# An Evaluation of the Success of the Hungarian Economic Reform: An Analysis Using International-Trade Data[1]

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The behavior of centrally planned economies (CPE's) will markedly differ from that of market economies (ME's). Tests of the success of decentralizing reforms in Hungary are based on comparing the behavior of post-reform Hungary to CPE's and ME's at similar levels of development. The basis of comparison is the pattern of comparative advantage. Discriminant analysis is used to examine whether there are significant differences between CPE's and ME's. The discriminant function, a linear function of the comparative advantages, is then used to classify pre- and post-reform Hungary. The results indicate that the reform has been effective. *J. Comp. Econ.*, Dec. 1981, 5(4), pp. 352–366. University of Maryland, College Park, Maryland 20742.

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## 1. BACKGROUND

Both critics and supporters of the 1968 Hungarian economic reform would agree that it is ". . . the most radical post-war change, in the economic system of any Comecon country, which has been maintained over a period of years and gives promise of continuity" (Granick, 1973, p. 414). The reform enhanced the degree of decentralization of decision making, reduced the use of physical indicators of managerial performance, increased the use of financial success criteria, and removed centralized directive planning from its dominant role in the economy. Thus, the reform removed many features of a centrally planned economy (CPE) and instituted elements of a market economy (ME). The reform did not mark a change toward private ownership of the means of production. The change was in the mode of economy.[2]

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the mode of interaction, rather than in the ownership pattern, of the economy.[2]

Given the significance of the reform, it is important to know whether the reform was effective in producing a change in the behavior of the economy. However, there is much disagreement, both in the West and in Hungary, on whether the reform has been effective. Wiles (1977, p. 255) and Portes (1977, p. 795) argue that improved performance has been the result. Balassa (1978) indicates that, while the early years were successful, central intervention increased in the mid-1970's. Granick (1975, p. 219) and Hare (1976, p. 387) argue that central planning is still more important than the market.[3] In Hungary, the reform has been described as an "exceptionally successful undertaking" (Csikos-Nagy, 1978, pp. 540–541), while at the same time critics maintain that the central-planning hierarchy is still intact (Gamarnikow, 1974, p. 194). Thus, in both Hungary and the West, disagreement not only centers on the success of the reform but also on whether there has been a significant change from central planning to the market.

Given the present state of the debate over the effectiveness of the reforms, it is important to develop analyses that can bring fresh evidence to bear on that debate. Therefore, in this paper, I undertake a statistical analysis of the reforms by comparing the performance of Hungary to the performance of CPE's and ME's. In Section 2, I develop the theoretical background necessary for that analysis. In Section 3, data sources and statistical methods are described, while test results are given in Section 4. In the conclusion, alternative explanations of the test results are considered and the importance of the results is evaluated.

There would be little disagreement with the claim that Yugoslavia's reforms have increased the role of market decisions. The most important of Yugoslavia's series of reforms was the one of 1965 that made the market, rather than the plan, the primary determinant of enterprise decisions (Schrenk et al., 1979, p. 27). However, before 1965 Yugoslav enterprises had more freedom than those in CPE's. Thus, Yugoslavia can be observed at different stages of the transition from a CPE to an ME. Using the methods developed in this paper, one can investigate whether the 1965

[2] I have already used some terms that may be subject to conflicting interpretations. For reasons of space, I will not attempt to define all these terms precisely. Montias (1976) has made the most careful attempt to provide working definitions of the terms frequently used by comparative economists. Especially important in the present context are his definitions of the market (p. 139) and of hierarchies (pp. 170–173), and his comment that it may be possible to discuss the Soviet economy in terms of complete hierarchy and its component hierarchies (p. 175). In the text, I have used "centrally planned economy" (CPE) where Montias would use "centrally directed economy" and where other writers have used "Soviet-type economy."

[3] Brada (1973), who undertook an analysis of foreign-trade patterns soon after the reform, has also concluded that the reform was unsuccessful.

reforms were the ones that were most important in changing Yugoslavia from a CPE to an ME. The analysis of Yugoslavia also serves as a test of this paper's methods. As Yugoslavia's reforms are usually regarded as having been effective, these methods should detect the transition from a CPE to an ME. If the methods cannot discern the effectiveness of Yugoslav reforms, they would not be useful in analyzing Hungarian experience.

## 2. THE COMPARATIVE BEHAVIOR OF CENTRALLY PLANNED AND MARKET ECONOMIES

It is a basic premise of this paper that the economic behavior of any specific ME will, in many respects, exhibit greater similarity to the behavior of another ME than to the behavior of a CPE. Of course, this premise must be qualified with an assumption that variations in other behavior-determining factors between the economies are within "reasonable" limits. In this paper, "reasonable" variations mean those variations observable in the developed world except, perhaps, variations in the level of development. In particular, the similarity in behavior between ME's will occur even though ownership patterns might differ as long as enterprises have an "interest in profit" and take "responsibility and risk" in decisions, using the terminology of Csikos-Nagy. At a later stage in this paper, statistical evidence for the premise will be presented. In this section, I will consider arguments taken from the literature of comparative systems that will show that the premise has sound theoretical underpinnings.

Before examining the theory behind the premise, one must select the particular characteristics to be used as the basis of comparison. The foremost problem in this selection is that there are systematic differences in data-collection methods between Eastern Europe and the rest of the developed world. Any attempt to analyze differences between CPE's and ME's may give spurious results due to differences in data-collection methods. It is important to obtain data collected on a standardized basis. Given that standardized measures of internal economic performance are unavailable, one is led to use data on external transactions. Using statistics published by the OECD, one can build a data set containing identical measures of performance for both OECD and non-OECD countries. Each OECD country publishes statistics on imports from and exports to each country in the world for a wide range of commodities. For example, figures for Poland's exports to Canada and Greece's exports to Canada are collected by Canadian authorities and published as Canadian imports. Thus, one can collect comparable data for, say, both Poland's and Greece's exports to OECD countries.[4] One can construct a picture of the structure of exports

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[4] At this juncture it must be emphasized that although Greece publishes figures on its own exports, these are not used for reasons of comparability. Thus, Greek exports to the OECD countries are found from the import data of the other OECD countries.

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to OECD countries of a group of CPE's and ME's so that export performance can be used as the basis for test comparisons.[5]

Given that this study will focus on export performance, it is important to show that one can expect export performance to be different in CPE's than in ME's. The following list of features of foreign-trade behavior serves to justify the premise that the two types of economies will exhibit different behavior. The items are taken from standard sources and should be regarded as suggestive of, rather than comprehensively covering, the many reasons why CPE's and ME's differ in patterns of export performance.

1. Because of reliance on centralized physical planning, CPE's will be slow to react to changes in world-market conditions, especially changes in prices (Holzman, 1974, p. 140; Brown, 1968, pp. 66–69; Pryor, 1963, p. 73). Therefore, export patterns of CPE's would systematically lag behind those of ME's.

2. In deciding which commodities to export, cost comparisons are often made. Yet domestic prices in CPE's are systematically different from scarcity prices. This difference will affect trade patterns. For example, Rosefielde (1973, p. 126) has concluded that ". . . the least implausible explanation of the empirical data at hand appears to suggest that the Soviets have relied on false labor value prices as a guide to trade decision-making. . . ."

3. Incentive schemes in CPE's often discourage product innovation and innovation within existing factories (Berliner, 1976, Chap. 14; Zielinski, 1973, p. 307). Innovation will be more likely to be concentrated in large jumps within new factories in CPE's than in ME's. As Vernon (1974, pp. 254–255) has pointed out in a different context, this pattern of innovations will affect trade behavior. CPE's are likely to have a comparative disadvantage in those industries in which learning-by-doing and product innovation are important.

4. When bonus payments are a function of quantity measures there will be a systematic bias against the production of high-quality products (Kornai, 1959, pp. 57, 67–68). Then CPE's are likely to have a comparative disadvantage in goods that are susceptible to quality variation (Brown, 1968, pp. 79–81; Pryor, 1963, p. 176).

5. CPE's are all characterized by lack of personal contact and direct negotiation between buying and selling institutions. Hence, sellers will not

[5] In order to avoid repetition, I will use "export performance," and later "comparative advantage," where "export performance in OECD markets" and "comparative advantage in OECD markets" would be more appropriate. Although it would be theoretically correct to add figures published by non-OECD countries in order to find total export performance, this is not possible because of data noncomparabilities, and not advisable because intra-CMEA trade is conducted on a basis very different from that of trade between CMEA and non-CMEA countries.

pay due attention to the specific needs of buyers (Kornai, 1959, pp. 154–155). Lack of personal contact between buyers and sellers means that CPE's are unable to sell those goods for which special needs and after-sales service are important (Pryor, 1963, pp. 174–176).

6. Neuberger (1968, pp. 364–365) points out that, because foreign trade is used as a balancing and rationing device in CPE's, exports are likely to be products that are in temporary excess supply on the home market. These products will be exported regardless of their suitability for export. Also, certain sectors that systematically suffer more than other sectors in the inevitable rationing processes of CPE's will be unreliable suppliers and will not be able to compete in foreign markets (Kornai 1959, pp. 154–155).

7. Because of the need to minimize administration costs, production units will be larger in CPE's than ME's (Pryor, 1973, pp. 143, 162). Therefore, CPE's will have a comparative disadvantage in those goods whose production is subject to large diseconomies of scale.

It is important to bear in mind two points when interpreting the foregoing analysis. First, no CPE will exhibit all the aforementioned characteristics. National tradition or political emphasis may countervail other tendencies. Second, when a market-type reform is implemented, that reform can never be so thorough that all features of the behavior of a CPE will disappear. Vestiges of the previous system will affect behavior, as Neuberger (1968) has pointed out for Yugoslavia. The argument in this paper is solely that, if a reform is effective in introducing elements of a market system, the change will be observable in the foreign-trade behavior of the economy. Thus by using appropriate statistical techniques, it may be possible to detect the reform's effect by examining whether the foreign-trade behavior of the reformed economy is closer to that of a CPE or a ME.

## 3. THE DATA AND STATISTICAL BACKGROUND

If the characteristics of ME's and CPE's were randomly distributed, one would not need to control for these characteristics when formulating statistical tests. However, random distribution is not the case. It is necessary to find samples of ME's and of CPE's that have relatively similar characteristics. Having decided to use export data, the theory of international trade must be used to identify variables that would affect a comparison of CPE's and ME's.

Hufbauer (1970) has undertaken a systematic empirical analysis of six major trade theories. These theories focus on the relationship between characteristics of traded goods and characteristics of importing or exporting countries. Hufbauer measures four distinct country characteristics: GDP per capita (relevant to three theories), fixed capital per person in manufacturing industry, skilled employees as a percentage of the labor force,

and total manufacturing output. For Hufbauer's sample of 24 countries, the correlations between GDP per capita and the three other variables were all significant at the 1% level. The lowest correlation was that between GDP per capita and total manufacturing output. However, GDP per capita performed better than total manufacturing output when used as a proxy variable in the test for which the latter variable was relevant. Given these correlations and the performance of GDP per capita as a proxy variable in Hufbauer's tests, it is safe to conclude that, if one compares CPE's and ME's that are at the same level of development, then one is controlling for the effects of the most important determinants of international-trade patterns.[6]

The process of choosing a set of ME's and CPE's at the same level of development is described in the Appendix. At this stage the sample of ME's can be listed: Portugal, Greece, Spain, Ireland, Italy, Austria, and the United Kingdom. The CPE's used are Bulgaria, Romania, Poland, the USSR, Czechoslovakia, and the German Democratic Republic (GDR).

Hungary was in the eighth year of its reform in 1975. If the reform was effective, the changes it produced should be observable in that year. Trade data were collected for 1975 for the six CPE's, the seven ME's, and the two "unknowns," Hungary and Yugoslavia. Data were also collected for 1966 for a number of reasons. First, it is important to ensure that the classification results for Hungary in 1975 are a reflection of the reform and not due to particular characteristics of Hungary. By including a pre-reform observation, one can ensure that pre-reform Hungary was a CPE. Second, inclusion of 1966 data increases the sample size from 13 to 27 observations (i.e., Yugoslavia in 1966 and 1975 and Hungary in 1975 are the "unknowns"). Third, if the measures of GDP are inaccurate, the effect of the level of development on trade may not have been removed. By including two sets of observations at different levels of GDP (because of 9 years of growth), one can reduce the possibility that the results are affected by differences in the level of development. Fourth, use of 1966 data allows one to observe Yugoslavia soon after a major reform. Since the legacies of the pre-reform situation would be strong (Neuberger, 1968), pre-reform characteristics would still be observed in 1966 data. However, the choice of 1966 was dictated by the focus on Hungary. This year was the last year in which Hungary was a normal CPE; during 1967 preparations for the reform were taking place (Portes, 1972, p. 650).

The exact nature of the data must be specified. In studying trade patterns, it is usual to focus on trade in manufactured goods so that the effect of

[6] Hufbauer's sample of 24 countries did not include any CPE's. Therefore, it might be argued that his results are not representative of the relationships between the national characteristics in CPE's. However, to the extent that this is true the difference will be a result of the different mode of economic organization and should not be systematically removed.

raw-material endowments on trade is reduced (Hufbauer, 1970, p. 151; Balassa, 1967, p. 204). Data were collected on 27 manufactured goods defined at the two-digit level of the Standard International Trade Classification (SITC): all those commodities whose first classification digits were 5, 6, 7, or 8. The basic unit of observation was $X_{ij}^k$, exports to OECD countries by country $i$ of commodity $j$ in year $k$.[7] To remove the effect of country size, measures of "revealed comparative advantage" were calculated using Balassa's formula (1967, pp. 203-209). Thus, $x_{ij}^k$, the comparative advantage for country $i$ in commodity $j$ during year $k$ is defined as

$$x_{ij}^k = \frac{(X_{ij}^k / \sum\limits_{j=1}^{27} X_{ij}^k)}{(\sum\limits_{i=1}^{15} X_{ij}^k / \sum\limits_{i=1}^{15} \sum\limits_{j=1}^{27} X_{ij}^k)}.$$

Given observations on the structure of comparative advantage in CPE's and ME's, statistical tests can be used to find out whether there are significant differences between the two types of economies. Then, if there is a significant difference, the three "unknowns" (Hungary in 1965, Yugoslavia in 1966 and 1975) can be classified. A standard technique, discriminant analysis, has been developed for such situations. Kendall and Stuart (1976, p. 327) describe the use of discriminant analysis in the following way: "We are given the existence of two or more populations and a sample of individuals from each. The problem is to set up a rule, based on measurement from these individuals, which will enable us to allot some new individuals to the correct population when we do not know from which it emanates." Thus, one estimates a function $D(\cdot)$ such that if $D(x_{i1}^k, \ldots, x_{ij}^k, \ldots) > 0$, the $i$th country at time $k$ is classified as a CPE. If the inequality is reversed the classification is as an ME.

For those not familiar with discriminant analysis, I will give a brief description for the present context.[8] One wants to create a function of a country's characteristics (comparative advantages) that will give a prediction of that country's classification (CPE or ME). For an initial set of countries, the classifications are known. In order to develop an estimation theory, one must formulate a criterion to select an estimate. The usual criterion is "minimize the cost of misclassification." That cost depends upon the relative costs of misclassification in each group and the prior

[7] Export figures for the GDR to West Germany were not available, so that GDR figures exclude these exports.

[8] See Dhrymes (1970, pp. 65-77), Kendall and Stuart (1976, pp. 327-337), or Tatsuoka (1971, pp. 157-176) for detailed presentations of the assumptions and procedures of discriminant analysis.

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probability that a new observation will come from a particular group. The most usual assumptions are that all misclassification costs are equal and that any new observation is equally likely to come from any group. Thus, it is assumed that the cost of misclassification as a CPE equals the cost of misclassification as an ME and that the prior probability that an unknown observation is a CPE is one-half.

With the assumptions made in the previous paragraph, the cost criterion is identical to a least-squares criterion with a dummy variable as the dependent variable. Thus, in the present context, the discriminant function is linear in the comparative advantages,

$$D(x_{i1}^k, \ldots, x_{ij}^k, \ldots) = a + B_1 x_{i1}^k + \cdots + B_j x_{ij}^k + \ldots,$$

where $a, B_1, \ldots, B_j, \ldots$ are the parameters to be estimated. Given the present assumptions, estimation of $D(\cdot)$ using discriminant analysis is equivalent to using ordinary least squares on an equation with a classification dummy as the dependent variable and the comparative advantages as independent variables. Once the function is estimated using the observations for which the classifications are known, it can be used to classify the "unknowns."

One final estimation problem remains. There are 27 variables and, coincidentally, 27 observations. If all variables were used, the discriminant function would fit those observations perfectly even if no systematic differences existed between CPE's and ME's. Such an estimate would be a geometric representation of the particular observations rather than a statistical representation of fundamental regularities found in the data. If the statistical results are to be a convincing representation of the fact that CPE's and ME's have different characteristics, there must be significant discrimination with a small number of variables. Such significant discrimination would be statistical verification of the theory that CPE's have a different structure of comparative advantage than ME's. However, in order to identify directly those comparative advantages most relevant in distinguishing between CPE's and ME's one needs data that are not readily available. (For example, it is difficult to identify those goods whose cost of production is systematically undervalued by CPE's.) Thus, in this paper, an empirical approach to the identification of the discriminating variables is taken.

Variables were added to the discriminant function using a standard stepwise procedure (Nie et al., 1975). The additional variable chosen at each stage was the one that produced the largest $F$-test statistic for the new function (see Kendall and Stuart (1976, p. 336) for a description of this statistic). This procedure continued until no variable could be found that

would significantly increase the discriminating power of the function. Significance was judged using a single variable $F$ test.[9]

## 4. TEST RESULTS

The results of the estimation using 27 observations are given in columns (1)–(4) of Table 1. Columns (1) and (2) give the SITC classifications of the goods whose comparative advantages are arguments of the discriminant function. Column (4) gives the $F$-test statistics for each variable. All were significant at the 95% level, as dictated by the stepwise procedure. All other variables would fail a 95% level significance test if they were entered singly into the function. As the sign and absolute size of the function's coefficients are arbitrary, standardized coefficients are presented in column (3). These coefficients are the ones which would be estimated if all variables had a standard deviation of one. Loosely, the relative size of the standardized coefficients shows which variables have the most influence on the function. In order to interpret the sign of the coefficients, one must keep in mind that a positive value of the discriminant function classifies a country as a CPE.

One way to check the performance of the discriminant function is to use it to classify the observations used in the estimation procedure. Of these 27 observations, 26 were classified correctly. Portugal in 1966 was the

[9] See Kendall and Stuart (1976, pp. 342–345) for a justification of the use of the $F$ test for a single variable. All variables that entered the functions remained significant throughout so that procedures for removing variables were not relevant.

### TABLE 1

Estimates of the Discriminant Function

| SITC number (1) | SITC name (2) | Estimates using 27 observations | | Estimates using 28 observations | |
|---|---|---|---|---|---|
| | | Standardized coefficients (3) | $F$-test statistics (4) | Standardized coefficients (5) | $F$-test statistics (6) |
| 52 | Crude chemicals from coal, petroleum, gas | 0.42 | 14.9 | 0.37 | 9.5 |
| 56 | Fertilizers | 0.28 | 8.6 | 0.25 | 5.6 |
| 62 | Rubber manufactures | −0.23 | 5.2 | −0.28 | 6.1 |
| 67 | Iron and steel | 0.41 | 15.2 | 0.43 | 13.2 |
| 82 | Furniture | 0.27 | 7.7 | 0.28 | 6.8 |

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| | Estimates using 28 observations | |
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| t ics | Standardized coefficients (5) | $F$-test statistics (6) |
| | 0.37 | 9.5 |
| | 0.25 | 5.6 |
| | −0.28 | 6.1 |
| | 0.43 | 13.2 |
| | 0.28 | 6.8 |

exception.[10] Although there is a bias toward correct classification of observations used to estimate the function (Kendall and Stuart, 1976, pp. 341–342), it is nevertheless reassuring that the function makes only one error.

Given the variables selected, it is evident that the discriminant function is a representation of the theory of Section 2. The goods in which CPE's have a comparative advantage are all goods for which quality is easily ascertainable, for which after-sales service is not important, and that are made in large establishments.[11] In contrast, for rubber products (in which automobile tires are included) quality is important and cannot be easily ascertained by inspection. One surprising result from the estimation is that there is no variable related to machinery in the function. Thus, the general perception that CPE's perform particularly poorly in exporting machines may be a result of the fact that CPE's are often compared to ME's at a much higher level of development.[12]

The statistically significant function can be used to classify the "unknown" observations. Yugoslavia in 1966 was classified as a CPE, while both Hungary and Yugoslavia in 1975 were classified as ME's.[13] The analysis supports the view that post-reform Hungary has a structure of trade similar to those of market economies that are at the same level of development. Given that Hungary in 1966 was classified as a CPE, the results indicate that the structure of trade has changed significantly from 1966 to 1975. The same result is true for Yugoslavia, indicating that the 1965 reforms changed that country from a CPE to an ME.

One strong objection can be made against the foregoing analysis. The observation on Hungary in 1975 was not treated in the same manner as those of the CPE's and in particular of Hungary in 1966. While it is appropriate to classify a reformed economy as "unknown," the suspicion may linger that the results are due to asymmetry of treatment between Hungary and the other CMEA countries. To remove this suspicion and show that the results are robust, a procedure was adopted that would lead

[10] Portugal's classification may be correct, because in 1966 Portugal was still a semifascist, semicorporative, semiplanned economy. I would like to thank Fred Pryor for this observation.

[11] See Pryor, 1973, p. 138. The exception to this statement is that furniture is not made in large establishments. However, the two other characteristics apply to furniture.

[12] Balassa (1978, pp. 248–253) argues that Hungary's export performance in machinery has been poor relative to countries at a similar level of development. The present analysis suggests that this performance is not critical in judging the effect of the reform.

[13] The discriminant analysis does not give significance tests for these classifications. However, the analysis does give a probability for each classification. The probabilities were as follows (to two decimal places): Yugoslavia in 1966 has a probability of being a CPE of 1.00, Hungary in 1975 a probability of 0.91 for being an ME, and Yugoslavia in 1975 a probability of 0.98 for being an ME. All other classification probabilities were close to 1 or 0 except Portugal in 1965 (0.51 for being a CPE).

to a bias against Hungary being classified as an ME. The discriminant function was reestimated using 28 observations, one of which was Hungary in 1975 assumed to be a CPE (i.e., all observations on CMEA countries were treated symmetrically). Exactly the same methods were applied as in the estimation of the first equation. The results of this process are presented in Table 1 columns (4)–(6).

For the new estimate, the stepwise procedure selected the same variables as in the original function, the signs of their coefficients are the same, and their relative importance, measured by the standardized coefficients, is approximately the same. Not surprisingly, this function gives exactly the same classification results as the original one.[14] Thus, when post-reform Hungary is treated on the same basis as pre-reform Hungary and all other CMEA countries, post-reform Hungary, alone of these countries, is classified as an ME. The statistical analysis detects a difference in the behavior of pre-reform and post-reform Hungary, even though the procedures adopted involve a bias toward producing the result that there is no such difference.

## 5. A CONSIDERATION OF ALTERNATIVE EXPLANATIONS OF THE RESULTS

In this conclusion, the main results of the paper will be reviewed, alternative explanations considered, and the significance of the results evaluated. The first result is that there exists a function of comparative advantages that significantly discriminates between CPE's and ME's. That discrimination is interpreted to be a representation of the fact that CPE's and ME's produce significantly different trade patterns. However, two alternative interpretations are possible. First, as the ME's are all mixed economies and the CPE's have public ownership of industry, the discriminant function may be based on ownership patterns rather than on differences in interaction mechanisms. Second, since the CPE's are CMEA countries and the ME's OECD countries, the discriminant function may solely represent the effects of barriers to trade. However, neither of these alternative interpretations can explain the classification results for Hungary and Yugoslavia. Neither is consistent with the fact that Hungary and Yugoslavia in 1975 are classified with the OECD economies. Those classifications are consistent with the interpretation that the function discriminates on the basis of the types of interaction mechanisms.

The second major result is the classification of pre-reform Hungary as

[14] Classification probabilities were: Portugal in 1966 0.61 as a CPE, Hungary in 1975 0.68 as an ME, Yugoslavia in 1966 1.00 as a CPE, Yugoslavia in 1975 0.89 as an ME. The decline in the probability for Hungary, relative to that in footnote 13, is a reflection of the different treatment of Hungary in the two estimations.

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CD economies. Those classifica-
n that the function discriminates
echanisms.

ation of pre-reform Hungary as

66 0.61 as a CPE, Hungary in 1975 0.68
lavia in 1975 0.89 as an ME. The decline
otnote 13, is a reflection of the different

a CPE and post-reform Hungary as an ME. The analysis suggests that the reform has been effective. However, other interpretations should be considered. Because the methodology involves comparing the behavior of Hungary to that of the other CPE's, any factor that affected all of the CPE's could not be responsible for the results. Hence, the cause of the change in classification of Hungary between 1966 and 1975 must be an event that uniquely affected Hungary. Before concluding that that unique event was the reform, one must examine an alternative explanation: economic relations between Hungary and the ME's.

East-West trade expanded a great deal between 1966 and 1975. If Hungary's trade with the OECD expanded much faster than that of other East European countries because of preferential trade treatment, then one might obtain the results of Section 4. However, Hungary's trade relations with the West were improved later than those of some CMEA countries. Poland and Romania both acceded to GATT before Hungary (Baumer and Jacobsen, 1977, p. 1000). The U. S. granted MFN status to Poland in 1960 and to Romania in 1975 (Raffel et al., 1977, p. 1396). In 1973, Romania became the first CMEA country to be granted the European Economic Community's General Preferences (Baumer and Jacobsen, 1977, p. 1000). Thus, both Poland and Romania have been ahead of Hungary in obtaining lower trade barriers. During 1966–1975, Poland, Romania, and the GDR all had higher rates of growth of exports to Western countries than did Hungary (Snell, 1974; Lenz and Kravalis, 1977). Because the changes in Hungary's trade relations with the ME's have not been exceptional compared to other CMEA countries, one can conclude that the classification results are not due to changes in trade relations. The economic reforms are the most likely candidate to explain the results.

As foreign-trade data have been used, it is reasonable to ask whether the results are due solely to foreign-trade reforms. Hungary and Yugoslavia did have the most thoroughgoing foreign-trade reforms in Eastern Europe (Brown and Marer, 1973, p. 168). However, implementation of these foreign-trade reforms would be unlikely without implementation of more general reforms. "Partial reforms in any given area provide no benefit beyond a certain point without introducing coordinated reforms in other areas" (Brown and Marer, 1973, p. 169). It is unlikely that an enterprise can act as a participant in an ME for foreign-trade purposes and as a participant in a CPE otherwise. Although one cannot rule out the possibility that the results are due solely to foreign-trade reforms, it seems unlikely that this is the case.

The third result is Yugoslavia's classification. The obvious interpretation of this classification is that the 1965 reforms only gradually had an effect on the behavior of the economy. Thus, the results for Yugoslavia support the interpretation given to Hungary's results. In trying to explain the results

## TABLE 2

Estimates of GDP per Capita as a Percentage of U.S. GDP per Capita in 1970

| CMEA countries | | Market economies | |
| --- | --- | --- | --- |
| Romania | 31.2 | Portugal | 27.1 |
| Poland | 35.4 | Spain | 38.7 |
| Bulgaria | 37.3 | Greece | 39.7 |
| Hungary | 42.7 | Ireland | 42.6 |
| USSR | 46.9 | Italy | 48.7 |
| Czechoslovakia | 62.0 | Austria | 52.1 |
| GDR | 63.9 | U.K. | 62.5 |

for both countries, one must find some factor that caused both countries to be classified as CPE's in 1966 and both countries to be classified as ME's in 1975 and had no effect on any other Eastern European country. It is reasonable to conclude that that factor was the economic reforms in both countries, and that those reforms have been effective in changing the behavior of the two economies in which they were implemented.

## APPENDIX: THE CHOICE OF MARKET ECONOMIES

The Kravis, Heston, and Summers (1978, henceforth KHS) estimates of GDP per capita are probably the most reliable for cross-national comparisons of GDP per capita. Hungary is the only East European nation included in their figures. Pryor (1979) has produced a comparable set of figures for the Eastern European countries. Therefore, I use the KHS and Pryor figures for 1970, the mid-year of the two sets of trade data. Both sources provide alternative estimates for 1970. I use the estimates classed by the authors as "preferred" (KHS, Table 4, Column (5) and Pryor, Table 1, Column (4)).

Pryor's estimates for the CMEA countries are given in Table 2. I have included Hungary in this group because one observation of Hungary is that of a CPE. The tests require a comparable sample of market economies. In order to minimize differences in trade due to cultural and geographical effects, European market economies are chosen. A comparable sample of ME's would consist of seven countries whose GDP's per capita had the same mean (45.4) as the seven CPE's. The KHS estimates of GDP per capita for the seven poorest countries in Western Europe are given in Table 2. (The U. K., Netherlands, and Belgium were at the same level of GDP per capita; the U. K. was chosen in order to include a country as near as possible to the total GDP of the USSR.) The mean value for the ME's is 44.5. Given the small differences between the summary statistics of these

TAGE OF U.S. GDP PER CAPITA IN 1970

| Market economies | |
| --- | --- |
| Portugal | 27.1 |
| Spain | 38.7 |
| Greece | 39.7 |
| Ireland | 42.6 |
| Italy | 48.7 |
| Austria | 52.1 |
| U.K. | 62.5 |

factor that caused both countries
both countries to be classified as
other Eastern European country.
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MARKET ECONOMIES

1978, henceforth KHS) estimates
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e one observation of Hungary is
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due to cultural and geographical
chosen. A comparable sample of
whose GDP's per capita had the
The KHS estimates of GDP per
Western Europe are given in Table
m were at the same level of GDP
r to include a country as near as
) The mean value for the ME's is
n the summary statistics of these

two groups, it was concluded that these seven countries would be suitable as the sample of market economies.

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