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TITLE: ON THE NATURE OF CENTRALLY-PLANNED ECONOMIC SYSTEMS: INSIGHTS FROM THE ECONOMETRIC ANALYSIS OF INTERNATIONAL TRADE DATA

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EXECUTIVE SUMMARY

The research summarized here analyzes which broad economic theories can best explain the differences between capitalist and socialist economies. The framework of the analysis is a comparative empirical examination of the economic behavior of those two sets of economies. The results indicate that the standard theories used by economists might not be the best ones to analyze the differences between capitalist and socialist economic performance. A Schumpeterian model -- focusing on the evolutionary aspects of economic progress -- fits the data better than traditional neoclassical theories. If this conclusion is correct, it has profound consequences for prediction of future socialist economic performance, for analysis of the direction of trade between East and West, and, most importantly, for understanding which types of reforms will succeed in Eastern Europe.

The following paragraphs summarize the study's results, largely ignoring the methods used to derive these results. In fact, those methods also constitute a contribution to the study of comparative economic behavior. Scholars wishing to examine the details of these methods would need to consult the full study -- an almost completed book entitled The Nature of Socialist Economies: Lessons from East European Foreign Trade. This book will be published by Princeton University Press in 1989.
The research proceeds by examining the major alternative theories on the comparative behavior of socialist and capitalist economies, constructing the implications of these theories for foreign trade behavior, obtaining a set of data for which the theories have precise implications, and then using econometric techniques to examine whether these implications hold. The study analyzes foreign trade behavior because foreign trade interactions provide a particularly rich data source for examining the behavioral regularities of socialist systems. However, the results of the study are perfectly general since foreign trade behavior inevitably reflects the operations of the domestic economy.

The central idea that lies behind the study's results is that there are two broad theories that stand as rivals in attempting to understand economic behavior. These theories are usually called neoclassical and Schumpeterian. The former dominates the thinking of the economics profession and is implicitly used when economists discuss such issues as the behavior of centrally-planned economies and the possibilities for economic reform in Eastern Europe.

The neoclassical approach centers on examining the processes that lead to the allocation of physical resources between different uses. It emphasizes the correct incentives that economic agents must face in making production decisions. It focuses on the role of prices in conveying information. It emphasizes the costs of large scale bureaucracies as mechanisms for allocating resources in a complex modern economy.

The Schumpeterian approach downplays the importance of the allocation of resources, in the sense that this is an easy task for an economy -- either market or planned -- to accomplish at a satisfactory
level. Instead, Schumpeterians emphasize the generation of change and the adaptation to change as the key aspects of economic performance. In particular, of course, it is technological change that lies at the center of modern economic success. In the Schumpeterian view, technological change can be best promoted in a process akin to Darwinian evolution in which new ideas come from new entrants, in which the best ideas are allowed to spread by the above-average growth of successful firms, and in which the less successful entities suffer demise.

In comparing the dynamics of capitalist and socialist societies, the Schumpeterian approach would emphasize two crucial features of capitalist society -- entry of new firms and the role of multinational corporations. To widen the bounds of possible sources of new technologies, both domestic free entry and the competition of foreign firms are important. So that the new technologies can best be spread by the expansion of successful early users and the contraction of the unsuccessful, economies need both freedom for domestic enterprises to expand (or fail) and access to cross-national economic organization -- the multinational corporations. It is obvious that socialist economies, as constituted at present, have neither of these features.

The bulk of the book being summarized concentrates on the economic and econometric methodology of examining and testing the differences between the implications of the neoclassical and Schumpeterian hypotheses. In this summary, a focus on the results is more natural. The following list shows the general tenor of the results, but is not exhaustive since description of some of the results would require too lengthy an explanation for this summary:
1. A multi-equation neoclassical model of trade behavior fits the data of the socialist economies as closely as that of the capitalist economies. Hence, one cannot conclude that the socialist economies fail to allocate resources in a rational manner.

2. The decentralized socialist economies -- Hungary and Yugoslavia -- fare less well on this test of rationality than the orthodox centrally-planned economies. Hence, decentralization as presently undertaken in Eastern Europe does not seem to improve the allocation of resources. Here, it should be noted that the decentralization that has been undertaken in Eastern Europe is the type that is consistent with the neoclassical model.

3. Many of the traditional hypotheses on economic behavior that have been formulated from a neoclassical perspective are not evidenced in trade data. For example, there does not seem to be a bias toward the exportation of capital-intensive products, nor do the socialist economies fail in the sectors that are subject to diseconomies of scale.

4. The results show that the centrally-planned economies have a striking comparative disadvantage in those industries in which free entry is important, thus supporting one of the fundamental Schumpeterian predictions.

5. The socialist economies have a low level of imports in sectors in which the multinationals are important, even though these are high-technology sectors in which the socialist countries do not perform well. This is consistent with the Schumpeterian perspective, which emphasizes that technology cannot be easily bought at arm's length by existing firms, but instead must be spread by the expansion of existing firms.

6. The results do show that the socialist countries are successful in the sectors in which concentration is high in the West. This shows that
these countries are actually taking advantage of inefficiencies in market economies by exporting goods in which monopolistic tendencies prevail under capitalism. This would surely argue that socialist ability in static allocation of resources could equal that of the market economies.

7. The results as a whole show that Hungary and Yugoslavia can be viewed as typical of socialist economies. From the neoclassical view, this is inconsistent with the fact that these two economies are much more decentralized than the rest of Eastern Europe. From the Schumpeterian perspective, this is consistent with the fact that the essence of the market is a process akin to natural selection, not decentralization.

This list of empirical results could arise only if the Schumpeterian view was more powerful than the neoclassical perspective in analyzing the differences between socialist and capitalist economic behavior. This conclusion has profound implications, for example for the economic reform of socialist economies. The above implies that decentralization is not sufficient for technological change, if decentralization means merely more latitude for existing enterprises. What is needed is cross-sectoral -- or even cross-national -- movements of firms, a variety of approaches to innovation, and expansion of the successful through multi-plant operations. These features are usually not elements in discussions of reform, which focus primarily on perfecting prices, optimizing incentives, and decentralizing decisions to the enterprise level. If the analysis contained in the book is correct, one would need to reevaluate seriously existing analyses of the likely course of the Eastern European economies after the implementation of reforms.
ON THE NATURE OF CENTRALLY-PLANNED ECONOMIC SYSTEMS: INSIGHTS FROM THE ECONOMETRIC ANALYSIS OF INTERNATIONAL TRADE DATA

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One can think of few more important topics for economic research than inquiry into the nature of the differences between capitalist and socialist economic systems. Such research has ramifications for international security, for the major ideological struggles of our day, and for economic policy and economic reform in all countries.

The following report summarizes the results of a study into the nature of the differences between capitalist and socialist economies that was funded by the National Council for Soviet and East European Research. The full study is detailed in an almost completed book entitled *The Nature of Socialist Economies: Lessons from East European Foreign Trade*. This book will be published by Princeton University Press in 1989. Because that book contains complex theoretical and econometric analysis, this report must be highly selective in its summary of the research. Here, there is no attempt to achieve exactly the same balance of different types of material as is in the book. In particular, the following summary of the research concentrates on the most important results and implications of the analysis, without attempting to present any details of the economic and econometric theory that have been used to justify the book’s conclusions.

The study uses a particularly rich data source -- foreign trade statistics -- to discover the behavioral regularities of socialist systems, in particular in comparison with those of capitalist economies. The approach is unabashedly empirical: the data analysis, using both simple and complex statistical techniques, is descriptive, rather than centering on formal tests of theories. However, the aim is not merely to describe, but to provide a coherent interpretation of the nature of the differences
between capitalist and socialist economic behavior. To do that, one needs a theoretical orientation. That orientation is provided in Section I of this report where I contrast two ways of analyzing economies -- the neoclassical and Schumpeterian approaches. In many ways, the major conclusion of the book centers on which of these two approaches provides the most powerful analyses when examining the most important differences between capitalist and socialist economies.

Section I examines the motivation behind the study. Section II discusses the types of economic theories that can be used to analyze the differences between capitalist and socialist economies. This discussion is particularly important because the empirical results indicate that most trusted theories of economists might not be the best ones to analyze the differences between capitalist and socialist economic performance. If this implication of the empirical results is correct, it has profound consequences for prediction of future socialist economic performance, for analysis of the direction of trade between East and West, and, most importantly, for understanding which types of reforms are most likely to be successful in Eastern Europe.

The research summarized here proceeds by formulating theories on the behavior of centrally-planned economies, examining the implications of these theories for foreign trade behavior, obtaining a set of data for which the theories have precise implications, and then using econometric techniques to examine whether these implications hold in practice. Section III summarizes the theoretical investigation and Section IV briefly examines the data used for the study. Section V summarizes the empirical results, which provide a
large amount of truly new information for scholars of the socialist economies.

The countries examined in the study are Albania, Bulgaria, Czechoslovakia, the German Democratic Republic (GDR), Hungary, Poland, Romania, the U.S.S.R., and Yugoslavia. Authors writing about Eastern Europe usually equivocate between several terms to refer to this group of countries, for no single expression could satisfy all interested parties. The terms "socialist economies", "centrally-planned economies (CPE's)", and "Eastern Europe" are preferred by different groups of scholars. I use these expressions interchangeably in this report to refer to the group of nine countries listed above.

I. The Need For Such a Study

The primary motivation for the study summarized here lies in the awareness that there is a disparity between the amount of factual knowledge available about the centrally-planned economies (CPE's) and the ability to construct a coherent analysis of the operation of these economies, to evaluate their strengths and weaknesses, and to predict the consequences on economic activities of politico-economic decisions. Scholars studying the centrally-planned economies have access to considerable information. Much is known about the institutions and economic procedures of these economies. However, the economic theories used to analyze the CPE's have been constructed primarily for capitalist economies and often have been empirically tested using only Western data. There has been little attempt to ask which of these theories, if any, really apply to the socialist economies and to ask which of these theories can best explain the most important differences between capitalist and socialist economies. Quite
simply, the study of the socialist economies, especially in comparison to capitalist economies, lacks a body of theories that has been subjected to rigorous empirical analysis. As the debate on shortages between Kornai (1980) and Portes and Winter (1980) shows, for example, many surprising conclusions can result once conventional wisdom is placed in an explicit theoretical framework and examined empirically.

In order to acquire a deeper knowledge of the operation of the CPE's, it is important to pursue a research methodology that emphasizes the development of systematic theories and the creation of procedures to test these theories using rigorous econometric methods. One reason why such methodologies have been little implemented in the past is the continuing problem of the quality of the data available for the CPE's. This problem is especially critical when testing theories that are explicitly comparative in nature. It is rare to be able to test differences between the CPE's and market economies and yet to be sure that the results are not affected by disparities in data collection between the two types of economies. Since many of the most interesting hypotheses on the CPE's are explicitly comparative in nature, one important element in the formulation and testing of theories on the CPE's is the development of methodologies that explicitly confront the data problems common in comparative economics.

The aims of the research undertaken for the National Council, which is summarized below, follow directly from the foregoing methodological considerations. The research formulates and tests important hypotheses about the operation of the CPE's and their strengths and weaknesses. Moreover, many of the hypotheses are explicitly comparative, so that the econometric methodology addresses the typical data problems encountered by
students of the CPE's. The basis of the research can be best understood with reference to three central elements. First, international trade information can be compiled in a manner that establishes a high degree of comparability between the data for capitalist economies and CPE's. Thus, a rich data bank underpins the analysis. Second, international trade decisions provide a window on the rest of the economy. Trade data can be used to test hypotheses about many elements of economic behavior, because domestic decisions are reflected ultimately in changing patterns of imports and exports. Third, given that data on some variables is available for all countries, poor information on other variables is less than critical. The author has developed econometric methods that greatly reduce the problems arising from missing data.

At this juncture, it is crucial to stress one important point. Much of the study focuses on foreign trade behavior. However, the ultimate interest lies not in international trade per se but rather in what international trade interactions reveal about the more fundamental features of socialist economies. In focusing on international trade, the aim has been to employ a source of information that can be used to shed light on the nature of socialism as practiced in Eastern Europe. Thus, the use of foreign trade data results from the comprehensiveness and comparability across countries of that data. The goal of the study is to use that data to understand socialist economies as a whole.

II. Perspectives on the Differences Between Capitalism and Socialism

The overwhelming majority of economists, whether from the West or from the socialist economies, would readily agree that the socialist economies have much to learn from the experience of capitalism. Nothing in the study
that has been undertaken is likely to change anybody's mind on this score and nothing is intended to have that effect. But the study does have some rather profound implications for the way in which economists should analyze the differences in capitalist and socialist economic experience.

At least since the market-socialist debates of the inter-war period, economists' understanding of the behavior of socialist economies, in the West at least, has been very much a product of the way in which capitalism is analyzed. This indeed could be no other way, since Western students of the socialist economies are trained in the same economics departments -- learn the same economic theory -- as those students with more local concerns.

Discussion of the operation of the socialist system, the identification of failures and successes, and debates on the way in which central planning should be reformed -- all these are driven by the view of economic processes that is usually called neoclassical economics. Consider, for example, the following statement of Wiles (1977 p. 404): "The [CPE's] are not catching up any more. What are they to do? To most Western economists and to many Communist revisionists, the answer is simple: decentralize and revivify the price mechanism..." It is easy to see that this answer derives directly from the analyses of neoclassical economics, which emphasize the efficiency of an economic system comprising independent economic agents reacting to the signals of the price mechanism.

An important conclusion of the empirical analysis summarized in this report is that emphases within neoclassical theory might lead analysts in inappropriate directions when seeking to understand the comparative behavior of capitalist and socialist economies. To see the significance of this
conclusion, it is important to understand those emphases and to see how the particular features of neoclassical theory cause economists to focus on some aspects of socialist economies and pay relatively little attention to other aspects. Therefore, in the ensuing paragraphs, I comment at length on the main emphases within traditional neoclassical analysis.

What follows on the limitations of neoclassical analysis is consistent, I believe, with the present views of economic theorists. In the 1970's, theorists began to recognize the problems of the informational assumptions of standard neoclassical analysis. This recognition has resulted in research that questions much of conventional economic wisdom (Holmstrom 1985, p. 200). Indeed, such research reopens debate on the relative informational properties of markets and central planning (Arrow 1987, p. 210); Holmstrom (1985, p. 207); Grossman and Stiglitz (1976, p. 252)). But this new direction for neoclassical economics is only in its infancy and has not yet fundamentally changed the standard analysis used by economists. Although many economists recognize the limitations of traditional neoclassical theory, still those ideas lie at the center of applied economics and policy recommendations.

The comments in this section occupy a disproportionate share of the this report, compared to their share of the book being summarized. The reason for the emphasis here is that the most important conclusion of the book's empirical analysis is that Schumpeterian theory, rather than neoclassical theory, provides the most powerful analysis of the differences in capitalist and socialist economic behavior. In order to appreciate the book's implications then, it is crucial to understand the way in which
acceptance of the Schumpeterian view alters one's perceptions of economic processes.

II.1 The Emphases within Neoclassical Economic theory

The following statements reflect the emphases inherent in modern neoclassical economics. They cannot be said to be literally true of all analyses conducted within neoclassical theory. They reflect the core ideas embodied within standard economics, as that model is presented in advanced textbooks. The statements are therefore reflective of the theory learned by applied economists, among them those who study the socialist economies.

1. Neoclassical theory focuses on the examination of economies in equilibrium in which individual markets attain a balance of supply and demand. Given this emphasis, there is a tendency to adopt the normative view that imbalance is harmful per se and that underemployment of resources cannot have a functional aspect. Moreover, as Nelson (1981, p. 1,059) has remarked, in a different context: "...if equilibrium meant only a tendency for the better economic technique, the more effective organization, the more profitable firm to drive out competitors or to force their reform, there would be no particular difficulty with this concept as a tool for analyzing long-run economic change. The equilibrium concept, however, as it is conventionally employed in economics, does not depict such an economic process; it presumes the process is (always) complete." Hence, neoclassical theory excludes consideration of the processes by which economic change comes about (Arrow 1987, p.203). This emphasis is consistent with the model's informational assumptions, since it is new information -- new products, new technologies -- which promotes change.
2. Neoclassical analysis judges outcomes using the normative criterion of Pareto efficiency. Suited to analyzing the allocation of physical resources between alternative uses, this criterion has not proven useful in evaluating informational activities such as the design of internal organization or the generation and spread of new technologies. Indeed, as Hirshleifer and Riley (1979, p. 1441) remark: "Information generation is in large part a disequilibrium-creating process, and information dissemination a disequilibrium-repairing process....It does not yet seem that we are very close to having an efficiency concept that can be usefully employed to measure the dynamically optimal level of such activities." A subtle bias then ensues. Theory focuses on situations in which the normative criterion is applicable and the policy recommendations of the applied economist center on facets of economic activity illuminated by that criterion.

3. The emphasis on equilibrium and Pareto efficiency interact to give a particularly narrow view of the economic role of entry and exit of firms. In neoclassical theory, entry changes the behavior of existing firms, forcing them to act like perfect competitors (Novshek and Sonnenschein 1987). McNulty (1968) points out how limited is this notion of competition, especially when trying to explain the sources of economic progress. Nowhere is there consideration of the possibility that new entrants might possess something which existing firms do not, nor of the fact that new entrants might destroy existing firms. The neoclassical theory of economic progress then is Lamarckian rather than Darwinian.

4. Neoclassical theory focuses on transactions between firms (and between firms and consumers), not on relations within firms. Within the literature analyzing socialism, this focus translates inevitably into an
assumption of the superiority of arm's length transactions and the notion that bureaucratic interactions are inherently inefficient. This view seems to be stubbornly held despite the fact that ex post inefficiencies are the natural result of ex ante efficient decisions in the presence of informational constraints (Holmstrom 1985, p. 204). Hence, if neoclassical theory is applied without consideration of its limitations, there can be too much emphasis on prices as conveyors of information and profit maximization as the rational decision-making criterion. But there are situations where price information is not available -- new products for example -- and where profit maximization simply cannot be implemented (Nelson 1981, p. 1059). In comparative analysis, the largest danger in this market bias might not lie in misdiagnosis of the problems of socialism, but in overlooking important properties of capitalism -- for example, the fact that a large part of the international transmission of technological information occurs within bureaucracies (Mansfield et al., 1982 p. 14).

Neoclassical theory provides a compelling vision -- all agents acting independently, gathering information that comes free in the form of prices, and behaving rationally by maximizing a simple criterion. Then, society attains an optimum -- no slack, no shortage, no waste. Political ideologies and religious creeds can only aspire to such beauty of rigor, such promise of harmony. Nevertheless, this vision is gained at some cost. If one applies this model to situations where information is private, where markets are incomplete, or where there is imperfect competition, one must assume that every single agent uses a model of the whole economic system (Arrow, 1987 p. 208). "Indeed, under these knowledge conditions, the superiority of market over centralized planning disappears. Each individual agent is in
effect using as much information as would be required for a central planner." (Arrow 1987, p.208) This is a chilling insight for those who have used neoclassical theory and Lange-Lerner market socialism, its descendant, to reflect upon the possibilities for reform of the socialist economies.

III.2 The Schumpeterian View of Economic Processes

Turning away from neoclassical theory, one must be content with a more eclectic style of inquiry: no single rival offers such a consistent, rigorous system. Therefore, I borrow elements from a variety of sources in order to suggest an alternative approach to analyzing the differences between capitalism and socialism. Some major elements of the following arise from a Schumpeterian perspective and I therefore attach that name to this alternative approach. However, some of the following is inconsistent with ideas often associated with Schumpeter.

The alternative, or Schumpeterian, view begins with the premise that the efficiency of static resource allocation is not important in comparisons between capitalist and socialist societies. There are several reasons why this might be the case. First, the perspective of von Mises (1932, p. 63) is that static allocation is not difficult and could be accomplished by a socialist bureaucracy. Second, one might claim that the whole orientation of the apparatus of central planning focuses on resource allocation and that bureaucracies are not as inept as portrayed in the folklore of capitalism. Moreover, there are myriad static inefficiencies in capitalist society, which might rival those of a socialist bureaucracy.

The third perspective on resource allocation, explicitly
Schumpeterian, is that the emphasis on efficiency and competition within a static framework is misplaced:

...[I]t is...competition within a rigid pattern of invariant conditions, methods of production and forms of organization in particular, that practically monopolizes attention. But in capitalist reality as distinguished from its textbook picture, it is not that kind of competition that counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization...This kind of competition is much more effective than the other as a bombardment is in comparison with forcing a door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly...

Schumpeter (1950, pp. 84-5)

Thus, the Schumpeterian view does not say that the neoclassical theory of competition and static efficiency is incorrect, but rather that it describes features of capitalism that are only of secondary importance. Moreover, full employment of resources could even be detrimental to economic progress:

A system -- any system, economic or other -- that at every given point of time fully utilizes its possibilities to the best advantage may yet in the long run be inferior to a system that does so at no point of time, because the latter's failure to do so may be a condition for the level or speed of long-run performance.

Schumpeter (1950, p. 83)

Consistent with such a view, one might mention Mansfield's (1968, p. 117) evidence that excess capacity is necessary for the introduction of innovations.

If one follows a Schumpeterian view, one explains the successes of capitalism by innovation and mechanisms for change, not by any presumed efficiency in static resource allocation. It is natural therefore to look towards the same explanation for the differences between capitalism and socialism.
Studies identifying causes of technological lags in socialist economies usually emphasize two sets of factors. First, there are the myriad dysfunctions of bureaucracy, for example the remoteness of R&D workers from users of innovations. Second, the incentives of enterprise managers to adopt technological change are diminished by features of the structure of prices, of bonus schemes, and of the motives implicit in traditional career patterns. The conclusion follows that the most important steps in speeding up productivity growth would be the decentralization of decision-making and the creation of optimal incentives. This conclusion is completely consistent with the notion that neoclassical theory provides a blueprint for the ideal economy.

Here, I do not intend to dispute the view that bureaucratic structure or incentives play a role in technological change. However, I do question whether these explanations are sufficient to explain the differences in innovation under capitalism and socialism. An alternative but not inconsistent explanation would focus not only on divergences between the CPE's and neoclassical theory, but on the process of economic change.

The alternative explanation notes that the supposed dysfunctions of bureaucracy exist everywhere. The literature on innovation under capitalism contains many references to rigidities and to the gulfs between R&D, production, and marketing personnel. Indeed, for organizations that must produce balance between routine and adaptability, such features might be optimal. The direct consequence of these features, however, is that a large share of capitalist innovative activity is produced by organizations and individuals outside the sector primarily affected by the innovation. Innovation is usually followed by entry of new firms and firms from other
sectors. And these new firms are so important precisely because they are different from the established ones. For, as Arrow (1974 pp. 56-59) emphasizes, new organizations are often essential for change given that established ones have an irreversible capital commitment to existing arrangements. The contribution of the new firms is not competition per se, but rather the fact that they bring something that existing firms do not -- perhaps cannot -- have.

The alternative explanation proceeds with the observation that uncertainty is inherent in innovation. Indeed, the range of possibilities and consequences simply cannot be specified (Nelson 1981 p. 1046). A new technology is a venture into the unknown. Consumer reactions to a new product are unpredictable. Moreover, a significant part of technological change lies in learning-by-doing, the lessons of which take many years to assimilate and are not easily transferred.

Given the uncertainties in the development and use of new technologies, there can be no consensus on the optimal way to proceed. In fact, the optimum is revealed only after a long process of learning. Therefore, society needs a mechanism to generate experience with a diverse set of alternatives and a mechanism to use that experience in choosing between options. Moreover, there must be a means of shifting resources to the chosen alternative despite the difficulties of transferring the lessons of experience between organizations.

How do capitalist societies accomplish the process of generating alternatives, selecting among them, and executing the required changes? The process of free entry -- new firms, firms from other sectors, foreign firms -- implies that many innovations are undertaken and a variety of experience
The more successful innovators grow much faster (Mansfield 1968a, p. 106) and firms that made the wrong bet exit (Gort and Klepper 1982). The process of growth of the successful and demise of the unsuccessful is fundamental because the lessons of experience are costly to transfer outside an organization. Growth and change is accomplished not so much by the effect of competition on the behavior of existing units but rather by a changing balance of firms through growth and selection. This then is not the competition of Arrow-Debreu or of Marshall, but rather that of Darwin or Schumpeter.

The above discussion emphasizes that some economic activities must be undertaken within organizations. Neoclassical theory cannot produce such conclusions because it does not analyze the way in which transactions are divided between bureaucracies and the market. Moreover, by treating bureaucracies as black boxes and focusing on the efficiency of arm's length transactions, there is a tendency for the model to be interpreted as showing the efficiency of the market compared to bureaucracy. But such interpretation is inappropriate, and especially inconsistent with theory on the nature and causes of internal organization (Williamson 1975). Focusing on informational difficulties, this theory shows that some transactions are accomplished most efficiently within bureaucracies. Examples of such transactions are the transfer of technological information and the exchange of goods for which quality is difficult to ascertain.

The observations on the advantages of internal organization apply equally to transactions across borders. Therefore, one can expect that multinational corporations play a large role in the transfer of technology. Three-quarters of direct technology transfer by U.S. corporations is
adjudged to flow to affiliates of multinational corporations rather than at arm’s-length to licensees. Indeed, it has been claimed that technology transfer is exactly the activity in which multinationals excel (Dunning 1983, p.348). For example, Mansfield et al. (1982, p. 36) estimate that it takes six years to transfer a technology overseas to the subsidiary of a multinational in a developed economy, but the lag is thirteen years if licensing is the method of transfer.

There is another way in which multinationals could be instrumental in technology transfer -- through the exchange of new products. Presently 75% of R&D activity is directed at creating new products, as opposed to new processes (Scherer 1984, p. 448). New products are difficult to exchange at arm’s-length because the value of new technology is hard for a buyer to estimate, especially in view of the fact that learning-by-doing is important in using the item. For some new products, internal transactions might be the only feasible mechanism of exchange.

Countries refusing to countenance the internal operations of multinational corporations lose two sources of technology -- direct transfers occurring within organizations and technology embodied in new goods that cannot be easily exchanged on the market. The CPE’s are such countries, of course. Even joint ventures between Western corporations and CPE enterprises are rather rare (Zaleski and Wienert 1980). And, of course, joint ventures, where a contract must be negotiated between two separate entities, are no real substitute for internal organization.

In the above discussion, I have emphasized two features of capitalist society that might, at first blush, seem somewhat unconnected -- the generation of, and adaptation to, new technologies and information
transmission within multinationals. But in fact the connection is direct.
The above analysis simply emphasizes that price competition and static
efficiency are only a small part of the story when examining economic
success. Two other features of economic organization are more important.
First, society must widen the bounds of possible sources of new
technologies. Hence both free entry and foreign firms are important.
Second, the new technology can best be spread by the expansion of successful
early users and the contraction of the unsuccessful, rather than by
information transfer between agents. Hence, one emphasizes both freedom for
domestic enterprises to expand (and fail) and the importance of cross-border
internal organization -- the multinational corporations.

The above characterization of the essential elements of capitalist
innovation has important implications both for economic reform of socialist
economies and for comparisons of capitalism and socialism. The above
implies that decentralization is not sufficient for technological change, if
decentralization means merely more latitude for existing enterprises. What
is needed is cross-sectoral -- or even cross-national -- movements of firms,
a variety of approaches to innovation, and expansion of the successful
through multi-plant operations. These features are usually not elements in
discussions of reform, which focus primarily on perfecting prices,
optimizing incentives, and decentralizing decisions to the enterprise
level.\textsuperscript{12} The implications of the Schumpeterian view for economic reform are
indeed profound.

If the above analysis is correct, there flow important consequences
for comparisons of capitalism and socialism. In the book which this report
summarizes, these consequences are formulated in precise terms and examined
using a variety of econometric techniques. The core of that book is in fact the formulation of the empirical analysis. That analysis is described in the ensuing sections, beginning with a description of the theoretical investigation that drives the empirical work.

III. The Theory Underlying the Empirical Analysis

The ultimate goal of the study is not primarily to analyze the international trade of socialism but rather to use trade data to understand the effect of economic system on economic behavior. The central assumption underlying this methodology is that the world is a seamless web, with trade patterns inevitably reflecting the internal character of economies. Those doubting the reasonableness of this assumption for Eastern Europe should find their doubt dispelled by considering whether they would predict that the Soviet Union exports as many VCR's as barrels of oil. The question is not whether trade depends on the character of the domestic economy, but how. Many theoretical ideas on the nature of that dependence were considered in the course of the study.

There are two basic sources for the analysis of the trade behavior of the CPE's. First, there are the models of trade developed by neoclassical economists for the analysis of capitalist societies. Batra (1976) and Rosefielde (1981) have both suggested that such models have applicability for the centrally-planned economies. The most important of these models is the venerated Heckscher-Ohlin model, which focuses on the way in which a society allocates its most basic physical resources (labor, capital, land, etc.).13 A further neoclassical model is of more recent vintage, emphasizing the fact that much international trade occurs because countries are able to create a unique set of products, differing in characteristics
from those available domestically. In the rest of this report, I will call these theories the Heckscher-Ohlin and "product variety" theories, respectively.

Both these theories generate explicit models predicting the cross-sectional nature of international trade. Hence, the models can be given empirical content. In such an exercise, a particularly interesting question involves examining how closely the CPE’s fit models estimated for market economies. Hence, one can test the following two hypotheses:

Hypothesis -- the trade of the market economies conforms more closely to the Heckscher-Ohlin model than does the trade of CPE's.

Hypothesis -- the trade of the market economies conforms more closely to the product variety model than does the trade of CPE's.

Both of these hypotheses are tested in the book presently being summarized.

The importance of these hypotheses is that they relate very closely to the distinction between the neoclassical and Schumpeterian perspectives that were outlined in the previous section. The Heckscher-Ohlin model focuses purely on the ability of a country to allocate physical resources. There is no assumption in that model that a country is a fundamental innovator. The assumptions of the Heckscher-Ohlin model could be rationalized by positing that countries can obtain the most advanced technologies through market transactions or by imitation. The ability to imitate, but not necessarily to innovate, is implicit in the Heckscher-Ohlin model. That model quite clearly, therefore, represents the neoclassical perspective outlined in Section II.1 above.
In contrast, the product variety model assumes that a country produces a unique set of varieties of any good. Therefore, each country must have, to some degree, developed its own technology.\textsuperscript{14} Imitation or the use of a foreign patent cannot lead to the types of behavior assumed in the model. The product variety model implicitly assumes that a country does some innovation of its own. That model therefore contains elements of the Schumpeterian perspective, summarized in Section II.2.

The phrasing of the above hypotheses represents the traditional way in which comparative economists have thought about the centrally-planned economies. Usually it is assumed that the CPE's are thoroughly different in all respects from the market economies. Further, there is a strong tendency for economists to assume that the CPE's are inefficient because of the nature of their institutions. The character of institutions causes specific types of economic behavior that cannot be considered to promote the maximization of economic welfare. Knowledge of the institutional structure of the CPE's is therefore the second source of information that is relevant to making predictions about the way in which the CPE's conduct international trade.

The book examines the ways in which the organizational features of CPE's might distort trade patterns away from those that are rational for an economy that makes maximum use of its resources. Myriad hypotheses about such distortions are implicit in the works of scholars who have previously described and analyzed the CPE's. This summary is too brief to show the full variety of hypotheses which the book examines, but a small sample can be given to provide some flavor of the types of arguments that are usually made.
For example, Rosefielde (1973 p. 126) has argued that since allocation decisions in CPE's are made on the basis of comparative costs, systematic distortions in the price system are likely to be reflected in trade decisions. Throughout their history, the socialist countries have wrestled with the dilemma of using interest rates because such practice could be construed as inconsistent with Marx's Law of Value. An uneasy compromise has led to an undervaluation of capital. Then, following Rosefielde one might postulate:

Hypothesis -- the undervaluation of capital in CPE's leads to greater net exports of capital intensive goods than would be the case if there were no distortions in the price system.

As another example, one might reflect on the absence of multinational corporations in Eastern Europe. When allowed to function in a country these firms play a very important role in the transfer of technology, advancing such transfer between developed countries by an average of seven years, according to the estimates of Mansfield et al. (1982 pp. 14, 36). Because the importance of multinationals varies across sectors, their absence in CPE's will lead to a distinctive structure of relative costs and therefore a distinctive pattern of trade. Since the role of the multinationals is in facilitating trade -- both exports and imports -- one would postulate that their absence in Eastern Europe has the following effect:

Hypothesis -- CPE's evidence a lower level of trade in those sectors in which multinational corporations are most important in market economies.

The book's theory results in a host of such hypotheses, of which the above
are only examples. More examples of these hypotheses will be given when the books results are discussed in later sections of this report.

IV. The Data

The basic data used in this study were the foreign trade statistics collected by the United Nations. The study used trade data at the 3-digit level of the United Nations Standard International Trade Classification, which contains 182 commodity groups. This data had to be used in a very specific way, given the countries that were the focus of the research.

The method of creating the data relevant to a particular country's trade was partially determined by data availability and partially by a methodological consideration regarded as central to the research. The study aimed at a truly comparative set of results. That is, the results were derived using methods that treat all countries in an identical manner. Only by using such methods can one be sure that those results are the product of real differences between countries, rather than caused by some artifact of the data collection process.

If one insists on exact comparability of trade measures across countries, difficulties arise when using countries' own reports of their foreign trade. The trade reports of most CMEA countries cannot be easily made comparable with those of Western nations. The U.N. and CMEA classification systems are so different and prices within the CMEA are so far removed from world market prices that any attempt to reconcile the reports of Eastern and Western countries would be fraught with grave difficulties. Many ad hoc judgments would be necessary in order to accomplish the reconciliation. The end result would be data for East and West that few researchers would trust for comparative analysis.
For the above reasons, I decided to use only data reported to the United Nations in this study. Hence, the trade measures for each country were assembled from the reports of their trading partners — the so-called mirror statistics, whose construction is described in much greater detail in the book. Thus, for example, Hungary's exports of wine were found by summing British imports of Hungarian wine, Swedish imports of Hungarian wine,..., etc.

The mirror statistics do not cover the whole of a country's trade behavior. Because some countries, most particularly the Eastern European ones, do not provide trade statistics to the U.N. and because obtaining data from all reporting countries would have consumed a prohibitive amount of research resources, only a subset of a country's trading partners is used. Of course, in order to ensure comparability, the same trading partners are employed to construct each country's trade statistics. The subset chosen comprises 40 countries that together undertake approximately 80% of world trade and virtually all of non-CPE, non-OPEC trade. For the countries of interest of this study, the primary cause for concern in using this partial trade data lies in the omission of intra-CMEA trade. The effects of such omission are discussed at length in the book which this report summarizes. As far as can be judged from the information available, the omission of intra-CMEA trade does not have an effect on the general conclusions that are drawn in the book.

The basic trade data comprises three measures. $X_{ij}$ is the gross exports of good i by country j to the 40 countries from whom the reports were obtained from the U.N. Similarly, $M_{ij}$ is gross imports and $W_{ij} = X_{ij} - M_{ij}$ is net exports. The i subscript is taken to vary over
the 182 3-digit categories of the SITC. The \( j \) subscript varies over a large number of countries (77), chosen so that there were enough data points to make valid comparisons between the CPE's and Western economies.

It is important to emphasize the fact that Western and Eastern countries were treated identically when the trade measures were created. Even though it would be possible to obtain the measures \( X_{ij}, M_{ij}, \) and \( W_{ij} \) for a Western country, \( j \), from its own trade reports, these reports were not used in constructing \( j \)'s data. The trade data for Western countries were found in the same manner as those of Eastern countries.

\( X_{ij}, M_{ij}, \) and \( W_{ij} \) are summaries of only a part of a country's trade behavior -- that element conducted with the countries whose trade reports were obtained from the U.N.. These reporting countries undertake a larger share of trade within the West than in Eastern Europe. Therefore, for the nations that are of central interest in the study -- the members of the CMEA -- \( X_{ij}, M_{ij}, \) and \( W_{ij} \) cover a much smaller proportion of total trade activity than they do for Western countries. One would not want to use these mirror trade statistics in an analysis that focuses on the level of trade.

To avoid problems that might arise when using data on the absolute size of trade flows, one can transform those data to obtain measures of the structure of trade. Therefore, for exports and imports, one creates:

\[
X_{ij} = \left[ \frac{T}{N} \sum_{t=1}^{T} \frac{X_{it}}{\sum_{n=1}^{N} \sum_{t=1}^{T} X_{nt}} \right] / \left[ \frac{1}{N} \sum_{n=1}^{N} X_{nj} \right]
\]
Then one can also combine these measures to form:

\[ w_{ij} = \frac{x_{ij}}{m_{ij}} \]

which measures total trade performance in a particular commodity category.

The variables defined in the above formulae are usually referred to by the name coined by Balassa (1967) -- revealed comparative advantages. Their structure shows that they summarize the performance of a country in a particular commodity by comparing the country's proportion of trade in that commodity to the world's proportion of trade in the same commodity. These were the basic measures used in the empirical analysis of trade data contained in the book.

V. The Results

The results from this study can be conveniently divided into three groups. Those summarized in Section V.1 focus on characteristics of trade that are less usually studied -- for example the effect of the absence of multinational corporations or the effect of a country's poor performance on salesmanship. The results summarized in the following section focus on the standard trade determinants, such as labor and capital. The primary difference between these two sets of results is that for the standard trade determinants it is possible to study trade within a multi-endowment model that considers a country's trade in a particular good as depending
simultaneously on a number of endowments. For the non-standard trade
determinants, cross-country data is not available in the amount and the
quality that is required for such rigorous modelling. For these trade
determinants, one has to be content with some basic summary statistics on
trade, rather than the output of a formal model. Finally, Section V.3
examines how well the data of capitalist and socialist economies fit these
multi-endowment trade models. Such an analysis of goodness-of-fit reveals
which types of economic theories are most relevant to which types of
economies.

V.1 Measures of Performance on Non-Standard Trade Determinants

To think about the types of results that are summarized in the present
section, consider, for example, Holzman's (1979) suggestion that CPE's tend
to breed managerial personnel with little ability for salesmanship, a
property of CPE's that is reflected in trade patterns. Formal econometric
testing of the effect of salesmanship on trade would be difficult even for
Western countries because cross-country measures of endowments of
salesmanship are simply not available, nor are there any obvious proxies.

Qualitative information can provide a basis for empirical work when the
"resource endowment" of interest cannot be quantified. Often, one knows
which goods use a particular endowment intensively in production. If one
creates measures of trade performance of a country for these goods, then one
might be able to deduce some facts about the endowment of interest. For
example, suppose that one can find which 3-digit commodities most require
salesmanship. This could be done, for example, by examining the statistics
on the cost-structure of manufacturing companies in some Western country.
Then one could construct "revealed comparative advantages" for these goods,
using the formulae given above. By comparing the revealed comparative advantages for CPE's with those for a matched group of market economies, one can discover whether salesmanship is really an important ingredient of success in international trade and whether the CPE's have really performed badly along this dimension.

In the aforementioned book, there is much discussion of the properties of the revealed comparative advantages and of the circumstances under which these measures give reliable information on the hypotheses to be tested. It is impossible to summarize this technical discussion here. Nevertheless, the reader can be assured that the revealed comparative advantages do have the properties that are needed for them to convey accurate information. Thus, this summary will proceed directly to a discussion of the implications of this first set of results.

In section II of this report, I distinguished "neoclassical" and "Schumpeterian" viewpoints on the differences between capitalism and socialism. Many of the foregoing results reflect on those viewpoints. Which of those viewpoints best explains the differing trade behavior of CPE's and capitalist countries is really the main message of the research reported here. Thus, a convenient way to briefly summarize the results on non-standard trade determinants is to show that collectively the empirical analysis strongly supports one of these viewpoints.

There are three ways in which the different results bolster the Schumpeterian perspective, as opposed to the traditional one. In reverse order of importance, the three are:

1. Some of the analysis reveals patterns of trade that are
inconsistent with the predictions of the neoclassical approach, while not bearing directly on predictions from the Schumpeterian perspective.

2. The data give results supporting Schumpeterian predictions, while not bearing directly on predictions based on the neoclassical view.

3. Some conclusions from the empirical analysis support the Schumpeterian predictions, while being inconsistent with the neoclassical approach.

Facts that fall in the first category are the following:

a. When decisions are made at the apex and implemented through a hierarchy, some attention must be paid to the costs of organizational complexity. The simplest way to reduce those costs is to limit the number of operational units; hence, production units are larger in CPE’s than in ME’s. When there is a bias towards large scale, relative costs increase in industries in which firms are subject to diseconomies of scale. The neoclassical analysis would say that such costs are significant and must affect trade patterns. However, that data reveal that the predicted effect -- that CPE’s have a comparative disadvantage in decreasing-returns-to-scale industries -- does not occur.

b. The leaders of CPE’s seem to have sought growth at the expense of alternative economic goals, including protection of the environment. Hence, if trade is rational, one would find that the CPE’s are likely to have a comparative advantage in goods whose production results in a large amount of pollution. The results reveal such trade patterns, indicating that cost calculations do strongly influence the pattern of trade in a direction that is "rational", given pollution policy. The neoclassical analysis, focusing
on the absence of rational prices in CPE's, would not predict such a rational trade policy.

c. The results on goods that are of high quality and on goods that require much advertising show patterns of trade that are consistent across CPE's and different from those in market economies. Thus, these results evidence a pattern of rational reaction to economic circumstances that is inconsistent with the emphasis in the neoclassical literature on the static inefficiency of resource allocation in CPE's.

Results of the second type are as follows:

d. The Schumpeterian analysis predicts that the free entry of firms is a vital force of economic advance under capitalism. Socialist economies lack this wellspring of technological advance and organizational change. The results show that the CPE's have a striking comparative disadvantage in those industries in which free entry is important, thus supporting one of the fundamental Schumpeterian predictions.

e. The CPE's have a low level of imports in sectors in which the multinationals are important, even though these are high-technology sectors in which the CPE's have a comparative disadvantage. This is consistent with the Schumpeterian perspective, which emphasizes that technology cannot be easily bought at arm's length by existing firms.

In the third category of results, one has the following:

f. For a variety of reasons, the Schumpeterian perspective directly leads to the conclusion that CPE's will be deficient in product innovation, but not necessarily in process innovation. First, the absence of entry is critical. New products are often generated outside a particular sector, whereas new processes tend more often to arise in existing firms. Second,
decisions on new processes can be cast much more easily into the rational cost-benefit framework favored by CPE’s than can decisions on new products. Third, new process technologies are easier to disseminate without internal organization than new product technologies. Thus, new product technologies must be spread by the relatively rapid rise of innovators, rather than by communication between sovereign enterprises. The presence of a rigid structure of growth in CPE’s might inhibit the ability of the economy to adapt quickly to the rise of new products. Lastly, the need for internal organization means that importers of technology must rely critically on multinational corporations for new product technologies.

For all the forgoing reasons one would predict, from the Schumpeterian perspective, a striking contrast between the CPE trade performance in process-innovating sectors and that in product-innovating sectors. The neoclassical analysis predicts the same effects on technological change in both types of innovating sectors. In fact the results, supporting the Schumpeterian view, show that the CPE’s are woefully deficient in developing new products, but actually have a comparative advantage in process-innovating sectors.

g. If the CPE’s can conduct trade rationally, they can actually take advantage of the inefficiencies in market economies by exporting goods in which monopolistic tendencies prevail under capitalism. The results do show that CPE’s are successful in the sectors in which concentration is high in the West. This would surely argue that CPE ability in static allocation of resources could equal that of the market economies.

h. The results as a whole show that Hungary and Yugoslavia can be viewed as typical CPE’s. From the neoclassical view, this is inconsistent with the
fact that these two economies are much more decentralized than the rest of Eastern Europe. From the Schumpeterian perspective, this is consistent with the fact that the essence of the market is a process akin to natural selection, not decentralization.

This above list of facts could arise only if the Schumpeterian view was more powerful than the neoclassical perspective in analyzing the differences between socialist and capitalist economic behavior. The results in the next section also support that conclusion.

V.2 The Factor Content of Trade

The Heckscher-Ohlin model allows one to formulate a multi-equation model that relates trade to resource endowments in all countries (Leamer 1984). This model can be adapted to use as its dependent variables the revealed comparative advantages, which were defined in Section III of this report. In the research summarized here, this adapted model is used in combination with new econometric techniques to produce valuable information on the trade behavior of CPE's.

To understand the nature of the results, one must realize that more data are available for Western economies than for CPE's. In particular, Leamer (1984) has developed data on the values of eleven resource endowments across a wide variety of Western economies. The statistical procedures use these Leamer data plus data on trade in both CPE's and market economies to estimate the values of resource endowments that are implicit in the trade patterns of CPE's. These estimates show, for example, the capital resources that are consistent with the trade of a country, if that country were conducting its affairs efficiently. Hence, one can tell whether that country has a capital-intensive bias to its trade or not.
The econometric procedures begin with the relationship derived from the Heckscher-Ohlin theory. That theory postulates that trade performance is determined by the levels of resource endowments possessed by a country. The first step in the procedures is to find the set of countries for which data on both trade performance and resource endowments is available -- the Western countries. With the Western data, containing both exogenous and endogenous variables, one can estimate the relationships between trade performance and resource endowments. At the most basic level of understanding, obtaining the estimates of resource endowments implicit in trade simply entails inverting these relationship. (There is much econometric nuance behind this process of "inversion", but details are omitted here.)

These econometric procedures also allow one to develop a picture of the temporal progression of trade patterns. These procedures give a set of linear relations between estimated internal characteristics and observed trade patterns. Thus, for any period in which trade data are available, one can simply use these linear relationships to obtain a time series of estimated endowments. Of course, the interpretation of these estimates has to be somewhat tentative, since one has ignored the temporal changes in the linear relationship that occur in reality. (The Western endowment data is only available for estimating the relationships in 1975.) Nevertheless, given careful interpretation, there is much information in the time series of estimated endowments.

The data from Leamer (1984) allow one to develop the results for the following endowments:

- per capita capital stock, in thousands of current U.S. $'s per person,
proportion of population who are professional and technical workers,
proportion of population who are non-professional literate workers,
proportion of population who are illiterate workers,
hectares of tropical land per person,
hectares of dry land (desert and steppe) per person,
hectares of humid mesothermal land per person,
hectares of humid microthermal land per person,
value of coal production per person, in current U.S. $'s,
value of mineral production per person, in current U.S. $'s,
value of oil and gas production per person, in current U.S. $'s.

The book contains estimates of the values of these eleven endowments that are implicit in CPE trade patterns for 1975. Moreover, there are time series of (less reliably estimated) implicit endowments for the years 1966, 1972, and 1975-83. It would be no exaggeration to say that nothing approaching this detail of information on CPE trade patterns has ever been offered before.

The results on implicit endowments constitute a large body of new evidence on the behavior of the socialist economies. Thus, the implications of that evidence cannot be easily and succinctly summarized. The most important contribution of this element of the research to the understanding of the nature of the CPE’s lies in the details of the results -- details which provide much information for both country specialists and scholars of comparative economic behavior.

One central message does, however, present itself in the results on endowments. This is the reasonableness of the estimates, given currently available information on the CPE’s. Especially for the more orthodox CPE’s,
the estimated factor contents present a coherent picture and one that is largely consistent with objective economic circumstances. The results certainly do not lead to the characterization of the CPE’s as having an irrational structure of trade, as they are often portrayed, even in academic writing. To be sure, there are some consistent signs in the estimates of behavioral causes of inefficiencies. Particularly strong examples are the tendency to over-export land-intensive products and the relatively slow adjustment to changing world energy prices in the 1970’s. But these abnormalities are surely much less significant than one would expect given the general tenor of current writing on the socialist economies. For example, nowhere in the data is there evidence of expected pathologies such as a large capital-intensive bias to exports.

A central conclusion emanating from the results on implicit factor contents is that the basic neoclassical model of trade -- the Heckscher-Ohlin model -- is eminently applicable to the socialist economies. For the orthodox CPE’s, one applies that model and obtains sensible results. One certainly does not get a picture of irrational resource allocation. This conclusion, however, does not apply to the two reformed economies, Hungary and Yugoslavia. The results for the latter country especially do not present a picture that one could describe as coherent. Yugoslavia evidences an extreme bias towards the importation of capital-intensive products and a concentration on exportation of products intensive in natural resources, fuel and land. Thus, there is little evidence that decentralization and price rationalization, as currently practiced in socialist reforms, can improve the rationality of static resource allocation of the socialist economies. Hence, to diagnose the economic failures that
might be present in CPE's and to suggest remedies, one cannot use the lens of neoclassical theories.

V.3 Do Socialist Economies Exhibit an Irrational Trade Pattern?

Given that the results on the implicit factor content of trade seem to imply that the centrally-planned economies fit the Heckscher-Ohlin model well, it is an interesting exercise to find out just how good this fit is, especially in relation to the market economies. Therefore, in the final analysis of the book, I present estimates of the degree to which the trade patterns of market and socialist countries can be said to be similar. In the book, I develop theoretical arguments seeking to interpret the meaning of those measures. Two such interpretations are suggested -- "coherency" and "static efficiency", the former based on very weak assumptions, the latter requiring much stronger assumptions. The concepts of coherency and static efficiency really represent the weakest and strongest interpretations of the results, amongst a continuum of interpretations.

The weakest interpretation of the results presently being summarized is that they follow in the same vein as a host of previous studies searching for differences between socialist and capitalist economies. "Coherency" therefore just measures the closeness with which a country's data fits a particular estimated model. Many measures of coherency are therefore possible, depending on the particular model that has been used and the data employed to estimate it. The significance that can be attached to a specific numerical measure of coherency therefore depends upon the intellectual force that stands behind the theoretical model and the closeness with which the empirical implementation is tied to that model. In the cited, I measure the degree to which CPE trade conforms to patterns
found using a neoclassical model of trade that is estimated for market economies. Given the central role that such models play in the economics literature, results on the closeness with which CPE's fit these models are obviously of great significance.

The strongest interpretation -- "static efficiency" -- of the results presently being discussed is based on the strong normative implications of the theoretical model that is employed in the empirical work. The details needed to justify this interpretation cannot be easily summarized here. However, the idea is simple -- under strong assumptions deviations from rational trade patterns indicate deviations from static efficiency. Given those assumptions, all countries have the same mapping from trade patterns to resource endowments, where the latter includes a static-inefficiency causing endowment. Then, the residuals in estimated Heckscher-Ohlin relationships are monotonically related to static inefficiencies. Hence, one can use the Heckscher-Ohlin relationships for market economies and the trade patterns of all countries to construct indicators of static efficiency, comparable across market economies and CPE's.

Given the importance attributed to static efficiency by economists and given the tendency to emphasize the superiority of the market in achieving efficiency, it is perhaps surprising that there is a dearth of studies that give cross-country comparable measures of static efficiency. As Pryor (1985, p. 193) has concluded:

Computations of relative efficiency of different nations are very difficult and we have no unambiguous empirical evidence that price allocation systems are any more efficient than physical allocation systems.

Hence, any results reflecting upon the notion of static efficiency can make
a significant contribution to the understanding of the socialist economies, even if the assumptions underlying them are rather strong.

When examining the degree to which various countries fit the empirically implemented trade models, the Eastern European countries, on average, have a much closer fit than the groupings of market economies. Only two Eastern European countries stand out as having poor performance, Poland and Yugoslavia. The poor performance of these two countries on the econometric tests is of course absolutely consistent with that which would be expected on the basis of their economic performance in the years following 1975.

Yugoslavia’s results force one to doubt whether decentralization improves the allocation of resources in socialist societies. These doubts are increased by the observation that Hungary fares worse than all its neighbors except Poland and Yugoslavia. The results on "coherency" or "static efficiency" are totally inconsistent with the idea that market-socialist reforms can increase the performance of centrally-planned economies in allocating resources.

The most striking results on the degree of closeness of fit to the Heckscher-Ohlin model are those for the orthodox centrally-planned economies, excluding Poland. Each of these economies conforms more closely to that model than any matched set of market economies. Nowhere is there evidence supporting the first hypothesis given in Section III above, which embodies a view that seems to be overwhelmingly supported by economists who study Eastern Europe. That hypothesis states that the Heckscher-Ohlin model -- the most widely used neoclassical model of trade -- fits the market
economies better than the CPE's. Insofar as can be ascertained, given the data available, this hypothesis must be rejected.

Because the Heckscher-Ohlin model is the most venerated in international trade theory, the analysis summarized so far has focused on that model. However, one can do the same analysis for the product variety model that was discussed in Section III. The results for the two different models present a striking contrast. The relative performance of the CPE's is reversed. The groupings of Eastern European economies fit the product variety model less well than any matched grouping of market economies.

The interpretation of the contrasting results for the two models arises naturally from the intuition underlying them. The Heckscher-Ohlin model focuses on the ability of a country to rationally allocate physical endowments. That model does not reflect upon the nature of product development, the role of marketing, the importance of quality control, etc. In contrast, the product variety model focuses on the types of behavior that occur in industries subject to product differentiation. In such industries, the rapid creation of new products is important as well as the ability to sell these new products on world markets. As discussed above, the ability to produce new products is dependent on the extent of free entry in the economy and on the degree to which multinationals are willing and able to function within the domestic economy. The ability to sell those new products is dependent on marketing skills, a reputation for quality, and on access to the resources of multinational corporations. All of these ingredients in economic success are factors stressed by the Schumpeterian model. Hence, the contrast between the relative performance of the CPE's on
the Heckscher-Ohlin and product variety models can be best understood from a Schumpeterian perspective.

The analysis in the book does not delve in great detail into its implications for the future of the Eastern European economies. But given the results generated, and the fact that they overwhelmingly support the Schumpeterian hypothesis, one does not have to reflect deeply to realize that the implications are profound. Stated in their simplest, but bluntest, form the results imply that no reform in Eastern Europe will improve economic performance unless that reform allows some degree of free entry for new firms and gives the multinational corporations a real role in the economy.
1. For example, examine Varian's (1984) excellent textbook. The new approaches are still treated as peripheral, within a last chapter. What I have called standard neoclassical analysis gets the first seven chapters. Advanced textbooks are of course not representative of what theorists are researching, but they are representative of what applied economists learn.

2. For the most complete exposition of the set of ideas upon which I loosely draw, see Nelson and Winter (1982). They use the term "evolutionary" to describe their approach.

3. I especially reject the hypothesis that large corporations are the most efficient means of undertaking all necessary innovation. This hypothesis seems to have been rejected by modern Schumpeterians. For the relevant evidence, see Baldwin and Scott (1987), especially their conclusion on page 111.


5. See the Wiles (1977 p. 404) quote given above.

6. See, for example, Mansfield (1968a, pp. 88-9), Utterback (1979, p. 54) and Scherer (1980, pp. 437-8).

7. See, for example, Mansfield et al. (1971, p. 16), Gort and Konakayama (1982, p. 1115), and Baldwin and Scott (1987, pp. 111-112).


9. Witness Akio Morita's (1986, p. 82) comment that no amount of marketing expertise could have predicted the success of the Sony Walkman.

10. See, for example, Scherer (1980, pp. 437-8), Utterback (1979, p. 48), Mansfield et al. (1971, p. 14).

11. "Direct" technology transfer is taken to mean that which is the direct object of an exchange, rather than transfer that is implicit in the exchange of a good. The estimate is from Vernon (1980, p. 737). Of course, such estimates, obtained from data on payments for technology, are highly imprecise.

12. For such views of reform see Bornstein (1977, p. 108), Gregory and Stuart (1986 pp. 394-6), Hare (1987), and, of course, the many authors who take Lange (1938) as a blueprint. Also, these views are implicit in the diagnoses of the problems of CPE's given for example by Nove (1980 pp. 37-8) and Bergson (1978, p. 43).

13. See Leamer (1984) for a complete discussion of this model.
14. Here, I ignore the role of multinational corporations in using domestic R&D facilities to develop products to be made on foreign territory. The statement in the text therefore applies most directly to countries that do not allow multinationals to operate on their territory.

15. Upwards of 150 nations.

16. One country's trade reports at the 3-digit level for one year consists of 40,000 items of information.

17. The relevant information on shares of world trade can be found in Kelly (1982).

18. This conclusion is consistent with that of Rosefeld (1981), whose work has tended to contrast with the tenor of the prevailing literature.


20. There is one study whose ideas bear some relation to the ones presently being summarized, that of Rosefeld (1981). Rosefeld's notion of "fundamental comparative advantage" entails the idea that cost considerations, of the type witnessed in market economies, also play a role in planned economies.
REFERENCES


Addendum to the Report on Contract No. 802-10

The purpose of this addendum is to describe the data that is now available as a result of the completion of the Contract and to explain how scholars can obtain these data. All inquiries concerning the data should be addressed to:

Professor Peter Murrell  
Dept. of Economics  
University of Maryland  
College Park  
MD 20742  
(301)-454-4835.

On request, the data will be supplied, at cost (i.e., the price of postage, a floppy disk mailer, and 10 floppy disks) on diskettes that are readable by IBM-compatible machines. The data can be supplied either on 5-1/4" or 3-1/2" diskettes. This Addendum will also be on one disk in ASCII format. Its file name will be READ.ME.

As a result of the study, a set of mirror foreign trade statistics were constructed from the basic U.N. trade tapes. The statistics were obtained from the reports of 40 countries. This list of 40 countries is detailed in Table I, below.

In order to conduct a comparative empirical analysis, the mirror trade data were constructed for a large range of countries, 77 in number. These countries are listed in Table II, below. The order of countries on that list corresponds to the order of countries in the data files that are described below. This list of countries is in linear form, rather than in several columns, to facilitate easy computational manipulation of the names. (The present document will be on the data disks in ASCII format and so can be read into standard word-processing or spreadsheet programs.)

The mirror data have been constructed at the 3-digit SITC level for exports and imports for the years 1975 to 1983. Thus, there are 18 3-digit
files, labelled E75, I75, E76, I76, ... etc.. (Obviously, the letter in the name refers to either exports or imports, the number to the year.) Category 001 (live animals) of the SITC is missing, leaving 181 categories.

Each file comprises 181 blocks of information, each block comprising one SITC category. The block begins with the 3-digit code, then follows the year, and then the trade figures (in thousands of U.S. $'s) for the 77 countries listed in order in Table II. Each item of information occupies eleven spaces, with the numbers right-adjusted. The FORTRAN format (which is used by most standard programs) for the export files is --

\[(11X,2I11,8F11.0/6(11F11.0/),3F11.0)\]. The FORTRAN format for the import files is -- \[(11I,11X,11I,8F11.0/6(11F11.0/),3F11.0)\]. The two types of files are given these slight differences in format in order to ensure that the two types of data are not confused. The data can also be read into programs using free format since there is at least one blank space between each piece of information. This means also that they can be read straight into spreadsheet programs such as Lotus 123. (On that program one would use the /File/Import/Numbers command.)

There are also four files of two-digit information for the years 1966 and 1972. These files are called E66, E72, I66, and I72. They are constructed in exactly the same manner as the 3-digit files, the only difference being the amount of information. Users should also note that these files use 2-digit codes, so that a "67" industry code on the 2-digit files actually means "670" in the 3-digit classification system.
<table>
<thead>
<tr>
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<th>Country</th>
<th>Country</th>
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</thead>
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JAMAICA
TRINIDAD
PANAMA
ISRAEL
JAPAN
IRAN
IRAQ
JORDAN
SYRIA
TURKEY
BANGLADESH
SRI LANKA
HONG KONG
INDIA
INDONESIA
KOREA, SOUTH
MALAYSIA
PAKISTAN
PHILIPPINES
SINGAPORE
THAILAND
CHINA
KOREA, NORTH
BELGIUM
TABLE II: COUNTRIES WHOSE MIRROR TRADE STATISTICS ARE IN THE DATA SET

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<tr>
<td>VENEZUELA</td>
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<tr>
<td>COSTA RICA</td>
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DENMARK
FRANCE
GERMANY, WEST
GREECE
IRELAND
ITALY
NETHERLANDS
UK
AUSTRIA
FINLAND
ICELAND
NORWAY
PORTUGAL
SWEDEN
SWITZERLAND
SPAIN
YUGOSLAVIA
ALBANIA
BULGARIA
CZECHOSLOVAKIA
GDR
HUNGARY
POLAND
ROMANIA
USSR
AUSTRALIA
NEW ZEALAND