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Global Institutions and Networks

Contingent Change in the Structure of World Trade Advantage, 1965-1980

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The authors motivate social capital arguments at the world-system level through the analysis of world-trade flows and nation status, 1965 to 1980, with specific attention to contextual changes in global trade and stratified effects on participation in trade within it. They generate measures of structural autonomy based on world-trade data from the United Nations Commodity Trade Statistics Index and incorporate these measures into robust regression models of the determinants of nation status. The authors find support for the overall positive effects of structural autonomy on nation status in 1965 and 1970 but find that these effects dissipate by 1980. They then use quantile regressions to find that only high-status countries experience significant returns on structural autonomy in any of the 3 observation years. The authors combine network and institutional perspectives on trade to argue that changes in the context of world trade between 1965 and 1980 affect the benefits that social capital can reap and for whom.

Globalization is a popular concept for debate and scholarly volumes. However, what is globalization, and how much of it is there? What are the sources and consequences of globalization? Each of these questions is a topic of heated,

Authors' Note: *An earlier version of this article was presented at the 1998 meetings of the American Sociological Association and was published in the working paper series of the Institute for Policy Research at Northwestern University. We thank Dave Smith and Doug White for providing us with a data set on world commodity trade, Francisco Ramirez for trade ministry data, Ron Jepperson for assistance on trade-regime information, Charles Ragin for ongoing methodological advice, and Art Stinchcombe for his careful critical reading of an earlier version of this article. We also thank Ann Janda of the Northwestern University library for help with nation-state data collection. We further express our gratitude to Cindy Aitken, Karen Frazer, Katlyn Gao, Samiah Khan, and Michelle Naffziger for data collection and research assistance. Finally, we gratefully acknowledge grants in support of this project from the Center for International and Comparative Studies, the Institute for Policy Research, the Management and Organization Department's Faculty Incentive Fund, and the Department of Sociology, all at Northwestern University.*

AMERICAN BEHAVIORAL SCIENTIST, Vol. 44 No. 10, June 2001 1579-1601

substantive, theoretical, and methodological debate (Lechner & Boli, 2000; Robertson, 1992; Sassen, 1998; Tzeng & Uzzi, 2000). But countries do not experience globalization in the abstract. Rather, states are stratified in complex social, economic, and political arrangements, and the impacts of globalization may well be contingent on where a country is positioned in this system of stratification. The rise of scholarly and popular discussion about globalization—what it is and why it matters—provides new impetus to understand questions central to much sociological thinking about inequality, stratification, and opportunity among actors ranging in scope from individuals to organizations and nations (Cox, 1979; Meyer, 1994; Sachs & Uzzi, 2000). Why do some actors experience better outcomes than others? How do system features shape the outcomes of individual actors? How do mechanisms vary in effect over time and across a set of actors?

In this article, we assess the effects on nation status of a country's position in the global social structure of trade, and we examine whether the pattern of effects varies over time and, if so, why this occurs. Much research contends that political, social, and cultural conditions at the world-system level foster imperfect competition and that positions within the global stratification system are associated with differential opportunities that any particular country has to garner rents and other benefits (Cox, Reynolds, & Rokkan, 1974; Delacroix, 1977; Porter, 1990; Wallerstein, 1974). We develop this argument and incorporate recent conceptual and methodological advances from social network analysis to provide evidence of the mechanisms by which this occurs. In our arguments, we explicitly focus on changes in the institutional regime governing global trade (Jackson, 1994; Krasner, 1983; Ruggie, 1996; Strange, 1994). This framework provides the basis for questions about the effects of the globalization of trade on nation status and combines the precision of social network analysis with theories of contextual and institutional change.

Trade, of course, is a primary indicator of the degree to which wider economic and political processes affect a national economy (Bradshaw & Wallace, 1996; Chase-Dunn, Kwano, & Brewer, 2000). During the period 1965 to 1980, the overall volume of trade increased dramatically, and its composition shifted. In addition, a greater proportion of countries in the world participated in trade, and more varied trading relationships developed among them. Two pivotal shifts also occurred during this time period: (a) the transition from the immediate period of mass decolonization in the modern states system and (b) the development of mass national economies (McMichael, 1996; Strang, 1990). Moreover, the institutional conditions of global trade—trade-regime governance, volume and composition of trade, and trade participants from the 1960s to 1980s—affected the extent to which there were advantages to reap and which countries received them (Organization for Economic Cooperation and Development [OECD], 1995).

THEORIES OF GLOBAL SOCIAL ORGANIZATION AND NATION STATUS

Early social scientific studies of modernization focused on internal attributes of countries and presumed that development followed a fairly fixed schedule, using the historical European experience as a (presumptive) yardstick and template (Chirot, 1986). These arguments emphasized political, cultural, and social-psychological prerequisites for (economic) development, the resulting material prosperity, and national status.[1] Dissenting approaches, informed by more structural and conflict-oriented social science theories, argued for varied paths to modernization and recognized wider economic and political system dynamics that shaped global patterns of modernization and development (Chase-Dunn, 1989; Giddens, 1987; Meyer & Hannan, 1979; Wallerstein, 1974). In contrast to many studies that investigate globalization as the aggregate of local activities, we favor a perspective that puts changes in the institutional and cultural organization of the global polity at the center of understanding the effects of globalization (Boli & Thomas, 1997; McNeely, 1995; Meyer, Boli, Thomas, & Ramirez, 1997; Meyer & Hannan, 1979; Wendt & Duvall, 1990).

SOCIAL NETWORK APPROACHES TO GLOBAL SOCIAL ORGANIZATION

Network analysis explains how social relationships among exchange partners mediate commercial transactions by affecting who transacts with whom and how gains and losses of trade are distributed among trading partners (Burt 1982, 1992; Fligstein 1996; Granovetter 1985; Uzzi 1996, 1997). Since the early functionalist arguments (Inkeles, 1975), studies of global interdependence have envisioned the globalization process as one of increasing numbers of links between more countries. Empirical studies have examined changes in the flow, volume, and direction of communication and, more recently, information about people, goods, and ideas (Sassen, 1988). Studies of globalization tend to envision a process that measures the degree to which a wide set of countries are more or less connected through flows of exchange.

Network approaches to world-system dynamics provide useful direction for such studies (Su, 1995). Analyses of the structure of global trade refocused research away from studies of development and toward inquiry into how social structures of the world system create advantage or disadvantage for countries in specific network positions. Snyder and Kick (1979) pioneered this line of research with an influential blockmodel analysis of resource flows in the global economy, showing that nations more central in the world system in 1965 experienced faster rates of economic growth than those more peripheral to the system. Nemeth and Smith (1985) replicated the Snyder and Kick study but developed

more precise network analytic procedures and limited the scope of analysis exclusively to international trade data. Smith and White (1992) extended the basic cross-sectional analysis to three periods—1965, 1970, and 1980—and made comparisons across these time periods. Although the overall network structure of global trade remained fairly stable during these times, 19 nations shifted toward the center, whereas 3 slipped toward the periphery of the world-system network. These studies are primarily descriptive and make use of the correlation that network location matters and that these effects change over time; the studies do not address the causes of network mobility. The accomplishments of this line of work raise the next generation of research questions that take into account changes in the institutional structure of world trade.

In this research, we begin with a focus on structural autonomy as an alternative to the centrality measure standard in this empirical literature. We use and extend the original data set, and we retain other design features, such as the time periods and dependent variables of interest. We take advantage of methodological developments, including regression techniques such as robust and quantile regression.

WHAT IS STRUCTURAL AUTONOMY IN THE CONTEXT OF GLOBALIZATION?

In the language of network analysis, *social* capital conditions allocation and returns beyond what an assessment of attributes of individual actors—*human* capital—can provide. The structure of relationships comprises varied features that create the possibility for advantage. Burt (1997) further argued that social capital has contingent effects: Social capital effects are not homogeneous within any given network structure, but rather social capital confers diverse and contingent advantage, depending on the number and extent of participation of actors in a network. In the world-system empirical context, centrality has indicated a country's location in the overall volume of trade and the number of trading partners. Centrality analyses measure the structure of the world system but offer little explanation about the dynamics that reinforce it. Why nation status improves or declines in the world system remains a question only addressed at the theoretical level. Furthermore, centrality measures collapse multiple and potentially varied (even counterbalancing) processes into a single structural outcome measure.

The structural autonomy measure extends the basic centrality concept by incorporating evidence about the degree of connectedness of a country's trading partners with each other. This is, of course, an application of Burt's (1992) key concept of structural holes—the structure of absent ties that define social spaces of opportunity. The structural autonomy measure makes it possible to distinguish between countries central in global trade and countries that are central but have relatively advantageous positions vis-à-vis others with the same centrality profile—in short, to specify more clearly in structural terms why both portfolio of trading partners and the "mix" of trade can relatively advantage or disadvantage any particular country.[2] This distinction is an important one, as we begin to refine the mechanisms by which this aspect of globalization matters.

In our work on world trade, structural autonomy is the aggregate of a nation's constraint (both primary and secondary) and opportunity conditions with its contacts. Primary constraint refers to the amount of time and resources a nation's contacts invest in relationships with that nation's other contacts. Secondary constraint is the redundant ties that trading partners of the nation's trading partners have with one another. Constraint varies from 0 (where a contact has no common connections, primary or secondary, with the nation's other contacts) to 1 (where a contact has ties to all the other contacts of its trading partners). Opportunity refers to the extent to which other nations are not trading with one another. Opportunity ranges from 0 (where nations in the network all trade heavily with one another) to 1 (where nations are not trading with one another, allowing many chances for a nation to dominate the terms of trade in that network).

We present the structural autonomy argument visually in Figures 1 and 2. Figure 1 is a situation of pure network autonomy for Actor A. A's three network connections (B, C, and D) are not connected with one another (no primary constraint), and they do not share other connections through which they could exchange information (no secondary constraint). They have no ability to compare information that A gives them, nor can they collude in any move against A. Furthermore, A has a choice among the three connections for resources, whereas B, C, and D have no alternative to A for information or resources. These facts give A a great advantage in gathering information and negotiating the terms of exchange for trade. In this case, A has a structural autonomy measure of 1, the maximum possible score for autonomy.

Figure 2 shows the opposite situation. In this case, A's three network contacts (B, C, and D) all have connections with one another (primary constraint), and they have mutual connections in their networks (secondary constraint). Actor A cannot play one contact off another, as their connection provides them with information on the actions of A on other actors in the network (i.e., pricing, terms of trade, costs, profits). In addition, actors in the network can collude against A. A's information-gathering and negotiating power has been significantly reduced through the highly constraining nature of the multiple ties within the network. In this case, A has an autonomy score of 0, the lowest possible autonomy score. A is in a highly disadvantaged position for trade.

Autonomy measures provide more nuanced indicators that take into account both the composition and relative intensity of linkages, in contrast to the concern of centrality measures, which treat aggregate volumes and number of nodes. This measure offers a means to incorporate the long-term substantive concerns of researchers interested in the composition of trade and of structural analysts, who focus on the pattern of relationships. Hence, the autonomy measures offer the potential to unpack mechanisms and causal processes that centrality

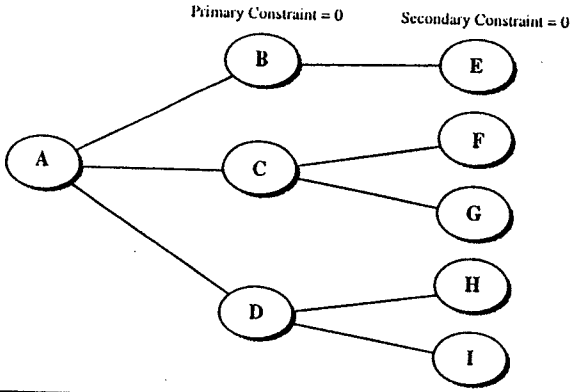

Figure 1: Pure Autonomy (autonomy = 1)

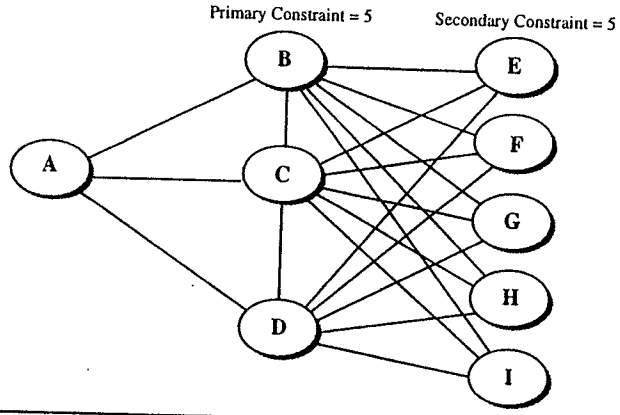

Figure 2: Pure Constraint (autonomy = 0)

measures may obscure. In short, these are countries that have relatively more discretion and stand to benefit disproportionately from trade.

ORIENTING ARGUMENTS

In our efforts to motivate the interplay of social structure and changes in the institutional features of global trade, we identify three key questions with which to examine the effects of structural autonomy: (a) Does structural autonomy affect outcomes of interest, and are the effects context-invariant? (b) Do changes in the historical and institutional structures of trade condition autonomy effects? and (c) Are autonomy effects contingent, that is, do they differ across the range of countries?

STRUCTURAL AUTONOMY EFFECTS

Burt (1992) argued that attributes of actors[3] can determine the amount of value possible within economic transactions but that position in a social structure better predicts which actors get what portion of that value. Actors with higher structural autonomy—network freedom through reduced dependencies, which allows actors greater negotiating power and access to information resources—garner higher levels of desired returns.

Proposition 1: High structural autonomy will vary directly with high nation status.

CONTINGENT EFFECTS OF STRUCTURAL AUTONOMY AS INSTITUTIONAL CONDITIONS CHANGE

Because the contingent value of social capital rests in part on the number of actors involved in the core of trade (Burt, 1997), we predict that the effect of structural autonomy will decrease over time as the volume of trade and number of nations actively involved increase. We focus on changes in institutional context not reducible to the social structure of ties (Dacin, Ventresca, & Beal, 1999) to contrast network claims that posit context-invariant effects of autonomy. Our argument contends that as institutional conditions change in ways that support broader participation in world trade as a standard feature of modern states, autonomy effects will attenuate. These changes include the development of global institutions of governance, such as establishment of UN agency mandates that promoted trade in and among developing countries in the postcolonial period, the proliferation of multilateral trade agreements, and the initiatives of global financial actors like the International Monetary Fund (IMF) to regularize and monitor trade activity and in effect to promote it. Major shifts in the early 1970s redefined structural and institutional regimes governing international trade. By 1980, historical country differences in patterns and participation in world trade reflected the new role of global trade regimes in defining "rules of the game," meaning, and mechanisms of trade (Jackson, 1994; Krasner, 1985; McMichael, 2000). We argue that these shifts in the governing regimes redefine the foundational rules of overall trading activity, rationalizing opportunities and incentives for country participation in trade and establishing conventions and regime norms that supplant the network effects captured by the structural autonomy mechanism.

Proposition 2A: The more global trade is institutionally structured, the less effect structural autonomy exerts.

CONTINGENT EFFECTS OF STRUCTURAL AUTONOMY AS COUNTRIES ESTABLISH "MODERN" TRADE STRUCTURES

Modern trade infrastructures at the country level may facilitate participation in rationalized global trade through direct government subsidy, the provision of indirect incentives and expertise, and/or the focus of bureaucratic attention on trade initiatives (OECD, 1995). We use the presence of a government trade ministry or other such bureaucratic structure (e.g., trade council) to proxy the effects of country-level trade infrastructure. The establishment of trade ministries and other intentional agency arrangements may work to affect trade in two ways: (a) creating capacity and venues for action internal to the country or (b) creating formal linkages and nodes to the wider, rationalized trade context where such convention supplants the effects of network structure (McNeely, 1995; Meyer et al., 1997; Thomas & Meyer, 1984).

In light of the claims we develop from Proposition 2A, we further posit that the effects will vary with historical period (per the rationalization of global trade regime). In the 1965 period, when autonomous trade remained the privilege of a relatively few historically dominant countries, the presence of a trade ministry marked state intent, capacity, or modern state status and would have had a positive impact on nation status. The 1970 period was a time when more countries were participating in world trade, most states of the world had become independent, and there were beginnings of global trade regimes; this was a transitional period, but we would expect the presence of a ministry to contribute to nation status. By 1980, the global trade regimes were well-established, and patterns of trade incorporated a wider group of countries in routine ways, making ministry establishment less important for outcomes.

Proposition 2B: The more individual countries have proximate trade infrastructure, the higher their nation status will be.

But we argue above for contingent effects of autonomy as the institutional context of the global trade regimes evolves, so we refine this proposition:

Proposition 2C: When there is little global trade institutional structure, country-level trade infrastructure will be associated with higher nation status, relative to when there is more global trade institutional structure in place.

COUNTRY STRATIFICATION AND CONTINGENT EFFECTS OF STRUCTURAL AUTONOMY

One argument concerns the contingent effects for nations located in different strata, with time and other conditions equal. Because countries are stratified on dimensions of theoretical and substantive interest, our arguments about the overall effects of autonomy within each historical period may conflate how this mechanism actually works for different strata of countries. For our work, this suggests that countries with relatively high nation status will experience the benefits of structural autonomy to different degrees than will those with relatively low nation status. We argue that the effects of autonomy are contingent, depending on the status of the country.

Proposition 3: Autonomy effect varies by current nation status of a country.

DATA AND METHOD

SAMPLE

Studies of international trade have used yearly import/export trade flows for a wide range of commodities compiled by the United Nations Commodity Trade Statistics (Delacroix, 1977; Nemeth & Smith, 1985; Smith & White, 1992; Steiber, 1979).[4] These data report relational dyadic exchange matrices for each commodity, for example, the amount of wheat (in U.S. dollars) traded between France and Japan, and so on. They are widely considered the most accurate and complete among international trade statistics. We use data from the years 1965, 1970, and 1980. Our sample comprises only countries with a population of 1 million people or more. This reduces potential concern that smaller countries are disadvantaged simply by population size from being equipped to participate in international trade. In addition, countries that failed to report commodity-trade data for any of the three time periods were eliminated from consideration. The sample provides 63 countries available for analysis.

DEPENDENT VARIABLE

Quantitative research interested in the cross-national determinants of nation status has examined a wide variety of outcomes. Nation status in particular is a highly contested concept where measurement issues are debated in the literature. National prosperity, well-being, and even a human misery index have all been used to represent the construct in world-systems research (Ragin & Bradshaw, 1992). We use GNP per capita, a common proxy for nation status, to be consistent with much prior world-systems research, including network studies (Nemeth & Smith, 1985; Smith & White, 1992).

INDEPENDENT VARIABLES

Our primary interest in this article is to develop and test a measure of structural autonomy. In addition, we examine the effects of several independent variables that offer competing explanations for nation status. The first set of variables is nation centered, characteristic of factors central in modernization arguments. The second group is system centered, reflecting dependency

arguments that regional position and historical linkage type have long-term impacts on nation status.

NATION-CENTERED VARIABLES

Three independent variables capture effects of internal nation characteristics that figure in standard modernization/comparative advantage models of nation status. These are industrial development, domestic capital investment, and education. We used kilowatt consumption per capita as a proxy for the level of industrial development or modernization for a country. We took the log of this variable to control for the large range and skew of data within our sample. Second, we used domestic capital rates to represent the internal expenditures countries invest for the improvement and vitalization of their infrastructure. The distribution of this variable was relatively normal and required no transformation. Third, we used a measure of secondary education to represent the extent to which nations have a modern industrial labor force rather than a primarily agricultural one. The variable was measured by secondary education enrollments as a percentage of the population age 14 to 17 in a particular year. This variable was highly skewed, and we performed a log transformation to create a more normalized distribution.

SYSTEM-CENTERED VARIABLES

The remaining two independent variables (other than autonomy) represent features of the nation in relation to the international states system. The first distinguishes among countries by region and historical relation to international state systems. We used six categories to capture the effect of linkage type (Meyer, Ramirez, & Soysal, 1992): 1 = sub-Saharan Africa, 2 = European periphery, 3 = Asian and Pacific Rim, 4 = North Africa and Middle East, 5 = Latin America, and 6 = European and Anglo-Saxon core. We omitted Category 1 as the reference category. This system-based variable addresses the impact of a country's regional position and linkage type, or political/historical connection-type to other countries on economic returns. This is consistent with other network approaches that make predictions based on both regional location and types of connections/linkages to other countries (Louch, Hargittai, & Centeno, 1999).

Finally, we used the presence of state ministries of trade or their bureaucratic equivalent (commission, trade council, etc.) as a proxy for the argument that the existence of a trade ministry provides a formalized institutional link to the core of global trade and promotes international mobilization around trade (Kim, 1996). In effect, trade ministry existence is a simple measure of state attention and intent with regard to trade, a dichotomous measure of whether a country had a trade ministry prior to the observation year.

CONSTRUCTING THE STRUCTURAL AUTONOMY MEASURE

We followed conventions in prior research in choosing which commodity types to include in our analyses. Previous studies of world-trade patterns (Chase-Dunn, 1989; Hirschman, 1945; Rau & Roncek, 1987; Rubinson & Holtzman, 1981) report a global stratification in trade composition: Core countries are more likely to export processed commodities, whereas periphery countries are more likely to export raw materials. Thus, following the logic of Nemeth and Smith (1985), we chose commodities that represent different levels of processing, from raw materials to finished products. We used two-digit Standard International Trade Classifications (SITC) categories to capture a broad array of commodities. SITC codes vary from five-digit (very specific) to one-digit (very general) classifications; using two-digit categories incorporates some commodity-type heterogeneity into the model. Using the two-digit SITC codes, which aggregate many specific, related types of commodities, reduces the possibility that a country's dominance in any particular commodity (through using five-digit SITC codes as the unit of analysis) would bias the overall autonomy measure.

We used the results of Smith and Nemeth's (1988) factor analysis in selecting which commodities to include from the categories, based on levels of processing stated above. The top three most heavily traded commodity types from each of five levels of processing categories were included in our analyses. We then conducted 45 network analyses to produce a mean structural autonomy score for each country in each commodity category (for each of the three time periods). Because this mix of commodities is broadly representative of the larger patterns of global trade, we aggregated the specific commodity-level autonomy scores to generate an overall country autonomy score for each of the 3 years. Appendix A outlines in detail the steps we took in choosing the commodities and preparing the data for further analysis. See Appendix B for a detailed discussion of the mechanics of the structural autonomy analyses.

MODELING STRATEGY

To assess the arguments and claims we put forward, we used regression analyses to test the effects of autonomy and the other independent variables on nation status. We used 5-year time lags of the secondary education and domestic capital investment-rate variables because countries experience the effects of these variables several years after the period in which they are measured. The energy consumption and autonomy variables were not lagged, given that they measure activity with timely impact on economic returns.[5]

First, we regressed nation status on the independent variables, the standard modernization and dependency indicators, and the structural autonomy measure. We conducted one robust regression for each of the three time points in the

observation period. We use robust regression because of our theoretical concerns that outliers may overestimate the significance of the overall equation. A robust regression is similar to an ordinary least squares (OLS) regression, but it controls more effectively for the impact of outliers by testing around the median of a sample, not the mean, and by using absolute rather than squared deviations.

We then estimated quantile regressions to show the contingent effects of the variables at different levels of nation status. A robust regression shows the overall effect of variables on the dependent variable. A quantile regression assesses the contingent effects within certain quantiles of the dependent variable. This regression method makes it possible to examine theoretical claims that subpopulations in the sample experience the effects of the independent variables on the dependent variable differentially. In quantile regression, specified quantiles of the dependent variable, rather than just the mean, are regressed on the independent variables.

We ran quantile regressions for each of the 3 years of the study by breaking the sample into quantiles at the .35, .50, and .65 levels of the dependent variable. This allowed us to assess the extent to which countries at high and low ends of GNP per capita experience the independent variables differently. Combining this approach with our three observation periods, we can assess how the contingent effects of independent variables change across time and with specific subpopulations.

RESULTS

We report the results in Table 1. For each time period, Model 1 reflects the results of the robust regressions, whereas Models 2 through 4 show quantile regression results at the .35, .50, and .65 quantiles of the dependent variable, respectively. First, we discuss the results of the nation-based and system-based independent variables. Then, we review the results in the order of our propositions. Propositions 1, 2A, 2B, and 2C are reflected in Model 1 for each time period, whereas Proposition 3 is illustrated by Models 2 through 4.

The results in Model 1 reinforce basic findings about the association between measures of modernization level and nation status. Of the variables linked to standard modernization arguments—domestic capital investment rate, secondary education, and energy consumption—only energy consumption showed consistently positive and significant returns on nation status. The other two nation-based variables—domestic capital investment rate and education—did not show significant returns at any of the three observation points. The results of the system-based variables showed virtually no significant impact on nation status. In all of the models, there were only two instances of significant returns based on linkage type. Being a country in the European core in 1965 provided significantly positive returns, as compared with the reference category, countries in sub-Saharan Africa. This is not a surprising finding, given the historical

TABLE 1: Regression Estimates of Independent Variables as a Determinate of Nation Status, 1965, 1970, and 1980

	1965				1970				1980			
Independent Variable[a]	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Autonomy	1.46***	.248	1.243	1.700*	1.250**	.972	1.549	2.006**	1.395	.287	1.663	2.151
	(.531)	(1.102)	(.978)	(.937)	(.564)	(1.024)	(.970)	(.880)	(.936)	(1.659)	(1.572)	(1.538)
Ministry existence	-.028	-.101	-.036	-.002	.105	-.012	.091	.172	.058	.079	.045	.012
	(.129)	(.284)	(.275)	(.318)	(.124)	(.216)	(.229)	(.239)	(.142)	(.208)	(.222)	(.247)
Domestic capital investment rate	-0.008	-.009	.006	-.011	.017	.011	.022	.031	-.010	-.014	-.011	-.007
	(.008)	(.018)	(.015)	(.019)	(.012)	(.022)	(.026)	(.028)	(.015)	(.025)	(.028)	(.032)
Secondary education	.021	.086	.108	.022	.126	.089	.160	.144	.116	.113	.169	.160
	(.065)	(.126)	(.137)	(.128)	(.131)	(.227)	(.251)	(.260)	(.095)	(.160)	(.178)	(.185)
Kilowatt per capita	6.72***	7.21***	5.23**	7.16***	7.11***	9.44***	7.84***	6.73**	9.80***	10.33***	10.16***	10.25***
	(1.05)	(1.94)	(2.19)	(1.49)	(1.24)	(2.23)	(2.54)	(2.72)	(1.47)	(2.64)	(2.92)	(3.07)
European periphery	.455*	.584	.307	.404	.306	.493	-.126	-.215	-.065	-.001	-.400	-.478
	(.260)	(.451)	(.387)	(.481)	(.324)	(.467)	(.515)	(.544)	(.435)	(.700)	(.687)	(.712)
Asia and Pacific Rim	-.151	-.130	-.221	-.229	-.446	-.536	.619	-.586	-.839**	-.753	-.926	-1.057
	(.233)	(.357)	(.335)	(.410)	(.294)	(.430)	(.452)	(.471)	(.393)	(.668)	(.632)	(.627)
North Africa	.001	.104	-.190	-.064	.080	.210	.361	.272	-.138	-.310	.028	-.071
	(.243)	(.353)	(.410)	(.311)	(.277)	(.582)	(.606)	(.632)	(.384)	(.580)	(.568)	(.624)
Latin America	.245	.195	.075	.181	-.073	-.396	-.376	-.316	-.466	-.493	-.678	-.650
	(.219)	(.385)	(.355)	(.357)	(.243)	(.371)	(.386)	(.395)	(.350)	(.581)	(.555)	(.575)
European core	.861***	.788	.758	.786	.503	.005	.098	.152	.115	.219	-.136	.217
	(.310)	(.593)	(.615)	(.519)	(.356)	(.555)	(.600)	(.607)	(.500)	(.804)	(.840)	(.900)
Constant	-4.16***	-4.45*	-2.59	-4.70**	-4.59***	-7.36***	-5.67*	-4.42	-.677***	-7.04**	-7.22**	-7.56*
	(1.34)	(2.40)	(2.76)	(1.90)	(1.47)	(2.56)	(2.88)	(3.05)	(1.79)	(3.24)	(3.56)	(3.81)
Pseudo R^2	0.92	0.77	0.78	0.78	0.91	0.78	0.78	0.76	0.86	0.74	0.73	0.71

NOTE: Model 1 = robust regression estimates. Models 2 through 4 are quantile regression estimates with .35, .50, and .65 quantiles of the dependent variable, respectively.
a. Source: World Bank, 1993/1997.
*$p < .1$. **$p < .05$. ***$p < .01$.

dominance of the European metropols in global trade. The other significant effect appears in the 1980 analyses, when being a country in the Asia and Pacific Rim category has a negative and significant return on nation status.

Now, we turn to our propositions and discuss the results of our analyses. Proposition 1 argues that high structural autonomy would be associated with high nation status in all time periods. That is, structural autonomy has context-invariant effects on nation status. Our results provide support for this claim in 1965 and 1970, but not in 1980. These findings support the importance of the structural autonomy argument but challenge network perspectives that make claims about the general effects of social capital. The actors in this network were the same for all three time periods, as were the raw data sources for analysis. This suggests that factors other than the structural composition of the trade of goods in the network had an effect on patterns in nation-status change over time.

Changes in the institutional context of global trade may have affected the returns that structural autonomy offers for countries. The pattern of results in Model 1 provides initial support for Proposition 2A, which argues that as global trade becomes more institutionally structured over time, structural autonomy produces less of an effect on nation status. An increasing number of countries traded higher volumes of goods between 1965 and 1980, and a variety of global trade regimes regularized the process of trade. As such, the effects of social capital vary as the context of the global network of trade changes over time.

The decreasing influence of autonomy on nation status is depicted in Figures 3, 4, and 5 for 1965, 1970, and 1980, respectively. The figures report a scatterplot of country autonomy scores and GNP per capita with the bivariate regression line highlighted as well. In the 1965 data, shown in Figure 3, the countries are arranged in a trimodal cluster, with the higher GNP per capita countries at higher levels of autonomy, moderate countries at medium levels of autonomy, and low GNP per capita countries at low levels of autonomy. Deviations from the regression line are relatively low, as illustrated by the oval-like shape of the cloud. In 1970, the clustering of nations is beginning to shift, as reflected by both wider deviation from the regression line and the more circular shape of the cloud. By 1980, the relationship between autonomy and GNP per capita is statistically random, as shown by the larger deviations from the regression line and wider, circular cloud. These figures graphically represent the diminishing effect of structural autonomy on nation status as the institutional context of the world system shifts over time between 1965 and 1980.

Proposition 2B argues that a country's formal trade infrastructure, measured as the existence of a trade ministry, would foster high returns. The logic was that a trade ministry would foster a country's ability to trade in the global economy through formalized links to other countries: trade ministries. Proposition 2C argues that the effects of having a trade ministry would produce significant returns in 1965 and 1970, but not in 1980, when wider participation in global trade emerged. Neither proposition was supported, as the effects for trade

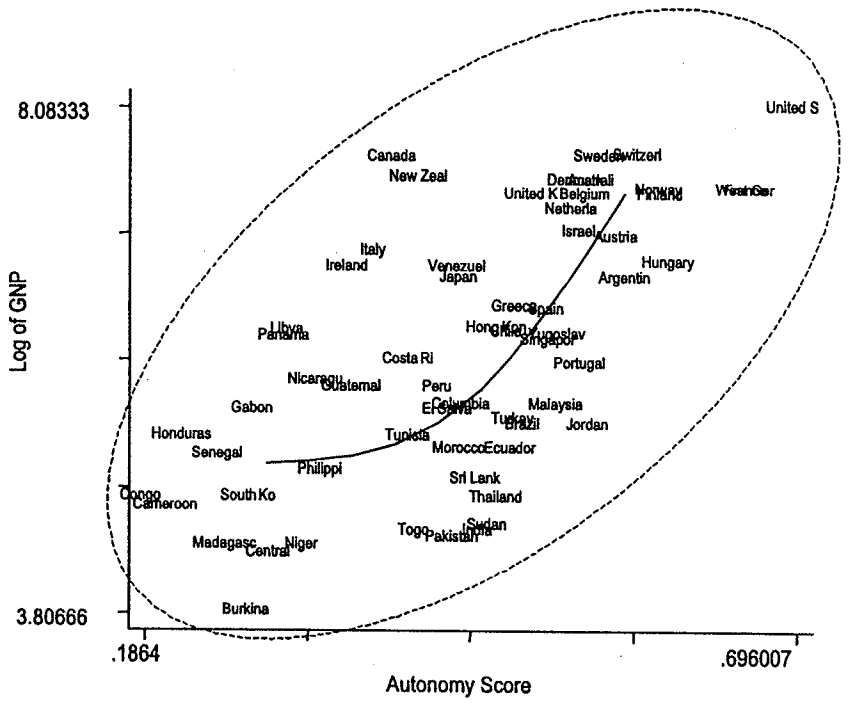

Figure 3: Median Bivariate Regression of Log of Gross National Product on Autonomy Score, 1965

ministry were not significant in any time period. Trade ministries may be important in signaling state intent to conduct international trade, but they do not appear to yield significantly higher returns on nation status.

We now turn to the results of Models 2 through 4 in each time period for assessment of Proposition 3. Here, we examine a different argument about contingent effects of social capital to suggest that overall autonomy effects vary within a given population. In this empirical setting, we argued that countries with high nation status would experience a greater return from structural autonomy than those with lower nation status. The results of the quantile regressions support this conjecture. Robust regressions depicted in Model 1 for 1965 and 1970 suggest significant overall returns on autonomy. But the results of quantile regressions shown in Model 4 reveal that these returns are only significantly experienced by the top quantile. As such, what appears to be a significant overall effect for structural autonomy is really a contingent effect in favor of the wealthier countries of the world.

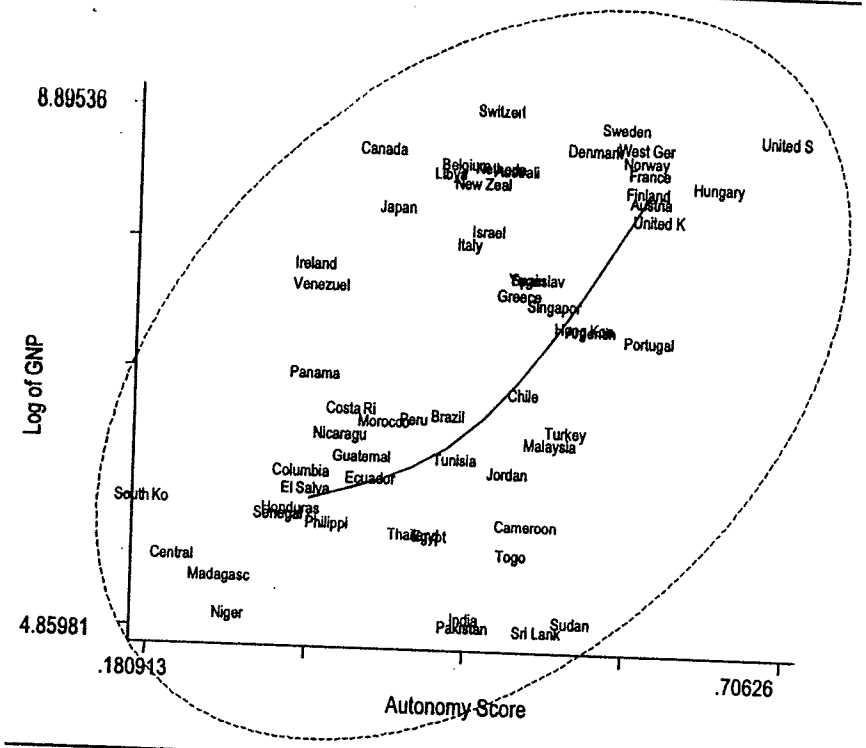

Figure 4: Median Bivariate Regression of Log of Gross National Product on Autonomy Score, 1970

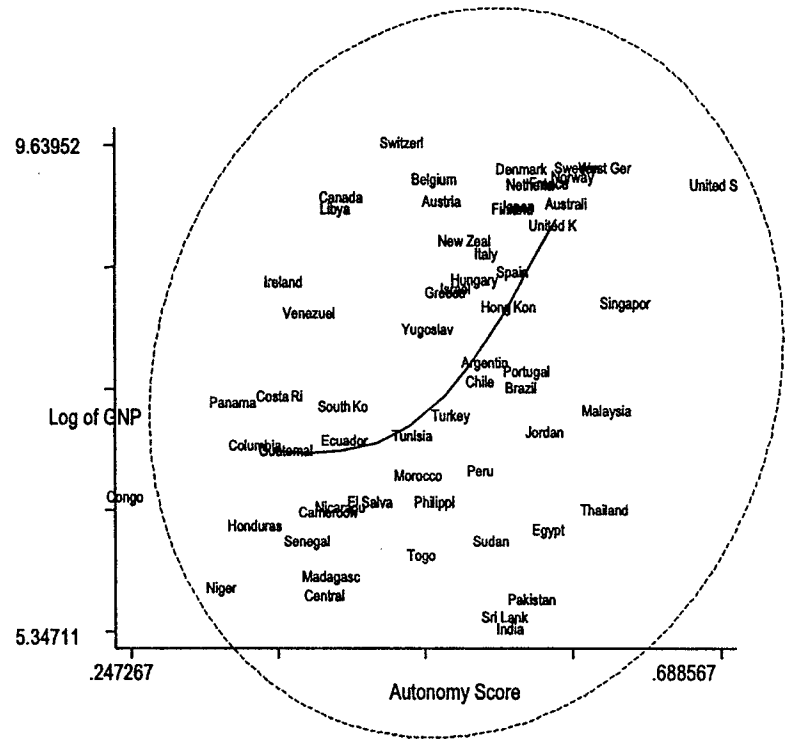

Figure 5: Median Bivariate Regression of Log of Gross National Product on Autonomy Score, 1980

DISCUSSION AND CONCLUSIONS

The pattern of results across the three time periods and within each period across quantiles provides evidence for our claims about the general relationship between structural autonomy and nation status and for the contingent effects of social capital benefits. In this empirical case, the contingent results follow changes in the institutional features of the global trade regimes and variations among relatively more or less prosperous countries within any one period. To make sense of this pattern, we apply Burt's (1997) arguments about the contingent value of social capital to work on trade regimes. Burt argued that as networks comprise more and more participants in dense network relations, social capital effects are contingent. The history of the time periods within this study encompasses just such shifts: More and more countries participate in global trade as standard state members, trade itself expands, and more countries trade in more complex ways. By 1980, autonomy does not return significant advantages to any group of countries.

In addition to contingent effects over time, the influence of autonomy is also contingent on structural position within specific time periods. The quantile regressions revealed that what appeared to be an overall effect in 1965 and 1970 was really concentrated among the countries with the highest nation status. In other words, only the most privileged countries gained significant returns on their autonomous positions in the flow of global trade. This finding suggests that autonomy may represent another source of stratification in the world system.

In sum, our study generally validates arguments about the positive value of structural autonomy but shows that this value is clearly contingent on (a) position within a social structure and (b) the nature of that social structure itself. Actors within a social structure are differentially able to reap benefits based on their network position, and unique social structural conditions provide different types of benefits to distinct kinds of actors. This study of the structure of world trade shows how changing context within the global economy affects what the broader social structure has to offer and who benefits from those structural arrangements.

APPENDIX A
Constructing the Structural Autonomy Variable

Smith and Nemeth (1988) performed a factor analysis of all the bilateral exchanges between nations to find five bundles of commodities that tend to move together in the global economy: High Technology and Heavy Manufacture, Sophisticated Extractive, Simple Extractive, Low Wage/Light Manufacture, and Food Products and By-Products. Three commodities that "consistently loaded most highly on each of the five factors" were selected from each grouping (Smith & White, 1992, p. 866). These are the 15 commodities for our investigation:

Standard International Trade Classifications (SITC) Code	*Commodity*
	High Technology & Heavy Manufacture
46	Machinery-nonelectrical
35	Artificial resins, plastics, cellulose esters and ethers
45	Manufactures of metal, not elsewhere specified
	Sophisticated Extractive
40	Paper, paperboard, and articles of paper pulp
16	Pulp and wastepaper
23	Gas, natural and manufactured
	Simple Extractive
13	Oil seeds and oleaginous fruit
25	Animal oils and fats
04	Cereals and cereal preparations
	Low Wage/Light Manufacture
52	Articles of apparel and clothing accessories
53	Footwear
51	Travel goods, handbags, and similar containers
	Food Products and By-Products
01	Meat and meat preparations
02	Dairy products and birds' eggs
20	Crude animal and vegetable material, not elsewhere specified

The data set compiled the dollar value of trade between nation dyads for each category for each of the three time periods. This resulted in 45 commodity trade tables of size 63 × 63 with missing diagonals (the diagonals represent where a nation's position on the vertical and horizontal axes meet). These tables served as the raw network data we used in generating the structural autonomy measures.

The computations involved in a structural autonomy network analysis rest on the measurement of network constraint and opportunity. The structural autonomy calculation is often, but not always, weighted by an oligopoly measure.[6] In the present analysis, the oligopoly measure has been set to 1 throughout the computations. This follows the logic that as the number of actors increases in a network, the concentration ratio becomes less important in the overall autonomy measures, as they have multiple network contacts with whom to engage in negotiations (Burt, 1992). In the present study, the use of two-digit SITC codes—broad categories embracing a wide array of commodities—helps ensure that there are many producers and consumers in all of the commodities under investigation. In addition, the factor analysis described earlier provided commodities that are traded most heavily in the world system. These facts lead to the conclusion that concentration ratios are less useful in the present case. This would be a very different situation were five-digit SITC codes being used as the units of investigation.

APPENDIX B
Full Description of Structural Autonomy Network

Analysis

Entrepreneurial opportunities are constrained to the extent that one of a nation's (i) contacts (q) has invested in a relationship with another of the nation's contacts (j). This can be expressed in the following manner:

$$P_{iq}P_{qj}.$$

Here, P_{iq} represents the proportional strength of i's relationship with q, and P_{qj} represents the proportional strength of q's relationship with j. A high product of this equation represents a high degree of constraint that j's relationship with q places on i's relationship with q, making it harder for nation i to serve as a bridge between q and j. An aggregate of the product of the above equation across all of the contacts in the network (excluding nation i) shows the overall extent to which nation j constrains nation i in the network. Adding this to the direct connection i has with j produces a figure that defines the constraint that nation j places on nation i directly and indirectly:

$$P_{ij} + \sum P_{iq}P_{qj}.$$

The sum of the above equation across all contacts j measures the aggregate constraint on nation i's entrepreneurial opportunities within the network:

$$C = \sum (P_{ij} + \sum P_{iq}P_{qj}).$$

The second part of the structural autonomy computation involves the opportunities other nations have to exploit disconnections between nation i and its contacts within the network. This is because i must also spend time protecting itself from other nations who wish to serve as the bridge between i and its contacts. We begin the process of deriving the sum opportunity for other nations to exploit the relationship between nation i and its contacts by examining the extent to which another nation (j) is able to fill a structural hole between i and another of its contacts (q):

$$P_{ji}P_{iq}.$$

Here, P_{ji} represents the proportional strength of j's relationship with i (in terms of time and resources spent in the maintenance of the relationship), and P_{iq} represents the proportional strength of q's relationship with j. When the product of this equation is high, nation i would have to spend more time and resources connecting with j and q to counteract the efforts j maintains to serve as a broker between them.

The next step is to measure the extent to which nation j can exploit the relationship between nation i and its contacts with other nations in the network. To do this, we aggregate the product of the above equation across all of i's contacts in the network (excluding nation i) and add in the direct connection that j has with i:

$$P_{ji} + \sum P_{jq}P_{qi}.$$

The resulting sum is the total extent to which j can exploit the disconnections between nation i and its contacts. The last step is to determine the extent to which all nations j can fill structural holes between i and its contacts. This is done by aggregating the above equation across all of the other nations in the network:

$$O = \sum(P_{ji} + \sum P_{jq}P_{qj}).$$

Thus, O represents the total opportunity other nations have to exploit i's connections with other nations in the network.

Understanding the components of O and C, we can now turn to the overall structural autonomy calculation. The functional form of structural autonomy is:

$$A = \alpha(1\text{-}O)^{Bo}C^{Bc}.$$

Here, O is the sum of other nations' opportunities to fill structural holes between the focal nation and its contacts, and C is the sum of the focal nation's constraints. Estimates of Bo and Bc are negative fractions, which illustrates that structural holes are most effective at lower levels of constraint.

NOTES

1. With perhaps unintended irony, the recent work on comparative advantage (Porter, 1990) provides a kind of neo-modernization argument, where each country has distinctive assets that locate in a wider division of labor and resources. Historically grounded studies unpack and provide evidence of political and institutional decisions that configure the generative infrastructures of education and define apparently given distributions of labor and natural resources, the starting points for the comparative advantage studies (see Murmann, 1998; see also, Biggart & Guillen, 1999).

2. For the sake of argument, we allow structural autonomy to be a proximate mechanism, and we remain silent about the sources of that autonomy located in the complicated historical and decisional processes of individual firms, state actors, and the like who together shape any one country's participation in the system of world trade. Here, the qualitative and historical analyses of world system studies offer more grounded explanations.

3. These attributes are human capital, such as education and ability for individual people, efficiency at the organization level, and level of modernization for countries.

4. We benefit from the generosity of David Smith and Douglas White, who made available for us the data set they analyzed in Smith and White (1992).

5. Our original aim was to construct panel models that could offer more stringent longitudinal analyses of how autonomy explained changes in GNP per capita over time. We encountered severe multicollinearity and autocorrelation issues in the process, issues common in cross-national panel model studies (Meyer & Hannan, 1979; Ragin, 1994). Hence, we report below the results of cross-sectional analyses. Although these are less dynamic in their implications, they provide a means to associate changes in nation status with the independent variables of interest in our study.

6. This is important in assessing the competitiveness of the network, as a network with a high oligopoly measure is one where a few players have a high amount of control within the network. This oligopoly measure is often described using a concentration ratio, which describes a nation's freedom in its network as measured by the extent to which it is central and not easily replaced by another contact. Specifically, this is operationalized as the extent to which a proportion of all network exchanges comes from a limited number of sources within the network. The fewer the sources and the higher the degree to which a resource is concentrated in these few sources, the higher the concentration measure.

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