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Woojin Lee

John Roemer

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# DEPARTMENT OF ECONOMICS

## Working Paper

**Values and Politics in the US:  
An Equilibrium Analysis of the 2004 Election**

by

Woojin Lee and John Roemer

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*Values and Politics in the US:*  
*An Equilibrium Analysis of the 2004 Election*

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Woojin Lee

Department of Economics  
University of Massachusetts  
Amherst, Ma 01003  
[wojin.lee@econs.umass.edu](mailto:wojin.lee@econs.umass.edu)

John Roemer

Department of Political Science  
Department of Economics  
Yale University  
New Haven, CT 06520  
[john.roemer@yale.edu](mailto:john.roemer@yale.edu)

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## Abstract

The CNN exit polls after the 2004 election rated ‘moral values’ the most important issue; next came ‘jobs and the economy.’ Eighty percent of the voters who rated moral values the most important issue voted for Bush while eighty percent of the voters who rated jobs and the economy the most important voted for Kerry. We study the extent to which the distribution of voter opinion on moral values influences the positions that parties take on the economic issue, which we take to be the size of the public sector, through political competition.

There are at least two distinct ways this influence might occur. First, because the Republican Party is identified with a traditionalist stance on moral values, some voters who desire a large public sector may nevertheless vote Republican because traditionalist morality is important for them. This we call the *policy bundle effect*. Second, it may be the case that those who subscribe to a traditionalist morality take economic conservatism to be part of that view, in the sense that they view the state as, for instance, usurping the role of the individual and/or family. We call this effect the *moral Puritanism effect*.

Thus economic conservatism in the US may be politically strengthened by moral traditionalism because the Republican Party links *the two issues* (policy bundle) or because moral traditionalists in the US are anti-statist (in the Puritan sense).

Our analysis will enable us to predict how equilibrium policies proposed by Democratic and Republican Parties would change *if all voters had the same view on the moral-values issue*, and we will decompose these changes into the aforementioned two effects.

**JEL Classification:** D3, D7, H2

**Keywords:** moral values, redistribution, moral Puritanism effect, policy bundle effect, party unanimity Nash equilibrium

“Democrats are assaulting our basic values. They attacked the integrity of the family and parental rights. They ignored traditional morality. And they still do.”  
*The 1984 Platform of the Republican Party*

“The advantage we have is that liberals and feminists don’t generally go to church. They don’t gather in one place three days before the election.” *Ralph Reed, The Christian Coalition*

## 1. Introduction

The Republican Party, whose economic policies are perhaps in the interest of the top 5% of the wealth distribution, is supported by approximately one-half of the US electorate. President George W. Bush, during his first term, has made quite clear what his economic policies are – from tax cuts that benefit primarily the very rich, engendering large deficits, to abolition of the inheritance tax, and privatizing social security.

In contrast, the policies of the Democratic Party are not left-wing: they are moderate. It would seem that, if voters were rational and concerned largely about the economic issue, the Democratic Party would receive the vast majority of the vote. Why is this not the case?

Many explanations can be offered, but we believe the three most likely explanations are the following:

- Cognitive errors and false consciousness. Voters make cognitive errors concerning economic policy. They do not make the connection between taxation and the supply of government goods and services. This can be viewed as a special case of not understanding the mapping from *policies* to *outcomes*. What voters are concerned with are economic outcomes (their consumption of various goods, and perhaps the

consumption of others – we do not assume voters are entirely selfish); what they do not understand is how policies engender outcomes. ‘False consciousness’ might be one description of this phenomenon. But false consciousness also applies to another phenomenon, which is distinct from this one – the belief by poor people that rich people deserve their earnings, and it would be unjust to redistribute through taxation.

- Imperfect representation. Politicians represent the wealthy. Bartels (2002), Gilens (2003), and Jacobs and Page (2003) have shown that politicians reflect the preferences of the wealthy, not the average voter. One mechanism, of several, may be that political parties, under a regime of private funding, represent their contributors. Thus, the political competition between Democrats and Republicans may be one between two parties each of whom represents the wealthy, which would skew the equilibrium economic policies to the Right.

- Policy bundling. Other issues, besides the economic issue, are of importance to voters, and the support for the Republican Party may be in part due to the bundling of the economic issue with these other issues. Important non-economic issues are race issues, gun control, abortion, gay marriage (family values), and foreign policy. Thus the Republicans may have crafted a program with a large constituency, *in spite of* their economic position. Put somewhat differently, their position on non-economic issues may win the Republicans a sufficiently large support that they need not compromise on their extreme economic position.

It is not our aim in this paper to examine the relative importance of these three possible explanations for the vitality of the Republican Party. We focus on the third issue

while taking the US presidential election of 2004 as an example. In particular, we study the importance of moral value issues.

The so-called ‘American exceptionalism’ literature, dating back to Alexis de Tocqueville’s *Democracy in America*, emphasizes that moral Protestantism (in particular, that of evangelicals), together with racial division, has always had an unusually powerful influence on the US political culture. For the period 1972-1992, we have demonstrated the importance of the race issue in the US politics (Lee and Roemer, 2004). Today, however, the ‘values’ issue may be more important, although the race issue and the values issue are often interlinked as can be seen in the case of the Ku Klux Klan movement in the 1920 and prevalence of racially segregated religious schools.

Seymour Martin Lipset (1990, 1996), a leading contemporary advocate of American exceptionalism, argues that from the colonial time to the present, a particular set of religious values and ideological emphases have distinguished Americans. Among these ideological tendencies two are especially distinctive: (1) a streak of conservative moralism that fuels recurring crusades for social reform, and (2) meritocratic individualism that supports the spirit of capitalism, anti-statist attitudes and a bourgeois economy. Hoover et. al (2000) examine the extent to which evangelical influences on moral conservatism and economic conservatism are similar in the United States and Canada, and conclude that evangelicalism’s influence on moral conservatism and value priorities is transnational, but its influence on economic conservatism is distinctively American.<sup>1</sup>

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<sup>1</sup> According to Hoover et al. (2000), evangelicals were identified by their agreement with all of the following ‘common denominator’ evangelical beliefs statements: (1) I feel that

Religion, like superstition, derives from irrational human fears and anxieties; it is a mechanism for people to ward off forces that they could not rationally explain. In contrary to the argument that religious beliefs, by requiring abstract thinking and intellectual inquiry, are positively correlated with education (McCleary and Barro, 2003; Sacerdote and Glazer, 2001), religious people are predominantly uneducated and living in rural areas.

Marx and Engels believed that religion appealed most strongly to the oppressed who desperately needed some explanation for their plight. Christianity found its pioneers among its slave populations because it promised them the solace of a better life to come; psychologically, the Christian religion was a balm, a salve for despair. Consequently the growth of Christianity (and probably almost all religions) was encouraged by ruling classes because it might teach the ‘lower orders’ – be they slaves, serfs, workers, peasants, or colonial citizens – to accept their condition as ‘God’s will’ and to look for solace in the afterlife. This is the precise sense when Marx says religion is the ‘opiate’ of the people.

Marx and Engels expected a rising of a new, just world order, and predicted that all the artificial doctrines developed to support the dethroned system – including religion – would be consigned to the ‘dustbin of history’ in the new social order where humankind would reclaim its proper place as the maker of its own destiny. What Marx perhaps could not see is that persistence of religion may make the rising of the new world order difficult.

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through the life, death and resurrection of Jesus, God provided a way for the forgiveness of my sins; (2) I believe the Bible is the inspired word of God; (3) I have committed my life to Christ and consider myself to be a converted Christian; (4) I feel it is very important to encourage non-Christians to become Christians.



The election of a Catholic president (John F. Kennedy) in 1960 in a country where Protestants are a vast majority was widely considered marking the end of sectarian religious appeals in American politics. In the last twenty years, however, those sectarian religious issues and moral Puritan themes that many observers declared no longer to be salient from the American political scene have assumed much greater importance in political debate and percolated through presidential politics. In the 2000 campaign for the Republican nomination, George W. Bush, who stumbled badly in early primary elections, survived the early defeats only because conservative Protestants – whom Senator John McCain once denounced as ‘agents of intolerance’ who exerted an ‘evil influence’ on the Republican party – rallied to his cause in key states. Throughout the campaign, Bush emphasized his religious conversion and called for state funding of social services delivered through religious organizations.

In this paper, we will study the electoral consequence of the moral values issue in the 2004 presidential election by distinguishing what we call the policy bundle effect (PBE) from the moral Puritanism effect (MPE).

There are at least two distinct ways the influence of values might occur. First because the Republican party is identified with a traditionalist stance on moral values, some voters who desire a large public sector may nevertheless vote Republican because traditionalist morality is important for them. This we call the *policy bundle effect*. Second, it may be the case that those who subscribe to a traditionalist morality take economic conservatism to be part of that view, in the sense that they view the state as, for instance, usurping the role of the individual and/or family. We call this effect the *moral Puritanism effect*.

Section 2 carries out some econometric analysis of the 2004 election. Section 3 describes our model and the method of decomposition that we will employ. Section 4 summarizes our numerical computation results. Section 5 concludes. The ANES variables used in the paper are defined in Appendix.

## 2. Econometric analysis of the 2004 election data

In our empirical analysis and numerical computation, we use an advance release of the 2004 ANES pre-post study. The sample consists of a new cross-section of respondents that yielded 1,212 face-to-face interviews in the pre-election study, 1,066 of which later provided a face-to-face interview in the post-election study. Data collection was conducted by the Survey Research Center at the University of Michigan.<sup>2</sup>

We first construct four persistent issues in the US politics – the ideal size of the public sector, the issue of moral values, the race issue, and the issue of libertarianism – and four contemporary issues of the 2004 election – the approval on the Iraq war, the Bush tax cut, the social security reform, and the school voucher. For every opinion variable in the ANES2004 which takes the value of  $j$  ranging from  $k$  to  $k+n$ , where  $k$  is an integer and  $n$  is a positive integer, we convert it into  $\frac{j - (k - 1)}{n + 2}$ . Thus every converted value lies strictly between 0 and 1.

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<sup>2</sup> Just right after we complete this paper, the full version of ANES2004 was released. According to the official web page of the National Election Studies, however, the major difference between the full version and the advance version is that the former includes non-survey question variable and corrects for some errors in the latter. We corrected the errors of the advance release here, so that the dataset we use contains the same survey question variables as the full version.

The four persistent issues in the US politics are constructed in the following way. For the preference of the public sector, we take the average of the following three variables (see Appendix for their definitions): (1) **spending**; (2) **job**; and (3) **health**. For the moral values issue, we take the average of the following four groups of variables: (1) women's role in the society (**womenrole**, **workingmom**, and **womenhome**); (2) attitudes on abortion (**abortion**); (3) attitudes on homosexuals (**homo\_nodiscrimination**, **gaymarriage**) and; (4) attitudes on traditionalism and modernism (**tradition\_important**, **newlifestyles\_important**). For the race issue, we take the average of the two variables: (1) **aidtoblacks**; and (2) **blackfavor**. Finally the issue of libertarianism was measured by the attitude towards big government (**biggovt**).

The four contemporary issues are, on the other hand, constructed from the corresponding questionnaires in the ANES: **iraqwarissue**, **taxcutissue**, **ssreform**, **schoolvouchers**. These are specific issues in the 2004 election.

We take the actual vote share of the 2004 election as the observed vote share, while taking as the *population* citizens voting for either party D or party R. Estimating the observed policy position of the two parties is tricky; announced size of the public sector or announced stance on the moral values issue are rarely observable, although we know which party takes a more conservative stance on each of these issues. The ANES 2004 provides information on the public perception about the position of the presidential candidates and the two parties on several variables, such as **spending**, **job**, **womenrole**, **abortion** etc. We take the mean values of these variables for each candidate (party) as the candidates' (parties') position on these issues; if voters are perceptive, this assumption is

not unreasonable. We then take the average of the candidate position and the party position as the *observed party position* on specific policy issues.

Regarding the size of the public sector, only two variables (**spending** and **job**) have observed party positions. We take the average of the observed positions of these two variables to be the observed party policy on the size of the public sector. Regarding the moral value issues, again only two variables (**womenrole** and **abortion**) have observed party positions. We take the average of the observed positions of these two variables to be the observed party policy on the moral values issue.

We first ran a probit regression to see the salient determinants of the voting pattern in the 2004 election. The dependent variable is the dummy variable indicating whether the respondent voted for Republicans and the independent variables are the four persistent election issues, the four temporary issues, and demographic variables such as age, education, household income, etc. Table 1 shows the result. The first column reports the regression coefficients and the second column reports the coefficients in terms of marginal effects.

**[See Table 1 about here]**

We first observe that out of the four persistent issues, the size of the public sector, the moral values issue, and the race issue are highly salient in determining the voting pattern. This may suggest that the most desirable model should consider a model of political competition with three policy issues; the current limitation on the computation

time forbids us to pursue this. The current paper chooses the moral values issue, rather than the race issue, as the second policy issue.

Not surprisingly, a few contemporary issues, such as the approval for the Iraqwar, are highly salient in determining the outcome in the 2004 election. We focus on the persistent issues rather than temporary issues in our analysis because we are more interested in the long-run pattern of American politics. We assume that the contemporary issues do not affect the policy positions of the two parties on the two persistent issues upon which we focus.

Table 2 examines the determinants of the two issues upon which we focus.

**[Table 2 about here]**

First we notice from column (1) that the preferred size of the public sector is negatively correlated with the conservative stance on the moral values issue. In other words, the more conservative a voter is on the moral values issue, the less liberal he or she is on the size of the public sector. But at the same time we notice that this effect is different across party identification. Republicans, for instance, have a very strong negative effect (column (3)) while Democrats have no statistically significant effect (column (2)).

Second, column (4) examines the determinants of the stance on the moral values issue. As we expect, it is negatively correlated with the thermometer feelings on feminists and homosexuals, and positively correlated with religiosity. At the same time, we notice that it is also positively correlated with antiblack affect, although the coefficient is

marginally significant. Thus what we observe as the stance on moral values incorporates part of racism. There could be two possible interpretations for this.

First, our constructed variable on the moral values issue may be impure in that it contains other elements than moral values.

Second, it may be the case that the moral value issues that Republicans have emphasized may not be truly related with moralism; it may be a political cover or a code word for politically unacceptable issues, such as racism.

We do not think that there is an easy way of solving this problem.

### 3. The model

#### A. The model of political equilibrium

We model the 2004 presidential election as a political competition between two parties who compete on a two-dimensional policy space, which, in our application will be the *size of the public sector* and the *policy towards moral values*. The model of political competition employed here is that of *party unanimity Nash equilibrium with endogenous parties* (PUNE) as defined in Roemer (2001, Chapter 13). Unlike the model of Downs, in our model, parties will generically propose distinct policies in equilibrium. We briefly review the concept of party unanimity Nash equilibrium (PUNE).

The PUNE model attempts to explain observed political equilibria in general elections with single or multi-dimensional policy spaces. The *data* of the model are (1) a set of *voter types*,  $H$ ; (2) a *probability distribution* of the voter types,  $F$ , describing the composition of the polity; (3) a *policy space*,  $T$ , over which political competition takes

place between parties, and (4) a *utility function* which describes, for every voter type, its preferences over policies,  $v(t;h)$ . Thus, the data are summarized by a tuple  $(H, \mathbf{F}, T, v)$ . For each probability measure  $\mathbf{F}$ , we will denote the associated distribution function by  $F$  and its density by  $f$ . (Do not confuse the distribution function  $F$  with the probability measure  $\mathbf{F}$ .) We fix the number of parties, exogenously, to be two.

The equilibrium will then consist in a tuple  $(D, R, \tau^D, \tau^R)$  where:

(1)  $(D, R)$  is a partition of the set of voter types into *party memberships* or *constituencies*:

*i.e.*,  $D \cup R = H$ ,  $D \cap R = \emptyset$ ; and

(2)  $\tau^J \in T$  is the equilibrium platform of party  $J$ , for  $J=D, R$ .

(There will be no confusion if we refer to a *party* and its *constituency* by the same variable: e.g,  $R$  for Republican.)

It is important to note that constituencies are endogenous: they are engendered by the data of the model. Thus, the formation of parties and the policies ultimately proposed are the consequence of voter preferences. Of course the model does not endogenize everything: the number of parties is taken as given, the policy space is given, and the fact that parties contain the factions described below is also given.

For our application, a voter's type will be an ordered pair  $h=(\theta, \rho)$  where  $\theta \in [0,1]$  is the voter's ideal size of the public sector (which we sometimes call, for short, her 'tax rate') and  $\rho \in [0,1]$  is her position on the moral values issue. The policy space  $T$  is a set of ordered pairs  $\tau=(t,r)$ , which we may take to be the unit square, where  $t$  is a party's policy on the size of the public sector and  $r$  is its policy on the values issue.

We assume that the utility function of the polity is a weighted Euclidean distance function  $v : T \times H \rightarrow \mathbf{R}$ :

$$v(t, r; \theta, \rho) = -(t - \theta)^2 - 2\beta(t - \theta)(r - \rho) - \gamma(r - \rho)^2, \quad (1)$$

where  $\gamma > 0$ . We also impose the condition  $\gamma > \beta^2$  to ensure that the utility function is concave. For a reason that will be explained below, we assume that the utility functions  $v$  are cardinally measurable and unit-comparable.

Note that in vector notation, this function is identical to:

$$v(t, r; \theta, \rho) = -(t - \theta, r - \rho) \begin{pmatrix} 1 & \beta \\ \beta & \gamma \end{pmatrix} \begin{pmatrix} t - \theta \\ r - \rho \end{pmatrix}, \quad (2)$$

where  $\begin{pmatrix} 1 & \beta \\ \beta & \gamma \end{pmatrix}$  is a weight matrix. We refer to  $\gamma$  as the *relative salience the issue of moral values*, and assume it is positive. The off-diagonal term  $\beta$ , on the other hand, is an interaction term, which can be either positive or negative. (If  $\beta$  is zero, then the utility function is separable.) This term measures how much the voter's evaluation of changes in one issue depends on the expected level of another issue. To see this, suppose we fix  $t$  at a certain level,  $\bar{t}$ , and choose  $r$  for each voter that maximizes her utility; call it  $r(\bar{t}; \theta, \rho)$ .

Then it can be shown that  $r(\bar{t}; \theta, \rho) - \rho = -\frac{\beta}{\gamma}(\bar{t} - \theta)$ . Thus if  $\beta$  is negative, then we have positive complementarity between the two issues. If it is positive, then we have negative complementarity. (See Figure 1.) Whether the utility function exhibits positive or negative complementarity is an empirical matter, which cannot be determined a priori.

**[Figure 1 about here]**



Given two policies  $(\tau^D, \tau^R)$  proposed by the two parties, we define  $\varphi(\tau^D, \tau^R)$  as the fraction of the polity who prefer the policy  $\tau^D$  to the policy  $\tau^R$ . In our model, if the policies are distinct, then the set of voters indifferent between two policies will always have F-measure zero.

A party possesses *entrepreneurs* or *organizers*, and *members* or *constituents*. The members of a party are citizens who, in equilibrium, prefer that party's policy to the policy of the other party. The entrepreneurs are professional politicians who make policy in the party. Think of them as a very small group of individuals, who are not identified as citizens characterized by a type. (Their type is irrelevant.) We will assume that the organizers of the Democratic and Republican parties are each divided into two factions – an Opportunist faction and a Militant faction. The Opportunist faction wishes, in the party competition game, to propose a policy that will maximize the party's vote share, or probability of winning. The Militant faction wishes to propose a policy that will maximize the average welfare of the party's constituency.

The proposal that parties consist of bargaining factions captures the view that parties have conflicting goals: to represent constituencies, and to win office, or, more generally, to maximize vote share. Mathematically, the virtue of the factional model of parties is that it engenders the existence of political equilibria when policy spaces are multi-dimensional.

Without loss of generality, we could postulate a third faction in each party – a Reformist faction, whose members desire to maximize the average expected welfare of the party's constituency. As is shown in Roemer (2001), the set of equilibria will not

change with this additional faction: in an appropriate sense, the Reformists are a ‘convex combination’ of the other two factions. Therefore we have dispensed with it, and also with having to define the probability of victory, which would be essential, were we have to discuss expected utility of voters, something of concern to Reformists.

We mention the Reformists because postulating their existence adds an important element of realism to the model, although, it turns out, it does not alter the model’s equilibria. Thus, from the formal viewpoint, we may ignore Reformists<sup>3</sup>.

The idea of PUNE is that parties compete against each other *strategically*, as in Nash equilibrium, and factions *bargain* with each other, inside parties. At an equilibrium, each party’s platform is a best response to the other party’s platform in the sense that it is a *bargaining solution* between the party’s factions, given the platform proposed by the other party.

Suppose the members of a party consist of all citizens whose types lie in the set  $J \subset H$ . We define the *average welfare function* for this party as a function mapping from  $T$  to the real numbers defined by:

$$V^J(\tau) = \int_{h \in J} v(\tau; h) d\mathbf{F}(h). \quad (3)$$

That is,  $V^J(\tau)$  is just (a constant times) the average utility of the coalition  $J$  at the policy  $\tau$ . (For equation (3) to make sense, we must assume that the utility functions  $v$  are unit-comparable.)

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<sup>3</sup> The reader may be puzzled that adding the Reformist faction does not change the equilibrium set. Adding them does change something, however: the interpretation of the bargaining powers of the factions associated with particular equilibria. Thus, we do not say that Reformists don’t matter: it is just that they do not matter for the present analysis.

Suppose the two parties propose policies  $\tau^D$  and  $\tau^R$ . Define:

$$\Omega(\tau^D, \tau^R) = \{h \in H \mid v(\tau^D, h) > v(\tau^R, h)\}. \quad (4)$$

Then the share of the polity who (should) vote for the  $D$  policy is:

$$\varphi(\tau^D, \tau^R) = \mathbf{F}(\Omega(\tau^D, \tau^R)). \quad (5)$$

Definition A party unanimity Nash equilibrium (PUNE) for the model  $(H, F, T, v)$  is (a) a partition of the set of types  $H = D \cup R$ , possibly ignoring a set of measure zero; and (b) a pair of policies  $(\tau^D, \tau^R)$  such that:

(1a) Given  $\tau^D$  there is no policy  $\tau \in T$  such that:

$$V^R(\tau) \geq V^R(\tau^R) \text{ and } \varphi(\tau^D, \tau) \leq \varphi(\tau^D, \tau^R)$$

with at least one of these inequalities strict;

(1b) Given  $\tau^R$  there is no policy  $\tau \in T$  such that:

$$V^D(\tau) \geq V^D(\tau^D) \text{ and } \varphi(\tau, \tau^R) \geq \varphi(\tau^D, \tau^R)$$

with at least one of these inequalities strict;

(2) for  $J=D, R$ , every member of coalition  $J$  prefers policy  $\tau^J$  to the other policy, that is

$$h \in J \Rightarrow v(\tau^J, h) > v(\tau^{J'}, h) \text{ for } J' \neq J.$$

Condition (1a) states that, when facing the policy  $\tau^D$ , there is no feasible policy that would increase both the average welfare of party  $R$ 's constituents and the vote fraction of party  $R$ . Thus, we may view policy  $\tau^R$  as being a *bargaining solution* between party  $R$ 's two factions when facing the opposition's policy, as the Militants' desire to maximize the average welfare of constituents, and the Opportunists desire to maximize

vote share. All we employ here is the assumption that a bargain must be Pareto efficient for the two players in the bargaining game. Condition (1b) similarly states that policy  $\tau^D$  is a bargaining solution for party  $D$ 's factions when facing the policy  $\tau^R$ . Condition (2) states that the endogenous party memberships are stable: each party member prefers her party's policy to the other parties' policies.

There are two 'free' parameters in this equilibrium concept: one might think that the relative strength of the Militants with respect to the Opportunists in a party is an important variable, in determining where on the mini-Pareto frontier of the factions the bargaining solution lies. There is one such parameter for each party  $D$  and  $R$ . Thus, we can expect that, if there an equilibrium, there will be a two-parameter manifold of equilibria, where the elements in this manifold are associated with different pairs of relative bargaining strengths of the pairs of factions in  $D$  and  $R$ . This indeed turns out to be the case, as we will see below.

With differentiability, we can characterize a PUNE as the solution of a system of simultaneous equations. Denote by  $\nabla_j \varphi(\tau^D, \tau^R)$  the gradient of the function  $\varphi$  with respect to the policy  $\tau^j$ . Denote by  $\nabla V^j$  the gradient of  $V^j$ . Then, we can write the necessary conditions for a PUNE where  $\tau^D$  and  $\tau^R$  are interior points in  $T$  as:

(1a) there is a non-negative number  $x$  such that

$$-\nabla_D \varphi(\tau^D, \tau^R) = x \nabla V^D(\tau^D) \quad (6)$$

(1b) there is a non-negative number  $y$  such that

$$\nabla_R \varphi(\tau^D, \tau^R) = y \nabla V^R(\tau^R). \quad (7)$$

Condition (1a) says that the gradients of the vote share function and the average welfare function for party D point in opposite directions, and so, assuming local convexity, there is no direction in which the policy of the party can be altered so as to increase both the party's vote share and the average welfare of the party's constituents. Thus conditions (1a) and (1b) correspond exactly to the conditions (1a) and (1b) in the definition of PUNE.

Our next task is to characterize PUNE as a system of equations, which requires us to formulate precisely the party constituencies. Denote the set of types who prefer a policy  $\tau^D = (t^D, r^D)$  to policy  $\tau^R = (t^R, r^R)$  by  $\Omega(\tau^D, \tau^R)$ , and compute that

$$\Omega(\tau^D, \tau^R) = \begin{cases} \{(\theta, \rho) \in H \mid \rho > \psi(\tau^D, \tau^R, \theta) \text{ if } \beta(t^D - t^R) + \gamma(r^D - r^R) > 0 \\ \{(\theta, \rho) \in H \mid \rho < \psi(\tau^D, \tau^R, \theta) \text{ if } \beta(t^D - t^R) + \gamma(r^D - r^R) < 0 \end{cases} \quad (8)$$

where

$$\psi(\tau^D, \tau^R, \theta) = \frac{(t^R - t^D) + \beta(r^R - r^D)}{\beta(t^D - t^R) + \gamma(r^D - r^R)} \theta + \frac{((t^D)^2 - (t^R)^2) + \gamma((r^D)^2 - (r^R)^2) + 2\beta(t^D r^D - t^R r^R)}{2\beta(t^D - t^R) + 2\gamma(r^D - r^R)}. \quad (9)$$

We will specify the values of the policies  $t$  and  $r$  so that larger  $t$  means more liberal in economic issues and larger  $r$  means more conservative in value issues. Thus, at equilibrium, we will expect that  $t^D > t^R$ ,  $r^D < r^R$  and  $\beta(t^D - t^R) + \gamma(r^D - r^R) < 0$ . For an equilibrium with this characteristic, it follows from (8) that the constituency  $D$  will be precisely:

$$D = \{(\theta, \rho) \in H \mid \rho < \psi(\tau^D, \tau^R, \theta)\}, \quad (10)$$

for these are the types who will prefer policy  $\tau^L$  to both other policies.  $R$ , of course, comprises the remaining types (except for a set of measure zero). See Figure 2.

[Figure 2 about here]

Thus we can write:

$$\varphi(\tau) = \int_{-\infty}^{\infty} \int_{-\infty}^{\psi(\tau, \theta)} dF(\theta, \rho), \quad (11)$$

where the inside integral is over  $\rho$  and the outside integral is over  $\theta$ . Similarly, we can write:

$$V^D(\tau^D) = \int_{-\infty}^{\infty} \int_{-\infty}^{\psi(\tau^D, \tau^R, \theta)} v(\tau^D; \theta, \rho) dF(\theta, \rho), \quad (12)$$

$$V^R(\tau^R) = \int_{-\infty}^{\infty} \int_{-\infty}^{\psi(\tau^D, \tau^R, \theta)} v(\tau^R; \theta, \rho) dF(\theta, \rho). \quad (13)$$

Now we substitute these expressions into the first-order conditions (FOC), and we have fully modeled PUNE – that is, condition (2) of the definition of PUNE holds by construction.

The first-order conditions now comprise four equations in six unknowns – the four policy unknowns of the Left and Right parties, and the two Lagrangian multipliers  $x$  and  $y$ . If there is a solution, there will (generically) be, therefore, a two-parameter family of solutions. As we described above, the points in this family or manifold can be viewed as corresponding to equilibria associated with different relative bargaining strengths of the pairs of factions in the parties L and R.

In general, there are many equilibria of the model. But in the empirical work that we have carried out over the past five years, it is heartening to learn that these equilibria

are quite concentrated in the policy space (in all the important applications). Thus, we do not lose much predictive power by virtue of the multiplicity of equilibria.

That multiplicity, which is two-dimensional (regardless of the dimension of the policy space), is due to our not specifying the relative bargaining strengths of the internal factions within the parties. In other words, if we could specify what those bargaining strengths were, we could pin down unique equilibria. Indeed, at any PUNE, we can compute the associated relative bargaining powers of the Opportunists and Militants in each party. We model the bargaining game within the parties as a Nash bargaining game with threat points. The details of the game and the computation of bargaining powers are presented in Roemer (2001, Chapter 8). The relative bargaining power of the Militants in Democrats at at PUNE  $(\tau^D, \tau^R)$  is given by

$$\frac{x(V^D(\tau^D) - V^D(\tau^R))}{\varphi(\tau^D, \tau^R) + x(V^D(\tau^D) - V^D(\tau^R))}, \quad (14)$$

where  $x$  solves equation (6), and the relative bargaining power of the Militants in Republicans is given by

$$\frac{y(V^R(\tau^R) - V^R(\tau^D))}{1 - \varphi(\tau^D, \tau^R) + y(V^R(\tau^R) - V^R(\tau^D))}, \quad (15)$$

where  $y$  is the solution of equation (7).

Unfortunately, we do not have good data on these relative bargaining strengths. (Indeed, there probably is no formal bargaining game taking place within parties: our model is meant to capture the idea that the setting of policies by parties reflects both vote-maximizing and constituency-representing aims.) One way that we can refine the set of equilibria is to fit the model to the observed data in various ways: for instance, by

restricting ourselves to equilibria that generate the *observed* vote shares for a particular election. This essentially eliminates one degree of freedom from the equilibrium set.

We have recently completed an analysis of how the race issue impacted the degree of income taxation in the US, during the period 1972-1992. (See Lee and Roemer (2004).) Along with Karine Van der Straeten, we have extended this analysis to three other countries – the UK, Denmark and France, which will be published as a book, tentatively entitled *Racism, Xenophobia, and Distribution*. In this analysis, we posited either two or three parties, as was appropriate for the particular country, and a two-dimensional policy space, consisting of the economic issue, and the race or immigration issue. We calibrated the model to the country at hand, and then conducted some counterfactual calculations to understand the degree to which the race/immigration issue affects the equilibrium on the economic issue. In all cases, we conclude that the effect is significant. In the US, we compute that the income tax rate would be approximately ten percentage points higher, were racism absent from American voters' worldviews.

Our work on this problem illustrates the tractability of the PUNE model – indeed, its capacity to track extremely closely the electoral experience in these countries. We conclude from this work that the conceptualization of parties as consisting of bargaining factions appears to be a fertile one, at least in the pragmatic sense of producing a model that tracks reality well, without having to postulate many exogenous parameters to achieve a good fit of model to data.

#### B. The policy bundle (PB) and moral Puritanism (MP) effects

The two counterfactual experiments are carried out in the following way.



The first counterfactual experiment is done by assuming that *the issue of moral values (r) is not an issue* in the election (thus parties compete over the single issue of the size of the public sector,  $t$ ), although voters continue to possess the same joint distribution described by  $F(\theta, \rho)$ . (In actual calculations, we set  $\bar{r} = \varphi r_D^{obs} + (1 - \varphi) r_R^{obs}$ .) Thus it continues to be the case, in this counterfactual contest, that voters' views on values will affect the political equilibrium, *directly* via their effect on preferences on party constituents and *indirectly* via their effect on preferences over size of the public sector. If we call  $t^J$  an equilibrium public sector size for party  $J$  in the full model and  $t_I^J$  an equilibrium public sector size for party  $J$  in this counterfactual, then the difference  $t_I^J - t^J$  is exactly a measure of the policy-bundle effect.

The second counterfactual is then carried out by estimating a distribution of *value-weak preference for the public sector*. We have seen that Republicans had a significant anti-state effect of values while Democrats had no such an effect. We estimate what the distribution of preferences over the size of the public sector would be, had Republican voters the anti-state effect of values of the average population, which is obtained by running the regression over the entire population. Call the *value-weak preference for the public sector*  $\theta'$ . We now run a second unidimensional election, on the size of the public sector, where we assume that the distribution of voter preferences on the tax issue is given by  $G(\theta', \rho)$  and that the issue of moral values ( $r$ ) is not an issue in the election. The results of this election will be sterilized of both the policy-bundle and the moral Puritarianism effects. If we summarize the policy of the PUNEs here

calculated by  $t''^J$  then we say that the total effect of moral value is  $t''^J - t^J$ , and the moral Puritarianism effect is  $t''^J - t_I^J$ . In other words,

$$\begin{aligned}
 & t''^J - t^J && \text{Total effect} \\
 = & t_I^J - t^J && \text{PB effect} \\
 + & t''^J - t_I^J && \text{MP effect}
 \end{aligned}$$

The order of decomposition is not unique, however. Consider the following third experiment. Suppose we assume that the joint distribution is given by  $G(\theta^j, \rho)$  and run a two dimensional election with this counterfactual distribution. If we call  $t''^J$  an equilibrium public sector size for party  $J$  in this counterfactual, then the difference  $t''^J - t^J$  is exactly a measure of the moral Puritanism effect, and the difference  $t''^J - t_I^J$  is a measure of the policy bundle effect. We call the decomposition method according to the first order ‘Method 1,’ while that according to the second order ‘Method 2.’ Because the order of decomposition is arbitrary, we take the average of the effects obtained from the two methods. Figure 3 illustrates the two methods of decomposition schematically.

**[Figure 3 about here]**

#### 4. Numerical computation

In the numerical computation, we will assume that the distribution of voter types is given by a five-parameter bivariate Beta distribution specified in Gupta and Wong

(1985). More specifically, the joint probability density function of the bivariate Beta distribution we use is given by

$$f(h_1, h_2) = \left( \prod_{j=1}^2 g(h_j; a_j, b_j) \right) \left( 1 + \lambda \prod_{j=1}^2 (2G(h_j; a_j, b_j) - 1) \right), \quad (16)$$

where  $g(h_j; a_j, b_j) = \frac{1}{B(a_j, b_j)} (h_j)^{a_j-1} (1-h_j)^{b_j-1} \mathbf{I}_{[0,1]}(h_j)$  is a univariate Beta density,

$G(h_j; a_j, b_j)$  is the distribution function of  $g(h_j; a_j, b_j)$ , and  $a_j > 0, b_j > 0, |\lambda| \leq 1$ . It has been shown that the parameter  $\lambda$  is proportional to the coefficient of correlation between  $h_1$  and  $h_2$ . We denote the distribution function of  $f$  by  $F$ . Gupta and Wong (1985)

derive the following formula for joint moments of the bivariate Beta distribution:

$$E(h_1^{n_1} h_2^{n_2}) = \prod_{i=1}^2 E(h_i^{n_i}) + \lambda \prod_{i=1}^2 E(h_i^{n_i}) \left\{ \frac{2B(2a_i + n_i, b_i)}{a_i B(a_i, b_i) B(a_i + n_i, b_i)} * {}_3F_2 \left( \begin{matrix} a_i, 1-b_i, n_i + 2a_i \\ a_i + 1, n_i + 2a_i + b_i \end{matrix} \middle| 1 \right) - 1 \right\},$$

where  ${}_pF_q \left( \begin{matrix} x_1, \dots, x_p \\ y_1, \dots, y_q \end{matrix} \middle| z \right) = \sum_{n=1}^{\infty} \frac{\prod_{i=1}^p \Gamma(x_i + n)}{\prod_{i=1}^q \Gamma(y_i + n)} \frac{z^n}{n!}$  is the hypergeometric function. This formula

allows us to compute the means and the variances of the two marginal distribution functions and the covariance between the two variables. Thus

$$Eh_i = \frac{a_i}{a_i + b_i}, \quad (17)$$

$$Var(h_i) = \frac{a_i b_i}{(a_i + b_i)^2 (a_i + b_i + 1)}, \quad (18)$$

and

$$Cov(h_1, h_2) = \lambda \prod_{i=1}^2 \frac{a_i}{a_i + b_i} \left\{ \frac{2B(2a_i + 1, b_i)}{a_i B(a_i, b_i) B(a_i + 1, b_i)} * {}_3F_2 \left( \begin{matrix} a_i, 1-b_i, 1+2a_i \\ a_i + 1, 1+2a_i + b_i \end{matrix} \middle| 1 \right) - 1 \right\}. \quad (19)$$

By comparing them with the empirical means, variances, and covariance, we can determine the values of  $(a_1, b_1, a_2, b_2, \lambda)$ .

Figure 4 shows the estimated beta densities and a non-parametrically estimated densities (a kernel method with the Silverman's optimal bandwidth). As is clear from the figure, the fit is extremely good. Using a non-parametric joint density in numerical computations is possible, but extremely expensive in terms of the computation time required; thus we use the Beta distribution. The joint density and its contour plot are shown in Figure 5. As we expect, the two dimensions are negatively correlated.

**[Figure 4 about here]**

**[Figure 5 about here]**

We also computed the density of the *value-weak preference for the public sector*. As is shown in Figure 6, the Beta fit is not bad for the counterfactual distribution as well.

**[Figure 6 about here]**

We do not know the empirical values of  $\gamma$  and  $\beta$ . Thus we varied the value of  $\gamma$  from 0.8 to 1.6 and for each value of  $\gamma$  we chose the value of  $\beta$  that minimizes  $\varphi(t_{obs}^D, t_{obs}^R, R_{obs}^D, R_{obs}^R) - \varphi_{obs}$ . The values of  $\beta$ 's computed in this way are all negative; thus the utility function exhibits positive complementarity. (See Figure 1 again.)

Out of the four models described in Figure 3, two of them are two-dimensional models (i.e., the full model and model 21) while the other two are one-dimensional models (i.e., model 12 and model 22). For the full model and model 21, we use equations (6)-(7), which form a system of 4 equations in 6 unknowns (the four policy variables and the two Lagrangean multipliers). Consequently, we can expect to find a 2-manifold of solutions in these models if there are any solutions. We started the computation by (randomly) choosing a pair of  $r^D$  and  $r^R$  (with  $r^D < r^R$ ); we solve the four equations for  $t^D$ ,  $t^R$ ,  $x$ , and  $y$  for the chosen values of  $r^D$  and  $r^R$ . In the computation we checked whether (1) the root found by the computer satisfies the four first-order conditions, (2) the indifference curves of party factions are indeed tangent to each other for both parties, and (3)  $x$  and  $y$  are nonnegative. For the two counterfactual models, we (randomly) choose a pair of  $t^D$  and  $t^R$  solving the two equations  $-\frac{\partial \varphi(t^D, t^R, r_{obs}, r_{obs})}{\partial t^D} = \frac{\partial V^D(t^D, r_{obs})}{\partial t^D}$  and  $\frac{\partial \varphi(t^D, t^R, r_{obs}, r_{obs})}{\partial t^R} = \frac{\partial V^R(t^R, r_{obs})}{\partial t^R}$  for  $x$  and  $y$ , while checking whether  $x \geq 0$  and  $y \geq 0$  hold.

For the two-dimensional models, we keep running the computer until it finds at least 60 PUNEs. For the one-dimensional models, we did 300 random samplings, which usually finds 100-150 PUNEs. Running the two-dimensional models is more time-consuming than running the one-dimensional models.

We did not use all these PUNEs in computing our decomposition effects. We adopted the following procedure. First, out of the 60 PUNEs in the full model, we selected those whose (equilibrium) vote share is within 10% of the observed vote share.

Then we computed the average bargaining powers of these equilibria. Finally for the other three models, we chose those equilibria whose bargaining powers are close to the average bargaining powers of the selected equilibria in the full model. This means that we are controlling for the effect of a change in bargaining powers. As we view the relative bargaining powers of the factions as our missing data, it seems to us that this makes good sense. This does not mean that we think the actual bargaining powers would not change. It means we are interested in the pure effects of MPE and PBE, not the combination of these effects and the effect of a change in bargaining powers.

In Figure 7, we report the equilibrium values of PUNEs for the full model with different sets of  $(\gamma, \beta)$ . We use blue dots to denote the equilibrium policy vectors for party D and red dots to denote those for party R. The big rectangles denote the observed policies of the two parties, while big dots represent the average equilibrium policies of the two parties. The mid size dots represent the ideal policies of the militants in the two parties, while the smallest dots the individual PUNEs.

**[Figure 7 about here]**

Table 3 shows the results for all different combinations of  $(\gamma, \beta)$  and their decompositions according to the two methods described in section 3. The average policies are the averages of the policies of the two parties.

**[Table 3 about here]**

First, we note that the equilibrium policies are differentiated between the two parties. When  $(\gamma, \beta) = (1.4, -0.6)$ , for instance, the Democratic Party proposes  $t^D = 0.59$  while the Republican Party proposes  $t^R = 0.47$ .

The effect of moral values on redistribution in the United States is small if  $\gamma$  is low, while it is large if  $\gamma$  is high. This is not surprising because  $\gamma$  measures the relative salience of moral values. If  $(\gamma, \beta) = (1.4, -0.6)$ , we predict that the Republican Party would have proposed  $t^R = 0.57$ , absent the issues of moral values. Due to the existence of values, however, the Republican Party was able to propose  $t^R = 0.47$ ; thus the effect of values on the size of the public sector is about 21 %  $(0.10/0.47)$  for the Republican Party. This is about 56% of the standard deviations of the distribution of ideal points of the tax rate. The effect of values on the size of the public sector for the Democratic Party is also large. Absent values, we predict party D would have proposed  $t^D = 0.68$ ; due to the existence of values, it proposed  $t^D = 0.59$ . If  $(\gamma, \beta) = (0.8, -0.21)$ , on the other hand, the effect of values on the size of the public sector is about 24 % of the standard deviations of the distribution of ideal points of the tax rate for the Republican Party and 16% for the Democratic Party.

When we decompose the total effect into the two effects that we suggested earlier, we notice that the moral Puritanism effect is generally positive, regardless of whether the value of  $\gamma$  is low or high. The policy bundle effect, on the other hand, is positive if the issue of moral values is sufficiently salient ( $\gamma = 1.4 \sim 1.6$ ) while it is negative if it is not salient ( $\gamma = 0.8 \sim 1.2$ ).

Figure 8 shows the equilibrium voter separation for the four models that we described in Figure 3, juxtaposed on the contour plots of the beta densities. Each straight line in these figures demarcates the types who, at equilibrium, vote Republican from the types who vote Democratic. The space of the plots in Figure 8 is  $(\theta, \rho)$ . Those types ‘below’ a line are Democrats, while those ‘above’ are Republicans. To be precise, each line is the graph of equation (9) above for one of the elections. (Note that  $\Psi$  is a linear function of  $\theta$  in equation (9).) For each pair of parameter values, the first panel shows the voter separation for the full model and model 12 and the second panel shows the voter separation for model 21 and model 22. The beta density in the first panel is that with the actual preference for the size of the public sector while the beta density in the second panel is that with the counterfactual value-weak preference for the size of the public sector. In both panels, the flatter separation curves are those for the two-dimensional models (i.e., the full model and model 21) and the steeper ones are those for the one-dimensional models (i.e., model 12 and model 22). Thus the presence of the issue of moral values makes the US politics less class-oriented.

**[Figure 8 about here]**

## 5. Conclusion

There has been much useful work in political science that is relevant to the question that we pose. Almost all of this work, however, has been descriptive, in the



sense that it searches for *correlations* between voter preferences and observed political outcomes. A multiple regression is only, after all, a correlation.

No statistical exercise of correlation, regardless of its sophistication, can answer adequately the kind of counterfactual question in which we are interested. For when we ask, “Why can the Republican Party propose an extremist economic policy and receive half the votes?” we are in fact asking, “What difference from the present reality would force the Republican Party to propose a much less extremist economic policy to remain a political player?” Questions such as this cannot be answered by observing correlations; they require a model of the social mechanism that connects voter views to political outcomes. The venue is party competition, and hence, we believe, a full model of party formation and competition is needed to analyze the problem.

We, as a social science, are only in the beginning stages of describing complex party competition with precise mathematical models. Doubtless our work will appear primitive in fifty years’ time -- we hope, in sooner than that. We do, however, believe that the project we have proposed involves a vital methodological step forward.

We briefly comment on the future research that might study what we proposed to use the PUNE model to study the relative importance of the three bulleted explanations, in the introduction. The procedure will again be to compute equilibria of the model under various counterfactual assumptions.

Ideally, we may define the set of voter types  $H$  as having many dimensions, which would be necessary to characterize voter preferences over many issues – say the economic issue, the ‘values’ issue, the ‘race’ issue, and foreign policy. Unfortunately,

working with such a large dimensional policy space would be intractable unless one uses a low level programming language such as C or Fortran.

One question we are concerned with is whether the most important secondary issue, in so far as explaining the conservative economic policy of the Republican Party is concerned, is the ‘race’ issue or the ‘values’ issue – or, more generally, whether one of these issues is important at all. For the period 1972-1992, we believe that we have demonstrated the importance of the race issue (Lee and Roemer, 2004). Today, however, the ‘values’ issue may be more important. To study this, we would specify a three-dimensional space of voter types, enabling us to represent voter preferences on the economic issue, the race issue and the ‘values’ issue. We would then conduct counterfactual experiments of the following sort: How would the equilibrium change if *race were not an issue* in the election; how would it change if *values were not an issue* in the election? Recall, that by a change in the equilibrium, we mean a change in party constituencies and party policies.

We note that our procedure is more sophisticated than simply estimating, from the NES data, the *relative salience* of these issues for voters: we have a full equilibrium model that tells us how party constituencies would change, and consequent party policies would change, were these issues to disappear from the electoral arena. The results of this kind of general-equilibrium computation are not related in any obvious way to the relative saliences that these issues have for voters<sup>4</sup>. (It may be that the issue with larger

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<sup>4</sup> There is a distinction between two kinds of counterfactual: in one, we assume that an issue, such as race, is not present in the electoral contest, but voters continue to care about race, and that influences their views on other issues; in another, we assume that

saliency has less effect on the equilibrium on economic policy than the third issue, because of the correlation of voter views on the three issues.)

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*racism ceases* to characterize the worldviews of voters. We will not pursue this distinction further in this proposal, although we will, in the project.

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**Table 1: Probit regressions for the Republican vote share**

	(1)	(2)
	voteR	voteR
publicsize	-2.729**	-1.071**
	(2.92)	(2.92)
moralvalue	3.475*	1.364*
	(2.51)	(2.51)
raceissue	2.902*	1.139*
	(2.52)	(2.52)
biggovt	0.595*	0.233*
	(2.17)	(2.17)
iraqwarissue	7.347**	2.884**
	(6.71)	(6.71)
taxcutissue	3.014**	1.183**
	(4.10)	(4.10)
ssreform	0.422**	0.166**
	(2.69)	(2.69)
schoolvouchers	0.171	0.067
	(1.09)	(1.09)
environmentissue	-0.754	-0.296
	(1.03)	(1.03)
age	-0.009	-0.004
	(0.87)	(0.87)
educatio	-0.033	-0.013
	(0.34)	(0.34)
income hh (10k)	0.042	0.017
	(0.99)	(0.99)
blackdummy	-1.902**	-0.590**
	(3.83)	(3.83)
femaledummy	-0.046	-0.018
	(0.18)	(0.18)
marrieddummy	-0.157	-0.062
	(0.58)	(0.58)
uniondummy	-0.166	-0.066
	(0.51)	(0.51)
usparentsdummy	0.559	0.220
	(1.55)	(1.55)
family military	-0.405	-0.156
	(1.35)	(1.35)
unemployeddummy	0.452	0.172
	(1.31)	(1.31)
pastfinancial	0.202	0.079
	(1.23)	(1.23)
futurefinancial	-0.477+	-0.187+
	(1.96)	(1.96)
pasteconomy	0.275	0.108
	(1.56)	(1.56)
futureeconomy	0.152	0.060
	(0.73)	(0.73)
religiosity	0.452	0.177
	(0.51)	(0.51)
Constant	-7.291**	
	(4.70)	
Observations	411	411
Absolute value of z statistics in parentheses		
+ significant at 10%; * significant at 5%; ** significant at 1%		

**Table 2: Determinants of the Size of the Public Sector and the Moral Values**

	(1)All	(2)Democrats	(3)Republicans	(4)All
	publicsize	publicsize	publicsize	moralvalue3
biggovt	-0.077**	-0.050*	-0.089**	0.004
	(5.91)	(2.37)	(5.05)	(0.51)
moralvalue	-0.337**	-0.124	-0.431**	
	(4.58)	(1.03)	(3.79)	
antiblackaffect	-0.000	-0.002	0.000	0.001+
	(0.26)	(1.55)	(0.49)	(1.92)
therm poor	0.002**	0.001*	0.001+	0.001**
	(4.13)	(2.29)	(1.75)	(2.68)
therm feminists	0.001**	0.001**	0.000	-0.001**
	(4.01)	(2.78)	(0.43)	(6.53)
therm homosexuals	-0.001+	-0.001	-0.000	-0.001**
	(1.89)	(1.38)	(0.92)	(8.25)
therm southerners	-0.001*	0.000	-0.001*	0.000
	(2.18)	(0.05)	(2.19)	(1.39)
age	-0.001+	-0.001	-0.001	0.001**
	(1.79)	(1.33)	(1.38)	(4.08)
education	-0.006	-0.000	-0.015*	-0.008**
	(1.30)	(0.01)	(2.37)	(3.30)
income hh (10k)	-0.005*	-0.003	-0.003	-0.001
	(2.48)	(0.98)	(1.13)	(1.25)
blackdummy	0.014	-0.004	0.039	-0.019+
	(0.76)	(0.15)	(0.88)	(1.79)
femaledummy	0.002	-0.022	0.028	-0.020**
	(0.13)	(1.14)	(1.50)	(2.90)
marrieddummy	0.022	0.017	0.029	0.022**
	(1.57)	(0.79)	(1.37)	(3.06)
uniondummy	0.003	0.007	0.005	-0.000
	(0.26)	(0.36)	(0.22)	(0.04)
unemployeddummy	0.017	0.027	0.015	0.004
	(1.22)	(1.10)	(0.66)	(0.46)
pastfinancial	-0.024**	-0.020*	-0.014	0.005
	(3.58)	(2.03)	(1.10)	(1.26)
futurefinancial	0.005	0.009	-0.002	-0.003
	(0.58)	(0.68)	(0.11)	(0.50)
pasteconomy	-0.032**	-0.012	-0.024+	0.010*
	(3.64)	(0.77)	(1.90)	(2.03)
futureeconomy	-0.007	0.009	0.000	0.004
	(0.82)	(0.69)	(0.01)	(0.75)
religiosity	-0.021	-0.092	0.111+	0.233**
	(0.49)	(1.46)	(1.82)	(10.00)
trust	-0.032**	-0.043*	-0.007	-0.007
	(2.63)	(2.20)	(0.38)	(1.01)
constant	0.768**	0.688**	0.845**	0.390**
	(14.59)	(8.21)	(9.12)	(16.37)
Observations	594	231	239	720
R-squared	0.39	0.22	0.36	0.52
Adj R-squared				
Robust t statistics in parentheses				
+ significant at 10%; * significant at 5%; ** significant at 1%				

**Table 3: PUNEs and the decomposition effects**

$(\gamma = 0.8, \beta = -0.21)$

	Full	Model 12	Model 21	Model 22	Observed
BPD	0.339206	0.26508	0.275152	0.262366	NA
BPR	0.307897	0.347609	0.334008	0.306647	NA
tD	0.594132	0.551025	0.604934	0.622341	0.62
tR	0.474849	0.42255	0.504866	0.518561	0.39
RD	0.438027	NA	0.461005	NA	0.34
RR	0.484764	NA	0.487175	NA	0.54
tAVE	0.532559	0.495335	0.561209	0.575715	0.501515
$\varphi$	0.485656	0.565547	0.583272	0.543194	0.484848

Democratic policies		Method 1	Method 2	Average
	PBE	-0.043107	0.0174069	-0.0128501
	% s.d.	-24.0419	9.70826	-7.1668
	MPE	0.0713167	0.0108028	0.0410598
	% s.d.	39.7751	6.02498	22.9
	$\frac{PBE}{TOT} \times 100$	-152.809	61.7054	-45.552
$\frac{MPE}{TOT} \times 100$	252.809	38.2946	145.552	
Republican policies		Method 1	Method 2	Average
	PBE	-0.0522989	0.0136946	-0.0193022
	% s.d.	-29.1684	7.6378	-10.7653
	MPE	0.0960106	0.0300171	0.0630139
	% s.d.	53.5475	16.7413	35.1444
	$\frac{PBE}{TOT} \times 100$	-119.645	31.3293	-44.1579
$\frac{MPE}{TOT} \times 100$	219.645	68.6707	144.158	
Average Policies		Method 1	Method 2	Average
	PBE	-0.0372245	0.0145064	-0.011359
	% s.d.	-20.761	8.09057	-6.33522
	MPE	0.0803804	0.0286495	0.054515
	% s.d.	44.8301	15.9785	30.4043
	$\frac{PBE}{TOT} \times 100$	-86.2558	33.6139	-26.3209
$\frac{MPE}{TOT} \times 100$	186.256	66.3861	126.321	



**Table 3 (Continued): PUNEs and the decomposition effects**

$(\gamma = 1.0, \beta = -0.30)$

	Full	Model 12	Model 21	Model 22	Observed
BPD	0.389088	0.303383	0.325135	0.299505	NA
BPR	0.368597	0.371428	0.328698	0.362057	NA
tD	0.597672	0.559066	0.640493	0.612459	0.62
tR	0.464476	0.407982	0.54586	0.488664	0.39
RD	0.428503	NA	0.440007	NA	0.34
RR	0.495531	NA	0.488379	NA	0.54
tAVE	0.530003	0.491472	0.594803	0.558208	0.501515
$\varphi$	0.491639	0.557873	0.500264	0.571921	0.484848

Democratic policies		Method 1	Method 2	Average
	PBE	-0.0386068	-0.0280337	-0.0333202
	% s.d.	-21.5319	-15.6351	-18.5835
	MPE	0.0533936	0.0428205	0.0481071
	% s.d.	29.7789	23.882	26.8305
	$\frac{PBE}{TOT} \times 100$	-261.089	-189.585	-225.337
	$\frac{MPE}{TOT} \times 100$	361.089	289.585	325.337
Republican policies		Method 1	Method 2	Average
	PBE	-0.0564945	-0.0571956	-0.0568451
	% s.d.	-31.5084	-31.8994	-31.7039
	MPE	0.0806823	0.0813833	0.0810328
	% s.d.	44.9985	45.3895	45.194
	$\frac{PBE}{TOT} \times 100$	-233.567	-236.465	-235.016
	$\frac{MPE}{TOT} \times 100$	333.567	336.465	335.016
Average Policies		Method 1	Method 2	Average
	PBE	-0.0385304	-0.036595	-0.0375627
	% s.d.	-21.4894	-20.4099	-20.9496
	MPE	0.0667359	0.0648004	0.0657681
	% s.d.	37.2202	36.1408	36.6805
	$\frac{PBE}{TOT} \times 100$	-136.606	-129.745	-133.176
	$\frac{MPE}{TOT} \times 100$	236.606	229.745	233.176

**Table 3 (Continued): PUNEs and the decomposition effects**

$(\gamma = 1.2, \beta = -0.57)$

	Full	Model 12	Model 21	Model 22	Observed
BPD	0.261542	0.243174	0.266812	0.216057	NA
BPR	0.267292	0.315706	0.258074	0.227213	NA
tD	0.570709	0.525204	0.641292	0.60274	0.62
tR	0.474396	0.395436	0.566851	0.517676	0.39
RD	0.441606	NA	0.436501	NA	0.34
RR	0.491791	NA	0.478175	NA	0.54
tAVE	0.523543	0.468684	0.604939	0.562459	0.501515
$\varphi$	0.510197	0.584103	0.471218	0.5342	0.484848

Democratic policies		Method 1	Method 2	Average
	PBE	-0.0455043	-0.0385514	-0.0420279
	% s.d.	-25.3789	-21.5011	-23.44
	MPE	0.0775361	0.0705832	0.0740596
	% s.d.	43.2438	39.366	41.3049
	$\frac{PBE}{TOT} \times 100$	-142.06	-120.354	-131.207
	$\frac{MPE}{TOT} \times 100$	242.06	220.354	231.207
Republican policies		Method 1	Method 2	Average
	PBE	-0.0789594	-0.0491754	-0.0640674
	% s.d.	-44.0376	-27.4263	-35.732
	MPE	0.122239	0.0924554	0.107347
	% s.d.	68.1759	51.5646	59.8703
	$\frac{PBE}{TOT} \times 100$	-182.439	-113.622	-148.03
	$\frac{MPE}{TOT} \times 100$	282.439	213.622	248.03
Average Policies		Method 1	Method 2	Average
	PBE	-0.0548589	-0.0424797	-0.0486693
	% s.d.	-30.5961	-23.6919	-27.144
	MPE	0.0937755	0.0813963	0.0875859
	% s.d.	52.3009	45.3967	48.8488
	$\frac{PBE}{TOT} \times 100$	-140.965	-109.155	-125.06
	$\frac{MPE}{TOT} \times 100$	240.965	209.155	225.06

**Table 3 (Continued): PUNEs and the decomposition effects**

$(\gamma = 1.4, \beta = -0.6)$

	Full	Model 12	Model 21	Model 22	Observed
BPD	0.378768	0.319886	0.337967	0.337946	NA
BPR	0.359993	0.25422	0.24951	0.236778	NA
tD	0.592529	0.613614	0.655917	0.678811	0.62
tR	0.469126	0.478783	0.578092	0.570594	0.39
RD	0.428004	NA	0.424388	NA	0.34
RR	0.495673	NA	0.474527	NA	0.54
tAVE	0.529929	0.540737	0.612395	0.617008	0.501515
$\varphi$	0.49172	0.451919	0.430915	0.413461	0.484848

Democratic policies		Method 1	Method 2	Average
	PBE	0.0210846	0.0228946	0.0219896
	% s.d.	11.7594	12.7689	12.2641
	MPE	0.0651977	0.0633877	0.0642927
	% s.d.	36.3623	35.3529	35.8576
	$\frac{PBE}{TOT} \times 100$	24.4368	26.5345	25.4857
	$\frac{MPE}{TOT} \times 100$	75.5632	73.4655	74.5143
Republican policies		Method 1	Method 2	Average
	PBE	0.0096572	-0.00749765	0.00107977
	% s.d.	5.38606	-4.18162	0.602216
	MPE	0.0918111	0.108966	0.100389
	% s.d.	51.2053	60.773	55.9892
	$\frac{PBE}{TOT} \times 100$	9.51745	-7.38916	1.06415
	$\frac{MPE}{TOT} \times 100$	90.4825	107.389	98.9359
Average Policies		Method 1	Method 2	Average
	PBE	0.0108085	0.00461301	0.00771076
	% s.d.	6.02817	2.57279	4.30048
	MPE	0.0762705	0.082466	0.0793683
	% s.d.	42.5379	45.9933	44.2656
	$\frac{PBE}{TOT} \times 100$	12.4123	5.2975	8.8549
	$\frac{MPE}{TOT} \times 100$	87.5877	94.7025	91.1451

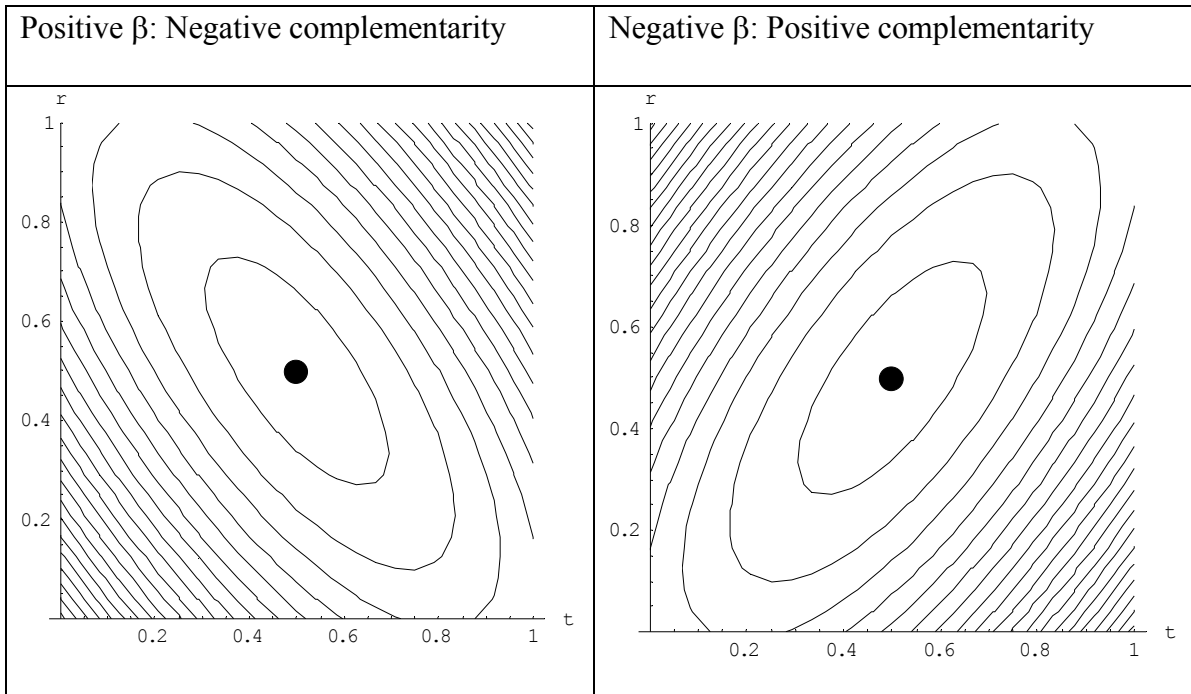
**Table 3 (Continued): PUNEs and the decomposition effects**

$(\gamma = 1.6, \beta = -0.75)$

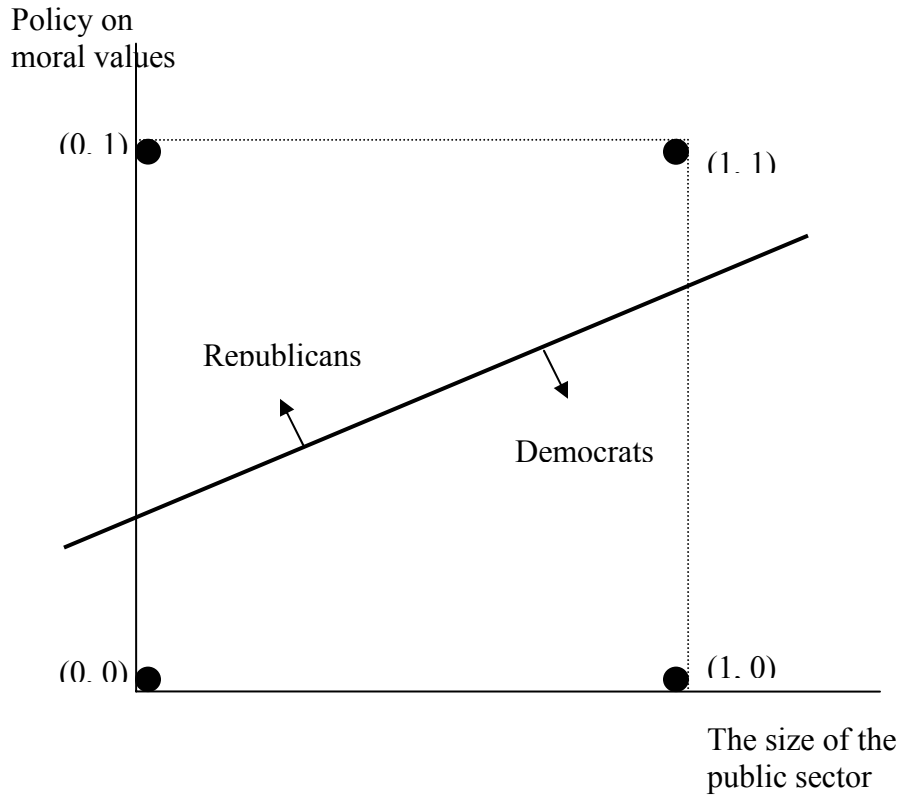
	Full	Model 12	Model 21	Model 22	Observed
BPD	0.273365	0.284156	0.291151	0.28602	NA
BPR	0.296373	0.221993	0.227285	0.199192	NA
tD	0.573599	0.622957	0.648374	0.672735	0.62
tR	0.474682	0.497724	0.583469	0.577014	0.39
RD	0.436817	NA	0.422606	NA	0.34
RR	0.494432	NA	0.469735	NA	0.54
tAVE	0.526095	0.5548	0.613572	0.618851	0.501515
$\varphi$	0.506395	0.431657	0.431663	0.416091	0.484848

Democratic policies		Method 1	Method 2	Average
	PBE	0.0493585	0.0243619	0.0368602
	% s.d.	27.5285	13.5872	20.5578
	MPE	0.0497784	0.074775	0.0622767
	% s.d.	27.7626	41.7038	34.7332
	$\frac{PBE}{TOT} \times 100$	49.7883	24.574	37.1811
	$\frac{MPE}{TOT} \times 100$	50.2117	75.426	62.8189
Republican policies		Method 1	Method 2	Average
	PBE	0.0230429	-0.00645558	0.00829365
	% s.d.	12.8516	-3.60043	4.62557
	MPE	0.0792893	0.108788	0.0940385
	% s.d.	44.2216	60.6736	52.4476
	$\frac{PBE}{TOT} \times 100$	22.5177	-6.30845	8.10464
	$\frac{MPE}{TOT} \times 100$	77.4823	106.308	91.8954
Average Policies		Method 1	Method 2	Average
	PBE	0.0287043	0.00527847	0.0169914
	% s.d.	16.0091	2.94393	9.47652
	MPE	0.0640509	0.0874768	0.0757638
	% s.d.	35.7227	48.7879	42.2553
	$\frac{PBE}{TOT} \times 100$	30.9463	5.69075	18.3185
	$\frac{MPE}{TOT} \times 100$	69.0537	94.3093	81.6815

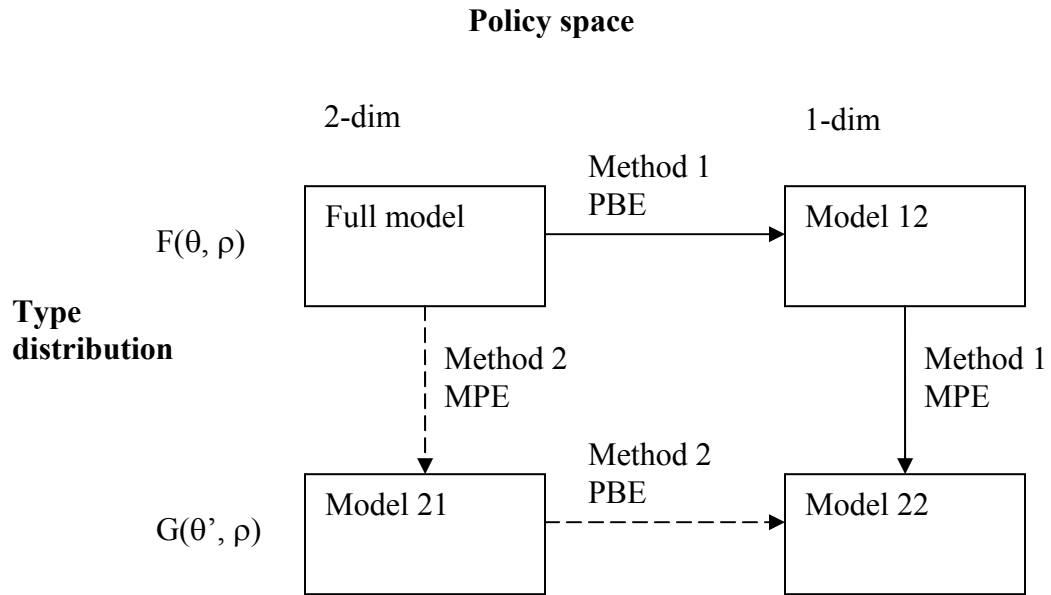
**Figure 1: Patterns of complementarity and the shapes of indifference curves**



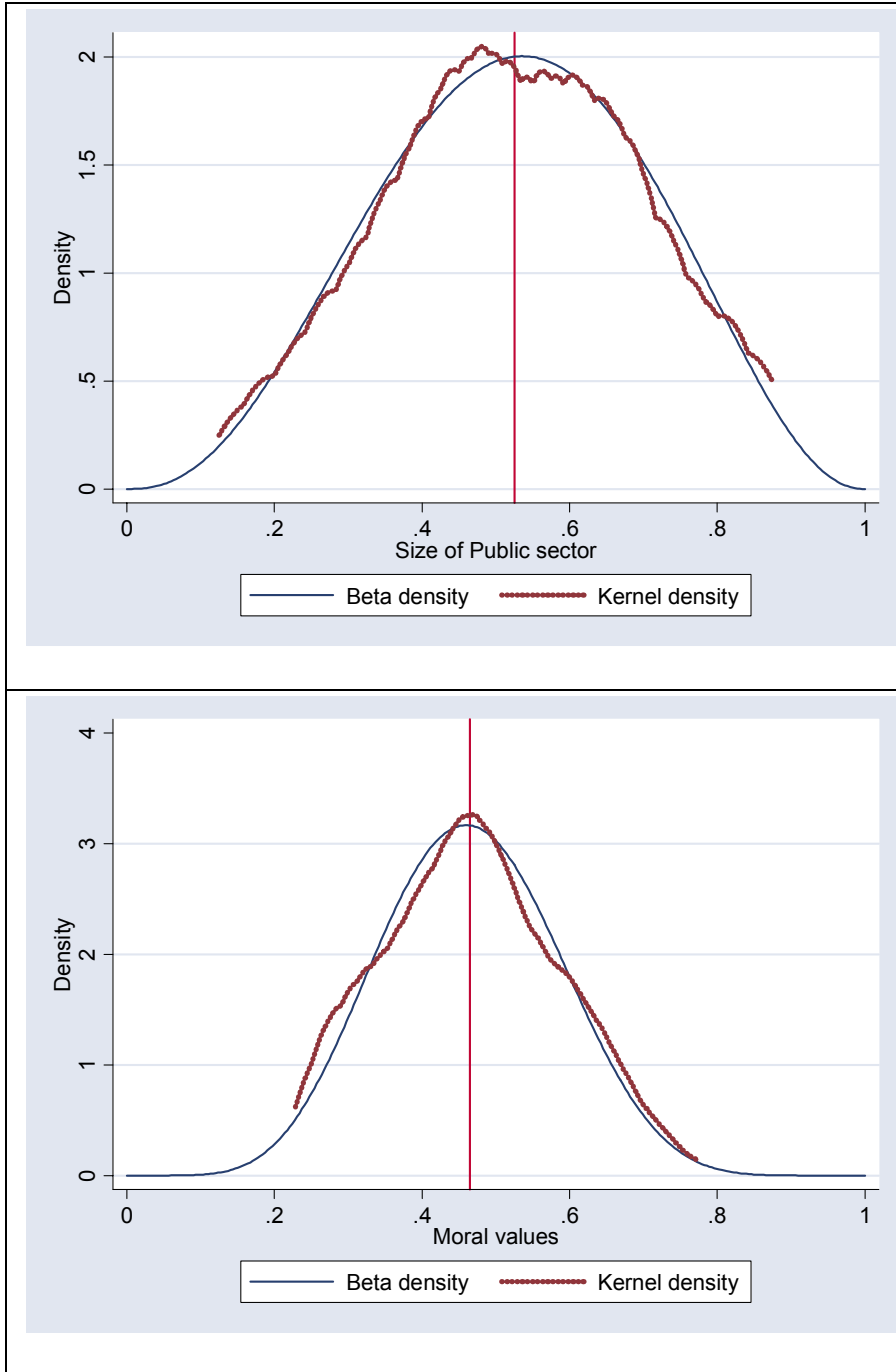
**Figure 2: Hypothetical voter separation**



**Figure 3: Decomposition of total effects into PBE and MPE**



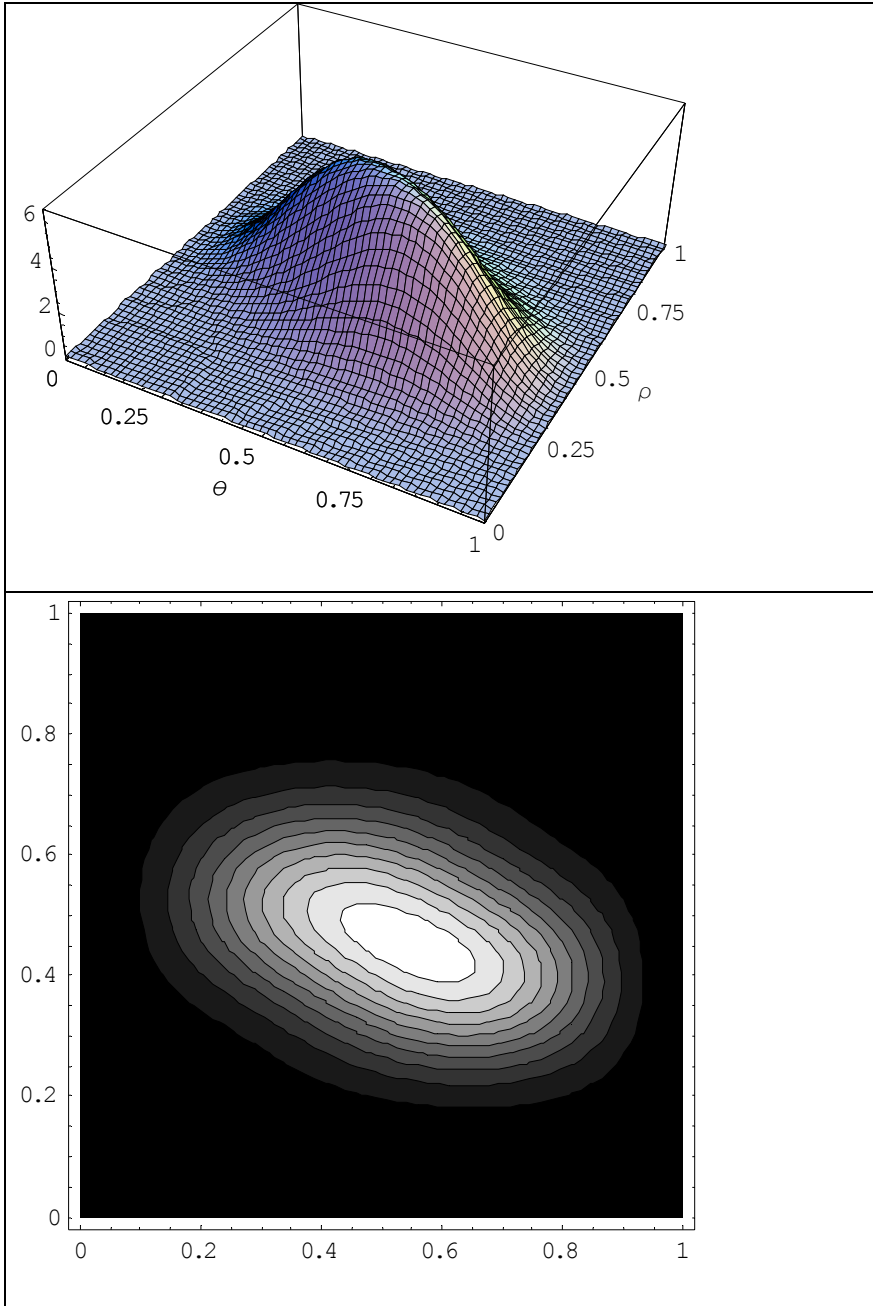
**Figure 4: Marginal densities of voter types: Non-parametric and parametric**



**Note:** We use the optimal bandwidth suggested by Silverman in drawing the kernel densities.



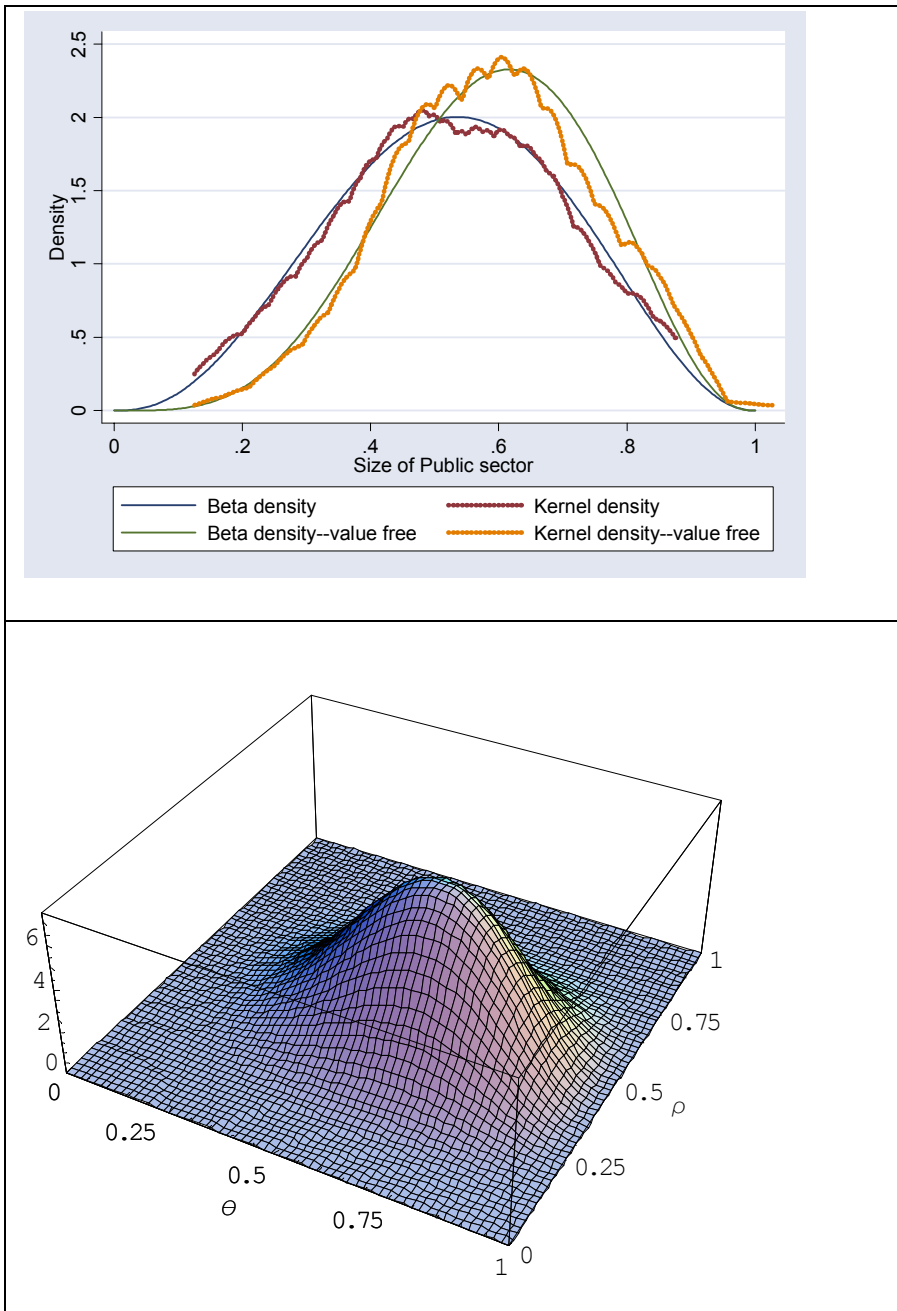
**Figure 5: Joint distribution of the size of the public sector and the moral values**



**Note:** Estimated parameter values for the bivariate beta distribution is

$$(a_1, b_1, a_2, b_2, \lambda) = (3.55, 3.21, 7.51, 8.65, -0.96).$$

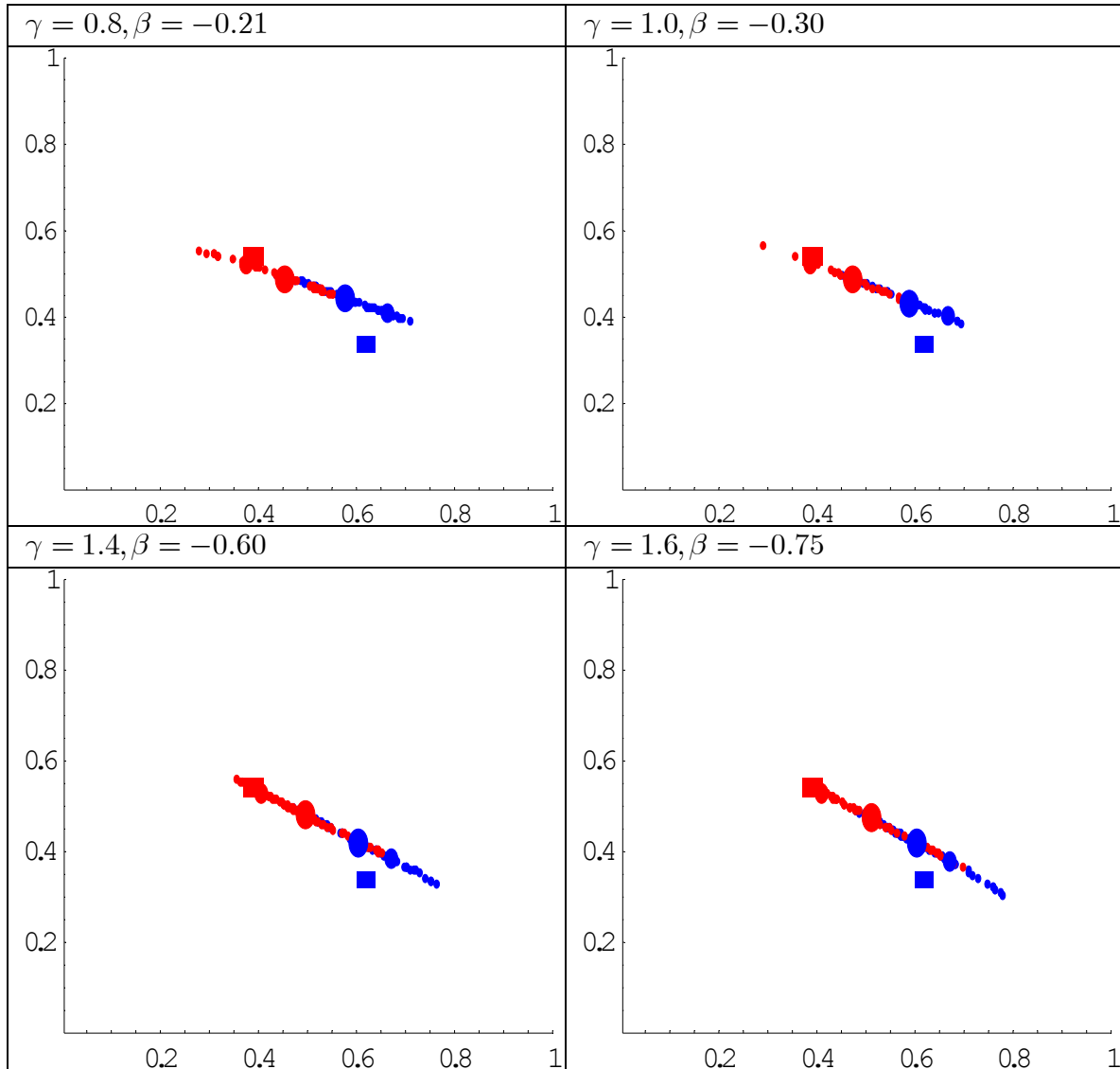
**Figure 6: Counterfactual distribution of value-weak preference for the public sector and its joint density with moral values**



**Note:** Estimated parameter values for the counterfactual bivariate beta distribution is

$$(a_1, b_1, a_2, b_2, \lambda) = (5.06, 3.53, 7.51, 8.65, -0.21).$$

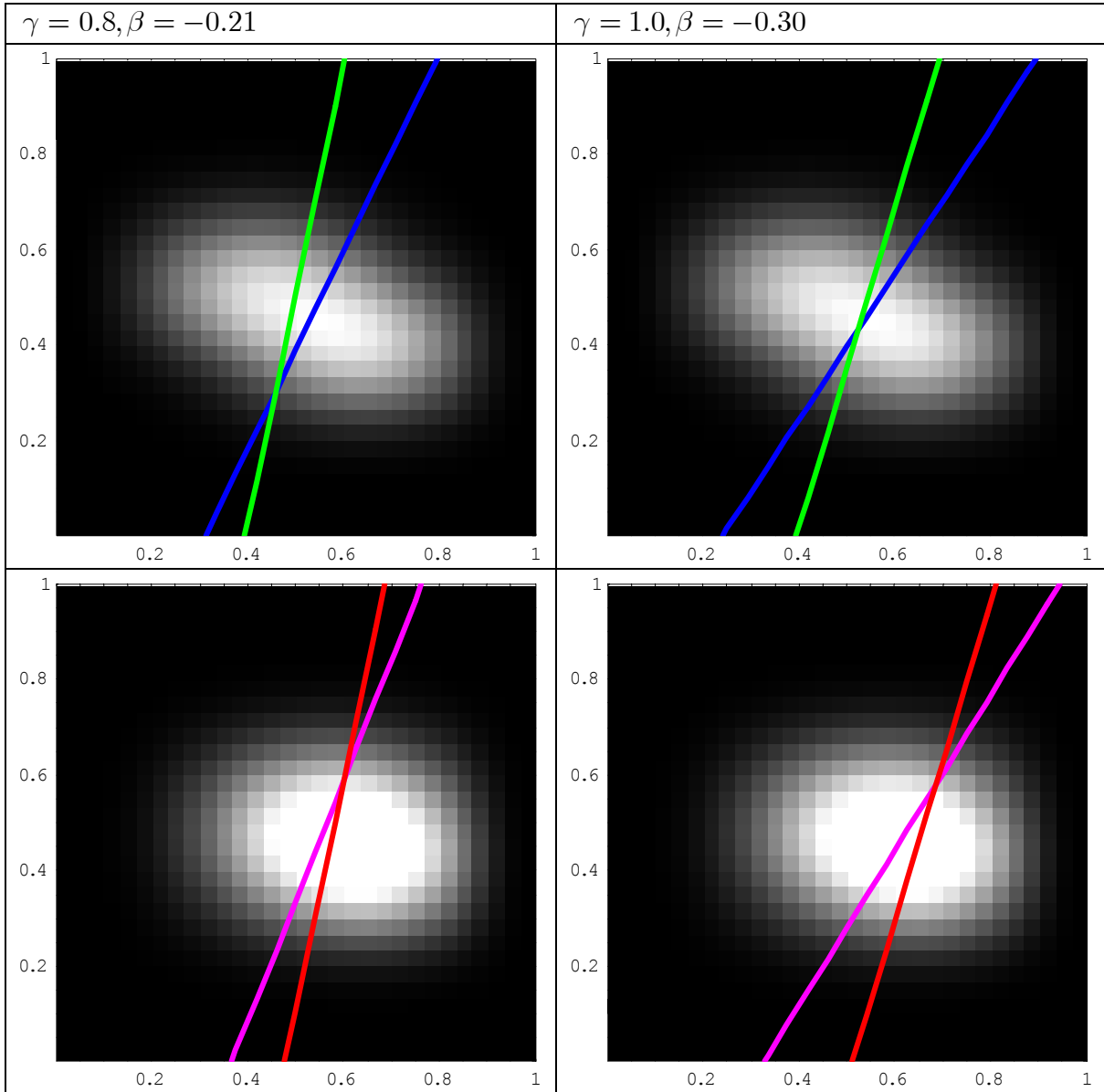
**Figure 7: PUNEs**



**Note:**

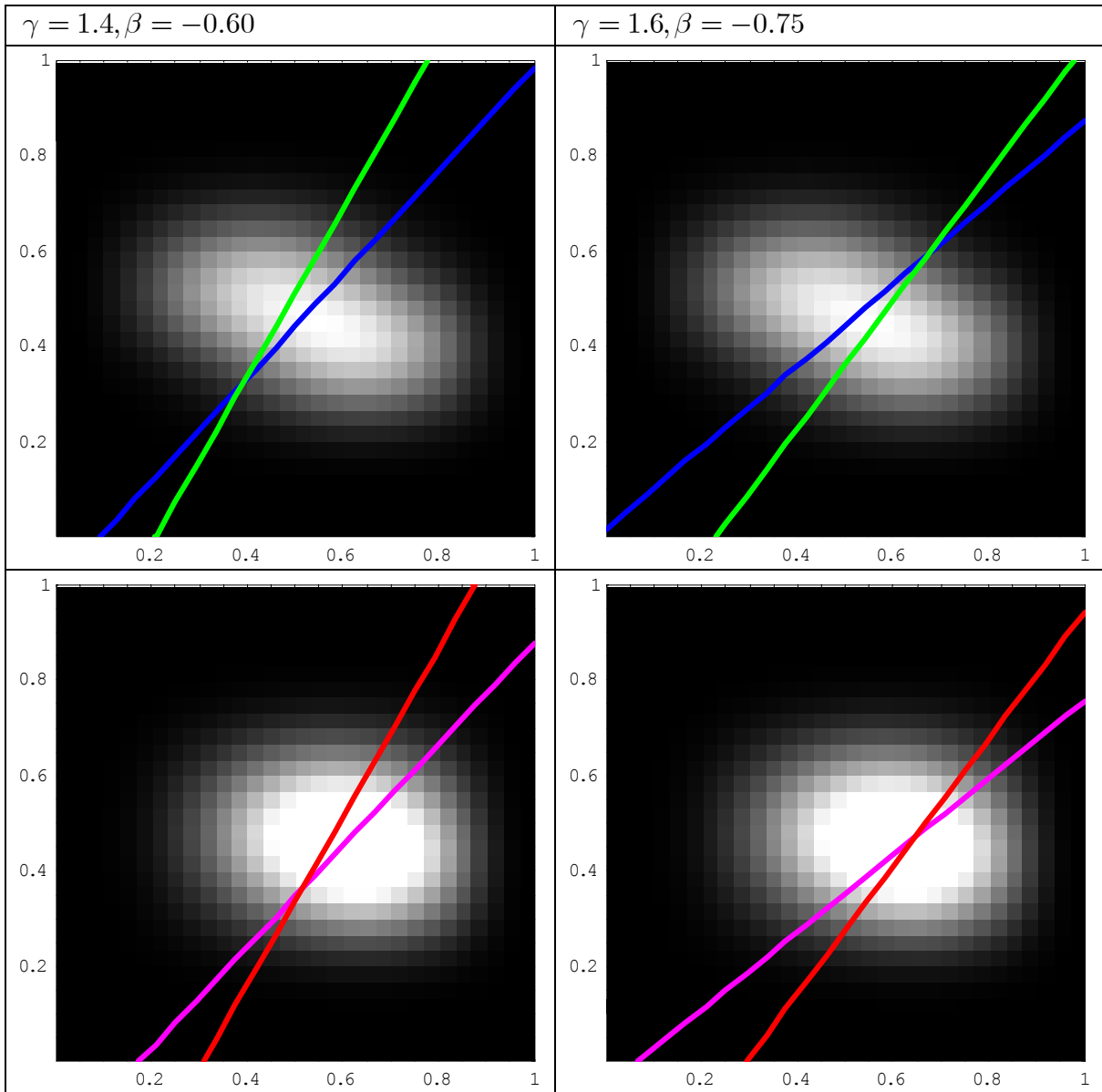
- (1) Rectangles denote the observed policies of the two parties
- (2) Mid size dots represent the ideal policies of the militants in the two parties
- (3) Bigger dots represent the average equilibrium policies of the two parties.
- (4) Smallest dots represent PUNEs.
- (5) We use Blue color for Democrats and Red color for Republicans.
- (6) The horizontal axis is the size of the public sector and the vertical axis is the moral value issue

**Figure 8: Equilibrium voter separation—full and counterfactuals**



**Note:** In each column, the first panel is based on the actual distribution  $F(\theta, \rho)$  whereas the second panel is based on the counterfactual distribution  $G(\theta', \rho)$ . In both panels, the flatter line is the voter separation line when the policy space is two dimensional whereas the steeper line is the voter separation line when the policy space is one-dimensional. All separation lines are evaluated at the average equilibrium policies.

**Figure 8 (continued): Equilibrium voter separation—full and counterfactuals**



**Note:** The first panel is based on the actual distribution  $F(\theta, \rho)$  whereas the second panel is based on the counterfactual distribution  $G(\theta', \rho)$ . In both panels, the flatter line is the voter separation line when the policy space is two dimensional whereas the steeper line is the voter separation line when the policy space is one-dimensional. All separation lines are evaluated at the average equilibrium policies.

**Appendix: ANES 2004 Pre-Post Study variables used in the paper**

<b>Variables</b>	<b>Definitions</b>
<b>spending</b>	Some people think government should provide fewer services even in areas such as health and education in order to reduce spending. Suppose these people are at one end of a scale, at point 1. Other people feel it is important for the government to provide many more services even if it means an increase in spending. Suppose these people are at the other end, at point 7. And of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5, or 6. Where would you place yourself on this scale? (Rescaled into 0-1)
<b>job</b>	Some people feel the government in Washington should see to it that every person has a job and a good standard of living. Suppose these people are at one end of a scale, at point 1. Others think the government should just let each person get ahead on their own. Suppose these people are at the other end, at point 7. And, of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5, or 6. Where would you place yourself on this scale? (Order reverted and then rescaled into 0-1.)
<b>health</b>	There is much concern about the rapid rise in medical and hospital costs. Some people feel there should be a government insurance plan which would cover all medical and hospital expenses for everyone. Suppose these people are at one end of a scale, at point 1. Others feel that all medical expenses should be paid by individuals through private insurance plans like Blue Cross or other company paid plans. Suppose these people are at the other end, at point 7. And, of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5, or 6. Where would you place yourself on this scale? (Order reverted and then rescaled into 0-1.)
<b>publicsize</b>	average of spending, job, and health
<b>womenrole</b>	Recently there has been a lot of talk about women's rights. Some people feel that women should have an equal role with men in running business, industry, and government. (Suppose these people are at one end of a scale, at point 1.) Others feel that a woman's place is in the home. (Suppose these people are at the other end, at point 7.) And, of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5 or 6. (Rescaled into 0-1.)
<b>workingmom</b>	A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.' Do you AGREE (1), NEITHER AGREE NOR DISAGREE (3), or DISAGREE (5) with this statement? (Order reverted and then rescaled into 0-1.)
<b>womenhome</b>	It is much better for everyone involved if the man is the achiever outside the home and the woman takes care of the home and family.' Do you AGREE (1), NEITHER AGREE NOR DISAGREE (3), or DISAGREE (5) with this statement? (Order reverted and rescaled into 0-1.)
<b>abortion</b>	There has been some discussion about abortion during recent years. Which one of the opinions on this page best agrees with your view? You can just tell me the number of the opinion you choose. 1. By law, abortion should never be permitted. 2. The law should permit abortion only in case of rape, incest, or when the woman's life is in danger. 3. The law should permit abortion for reasons other than rape, incest, or

	<p>danger to the woman's life, but only after the need for the abortion has been clearly established.</p> <p>4. By law, a woman should always be able to obtain an abortion as a matter of personal choice.</p> <p>(Order reverted and then rescaled into 0-1.)</p>
<b>homo_nodiscrimination</b>	<p>Do you FAVOR (1) or OPPOSE (5) laws to protect homosexuals against job discrimination? (Order reverted and then rescaled into 0-1.)</p>
<b>gaymarriage</b>	<p>Should same-sex couples be ALLOWED to marry, or do you think they should NOT BE ALLOWED to marry?</p> <p>1. Should be allowed</p> <p>3. Should not be allowed</p> <p>5. Should not be allowed to marry but should be allowed to legally form a civil union [VOL]</p> <p>(Reclassified as 'should be allowed' (1) and 'should not be allowed (3 &amp; 5) and then rescaled into 0-1.)</p>
<b>newlifestyles_problem</b>	<p>The newer lifestyles are contributing to the breakdown of our society. Do you AGREE STRONGLY (1), AGREE SOMEWHAT (2), NEITHER AGREE NOR DISAGREE (3), DISAGREE SOMEWHAT (4), or DISAGREE STRONGLY(5) with this statement? (Order reverted and then rescaled into 0-1.)</p>
<b>tradition_important</b>	<p>This country would have many fewer problems if there were more emphasis on traditional family ties.' Do you AGREE STRONGLY (1), AGREE SOMEWHAT (2), NEITHER AGREE NOR DISAGREE (3), DISAGREE SOMEWHAT (4), or DISAGREE STRONGLY(5) with this statement? (Order reverted and then rescaled into 0-1.)</p>
<i>moralvalue</i>	<p>Average of womenrole, workingmom, womenhome, homo_nodiscrimination, gaymarriage, newlifestyles_problem, and tradition_important.</p>
<b>aidtoblacks</b>	<p>Some people feel that the government in Washington should make every effort to improve the social and economic position of blacks. (Suppose these people are at one end of a scale, at point 1.) Others feel that the government should not make any special effort to help blacks because they should help themselves. (Suppose these people are at the other end, at point 7.) And, of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5, or 6. Where would you place yourself on this scale? (Rescaled into 0-1)</p>
<b>blackfavor</b>	<p>Some people say that because of past discrimination, blacks should be given preference in hiring and promotion. Others say that such preference in hiring and promotion of blacks is wrong because it gives blacks advantages they haven't earned. What about your opinion -- are you FOR (1) or AGAINST (5) preferential hiring and promotion of blacks? (Rescaled into 0-1.)</p>
<i>raceissue</i>	<p>Average of aidtoblacks and blackfavor</p>
<b>therm_whites (blacks, poor, feminists, homosexuals, southerners etc)</b>	<p>I'd like to get your feelings toward some of our political leaders and other people who are in the news these days. I'll read the name of a person ( a group of people) and I'd like you to rate that person (group) using something we call the feeling thermometer. Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person (group). Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person (group) and that you don't care too much for that person (group). You would rate the person (group) at the 50 degree mark if you don't feel particularly warm or cold toward the person (group). If we come to a person whose name you don't recognize, you don't need to rate that person. Just tell me and we'll move on to the</p>

	next one.
<b>antiblackaffect</b>	thermometer feeling towards the respondent's own race minus thermometer feeling towards blacks
<b>bible</b>	Which of these statements comes closest to describing your feelings about the Bible? You can just give me the number of your choice. 1. The Bible is the actual word of God and is to be taken literally, word for word. 2. The Bible is the word of God but not everything in it should be taken literally, word for word. 3. The Bible is a book written by men and is not the word of God. (Order reverted and then rescaled into 0-1.)
<b>pray_often</b>	People practice their religion in different ways. Outside of attending religious services, do you pray SEVERAL TIMES A DAY (1), ONCE A DAY (2), A FEW TIMES A WEEK (3), ONCE A WEEK OR LESS (4), or NEVER (5)? (Order reverted and then rescaled into 0-1.)
<b>religiosity</b>	Average of pray_often and bible
<b>biggovt</b>	You might agree to some extent with both, but we want to know which one is closer to your own views. ONE, we need a strong government to handle today's complex economic problems; OR TWO, the free market can handle these problems without government being involved. (Rescaled into 0-1.)
<b>iraqwarissue</b>	Do you APPROVE (1) or DISAPPROVE (5) of the way George Bush is HANDLING THE WAR IN IRAQ? (Rescaled into 0-1.)
<b>taxcutissue</b>	As you may recall, President Bush signed a big tax cut a few years ago. Did you FAVOR (1) or OPPOSE the tax cut (5), or is this something you haven't thought about (3). (Rescaled into 0-1.)
<b>ssreform</b>	A proposal has been made that would allow people to put a portion of their Social Security payroll taxes into personal retirement accounts that would be invested in private stocks and bonds. Do you FAVOR (1) this idea, OPPOSE (5) it, or NEITHER FAVOR NOR OPPOSE it (3)? (Rescaled into 0-1.)
<b>schoolvouchers</b>	Do you FAVOR (1) or OPPOSE (5) having the government give parents in low-income families money to help pay for their children to attend a private or religious school instead of their local public school? (Rescaled into 0-1.)
<b>environmentissue</b>	Some people think it is important to protect the environment even if it costs some jobs or otherwise reduces our standard of living. (Suppose these people are at one end of the scale, at point number 1) Other people think that protecting the environment is not as important as maintaining jobs and our standard of living. (Suppose these people are at the other end of the scale, at point number 7. And of course, some other people have opinions somewhere in between, at points 2, 3, 4, 5, or 6). (Rescaled into 0-1.)
<b>trust</b>	Generally speaking, would you say that most people CAN BE TRUSTED (1), or that you CAN'T BE TOO CAREFUL (5) in dealing with people? (Order reverted and rescaled into 0 & 1.)
<b>pastfinancial</b>	We are interested in how people are getting along financially these days. Would you say that you (and your family living here) are BETTER off (1) or WORSE off (5) than you were a year ago or JUST ABOUT THE SAME (3)? (Order reverted and rescaled into -1,0,1.)
<b>futurefinancial</b>	Now looking ahead, do you think that a year from now you (and your family living here) will be BETTER OFF (1) financially, WORSE OFF (5), or JUST ABOUT THE SAME (3) as now? (Order reverted and



	rescaled into -1,0,1.)
<b>pasteconomy</b>	Now thinking about the economy in the country as a whole, would you say that over the past year the nation's economy has gotten BETTER (1), stayed ABOUT THE SAME (3), or gotten WORSE (5)? (Order reverted and rescaled into -1,0,1.)
<b>futureconomy</b>	What about the next 12 months? Do you expect the economy, in the country as a whole, to get BETTER (1), stay ABOUT THE SAME (3), or get WORSE (5)? (Order reverted and rescaled into -1,0,1.)
<b>age</b>	age
<b>education</b>	Education 1. 8 grades or less and no diploma or equivalent; 2. 9-11 grades, no further schooling; 3. High school diploma or equivalency; 4. More than 12 years of schooling; 5. Junior or community college level degree; 6. BA level degrees; 7. Advanced degree, including LLB.
<b>income_hh</b>	Income of the household (in \$10,000)