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Fundamental dimensions of U.S. trade policy

Alok K. Bohara[a], Alejandro Islas Camargo[b], Therese Grijalva[c], Kishore Gawande[d,*]

[a] *Department of Economics, University of New Mexico, Albuquerque, NM 87131, USA*
[b] *Depto. De Estadística, ITAM, Río Hondo # 1, Col. Tizapán San Ángel, Del. Álvaro Obregón, C.P. 01000 Mexico, D.F. Mexico*
[c] *Department of Economics, Weber State University, Ogden, UT 84408-3807, USA*
[d] *Bush School of Government, Texas A&M University, College Station TX 77843-4220, USA*

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Abstract

How many dimensions adequately characterize voting on U.S. trade policy? How are these dimensions to be interpreted? This paper seeks those answers in the context of voting on the landmark 1988 Omnibus Trade and Competitiveness Act. The paper takes steps beyond the existing literature. First, using a factor analytic approach, the dimension issue is examined to determine whether subsets of roll call votes on trade policy are correlated. A factor-analytic result allows the use of a limited number of votes for this purpose. Second, a structural model with latent variables is used to find what economic and political factors comprise these dimensions. The study yields two main findings. More than one dimension determines voting in the Senate, with the main dimension driven by economic interest, not ideology. Although two dimensions are required to fully account for House voting, one dimension dominates. That dimension is driven primarily by party. Based on reported evidence, and a growing consensus in the congressional studies literature, this finding is attributed to interest-based leadership that evolves in order to solve collective action problems faced by individual legislators.

Keywords: Dimensionality; Roll call voting; Omnibus Trade Act; Interest; Ideology

JEL classification: F13; D72; C39

Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question shall, at the desire of one fifth of

* Corresponding author. Tel.: +1-979-458-8034; fax: +1-979-862-7953.
E-mail address: kgawande@bushschool.tamu.edu (K. Gawande).

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those present, be entered on the journal. In Article I, Section 5 of The Constitution Of The United States.

Every bill which shall have passed the House of Representatives and the Senate, shall, before it become a law, be presented to the President of the United States; if he approve he shall sign it, but if not he shall return it, with his objections to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered, and if approved by two thirds of that House, it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. In Article I, Section 7 of The Constitution Of The United States.

1. Introduction

Roll calls votes are constitutionally mandated votes taken in the two chambers of the U.S. Congress, the House and Senate, as their members legislate bills and enact them into law. More than a thousand roll call votes are taken by each biannual Congress, spanning a complex range of issues. It is therefore surprising that the most influential studies (e.g. Poole and Rosenthal, 1997) find that legislators consider very few, at most two, attributes of roll calls when they vote on them. If this were true, then the tens of thousands of roll call votes taken over past Congresses should follow a simple pattern: they should be explained completely by those two attributes or *dimensions*. Since those attributes are not observable, the literature on dimensionality of roll call voting has employed factor analytic methods to reduce the voting data to its essential dimensions, and then interpreted those dimensions graphically or using regression.

There co-exists a voluminous literature that attempts to understand what political and economic influences motivate legislators' voting behavior.[1] This literature approaches each vote as if it were unique. Thus, two distinct and separate literatures have built around (i) the number of attributes legislators take into account while voting on roll calls, that is, dimensionality of roll call voting data, and (ii) the political and economic determinants of legislators' voting behavior. The main objective of the paper is to integrate these two component parts into a more complete analysis of roll call voting data. A methodology that combines the two approaches has been widely used in psychology, geology and education, disciplines in which direct measurement of characteristics (e.g. intelligence, properties of

[1] The literature on the determinants of voting behavior has a long and rich history in economics and political science. The importance of "ideology" versus "interest" in explaining voting behavior has been vigorously debated among political scientists and economists. Adherents of political determinants emphasize political ideology as the main determinant of politicians' voting behavior (e.g. Kalt and Zupan, 1984; Poole and Rosenthal, 1997), while proponents of the economic view emphasize lobbying and constituency interests as fundamental determinants of congressional voting (e.g. Baldwin and Magee, 2000; Irwin, 1994; Kau and Rubin, 1979; Kau et al., 1982; Peltzman, 1984, 1985; Stratmann, 1996).

minerals) is difficult or impossible, but remains underappreciated in economics and political science. This structural modeling methodology, popularly termed the linear structural relationship (LISREL) model, was first developed by Joreskog and Sorbom (1979).

In this paper, the number of dimensions that adequately characterize the voting data is determined factor-analytically in a first step, then a structural model of those factors is estimated in order to assess the relative influence of political and economic factors in a second step. An analogy with studies of test scores is useful in explaining the method employed. Factor analysis of a battery of test scores can be used to distill the scores down to their more essential dimensions or factors. The identification of those factors makes their analysis meaningful. For example, they may be identified to be "math" and "verbal" aptitudes on the basis of how those factors are numerically related to the types of tests taken. A structural model of math and verbal aptitudes then helps us understand how observable variables on test takers such as ethnicity, parental aptitudes, parental income, and characteristics of schools attended influence those aptitudes.

The specific issue considered in this paper is voting on the landmark 1988 Omnibus Trade and Competitiveness Act. The Act marked a turning point in U.S. trade policy, changing its orientation from free trade to a more aggressive and strategic stance. It was enacted during the term of President Reagan, a free trader, and hence required forceful legislation in Congress. Voting on the Act encapsulated a range of trade politics. The main results of the paper answer the three questions:

- How many attributes characterized voting during legislation of the Act?
- What were those attributes?
- What measurable political-economic variables influenced legislator preferences on those attributes?

Using factor analytic methods, we find that legislators considered *two* attributes or factors while legislating this Act. Using a structural model of the factors we find they were influenced by a variety of legislator characteristics, both political and economic. Liberal-conservative ideology played a far smaller role than what previous dimension studies of historical roll call voting indicate.

This study carries to a logical conclusion the findings of Heckman and Snyder (1997) that, because of issue specificity, as many as eight dimensions characterize voting data. They find that merely using measures of fit such as classification error or proportional reduction in error in order to assess the correct number of dimensions masks the importance of several critically important pieces of legislation. This is simply because the information about greater dimensionality in those few pieces of legislation are swamped by the information about sparse dimensionality present in the large number of votes on more routine issues. Heckman and Snyder introduce simpler, yet rigorous, methods to infer that seven or eight dimensions are necessary to fully rationalize historical voting data. They attribute these extra dimensions to "issue-specific ideology" as opposed to general liberal-conservative ideology. In this study, we corroborate their argument by considering roll call voting on a very specific and important trade policy issue. We are thus able to give concrete meaning to "issue-specific ideology" and even identify the source of such ideology in the trade policy setting.

The paper proceeds as follows. In Section 2, the empirical methodology is motivated, differentiated from existing methods, and formally described. In Section 3, the evolution of the Omnibus Bill through its legislative journey is described. The data are described in detail in Section 4. In Sections 5 and 6, the empirical results for the Senate and House are analyzed. Endogeneity of regressors is discussed in Section 7. Section 8 summarizes and offers concluding remarks.

2. The econometric approach

2.1. Attribute space, dimensionality and preferences

Heckman and Snyder (1997) advance a rigorous choice-theoretic foundation for using linear probability models to study dimensionality of voting data. Consider an $n\times p$ data matrix Y of 1–0 (yea–nay) voting by n legislators on p roll calls. Suppose it were known that there are k essential attributes of roll calls which legislators (i.e., voters) consider while voting on roll calls. That is, legislator preferences are defined over the attribute space of k dimensions. Suppose further that there were available matrix Z: $n\times k$ containing measures of preferences over those k attributes for the n legislators.[2] Then a linear probabilistic voting model for this voting data takes the form:

$$P(Y_{ij}=1)=Z_{i.}\times\Lambda_{.j},\quad i=1,\cdots,n,j=1,\cdots,p, \tag{1}$$

or voter i's probability of voting yea on roll call j is a linear function of her preferences measured by the $1\times k$ vector Z_i. The $k\times 1$ vector of coefficients $\Lambda_{.j}$ are interpreted as measures of the attributes of roll call j, and are interpreted just as regression coefficients. If, for example, k=1 (attribute space is single dimension), then the scalar Λ_j indicates the change in the probability of voting on the jth roll call as voter preference over the single attribute changes by one unit.

The problem is that neither the number of attributes k (''factors'') over which legislator preferences are defined, nor measures of those preferences Z (''factor scores''), are known.[3] The ''factor loadings'' Λ are thus difficult to estimate using conventional methods. Factor-analytic methods (see below) are designed to solve this problem. Factor analysis is a data reduction technique that brings to fore the underlying dimensions of the data: each column of the data matrix Y is a linear transformation of the columns of the lower dimensional matrix of factors, η (which replaces the observed Z matrix). The factor model is therefore

$$P(Y_{ij}=1)=\eta_{i.}\times\Lambda_{.j},\quad i=1,\cdots,n,j=1,\cdots,p. \tag{2}$$

[2] The quadratic-in-attributes model has utility $V(Z)=a_i'\Lambda+\Lambda'A_i\Lambda$, where $\{a_i A_i\}$ are the preference parameters for legislator i that constitutes Z_i. Setting $A=I$, we get the ideal-point model where $a_i/2$ is the vector of ideal points for legislator i (see e.g. Heckman and Snyder, 1997). For this model, each row of Z contains measures of the vector a for each legislator. The further is the roll call's attribute from the ideal point, the lower the legislator's utility. The legislator will vote yea on the roll call only if her utility is lower in the status quo (defined by it's own set of attributes, say Z_0).

[3] Heckman and Snyder (1997) justify use of the linear probability model over more complicated and computationally intensive nonlinear-in-parameter models when Z and Λ are latent and unmeasurable.

For example, suppose we have data on only two roll calls, one on issue "A" (j=1) and another on issue "not A" (j=2). Then Y is orthogonal, absent any randomness in voting. The attribute space then consists of a single dimension, $\Lambda_1=-\Lambda_2$, and preferences η are defined on that dimension.

Two issues require consideration. The first is estimating dimensionality, or the number of factors k. Estimation of k proceeds as follows. For a *given* number of factors k, a variety of techniques such as maximum likelihood and principal components analysis may be used to estimate model (2) (see e.g. Anderson, 1984 for maximum likelihood approaches to factor analysis, and Theil 1971 for principal components). Standard chi-squared tests can then be used to infer the relevant number of factors present in the data. Criteria based on error-reduction or proportion correctly classified have also been used to assess dimensionality.

The second issue is the precision with which the factor scores η on the k dimensions can be measured. It is widely accepted that at least 200 roll calls (p=200) should be used to measure preferences precisely for any single legislator (Groseclose and Snyder, 2000).[4] Using historical data, Poole and Rosenthal (1997) and Heckman and Snyder (1997) are therefore able to estimate legislators' preferences. Poole and Rosenthal (1997) find at most two dimensions, which they interpret as representing liberal-conservative ideology and not economic interest. They then use a nonlinear-in-parameters model to estimate legislator preferences on those sparse dimensions. The main contribution of Heckman and Snyder (1997) to the literature is their finding of at least six or seven dimensions due to the issue-specificity of roll call votes on, for example, civil rights, trade policy, defense spending, and foreign aid. Intuitively, while any two legislators may be closely located to each other in two-dimensional space, they may be located significantly apart in a higher dimensional space. These additional dimensions are required in order to explain why their votes diverge on a significant number of roll calls.

The Heckman–Snyder finding motivates our attempt to understand what constitutes issue-specific dimensions in the context of trade policy. However, legislation of a specific issue involves only a few roll call votes.[5] For example, in this paper the voting data comprise seven roll calls in the Senate and six in the House. It is thus not possible to precisely estimate legislator preferences. The focus of this study is therefore *not* on estimating legislator preferences. An advantage of the LISREL model is that it allows us to treat legislator preferences as latent variables.

The number of dimensions can still be estimated with precision even with a limited number of roll call votes. This is a consequence of the singular value decomposition (SVD) theorem that justifies the method of factor analysis (see e.g. Reyment and Joreskog, 1993; Heckman and Snyder, 1997). When there are many roll calls relative to the number of voters (pn), dimensionality is based on the intercorrelations among voters. Formally, dimensionality is effectively measured by the number of nonzero eigenvalues of the $n\times n$ cross product matrix YY'. When voters are numerous relative to roll calls (np), as is the case here, then

[4] The factor loadings Λ are estimated with precision since for any roll call there are data on over 400 votes in the House (n=400) and 100 in the Senate (n=100).

[5] Historically, a Congress has averaged 572 roll call votes in the Senate and 494 in the House (Heckman and Snyder). In the 100th Congress 799 roll call votes were taken in the Senate and 542 in the House. That Congress enacted into Public Law 289 public bills that originated in the Senate and 424 in the House.

dimensionality is based on the intercorrelations among roll calls. Formally, dimensionality is effectively measured by the number of nonzero eigenvalues of the $p \times p$ matrix $Y'Y$. One approach is dual to the other: they both yield the same number of dimensions in the voting data (Reyment and Joreskog, 1993).

2.2. Structural model of factors

Given the number of attributes from the factor analysis, a LISREL model of latent endogenous variables (see e.g. Bollen, 1989) is used to answer the main questions of this paper: what are the attributes and what determines voting based on those attributes. Suppose dimensionality of the attribute space is determined to equal k ($<p<n$). As in Eq. (2), let η be the $n \times k$ matrix of factors to which the $n \times p$ matrix of voting data Y can be reduced. Each factor, or column of η, is a linear combination of the columns of Y. These coefficients are contained in the $p \times k$ matrix of factor loadings Λ. Some factors may load heavily on a subset of columns of Y while other factors may load on another subset. These factor loadings are the main ingredients (more on loadings below) in answering the second question posed in the introduction: what attributes are central to voting, or what should the factors be named.

The loadings are estimated jointly with other parameters of the structural model. The structural model fulfills the two objectives of allowing us to interpret the attributes over which legislators preferences are defined and to make inferences about which (observed) political and economic variables drive those preferences. The structural model for the j-dimensional endogenous factors (η) comprises two matrix equations:

$$\underset{n\times p}{Y} = \underset{n\times k}{\eta}\,\underset{k\times p}{\Lambda} + \underset{n\times p}{\varepsilon},$$
$$\underset{n\times k}{\eta} = \underset{n\times k}{\eta}\,\underset{k\times k}{B} + \underset{n\times m}{X}\,\underset{m\times k}{\Gamma} + \underset{n\times k}{\zeta}. \tag{3}$$

The first matrix equation is the "measurement model" for the latent endogenous factors η, so named because the columns of Y are viewed as multiple measures of one or more columns of η. It is identical to Eq. (2), except it is a stochastic version. Hence, measurement errors are captured by the $n \times p$ matrix of errors ε. Each row of ε is assumed to be identically and independently distributed multivariate normal with mean zero and constant variance matrix Θ.[6] The errors are assumed to be uncorrelated with η

[6] The assumption that ε is iid across legislators presumes that there is no logrolling or vote-trading coalitions among legislators beyond the coalitions that are implicitly accounted for in the factors η. This assumption amounts to saying that there is no spatial correlations across legislators after controlling for the factors. The factor analysis method accounts for intercorrelations across the k roll calls, but not across the n legislators (which would require data on many more roll calls). Hence, this assumption is not innocuous. However, the alternative assumption of nonindependence of the measurement model errors requires investigating for spatial correlations and correcting for them. It is a costly modeling assumption and burdens the estimation procedure. We leave the robustness of the results to this assumption as an open issue deserving further study.We assume the $p \times p$ error covariance matrix Θ is diagonal. This assumption is easier to justify (see e.g. Anderson, 1984, p. 553). In our factor analysis model, the interrelationships of the roll call votes are caused by common factors η, and the remainder (each column of ε) is specific to each vote. After accounting for the common factors, the columns of ε are uncorrelated. Parsimony is also served by assuming diagonality of Θ. With seven roll calls, for example, a full covariance matrix Θ requires estimation of 21 parameters.

(any missing dimensions are considered to be orthogonal to η). Estimates of factor loadings Λ are used to discover what issue-specific ideology is contained in the factors.[7]

The second matrix equation is the set of k simultaneous equations for the jointly determined latent variables η. The k columns of η contain the unobserved preferences of the n legislators on the k attributes. The $k\times k$ matrix of coefficients B on the explanatory endogenous variables has zeros on the diagonal. So only factors other than the one on the left-hand side of each equation appear on the right-hand side. X denotes the set of m observed exogenous explanatory variables, and Γ is the $m\times k$ matrix of coefficients on these exogenous variables. Each row of the $n\times k$ error matrix ζ is an identically and independently distributed (iid) multivariate normal random variable with mean zero and constant $k\times k$ variance matrix Ψ. No restrictions are imposed on Ψ. The assumption of iid errors presumes that there is no correlation in the errors across legislators after controlling for the exogenous variables X (also see footnote 6).

The matrix of coefficients Γ indicate which observed exogenous variables were important determinants of the international-trade-specific ideology that governed voting during the Omnibus Act. The exogenous variables in X represent six distinct sources of influences on legislators: geography, party, liberal-conservative ideology, committee behavior, special interest pressure, and constituency preferences. Data across legislators and their constituencies are used to measure these influences, as described in Section 4.2. The matrix Γ conveys the essential political economy message of this paper. It allows inference about which of these influences were important in shaping the preferences of legislators over the essential attributes of roll calls.

The appendix provides technical details of maximum likelihood estimation of the parameters of Eq. (3). The parameters estimated are B, Γ, Λ plus the covariance matrices Θ and Ψ. As described in footnote 6, diagonality of Θ is imposed. The model is identified by the exclusion restrictions on Γ (see Section 5.2). All measured variables (roll call votes Y and explanatory variables X) are standardized to have zero mean and variance equal to one. As a result, all reported parameter estimates are standardized beta coefficients. They can be easily converted to original units, as we indicate in Section 5. Since the latent variables η (and ζ) have mean zero, the constant term is not required.

3. Background: the Omnibus Bill

Features of the Omnibus Act and its route through the legislative process are presented in Table 1 (see also Schwab, 1994). The genesis of the 1988 Act lay within a strategic and relatively protectionist House bill (HR 4800) that was passed by a

[7] Zero restrictions are placed on elements of Λ for identification, otherwise the k factors are observationally equivalent. If the dimensionality step indicated loadings close to zero, then zero restrictions are imposed. We will see that only one element in each of the k rows is restricted to be zero (see footnote 18).

Table 1
Evolution of the Omnibus Bill: house, senate, conference, and final versions

House Bill features		Senate Bill features	
H.R. 3 (Introduced in Ways and Means)	(1) Presidential negotiating authority: approval of fast track for 5 years. (2) Transfer of authority over Section 301 (unfair trade practices) cases and retaliation to USTR—rather than the President. Also, authority over Section 201 (escape clause), and 337 (intellectual property rights) transfers from President to USTR. (3) Section 301: mandatory action against agreement violation but otherwise up to President's discretion. "Special 301" allowed self-initiation on an annual basis of 301 cases against priority foreign countries who failed to protect intellectual property rights. (4) Gephardt bill: USTR required to retaliate against unfair trade practices; mandatory action against foreign countries to reduce their bilateral trade imbalance by 10% per year until 1991. (5) AD/CVD: extended to high-tech and agricultural goods from its traditional focus on steel and other heavy industries. (6) Bryant amendment: disclosure of foreign ownership in a US business to be reported to SEC.	S1420 (Introduced in Finance)	(1) Presidential negotiating authority: possibility of withdrawal by Congress of President's access to fast track. (2) Section 201: shift of earlier focus on protection to prevent injury, to assisting industry to adjust to import competition; mandatory funding of such adjustment. Less ability for president to deny ITC decision for protection; but set higher standard for industry in order to file under 201. Expansion of TAA. (3) Section 301: severely reduced president's discretion not to act in 301 cases. Expansion of scope of practices actionable under 301. Amend Section 301 to include "mandatory but not compulsory" retaliation against unjustifiable or discriminatory foreign (e.g. Japan) practices. (4) Other issues: telecommunications trade opportunities; intellectual property rights protection; access to foreign technologies; auctioned quotas.
Michel (R-IL) substitute for H.R.3 (#78) passed on 4/30/87, 290–137. It excluded Gephardt (but adopted Rostenkowski's alternative which was similar to Gephardt except for "surplus reduction" measures), Bryant, and "Buy America" provision. Else same as above.		S1420 passed (7/21/87), 71–27 (#208) with addition of 34 (out of 160 proposed) amendments. "Super 301" introduced: retaliation to target consistently protectionist countries. Amended S1420 close to original version above.	

Table 1 (*continued*)

Features of Conference Bill
Rostenkowski (Chair, House Ways and Means) started by proposing to drop most protectionist sections, and Bentsen (Chair, Senate Finance) reciprocated the sentiment. The bill adopted in conference, still called H.R.3, was a less protectionist version of the above bills, but contained their activist and strategic elements. It dropped Gephardt but included a labor-backed plant closing provision which required employers to give 60 days notice of plant closings or layoffs. It passed 312–107 on 4/21/88 in the House (#66), and 63–36 on 4/27/88 in the Senate (#110), and was sent to President Reagan.
Final Omnibus Bill
The bill was vetoed by President Reagan on 5/24/88, citing the plant closing provision. The House vote on the same day (#150) overrode the veto, but the Senate vote of 61–37 (#169) on 6/8/88 failed to override. A new bill in the House, H.R. 4848, similar to the vetoed bill but without the plant closing provision, was voted in 376–45 by the House (#231) on 7/13/88, and 85–11 (#288) by the Senate on 8/3/88. It was signed into law on 7/23/88. The plant closing provision made its way through the Senate and House as a separate bill (S2527) and became law in August 1988.

USTR=US Trade Representative; AD/CVD=antidumping duty/countervailing duty; TAA=trade adjustment assistance; SEC=Securities and Exchange Commission.
Sections 201 and 301 refer to same Sections of the Trade Act of 1974.

large majority in 1986. However, the Senate refused to consider it, largely because support for the bill fell far short of the two-thirds majority required to override a certain presidential veto. In 1987, following a shift in power in the Senate during the 99th Congress (Democrats holding 54 seats), the bill was reborn as HR3 in the House Ways and Means Committee, which was led by the shrewd chairmanship of Dan Rostenkowski (D-IL). Four other committees marked it up making HR3 an Omnibus bill.[8] The most controversial part of the bill was the Gephardt amendment, named after Rep. Gephardt (D-MO). The Gephardt amendment would make it mandatory for the President to retaliate against partners with "excess" trade surpluses vis-a-vis the U.S. (i.e., if their exports exceeded 175% of imports), if this excess was due to unfair trade practices.[9] While the amendment passed with a mere four-vote margin on the House floor, it was later dropped in the House–Senate conference before the bill was sent to President Reagan. Regardless, it was anticipated that Reagan would veto the bill since, other than its activist provisions, it sought to curb the executive's discretionary power to grant or deny protection. Such discretion had been used by Reagan to reverse the decision of the International Trade Commission (ITC), the

[8] Energy and Commerce added strategic amendments to promote exports in high tech U.S. goods; Foreign Affairs added amendments furthering U.S. exports, and on relaxing export controls; Banking added strategic amendments on exchange rates and third world debt.

[9] The genesis to the Gephardt amendment lay in an import surcharge bill during 1986 authored by Rostenkowski, Gephardt and Senator Bentsen, all key players in the Omnibus bill but later Rostenkowski and Bentsen distanced themselves from it and it became Gephardt's amendment.

independent bipartisan body that determined cases under Sections 201, 301 and 337 of the U. S. Trade Act. In many of these cases, the ITC had found in favor of petitioners seeking protection.

In the Senate, the Finance Committee led by Sen. Bentsen (D-TX) moved on a Senate trade bill that was similar in content to HR3, only less protectionist. While activist, it did not have overtly protectionist Gephardt-like provisions. Instead, Bentsen's main concern was curbing discretion of the executive in trade policy-making, and over the process of legislating the bill a coalition formed around this objective.

Though the Omnibus bill was an activist "fair trade" bill, its authors Rostenkowski and Bentsen pushed to drop explicit protectionist provisions from the bill. They foresaw the need for substantial support from moderate Republicans. Hence, the protectionist Textile bill was not packaged into the Omnibus bill, and a union-backed provision on plant closings was dropped after the veto. The content and outcome of the roll call votes analyzed are summarized in Table 2.1.

Table 2.1
Roll call votes analyzed

RC #	Short description	Date	Vote
House Bills			
72	Gephardt (D-MO). Mandatory retaliation to lower trade surplus.	4/29/87	218–214
77	Michel (R-IL). Drop Gephardt, Wylie, and Bryant (see Table 1) amendments.	4/29/87	156–268
78	Omnibus Bill, House version. Like Michel's version (77). Activist, Strategic. See Table 1.	4/30/87	290–137
426	Michel's (R-IL) motion to instruct House conferees to concede Gephardt amendment.	11/10/87	175–239
66	Omnibus Bill passage, Conference version. Gephardt dropped. Plant closing included.	4/21/88	312–107
231	Veto override, Final Omnibus Bill passage. Plant closing dropped.	7/13/88	376–45
Senate Bills			
158	Bentsen (D-TX). Against Specter's motion for private right of action to sue against unfair trade.	6/25/87	69–27
175	Bradley (D-NJ)/Packwood (R-OR). Against requiring President to keep oil imports below 50% of consumption.	7/1/87	55–41
178	Packwood (R-OR). Allow President discretion over ITC cases on account of national interest.	7/7/87	41–55
179	Domenici (R-NM). Expand definition of unfair trade practices.	7/8/87	71–28
208	Omnibus Bill passage, Senate version. See Table 1.	7/21/87	71–27
110	Omnibus Bill passage, Conference version. See Table 1.	4/27/88	63–36
285	Bentsen (D-TX). Defend the provision in the Bill to transfer authority from President to USTR.	4/27/88	63–36

Full descriptions of roll calls available from authors.
Other roll calls taken on the Omnibus bill but not included in the analysis: #150(S), #77(H), #206(S), #169(S), #114(H), #197(H), #132(S), #250(S), #190(S).

4. The data

4.1. Roll calls

Data on roll call votes taken during the legislation of the Omnibus bill were obtained from Congressional Quarterly's online database. Voting data on all 100 senators and 426 (of 435) representatives are used to study voting separately in the House and Senate.[10] Of the 30 or so roll calls taken in the House and the Senate during legislation of the Omnibus bill, the key roll calls clustered around two issues common to both the House and Senate, and a third issue exclusive to the Senate.[11] The *first* and most important issue concerned voting on the full Omnibus bill itself. There were four House bills at different stages of the process (#78—House passage, #66—adoption of conference bill, #150—veto override, #231—final passage), and four Senate bills (#208—Senate passage, #110—adoption of conference bill, #16—veto override, #288—final passage).[12]

The *second* issue was a push for protectionism. Action on the House floor centered around the controversial Gephardt amendment (#72), which explicitly targeted Japan, Taiwan, and Hong Kong. It barely passed the House, overcame two efforts at getting rid of it (#77, #426), but was dropped in conference. On the Senate floor a set of bills relating to protectionism sought to amend Section 201 dealing with import injury cases (#158, #179), with some winning and others losing.

The *third* issue, mainly debated in the Senate, (#175, #178, #285) was concerned with discretionary powers of the executive that would allow the President to overturn decisions by the International Trade Commission (ITC). This issue, championed by Bentsen (D-TX), Chair of the Senate Finance Committee, sought to transfer authority over protection cases from the President to the U.S. Trade Representative (USTR). The USTR was perceived as

[10] The method required the same number of observations for each roll call vote in the model. Votes other than "Y" (Yea) and "N" (Nay) were treated as follows: "?" (did not vote) were imputed as 1 (Y) or 0 (N), respectively, if the mean on the vote was greater than 0.5, conditioning on party; "+" were converted to 1 (Y) and "−" to 0 (N); "#" were converted to 1 (Y) and "X" to 0 (N);"S" (Speaker did not vote) was deleted; "I" (not allowed to vote for part of 87–88) were deleted. For each roll call, details on the missing data is as follows: Senate: #158: 4 (Biden, Simon, Lugar, and Gore), #175: 4 (Biden, Murkowski, Simon, and Gore), #178: 4 (Simon, Wilson, Biden, and Rudman), #179: 1 (Simon), #208: 2 (Simon and Gore), #110: 1 (Biden), #285: 5 (Bumpers, Stennis, Biden, Chiles, and Cochran). After imputations, votes of all 100 Senators were used. House: #72: 1 (Annunzio), #77: 7 (Livingston, Badham, Schroeder, Borksi, Ford, Kemp, Annunzio), #78: 3 (Torres, Schroeder, Annunzio), #426: 7 (Lowry, Donnelly, Pickle, Boulter, Mackay, Mack, Lewis), #66: 9 (Barnard, Molinari, Latta, Dymally, de la Garza, Ray, Jones, Emerson, Clay), #231: 9 (Boggs, Livingston, Spence, Mackay, Cheney, Espy, Mica, Stratton, Anderson). After imputations, votes of 425 representatives were used, and 10 were dropped.

[11] Narratives from weekly issues of Congressional Quarterly (CQ), and examination of the nature of the bill (protectionist, free, curtailment of Presidential powers, strategic) were used to identify sets of homogeneous issues around which the roll calls cluster.

[12] There were no explicit votes taken on many important characteristics that were bundled into the Omnibus bill. The Super 301 provisions under Section 301 which granted Congress the power to undertake unilateral action against unfair trade practices by any partner, was one such key characteristic. It was considered by free-traders as the single most damaging aspect of the Act (see e.g. Bhagwati and Patrick, 1990). Since no roll call votes were taken on 301, the only analysis on this issue is from the voting on the passage of successive versions of the bill explicitly itself.

Table 2.2
Descriptive statistics for roll calls

Senate data			House data		
Roll call (year, #)	Mean	S.D.	Roll call (year, #)	Mean	S.D.
87, 158	0.73	0.45	87, 072	0.50	0.50
87, 175	0.56	0.50	87, 077	0.37	0.48
87, 178	0.43	0.50	87, 078	0.67	0.47
87, 179	0.72	0.45	87, 426	0.41	0.49
87, 208	0.73	0.45	88, 066	0.74	0.44
88, 110	0.64	0.48	88, 231	0.89	0.31
88, 285	0.73	0.45			

being independent of agencies under control of the executive, and hence impervious to their attempts to interfere with trade cases.

These three issues that formed the core of the Omnibus bill are the focus of the empirical analysis. Table 2.1 describes the roll calls representing these issues, while Table 2.2 presents descriptive statistics. Other roll call votes related to the Omnibus bill were peripheral to these fundamental issues and are excluded from the analysis.[13]

4.2. Independent variables

Table 3.1 describes the independent variables used in the structural analysis of legislator preferences over fundamental attributes. The ideology versus interest debate is at the heart of the paper, and these are measured as follows. General liberal-conservative ideology is measured by past raw ADA scores for senators and representatives.[14] Measures of economic interest are dichotomized into measures of special interest and measures of constituency interest. Nollen and Quinn's (1994) measures of special interest are used here: the proportion of all PAC contributions accounted by labor PACs (PACLABOR), domestic corporate PACs (PACCORP), and domestic corporate PACs with the largest exports or overseas sales (PACINTL).[15] Regional indicators and committee membership indicators are also from Nollen and Quinn. Our constituency interest measures reflect economic preferences of voters. High unemployment rates (UNEMP) in this time of relative economic prosperity measures distress either due to declining industries or trade pressure. Further, and as shown by Irwin (1994), sectoral employment is an important indicator of voting on trade issues. Constituency interest is therefore also measured by

[13] Full texts and splits on all roll calls taken are available from the authors.

[14] ADA scores are the average rating by Americans for Democratic Action (ADA) of Congressmen for 1985–1986. The ADA rating is the percentage of times a congressman voted for the ADA position on a selected sample of approximately 20 issues. For newly elected representatives to the 100th Congress, 1987 and 1988 ADA scores were used instead (1987 for the House and 1988 for the Senate). Only one vote used to calculate the 1987 ADA score was from the Omnibus Bill (i.e., the Gephardt Amendment).

[15] We are grateful to the authors for providing the data. Nollen and Quinn (1994, Appendix A) report that data for senators are from 1983–1988 and for representatives from 1985–1986. In 1987–1988, there were 1873 corporate PACs and 135 international PACs. International PACs are not counted as domestic corporate PACs in computing PACCORP. The total of the three PAC variables sums, on average, to around 60% of the total PAC money received by senators and reps.

Table 3.1
Variable definitions

Variable	Description
EAST	1 if congressman from East, 0 otherwise
SOUTH	1 if congressman from South, 0 otherwise
WEST	1 if congressman from West, 0 otherwise
HOUSETRADE	1 if Rep. on International Economic Policy and Trade Subcommittee of the House Foreign Affairs Committee, 0 otherwise
WAYSMEANS	1 if Rep. on Trade subcommittee of the House Ways and Means committee, 0 otherwise
INTLDEV	1 if Rep. on International Development, Finance, Trade, and Monetary Policy subcommittee of the House Banking, Finance, and Urban Affairs Committee, 0 otherwise
SENTRADE	1 if Senator on International Trade subcommittee of the Senate Finance committee, 0 otherwise
FOREIGN-REL	1 if Senator on Foreign Relations Committee, 0 otherwise
PARTY	1 if Republican, 0 if Democrat
ADA	Liberalism rating measure based on voting record by Americans for Democratic Action: 0 (very conservative) to 100 (very liberal)
PACCORP	Contributions from domestic corporate PACs as fraction of total PAC contributions (domestic corporations do not include international corporations defined for PACINTL)
PACINTL	Contributions from international corporate PACs as fraction of total PAC contributions (international corporations comprise either the 100 largest U.S. corporations in terms of foreign sales or the 50 largest U.S. exporters during any year during 1982–88)
PACLABOR	Contributions from labor union PACs as fraction of total PAC contributions
UNEMP	Unemployed persons as fraction of the labor force in 1986
APPAREL	Fraction of manufacturing labor force in textiles, apparel, and leather goods
TRANS	Fraction of manufacturing labor force in transportation goods
RESOURCE	Fraction of manufacturing labor force in resource-based manufacturing industries
OTHERMFG	Fraction of manufacturing labor force in all other industries not included above

Data are across states for Senators and congressional districts for Representatives.
All data (except employment in manufacturing sectors) taken from Nollen and Quinn (1994).
See their Appendix A for more detail.
Manufacturing employment are defined for the following two-digit SIC industries: APPAREL (22+23+31), TRANS (37), RESOURCE (21+24+25+26+27+32), OTHERMFG (20+28+29+30+33+34+35+36+38+39). SIC industries are as follows: 20—food; 21—tobacco; 22—textiles; 23—apparel; 24—wood; 26—printing; 27—furniture; 28—chemical; 29—petroleum refining; 30—rubber; 31—leather; 32—stone; 33—primary metals; 34—fabricated metals; 35—machinery; 36—elec. equipment; 37—transport; 38—instrumentation; 39—misc. manufacturing.

employment shares in textile and apparel (APPAREL), autos, aerospace, and other transport equipment (TRANS), resource-based manufactures, for example, refined petroleum, wood, and furniture (RESOURCE), and other manufactures including machinery, electronic goods, scientific instruments, primary metals, and iron and steel (OTHERMNF).[16] State and county level data on employment were obtained from the geographic area series of the 1987 Census of manufacturing. The Congressional District Atlas (U.S. Department of Commerce, Bureau of the Census, 1984) was used to construct

[16] The aggregation of the employment-to-value added ratios from the 20 two-digit set of industries to a smaller set is done on the pragmatic grounds of preventing collinearity.

Table 3.2
Descriptive statistics: independent variables

Variable	Senate data (N=100)				House data (N=425)			
	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
EAST	0.220	0.416	0	1	0.247	0.432	0	1
SOUTH	0.260	0.441	0	1	0.292	0.455	0	1
WEST	0.260	0.441	0	1	0.198	0.399	0	1
HOUSETRADE	–	–	–	–	0.031	0.172	0	1
WAYSMEANS	–	–	–	–	0.033	0.179	0	1
INTLDEV	–	–	–	–	0.035	0.185	0	1
SENTRADE	0.170	0.378	0	1	–	–	–	–
FOREIGN-REL	0.190	0.394	0	1	–	–	–	–
PARTY	0.460	0.501	0	1	0.412	0.492	0	1
ADA	0.467	0.339	0	1	0.478	0.349	0	1
PACCORP	0.293	0.133	0	0.640	0.233	0.115	0	0.672
PACINTL	0.295	0.174	0	0.667	0.259	0.178	0	1
PACLABOR	0.144	0.137	0	0.454	0.223	0.205	0	0.838
UNEMP	0.070	0.022	0.028	0.131	0.068	0.026	0.010	0.180
APPAREL	0.075	0.088	0	0.380	0.090	0.156	0	0.842
TRANSPORT	0.078	0.065	0	0.291	0.032	0.063	0	0.448
RESOURCE	0.253	0.093	0.110	0.587	0.253	0.178	0	1
OTHERMFG	0.468	0.132	0.075	0.694	0.481	0.246	0	1

ADA scaled by 100.

a mapping to concord the county-level Census data into congressional district-level data.[17] Descriptive statistics for the explanatory variables are presented in Table 3.2.

5. Analysis of Senate voting on the Omnibus Bill

5.1. Dimensionality

The factor analytic evidence in Table 4.1 indicates that Senate voting was based on two attributes. The factor model (Eq. (2)) is estimated using maximum likelihood (ML) for one, two, and three factors. In order to evaluate dimensionality three formal diagnostics are reported: a chi-squared statistic, Akaike's information criterion (AIC), and Schwarz's information criterion (SIC). AIC and SIC favor models with the smaller values of their statistics, but overparameterization is penalized more severely by SIC. According to SIC the two-factor model is preferred, while AIC favors the three-factor model. Following Heckman and Snyder (1997), our model selection is based on SIC. The chi-squared statistic weakly supports this decision. At the 1% level of significance the chi-squared test rejects the hypothesis that one factor is sufficient, but cannot reject the hypothesis that two factors are sufficient (although at the 5% level it does reject). Hence, testing based on ML methods indicate that fully two factors are required to rationalize the voting data.

[17] For one-to-many county-to-district mapping the employment data were proportioned based on population; for many-to-one mapping the county data were added up. Employment shares variables were then computed.

Table 4.1
Senate: dimensionality (seven votes)

	H_0: one factor sufficient	H_0: two factors sufficient		H_0: three factors sufficient		
χ^2 [*df*] (*p*-value)	55.17 [14] (0.0001)	20.03 [8] (0.0102)		2.198 [3] (0.5320)		
AIC	29.40	4.987		3.681		
SIC	−7.08	−15.85		−11.50		
Eigenvalues	10.30	10.40		10.80		
	0.722	0.435		1.795		
	0.325	0.181		0.174		
R^2 of data with each factor	Factor 1: 0.911	Factor 1: 1.00	Factor 2: 0.912	Factor 1: 1.00	Factor 2: 0.915	Factor 3: 0.642

Alternative hypothesis H_1: more factors required.
AIC=Akaike information criterion, SIC=Schwarz information criterion.

What is a reasonable description of these two factors? The first step is to summarize the roll calls on the basis of issues and other salient characteristics that bring out the nature of trade ideology incorporated in those roll calls. The estimates on the factor loadings of the measurement model in Eq. (3) [or in Eq. (2)] Λ, which map the two factors into the voting data, then provide hints about what trade-specific ideology might be contained in those factors. Names for factors can thus be related to the characteristics of roll calls on which they primarily load. The second, fourth, and fifth columns of Table 4.2 indicate, respectively, who championed the roll call, the issue of primary concern to each roll call, and our subjective measure of their protectionist character. While roll calls may have had other features built into them, leadership, primary issue, and degree of protectionism were their salient features. The factor loadings (in parentheses) in the sixth column indicate which factor(s) mapped into each roll call. Only if a factor loading on a roll call was greater than or equal to 0.30 was that factor considered to be related to the roll call.

The factor loadings are such that they neatly separate six of the seven roll calls into each factor. This simple factor structure makes it easy to interpret the factors.[18] Consider

[18] A simple structure can be achieved by design. An orthogonal rotation of the coordinate axis of the factor loadings can often lead to a simple structure. One such rotation is called the varimax rotation. Note that there is a basic indeterminacy about factors. Once a set of *k* factors is found to account for the set of intercorrelations of the roll calls, they may be transformed into another set of *k* factors that account equally well for the correlations. Technically, there are many linear transformations of the factor loadings and the factors that have the same exact fit (see e.g. Reyment and Joreskog, 1993). Thus, a simple structure is desirable, where only those factors are meaningful for which the roll calls have a simple interpretation. A matrix of loadings with many zero elements facilitates simple interpretation. A transformation, called the varimax rotation, performs an orthogonal rotation of the loadings such that the variance of the squared loadings in each column is maximized. By yielding more loadings closer to 0 and 1, this transformation achieves a simple structure. The LISREL estimates of factor loadings from model (3) that are reported in Table 4.2 are qualitatively close to the varimax loadings, not by any design but because the unrotated factors have a similar simple structure. No more restrictions than are necessary for model identification are imposed on Λ (see footnote 7). Identification of the parameters of the factor model is achieved by setting the coefficient on Factor 1 (η_1) corresponding to #158 and the coefficient on Factor 2 (η_2) corresponding to #110 to zero, on the basis of their small loadings in the first step.

Table 4.2
Factor names (senate voting)

Roll call number[a]	Initiator	Split	Issue[b]	Protectionism[c]	Roll call loads primarily on:[d]	Factor 1 based on this roll call?	Factor 2 based on this roll call?
158	Bentsen (D)	69–27	Against expanding Section 201[e]	F	Factor 2 (0.35)	No	Yes
179	Domenici (R)	71–28	For expanding Section 201	P+	Factor 2 (−1.01)	No	Yes
175	Bradley (D)/ Packwood (R)	55–41	Congressional versus Presidential authority	F	Factor 2 (0.33)	No	Yes
178	Packwood (R)	41–55	Congressional versus Presidential authority	F+	Factor 1 (−0.63) Factor 2 (0.30)	Yes	Yes
285	Bentsen (D)	63–36	Congressional versus Presidential authority	P	Factor 1 (0.82)	Yes	No
208	Bentsen (D) [Trade Bill]	71–27	Floor Bill Passage	P−	Factor 1 (0.84)	Yes	No
110	Bentsen (D) [Trade Bill]	63–36	Conference Bill Passage	C	Factor 1 (0.91)	Yes	No

Factor names[f]
Factor 1 (η_1): congressional power
Factor 2 (η_2): protectionism

[a] The roll calls were taken in this chronological order: 158, 175, 178, 179, 208, 110, 285.

[b] Detailed descriptions available from authors.

[c] Protectionism scale: P+ (very protectionist), P, P−, C (Centrist), F−, F, F+ (free trade). Subjective scale based on detailed description of the roll calls and accounts in Congressional Quarterly of those votes.

[d] Estimates of factor loadings in parentheses. These are from ML estimation of Eq. (3). Loadings are similar across all model specifications appearing in Table 4.3. Only if absolute loading coefficient greater than 0.30 is the roll considered significantly loaded on a factor. Loadings have simple varimax structure (see footnote 18).

[e] Section 201 of the Trade Act of 1974 authorizes the President of the United States to take action when a particular product is being imported into the country in such large quantities as to cause injury or threaten serious injury to a domestic industry. This authority can be used even if the import is not priced unfairly. Under this section, the United States International Trade Commission (ITC) assesses whether the industry is being seriously injured by imports and can recommend to the President that relief in the form of increased tariffs or quotas on imports and/or adjustment assistance for the domestic industry be provided.

[f] Based on loading estimates, protectionism scale and roll call description.

the last four votes (178, 285, 208, and 110) on which Factor 1 is primarily loaded. Over the history of trade policymaking, there has been a tension on the issue of congressional power versus presidential authority. Following the Smoot–Hawley tariffs, the move towards liberalizing tariffs in the Reciprocal Trade Agreements Act of 1934 involved switching tariff authority from Congress to the executive. After WWII, in 1947 Congress reclaimed

part of the authority it had ceded by permitting injury decisions based on the escape clause to overrule any tariff reductions ordered by the executive. The Trade Expansion Act of 1962 and the Trade Act of 1974 placed greater authority in the hands of the executive to negotiate reductions in the Kennedy round and Tokyo round (in return Congress bargained for safeguards like trade adjustment assistance). The 1984 Trade and Tariff Act gave the President authority to negotiate bilateral trade treaties. The Trade and Omnibus Act thus was the first legislation in decades that sought to turn the tide and curb Presidential authority.

Restricting Presidential authority had been Bentsen's main goal, and since its inception the Senate version of the bill contained wording to this effect. Once his coalition defeated Packwood's pro-presidential authority motion to amend the bill (#178) it was clear that this coalition could carry the bill. Naturally, Democrats were the coalition's mainstay. More voters from both parties joined this basic coalition in passing the floor and conference versions (#208, #110), as well as Bentsen's motion reiterating his goal to restrict executive authority (#285) before the conference version was passed by the Senate. Thus, Factor 1 is named the *congressional power* factor.

One interpretation of the second factor is that it is based on the protectionist-free trade character of the roll call. Factor 2 is strongly influenced by (has large loading on) #179, a protectionist vote led by Domenici (R-NM). Republicans as well as protectionist Democrats aligned with Domenici on this vote. For Republican senators to support protectionism may appear antithetical to their support of a pro-free trade executive. The resolution of such conflict lay in separating the attributes of the trade bill into congressional power (on which Republicans generally supported the executive), and degree of protectionism. The motion by Domenici, a ranking member and erstwhile chair of the powerful Senate Budget committee, served the purpose of assuring Republican senators that voting protectionist was not inconsistent with voting for the executive. Factor 2 is weakly influenced by #158, #179, and #178 all of which were in the direction of free trade, indicating that coalitions were not as stable across free-trade votes. Factor 2 is thus named the *protectionism* factor.

5.2. Structural analysis of dimensions

A substantive message from the vast literature on the political economy of protection is that trade ideology is inextricably linked with special interest and public interest considerations due to the redistributive nature of trade policy. Grossman and Helpman (1994), for example, model government's objective function as a weighted sum of welfare loss from protection and contributions from special interest groups. Evidence from cross industry studies (e.g. Ray, 1981; Baldwin, 1986; Trefler, 1993; Gawande, 1998; Gawande and Krishna, 2002) indicates that no single theory can fully explain protectionism. Proponents of special interest theories debate whether money matters more than votes. Proponents of public interest theories debate whether consumer surplus matters more than protecting the wages of unskilled workers. The finding here that voting on trade bills is multidimensional is consistent with this weighty cross-sectional evidence. Is variation across senators on these two fundamental dimensions adequately explained by observed

variables? If so, then we can infer about the relative importance of ideology versus interest on *each dimension*.

Four structural model specifications, each distinguished by different zero-restrictions on the Γ matrix are estimated. ML estimates of their structural parameters Γ are presented in Table 4.3.[19,20] The restrictions on Γ are motivated by (unreported) OLS regressions of factor scores obtained from the first step on all explanatory variables. In the first LISREL model, in the equation for the *congressional power* factor (η_1) the three PAC variables (PACCORP, PACINTL, PACLABOR) and unemployment (UNEMP) are dropped, and in the equation for the *protectionism* factor (η_2) the two committee variables (FOREIGN-REL, SENTRADE) are dropped. Additionally, constituency employment variables (APPAREL, TRANS, RESOURCE, and OTHERMFG) are not included in either equation. In Model 2, in addition to the restrictions in Model 1, PARTY and ADA are dropped in the equation for η_2. Model 3 corresponds to Model 2, but includes the four constituency employment variables. Finally, Model 4 estimates the least restricted model. Only PACLABOR is restricted to zero in the first equation while SENTRADE is restricted to zero in the second.

As indicated earlier, the correlation matrix of Y and X is used in the estimation, so the estimates are standardized beta coefficients. They are interpreted as the number of standard deviations by which η_1 or η_2 change due to a one standard deviation change in the explanatory variable. Being unit-free, the size of each coefficient indicates the importance of the corresponding variable in that model.

Three distinct inferences that are robust across the four structural models may be made from the results in Table 4.3. The first and most important inference is that there is more than one underlying determinant of both factors η_1 and η_2. This is a refutation of the Poole-Rosenthal interpretation that ‘‘ideology’’ is the single most important determinant of historical roll call voting. Consider, for example, the estimated coefficients in Model 1. The exogenous variables that dominate in explaining variations in the congressional power factor η_1 are WEST, both committees (FOREIGN-REL, SENTRADE), PARTY, and ideology (ADA). They are statistically significant in all models except in Model 4 (WEST and FOREIGN-REL). The existence of multiple determinants is also true of the protectionism factor η_2. Here EAST, PACINTL (and sometimes PACLABOR), and UNEMP are statistically significant determinants. In models with employment structure variables, APPAREL is an important determinant of η_2. In sum, variables emphasizing the structure of congress—committee, region, party and ideology—determine the congressional power factor, while variables measuring special interest (PAC contributions, constituency interest) and the public interest (unemployment) determine the protectionism factor.

Second, PAC spending, particularly by exporting firms (PACINTL), is a major determinant of the protectionism factor η_2. This is in line with the recent findings by Baldwin and Magee (2000) about voting on trade issues. Unemployment (UNEMP) is important as well. These variables measure special and constituency interests. In Model 4,

[19] All estimation was done on LISREL8. Convergence for all the reported models was rapid, within 100 iterations, which took no more than 2 min.

[20] The estimates on B (that is, coefficients on the η's) are not shown. The estimates of loadings are such that the factors are close to orthogonal, effectively making B=0.

Table 4.3
Senate voting: FIML estimates (standardized beta coefficients)

	Model 1		Model 2		Model 3		Model 4	
	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.
	η_1	η_2	η_1	η_2	η_1	η_2	η_1	η_2
EAST	0.12	0.29**	0.14*	0.26**	0.11	0.36**	0.19*	0.24
	(1.48)	(2.19)	(1.97)	(2.16)	(1.19)	(2.24)	(1.62)	(1.16)
SOUTH	0.05	−0.02	0.05	−0.05	−0.03	0.15	0.08	0.39**
	(0.71)	(−0.19)	(0.72)	(−0.41)	(−0.29)	(0.94)	(0.44)	(2.07)
WEST	−0.16**	0.14	−0.15**	0.19*	−0.19**	0.15	−0.13	0.34*
	(−2.41)	(1.19)	(−2.26)	(1.70)	(−2.44)	(0.99)	(−0.89)	(1.96)
FOREIGNREL	−0.12**	–	−0.10*	–	−0.13**	–	−0.05	0.28**
	(−2.10)		(−1.91)		(−2.35)		(−0.52)	(2.16)
SENTRADE	0.15**	–	0.15***	–	0.14**	–	0.15**	–
	(2.62)		(2.73)		(2.51)		(2.29)	
PARTY	−0.61***	−0.15	−0.60***	–	−0.65***	–	−0.46*	0.69*
	(−5.49)	(−0.52)	(−5.53)		(−5.45)		(−1.71)	(1.73)
ADA	0.23**	0.20	0.24**	–	0.20**	–	0.29**	0.18
	(2.43)	(1.09)	(2.52)		(2.12)		(2.36)	(0.59)
PACCORP	–	0.03	–	−0.02	–	0.17	0.17	0.19
		(0.25)		(−0.16)		(0.97)	(1.41)	(0.84)
PACINTL	–	−0.25*	–	−0.27*	–	−0.51**	−0.22	−0.50*
		(−1.70)		(−1.72)		(−2.60)	(−1.12)	(−1.97)
PACLABOR	–	−0.30**	–	−0.24*	–	−0.14	–	−0.13
		(−1.98)		−1.81)		(−0.93)		(−0.79)
UNEMP	–	−0.23**	–	−0.24**	–	−0.41***	−0.09	−0.40**
		(−2.03)		(−2.06)		(−2.66)	(−0.57)	(−2.44)
APPAREL	–	–	–	–	0.05	−0.39**	−0.12	−0.55***
					(0.59)	(−2.29)	(−0.58)	(−2.71)
TRANS	–	–	–	–	−0.04	−0.06	−0.05	−0.03
					(−0.64)	(−0.56)	(−0.78)	(−0.22)
RESOURCE	–	–	–	–	−0.07	−0.01	−0.09	−0.03
					(−0.98)	(−0.05)	(−1.05)	(−0.23)
OTHERMNF	–	–	–	–	−0.09	0.03	−0.04	0.13
					(−1.20)	(0.23)	(−0.49)	(0.92)
k	8	10	8	8	12	12	15	15
R^2	0.81	0.34	0.82	0.32	0.83	0.55	0.82	0.62
χ^2 [df]	129.91		131.08		193.44		184.34	
	[84]		[86]		[110]		[104]	
AIC	339.91		337.08		523.44		526.34	
CAIC	718.45		708.41		1118.30		1142.83	

η_1 and η_2 are endogenous, but have coefficients close to zero due to near-orthogonal factors.
R^2 for structural equations denotes squared multiple correlations for the structural equations.
t-statistics in parentheses. ***, **, * denotes significance at the 0.01, 0.05, and 0.10 levels, respectively.
Degrees of freedom (df)=0.5 (p+q)(p+q+1)−t, where p=# y-variables, q=# x-variables, and t=# coefficients estimated.

PARTY dominates, but these direct measures of interest continue to remain important. Regional variables (SOUTH, WEST) and membership of the foreign relations subcommittee (FOREIGN-REL) are also important determinants of η_2 in Model 4. It therefore appears that factor η_2 is based on variables spanning special interest pressure, constituency

interest (unemployment), committee membership, region, and party. The Poole-Rosenthal notion of general liberal-conservative ideology as the main determinant of voting behavior appears simplistic. That conclusion may be due to prevalence of routine voting in their data which may well have been driven by ideology, but which swamped the more subtle information contained in issue-driven voting like voting on trade bills.

Third, PARTY is the most important determinant of the congressional power factor η_1 in all models. Its magnitude dominates other variables. The ideology measure ADA comes in a distant second. The finding that party dominates a dimension is consistent with the Poole-Rosenthal finding. However, they interpret the dominance of party (together with region) to imply that liberal-conservative ideology is the driving force behind historical roll call voting. This interpretation is at odds with the results here. Since, ideology is controlled for it does not appear that the domination of PARTY in explaining η_1 is merely further evidence of ideology. Peltzman (1985) observed that party may measure the influence of special interest just as much as, or more than, the influence of ideology. Weingast and Marshall (1988) view coalitions in Congress as furthering self-interested objective functions of party leaders.

A view of parties that has gained favor in the legislative literature is one advanced by Cox and McCubbins (1993). In this sophisticated view, party is not merely a measure of political ideology. It is a mechanism based on interest (of party leaders), and designed to resolve the collective action problem of self-interested actors who would otherwise individually optimize, but achieve a lower level of success than if they optimized and their party had a majority. The structural estimates in Table 4.3 demonstrate the Cox–McCubbins view. Because Democrats had a majority they were able to achieve their individually desirable policy of restricting power of the executive, and turning back the decades-long tide of ceding power over trade liberalization to the executive.

The χ^2 statistics reported in Table 4.3 may be used to assess fit and compare models. The smaller the χ^2 values relative to the degrees of freedom, the better the fit (see e.g. Bollen, 1989). χ^2-differences may be used to compare models as follows. If the drop in the χ^2 value is about equal to the change in the degrees of freedom reported below the χ^2 statistic, then the improvement is not statistically significant, while a large drop indicates a better model.[21] Consider the drop in the χ^2 value between Model 3 and Model 2 (62.36) compared with the drop in the degrees of freedom (24), or 2.6 per degree of freedom. Model 2 is preferred by this criterion. Similar comparisons show that Model 1 is not preferred over Model 2, and Model 4 is not preferred over Model 3. Hence, Model 2 is most preferred among the four models by the χ^2-difference criterion. Alternative criteria for model comparisons are Akaike's information criterion (AIC) computed as $-2\ln L+2k$, where L is the likelihood function and k is the number of parameters, and consistent AIC (CAIC) computed as AIC$+k[\ln n+1]$ where n is the size of the sample. Both criteria penalize overfitting, with the CAIC penalizing excessive parameterization more stringently. The model with the smallest AIC and CAIC is preferred. Model 2 is also preferred by the AIC and the CAIC criteria. Inferences solely based on this model would accord with the conclusions above.

[21] The degrees of freedom are equal to $0.5\times(p+q)(p+q+1)-t$, where p=number of y-variables, q=number of x-variables, and t=number of coefficients estimated.

Table A1
Implied reduced form effects on each roll call vote (original units)

	Senate: based on Model 2 of Table 4.3							House: based on Model 1 of Table 5.3					
	158	175	178	179	208	110	285	72	77	78	426	66	231
EAST	0.09	0.07	−0.01	−0.31***	0.11*	0.13*	0.10	0.07**	−0.09***	0.09***	−0.08***	0.10***	0.06**
SOUTH	−0.02	−0.03	−0.06	0.04	0.05	0.05	0.05	−0.01	−0.01	0.03	0.00	0.09**	0.06**
WEST	0.08*	0.11**	0.19***	−0.16	−0.14**	−0.16**	−0.15***	−0.05*	0.07**	−0.07**	0.06**	−0.08*	−0.04
FOREIGNREL	0.01	0.03	0.09*	0.02	−0.10*	−0.12*	−0.10*	–	–	–	–	–	–
SENTRADE	−0.01	−0.04	−0.13***	−0.04	0.15***	0.18***	0.15***	–	–	–	–	–	–
HOUSETRADE	–	–	–	–	–	–	–	0.00	−0.03	0.08	0.00	0.15*	0.09*
WAYSMEANS	–	–	–	–	–	–	–	0.00	0.03	−0.05	0.00	−0.12	−0.09
INTLDEV	–	–	–	–	–	–	–	0.00	0.03	−0.03	0.00	−0.07	−0.05
PARTY	0.04	0.13*	0.41***	0.11	−0.46***	−0.54***	−0.45***	−0.60***	0.68***	−0.57***	0.67***	−0.40***	−0.13***
ADA	−0.01	−0.07	−0.24**	−0.07	0.27***	0.31***	0.27***	0.16**	−0.23***	0.28***	−0.20***	0.40***	0.23***
PACCORP	−0.03	−0.04	−0.04	0.07	0.00	0.00	0.00	0.35**	−0.25*	0.08	−0.30**	−0.31	−0.27**
PACINTL	−0.26	−0.26	−0.29	0.67*	0.05	0.06	0.08	0.03	−0.03	0.03	−0.03	0.00	0.00
PACLABOR	−0.30	−0.29	−0.29	0.79*	0.07	0.07	0.10	0.27***	−0.21**	0.05	−0.26***	−0.28**	−0.24**
UNEMP	−1.64*	−1.82*	−1.82*	4.70**	0.41	0.44	0.61	0.38	−0.55	0.54	−0.57	0.51	0.24
APPAREL	–	–	–	–	–	–	–	0.16**	−0.18**	0.12**	−0.19**	0.06	0.00
TRANS	–	–	–	–	–	–	–	0.00	0.00	0.00	0.00	0.00	0.00
RESOURCE	–	–	–	–	–	–	–	0.06	−0.05	0.05	−0.06	0.02	0.00
OTHERMNF	–	–	–	–	–	–	–	0.04	−0.04	0.02	−0.04	0.02	0.00

***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.
Estimates computed as $\Gamma(I-B)\Lambda$, using Eq. (3).
Beta coefficients converted into original units by multiplying the standardized coefficient on each variable x by sd(y)/sd(x), where sd(.) denotes sample standard deviation, and y the dependent variable (roll call vote).

It is easy to convert the beta coefficient on any variable x into original units by multiplying the standardized coefficient on x by sd(y)/sd(x), where sd(·) denotes sample standard deviation, and y the dependent variable. It is also straightforward to calculate the reduced form estimates of the observed variables X on the original roll call votes as $\Gamma(I-B)\Lambda$, using Eq. (3). The left half of Table A1 in the appendix presents these reduced form estimates, based on Model 2 of Table 4.3. These estimates may be interpreted as linear probability estimates. All else held constant, on roll call 178 being Republican increased the probability of voting yea by 41%, being from a western region increased the probability of voting yea by 19% and being on the Senate Trade subcommittee decreased the probability of voting yea by 13%. More liberal ADA scores and higher unemployment in the state also lowered the probability of voting yea. Similar estimates from probit models provided a consistency check on the structural estimates.

Nollen and Quinn (1994) also analyze roll call voting during legislation of the 1988 Omnibus Trade Act. They consider all 30 Senate votes and 20 House votes taken during the Act's legislation, not just the key roll calls that we consider. They pool roll calls according to whether the roll calls were fair trade, strategic trade, or protectionist, and use logistic regression to explore the effects of political institutions, ideology, and economic conditions on the voting outcomes. Nollen and Quinn find strong evidence that all types of trade intervention are opposed by the Republican Party. Votes on protectionist roll calls are primarily explained by economic variables such as geographic region, export employment, unemployment rates, and PAC contributions. Fair trade or strategic trade polices are primarily explained by political variables including party membership, ADA scores and committee memberships. Their findings suggest that trade policy may not be unidimensional since members' ideological views on various trade policies (i.e., fair trade, strategic trade, etc.) may be different. But they presuppose, rather than infer, that trade ideology constitutes preferences on fair trade, strategic trade and protectionism. We find that our factors contain richer descriptions of what constitutes trade ideology.

6. Analysis of house voting on the Omnibus Bill

6.1. Dimensionality

Evidence on dimensionality of the House voting data is presented in Table 5.1. Since the six roll calls support no more than two factors, ML estimates of eigenvalues and diagnostics with one and two factors are shown. The AIC and SIC both favor the model with two factors. Notably, the eigenvalues indicate that the first factor accounts for the lion's share of the total variance.

Table 5.2 depicts the contrast with Senate voting. While congressional authority dominated Senate voting, the issue that dominated House voting was protectionism. Gephardt's protectionist amendment (#72) was challenged by Michel's alternative that sought to drop the amendment in the House version of the Omnibus bill (#77). Later, Michel again moved to discourage Gephardt's attempt to bring his amendment independently to conference (#426). The stable coalitions voting yea on #72 and nay on #77 and

Table 5.1
House of representatives: dimensionality (six votes)

	H_0: one factor sufficient	H_0: two factors sufficient	
χ^2 [*df*](*p*-value)	147.30 [9] (0.0001)	33.91 [4] (0.0001)	
AIC	130.53	26.25	
SIC	94.07	10.04	
Eigenvalues	24.001	28.230	
	0.680	1.387	
	0.144	0.283	
R^2 of variables with each factor	Factor 1: 0.960	Factor 1: 0.966	Factor 2: 0.581

Alternative hypothesis H_1: more factors required.
See legend to Table 4.1.

#426 are reflected in the large loadings of Factor 1 on those votes. The House version (#78) of the Omnibus bill was activist and somewhat on the protectionist side, even though it did not include the Gephardt amendment. It actually resembled Michel's version but since it was Rostenkowski's (D) bill (and was still explicitly protectionist) the coalition that passed #78 was similar to the one that supported Gephardt's amendment #72. Hence, Factor 1 is named the *protectionist* factor.

Table 5.2
Factor names (house voting)

Roll call #[a]	Initiator	Split	Issue[b]	Protectionism[c]	Roll call loads primarily on:[d]	Factor 1 based on this roll call?	Factor 2 based on this roll call?
72	Gephardt (D)	218–214	Gephardt	P+	Factor 1 (−0.89)	Yes	No
77	Michel (R)	156–268	Anti-Gephardt	F+	Factor 1 (0.97)	Yes	No
426	Michel (R)	175–239	Anti-Gephardt	F+	Factor 1 (0.97)	Yes	No
78	Rostenkowski (D) [Trade Bill]	290–137	Floor Bill Passage	P	Factor 1 (−0.74)	Yes	No
66	Rostenkowski (D) [Trade Bill]	312–107	Conference Bill Passage	P−	Factor 1 (−0.34) Factor 2 (0.62)	Yes	Yes
231	Rostenkowski (D) [Trade Bill]	376–45	Veto Override: Bill Passage	C	Factor 2 (0.63)	No	Yes
Factor names[e]							
Factor 1 (η_1): protectionism							
Factor 2 (η_2): centrism							

[a] The roll calls were taken in this chronological order: 72, 77, 78, 426, 66 231.

[b] Detailed descriptions available from authors.

[c] Protectionism scale: P+ (very protectionist), P, P−, C (Centrist), F−, F, F+ (free trade). Subjective scale based on detailed description of the roll calls and accounts in Congressional Quarterly of those votes. This scale characterizes the specific roll call vote, not the trade bill in the event that the roll call passed. Hence, they rate the proposed marginal change to the trade bill. They do not provide the average rating of the trade bill given the proposed change.

[d] Estimates of factor loadings in parenthesis. These are from ML estimation of Eq. (3). Loadings are similar across all model specifications appearing in Table 5.3. Only if absolute loading coefficient greater than 0.30 is the roll considered significantly loaded on a factor.

[e] Based on loading estimates, protectionism scale, and roll call description.

Table 5.3
House voting: FIML estimates (standardized beta coefficients)

	Model 1		Model 2		Model 3		Model 4		Model 5
	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.	Dep. var.
	η_1	η_2	η_1	η_2	η_1	η_2	η_1	η_2	Single factor
EAST	−0.06**	0.13*	−0.05	0.16*	0.09***	0.03	0.06	0.15*	0.10***
	(−1.91)	(1.69)	(−0.94)	(1.73)	(3.05)	(0.28)	(0.94)	(1.73)	(4.11)
SOUTH	0.01	0.14**	0.02	0.15*	0.01	0.22***	−0.03	0.14*	0.02
	(0.27)	(2.21)	(0.46)	(1.78)	(0.31)	(2.78)	(−0.46)	(1.78)	(0.81)
WEST	0.05*	−0.09	0.04	−0.11	−0.06**	−0.03	−0.04	−0.11	−0.07***
	(1.66)	(−1.40)	(0.89)	(−1.41)	(−2.06)	(−0.43)	(−0.89)	(−1.41)	(−2.85)
HOUSETRADE	–	0.09*	0.02	0.10*	–	0.04	−0.02	0.09*	0.01
		(1.83)	(0.57)	(1.66)		(0.79)	(−0.57)	(1.66)	(0.27)
WAYSMEANS	–	−0.07	–	−0.08	–	−0.003	–	−0.07	−0.01
		(−1.54)		(−1.48)		(−0.07)		(−1.48)	(−0.58)
INTLDEV	–	−0.04	0.02	−0.05	–	0.04	−0.02	−0.04	−0.03
		(−0.89)	(0.65)	(−0.85)		(0.94)	(−0.65)	(−0.85)	(−1.24)
PARTY	0.67***	−0.36	0.64***	−0.69	−0.73***	0.32	−0.70***	−0.65	−0.85***
	(9.13)	(−0.94)	(3.35)	(−0.86)	(−9.91)	(0.48)	(−3.35)	(−0.86)	(−19.10)
ADA	−0.12	0.43***	−0.08	0.51***	0.19***	0.19	0.09	0.48***	0.23***
	(−1.62)	(3.17)	(−0.55)	(3.21)	(3.22)	(0.92)	(0.55)	(3.21)	(8.84)
PACCORP	−0.08**	−0.15*	−0.10**	−0.12	0.06	−0.13	0.11**	−0.12	0.07***
	(−2.06)	(−1.72)	(−1.97)	(−0.82)	(1.48)	(−1.42)	(1.97)	(−0.82)	(2.76)

PACINTL	−0.01	0.02	−0.01	0.01	0.01	0.02	0.01	0.01	0.01
	(−0.31)	(0.04)	(−0.17)	(0.09)	(0.35)	(0.34)	(0.17)	(0.09)	(0.30)
PACLABOR	−0.12**	−0.25**	−0.14**	−0.20	0.08*	−0.08	0.15**	−0.19	0.08***
	(−2.33)	(−2.06)	(−2.07)	(−0.98)	(1.84)	(−0.68)	(2.07)	(−0.98)	(3.45)
UNEMP	−0.03	0.04	−0.02	0.05	0.03	0.04	0.02	0.05	0.03
	(−1.19)	(0.73)	(−0.72)	(0.91)	(1.29)	(0.81)	(0.72)	(0.91)	(1.45)
APPAREL	−0.06**	–	−0.06*	0.04	0.06**	–	0.06*	0.03	0.07***
	(−2.14)		(−1.96)	(0.43)	(2.02)		(1.96)	(0.43)	(2.73)
TRANS	0.001	–	−0.001	−0.02	0.004	–	0.002	−0.02	−0.003
	(0.03)		(−0.06)	(−0.39)	(0.02)		(0.06)	(−0.39)	(−0.14)
RESOURCE	−0.02	–	−0.03	−0.01	0.02	–	0.03	−0.01	0.02
	(−0.81)		(−0.97)	(−0.11)	(0.66)		(0.97)	(−0.11)	(0.83)
OTHERMFG	−0.02	–	−0.02	–	0.01	–	0.03	–	0.01
	(−0.63)		(−0.74)		(0.43)		(0.74)		(0.58)
k	14	13	16	16	14	13	17	16	16
R^2	0.86	0.45	0.86	0.35	0.85	0.18	0.83	0.43	0.80
χ^2 [df]	244.43		242.99		261.92		242.99		–
	[94]		[89]		[94]		[89]		
AIC	606.43		614.99		623.90		614.99		–
CAIC	1520.86		1554.78		1538.40		1554.68		–

See legend to Table 4.3.

A second factor came into evidence during passage of the conference version of the bill (#66). While similar to the House version, it was somewhat less protectionist because Rostenkowski foresaw the need for bipartisan support in the face of a presidential veto of the bill. This was the beginning of the bill's move to the center. The final version (#231) that overrode the presidential veto was activist without being overtly protectionist. It still contained provisions that would allow the U.S. to behave strategically in trade policy. To move it to the center, a labor-backed provision that would make it mandatory for employers to a 60-day notice prior to any plant closings was dropped. Factor 2 is thus named the *centrism* factor.

6.2. Structural analysis of dimensions

In the structural estimation, prior zero restrictions on the factor loadings may be imposed to make the loading pattern resemble the unrotated or the varimax loadings. We experimented with different restrictions on the factor loadings, some designed to yield the unrotated pattern of loadings (Models 1 and 2) and others to yield the varimax pattern (Models 3 and 4). In all cases, as few restrictions as possible were imposed on the matrix of loadings Λ to keep it relatively free. Finally, a single factor model was also structurally estimated (Model 5) to check for robustness of the results.

In Table 5.3, the ML estimates of the structural parameters B and Γ for five structural models, each distinguished by different zero-restrictions on the Γ (and Λ) matrices, are presented. In Model 1, in the equation for factor η_1 the three committee variables (HOUSETRADE, WAYSMEANS, INTLDEV) are dropped, and in the equation for factor η_2 the constituency employment structure variables (APPAREL, TRANS, RESOURCE, and OTHERMFG) are dropped. In Model 2, as few variables as possible are dropped—WAYSMEANS from the η_1 equation, and OTHERMFG from the η_2 equation—to identify the model. Models 3 and 4 have the same explanatory variables as do Models 1 and 2, respectively, but different restrictions on factor loading. Model 5 is estimated presuming a single factor. This would be the case if dimensionality were based on eigenvalues (that is, variances rather than intercorrelations among the roll call votes).

The chi-squared measures of fit indicate that the system is adequately specified. The R^2 values indicate that while the fit on the first equation is good, the fit on the second equation varies from poor (Model 4) to moderate (Model 1). The AIC and CAIC both prefer Model 1 over the other three system specifications. Comparison of differences in χ^2 values relative to degrees of freedom also affirms the choice of Model 1. Inferences are based on Model 1, but are robust across models.

The protectionism factor η_1 is overwhelmingly determined by PARTY. This is in contrast to the Senate, where the protectionism factor was determined by special interests, constituency interests and region. In the House, although the impact of variables such as SOUTH, PACCORP, PACLABOR, and APPAREL are estimated precisely, the size of the beta coefficient on PARTY dominates. In Model 1 PARTY has a beta coefficient of 0.67, while the next closest influence is exerted by PACLABOR with an absolute beta coefficient of 0.12.

Our explanation of this difference between determinants of the protectionism factor in the House and Senate draws from accounts in Congressional Quarterly. In the House, the

Democratic coalition behind the narrowly passed Gephardt (D-MO) amendment, was the same that overthrew Michel's (R-IL) attempts to reject the amendment. The same coalition also lay behind passage of the House version of the Omnibus bill (#78) even though, like Michel's proposal, it excluded Gephardt's amendment. The individual initiating the roll call formed a coalition based on their party. Democrats coalesced to support their own in the face of Republican opposition, regardless of whether they individually disagreed with Gephardt's amendment. In the Senate, on the other hand, preferences about protectionism were formed by personal interest: PAC contributions and constituency employment structure were significant determinants of such preferences.

Ideology measured by ADA scores is an important determinant of the second factor (η_2) which we have termed centrism. In Model 1, the beta coefficient on ADA is precisely estimated with a magnitude of 0.43 but it is not the only important determinant. Although PARTY is imprecisely estimated with large standard errors, its beta coefficient is significant in magnitude. Other precisely measured influences, some of them with economically large magnitudes, are also in evidence. In Model 1 PACLABOR (absolute beta coefficient=0.25), PACCORP (0.15), and SOUTH (0.14) are also significant determinants of η_2. Hence, ideology plays an important role in determining the second factor, but neither does ideology influence the trade ideology dimension (η_1), nor does it unequivocally *define* the factor that it does influence (η_2). Other important influences are prevalent.[22]

In sum, the striking feature of House voting is the enormous influence of the majority party in determining the protectionism factor η_1. The results affirm the Cox and McCubbins (1993) view. Although legislators' main pursuit of their personal electoral interests may have clashed with the Gephardt amendment, they supported their partisan institutions. On the other hand, strong leadership by Rostenkowski led to a bill that was ideologically positioned to get the greatest support from House Republicans. In order to reconcile Rostenkowski's actions, which included dropping Gephardt's amendment, with the Cox–McCubbins view of mobilizing party support, it should be noted that the Omnibus bill's passage hinged not just on a majority vote but on overriding a presidential veto for which wider support was required.

7. Endogeneity

Endogeneity of the PAC spending variables is an issue, if the anticipated pattern of voting (say, based on a coalition of Democrats) determines the pattern of PAC spending across legislators. In that case, it is possible for there to be a two-way causality between voting and PAC spending, so that the effect of the PAC spending on voting is not identified using the variables PACINTL, PACCORP, and PACLABOR. Stigler (1971), Olson (1965), Corden (1974), and Grossman and Helpman (1994) suggest instruments to solve the identification problem. Stigler and Olson focus on the concentration ratio as a determinant

[22] These results are fairly robust across specifications. In Model 3, the estimates on the factor loadings makes the data almost unidimensional. Hence, ideology affects the first, not the second factor in this model. However, none of the model selection criteria favors this model.

of lobbying organization. Grossman and Helpman indicate corporate PAC spending is determined by industry size. Theories of public interest, for example, Corden (1974), have focused on maintenance of income as a reason for government's protection of certain industries. Formal theories of labor PACs are not common. We presume that the geographic pattern of labor PAC spending is correlated with geographic pattern of employment. The four influences, concentration, industry size, income, and employment are measured, respectively by number of firms (inverse of concentration) (EST), value added (VA), average income (AVGY) and employment shares. These variables are broken down by the four sectors (Apparel, Transportation, Resource, and Other), since sectors differ in their geographic distribution across legislator constituencies, and concorded into congressional districts. The employment variables are thus the same variables APPAREL, TRANS, RESOURCE, and OTHERMFG used in earlier models.

The first stage regressions of PACINTL, PACCORP, and PACLABOR on all exogenous variables including the instruments are reported in Table A2 in the appendix. However, the fitted values are highly correlated, with pairwise correlations exceeding 0.90. Due to the near-collinearity, ML estimation is not possible. Since collinear variables may be jointly, though not individually, informative, the natural solution in this setting is to reduce them to their essential factors. We find that one factor, termed the *PAC factor*, is sufficient to represent the information contained in the three fitted variables. The factor has a multiple correlation of 0.98 with those variables for House as well as Senate data.

Table 6 contains estimates of the structural models with the PAC factor replacing the PAC variables. With Senate data estimates from a specification similar to Model 2 in Table 4.3, and with House data estimates from a specification similar to Model 1 in Table 5.3 are presented here (the reduced forms in Table A.2 are based on these models). The PAC factor is statistically and economically significant in explaining variations in senators' preferences on the protectionism factor (η_2). It is not a significant determinant of preferences of representatives in the House on either the protectionism or centrism factor. The endogeneity correction thus changes the earlier inferences about the impact of PAC spending on the formation of preferences in the House, but reinforces those inferences for the Senate.

8. Summary and conclusions

What characteristics do legislators consider when they vote on trade bills? While voting may occur on several roll calls during legislation of trade issues, it is likely that only one or two attributes of all those roll calls determine how individual legislators will vote. The first objective of this paper is to understand how many essential attributes were considered by senators and representatives as they legislated the Omnibus Trade and Competitiveness Act of 1988, and what those attributes were. The second objective is to investigate whether legislator preferences on those attributes can be explained by observed variables. A structural factor analytic model is used to answer these questions. In contrast to more conventional probit analyses of individual roll call votes, the intent here is to discover what determined voting on attributes common across subsets of votes. That is, this method accounts for the fact that voting across roll calls may be highly correlated.

Table A2
First-stage regression for fitted PAC variables

	Senate: dependent variable			House: dependent variable		
	PACCORP	PACINTL	PACLABOR	PACCORP	PACINTL	PACLABOR
EAST	0.01 (0.05)	−0.06 (−0.40)	0.31** (2.23)	0.06 (1.20)	−0.02 (−0.38)	0.02 (0.65)
SOUTH	−0.13 (−0.87)	−0.16 (−1.08)	−0.13 (−0.95)	0.17*** (3.02)	0.01 (0.22)	−0.09** (−2.03)
WEST	0.15 (1.12)	0.08 (0.63)	0.01 (0.09)	0.14** (2.38)	−0.03 (−0.54)	−0.02 (−0.45)
FOREIGN-REL	−0.02 (−0.25)	−0.03 (−0.35)	0.01 (0.12)	–	–	–
TRADE Committees	0.12* (1.69)	0.01 (0.11)	−0.16*** (−2.53)	−0.04 (−0.92)	−0.01 (−0.15)	0.01 (0.14)
WAYSMEANS	–	–	–	0.12*** (2.79)	0.07 (1.44)	−0.10*** (−3.03)
INTLDEV	–	–	–	−0.02 (−0.64)	−0.08** (−2.15)	−0.03 (−1.04)
PARTY	0.32** (2.47)	0.40*** (3.18)	−0.47*** (−4.19)	−0.08 (−1.12)	−0.03 (−0.33)	−0.19*** (−3.46)
ADA	−0.32** (−2.32)	−0.34*** (−2.54)	0.44*** (3.67)	−0.77*** (−10.19)	−0.64*** (−7.58)	0.59*** (10.13)
UNEMP	0.36*** (3.39)	0.09 (0.86)	0.16* (1.75)	0.01 (0.15)	0.03 (0.61)	0.09*** (2.59)
APPAREL	0.26 (1.26)	0.18 (0.89)	−0.04 (−0.21)	0.05 (0.81)	0.16** (2.16)	−0.03 (−0.55)
TRANS	0.14 (1.07)	0.13 (1.00)	−0.20* (−1.71)	0.10 (1.18)	0.10 (1.08)	−0.03 (−0.38)
RESOURCE	−0.12 (−0.99)	0.09 (0.72)	−0.08 (−0.73)	−0.02 (−0.27)	0.08 (1.28)	0.03 (0.73)
OTHERMFG	−0.08 (−0.56)	0.06 (0.45)	0.06 (0.51)	0.07 (1.01)	0.13 (1.58)	0.01 (0.03)
APPAREL-EST	0.09 (0.26)	−0.24 (−0.66)	−0.48 (−1.50)	0.06 (0.56)	−0.04 (−0.38)	0.04 (0.45)
APPAREL-VA	−0.10 (−0.28)	0.18 (0.51)	0.09 (0.29)	−0.10 (−1.31)	−0.03 (−0.35)	0.02 (0.33)
APPAREL-AVGY	−0.04 (−0.29)	−0.19 (−1.47)	−0.17 (−1.44)	0.05 (0.93)	0.11* (1.80)	−0.03 (−0.74)
TRANS-EST	−0.11 (−1.27)	0.03 (0.32)	−0.14* (−1.89)	−0.01 (−0.13)	−0.01 (−0.01)	−0.04 (−0.99)
TRANS-VA	−0.04 (−0.19)	0.13 (0.68)	0.46*** (2.67)	−0.09 (−1.16)	0.01 (0.13)	0.01 (0.23)
TRANS-AVGY	0.08 (0.58)	0.05 (0.40)	0.03 (0.31)	0.02 (0.30)	−0.06 (−0.91)	0.04 (0.91)
RESOURCE-EST	0.49 (0.74)	−0.36 (−0.55)	0.72 (1.25)	−0.01 (−0.12)	−0.10 (−1.12)	−0.07 (−1.07)
RESOURCE-VA	−0.25 (−0.36)	0.17 (0.26)	0.27 (0.45)	0.01 (0.04)	0.05 (0.64)	0.01 (0.19)
RESOURCE-AVGY	−0.01 (−0.12)	0.05 (0.45)	−0.10 (−0.97)	0.14*** (2.68)	0.07 (1.24)	−0.03 (−0.63)
MFG-EST	−1.11 (−1.33)	−1.08 (−1.31)	−0.83 (−1.14)	0.05 (0.35)	−0.02 (−0.16)	0.09 (0.86)
MFG-VA	1.01 (1.43)	1.23* (1.76)	−0.08 (−0.12)	−0.03 (−0.29)	0.04 (0.38)	−0.04 (−0.52)
MFG-AVGY	−0.08 (−0.67)	−0.02 (−0.19)	−0.06 (−0.63)	0.02 (0.41)	−0.05 (−0.69)	0.02 (0.34)
k	24	24	24	25	25	25
R_2	0.65	0.66	0.73	0.50	0.38	0.67

Instruments are value added (VA), number of firms (EST), and average income (AVGY) for the four sectors.

Table 6
FIML estimates with endogenous PAC factor (standardized betas)

	Senate model 2		House model 1	
	Dep. var., η_1	Dep. var., η_2	Dep. var., η_1	Dep. var., η_2
EAST	0.12*	0.29**	−0.09***	0.10
	(1.71)	(2.31)	(−2.75)	(1.09)
SOUTH	0.05	0.05	−0.01	0.20***
	(0.70)	(0.42)	(−0.31)	(2.59)
WEST	−0.17**	0.16	0.04	−0.09
	(−2.46)	(1.43)	(1.19)	(−1.34)
FOREIGNREL	−0.12**	–	–	–
	(−2.14)			
SENTRADE	0.15***	–	–	–
	(2.57)			
HOUSETRADE	–	–	–	0.09*
				(1.75)
WAYSMEANS	–	–	–	−0.04
				(−0.58)
INTLDEV	–	–	–	−0.02
				(−0.38)
PARTY	−0.62***	–	0.75***	−0.07
	(−5.52)		(13.91)	(−0.14)
ADA	0.23**	–	−0.04	0.24
	(2.46)		(−0.41)	(0.86)
PAC factor	–	−0.37**	0.11	−0.15
		(−1.97)	(1.05)	(−0.62)
UNEMP	–	−0.24**	−0.03	0.02
		(−2.08)	(−1.52)	(0.40)
APPAREL	–	–	−0.08***	–
			(−2.60)	
TRANS	–	–	−0.01	–
			(−0.63)	
RESOURCE	–	–	−0.04	–
			(−1.31)	
OTHERMFG	–	–	−0.05	–
			(−1.45)	
k	8	6	12	11
R^2	0.81	0.34	0.86	0.40
χ^2 [df]	107.2 [73]		241.6 [84]	
AIC	265.2		533.6	
CAIC	550.0		1271.2	

In order to account for possible endogeneity of the three PAC variables PACCORP, PACINTL, and PACLABOR, their fitted values are computed from the first-stage regresssions reported in Table A1. The fitted values are highly correlated, with bivariate correlations exceeding 0.90. FIML estimation is not possible with all three (fitted) variables due to collinearity. PAC factor is thus constructed as the principal component of the fitted variables. The factor loadings on the principal components of PACCORP, PACINTL, and PACLABOR are 0.890, 0.946, and −0.951, respectively, in the Senate, and 0.984, 0.957, and −0.951, respectively, in the House.
t-values are in parentheses.

We find that in the Senate two factors are required to rationalize the voting data—a congressional power factor and a protectionism factor. Three conclusions emerge from the structural analysis of Senate voting. First, there are multiple determinants of both factors. Second, PAC spending is a major determinant of the trade ideology, or protectionism, factor. Third, the congressional power factor is dominantly influenced by party. These findings refute the conclusion of Poole and Rosenthal (1997) of one factor, liberal-conservative ideology, in determining historical voting. Like Heckman and Snyder (1997), we believe the main reason is that the information contained in numerous routine votes swamps the information about issue-specific ideology contained in issue-driven voting such as on trade bills. Heckman and Snyder find such issue-specific dimensions.

In the House, two factors are required to rationalize the voting data. In contrast to Senate voting, the trade ideology factor in the House is overwhelmingly influenced by party. The dominance of party as a determining influence of congressional power is in line with the Cox and McCubbins (1993) view of parties as a mechanism to solve collective action problems: rational vote-maximizing legislators realize that they are worse off if they pursue their self-interested goal of maximizing votes, rather than if they are able to do so given that their party has a majority. Parties therefore resolve collective action problem of legislators. While voting during legislation of the Act, legislators' main pursuit of their personal interests may have conflicted with roll calls such as the protectionist Gephardt amendment. Yet, they coalesced to support their own and defeat (even similar) roll calls initiated by the opposition.

A question the results pose is to what extent these factors emerged from the particular circumstances faced by the 100th Congress, and to what extent they represent long-lived influences. Has trade ideology, as defined by our factors, always been overwhelmingly influenced by party in the House? Has trade ideology always been influenced by special interests, in addition to party, in the Senate? To the extent those influences are long-lived, they may help explain the stickiness in U.S. trade policy, while turning points in the history of trade legislation may be traced to changes in those influences.

Appendix A. Maximum Likelihood estimation of the LISREL model

Consider the model in Eq. (3)

$$Y = \eta\Lambda + \varepsilon$$

$$\eta = \eta B + X\Gamma + \zeta. \tag{3}$$

The dimensions of the matrices are: Y: $n\times p$, η: $n\times k$, Λ: $k\times p$, ε: $n\times p$, B: $k\times k$, X: $n\times m$, Γ: $m\times k$, ζ:$k\times k$. In Eq. (3), ε is uncorrelated with η, ζ is uncorrelated with X, cov(ε)=Θ,

cov(ζ)=Ψ, and cov(X)=Φ. The covariance of the observed variables (YX) is given by the $(n+p)\times(n+p)$ matrix

$$\Sigma = \begin{pmatrix} \Lambda A(\Gamma\Phi\Gamma' + \Psi)A'\Lambda' + \Theta & \Lambda\ A\Gamma\Phi \\ \Phi\Gamma'\ A'\ \Lambda' & \Phi \end{pmatrix}$$

where A=$(I-B)^{-1}$. The parameters Λ, Θ, B, Γ, and Ψ (Φ is the sample covariance of X) must be estimated. All the Y and X variables are standardized to have zero mean and variance equal to 1. By construction the latent endogenous variables η are standardized, so the covariance matrix of η has diagonal elements equal to 1. The $k\times k$ matrix Ψ is unconstrained. We find k=2 with our data. The R-squared for structural equation i, i=1,2 is computed as $1-(\Psi_{ii}/\mathrm{cov}(\eta)_{ii})$, where Ψ_{ii} is the ith diagonal element of Ψ, and $\mathrm{cov}(\eta)_{ii}$ is the ith diagonal element of cov(η). Since cov(η) has ones on the diagonal, this reduces to $1-\Psi_{ii}$. Estimation of the parameters is by maximum likelihood, which is equivalent to minimizing

$$F = \log|\Sigma| + tr(S\ \Sigma^{-1}) - \log|S| - (p+q),$$

where S is the sample covariance of (YX). All estimation is done in LISREL 8 (see e.g. Joreskog and Sorbom, 1996). In the estimation, the only restrictions placed are (i) diagonality of Θ (see footnote 6), and (ii) zero-restrictions on Λ for identification and ease of interpretation (see footnote 7). Otherwise the parameter matrices and vectors are left free to vary. The models fit adequately, and convergence is rapid.

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