the correlations matrix of the independent variables derived from our theory—unemployment, military involvement, and marital attachments—to derive the value of a common factor, which we refer to as the "Social control index." For both the macro and micro analyses, the three measures used to capture these concepts loaded onto only one factor with an Eigenvalue of 1.31 (macro) and 1.46 (micro). For the macro-study, the factor loading were similar for each component of the index, including 0.71 for military personnel, 0.70 for marriage rate, and 0.57 for male unemployment. For the micro index, factor loadings were similar for employed (.266),

married (.267), and were weaker for armed forces (.06). We used these factor loadings to create the "Social controls index" measures used in Table 2, Models 1 and 5.

We also tested indices using a more naïve additive approach. For the macro-study, this was accomplished in three steps. First, we multiplied unemployment by -1 to make the direction of its expectation consistent with the measures for marriage rate and military personnel (i.e., higher values should decrease the likelihood of civil war onset). Second, we rescaled each measure to vary between 0 (lowest controls) and 1 (highest controls). Third, we added each measure to create a single "Social controls (additive) index." The final additive measure correlates with the common factor (explained above) at r=.90, and the results using the additive alternative do not alter the results appreciably (coefficient=-7.07, p=.002).

The naïve additive approach for the micro-tests was simpler. Given that the indicators are already dichotomous, we skipped the rescaling step. We reversed the sign of unemployed to create a measure for employed (i.e., switched 0s to 1s and 1s to 0s), and then added the three components. This again produced a very high correlation with the factor index (r=.97) and produced similar results (coefficient=-.106, p<.001).

II.b. Validity Concerns. We considered several issues to assure the validity of our independent variables, particularly for unemployment and marriage. Obtaining measures for these concepts is exceedingly difficult. Both the UN marriage data and the unemployment data provided by the World Bank come from the UN's International Labor Office (ILO) rely on a series of surveys. Each of these measures is likely influenced by reporting bias and difficulties reaching isolated population centers. While problems undoubtedly exist, these are the best available data available, and we have little reason to suspect systematic bias in the data that would result in Type I error in the forthcoming analyses. For a detailed discussion of these issues and solutions, see http://siteresources.worldbank.org/DATASTATISTICS/Resources/doc.pdf (for employment data) and http://unstats.un.org/unsd/demographic/products/indwm/standards.htm (for marriage data).

III. Missing Data.

In order to test as many country/years as possible in the macro-level tests, we were forced to alter the original unemployment and marriage data to deal with missing data. The marriage indicators are reported for sporadic years and include a single observation for each state in our dataset. For example, the UN reports that 5.3 percent of males aged 15-19 in Chile were married in 1992. No other years were reported for the Chile. We deal with this by assuming that reported marriage rate remains constant for each state in our dataset (e.g., *Male marriage rate* equals 5.3 from 1981 to 2008 in Chile). This approach seems reasonable for several reasons. First, many variables commonly examined in models of civil war onset (e.g., ethnic fractionalization, mountainous terrain, region, country size, resources) also remain constant for each year under study. Second, more detailed studies focusing specifically of marriage rates over time show that marriage rates change little, even in turbulent times (e.g., Fussell and Palloni 2004). Third, unlike our dependent variable, our approach eliminates temporal variation in the data, which likely works against our finding a statistically significant relationship.

Data capturing employment also include a decent amount of missing data. Many countries have complete data from 1980 to 2006, while others have gaps of missing years. For example, Chile has complete employment data for males from 1981 to 2007, while Mexico is missing values for 1990-1991. As with marriage, there is sound evidence that employment rates vary little over time (World Development Indicators: People 2009:36). Thus, we impute missing data by filling down from the most recent year that data are available. Values for 1990-1991 in Mexico, for example, equal the 1989 value (1.99 percent). We do not fill down beyond 5 years of missing data. This approach brings our unemployment observations from 1808 to 2636.

Finally, we should also note that while the WVS data include over 250,000 observations, our final analyses are much smaller due to missing data in the dependent variable. Rather than assuming that these data were missing at random, we ran a logit model in an attempt to predict the missing values using the same independent variables included in Models 1-4. These analyses revealed little of interest to suggest that our results should be biased by missing data.

IV. Control Variables

The analyses presented in the paper are kept as parsimonious as possible in terms of the control variables presented. The efforts from our macro-tests largely followed Dixon's (2009) discussion of the empirical results on civil war onset by including measures for the concepts deemed consistently important across many studies. To assure the robustness of our results, we also included measures for ethno-linguistic fractionalization, income inequality, alternative regime type indicators (e.g., polity and polity^2), resources, and the yearly change in state wealth. The inclusion of these indicators made no appreciable difference in our results. Regarding the micro-tests, we largely followed MacCulloch (2004) and Humphreys and Weinstein (2008, when possible) in developing appropriate control variables.

V. Multi-level Modeling

The individual-level analyses presented in the paper employ hierarchical linear modeling (HLM) with a Bernoulli distribution with a logit link function. The full specification of level one of the multi-level model is:

$$\text{Log}[p_{ij}/(1-p_{ij})] = \beta_{0j} + \beta_{1j}*(\text{'Primary IV'}_{ij}) + \beta_{2j}*(\text{Income}_{ij}) + \beta_{3j}*(\text{Male}_{ij}) + \beta_{4j}*(\text{Education, } 2^{nd}_{ij}) + \beta_{5j}*(\text{Education, } 3^{rd}_{ij}) + \beta_{6j}*(\text{Age}_{ij}) + \beta_{7j}*(\text{Age}^2_{ij})$$

Where p_{ij} is the probability that respondent i in country j has a "taste for revolt" and 'Primary IV' is "Social Control Index" (Model 1), "Unemployment" (Model 2), "Military" (Model 3) and "Marriage" (Model 4).

Specification of level two of the multi-level model is:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}*(\text{Military exp.}_j) + \gamma_{02}*(\text{Population}_j) + \gamma_{03}*(\text{GDP/capita}_j) + \gamma_{04}*(\text{Democracy}_j) + \gamma_{05}*(\text{Authoritarian}_j) + u_{0j}$$

All non-dummy individual-level independent variables in the individual-level analyses are grand-mean centered. Alternative estimation techniques, including robust standard errors clustered by state and state-level fixed effects produce substantively identical results to those presented in the manuscript.

VI. References

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