Economics Letters 123 (2014) 398–401

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Inequality in democracies: Testing the classic democratic theory of redistribution

Brandon Pecoraro

Fordham University, Department of Economics - 441 East Fordham Road, Bronx, NY 10458, United States

HIGHLIGHTS

- Dependence of redistribution on mean-to-median income ratio investigated.
- No evidence found that this inequality measure is relevant for predicting redistribution.
- Inference from nonparametric regression framework robust to specification error.
- Motivates need for reexamination of democratic theory of redistribution.

ARTICLE INFO

Article history:
Received 23 September 2013
Received in revised form
5 April 2014
Accepted 6 April 2014
Available online 13 April 2014

JEL classification:
D31
D72
H23

Keywords:
Redistribution
Income inequality
Democracy
Nonparametric econometrics

ABSTRACT

The classic democratic theory of redistribution claims that an increase in the mean-to-median (MM) income ratio causes a majority coalition in the electorate to collectively demand more redistribution. The functional dependence of redistribution on the MM income ratio is tested in parametric and nonparametric regression frameworks using an OECD panel dataset. While the parametric regression model is found to be misspecified rendering subsequent inference invalid, the robust nonparametric regression model fails to uncover evidence that the MM income ratio is relevant for predicting redistribution.

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1. Introduction

The influential Meltzer and Richard (1981) classic democratic theory of redistribution claims that an increase in income inequality characterized by a higher mean-to-median (MM) market income ratio incentivizes a majority coalition in the electorate to demand more redistribution. Candidates who make pre-election promises to expand redistributive policies are then elected into office; their post-election policies subsequently increase the relative size of government expenditures and taxation to offset rising inequality. Given the observed persistence of such inequality in democracies without a clear political economic response, especially in the United States, this letter questions whether the classic theory has any predictive value. This concern is important: without an inequality mitigating mechanism inherent in democracies as commonly believed, the persistence of inequality perpetuated by market, regulatory, and other forces is potentially indeterminant.

Existing empirical studies often fail to find support for the classic theory: Meltzer and Richard (1983) derive an estimating equation by linearizing their model and apply OLS with aggregate United States data for 1937–1977. Although they find evidence for the hypothesized positive relationship between the MM income ratio and redistribution, Tullock (1983) argues that statistical significance is an artifact of the coincident trending of both variables inducing spurious correlation. Gouveia and Masia (1998) reestimate the regression model using GLS and two-way fixed effects with a state-level panel dataset for 1979–1991; across specifications they find the coefficient estimate on the MM income ratio to be either statistically insignificant, or statistically significant with a theoretically incorrect sign or economically insignificant magnitude. Rodríguez (1999) adds demographic and political control variables and re-estimates the model using OLS and IV methods for 1984–1994 at the state-level; he fails to find evidence for a

E-mail address: bpecoraro@fordham.edu.

http://dx.doi.org/10.1016/j.econlet.2014.04.006
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significant relationship with the correct sign in any of his 18 specifications. Moreover, he also fails to find supporting evidence using time series methods over 1937–1992 for the United States. The cross-country studies of Lindert (1996) and Larcinese (2007) also fail to find a significant positive relationship between the MM income ratio and redistribution.

Despite these results, the substantive prediction of the classic theory remains a baseline for the inequality-redistribution relationship in democracies. The purpose of this letter is to address a common limitation in previous studies: the parametric frameworks used for hypothesis testing, which are only meaningful absent specification error, are not subjected to misspecification testing. In order for statistical inference in parametric regression models to be consistent, i.e. have asymptotic power equal to one, the model must be correctly specified with respect to the true data generating process. This is a concern because the estimating equation often used in previous studies is a linearization; if the linear equation is not a good approximation of the true model then the estimated regression model can be misspecified. Misspecification, however, can be avoided with a *nonparametric* framework, which makes no assumptions about the functional form of the regression model.

Using recent OECD cross-country data, I apply both parametric and nonparametric regression methods to test the relevance of the MM income ratio for predicting redistribution. Since the parametric model used here is determined to be misspecified and thus subject to inconsistent testing, nonparametric methods are indispensable for consistent inference. The robust nonparametric model subsequently used fails to uncover empirical support for the classic theory. This increased weight of evidence at odds with the classic theory motivates the need for further reexamination of the democratic theory of redistribution.

2. Data description

The dataset is an unbalanced panel of 29 countries[1] for 2000–2012 from the OECD (2014). Two measures of redistribution are defined to facilitate cross-country comparison following Lindert (1996) and Larcinese (2007), and used in turn: total general government expenditures and public social spending, each relative to GDP. Income variables are the MM equivalized household market income ratio and real median equivalized household market income in US dollars.[2] While the equivalence scale gives a rough measure of individual income, no attempt is made to adjust for voter turnout by income class; as in previous studies, the observed median income level is taken as a proxy for the voter with median income. Income variables are lagged by two years to acknowledge electoral cycle timing and policy implementation lags.

Table 1 presents sample descriptive statistics. The redistribution variables of general government expenditures relative to GDP (*GG*) and public social spending relative to GDP (*SS*) take on mean values of 0.454 and 0.218 respectively. Variation for both measures is relatively large with respective standard deviations of 0.067 and 0.050. The mean-to-median income ratio (*MM*) is 1.190 on average with minimum and maximum values of 1.071 and 1.374. Finally, median income in ten thousand US dollars (*MED*) in the sample is 2.054 on average with a fairly large range of 2.787.

The Pearson correlation coefficients $\rho(GG, MM) = -0.08$ and $\rho(SS, MM) = -0.11$ are both weakly negative, but statistically insignificant at all conventional levels. There is, however, a statistically significant positive correlation between the level of median income and the ratio of general government expenditures to GDP of $\rho(GG, MED) = 0.14$ at the 10% level of significance, indicating a weak positive linear association.

3. Regression analysis

Consider the general regression model $y_{it} = g(\mathbf{x}_{it}) + u_{it}$, where $\mathbf{x} \equiv \{x_1, x_2, \ldots, x_q\}$ is a vector of q explanatory variables, y is a response variable, $g(\mathbf{x})$ is the conditional expectation $\mathrm{E}(y|\mathbf{x})$, u is a disturbance term, and the indices i and t denote observations in cross-section and time dimensions respectively.

In previous tests of Meltzer and Richard (1981), the regression model is estimated by expressing the conditional expectation with a finite set of parameters as $g(\mathbf{x}) = \mathbf{x}\boldsymbol{\beta}$ where $\boldsymbol{\beta}$ is a $q \times 1$ vector of parameters. Meltzer and Richard (1983) specify the natural log of the re-centered MM income ratio, the reciprocal of median income, and a constant as explanatory variables in their estimating equation. Letting $\mathbf{x} = \{1, \log(MM - 1), \log(MED)\}$, I use the natural log of median income instead of the reciprocal for ease of interpretation. Both measures of redistribution in logs, $\log(GG)$ and $\log(SS)$, will each be used as the response variable y in turn. These explanatory variables are unadjusted for any nature of 'public dependency' due to limitations of available data. To capture any cross-sectional unobservables assumed to remain invariant over the short time dimension, such as structural public dependences, the parameter vector $\boldsymbol{\beta}$ is estimated with one-way fixed effects using the within estimator (Wooldridge, 2002, p. 269)

$$\hat{\boldsymbol{\beta}}_{FE} = \left(\sum_{i=1}^{N}\sum_{t=1}^{T_i} \ddot{\mathbf{x}}_{it}'\ddot{\mathbf{x}}_{it}\right)^{-1}\left(\sum_{i=1}^{N}\sum_{t=1}^{T_i} \ddot{\mathbf{x}}_{it}'\ddot{y}_{it}\right) \quad (1)$$

where $N = 29$ is the number of cross-sections, T_i is the number of time periods for cross-section i, and the double-dot accent denotes a time-demeaned variable.

Table 2 presents output for the parametric regression model. Of particular interest is the partial effect $\partial\, \mathrm{E}(\hat{y}|\mathbf{x})/\partial \log(MM - 1) \equiv \hat{\beta}_{MM} \in \hat{\boldsymbol{\beta}}_{FE}$ which, as no interaction or higher order terms are specified, is the estimate for the elasticity of *MM* on redistribution. This estimate is statistically no different from zero at all conventional significance levels with either definition of redistribution. The coefficient estimate on *MED* is statistically significant and positive for both definitions of redistribution, with implied elasticities of 0.27 and 0.37 for *GG* and *SS* respectively.

If one had perfect knowledge of the data generating process and is therefore able to correctly specify the parametric regression model, the above result may be considered evidence against the substantive prediction of the classic theory. Suppose, however, the true model is instead of the form $\mathrm{E}(y|\mathbf{x}) = \mathbf{x}\boldsymbol{\beta} + \boldsymbol{z\delta}$ where $\boldsymbol{z} \neq \mathbf{0}$ is a vector of unspecified interaction or higher order terms with $\boldsymbol{\delta} \neq \mathbf{0}$ as the associated vector of parameters. The estimated model is then misspecified because the true partial effect is $\beta_{MM} + \partial(\boldsymbol{z\delta})/\partial \log(MM - 1)$. A t-test of the null hypothesis that β_{MM} is equal to zero can potentially lead to misleading inference about the true partial effect; it is inconsistent in the sense $P(\text{Reject } H_0|H_0 \text{ is false}) \nrightarrow 1$ as $n \to \infty$.

[1] Country list: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States. Chile, Mexico, Portugal, and Turkey are excluded as outliers with observations exceeding three standard deviations from the mean. Hungary is excluded due to lack of available data.

[2] While the OECD collects data for mean market income, it only collects data on median disposable income. With this data limitation, median market income is approximated from median disposable income under the assumption that the median income unit faces the same average income tax rate and receives the same level of public transfers as the mean income unit. Each country's real median income values in terms of LCU and 2005 local prices are converted into US dollars using the 2005 PPP exchange rate.

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