Ideological change and the economics of voting behavior in the US, 1920–2008[☆]

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ABSTRACT

This paper tests the proposition that voters advance a more liberal agenda in prosperous times and turn more conservative in dire economic times. A reference-dependent utility model suggests that, with income growth, the relative demand for public goods increases and the median voter is more likely to vote Democrat. With slowing income growth, the median voter derives increased marginal utility from personal income—making taxation more painful—and is more likely to vote Republican. Ordinary and instrumented analyses of a new time series for the US median voter are encouraging of this income growth model. This work links voting behavior to economic business cycles and shows that ideological change is endogenous to income growth rates.

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Public-spiritedness is harder to inspire among people who feel they're losing ground.

Robert Reich.

1. Introduction

Do long-term economic business cycles impact ideology and voting behavior? Would a prospering economy push aggregate voter preferences towards more expansionary government and the liberal left; and does a contracting economy lead voters to favor smaller government and the conservative right? In short, is ideological change endogenous to variation in income growth rates?

Surprisingly few scholars have dealt with this important question head-on. That this fundamental dynamic in political economy is understudied may be explained by the following two reasons. First, the pioneering work by Campbell et al. (1960) and Lipset and Rokkan (1967) established models of voter preferences that are determined by partisan affiliation or class and religious cleavages in society. Later work augmented sociological sources with the ways in which electoral systems (Alesina and Glaeser, 2004; Iversen and Soskice, 2006), economic institutions (De Neve, 2009; Iversen and Soskice, 2009), and individual traits (Fowler et al., 2008; De Neve, 2013) shape interests, ideology, and voting behavior. The result of these literature, however, is a rather static vision of ideological change. For voter ideology to change we would need variation in sociological structures, electoral and economic institutions, or personality traits. Because these variables are either hard to quantify or slow-moving, there have been few attempts at better understanding ideological change.

Equally important may be that virtually all attention for the link between economics and voting behavior has been monopolized by short-term analyses of how economic performance affects incumbency. Hence, from the outset, it is important to distinguish the empirical and modeling effort in this paper from the large literature denoted as "economic voting." This paper studies how changing

Table 1
Comparison with alternative voter ideology measures.

Name	Availability	N	Range	Mean	Std dev	Min	Max
US Median Voter (De Neve, 2011)	1920–2008	89	−100/100	8.2	6.6	−7.8	20.9
US Median Voter (Kim and Fording, 2003)	1945–2003	59	0/100	48.9	9.5	35.5	66.1
Party identification (ANES)	1952–2008	28	1/7	3.6	0.2	3.3	4.0
Lib/Cons identification (ANES)	1972–2008	18	1/7	4.3	0.1	4.1	4.5
Lib/Cons identification (Ellis and Stimson, 2009)	1937–2006	70	0/100	39.3	4.2	31.8	46.3

economic realities alter political ideology and voting behavior over multiple elections regardless of incumbency. In doing so, it adds to a developing literature that studies this fundamental dynamic in political economy. Because swings in ideology happen slowly, the importance of having multi-generational time series cannot be overstated.

It is also worthwhile noting from the outset that this is not a theory about how rich or poor Americans vote. This work is preoccupied with how changing economic realities affect aggregate voting behavior; this paper thus hopes to gain understanding into the drivers of ideological change across the US electorate. In his seminal piece "What moves policy sentiment?" Robert Durr (1993) was the first to squarely tackle this deviously simple question. According to Durr, shifts in US domestic policy sentiment on the liberal-conservative spectrum were a response to changing economic expectations. With expectations of a strong economy producing greater support for liberal policies and declining economic conditions shifting the policy mood to the right. Durr's empirical analysis of US policy sentiment revealed the existence of such ideological undercurrents regardless of incumbency effects. In another prominent piece, Stevenson (2001) expanded on Durr's theory and conducted a comparative study of fourteen Western democracies to also find that changes in aggregate voter preferences relate systematically to national economic performance. In similar vein, Kim and Fording (2001), Markussen (2008), Rockey and Pickering (2011), and Kayser (2009) explore the interaction between economic conditions and electoral choice in a comparative setting and also point to international economic sources of these seemingly domestic processes. Durr (1993), however, was both the first and the last to take a close empirical look at whether the ideology of the US public moves in sync with the domestic business cycle. His analysis covered the years 1968–88, a relatively short period of time to record what Durr himself described as a long-memoried,

dynamic equilibrium between the economy and policy mood that moves in long waves through time. The dependent variable in Durr's analysis was the notion of "policy sentiment," a measure devised by Stimson (1991) that aggregates hundreds of distinct US public opinion surveys dealing with a multitude of different policy preferences. When pooled
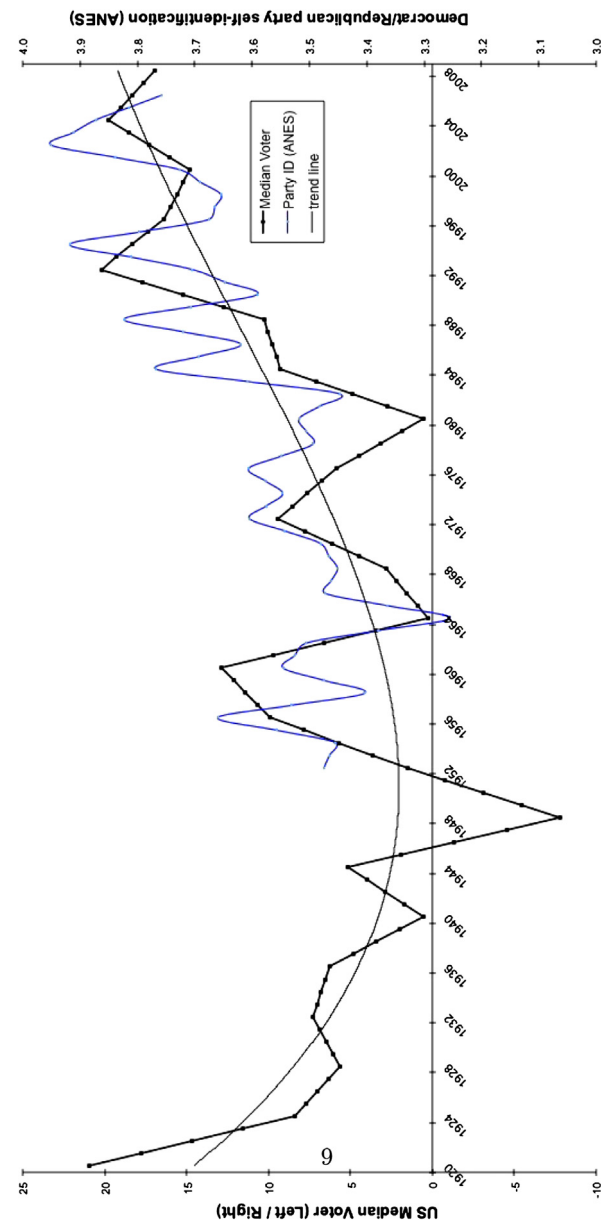
Fig. 1. The US median voter, 1920–2008.

Table 2
Alternative voter ideology measures correlations table.

Name	(1)	(2)	(3)	(4)	(5)
(1) *US Median Voter* (De Neve, 2011)	1.00				
(2) *US Median Voter* (Kim and Fording, 2003)	0.60	1.00			
(3) *Party identification* (ANES)	0.77	0.66	1.00		
(4) *Lib/Cons identification* (ANES)	0.08	0.40	0.49	1.00	
(5) *Lib/Cons ID* (Ellis and Stimson, 2009)	0.51	0.74	0.56	0.61	1.00

Note: To facilitate interpretation, the Kim and Fording (2003) and Ellis and Stimson (2009) measures were inversed to obtain data that would also increase when indicating a rise in conservatism.

together, Durr and Stimson argued, it becomes possible to construct a single time series for the policy mood that gauges movement along a liberal-conservative continuum.

This paper expands and tests the theory originally proposed by Durr (1993). In the process, this work introduces a new time series to capture actual voting behavior, formalizes an income growth model, and runs empirical tests that attempt to deal with the reverse causality of economic voting. The paper starts with a quick overview of ideological change and voting behavior in the US since 1920 and introduces the median voter as our dependent variable. Next, a reference-dependent utility model is discussed and the relationship between income growth and voting behavior is established. The logic and implications of this model are compared with the standard redistributive model of voter preferences. An empirical analysis that considers reverse causality is carried out for disposable income growth and the results of this research are discussed before the paper concludes.

2. Ideological change and voting behavior in the US, 1920–2008

2.1. The median voter data set

In order to quantify ideological change and voting behavior this paper turns to the concept of the median voter. Ever since the seminal works by Black (1948) and Downs (1957) established the concept of the median voter, or the ideological center of the electorate, it has figured widely across literature. This paper introduces a new median voter data set that is detailed in a separate research note (De Neve, 2011). The data employs the statistics provided by the Comparative Manifesto Project (Budge et al., 2001; Klingemann et al., 2006) but addresses stochastic error as done by Benoit et al. (2009).[1,2]

In essence, the position of the median voter is computed from vote shares for the ideologically ranked parties; a methodology spearheaded by Kim and Fording (1998). This is done by first ranking the parties by ideological score for every election through textual analysis of party documents. Then for each party the interval where its supporters are located is tabulated by locating the midpoints between the ideologically neighboring parties.[3] Assuming that voters choose the candidate or party that is ideologically closest to them, a party will attract the votes of those that are part of the interval that surrounds that party. The assumption that voting behavior is an expression of ideological beliefs is common (Coate and Conlin, 2004; Mullainathan and Washington, 2009). Still, it is important to underscore that this assumption implies a disregard of the part of the electorate that may vote strategically rather than ideologically.[4] Finally, the electoral results for each party at every election are matched to produce the percentage of the electorate that is grouped into each ideological interval. As Kim and Fording (2003) point out, this methodology requires us "to conceive of elections as large-scale opinion polls." Where the ballot acts as a survey in which the subject chooses the party that is ideologically closest on the partisan left-right spectrum. As such, it is possible to treat election results as a grouped frequency distribution and tabulate a median statistic. The results range between -100 (extreme left) and $+100$ (extreme right) and non-election values are interpolated linearly.[5] De Neve (2011) provides details on the precise tabulations and assumptions that were involved to build these new median voter statistics and extends the data to include over 50 democracies.[6] It is important to highlight that the median voter statistics are derived indirectly via party policy positions and their success at the election polls, rather than direct evidence of voter opinions. Notwithstanding these limitations, the

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[1] The Comparative Manifesto Project (CMP) codified all sentences of every election manifesto to place parties on a left-right scale. The manifesto data is collected such that each statement is assigned to either a pro-left, a pro-right, or a neutral category. Twenty-six out of the fifty-six categories are considered left or right—the rest are neutral (though they indirectly affect scores because the more neutral statements there are in the manifesto the more the score shifts towards center). Negative scores represent a generally left position, whereas positive scores are reflective of a right position. Results range between -100 (extreme left) and $+100$ (extreme right).

[2] Benoit et al. (2009) detail the processes of manifesto authorship and manifesto coding for which no measurement uncertainty is provided (although reliability estimates are produced in Klingemann et al. (2006)). Treating words as data with error, Benoit et al. (2009) proceed by bootstrapping the analysis of every coded manifesto. By way of these simulations they estimate degrees of non-systematic error for the thousands of manifestos coded by the CMP. The use of these error estimates allows for improved empirical and theoretical inferences from the CMP data. However, it is important to qualify the approach developed by Benoit et al. (2009) and applied here in that it makes the assumption that party manifesto authorship and manifesto coding are inherently stochastic. The bootstrapping work by Benoit et al. (2009) also allows for generating new data estimates of party policy positions. The alternative estimate for a party policy position thus becomes the mean estimator of the 1000 bootstrap simulations that were drawn for each manifesto. This new data for party policy positions calibrates for the presumed stochastic error in the CMP. De Neve (2011) adopts these corrected party policy positions in order to construct a new median voter data set.

[3] McDonald and Budge (2005) point out that in the case where the median voter falls in the interval of the left-most or right-most party that voters are unlikely to be uniformly distributed over such an ideological space. They propose to truncate the median party's interval so it is symmetrical around the median party's position. It is important to note, however, that truncating the median party's interval ultimately has only limited impact on the median voter score. This is presumably why McDonald and Budge (2005) called it a "marginal modification" (p.114). To illustrate for the case of the 2000 election, calculating the original Kim-Fording median voter score produces a value of 14.45 (also provided in the data disc that accompanies *Mapping Policy Preferences II* (Klingemann et al., 2006)), calculating the McDonald-Budge adjusted median voter score gives 14.70, and the adjusted median voter score used in this paper (developed in De Neve (2011)) arrives at 14.83. Generally speaking, the resulting differences between these slightly different approaches to calculating the median voter score based on CMP data are quite marginal and unlikely to dramatically alter the empirical analyses.

[4] Stevenson (2001) notes that estimates of the importance of strategic voting rarely attain 10%.

[5] Interpolating values for the in-between election years is far from ideal. Still, it is not unreasonable to assume that ideological sentiment moves gradually between elections rather than in a haphazard fashion. The appendix also provides the empirical analysis using the median voter data without interpolating non-election values. The empirical claims of this paper remain equally significant.

[6] De Neve (2011) provides a comparative analysis between the original Kim-Fording data and the adjusted median voter data. Generally, across the democracies for which data is available, the correlation coefficient between both measures is 0.93.

median voter data presented here are unique in their range and detail. Moreover, as compared to self-placement surveys, this methodology ties in actual voting behavior which leaves opinion polling data more appropriately coined as "median citizen" instead of "median voter".

The methodology to construct these median voter statistics underwent robustness checks carried out by, among others, Powell (2000) and McDonald and Budge (2005). Table 1 compares the US median voter data used in this paper with alternative measures from the American National Elections Studies (ANES), Kim and Fording (2003), and Ellis and Stimson (2009). Table 2 presents correlation coefficients between these measures. The Kim and Fording (2003) measure for the US median voter also builds on the CMP statistics but does not correct for stochastic error and applies a ratio method instead of a subtractive method to tabulate party positions. The ANES measure of party identification is a bi-annual survey that gauges whether respondents think of themselves as Democrat, Independent, or Republican on a 7-point scale. The ANES liberal/conservative measure is a bi-annual survey that gauges whether respondents think of themselves as liberal, moderate, or conservative on a 7-point scale. The Ellis and Stimson (2009) measure is a compiled and integrated time series of historical and more recent self-identification surveys on whether respondents think of themselves as liberal or conservative.

Of course, in order to measure ideological change in the US one could simply take the variation in electoral success between Democrat and Republican candidates over time. To do so, however, would be a mistake as it would falsely assume that the ideological position of either party has not altered over time. Combining electoral success with an in-depth analysis of party documents since 1920 allows for a sophisticated measure of voting behavior and ideological change that incorporates voter and party dynamics.

2.2. The United States, 1920–2008

For the United States only, the election documents going back as far as 1920 have been coded. Moreover, a special effort was made to code the 2008 election documents.[7] The result is a unique view of the evolution of voting behavior in the United States as shown in Fig. 1. The ANES party self-identification measure is added on from when it became available (1952), as well as a polynomial trend line to show the general trend in voting behavior between 1920 and 2008 in the US.[8]

In line with conventional wisdom it shows the US to be generally rightist or conservative. The one time that the US public enters leftist territory is between 1945 and 50 when, in the wake of the Roosevelt years, Truman finds fertile ground to introduce the Fair Deal that implements a large number of social and economic reforms; including the Housing Act of 1949, an expansion of social security, as well as the first call for universal healthcare. On the international

front this less conservative period shows in the large economic aid programs as symbolized by the Marshall Plan. Although the political realities of the post-1950 era are much more complex than a single graph can represent, it is clear that the US electorate gradually turns more conservative with support for Eisenhower, Nixon, Reagan, and Bush Sr. The elections of Kennedy, Johnson, and Carter do not indicate a turning of the ideological tide notwithstanding some landmark liberal policies associated with the Great Society. The mid-eighties see another quantum leap in the conservatism of the American public and culminates with the electoral victory of Bill Clinton who rode the conservative wave on a platform that heralded "the era of big government is over" and promoted fiscal conservatism. The conservativeness of the US electorate drops slightly throughout the second term of the Clinton years and the 2000 election of Bush Jr. However, towards the 2004 re-election of Bush Jr., we note an upswing in conservatism that gradually peels off when we head for the Obama presidency.

What drives these changes in voter sentiment? In his influential contribution, Durr (1993) argued that these broad shifts in ideological sentiment represent responses to changing economic conditions. Before testing this logic empirically, we describe a utility-based model that establishes a relationship between income growth and voting behavior by way of the demand for public goods and the optimal tax rate.

3. The economics of voting behavior

3.1. An income growth model

The logic of the model presented here can be traced back as far as Wicksell (1896) who also considered individuals that allocate their resources between private goods and public goods. The allocation or substitution mechanism for these competing supplies of goods is the rate of taxation and the democratic process allows for a decision. As such, the resulting rate of taxation is chosen by the decisive or median voter who maximizes utility derived from private and public goods given an income constraint. This voter utility model is similar to the textbook model in consumer choice with an individual deriving utility from a convex combination of two bundles of goods subject to a budget constraint that is their personal income. In this voter utility model there are the private goods procured by disposable (post-tax) private income, and there are public goods procured by tax revenue. Public goods are understood in the largest possible sense as comprising all public goods and services provided by government including education, social security, healthcare, utilities, parks, policing, and national defense. This view of public goods is purposely larger than the definition employed by, for example, Meltzer and Richard (1981) who limit government to a redistributive function only.

Given varying marginal utility, individuals will alter their preferred mix of private and public goods to maximize utility with changes in income. This logic was first applied to policy sentiment by Durr (1993) and formalized by Kayser (2009). Both authors assumed diminishing marginal utility on income and linear marginal utility on public goods. This paper extends variation in policy sentiment to behavior at the voting booth and develops the formal

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[7] Ian Budge (University of Essex) and Judith Bara (QMUL) are to be thanked for their efforts and approval of early release.

[8] Fig. 1 and the paragraph that briefly summarizes the recent history of the US median voter are also given in De Neve (2011).

modelization. As the preferred mix of private and public goods changes so does the optimal tax rate that allows for substitution between private and public goods. The way to express preferences on the supply of public goods and the tax rate is to vote for a candidate or party program that would advance those preferences. If the median voter perceives leftist parties as being associated with expansionary government, then a prospering economy with rising income growth will proportionally increase the demand for public goods which translates into more electoral support for the liberal left. Conversely, if the median voter associates parties of the right with lower taxation and smaller government, then a dismal economy that depresses income growth rates will make voters less willing to sponsor public goods and generate more electoral support for the conservative right. It is commonplace to associate leftist parties with higher taxation and expansionary government and parties of the right with lower taxation and smaller government (Downs, 1957; Hibbs, 1987; Huber and Inglehart, 1995; Iversen and Soskice, 2006).[9]

In order to formalize a voter preferences model that considers income growth, not levels of income, this paper taps into the literature on reference-dependent utility models that derive utility gains and losses from standard consumption utility models with reference points determined endogenously (Koszegi and Rabin, 2006; 2009). The intuition behind reference-dependent models originates in the work of Kahneman and Tversky (1979) who show that the outcome of a choice is not only shaped by absolute values but also by comparison with a reference point. An economic reference point that voters will have come to expect is the income growth rate of the previous year. Standard economic voting models typically equate the reference point with the status quo level of income. However, following Koszegi and Rabin (2006) "when expectations and the status quo are different—a common situation in economic environments—equating the reference point with expectations generally makes better predictions."

We can represent a simple reference-dependent voter utility model as the sum of the utility gains or losses on disposable personal income growth and tax revenue growth.[10] Formally, with linear utility on public goods,

$$U_v = [(1-\tau)\Delta y]^\alpha + \tau \Delta y(1-\delta)|\alpha,\delta,\tau < 1$$

where the first term captures the utility gains from income growth (Δy) after taxes (τ) or disposable personal income growth with which to procure private goods. The second
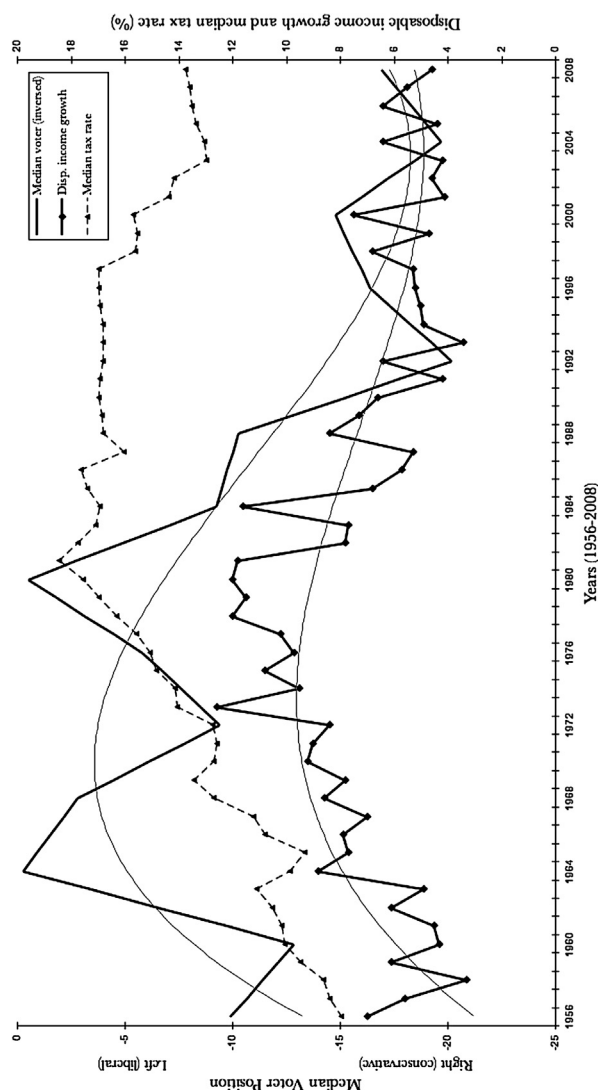

Fig. 2. The economics of voting behavior: Income growth, taxation, and voting behavior.

term represents the utility gains derived from public goods that are financed by tax revenue.[11] A parameter to capture the inefficiency of taxation is included ($1-\delta$). Income growth is subject to diminishing marginal utility, hence the first term is raised to a fractional exponent (α).[12]

Solving the first-order condition for the optimal level of taxation ($\tau*$) gives the below proposition.

Proposition 1. With linear marginal utility of public goods, the optimal level of taxation increases with rising income growth as given by

$$\tau^* = 1 - \frac{\alpha^{\alpha-1}(1-\delta)^{\frac{1}{\alpha-1}}}{\Delta y}$$

When income growth Δy rises, the optimal level of taxation τ^* also rises,[13,14] That the demand for public goods and services shows income elasticity is a regularity also known as Wagner's Law (Lamartina and Zaghini, 2011). This optimization result on taxation provides a dynamic link in the relationship between changing economic conditions and policy sentiment that Durr (1993) described.[15]

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[13] Proof for Proposition 1: With linear marginal utility of public goods, the optimal level of taxation increases with rising income growth.

$U_v = [(1-\tau)\Delta y]^{\alpha} + \tau \Delta y(1-\delta)|\alpha,\delta,\tau < 1$

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$\frac{dU_v}{d\tau} = (1-\delta)\Delta y - \alpha \Delta y((1-\tau)\Delta y)^{\alpha-1} = 0$

$\alpha \Delta y((1-\tau)\Delta y)^{\alpha-1} = (1-\delta)\Delta y$

If $\Delta y \neq 0, \alpha \neq 0$,

$((1-\tau)\Delta y)^{\alpha-1} = \frac{(1-\delta)}{\alpha}$

$\tau^* = 1 - \frac{\alpha^{\alpha-1}(1-\delta)^{\frac{1}{\alpha-1}}}{\Delta y}$

[14] Releasing the assumption of linear marginal utility on public goods leads to less obvious empirical implications as shown below. If we raise the second term to a fractional exponent (ε) we obtain the following voter utility model.

$U_v = [(1-\tau)\Delta y]^{\alpha} + [\tau \Delta y(1-\delta)]^{\varepsilon}|\delta,\tau,\alpha,\varepsilon < 1$

Solving the first-order condition for the optimal level of taxation (τ^*) and the implicit derivative ($d\tau/dy$) leads to the following equation:

$$\frac{\frac{\alpha^2}{\varepsilon^2(1-\delta)^2}\Delta y_{\tau}^{\frac{\alpha}{\varepsilon}-1}}{\{(1-\alpha)\tau - (1-\varepsilon)(1-\tau)\}\frac{\tau^{\varepsilon-2}(1-\tau)^{\alpha-2}}{[(1-\tau)^{\alpha-1}]^2}}$$

The sign on $d\tau/d\Delta y$ depends on the term $\{(1-\alpha)\tau-(1-\varepsilon)(1-\tau)\}$, hence

$\frac{d\tau}{d\Delta y} > 0 \Leftrightarrow (1-\alpha)\tau - (1-\varepsilon)(1-\tau) > 0$

$\overset{\alpha<1,\varepsilon<1}{\Leftrightarrow} \frac{(1-\alpha)}{(1-\varepsilon)}\frac{\tau}{(1-\tau)} > 1$

For this condition to hold it is required that $\varepsilon > \alpha$ as long as $\tau > 1/2$. As τ decreases, the ratio ε/α needs to increase for $d\tau/d\Delta y$ to remain positive. As mentioned before, for these conditions to hold a number of heroic assumptions need to be imposed that make this model variant practically inapplicable.

[15] Alternatively, as Stevenson (2001) observes, a slightly different logic from the above would lead to the same conclusion. If voters perceive leftist policies as luxury goods relative to rightist policies, then an individual will maximize her utility by advancing leftist policies when her personal income rises and rightist policies when income decreases. This logic circumvents the assumption that leftist parties and their policies have to be perceived as generating more expensive public goods as compared to rightist policies. An assumption that could be empirically problematic given that spending priorities by conservative governments have, at times, led to greater levels of public spending than liberal governments (Galbraith, 2008).

3.2. Income growth, taxation, and voting behavior

Fig. 2 plots the key variables of this voter utility model over time. Variable definitions and sources are available in the appendix. Disposable income growth and the tax rate track each other well, as hypothesized in the above model. A continued rise in income growth rates through the early 1980s is accompanied by a similar rise in the median tax rate. This trend reverses sharply after 1985 with income growth values and the tax rate either dropping or leveling. As income growth contracts, the median voter experiences increased marginal utility from personal income, whereas taxation will be perceived as evermore painful, thus the median voter is likely to become less supportive of taxation and public spending. Following the above logic, this model leads us to expect that the ideological center of the US electorate will have shifted rightward from the mid-eighties onwards as income growth depresses.

Adding the median voter data visualizes the principal claim of this paper; that ideological change is endogenous to variation in income growth rates. As Fig. 2 and the polynomial trend lines show, the ideological center of the electorate joins income growth rates in a long-run trend. While income growth rates increase the electorate becomes more liberal, or to put it more appropriately in the case of the US, the electorate votes less conservative. Conversely, when income growth rates stagnate or contract, voting behavior turns more conservative.

3.3. The income growth model and the redistributive model

It is worthwhile observing that the above voter model is a departure from influential work developed by Romer (1975) and Meltzer and Richard (1981), and applied by, for example, Alesina and Rodrik (1994) and McCarty et al. (2006). In essence, taxation and public spending are modeled as the result of redistributive demands by the median voter and those are a function of the position of the median voter in the income distribution. As Pontusson and Rueda (2010) also observe, virtually all of the voter models in political economy have taken the redistributive model as a point of departure.

The redistributive model and the income growth model developed here rely on three similar assumptions. First, both models imply a two-step mechanism where an individual first has to part with money at tax time before being returned funds through redistributive processes or reap the benefit from public goods. Preferences over the desired level of taxation are evaluated at each election in function of where the voter's income ranks in society or in function of the voter's income growth and related change in the demand for public goods. Second, both models require that voters perceive the level of taxation to be positively correlated with levels of redistribution and provision of public goods. Finally, the redistributive and income growth models assume that voters mainly care about their socio-economic situation. If other issues, such as religion, are meaningfully salient to voters it will

disturb the logic of these uni-dimensional models (Roemer, 1998).

While both models rely on similar assumptions, there are important differences and these may result in opposing effects on political preferences and optimal taxation. First, as mentioned before, for the income growth model the function of the state is defined as providing public goods and services with the tax revenue it collects. These are understood in the broadest possible sense. The redistributive voter model limits government to a redistributive function and voter's minds are pre-occupied with calculating whether they will be a net contributor or recipient at the end of the redistributive process. Second, the suggested effect of income growth on voter preferences holds across the electorate. A rising tide that lifts all boats will have a broad-based effect on the demand for public goods and, hence, political preferences. The redistributive model does not suggest a universal effect across the voting population but splits the electorate into opposing camps with those favoring taxation pitted against those that do not.

Of course, a comparison between the redistributive model and the income growth model developed in this paper is not ideal in that the latter is reference-dependent and thus dynamic, whereas the redistributive model is essentially static. Still, a dynamic read of the redistributive model implies, in the words of McCarty et al. (2006), that "[I]n a responsive democracy, more inequality should typically lead to more redistribution." In terms of ideological change this would mean that increasing inequality moves the median voter further left in order to drive support for higher levels of taxation and redistributive spending. The logic of the income growth model presented in this paper implies the opposite conclusion: a leftist policy agenda will be most successful when rising income growth is equally spread. Income growth that is limited to the few is projected to have less impact on the demand for public goods and resulting voting behavior.[16]

Notwithstanding a dramatic rise in inequality in the US over the past three decades, the US voting public has become more conservative by any ideological measure. The redistributive model failed to predict this conservative trend in voting behavior. Many scholars set out to explain this empirical conundrum, coined the "paradox of redistribution" or "Robin Hood paradox," by pointing to non-economic policy issues (Roemer, 1998), beliefs on social mobility and fairness (Piketty, 1995; Benabou and Ok, 2001; Alesina and La Ferrara, 2005; Benabou and Tirole, 2006;

Alesina and Angeletos, 2006), group loyalties and social identity (Luttmer, 2001; Klor and Shayo, 2010), or political pressures from the top outweighing pressure for redistribution from the bottom as low-income citizens are less likely to vote or are not entitled to vote (McCarty et al., 2006; Barnes, 2007; Pontusson and Rueda, 2010). A number of scholars offered alternative models to explain pressures for redistribution and partisanship by focusing in on electoral systems, coalitions, and organized labor (Bradley et al., 2003; Iversen and Soskice, 2006; 2009). Others reasoned that demand for insurance rises with income (Moene and Wallerstein, 2003), and still others state that "our goal is to rescue the idea that income inequality is not only shaped by politics, but also shapes politics"(Pontusson and Rueda, 2010).

The below empirical analysis gauges the influence of income growth rates on voting behavior and includes an updated measure of inequality by Piketty and Saez (2003). Contrary to the intuitive logic of the redistributive model, the results indicate that public spending does *not* "result from the difference between the distribution of votes and the distribution of income" (Meltzer and Richard, 1981). On the other hand, variation in income growth rates does provide explanatory power for the demand for public spending and voting behavior in the US.[17]

4. Empirical analysis

4.1. Reverse causality

Very little research on economic voting has dealt with the possibility that voting may also impact economics. Regression estimates may inflate the economic effect on voter ideology if voting behavior has some influence on the economic variables in the first place. Wlezien et al. (1997) first raised the endogeneity issue and showed that the estimated effects of economic perceptions on vote choice were substantially smaller than originally given in the widely cited work by Lewis-Beck (1988) when accounting for reverse causality. Recent work by Bartels (2009) provides a case in point by discussing the important economic effects on income growth and inequality when either a Democrat or Republican government is in power. Benign neglect of this reverse causality issue may have increased our understanding of how economic realities affect voting behavior but statistical analyses may be biased. Not unlike the proverbial chicken and egg problem, is there a serious risk to

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[16] It is left to future research to extend this analysis cross-nationally and evaluate whether different levels of inequality moderate the effect of income growth on voting behavior. A preliminary conjecture would be that *ceteris paribus* societies with less inequality will have seen a steeper rise in leftist voting as income growth accelerated through the eighties and a sharper conservative turn as income growth decelerated from the mid-eighties onwards. The opposite logic is suggested for societies with high levels of inequality where income growth is less widespread and will thus generate a softened effect on voting behavior.

[17] It is important to note that the income growth and redistributive models are not mutually exclusive. In fact, their logic may well be complementary and the cognitive processes operating simultaneously in the minds of voters. There is, of course, a strong negative utility associated with having to part with personal income at tax time. But the pain caused by taxation may be mitigated if times are more prosperous than before and also if one realizes that he or she may end up being a net benefactor of the redistributive system. The joint or net effect of these processes may be key in shaping the vote decision of an individual. It is left to future research to develop these ideas more formally and test them empirically.

attribute ideological change to variation in economic performance if, in fact, ideological change and the resulting voting behavior may have influenced economic performance in the first place.

The use of one or more valid instrumental variables in a two-stage least squares (2SLS) regression allows for the estimation of causal relationships in the presence of endogenous explanatory variables. The instrument cannot be correlated with the error term in the explanatory equation (exclusion) but should be highly correlated with the endogenous explanatory variable for which it instruments (relevance). If so, than a 2SLS regression allows for consistent estimation (Acemoglu et al., 2001; Heckman, 2008). This paper proposes to use net income growth per head in the OECD (minus the US) as instrument for the variation in US disposable income growth. With increasing economic interdependence, a great number of scholars have established that domestic economic performance moves in sync with international economic fluctuations, or that international business cycles may actually induce covariation across domestic business cycles (Campbell and Gregory Mankiw, 1989; Kose et al., 2003). Hence, it is expected that net income growth rates for the OECD will be strongly correlated with income growth in the US. Kayser (2009) takes this logic one step further and shows that international business cycles influence domestic economic performance which, in turn, induces domestic electoral choice. As such, Kayser concludes that the cross-national success of left and right parties over time is best characterized by "partisan waves" that originate from international economic sources.[18]

The validity of the 2SLS results relies on the assumption that international business cycles have an *indirect* effect on US voting behavior by way of US domestic business cycles. A screening of the first-stage results of the 2SLS models shows that economic indicators for the OECD (minus the US) are relevant instruments for their US domestic counterparts. In fact, net income growth per head in the OECD (minus the US) correlates at 0.88 with US disposable income growth figures, and the first-stage regression coefficients on OECD income growth, and their first differences, obtain *p*-values inferior to 0.01. The instrumented analysis produces an F-statistic of 5.33 (Stock and Yogo, 2005).

4.2. Empirical model

Having seen in Fig. 2 that ideological change and disposable income growth appear to move in sync over time, we can now turn to a statistical analysis that considers reverse causality and controls for other possible determinants of voting behavior.

Augmented Dickey-Fuller unit-root tests suggest the presence of non-stationary or integrated variables. In similar fashion to Durr (1993) and Kayser (2009), we turn to a general error correction model (ECM) as the most

appropriate way to proceed. Practically, the ECM is given by[19]:

$$\Delta Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 \Delta X_t + \beta_3 X_{t-1} + \beta_4 \Delta Z_t + \varepsilon_t$$

where ΔY_t is the dependent variable, ideological change in the position of the US median voter, in year t. ΔY_t is regressed on its lagged level Y_{t-1}. ΔY_t is also regressed on both the first difference and the lagged level of the co-integrated independent variable X_t, in this case US disposable personal income growth rates. A one year lag for income growth rates is used and a 4-year lag of the median voter is used to capture dynamics that span another election. Z_t are additional controls, here a measure for inequality[20] and US defense spending as a percentage of GDP.[21] The appendix reproduces the analysis using additional controls for inflation, voterturnout, and presidential approval rates. Variable definitions and sources are also listed in the appendix.

4.3. Results

Table 3 shows the results of ordinary and instrumented error correction models that test the hypothesis that variation in personal income growth predicts ideological change. Both the OLS and 2SLS models show that increases in disposable personal income growth rates are significantly associated with more leftist or liberal voting behavior in the US. This is the case for the one-year lagged income growth rates (OLS $p = 0.013$ and 2SLS $p = 0.024$), as well as for the first differences that capture short-run effects (OLS $p = 0.017$ and 2SLS $p = 0.020$). These results provide strong support for the logic behind the income growth model: an increase in personal income growth rates generates a relative increase in the demand for public goods and liberal policies, resulting in a leftward shift of the US median voter.

Also of interest is that the measure for inequality and defense spending as a percentage of US GDP come in significant, though both variables loose their significance once we control for reverse causality in the 2SLS model. Note that inequality is positively associated with conservative changes in the position of the US median voter, contrary to the intuitive logic of the Meltzer-Richard model. The 4-year lagged median voter position is negatively associated with current ideological

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[19] Theoretically, the ECM is given by.

$$\Delta Y_t = \alpha + \beta \Delta X_t + \delta(Y_{t-1} - X_{t-1}\gamma) + \varepsilon_t$$

where the error correction term measures the distance from equilibrium that variables move following changes and the time it takes to return to equilibrium. For more info on the ECM please refer to DeBoef and Keele (2008).

[20] A measure for inequality by Piketty and Saez (2003) is included to control for its possible influence on voting behavior as suggested by, among others, Meltzer and Richard (1981) and more recently by McCarty et al. (2006). The latter authors also show that inequality and the polarization of the US electorate are tightly correlated ($r = 0.93$), hence including inequality as a control also serves the purpose of covering the political polarization of the US public.

[21] US defense spending as a percentage of GDP is included to capture non-economic factors that may influence ideological change. Durr (1993) used dummies for the Vietnam War, Watergate, Iran hostage crisis, and Iran-Contra affair. Kayser (2009) used troop levels in Europe as a control in his cross-national study.

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[18] Quite a number of OECD member states do not have time series on net income growth that predates 1970. The 2SLS analysis thus has a lower limit at 1970.

Table 3
Ordinary and 2SLS error correction models on ideological change in the US (1950–2008).

	Δ Median voter OLS			Δ Median voter 2SLS		
	Coefficient	SE	P-value	Coefficient	SE	P-value
$\Delta IncomeGrowth$	−0.22	0.09	0.017	−0.42	0.18	0.020
$IncomeGrowth_{t-1}$	−0.28	0.11	0.013	−0.36	0.16	0.024
$Medianvoter_{t-4}$	−0.32	0.04	0.000	−0.34	0.10	0.001
$Defensespending$	−0.31	0.12	0.012	−0.51	0.44	0.245
$Inequality$	0.12	0.06	0.047	0.09	0.08	0.262
Intercept	2.39	3.43	0.489	5.38	5.53	0.330
N	58			36		
R-squared	0.57			0.33		
F statistic				5.33		

Note: Variable definitions are in the appendix. The 2SLS instruments are the first differences and a one-year lag of disposable income growth rates in the OECD countries minus the US (1970–2008). Regression coefficients with standard errors (SE) and P-values are presented.

change which would appear to indicate a tendency to somewhat reverse ideological course at every new election.

Additional statistical analyses reproduced in the appendix include controls for inflation, voter turnout, and presidential approval rates, as well as median voter data that is not interpolated. The results reported above are robust to these adaptations of the error correction model and coefficients on income growth variables remain significant.[22]

4.4. Fitting predicted model values: a retrospective

Fig. 3 plots the predicted values from the OLS error correction model on actual data for US ideological change as measured by the annual change in the ideological position of the US median voter. On the basis of 4-year old electoral data and up-to-date information on disposable income, defense spending, and inequality, this model tracks ideological change in the US fairly well.

5. Conclusion

The US median voter tends to advance a more liberal policy agenda when economic times are good and turns more conservative when the economic situation deteriorates. Error correction models of disposable income growth show it to be a strong predictor of ideological change even after controlling for other possible sources of
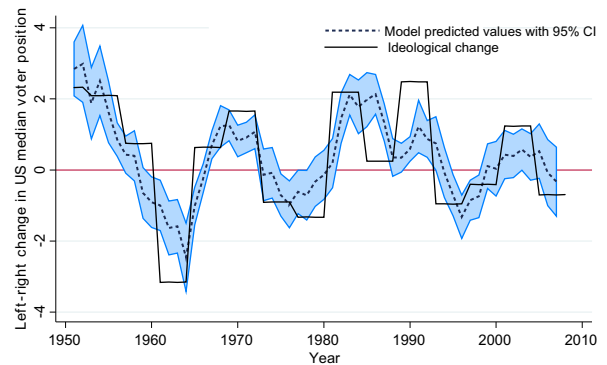
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[22] A unique feature of this paper is that it considers personal income growth statistics instead of the usual macroeconomic suspects that are GDP growth, unemployment, and inflation rates. Income is an obvious fit given that the income growth model presented above hinges on the utility of personal income and the willingness to fund public goods. Still, the few other papers that have elaborated on this logic considered either the usual economic indicators (Stevenson, 2001; Markussen, 2008; Kayser, 2009). In Appendix, Table A4 presents the results of ordinary and 2SLS error correction models analogous to Table 3 with GDP growth, unemployment, and inflation as explanatory variables. In line with personal income growth rates, the GDP growth variables are also negatively associated with Δ Median Voter and the lagged GDP growth rate ($GDPgrowth_{t-1}$) is statistically significant. This indicates, once again, that good economic times go hand-in-hand with leftward ideological shifts. This result on GDP growth is verified when introducing the respective OECD data instrumental variables though the low R-squared and F-statistic cast doubt over the validity of this result.

Fig. 3. Fitting predicted values on US ideological change, 1950–2008.

voting behavior (*Defensespending, Inequality, VoterTurnout, PresidentApproval*) and reverse causality.

That income growth influences voting behavior can be understood if one considers a reference-dependent utility model that is similar in set-up as the standard consumer choice model with competing goods. Given diminishing marginal utility on income growth, individuals will alter their preferred mix of private and public goods to maximize utility with changes in income. If the median voter perceives leftist parties as being associated with expansionary government, then a prospering economy with rising disposable income growth will proportionally increase the demand for public goods which translates into more electoral support for the liberal left. Conversely, if the median voter associates parties of the right with smaller government, then a dismal economy that depresses income growth will make voters less willing to sponsor public goods and generate more electoral support for the conservative right. The optimization results of the utility-based model presented in this paper provide a dynamic link for the fundamental relationship between changing economic conditions and policy sentiment that Durr (1993) first described. The empirical tests leave little doubt about the strength of that relationship.

The alignment of theory with empirical realities is what has plagued the redistributive model from the start (Meltzer and Richard, 1981). Still, the intuitive appeal of voting behavior as a function of redistributive demands and inequality has turned the model into the predominant starting point when considering the economics of voting behavior. The logic and results of the income growth model presented in this paper may complement recent iterations of the redistributive model and alternative models to develop a better understanding of voting behavior.

Although this work uses a measure for ideological change and voting behavior as the dependent variable—not public spending—the theory and findings presented here are potentially relevant for the literature on Wagner's law that stipulates a positive relationship between economic development and public spending (Lamartina and Zaghini, 2011). The influence that economic growth has on ideology and voting behavior may, in turn, translate into increased public spending thus providing a dynamic mechanism through which Wagner's law may operate. Note that the empirical analyses presented here would tend to confirm both a standard version as well as an "accelerationist" version of the

relationship between economic growth and the size of government.[23]

The general lesson to be drawn from this work is that ideological change in the US is endogenous to variation in disposable income growth rates. This result complements the finding in De Neve (2009) that the left-right ideological position of a country is endogenous to the variety of economic institutions that make up the political economy. With both ideological position and ideological change endogenous to economic realities, it is impossible to deny the pervasive and long-run impact of economics on voting behavior.

Appendix A. Descriptive statistics

Table A1
Variable properties

Variable	N	Mean	Std dev	Min	Max
MedianVoter	89	8.23	6.54	−7.77	20.91
IncomeGrowth	59	7.09	2.52	2.2	12.6
GDPgrowth	59	3.41	2.31	−1.9	8.7
Unemployment	59	5.61	1.46	2.9	9.7
Inflation	59	3.80	3.05	−2.08	13.91
OECD.Income	37	6.35	2.58	2.35	11.66
OECD.GDPgrowth	38	7.00	2.93	3.02	12.86
OECD.Unemployment	44	5.86	2.05	2.57	8.97
OECD.Inflation	38	6.83	3.40	2.37	14.86
Defensespending	59	6.45	2.76	3.00	14.2
Inequality	91	39.22	5.37	32.31	49.74
Turnout	61	55.71	4.11	48.9	62.8
PresidentApproval	59	55.78	13.35	23	84
Taxrate	54	14.06	3.02	7.35	18.44

Table A2
Variable definitions and sources

Variable	Definition and source
MedianVoter	The ideological center of the electorate; ranges from −100 (extreme left/liberal) to +100 (extreme right/conservative). Source: De Neve (2011).
IncomeGrowth	The annual percent change in US disposable personal income in current dollars (code A067RP1). Source: Bureau of Economic Analysis.
GDPgrowth	The annual percent change in US real gross domestic product. Source: Bureau of Economic Analysis.
Unemployment	The yearly US unemployment rate from the employment status of the civilian noninstitutional population. Source: Bureau of Labor Statistics.
Inflation	The inflation rate or the annual percent change in the Consumer Price Index (CPI). Source: Bureau of Labor Statistics.
OECD.Income	The annual percent change in net national income per head for the OECD minus the US (in current dollars). Source: OECD.
OECD.GDPgrowth	The annual percent change in real gross domestic product (in current dollars) for the OECD minus the US. Source: OECD.
OECD.Unemployment	The yearly unemployment rate in the OECD minus the US. Source: OECD.
OECD.Inflation	The inflation rate or the annual percent change in consumer prices in the OECD minus the US (base year = 2005). Source: OECD.
Defensespending	The annual national defense outlays as a percentage of GDP. Source: OMB (The Budget for Fiscal Year, 2009; Historical Tables).
Inequality	The top-10 percent fractile income share (including capital gains) in the US. Source: Piketty and Saez (2003).
Turnout	Voter turnout rate at presidential elections based on voting-age population. Source: McDonald and Popkin (2001).
PresidentApproval	Presidential approval rate at start of each year. Source: Gallup.
Taxrate	The average and marginal combined federal income and employee social security and medicare (FICA) tax rate for four-person families at the same relative positions in the income distribution (median income). Source: Treasury Department (through 1996); Tax Policy Center (1997–2008).

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[23] I am indebted to an anonymous referee for raising these important points.

Table A3
Additional OLS and 2SLS error correction models on ideological change in the US (1950–2008).

	Δ Median voter				Δ Median voter non-interpolated			
	OLS Coeff.	P-value	2SLS Coeff.	P-value	OLS Coeff.	P-value	OLS Coeff.	P-value
ΔIncomeGrowth	−0.22	0.026	−0.42	0.017	−2.68	0.000	−3.00	0.002
IncomeGrowth$_{t-1}$	−0.28	0.054	−0.43	0.068	−4.37	0.000	−4.02	0.006
Medianvoter$_{t-4}$	−0.33	0.000	−0.32	0.005	−1.83	0.000	−1.96	0.000
Defensespending	−0.33	0.050	−0.39	0.417	−3.71	0.000	−4.03	0.002
Inequality	0.13	0.038	0.09	0.288	−0.59	0.063	−0.41	0.187
Turnout	0.01	0.926	0.03	0.802			0.05	0.864
PresidentApproval	0.01	0.384	0.01	0.520			0.10	0.149
Inflation	0.02	0.830	0.07	0.559			−0.21	0.577
Intercept	1.01	0.839	2.85	0.717	95.79	0.001	82.43	0.018
N	58		36		14		14	
R-squared	0.58		0.37		0.94		0.97	
F statistic			3.72					

Note: The 2SLS instruments are the first differences and a one-year lag of disposable income growth rates in the OECD countries minus the US (1970–2008). There are insufficient observations to run a 2SLS on non-interpolated US median voter data. Regression coefficients with P-values are presented.

Table A4
Ordinary and 2SLS error correction models on ideological change in the US (1950–2008).

	Δ Median voter OLS				Δ Median voter 2SLS			
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
ΔGDPgrowth	−0.08	0.241			0.08	0.733		
GDPgrowth$_{t-1}$	−0.20	0.027			−0.84	0.077		
ΔUnemployment			0.19	0.277			1.05	0.021
Unemployment$_{t-1}$			−0.21	0.138			0.06	0.849
ΔInflation			−0.16	0.017			−0.33	0.023
Inflation$_{t-1}$			0.03	0.012			0.02	0.285
Medianvoter$_{t-4}$	−0.27	0.000	−0.29	0.000	−0.33	0.019	−0.26	0.006
Defensespending	−0.06	0.485	−0.17	0.132	−0.41	0.509	−0.20	0.650
Inequality	0.22	0.000	−0.16	0.259	0.24	0.009	−0.10	0.621
Intercept	−4.53	0.024	8.96	0.085	−1.26	0.803	6.49	0.384
N	58		58		36		37	
R-squared	0.56		0.61		0.00		0.48	
F statistic					0.97		1.95	

Note: Variable definitions are in the appendix. The instrumental variables used are the first differences and 1-year lags for GDP growth, unemployment, and inflation in the OECD countries minus the US (1970–2008). Regression coefficients with P-values are presented.

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