N91-22620

EXPLAINING PATTERNS IN THE RATIFICATION OF GLOBAL ENVIRONMENTAL TREATIES

David W. Cook

for the
Department of Geography

in cooperation with the
Center for Space and Geosciences Policy

University of Colorado
Boulder, Colorado

PREFACE

This study has been undertaken by the Center for Space and Geosciences Policy at the University of Colorado, Boulder, as part of our research in geosciences policy supported by NASA grant NAGW-1415. The work was done as thesis research by David Cook under the supervision of Professor John O'Loughlin of the Department of Geography with oversight by Sally McVey and Radford Byerly of the Center for Space and Geosciences Policy. Detailed explanations and documentation may be found in the thesis(1).

TABLE OF CONTENTS

Preface 6

Executive Summary 8

I. Introduction: Problem and Project 10

II. Process 11

III. Results 13

IV. Conclusions 15

Notes 17

Appendix of Tables and Figures

Table 1 Cumulative National Ratification Totals 18

Table 2 Pattern of Correspondence Between Treaty Ratification Totals and Position Within the World Economy 19

Figure 1 Global Environmental Treaty Ratification 22

Figure 2 Position in the World Economy 23

Figure 3 Ratification of Treaties by World Economic Category 24

EXECUTIVE SUMMARY

This report is based on a study of the ratification behavior of 160 countries with respect to thirty-eight global environmental treaties. The study identifies and explains patterns in the ratification of the treaties, providing two means of assessing the likelihood that any given country will support global environmental treaties.

When mapped, national ratification totals reveal a pattern of high ratification within the OECD countries (W. Europe, N. America, Japan, Australia, and New Zealand) and low ratification in Africa, Asia, the Middle East, and Central and South America. A country's standing within the range of high to low ratification rates can be explained well by the statistical model developed in this study.

This statistical model is based primarily on four interrelated attributes of each country. First, is there a national office of an international non-governmental environmental organization promoting an agenda on global environmental issues? Second, does the population enjoy a relatively high standard of living? Third, is the population growth rate low? And finally, does the country have a complex economy and a high rate of GNP per capita? If all the answers to these questions about a country are "no", that country will generally be unlikely to ratify global environmental treaties. Conversely, countries receiving affirmative answers on these four questions will be likely to ratify.

This research allows us to identify countries likely to support global environmental treaties. In addition, it points to some of the reasons why countries do or do not support such treaties, telling us something about how such treaties should be developed and what they should contain. The majority of countries are poor and unlikely to ratify global environmental treaties, yet in the case of a convention on greenhouse gas emissions, the support of all countries is of vital importance to the ultimate effectiveness of a treaty.

Three approaches are suggested to encourage ratification among those countries least likely to ratify. First, these countries must be included in the data collection and research related to climate change studies; national or regional data must be integrated with global scenarios and applied in national or regional climate impact analysis to "bring home" the nature and extent of potential greenhouse-driven climate impacts in a given country or region. Second, developing countries are likely to require assistance in overcoming barriers to treaty compliance, particularly in the areas of technology, capital, scientific information, and administrative capabilities. These needs should be addressed in the convention; in order to insure this, developing countries should be included in the drafting of the convention. Finally, the involvement of international non-governmental environmental organizations in developing countries should expand in several ways. These organizations might assist in the dissemination of climate impacts research results. Their legal and policy staffs could facilitate developing country participation in treaty negotiations, and they could carry a message to the international trade and banking communities about the long-term environmental importance of improving the developing countries' position within the world economy.

EXPLAINING PATTERNS IN THE RATIFICATION OF GLOBAL ENVIRONMENTAL TREATIES

I. INTRODUCTION: PROBLEM AND PROJECT

Human activity is causing an increase in the concentration of radiatively active gasses in the atmosphere. By means of the "greenhouse effect" these gasses trap heat and help maintain the Earth's temperature equilibrium. The increasing concentrations of these gasses are likely to cause an increase in the surface temperature of the Earth, leading to multiple changes linked to climate. A warming will generally shift climate zones poleward, causing a migration of farming and forestry zones. A warming will also alter atmospheric circulation patterns, leading to changes in the timing, location, and quantity of clouds and precipitation with related impacts on agriculture, forestry, and river basin management.

Finally, global warming is projected to cause sea levels to rise due to thermal expansion of the seawater as well as melting of both land and sea ice. A rise in sea level will threaten coastal cities and inundate many critical wetland areas.

These climate related impacts are potentially very disruptive. The poorer developing countries have the fewest resources to apply to adjusting to the likely changes. They also contribute the least to the cause of the problem. Most of the increasing greenhouse gas emissions come from carbon dioxide production (from fossil fuel combustion) and chlorofluorocarbon (CFC) releases, primarily in the industrialized nations. Increasing methane production also contributes to the problem. Methane emissions are derived from the digestive systems of cattle, and decomposition within rice paddies and landfills. Finally, deforestation leads to a net increase of carbon dioxide in the atmosphere. While many industrial nations have already substantially deforested themselves, a number of developing nations are being deforested rapidly due to international demand for tropical woods, a need for foreign trade to support the payment of foreign debts, and domestic policies promoting settlement in forested rural areas.

It is unlikely that the global warming problem will be solved if any significant segment of humanity fails to cooperate in its solution. Because they are the principal cause of the problem and because their development path influences all other countries, the industrialized countries almost certainly will have to alter their technology, science, economics, values, and policy. In contemplating such overall changes the emerging understanding of the Earth's overall biophysical systems must be incorporated into the planning of government, industry, and individuals world-wide.

The potential magnitude of the global warming problem has sparked substantial global concern, perhaps unrivaled by previous environmental concerns. However, there are barriers to a cooperative global solution to the problem. The need to create a development path enlightened by an understanding of critical earth systems is a substantial challenge to all nations, but the necessary intellectual and financial capital lies primarily in the developed

world. When combined with the stark reality of pressing, immediate needs for food, water, and shelter in the least developed countries, it is no surprise that treaty ratification on global environmental issues is high in the developed world and low in the less developed countries. By modeling the national disparities in overall wealth and in living conditions, we are able to explain real world ratification behavior quite well.

This project was undertaken because coordinated global action to reverse the trend toward global warming seems both necessary and unlikely. Our results can be used to help focus efforts to broaden multi-national participation in treaties designed to solve global environmental problems. Our work presents two methods for identifying which countries are likely to ratify (or not ratify) global environmental treaties: One method is a simple summary and analysis of past ratification behavior, the other employs a statistical model based on certain national attributes to explain past and project future ratification behavior. Both approaches lend insight into the behavior of nations in regard to treaty ratification, and thus suggest how more countries might be induced to ratify treaties; a first step in broader implementation of the treaties.

This report is based on thesis research done at the University of Colorado by David Cook in conjunction with the Center for Space and Geosciences Policy and the Department of Geography. Detailed explanations and documentation may be found in the thesis (1).

II. PROCESS

We combed the record of multi-lateral environmental treaties and identified thirty-eight fitting our definition of global environmental treaties. To be considered in the study a treaty had to be open to all countries of the world for ratification and it had to deal with an environmental issue of global or nearly global concern. Country's ratifications of these treaties were summed, yielding a listing of high to low ratifiers.

Drawing on international relations theory, we have developed an explanation of what might

make countries more or less likely to ratify global environmental treaties. This explanation is made up of four propositions, grouped into two pairs of related concerns. The first proposition is that people in the wealthier countries in the core of the world economy (2) possess the resources to perceive and respond to global environmental problems. In various ways these people can be characterized as able to afford to pay attention to such problems. This is true both of the general population and among the scientific and political communities as well. The second proposition is an inverse to the first. To provide a sharper focus to the simple view of the world economy which divides it into "core", "semiperiphery", and "peripheral" nations, we looked at several indicators of how well basic survival needs are met in a country to see if ratification levels would be lower for countries in which higher proportions of the population are confronted with immediate survival issues. Our third proposition was that the relative openness of the government would be a critical factor in the translation of popular priorities into foreign policy. And finally, we proposed that non-governmental organizations pressing for government action on global environmental issues might influence ratification behavior.

This does not constitute an exhaustive explanation of the ratification behavior of states. The influence of economic and political interests also play critical roles and are generally given much attention in the analysis of the behavior of states. This research is an effort to augment that traditional analysis by testing the importance of overall wealth, living conditions, type of government, and organized citizen opinion in explaining global environmental treaty ratification.

This view of the underpinnings of the ratification behavior of states was translated into a statistical model using the following national attribute data to represent our four propositions:

1) The first component is represented by a country's position in the world economy (core, semiperiphery, or periphery). Based on per capita GNP and the complexity of national economies, this indicator provides a summary of the relative economic strength of a country.

2) The second proposition is represented by three indicators: a) Rating on the physical quality of life index (PQLI), a composite of infant mortality, life expectancy, and literacy. This index provides an indication of how well medium-term basic human needs are met in each country. b) The number of calories per day in the average diet. This indicator is to represent the status of people's immediate survival needs. c) The population growth rate gives a sense of the rate at which a country's (economic) resources are being diluted by an expanding population.

3) The third component is represented by type of government, based on an analysis of relative freedom and type of political system in each country (3). It is included to represent the relative strength of the linkage between public policy and the other national attributes included in the model.

4) Finally, the fourth proposition is represented by the presence (or absence) of chapters of the International Union for the Conservation of Nature and Natural Resources (IUCN) and/or Friends of the Earth (FOE) in each country. This indicator is included to represent the influence of organized citizen opinion on public policy. These organizations were selected because both have explicit policy agendas on a variety of global environmental issues.

III. RESULTS

The likelihood that a country will support global environmental treaties can now be assessed two different ways: 1) by examining the historical record, or 2), by examining the cluster of interrelated national attributes used to successfully explain the historical record. The record on global environmental treaty ratification is shown in table 1 on page 18, listing the number of ratifications by each country of the world out of a total of the thirty-eight treaties in the study. To the extent that generalized past behavior is an indicator of future behavior, this list can be used to estimate a country's likelihood of ratifying future treaties.

When mapped, national ratification totals reveal a regional pattern of high ratification within the OECD countries (W. Europe, N. America, Japan, Australia, and New Zealand) and low ratification in Africa, Asia, the Middle East, and Central and South America, as shown by the map in figure 1 on page 22. In general, a country's location serves as an indication of its propensity to ratify global environmental treaties.

A country's standing within the range of high to low ratification rates can be explained well by the statistical model developed in this study. By updating national attribute data, such a model may continue to serve a predictive function over time, whereas location and the historical record may become less useful indicators as circumstances change.

A country's position within the world economy is the strongest indicator of ratification behavior. The correspondence between ratification and position in the world economy can be seen by comparing the map in figure 1 (pg. 22) with the map in figure 2 on page 23. The geographical pattern of high to low ratifiers closely matches the pattern of core to periphery states in the two maps. Figure 3 (on page 24) depicts the overall data on ratification in the form of a bar graph which sub-divides the countries into world economy categories. All these figures show that among the world community of nations, low ratifiers predominate and are largely peripheral states; high ratifiers are mostly core states, and the countries of the semiperiphery ratify within the range of overlap between core and periphery. Table 2 (on pages 19-21) contains the data plotted in the bar graph and also illustrates the correspondence between the number of treaties ratified by each country and its position within the world economy.

The whole group of treaties was also broken down and analyzed in several sub-groups. Analysis of treaty subgroups showed that treaties on environmental issues of a "truly global" scope engendered higher ratification than either treaties on "nearly global" issues or treaties on "regional issues of global concern". Environmental treaties with a "military" component were the only sub-group to approach the ratification rates of the "truly global" treaties. This suggests the possibility that global scale environmental problems are perceived as

serious threats warranting national concern on par with security issues.

In other sub-group analysis, we found a particularly strong difference in ratification levels on "nature" issues (birds, wetlands, whales, wildlife, etc.) when comparing the wealthy (high ratifiers) and the poor countries (low ratifiers). As expected, the treaties which focused on nature issues garnered fewer ratifications among the less developed countries.

IV. CONCLUSIONS

This study leads us to conclude that countries will generally be more likely to ratify global environmental treaties if international environmental organizations are active within their borders. The likelihood they will ratify also increases with their standard of living and with a more advantageous position in the world economy. A lower population growth rate is also associated with higher ratification rates on global environmental treaties.

Conversely, poor countries are least likely to participate in global environmental treaties. Because the solutions to many global environmental problems will require coordinated action, including those poor developing countries least likely to participate, there must be a special effort to encourage and enable their participation.

The presence of more pressing and immediate problems is one reason for low ratification rates among less developed countries. In the case of global warming, a disinclination to ratify a treaty may also be linked to unfamiliarity with the problem due to a lack of research on the potential local and regional impacts of climate change. For this reason, we suggest the following approaches to increase the participation of the developing countries in the treaty process:

1) Expand research, data gathering and analysis, dissemination and application of information on causes, dynamics, and consequences of human induced climate change with a particular focus on regions in the developing world.

2) Develop regional and local preventive and adaptive responses to climate change, with an emphasis on those which also address existing immediate issues of high priority in developing countries. Thus, to the extent that the problem is understood, its implications must be made real for countries without resident scientific communities presently capable of doing so.

3) If a developing country's leaders then come to perceive the problem as significant within their own sense of priorities, they may then wish to participate in the treaty development process in order to create a treaty that will work for their country. Creating a treaty that will work for the developing world may require the transfer or development of scientific information and expertise, capital, technology, and the administrative capability to pursue a development path consonant with the goals and needs of each nation and with the constraints of the treaty.

4) Various governmental and non-governmental international organizations may play important roles in facilitating the above three approaches to broadening global environmental treaty ratification. Such organizations might assist in the development of climate impacts research and the dissemination of research results. Their legal and policy staffs could facilitate developing country participation in treaty negotiations.

5) Finally, based on the fundamental influence of wealth on treaty ratification behavior, such organizations could carry a message to the international trade and banking communities about the long-term environmental importance of improving the developing countries' position within the world economy. More countries are likely to act with respect for the global environment when they can afford to, and/or when it can be shown that they can't afford not to.

NOTES

1. This report is based on thesis research done at the University of Colorado by David Cook in conjunction with the Department of Geography and the Center for Space and Geosciences Policy. The complete study, "The State in Nature-Society Relations: Explaining Patterns in the Ratification of Global Environmental Treaties" will be available through inter-library loan from the Norlin library at University of Colorado by January 1992. The thesis is also available from the libraries of the Center for Space and Geosciences Policy, Campus Box 361, Boulder, CO 80309, the Department of Geography, Campus Box 250, Boulder, CO 80309, and the author: David Cook 3003 5th St. Boulder, CO. 80304 USA.

2. We divide the world economy into three categories: core, semiperiphery, and periphery. A nation's placement among these categories is based on its GNP per capita ratio and the complexity of its economy. For example, many of the middle eastern oil states have a high GNP per capita but are not considered core states because they lack complex economies; they are largely dependent upon the export of a single minimally processed commodity. Core countries are characterized by their possession of a relatively high concentration of the processing and profit-making activities within the world economy. The economies of peripheral countries are dominated by extractive processes such as forestry, agriculture, and mining with much of the related processing and profit-making taking place in the core. Semiperipheral countries are characterized by a mix of core and peripheral processes. This view of the world economy can be likened to a "town and country" relationship on a global scale. This classification system is drawn from world systems theory and is explained in more depth in the thesis cited in note 1 above, and in the work of Terrence Hopkins and Immanuel Wallerstein. See for example: Hopkins, Terrence K., Immanuel Wallerstein and associates. (1982). "Patterns of Development of the Modern World-System." In World Systems Analysis. Beverly Hills, CA.: Sage, pg. 41-82; and Wallerstein, Immanuel (1976). "A World System Perspective on the Social Sciences." In British Journal of Sociology 27, September, pg. 343-353.

3. Data on the level of freedom and type of political system in each country were drawn from Freedom In the World by Raymond Gastil, 1987, New York: Greenwood Press.

APPENDIX OF TABLES AND FIGURES

Table 1 Cumulative National Ratification Totals Thirty-Eight Global Environmental Treaties

Norway	32	Peru	13	Laos	7
Sweden	30	Panama	13	Congo	7
United Kingdom	29	Czechoslovakia	13	Bolivia	7
Spain	29	Sri Lanka	12	Belize	7
Denmark	29	Niger	12	Unit. Arab Em.	6
United States	28	Malta	12	Singapore	6
Switzerland	28	Luxembourg	12	Saudi Arabia	6
Netherlands	28	Liberia	12	Maldives	6
Italy	28	Gabon	12	Kampuchea	6
Finland	28	Fiji	12	Honduras	6
USSR	27	Cuba	12	Haiti	6
Japan	26	Bangladesh	12	Guinea	6
West Germany	26	Bahamas	12	Cen. Af. Rep.	6
France	26	Afghanistan	12	Zaire	5
Mexico	25	Israel	11	Swaziland	5
Belgium	25	Cyprus	11	Sudan	5
Poland	24	Seychelles	10	St. Lucia	5
Yugoslavia	23	Rumania	10	Sao Tome	5
Portugal	22	Madagascar	10	Paraguay	5
New Zealand	22	Lebanon	10	Mauritania	5
Tunisia	21	Kuwait	10	Lesotho	5
South Africa	21	Jamaica	10	Antigua & Bar.	5
India	21	Indonesia	10	Tanzania	4
Hungary	21	Colombia	10	Taiwan	4
Australia	21	Cameroon	10	Rwanda	4
East Germany	20	Uganda	9	North Korea	4
Canada	19	Trinidad	9	Guinea-Bissau	4
Egypt	18	Thailand	9	Ethiopia	4
Bulgaria	18	Pakistan	9	El Salvador	4
Argentina	18	Mauritius	9	Burkina Faso	4
Senegal	17	Malaysia	9	Bahrain	4
Ireland	17	Ecuador	9	Vanuatu	3
Greece	17	Algeria	9	Guyana	3
Chile	17	Dem.Yemen (S.)	8	Gambia	3
Brazil	17	Yemen (N.)	8	Djibouti	3
Nigeria	16	Turkey	8	Burma	3
South Korea	16	Surinam	8	Brunei	3
Iceland	16	Qatar	8	Botswana	3
Uruguay	15	Oman	8	Barbados	3
Ghana	15	Mongolia	8	Zimbabwe	2
Dominican Rep.	15	Malawi	8	St. Vincent	2
Austria	15	Libya	8	Somalia	2
Papua New Guinea	14	Iraq	8	Mozambique	2
Morocco	14	Iran	8	Grenada	2
Kenya	14	Costa Rica	8	Eq. Guiana	2
Jordan	14	Cape Verde	8	Dominica	2
Ivory Coast	14	Zambia	7	Chad	2
Guatemala	14	Vietnam	7	Burundi	2
China	14	Togo	7	Bhutan	2
Benin	14	Syria	7	Albania	2
Venezuela	13	Sierra Leone	7	West. Samoa	1
Solomon Islands	13	Nicaragua	7	Comoros	1
Philippines	13	Nepal	7	Angola	1
		Mali	7		

Table 2 **The Pattern of Correspondence Between Treaty Ratification Totals and Position Within the World Economy.**

# R.	Core States	Semiperipheral States	Peripheral States
32	Norway.		
30	Sweden.		
29	Denmark, UK.	Spain.	
28	Finland, Switzerland, Netherlands, Italy, USA.		
27		USSR.	
26	France, Japan, W. Germany.		
25	Belgium.	Mexico.	
24		Poland.	
23		Yugoslavia.	
22	New Zealand.	Portugal.	
21	Australia.	Hungary, S Africa.	India, Tunisia.
20		E. Germany.	
19	Canada.		
18		Argentina, Bulgaria.	Egypt.
17		Brazil, Chile, Greece, Ireland.	Senegal.

Total number of treaties ratified is listed at the left.
Table 2 is continued on the next page.

Table 2 (cont) **The Pattern of Correspondence Between Treaty Ratification Totals and Position Within the World Economy.**

# R.	Core States	Semiperipheral States	Peripheral States
16	Iceland.	S. Korea.	Nigeria.
15	Austria.	Uruguay.	Dominican Republic, Ghana.
14			Benin, China, Guatemala, Ivory Coast, Jordan, Kenya, Morocco, Papua New Guinea.
13		Czechoslovakia, Venezuela, Panama.	Solomon Islands, Peru, Philippines.
12	Luxembourg.	Malta.	Afghanistan, Bahamas, Bangladesh, Cuba, Fiji, Gabon, Liberia, Niger, Sri Lanka.
11		Israel.	Cyprus.
10		Jamaica, Lebanon, Rumania.	Cameroon, Colombia, Indonesia, Kuwait, Madagascar, Seychelles.
9		Malaysia.	Algeria, Ecuador, Mauritius, Pakistan, Thailand, Trinidad, Uganda.
8		Iran.	Cape Verde, Costa Rica, Iraq, Libya, Malawi, Mongolia, Oman, Qatar, Surinam, Turkey, N. Yemen, S. Yemen.
7			Belize, Bolivia, Congo, Laos, Mali, Nepal, Nicaragua, Sierra Leone, Syria, Togo, Vietnam, Zambia.

Total number of treaties ratified is listed at the left.
Table 2 is continued on the next page.

Table 2 (cont) **The Pattern of Correspondence Between Treaty Ratification Totals and Position Within the World Economy.**

# R.	Core States	Semiperipheral States	Peripheral States
6			Central African Rep., Guinea, Haiti, Honduras, Kampuchea, Maldives, Saudi Arabia, Singapore, U.A. Emirates.
5			Antigua, Lesotho, Mauritania,Paraguay, St. Lucia, Sao Tome, Sudan, Swaziland, Zaire.
4			Bahrain, Burkina-Faso, El Salvador, Ethiopia, Guinea-Bissau, Rwanda, Taiwan, Tanzania, N. Korea.
3			Barbados, Botswana, Brunei, Burma, Djibouti, Gambia, Guyana, Vanuatu.
2			Albania, Bhutan, Burundi, Chad, Dominica, Equatorial Guinea, Grenada, Mozambique, St. Vincent, Somalia, Zimbabwe.
1			Angola, Comoros, Western Samoa.

Total number of treaties ratified is listed at the left.

GLOBAL ENVIRONMENTAL TREATY RATIFICATION

National Ratification Totals for 38 Treaties Studied

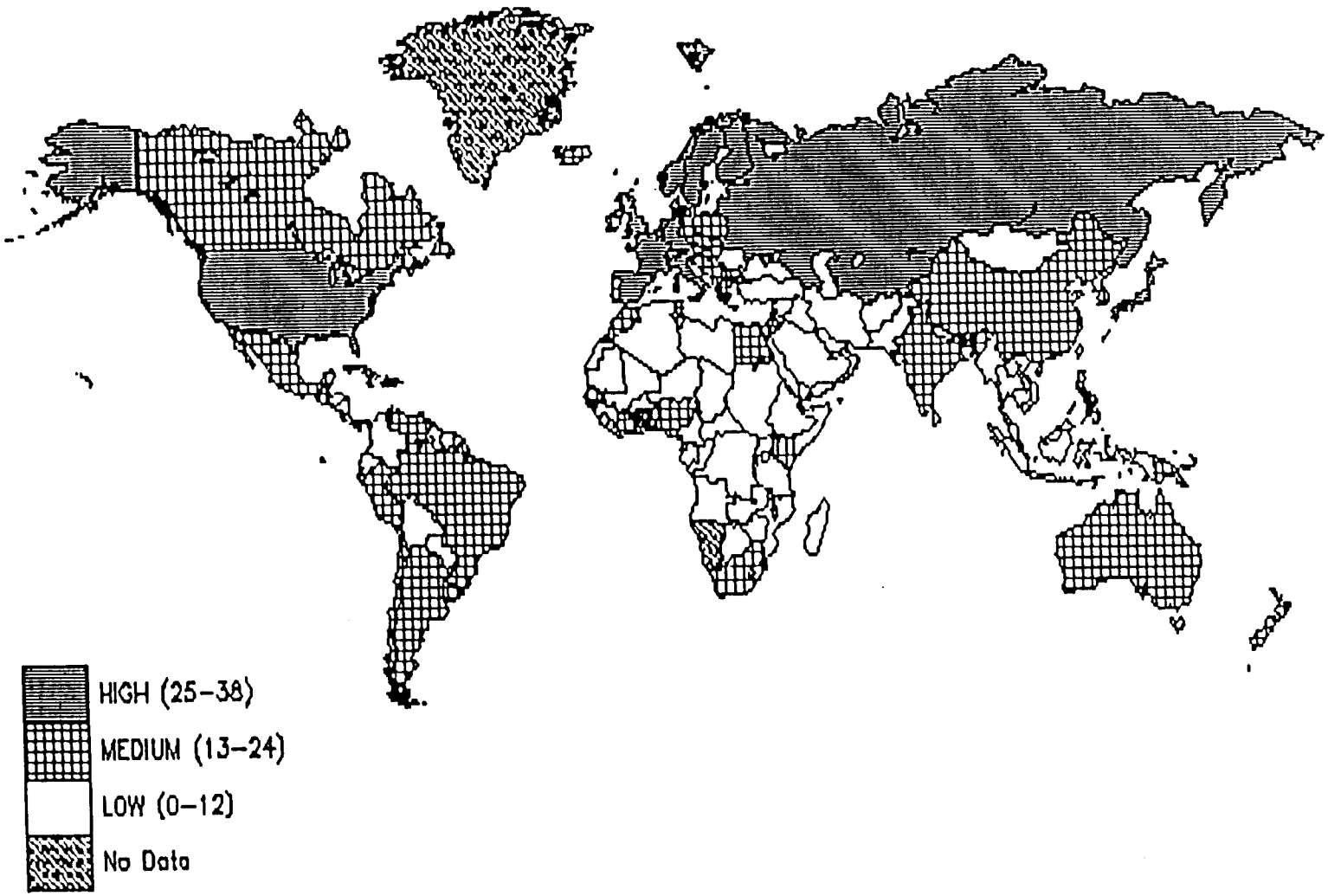

Figure 1

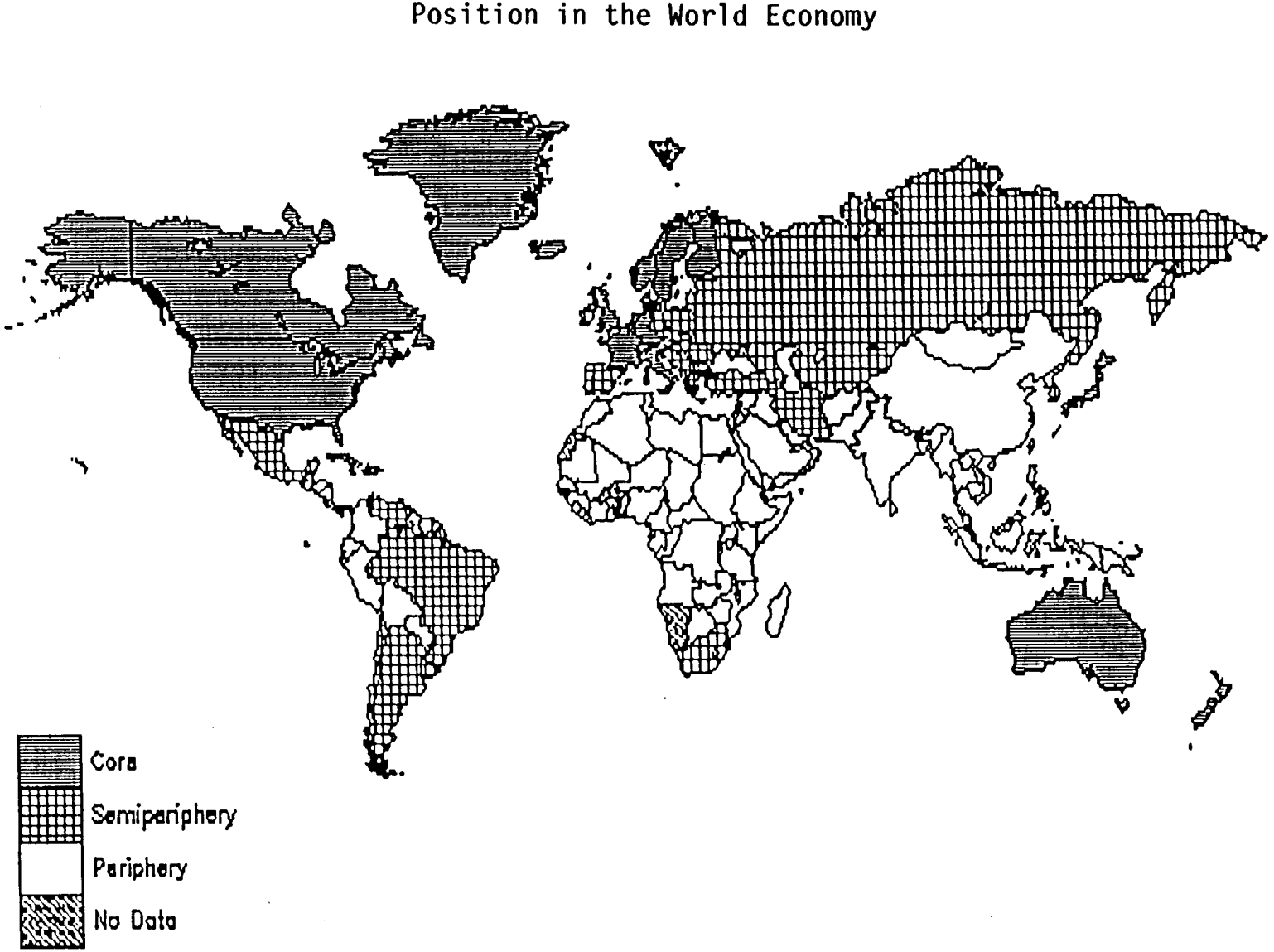
Position in the World Economy
Core
Semiperiphery
Periphery
No Data

Figure 2

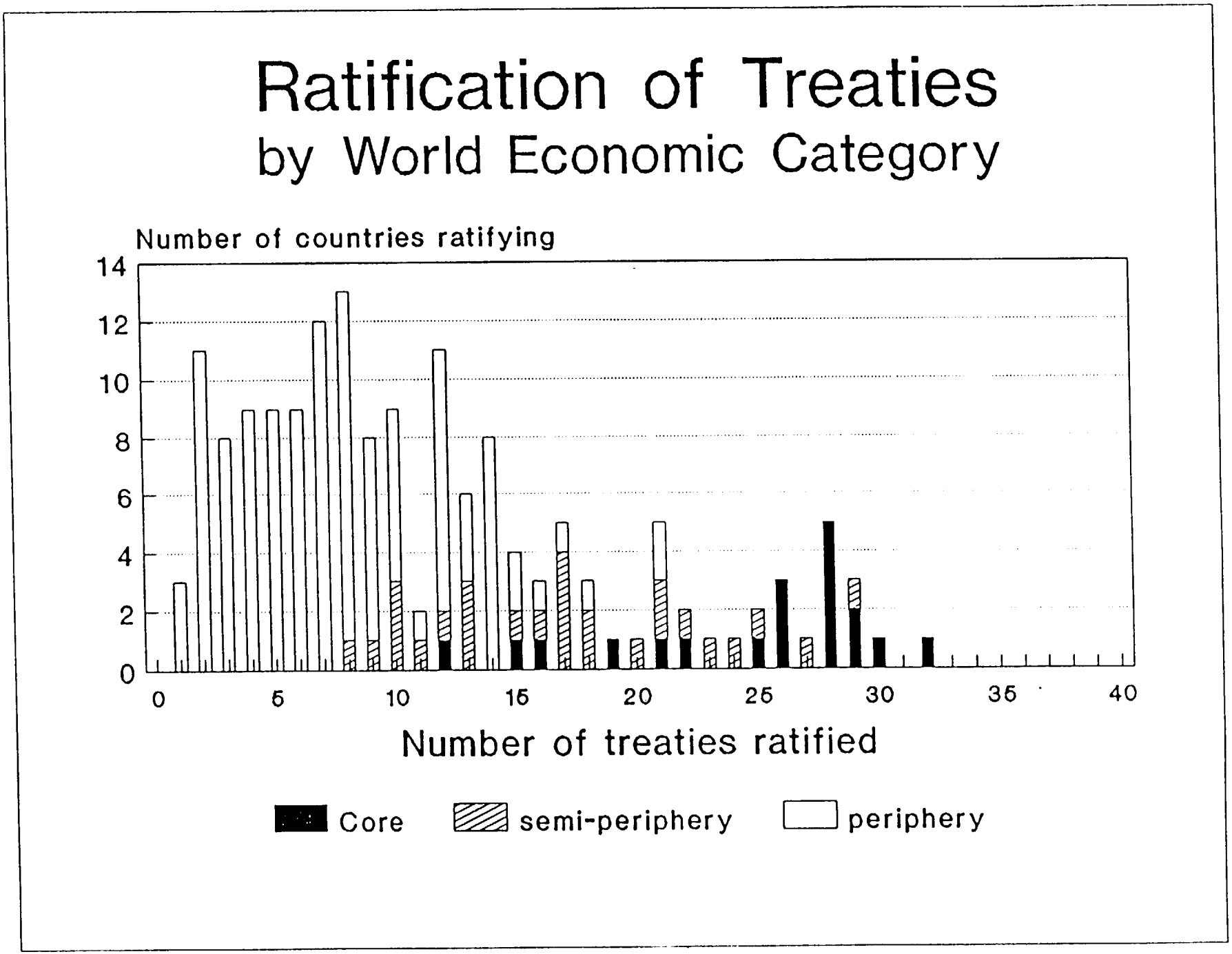
Ratification of Treaties
by World Economic Category
Number of countries ratifying
14
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
40
Number of treaties ratified
Core
semi-periphery
periphery

Figure 3