NBER WORKING PAPER SERIES

SECTORAL AND NATIONAL AGGREGATE DISTURBANCES TO INDUSTRIAL OUTPUT IN SEVEN EUROPEAN COUNTRIES

Alan C. Stockman

Working Paper No. 2313

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 1987

An earlier draft of this paper was presented at the University of Rochester - Portuguese Catholic University Conference on Real Business Cycles. I want to thank numerous participants at that conference and in seminars at Rochester, the Federal Reserve Bank of Richmond, MIT, Harvard, and the NBER for very helpful comments and advice, not all of which I have followed. The usual caveat applies, perhaps with more strength than usual. Financial support from the National Science Foundation is gratefully acknowledged. The research reported here is part of the NBER's research program in Economic Fluctuations. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working Paper #2313
July 1987

Sectoral and National Aggregate Disturbances to Industrial Output in Seven European Countries

ABSTRACT

A class of real business cycle models suggests that shocks to technology can explain aggregate fluctuations in output and employment. This paper begins from the premise that shocks to productivity may vary across industries but are unlikely to vary systematically across national boundaries for a set of developed countries. Alternative sources of macroeconomic fluctuations, however, such as those due to nation-specific government policies, may produce variations in output growth across nations that are common to industries. This paper discusses these implications within the context of a simple theoretical model, then the paper decomposes the quarterly and annual growth rate of industrial production in two-digit manufacturing industries in seven European countries and the United States into components that are specific to industries but common to nations, and idiosyncratic components. The paper shows that shocks that are nation-specific and common to industries are important, and cast doubt on the hypothesis that most macroeconomic fluctuations can be ascribed to shocks to technology.

Professor Alan C. Stockman
Department of Economics
University of Rochester
218 Harkness Hall
Rochester, NY 14627

(716) 275-7214

1. Introduction

Much of macroeconomic analysis is concerned with the effects of changes in national economic policies — monetary, fiscal, or other policies — on aggregate output. Fluctuations in aggregate output are frequently thought to result from changes in national policies. At the same time, "real business cycle models" have suggested that a large fraction of fluctuations in aggregate output may result from such disturbances as technology shocks. Clearly, technology shocks may be important without precluding roles for monetary or fiscal impulses as central to business cycles. But it is difficult to isolate and date specific technological changes in various industries, let alone form a time series of technical shocks that could be controlled for in macroeconomic analysis to investigate the importance of other (e.g. monetary) disturbances. This paper presents some research designed to get around this problem. The paper seeks to isolate changes in output that are due to aggregate national "policy" changes (in a broad sense) or to aggregate nation-specific disturbances, from changes in aggregate output that are associated with disturbances such as technical change in a particular sector of the economy. To accomplish this decomposition, the paper uses a simple statistical model that is assumed to generate industrial production data for a panel of ten 2-digit industries across eight countries, over 21 years.

This paper investigates the source of disturbances to fluctuations in the growth rate of output by examining whether the fluctuations in industrial production in seven European countries and the US over the past two decades reflect mainly disturbances like changes in monetary and fiscal policies that should be shared by industries within a country but not necessarily by other countries. The paper seeks to determine what fraction of the variations in output growth can be attributed to industry-specific shocks and what fraction can be attributed to nation-specific shocks. The natural interpretation of nation-specific disturbances is that they result from differences in government policies followed (at a point in time) by the governments of the nations in the sample. As argued below, this is not the only reasonable interpretation, though.

The attempt to isolate the changes in output due to national policies (or other nation-specific events) relies on the assumption that there have been differences in such policies across the countries studied over the sample period. Most open-economy analyses of the effects of changes in policies imply that the effects at home differ from the effects of the domestic policy changes on foreign countries. Monetary theories of business fluctuations, whether of the "sticky nominal price or wage" type (due to contracts signed in nominal terms, menu costs, or other reasons) or of the "incomplete information" type (with confusion of nominal and relative price changes) predict that an innovation to the domestic money supply will have an expansionary effect on the domestic economy, while the effect on foreign economies will be smaller or different in character, depending on the precise theory of how money affects real variables. Fiscal policies are also predicted to have different effects at home and abroad in most economic models. "Real business cycle" theories are less clear on this point, since they do not (or at least need not) share a common view on the source of disturbances, except that they are "real." Disturbances that cause changes in aggregate output could include fiscal and regulatory policies of nations, or — what is more common in the models — productivity disturbances that have little to do with national boundaries but are likely to differ across industries. Most of the rest of this paper will identify "real business cycle theory" with what is actually only a subset of that theory: models in which exogenous industry-specific productivity shocks play a major role. This class includes Long and Plosser, 1983, and is in the spirit of the models of Kydland and Prescott (1981), Hansen (1985), and Prescott (1986).

The paper first estimates industry-specific and nation-specific disturbances and the fractions of output-growth variation attributable to each. It then compares the nation-specific disturbances to determine how similar or dissimilar are aggregate fluctuations that have been "purged" of industry-specific shocks, and examines how these nation-specific shocks are related to each other. The estimated nation-specific time-series may differ from the usual measures of aggregate output growth (such as aggregate GNP or industrial production indexes) because industry-specific shocks have been removed. Consequently, these series may provide a better indication of the results of national government policies than does measured aggregate output. These series might also provide better indications of the joint dynamics of aggregate fluctuations induced by national policies than would the measured aggregate series. The paper investigates those joint dynamics. These indexes may also be useful in investigating the international transmission of aggregate disturbances induced by government policies, and to examine such issues as the effects of institutional changes like the breakdown of Bretton-Woods and the adoption of floating exchange rates.

This paper does not estimate an economic model; it is restricted to a purely statistical model. But a large class of macroeconomic models would appear to be consistent with the basic statistical model, so the results may have natural interpretations and may be useful in guiding further theoretical analysis. The next section discusses the basic statistical model and the date. Section 3 presents an interpretive economic model designed to help motivate the statistic model. Section 4 presents the main results.

2. The Statistical Model and the Data

A large class of models like the one presented in this paper can be formulated to imply, as a log-linear approximation,

$$\text{(1)} \qquad dlnIP(i,n,t) = m(i,n) + f(i,t) + g(n,t) + u(i,n,t)$$

where IP(i,n,t) represents the index of industrial production in industry i in nation n at time t and dlnIP represents its growth rate. The term m(i,n) is the mean over time of output growth in industry i in nation n. The term f(i,t) represents the interaction of a fixed effect (in variance components terminology) for industry i with a fixed time effect, that is, f(i,t) is a vector of dummy variables specific to industry i and to time t but common to all nations. (To be more precise, f(i,t) is a vector of coefficients of these dummy variables multiplied by the dummy variables themselves.) It is intended to represent disturbances to production functions, input prices, or product demands that would affect production in industry i in all nations. The term g(n,t) is the interaction of a fixed effect for nation n with a fixed effect for time, i.e. it is a vector of dummy variables (multiplied by their coefficients) for each nation n at each time period t, but is common across industries. It is intended to represent the effects of nation-specific disturbances such as changes in monetary or fiscal policies that affect output differently in that nation than in other nations. The g term may also represent other aggregate disturbances that differ across nations, unrelated to policy differences, though "policy," broadly defined, seems to be the most natural interpretation. In some of the results discussed below, the g(n,t) term is decomposed into a seasonal component, gs(n,t), and a nonseasonal component, gns(n,t). Finally, u(i,n,t) is an idiosyncratic disturbance to industry i in nation n at time t, assumed to be an i.i.d. random variable. Estimation of (1) was performed with SAS Proc GLM. Identification of the model is discussed below.

The model (1) was estimated with quarterly seasonally-unadjusted data (aggregated to annual data for some of the results) on indexes of industrial production in ISIC industries 20, 31-38, and 40. These are mining (20), food, beverages, and tobacco (31), textiles and clothing (32), wood and wood products (33), paper and paper products (34), chemicals and chemical products (35), non-metallic mineral products (36), primary metals (37), metal products, machinery, and equipment (38), and utilities (40). Data span from 1964I through 1985II for eight countries: Germany, France, Italy, Belgium, the Netherlands, the United Kingdom, Switzerland, and the United States. Data were taken from the OECD and national publications, and are available from the author in printout or on floppy disk.

This model (1) is obviously unidentified, but combinations of parameters can be identified through a set of normalizations. The normalization chosen for the results below sets $\bar{g}(n^*,t) = 0$ for one specific nation, n^*. In all of the results reported below except those that exclude the United States in Table 1, nation n^* is the United States. (Otherwise n^* is Switzerland.) Then the time series $g(n) = (g(n,1),\ldots,g(n,T))$ for other nations can be interpreted as a (time-varying) nation effect for nation n relative to the United States. The (time-varying) industry effects $f(i) = (f(i,1),\ldots,f(i,T))$ must also be interpreted relative to this normalization. So the estimated industry effects are estimates of the growth rates of output in each industry in the United States.

The nation and industry effects, f(i) and g(n), may be correlated. If the data were balanced, i.e., if observations were available for all industry-nation pairs at each time period, then the correlations between the industry effects and the nation effects would be zero. But the data are unbalanced, e.g. data for industry 31 (food, beverages, and tobacco) were not available for France until 1969, and data for industry 33 (wood and wood products) were not available for any nation in the sample until at least 1976. With unbalanced data, the nation and industry effects are correlated. In order to decompose output growth variations into fractions explained by industry effects and fractions explained by nation effects, the paper reports the fractions explained by the orthogonal components of f and g, and the fraction attributable to the covariation of f and g.

The motivation behind the formulation (1) is simple. Roughly, if the main exogenous forces driving short-term variations in the growth rate of industrial production are due to innovation and productivity shocks, then those shocks are likely to be concentrated in one industry or a set of industries, but should have little if anything to do with national boundaries. The f(i,t) terms should then be important, but the g(n,t) terms should be unimportant. If the main exogenous disturbances are due to exogenous national variations in monetary or fiscal policies — and if these variations in policies differ across nations — then the g(n,t) terms should be important but the f(i,t) terms should be unimportant. The formulation (1) permits estimation without measurement of any actual policies and without assuming very much dynamic structure on the data (with the cost of estimating a large number of parameters). The next section attempts to make this motivation more precise; some readers may prefer to skip to the results in Section 4.

3. An Interpretive Economic Model

Consider a world with N nations and J traded commodities. Each commodity is produced by labor and inputs of some of the J commodities. Total quantities of these inputs used at date t in nation n are denoted by (L^{n}_{t}, K^{n}_{t}), where $K^{i\,n}_{t}$ is a J-dimensional vector of goods used as inputs into production at date t. A typical element of $K^{i\,n}_{t}$ will be denoted $K^{i\,n}_{j\,t}$, with the subscript j denoting the input good and the superscript denoting the output good. There are constant returns to scale production functions in each country,

$$(2) \qquad y^{i\,n}_{t} = A^{i}_{t}\, F^{i}\,(L^{i\,n}_{t},\ K^{i\,n}_{t},\ T^{i\,n}),$$

where $y^{i\,n}_t$ is output of good i in nation n at date t, $L^{i\,n}_t$ and $K^{i\,n}_t$ are the quantities of labor and capital (of each type i = 1,...,J) allocated at date t to industry i in nation n, A^i_t is an exogenous stochastic disturbance to industry i at date t, and $T^{i\,n}$ is an exogenous, time-invariant supply in nation n of a factor that is specific to industry i. The significance of the specific factor $T^{i\,n}$ will be discussed below. Whether realizations of the random shocks A_i become known before or after factors are allocated is probably unimportant for analysis of cyclical fluctuations; that choice affects factor allocations across industries, however, because if the productivity terms remain uncertain when factors are allocated to industries, those allocations will be affected by attempts to reduce risk (e.g. by allocating more or fewer factors to industries with greater productivity risk, depending on whether the degree of relative risk aversion is larger or smaller than one). Assume that productivity shocks are observed before factor allocations are determined. Both A^i_t and the function F() are assumed to be common to nations.

Output at date t, $y^{i\,n}_t$, is available for consumption or investment at date t+1. So

$$(3) \qquad y^{i\,n}_t = c^{i\,n}_{t+1} + \sum_{j=1}^{J} K^{j\,n}_{i\,t+1} + x^{i\,n}_{t+1}$$

where $c^{i\,n}_{t+1}$ is consumption of good i in nation n at time t+1 and $x^{i\,n}_{t+1}$ is net exports of good i by nation n at date t+1. Equation (3) states that each good is consumed at home, invested at home, or exported.

Assume that all households have identical preferences of the form

$$(4) \qquad E_0 \sum_{t=0}^{\infty} \beta^t \left[\sum_{i=1}^{J} U(c^i_t) + V(1-L_t) \right]$$

where L_t is the sum of labor inputs to all industries, $1-L_t$ is leisure, and U() and V() are strictly concave and increasing. Nation superscripts in equation (4) are suppressed.

The competitive equilibrium solves a social planning problem for the world economy that consists of maximizing a weighted average of utilities like that in equation (4) subject to the technology constraints (2) and (3), initial conditions on all capital stocks, appropriate transversality conditions, the constraints that exports of each good sum to zero across countries,

$$(5) \qquad \sum_{n=1}^{N} x^{i\,n}_t = 0, \qquad \text{for all } i,\ t,$$

and the identities,

$$(6) \qquad L^n_t = \sum_{i=0}^{J} L^{i\,n}_t, \qquad \text{for all } n,\ t$$

where $i = 1,\ldots,J$ denotes the use of labor in those industries and $L^{0\,n}_t$ denotes "other" use of labor. The "other" category for labor use is intended to allow for the results of various national government policies, so it is assumed that $L^{0\,n}_{t}$ is a function of a vector of policies,

$$(7) \qquad L^{0\,n}_{t} = L^{0}(g^{n}_{t}).$$

These "other" uses of labor may be nonproductive, as when government policies lead to inefficiencies or rent-seeking. In a model with nominal rigidities they may result from insufficient aggregate demand, affected by the vector g of government policies.

Obviously, without international differences in government policies or the distribution of the specific factors $T^{i\,n}$, this model would do nothing to distinguish nations from one another. Witout these elements the composition of industries would be identical across nations in the equilibrium. (Otherwise, without the specific factors, times will arise when some nations have industries with higher productivity terms A^{i} than do other nations, and this will require greater labor effort to be expended by people with the larger marginal products of labor. Since this adds unnecessary variance to labor effort and the marginal utility of leisure is decreasing, it cannot be the competitive equilibrium.) So, in equilibrium, all nations would have identical compositions of industry, and there would be no trade.

With the specific factors $T^{i\,n}$ distributed differently across nations, the industrial composition will differ across countries. As a result, total employment or hours worked will differ across countries. Consider a positive technology shock to industry j holding fixed all other technology terms. A country with a larger share of industry j (per capita) has a greater marginal product of labor than a country with a smaller share of industry j. In equilibrium, this will require greater labor effort from people in the former country. The assumption that utility is additively separable in consumption and leisure prevents this difference in leisure from making consumption of goods differ across countries. Generally, the equilibrium can be expressed as

$$L^{in}_t = L^{in}(s_t)$$

$$K^{in}_t = K^{in}(s_t) \tag{8}$$

$$c^{in}_t = c^{in}(s_t)$$

$$x^{in}_t = x^{in}(s_t)$$

where the state vector s_t is

$$s_t = (A^1_t, \ldots, A^J_t, g^1_t, \ldots, g^N_t). \tag{9}$$

Substituting (8) into the production function (2) gives

$$y^{in}_t = A^i_t F^i [L^{in}(s_t), K^{in}(s_t), T^{in}]. \tag{10}$$

Taking percentage changes gives approximately

$$(11) \qquad d\ln y^{i\,n}_{t} = d\ln A^{i}_{t} + \sum_{j=1}^{J} b^{i\,n}_{j}\, d\ln A^{j}_{t}$$

where

$$(12) \quad b^{i\,n}_{j} = (d\ln F^{i}\,[L^{i\,n}(s_t),\, K^{i\,n}(s_t),\, T^{i\,n}]/d\ln L^{i\,n})(d\ln L^{i\,n}/d\ln A^{j})$$

$$+ (d\ln F^{i}\,[L^{i\,n}(s_t),\, K^{i\,n}(s_t),\, T^{i\,n}]/d\ln K^{i\,n})(d\ln K^{i\,n}/d\ln A^{j})$$

depends on the nation as well as the industry. Define b^{i}_{j} as the average of the $b^{i\,n}_{j}$ across nations,

$$(13) \qquad b^{i}_{j} = \frac{1}{N} \sum_{n=1}^{N} b^{i\,n}_{j}.$$

Then equation (11) can be rewritten as

$$(14) \qquad d\ln y^{i\,n}_{t} = d\ln A^{i}_{t} + \sum_{j=1}^{J} b^{i}_{j}\, d\ln A^{j}_{t} + e^{i\,n}_{t}$$

where

$$(15) \qquad e^{i\,n}_{t} = \sum_{j=1}^{J} [b^{i\,n}_{j} - b^{i}_{j}]\, d\ln A^{j}_{t}.$$

Obviously, $e^{i\,n}_{t}$ is not orthogonal to $b^{i}_{j}\, dlnA^{j}_{t}$, so the b^{i}_{j} in equation (14) could not be consistently estimated by ordinary least squares if data were available on the $dlnA^{j}_{t}$. However, if data were available on these technology changes, then one might proceed more directly as Prescott (1986) does with Solow residuals. Instead, (14) can be used to express output growth in industry i in nation n as the sum of an industry-specific component, a nation-specific component, and an idiosyncratic component.

(16) $$dlny^{i\,n}_{t} = f(i,t) + g(n,t) + u(i,n,t)$$

Then estimates of the time series f(i,t) and g(n,t) can be obtained.

The model shows that the industry-specific component will be large if the industry-specific productivity shocks are important. The nation-specific component, however, can arise for two general types of reasons. First, the nation-specific component will be nonzero if national differences in government policies change over time, and these policies have effects similar to those modeled above. (The important point is probably not that they operate through labor allocations alone, rather than allocations of capital or other factors, but that they have effects that differ across countries.)

Second, the nation-specific effect can be nonzero even if national government policies have <u>no</u> effects on the growth of output, but nations differ in their responses to industry-specific productivity shocks. In the model above, a productivity shock in one industry can raise output in other industries in one country relative to another because of differences in the distribution of the specific factors $T^{i\ n}$ across nations. For example, suppose $T^{i\ n} > T^{i\ m}$ for all i=1,...,J and for some nations n and m, so that nation n has more of all specific factors than does nation m. Then, in equilibrium (assuming $L^{0\ n} = L^{0\ m} = 0$), total labor use will be greater in nation n than in nationl m, $L^{n} > L^{m}$. As a result, the shadow price of labor will be greater in nation n. So the response of labor supply to any particular productivity shock differs across nations. The result is that the presence of nation-specific g(n,t) terms in estimates of (1) does not necessarily imply that national government policies have effects as in the model above; these terms can arise solely because of different responses across nations to the same industry-specific productivity disturbance. In the model above, this requires that total labor effort (per capita) differ across countries; the effect vanishes if conditions for factor-price equalization are met. Because per capita labor does not differ substantially across countries in the sample examined here, it seems unlikely that different national responses to the same industry-specific productivity shocks would account for large estimates of g(n,t).

4. Results

Summary statistics from estimation of equation (1) with annual data (the difference of the log of annual industrial production indexes that were aggregated from the quarterly data) are reported in Table 1. The sample goes through 1984, because quarterly data went through only the first half of 1985. Part A of the table summarizes results for the whole sample.

The model (1) explains about 3/4 of the variation in industrial production growth rates. Both the industry (by time) effects f(i,t) and the nation (by time) effects g(n,t) are significantly nonzero. The F statistics, for testing the null hypothesese that all of the f(i,t) terms or the g(n,t) terms are zero, are 2.61 and 2.94, with marginal significance levels (P in the table) of .0001. This indicates the presence of industry-specific disturbances that are common to nations as well as nation-specific disturbances that are common across industries. The total sum of squares attributable to the industry effects f(i,t) and the nation effects g(n,t) is 3.27, which is about half of the total sum of squares. Because the data are unbalanced, f(i,t) and g(n,t) are correlated. Table 1 shows the variance decomposition. The sum of squares attributable to the orthogonal part of f(i,t) is .9 (i.e. this is the sum of squares attributable to the part of f(i,t) that is orthogonal to g(n,t)), the sum of squares attributable to the orthogonal part of g(n,t) is .79, and the remainder of the 3.27 is attributable to the covariation between f(i,t) and g(n,t). So about one-fifth of the variation explained by the model is attributable to the orthogonal portion of the industry effects and one-sixth to the orthogonal portion of the nation effects; about one-third is attributable to the covariation between industry and nation effects. The annual nation effects and industry effects estimated in Table 1A are graphed in the Appendix, where estimated values are also presented (as NATPAR for the estimated nation effects g(n,t), along with associated t-statistics, and as INDPAR for the estimated industry effects f(i,t), along with their associated t-statistics). The estimates reported in the Table do not normalize the mean of the g(n,t) to zero; instead, they normalize g(n, 1984) = 0 for all n. The means of the nation effects from Table 1A are reported, along with their standard errors, in Table 6. Residuals from the estimation in Table 1A show little evidence of autocorrelation (that is, the time series of residuals for each industry-nation pair shows little evidence of autocorrelation).

Recall that the g(n,t) terms are normalized so that g(n*,t) is identically zero for some nation n*, which is the United States unless otherwise noted. So the significant nation effects indicate that the European nations experienced disturbances, common to industries, that differed from nation-specific disturbances (again common to industries) in the United States. Note that this normalization does not affect the question of what fractions of variance are explained by the nation effects and industry effects. To determine whether there are significant nation effects within the set of European countries, the United States was excluded from the sample. Part B of Table 1 shows results when nation effects are normalized on Switzerland (i.e. when it is nation n*). Again both the industry-specific and nation-specific effects are significantly nonzero, and the fractions of variation explained are not affected much by the exclusion of the United States. Similar results hold regardless of which of the European nations is chosen for the normalization. Clearly the results do not indicate that the main difference between countries is between the United States on the one hand and the set of European countries on the other; differences between nation effects within the European countries are just as important as between them and the United States.

The nation-specific effects relative to the United States, estimated in Table 1A, can be used to investigate the behavior of aggregate output "purged" of industry-specific disturbances, as graphed in the Appendix. Tables 8 and 10 present autocorrelation coefficients of these nation effects and results from univariate autoregressions. Only the United Kingdom nation effects show a significant tendency toward mean-reversion, though there is weaker evidence of mean-reversion for the nation effects of all of the other nations except the Netherlands, which has positive autocorrelations. With the exception of the United Kingdom, the results are somewhat consistent with those found by Campbell and Mankiw (1986) with quarterly United States measured aggregate data: the growth rate of output is either serially uncorrelated or, as in the case of the Netherlands, has positive serial correlation. In these cases, disturbances to output (the estimated nation effect) are largely permanent, with the exception of the United Kingdom. On the other hand, with the exception of the Netherlands, the evidence is not inconsistent with a weak mean-reversion of the kind found by for the United States by Cochrane (1986).

Table 12 presents simple contemporaneous correlations among these nation effects. They are highly correlated: coefficients range from .40 between Italy and the United Kingdom to .87 between Belgium and France. The United Kingdom nation effect has, overall, the smallest correlation with the others.

The estimated nation effects in Table 1A differ from aggregate industrial production indexes for the countries, but they have fairly high correlations with them. Table 14 shows the standard deviations of the estimated nation effects from Table 1A, and the standard deviations of the grwoth rate of industrial production in each nation relative to the grwoth rate of industrial production in the United States. The table also shows the simple correlations between the estimated nation effects from Table 1A and the difference between the growth rates of the industrial production indexes for the country and the United States. Overall, the estimated nation effects show somewhat more variation than the (relative) measured Industrial production indexes. The two exceptions are Switzerland and the United Kingdom. The correlations are around .9, ranging from .84 for the Netherlands to .99 for Italy.

Table 2 shows estimates of equation (1) with quarterly data. Plots of the data made it clear that there were substantial differences across countries in the seasonal behavior of output growth. So the nation-specific effect g(n,t) was divided into two components,

$$g(n,t) = gs(n,q) + gns(n,t)$$

where gs(n,q) is a vector of separate seasonal dummies for each nation (multiplied by their coefficients) and gns(n,t) is the nonseasonal part of nation effect. In the estimation, gns(n,t) is specified exactly as g(n,t) was previously. But given gs(n,q), gns(n,t) now has the interpretation of the nonseasonal component of the nation effects.

In order to estimate the model with quarterly data, it was necessary to divide the sample into subsamples as shown in Table 2. The table presents summary statistics and a variance decomposition from the estimation. Industry effects f(i,t) are significantly nonzero, as in Table 1. The seasonal components of the nation effects, gs(n,q) are also significant. But the nonseasonal nation effects, gns(n,t) are close to zero; the F statistic for testing the hypothesis that the orthogonal component of gns(n,t) is zero is, in each subperiod, close to zero (marginal significance levels are .99). The quarterly results in Table 2 indicate, in contrast to the Table 1 results, that there are no significant nonseasonal nation-specific disturbances once industry-specific disturbances and purely seasonal nation-specific disturbances are accounted for.

Table 2 also shows that the relative importance of the nation effects has declined over time, while the relative importance of the industry effects has risen over time. The result that nation effects (relative to the United States) have declined over time is similar to Quah's (1986) result that a (slightly different) set of countries have experienced GNP growth that has become more similar across countries since the breakdown of Bretton Woods than before. Some of the large individual coefficients in the quarterly estimates of the nation effects correspond to particular identifiable events, e.g. the nation effect for France for 1968II, corresponding to the events of May, 1968 there. The recover comes in the fourth quarter, following normal vacations in the third quarter.

One hypothesis regarding the absence of nonseasonal nation-specific effects in these estimates with quarterly data is that the model (1) assumes that a nation-specific disturbance has the same effect on the growth rate of output in all industries in the sample. This is unlikely to be true, given that the industries have different cyclical amplitudes. (The standard deviations of output growth in the food, paper, and utilities industries, for example, are much lower than those of other industries, and the standard deviation of primary metals is higher than the others.) One way to test this hypothesis would be to estimate a modified version of (1),

$$(1') \qquad dlnIP(i,n,t) = m(i,n) + f(i,t) + \beta^i g(n,t) + u(i,n,t)$$

where β^i is a coefficient unique to industry i but common to nations. The model (1'), however, is nonlinear and continues to include a very large number of parameters, making estimation infeasible. An alternative but similar procedure is to adjust the data prior to estimating equation (1) by dividing the growth rate of output in each industry by its standard error. This is similar to imposing estimates of β^i in (1') that are proportional to standard errors. Growth rates of output for each industry i in each nation n were divided by the standard deviation of the growth rate of output in industry i in the United States (and multiplied by a constant). This results in "adjusted data" used to estimate equation (1). Results for quarterly data are summarized in Table 3, and results for annual data are summarized in parts C and D of Table 1. Table 3 shows that, for the quarterly data, this correction makes little difference for the main results. Industry-specific effects and purely seasonal nation-specific effects are still important, and nonseasonal nation-specific effects are still close to zero. For the annual data, the relative fraction of variance attributable to industry-specific disturbances falls somewhat with this adjustment.

The estimated nation-specific effects and industry-specific effects obtained by using the adjusted data are listed in the Appendix as ADNATPAR and ADINTPAR, along with the associated t-statistics, and are graphed as "adjusted" industry and nation effects. The means and standard deviations of the adjusted nation effects from Table 1C are listed in Table 7 (the normalization sets the nation effects equal to zero in 1984). Autocorrelations and autoregressions of the adjusted nationl effects are reported in Tables 9 and 11. As with the unadjusted estimates, there is clear evidence of mean-reversion for the United Kingdom and clear evidence of positive autocorrelation of nation-specific output growth rates in the Netherlands. Estimates for the other countries are consistent with either permanent disturbances to output or some mean-reversion of output. The adjusted nation-specific effects show lower cross-correlation than the unadjusted effects; these are reported in Table 13. Table 15 reports the standard deviations of the adjusted national effects and their correlations with the growth rate of industrial production in the nation minus the growth rate of United States industrial production. The correlations are lower than with the estimates from unadjusted data. They range from .75 for Germany and the Netherlands to .94 for France.

The residuals from the estimation with quarterly data show evidence of autocorrelation (for each nation-industry pair). The autocorrelation may be part of the explanation for the difference between the quarterly and annual results. If industries differ in the timing of the response of their outputs to a nation-specific disturbance that is common to industries, then the estimated nation effects may be smaller with quarterly than with annual data. To investigate this, equation (1) was estimated again using as data the residuals from univariate regressions of output growth in each nation and industry on four lags of itself. Specifically, residuals v(i,n,t) from the autoregressions (for all i, n)

$$dlnIP(i,n,t) = a_0 + a_1 dlnIP(i,n,t-1) + a_2 dlnIP(i,n,t-2)$$

$$+ a_3 dlnIP(i,n,t-3) + a_4 dlnIP(i,n,t-4) + v(i,n,t)$$

were used to replace dlnIP(i,n,t) in equation (1). The results of estimating (1) with these residuals are summarized in Table 4. The results for the nonseasonal nation-specific effects change dramatically: they are now jointly significant at .0001 or .0002, depending on the subsample. The results also show a difference across subsamples in the importance of industry-specific effects: they were not very important in the first subsample (1964II-1969IV). Table 5 shows results obtained by using the residuals v(i,n,t) and then adjusting them by dividing by the standard deviation of output growth in that industry in the United States, as in Table 3. The results in Table 5 show that industry-specific effects, common to nations, were also not particularly important in the last half of the 1970s.

5. Conclusions

A substantial fraction of changes in national aggregate industrial production growth rates in the sample studied here can be attributed to industry-specific disturbances that are common across nations. These are the types of disturbances emphasized in most real-business cycle models. But a substantial fraction of changes in national output can also be attributed to nation-specific disturbances that are common to industries (though they may have different magnitudes of effects on different industries, as in the results using "adjusted" data). Since it seems unlikely that productivity shocks respect national boundaries (particularly in manufacturing, as opposed to agriculture where the weather plays a major role), it is natural to interpret that nation-specific disturbances as resulting from national economic policies that are "aggregate" in the sense that they affect most or all industries in the nation. The model in section 3 illustrates that this is not the only interpretation: whatever factors make nations differ from each other so that international trade is useful <u>may</u> also produce the results obtained above, though it seems unlikely. The results, then, suggest that nation-specific policy differences play a major role in fluctuations in industrial output growth rates. This paper does not investigate what those policies might be.

The estimated nation effects display some properties thought to characterize aggregate output: they are highly correlated across nations, they exhibit complicated short-run dynamic behavior, and it is not grossly inconsistent with the evidence to characterize their changes as roughly permanent (after some dynamics) in most of the cases. Macroeconomic models — as opposed to purely statistical models — could be combined with the approach in this paper to purge aggregate output measures of industry-specific disturbances and to investigate the effects on national outputs of particular macroeconomic policies. The cost of using the method discussed in this paper is that only differences across countries in policies can be studied, and a multicountry sample must be employed to estimate the industry effects. But there may be benefits because controlling for these industry effects may provide, in the short time-series samples frequently used in macroeconomic research, stronger evidence on the effects of aggregate policies and on the interactions between aggregate fluctuations across countries.

References

Altonji, Joseph G. and John C. Ham, "Variation in Employment Growth in Canada: The Role of External, National, Regional, and Industrial Factors," NBER Working Paper 1816, January 1986.

Cochrane, John, "How Big is the Random Walk in GNP?" University of Chicago, 1986.

Frenkel, Jacob and Michael Mussa, "Asset Markets, Exchange Rates, and the Balance of Payments," chapter 17 in R.W. Jones and P.B. Kenen (eds.), Handbook of International Economics Vol II, Amsterdam: North-Holland, 1985.

Frenkel, Jacob and Assaf Razin, "Fiscal Policies in the World Economy," Journal of Political Economy 94, no. 3, June 1986.

Hansen, Gary, "Indivisible Labor and the Business Cycle," Journal of Monetary Economics, 1985, 309-27.

International Monetary Fund, World Economic Outlook, various issues.

Kydland, Finn and Edward Prescott, "Time to Build and Aggregate Fluctuations," Econometrica, November 1982, 1345-70.

Long, John and Charles Plosser, "Real Business Cycles," Journal of Political Economy, 1983, 39-69.

McCallum, Bennett T., "Real Business Cycle Models," Carnegie-Mellon University, 1987.

Prescott, Edward, "Theory Ahead of Business Cycle Measurement," Carnegie-Rochester Conference Series on Public Policy and Quarterly Review, Federal Reserve Bank of Minneapolis, Fall, 1986.

Summers, Lawrence, "Some Skeptical Observations on Real Business Cycle Theory," Quarterly Review, Federal Reserve Bank of Minneapolis, Fall, 1986.

Table 1
Annual Data
1964 - 1984

Model is: dln [IP (i,n,t)] = m(i,n) + f(i,t) + g(n,t) + u(i,n,t)

A. All eight countries included; unadjusted results; (1240 obs.)

Total SS = 6.45
Model SS = 4.77
Error SS = 1.68 R-square = .74
Total SS attributable to f(i,t) + g(n,t) = 3.27

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.897	2.61	.0001
Orthogonal Nation*Time, g(n,t)	.786	2.94	.0001

B. USA excluded from sample; unadjusted results; (1040 obs.)

Total SS = 5.36
Model SS = 3.91
Error SS = 1.45 R-square = .73
Total SS attributable to f(i,t) + g(n,t) = 2.60

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.766	2.90	.0001
Orthogonal Nation*Time, g(n,t)	.574	2.46	.0001

C. All eight countries included; adjusted results; (1240 obs.)

Total SS = .321
Model SS = .226
Error SS = .095 R-square = .70
Total SS attributable to f(i,t) + g(n,t) = .107

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.023	1.22	.0430
Orthogonal Nation*Time, g(n,t)	.032	2.14	.0001

D. USA excluded from sample; adjusted results; (1040 obs.)

Total SS = .288
Model SS = .199
Error SS = .089 R-square = .69
Total SS attributable to f(i,t) + g(n,t) = .094

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.023	1.44	.0024
Orthogonal Nation*Time, g(n,t)	.026	1.86	.0001

Table 2
Quarterly Data

Model is: dln [IP (i,n,t)] = m (i,n) + f (i,t) + gs (n,q) + gns (n,t) + u (i,n,t)

A. 1964II - 1969IV (1286 obs.)
Total SS = 15.72
Model SS = 11.46
Error SS = 4.26 R-square = .73
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 11.11

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	2.44	2.47	.0001
Orthogonal Nation * Quarter, gs (n,q)	2.92	27.97	.0001
Orthogonal Nation * Time, gns (n,t)	.62	0.93	.6884

B. 1970I - 974IV (1140 obs.)
Total SS = 17.04
Model SS = 11.80
Error SS = 5.24 R-square = .69
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 11.63

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	2.87	2.43	.0001
Orthogonal Nation * Quarter, gs (n,q)	2.52	17.41	.0001
Orthogonal Nation * Time, gns (n,t)	.60	0.78	.9474

C. 1975I - 1979IV (1271 obs.)
Total SS = 22.25
Model SS = 15.87
Error SS = 6.37 R-square = .71
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 15.65

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	4.07	3.25	.0001
Orthogonal Nation * Quarter, gs (n,q)	2.70	17.56	.0001
Orthogonal Nation * Time, gns (n,t)	0.38	0.46	1.0000

D. 180I - 1985II (1678 obs)
Total SS = 32.23
Model SS = 21.43
Error SS = 10.80 R-square = .66
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 21.34

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	6.53	3.97	.0001
Orthogonal Nation * Quarter, gs (n,q)	4.39	24.05	.0001
Orthogonal Nation * Time, gns (n,t)	0.67	0.61	.9997

Table 3
Adjusted Quarterly Data

Model is: dln [IP (i,n,t)] / Stdev (i) = m (i,n) + f (i,t) + gs (n,q) + gns (n,t) + u (i,n,t)

A. 1964II - 1969IV (1286 obs.)
Total SS = 4.47
Model SS = 3.05
Error SS = 1.42 R-square = .68
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 2.96

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	1.29	3.90	.0001
Orthogonal Nation * Quarter, gs (n,q)	0.67	19.25	.0001
Orthogonal Nation * Time, gns (n,t)	0.11	0.48	1.0000

B. 1970I - 1974IV (1140 obs.)
Total SS = 4.17
Model SS = 2.69
Error SS = 1.48 R-square =.64
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 2.65

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	1.03	3.09	.0001
Orthogonal Nation * Quarter, gs (n,q)	0.59	14.44	.0001
Orthogonal Nation * Time, gns (n,t)	0.10	0.45	1.0000

C. 1975I - 1979IV (1271 obs.)
Total SS = 4.85
Model SS = 3.30
Error SS = 1.55 R-square = .68
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 3.26

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	1.24	4.06	.0001
Orthogonal Nation * Quarter, gs (n,q)	0.55	14.65	.0001
Orthogonal Nation * Time, gns (n,t)	.07	.36	1.0000

D. 1980I - 1985II (1678 obs)
Total SS = 5.87
Model SS = 3.86
Error SS = 2.01 R-square = .66
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 3.85

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	1.52	4.95	.0001
Orthogonal Nation * Quarter, gs (n,q)	0.71	20.88	.0001
Orthogonal Nation * Time, gns (n,t)	.09	.43	1.0000

Table 4
Adjusted Quarterly Data II

Model is: Res (i,n,t) = m (i,n) + f (i,t) + gs (n,q) + gns (n,t) + u (i,n,t)

A. 1965II - 1969IV (1059 obs.)
Total SS = 2.46
Model SS = 1.34
Error SS = 1.12 R-square = .54
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 1.17

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	0.21	0.80	.9618
Orthogonal Nation * Quarter, gs (n,q)	0.12	3.56	.0001
Orthogonal Nation * Time, gns (n,t)	0.54	3.19	.0001

B. 1970I - 1974IV (1139 obs.)
Total SS =3.43
Model SS = 1.69
Error SS = 1.74 R-square = .49
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 1.60

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	0.52	1.32	.0082
Orthogonal Nation * Quarter, gs (n,q)	0.06	1.31	.1563
Orthogonal Nation * Time, gns (n,t)	0.64	2.50	.0001

C. 1975I - 1979IV (1195 obs.)
Total SS = 4.51
Model SS = 2.32
Error SS =2.19 R-square = .52
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 2.18

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	0.70	1.50	.0002
Orthogonal Nation * Quarter, gs (n,q)	0.10	1.67	.0310
Orthogonal Nation * Time, gns (n,t)	0.49	1.61	.0002

D. 1980 - 1985II (1657 obs)
Total SS = 5.02
Model SS = 2.30
Error SS = 2.72 R-square = .46
Total SS attributable to f (i,t) + gs (n,q) + gns (n,t) = 2.13

Effect	SS	F	P
Orthogonal Industry * Time, f (i,t)	0.81	1.92	.0001
Orthogonal Nation * Quarter, gs (n,q)	0.12	2.63	.0001
Orthogonal Nation * Time, gns (n,t)	0.74	2.65	.0001

Table 5
Adjusted Quarterly Data III

Model is: Res (i,n,t) / Stdev (i) = m(i,n) + f(i,t) + gs(n,q) + gns(n,t) + u(i,n,t)

A. 1965II - 1969IV; (1059 obs.)

Total SS = .426
Model SS = .194
Error SS = .232 R-square = .45
Total SS attributable to f(i,t) + gs(n,q) + gns(n,t) = .167

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.039	0.72	.9944
Orthogonal Nation*Quarter, gs(n,q)	.020	2.79	.0001
Orthogonal Nation*Time, gns(n,t)	.071	2.03	.0001

B. 1970I - 1974IV; (1139 obs.)

Total SS = .633
Model SS = .286
Error SS = .347 R-square = .45
Total SS attributable to f(i,t) + gs(n,q) + gns(n,t) = ..267

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.093	1.19	.0655
Orthogonal Nation*Quarter, gs(n,q)	.009	0.98	.4885
Orthogonal Nation*Time, gns(n,t)	.100	1.96	.0001

C. 1975I - 1979IV; (1195 obs.)

Total SS = .771
Model SS = .336
Error SS = .435 R-square = .44
Total SS attributable to f(i,t) + gs(n,q) + gns(n,t) = .315

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.096	1.04	.3709
Orthogonal Nation*Quarter, gs(n,q)	.013	1.16	.2792
Orthogonal Nation*Time, gns(n,t)	.094	1.54	.0006

D. 1980I - 1985II; (1657 obs.)

Total SS = .691
Model SS = .296
Error SS = .395 R-square = .43
Total SS attributable to f(i,t) + gs(n,q) + gns(n,t) = .259

Effect	SS	F	P
Orthogonal Industry * Time, f(i,t)	.093	1.52	.0001
Orthogonal Nation*Quarter, gs(n,q)	.015	2.20	.0014
Orthogonal Nation*Time, gns(n,t)	.100	2.46	.0001

Table 6. Unadjusted Nation Effects Relative to USA (Annual Data)

Nation	Mean	St. Dev.
Germany	.0640	.0410
France	.0794	.0400
Italy	.0630	.0492
Belgium	.0417	.0426
Netherlands	.0375	.0469
United Kingdom	.0594	.0442
Switzerland	.0735	.0445

Table 7. Adjusted Nation Effects Relative to USA (Annual Data)

Nation	Mean	St. Dev.
Germany	.0111	.0074
France	.0124	.0057
Italy	.0134	.0090
Belgium	.0071	.0073
Netherlands	.0106	.0094
United Kingdom	.0127	.0077
Switzerland	.0159	.0090

Table 8. Autocorrelations of Unadjusted Nation Effects
relative to USA; Annual Data

Nation	LAG1	LAG2	LAG3
Germany	.08	-.14	-.48
France	-.10	.06	-.27
Italy	-.28	-.11	-.28
Belgium	-.27	.19	-.20
Netherlands	.36	.34	.11
United Kingdom	-.25	.28	.21
Switzerland	-.06	-.15	-.17

Table 9. Autocorrelations of Adjusted Nation Effects
relative to USA; Annual Data

Nation	LAG1	LAG2	LAG3
Germany	.18	-.23	-.33
France	-.07	.05	-.21
Italy	-.29	-.24	.16
Belgium	-.18	.21	-.07
Netherlands	.61	.47	.43
United Kingdom	-.26	-.21	.16
Switzerland	-.26	-.08	-.01

Table 10. Autoregressions of Unadjusted Nation Effects (Annual Data)

Nation	β_1	SE	β_2	SE	$\bar{R}^2$	ℓ
Germany	.19	.25	-.28	.27	-.03	-.09
France	.08	.29	-.16	.29	-.10	-.02
Italy	-.14	.27	-.28	.32	-.07	-.06
Belgium	-.26	.25	-.08	.26	-.06	-.02
Netherlands	.34	.25	.18	.27	.07	.02
United Kingdom	-.41	.22	-.52	.22	.23	-.12
Switzerland	.07	.27	-.28	.29	-.06	-.02

The estimated equation is $y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \epsilon_t$.
ℓ is the estimated autocorrelation coefficient of ϵ.

Table 11. Autoregressions of Adjusted Nation Effects (Annual Data)

Nation	β_1	SE	β_2	SE	$\bar{R}^2$	ℓ
Germany	.34	.24	-.37	.25	.08	-.04
France	.25	.28	-.18	.29	.06	-.01
Italy	-.20	.27	-.38	.29	.01	.03
Belgium	-.19	.25	-.03	.26	-.09	0
Netherlands	.59	.26	.11	.27	.34	.01
United Kingdom	-.42	.23	-.51	.23	.21	-.15
Switzerland	-.17	.28	-.21	.30	-.08	0

The estimated equation is $y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \epsilon_t$.
ℓ is the estimated autocorrelation coefficient of ϵ.

Table 12. Unadjusted Nation Effect Correlations (Annual Data)

Nation	Ger.	Fra.	Ita.	Bel.	Neth.	UK	Swi.
Germany	1.00	.79	.67	.81	.79	.64	.75
France	.79	1.00	.74	.87	.76	.53	.79
Italy	.67	.74	1.00	.74	.63	.40	.74
Belgium	.81	.87	.74	1.00	.72	.61	.73
Netherlands	.79	.76	.63	.72	1.00	.42	.59
United Kingdom	.64	.53	.40	.61	.42	1.00	.49
Switzerland	.75	.79	.74	.73	.59	.49	1.00

Table 13. Adjusted Nation Effect Correlations (Annual Data)

Nation	Ger.	Fra.	Ita.	Bel.	Neth.	UK	Swi.
Germany	1.00	.70	.61	.69	.72	.56	.49
France	.70	1.00	.56	.79	.64	.45	.50
Italy	.61	.56	1.00	.65	.54	.35	.47
Belgium	.69	.79	.65	1.00	.54	.56	.46
Netherlands	.72	.64	.54	.54	1.00	.28	.31
United Kingdom	.56	.45	.35	.56	.28	1.00	.39
Switzerland	.49	.50	.47	.46	.31	.39	1.00

Table 14. Correlation Between Growth Rate of Aggregate IP Index and Unadjusted Nation Effects (Annual Data)

NATION	SE(PAR)	SE(IP)	CORR(PAR,IP)
Germany	.04	.03	.91
France	.04	.04	.92
Italy	.05	.04	.99
Belgium	.04	.04	.88
Netherlands	.05	.04	.84
United Kingdom	.05	.05	.90
Switzerland	.05	.05	.94

PAR is the estimated unadjusted nation effect and IP is the growth rate of aggregate industrial production index relative to US.
$IP = \Delta IP_i - \Delta IP_{us}$

Table 15. Correlation Between Growth Rate of Aggregate IP Index Adjusted Nation Effects (Annual Data)

NATION	SE(PAR)	SE(IP)	CORR(PAR,IP)
Germany	.01	.03	.75
France	.01	.04	.94
Italy	.01	.04	.88
Belgium	.01	.04	.87
Netherlands	.01	.04	.76
United Kingdom	.01	.05	.88
Switzerland	.01	.05	.83

PAR is the estimated adjusted nation effect and IP is the growth rate of aggregate industrial production index relative to US.
$IP = \Delta IP_i - \Delta IP_{usa}$

APPENDIX

Unadjusted and Adjusted Estimates of the Nation Parameter and Their T-Statistics

Annual Data

GERMANY

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.041185	1.27	0.0094250	1.22
66	0.008422	0.26	0.0009821	0.13
67	0.044035	1.35	0.0049609	0.64
68	0.120680	3.71	0.0220128	2.86
69	0.119129	3.66	0.0214221	2.78
70	0.118240	3.63	0.0201675	2.62
71	0.074264	2.28	0.0157090	2.04
72	0.019580	0.60	0.0034099	0.44
73	0.064618	1.99	0.0135615	1.76
74	0.088421	2.72	0.0194967	2.53
75	0.079893	2.46	0.0133272	1.73
76	0.044223	1.36	0.0077476	1.00
77	0.017215	0.53	0.0013710	0.18
78	0.041082	1.32	0.0079509	1.08
79	0.095411	3.20	0.0171153	2.43
80	0.098660	3.32	0.0121341	1.72
81	0.018502	0.63	0.0029117	0.42
82	0.119459	4.10	0.0170127	2.46
83	0.003272	0.11	0.0006978	0.10

FRANCE

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.016982	0.51	0.0047394	0.60
66	0.065508	1.96	0.0085186	1.07
67	0.094448	2.82	0.0140785	1.77
68	0.057901	1.73	0.0089037	1.12
69	0.132513	3.96	0.0214892	2.71
70	0.136687	4.19	0.0214060	2.77
71	0.112346	3.45	0.0181791	2.35
72	0.067489	2.07	0.0135396	1.75
73	0.051995	1.60	0.0074770	0.97
74	0.107175	3.29	0.0155834	2.02
75	0.082023	2.52	0.0142638	1.85
76	0.067609	2.07	0.0103913	1.35
77	0.031155	0.96	0.0035729	0.46
78	0.054268	1.69	0.0100011	1.32
79	0.092784	2.96	0.0139677	1.88
80	0.126886	4.35	0.0159580	2.31
81	0.053033	1.82	0.0097632	1.41
82	0.145738	5.00	0.0207769	3.01
83	0.011587	0.40	0.0034110	0.49

ITALY

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.031597	0.97	0.0061985	0.80
66	0.076882	2.36	0.0156271	2.02
67	0.118284	3.63	0.0208718	2.70
68	0.070013	2.15	0.0166709	2.16
69	0.049027	1.50	0.0120777	1.56
70	0.127416	3.91	0.0265055	3.43
71	0.020537	0.63	0.0063562	0.82
72	0.022834	0.70	0.0052469	0.68
73	0.079248	2.43	0.0248832	3.22
74	0.117208	3.60	0.0211906	2.74
75	0.058323	1.79	0.0073194	0.95
76	0.081001	2.49	0.0214225	2.77
77	-0.000249	-0.01	-0.0023788	-0.31
78	0.019399	0.60	0.0068501	0.90
79	0.089661	2.86	0.0222247	2.99
80	0.136116	4.67	0.0200638	2.90
81	0.023024	0.79	0.0053391	0.77
82	0.120093	4.12	0.0201898	2.92
83	-0.042750	-1.47	-0.0017732	-0.26

BELGIUM

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.007911	0.24	0.0009718	0.13
66	-0.015768	-0.48	-0.0032887	-0.42
67	0.056567	1.73	0.0098599	1.27
68	0.041238	1.26	0.0042048	0.54
69	0.069277	2.12	0.0110904	1.43
70	0.073937	2.26	0.0118793	1.53
71	0.069869	2.14	0.0148104	1.91
72	0.022512	0.69	0.0047686	0.62
73	0.026978	0.83	0.0097190	1.26
74	0.085375	2.61	0.0155662	2.01
75	0.016715	0.51	0.0020146	0.26
76	0.042447	1.30	0.0069607	0.90
77	-0.013424	-0.41	-0.0032317	-0.42
78	0.011594	0.36	0.0008480	0.11
79	0.065979	2.10	0.0101918	1.37
80	0.093272	2.98	0.0134537	1.81
81	0.010894	0.37	0.0027666	0.40
82	0.144355	4.95	0.0244347	3.54
83	-0.017962	-0.62	-0.0015393	-0.22

NETHERLANDS

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.024960	0.76	0.0108647	1.39
66	0.020361	0.62	0.0070397	0.90
67	0.073980	2.25	0.0180484	2.31
68	0.091008	2.76	0.0241527	3.10
69	0.095726	2.91	0.0212663	2.73
70	0.117547	3.57	0.0255824	3.28
71	0.101092	3.07	0.0257110	3.29
72	0.019469	0.59	0.0105575	1.35
73	0.027570	0.84	0.0139530	1.79
74	0.034056	1.03	0.0092600	1.19
75	0.032855	1.00	0.0104534	1.34
76	0.026524	0.81	0.0084978	1.09
77	-0.048679	-1.48	-0.0077759	-1.00
78	-0.018224	-0.56	-0.0011332	-0.15
79	0.031708	1.03	0.0085277	1.17
80	0.055393	1.80	0.0057857	0.80
81	-0.020715	-0.69	-0.0003648	-0.05
82	0.077780	2.58	0.0113861	1.59
83	-0.030821	-1.02	-0.0007543	-0.11

SWITZERLAND

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.044526	1.26	0.0152656	1.83
66	0.039075	1.11	0.0093561	1.12
67	0.096172	2.73	0.0194898	2.34
68	0.067557	1.92	0.0135081	1.62
69	0.112102	3.18	0.0226700	2.72
70	0.154012	4.37	0.0337505	4.05
71	0.061951	1.76	0.0109409	1.31
72	0.021285	0.60	0.0056740	0.68
73	0.076858	2.18	0.0231069	2.77
74	0.098196	2.79	0.0143375	1.72
75	0.060313	1.71	0.0128021	1.53
76	0.015506	0.44	0.0009115	0.11
77	0.086624	2.46	0.0261757	3.14
78	0.020601	0.64	0.0032677	0.43
79	0.094866	3.15	0.0198812	2.78
80	0.151533	5.03	0.0273313	3.83
81	0.074532	2.47	0.0165996	2.32
82	0.124758	4.14	0.0231219	3.24
83	-0.003572	-0.12	0.0038479	0.54

UK

YR	NATPAR	TSTAT	ADNATPAR	ADTSTAT
65	0.029646	0.91	0.0084660	1.10
66	0.010256	0.32	0.0043713	0.57
67	0.056661	1.74	0.0093562	1.22
68	0.058205	1.79	0.0106616	1.38
69	0.053241	1.64	0.0114340	1.49
70	0.091738	2.82	0.0155381	2.02
71	0.080289	2.47	0.0185697	2.41
72	-0.004400	-0.14	0.0016537	0.21
73	0.084488	2.60	0.0195025	2.53
74	0.060827	1.87	0.0129914	1.69
75	0.102151	3.14	0.0192269	2.50
76	0.028868	0.86	0.0065274	0.82
77	0.037797	1.13	0.0099308	1.25
78	0.030654	0.98	0.0109488	1.48
79	0.129265	4.43	0.0272935	3.95
80	0.013018	0.45	0.0026279	0.38
81	0.039796	1.36	0.0093870	1.36
82	0.178006	6.10	0.0308869	4.47
83	0.048590	1.67	0.0125767	1.82

NATPAR – estimate of the unadjusted nation effect
TSTAT – T-statistic for NATPAR
ADNATPAR – estimate of the adjusted nation effect
ADTSTAT – T-statistic for ADNATPAR

Unadjusted and Adjusted Estimates of the Industry Parameter and Their T-Statistics

Annual Data

INDUSTRY 20

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.02331	-0.73	-0.006222	-0.82
66	-0.04055	-1.26	-0.009224	-1.21
67	-0.05943	-1.85	-0.009965	-1.31
68	-0.02181	-0.68	-0.001532	-0.20
69	-0.05146	-1.60	-0.008103	-1.07
70	-0.09332	-2.91	-0.016830	-2.22
71	-0.04279	-1.33	-0.008176	-1.08
72	-0.02582	-0.81	-0.006856	-0.90
73	-0.04424	-1.38	-0.011774	-1.55
74	-0.09136	-2.85	-0.018986	-2.50
75	-0.08108	-2.53	-0.016919	-2.23
76	-0.03722	-1.14	-0.007529	-0.97
77	-0.02023	-0.62	-0.004629	-0.60
78	-0.01710	-0.54	-0.004345	-0.58
79	-0.02487	-0.81	-0.001669	-0.23
80	-0.09124	-2.97	-0.014370	-1.97
81	-0.02442	-0.80	-0.006014	-0.83
82	-0.14446	-4.71	-0.026361	-3.63
83	-0.01030	-0.34	-0.005595	-0.77

INDUSTRY 31

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.02473	-0.78	-0.004543	-0.61
66	-0.02361	-0.75	-0.005084	-0.68
67	-0.04786	-1.51	0.000445	0.06
68	-0.05158	-1.63	-0.002884	-0.38
69	-0.05210	-1.65	0.000069	0.01
70	-0.07472	-2.40	-0.001675	-0.23
71	-0.04538	-1.46	-0.001249	-0.17
72	-0.00982	-0.32	0.001586	0.22
73	-0.02373	-0.76	0.003661	0.50
74	-0.08650	-2.78	-0.021585	-2.93
75	-0.08584	-2.76	-0.030206	-4.10
76	-0.01660	-0.53	0.006013	0.82
77	-0.02179	-0.70	-0.008552	-1.16
78	-0.01126	-0.37	0.000682	0.09
79	-0.06423	-2.16	-0.008058	-1.14
80	-0.08215	-2.77	-0.010757	-1.53
81	-0.02846	-0.96	-0.008083	-1.15
82	-0.12326	-4.17	-0.024526	-3.50
83	-0.00148	-0.05	-0.005525	-0.79

INDUSTRY 32

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.01146	-0.23	-0.003495	-0.29
66	0.03312	0.65	0.006218	0.52
67	-0.08775	-1.72	-0.014480	-1.20
68	0.01249	0.25	0.002049	0.17
69	-0.00197	-0.04	-0.000425	-0.04
70	-0.09393	-1.85	-0.016675	-1.38
71	-0.03284	-0.65	-0.006922	-0.57
72	0.04237	0.83	0.006777	0.56
73	-0.03119	-0.61	-0.009268	-0.77
74	-0.09585	-1.88	-0.016252	-1.35
75	-0.12135	-2.38	-0.020638	-1.71
76	0.06211	1.22	0.011096	0.92
77	-0.00475	-0.09	-0.000683	-0.06
78	-0.06087	-1.20	-0.010897	-0.91
79	0.00492	0.10	0.000382	0.03
80	-0.07790	-1.55	-0.009854	-0.83
81	-0.07184	-1.43	-0.012917	-1.08
82	-0.11436	-2.27	-0.017404	-1.46
83	0.02664	0.53	0.003123	0.26

INDUSTRY 33

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.05651	-1.08	-0.009981	-0.81
66	-0.05839	-1.12	-0.010223	-0.83
67	-0.10531	-2.02	-0.016253	-1.32
68	-0.06700	-1.29	-0.011329	-0.92
69	-0.09691	-1.86	-0.015174	-1.23
70	-0.10040	-1.93	-0.015622	-1.26
71	-0.06981	-1.34	-0.011691	-0.95
72	0.03969	0.76	0.002383	0.19
73	-0.09207	-1.77	-0.014552	-1.18
74	-0.19246	-3.69	-0.027455	-2.22
75	-0.16758	-3.21	-0.024257	-1.96
76	0.03467	0.66	0.001737	0.14
77	-0.01127	-0.22	-0.004168	-0.34
78	-0.04775	-1.37	-0.008528	-1.03
79	-0.09362	-2.73	-0.017654	-2.17
80	-0.12646	-4.01	-0.017947	-2.40
81	-0.11007	-3.59	-0.016792	-2.31
82	-0.21335	-6.96	-0.031626	-4.36
83	0.00993	0.32	-0.001199	-0.17

INDUSTRY 34

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.05972	-1.15	-0.011196	-0.91
66	-0.05119	-0.98	-0.009391	-0.76
67	-0.09314	-1.79	-0.018274	-1.48
68	-0.09536	-1.83	-0.018743	-1.52
69	-0.06747	-1.29	-0.012838	-1.04
70	-0.14647	-2.81	-0.029567	-2.39
71	-0.10369	-1.99	-0.020507	-1.66
72	-0.05352	-1.03	-0.009883	-0.80
73	-0.08143	-1.56	-0.015793	-1.28
74	-0.13871	-2.66	-0.027923	-2.26
75	-0.22162	-4.25	-0.045480	-3.68
76	-0.02262	-0.43	-0.003340	-0.27
77	-0.05695	-1.09	-0.010610	-0.86
78	-0.05531	-1.06	-0.010263	-0.83
79	-0.08316	-2.57	-0.016753	-2.19
80	-0.12755	-4.21	-0.021358	-2.98
81	-0.07959	-2.69	-0.017384	-2.48
82	-0.17686	-5.98	-0.031836	-4.54
83	-0.03311	-1.12	-0.009908	-1.41

INDUSTRY 35

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	0.00657	0.21	-0.001766	-0.24
66	0.00394	0.13	-0.000375	-0.05
67	-0.05783	-1.86	-0.010460	-1.42
68	-0.00075	-0.02	-0.002023	-0.27
69	-0.02053	-0.66	-0.005400	-0.73
70	-0.09409	-3.02	-0.017953	-2.44
71	-0.07103	-2.28	-0.014788	-2.01
72	0.00209	0.07	-0.001720	-0.23
73	0.00444	0.14	-0.004651	-0.63
74	-0.11182	-3.59	-0.019909	-2.70
75	-0.23592	-7.58	-0.040420	-5.48
76	0.04196	1.35	0.005644	0.77
77	-0.03328	-1.07	-0.006724	-0.91
78	-0.04952	-1.62	-0.009803	-1.35
79	-0.06588	-2.17	-0.013659	-1.90
80	-0.17354	-5.74	-0.027745	-3.88
81	-0.08785	-2.97	-0.016356	-2.33
82	-0.18726	-6.33	-0.030796	-4.39
83	-0.01537	-0.52	-0.005298	-0.76

INDUSTRY 36

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.04094	-0.78	-0.007811	-0.63
66	-0.07082	-1.36	-0.011814	-0.96
67	-0.11877	-2.28	-0.018238	-1.47
68	-0.04335	-0.83	-0.008134	-0.66
69	-0.06578	-1.26	-0.011139	-0.90
70	-0.15270	-2.93	-0.022784	-1.84
71	-0.05108	-0.98	-0.009170	-0.74
72	0.00238	0.05	-0.002008	-0.16
73	-0.02230	-0.43	-0.005315	-0.43
74	-0.11671	-2.24	-0.017962	-1.45
75	-0.22137	-4.24	-0.031983	-2.59
76	0.01287	0.25	-0.000603	-0.05
77	-0.03096	-0.59	-0.006475	-0.52
78	-0.01772	-0.34	-0.004700	-0.38
79	-0.08861	-2.61	-0.016681	-2.07
80	-0.10813	-3.47	-0.015347	-2.08
81	-0.12875	-4.35	-0.019715	-2.81
82	-0.20597	-6.96	-0.030828	-4.40
83	-0.02245	-0.76	-0.005596	-0.80

INDUSTRY 37

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.02871	-0.91	-0.006838	-0.91
66	-0.10153	-3.21	-0.011157	-1.49
67	-0.13289	-4.20	-0.016795	-2.24
68	-0.06279	-1.98	-0.012878	-1.72
69	-0.06703	-2.12	-0.014073	-1.88
70	-0.16756	-5.30	-0.023296	-3.11
71	-0.17438	-5.51	-0.022952	-3.06
72	-0.05061	-1.60	-0.008338	-1.11
73	-0.04302	-1.36	-0.012863	-1.72
74	-0.13615	-4.30	-0.018927	-2.53
75	-0.34082	-10.78	-0.031840	-4.25
76	-0.03120	-0.99	-0.008510	-1.13
77	-0.11253	-3.56	-0.008991	-1.20
78	-0.07045	-2.30	-0.008675	-1.20
79	-0.11701	-3.93	-0.018090	-2.56
80	-0.23859	-8.05	-0.023869	-3.40
81	-0.12009	-4.06	-0.013023	-1.86
82	-0.31327	-10.59	-0.033610	-4.79
83	-0.07276	-2.46	-0.007878	-1.12

INDUSTRY 38

YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	-0.01956	-0.63	-0.006382	-0.87
66	-0.01556	-0.50	-0.004113	-0.56
67	-0.09108	-2.93	-0.014932	-2.02
68	-0.04777	-1.53	-0.010634	-1.44
69	-0.00715	-0.23	-0.006510	-0.88
70	-0.07770	-2.50	-0.016362	-2.22
71	-0.09651	-3.10	-0.017588	-2.39
72	-0.02424	-0.78	-0.005986	-0.81
73	-0.01303	-0.42	-0.009379	-1.27
74	-0.09322	-3.00	-0.015888	-2.16
75	-0.17584	-5.65	-0.024651	-3.34
76	-0.03387	-1.09	-0.007275	-0.99
77	-0.01803	-0.58	-0.003969	-0.54
78	-0.03327	-1.09	-0.006455	-0.89
79	-0.08102	-2.72	-0.015632	-2.22
80	-0.11090	-3.74	-0.015378	-2.19
81	-0.07859	-2.66	-0.012293	-1.75
82	-0.18207	-6.15	-0.026733	-3.81
83	-0.04055	-1.37	-0.007439	-1.06

INDUSTRY 40

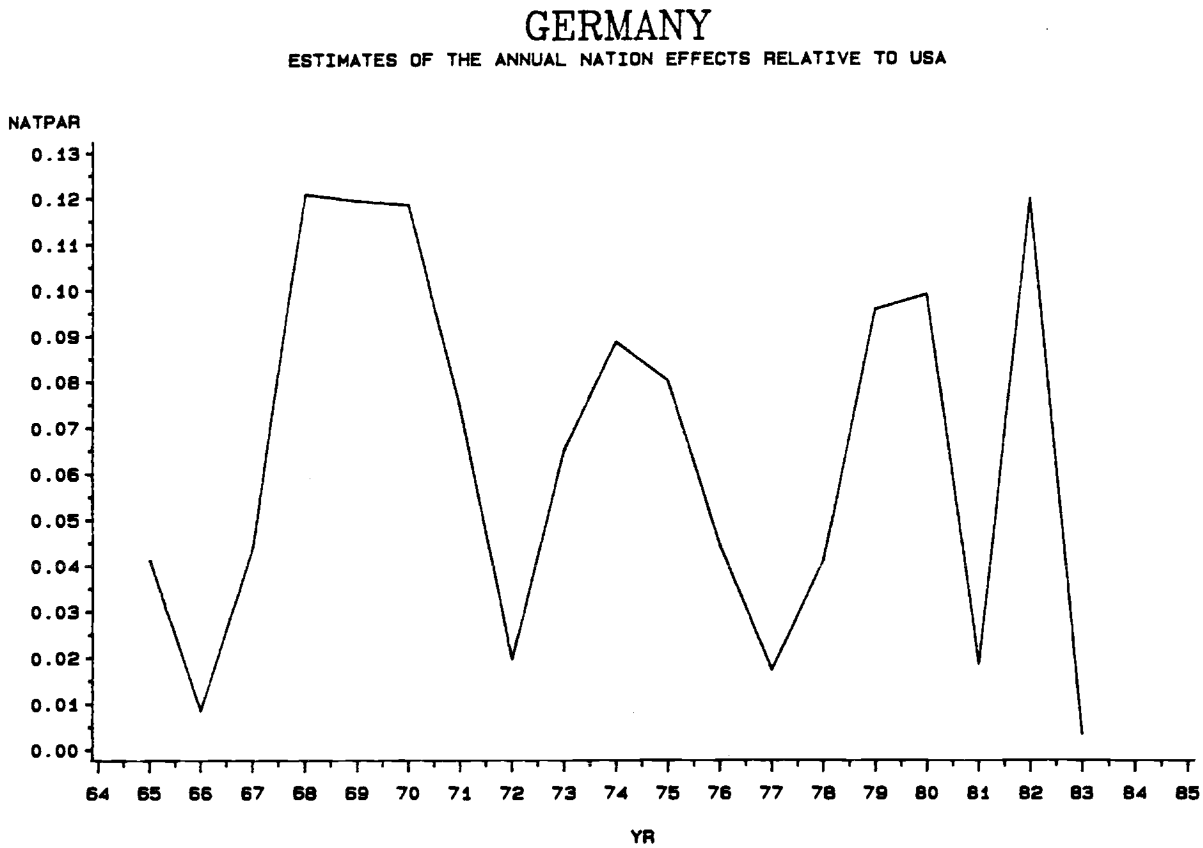
YR	INDPAR	TSTAT	ADINDPAR	ADTSTAT
65	0.02395	0.77	0.009015	1.22
66	0.01940	0.62	0.009505	1.29
67	-0.02516	-0.81	0.001881	0.26
68	-0.01565	-0.50	0.003202	0.43
69	-0.02258	-0.73	0.003378	0.46
70	-0.04590	-1.48	-0.000713	-0.10
71	-0.03610	-1.16	-0.004241	-0.58
72	0.03953	1.27	0.014381	1.95
73	0.00319	0.10	0.003994	0.54
74	-0.07573	-2.43	-0.014153	-1.92
75	-0.06136	-1.97	-0.012342	-1.67
76	-0.01859	-0.60	-0.001320	-0.18
77	0.00342	0.11	0.002219	0.30
78	-0.00150	-0.05	0.001230	0.17
79	-0.05547	-1.86	-0.008474	-1.20
80	-0.09889	-3.34	-0.016960	-2.41
81	-0.04965	-1.68	-0.013965	-1.99
82	-0.15329	-5.18	-0.031504	-4.49
83	-0.01137	-0.38	-0.007111	-1.01

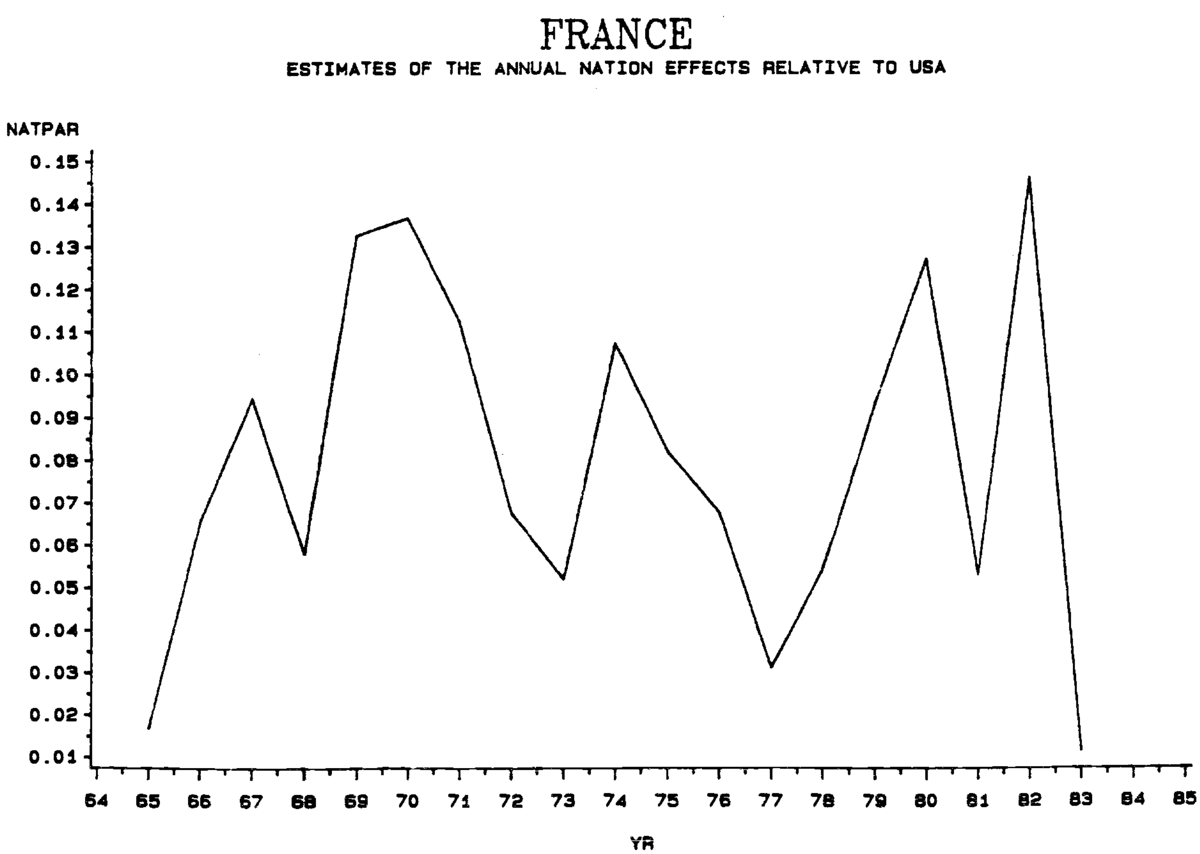
INDPAR – estimate of the unadjusted industry effect

TSTAT – T-statistic for INDPAR

ADINDPAR – estimate of the adjusted industry effect

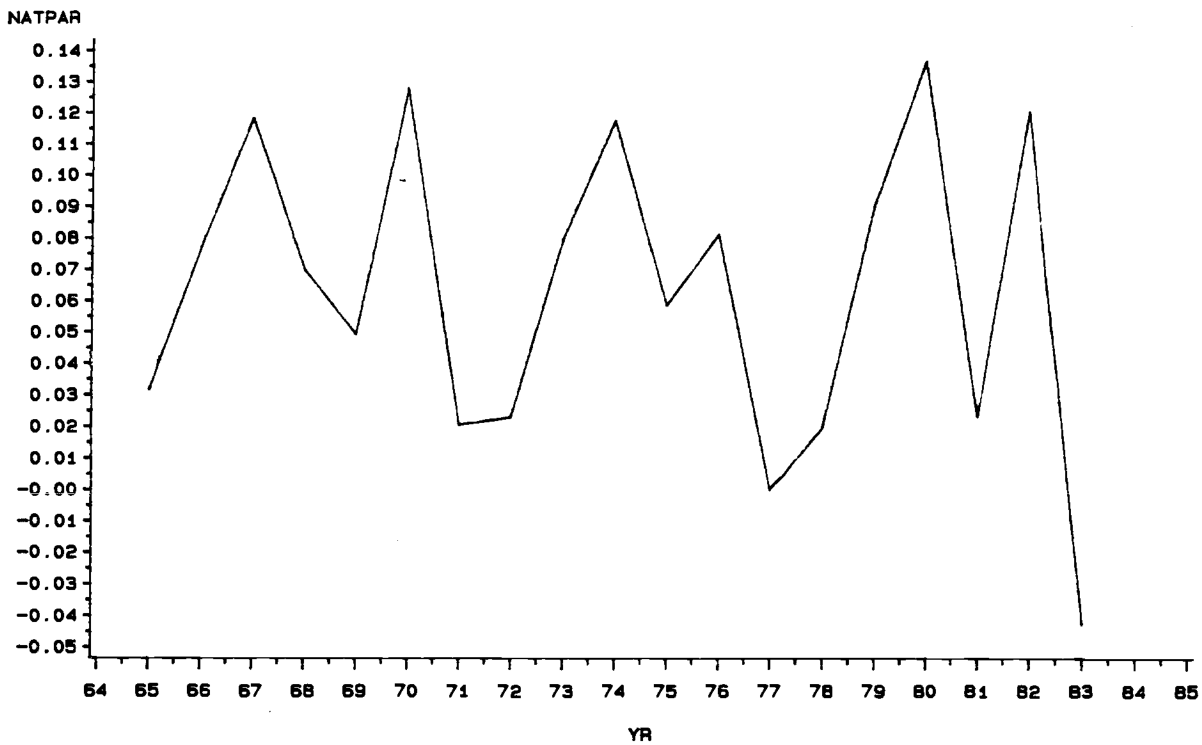
ADTSTAT – T-statistic for ADINDPAR


GERMANY
ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA
NATPAR
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
YR


FRANCE
ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA
NATPAR
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
YR

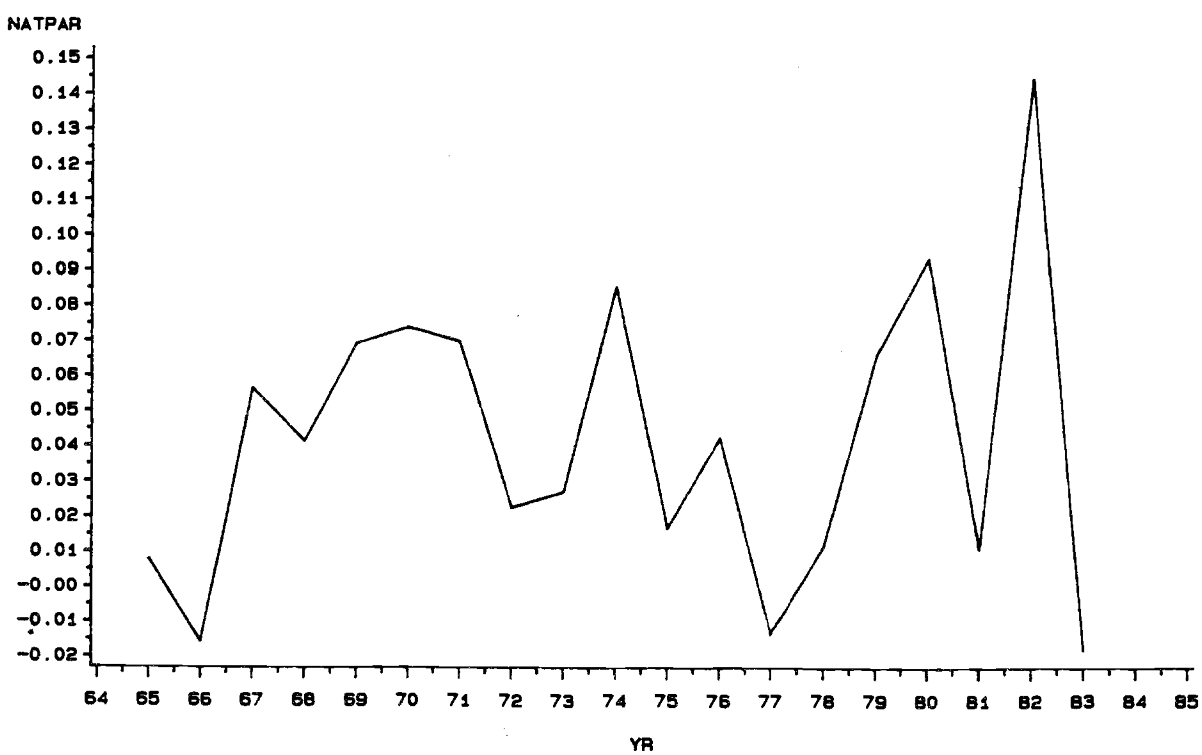
ITALY

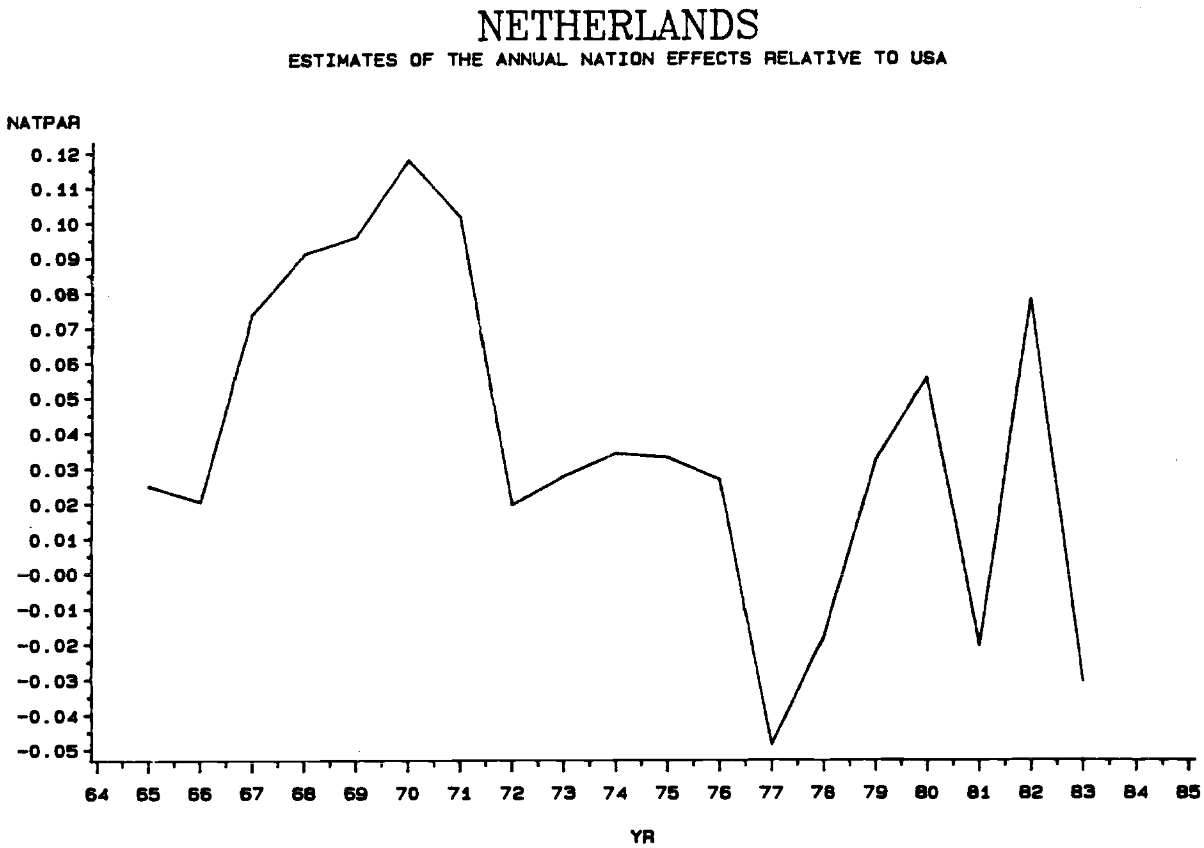
ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA

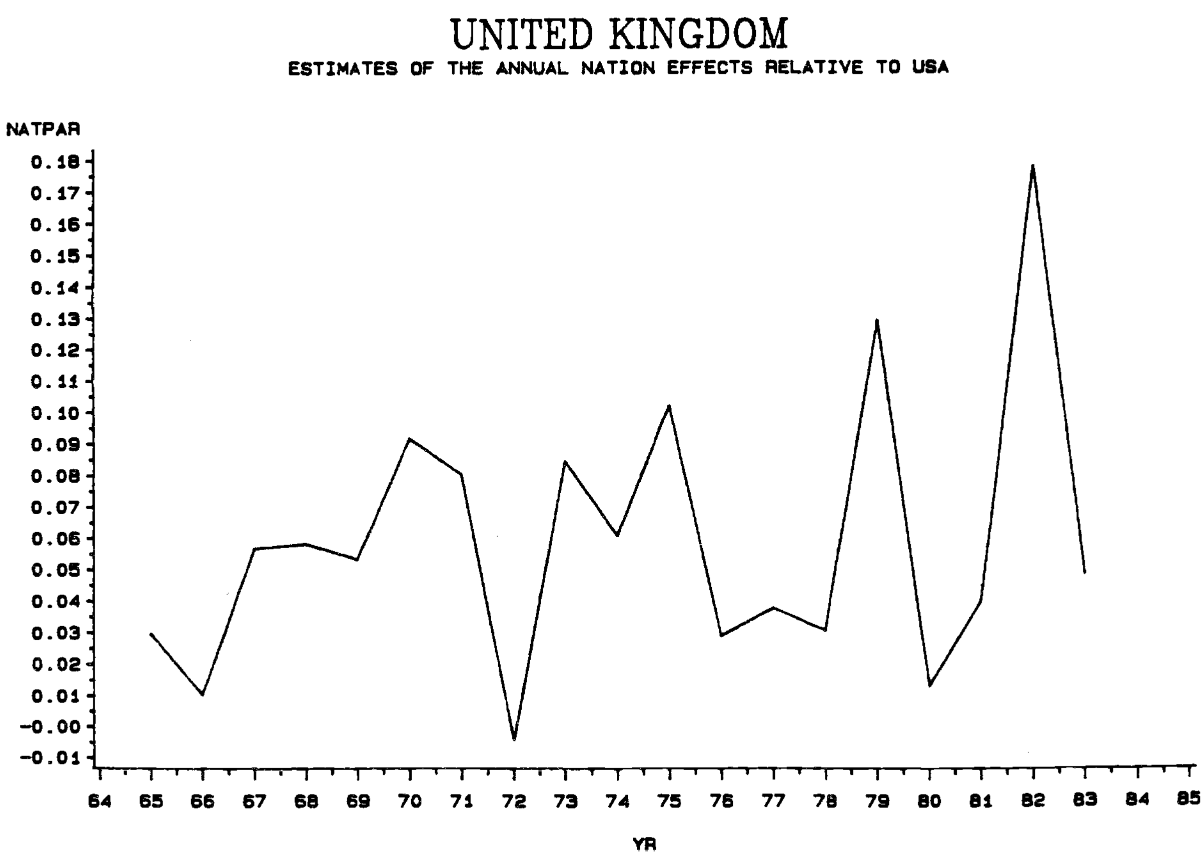


BELGIUM

ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA

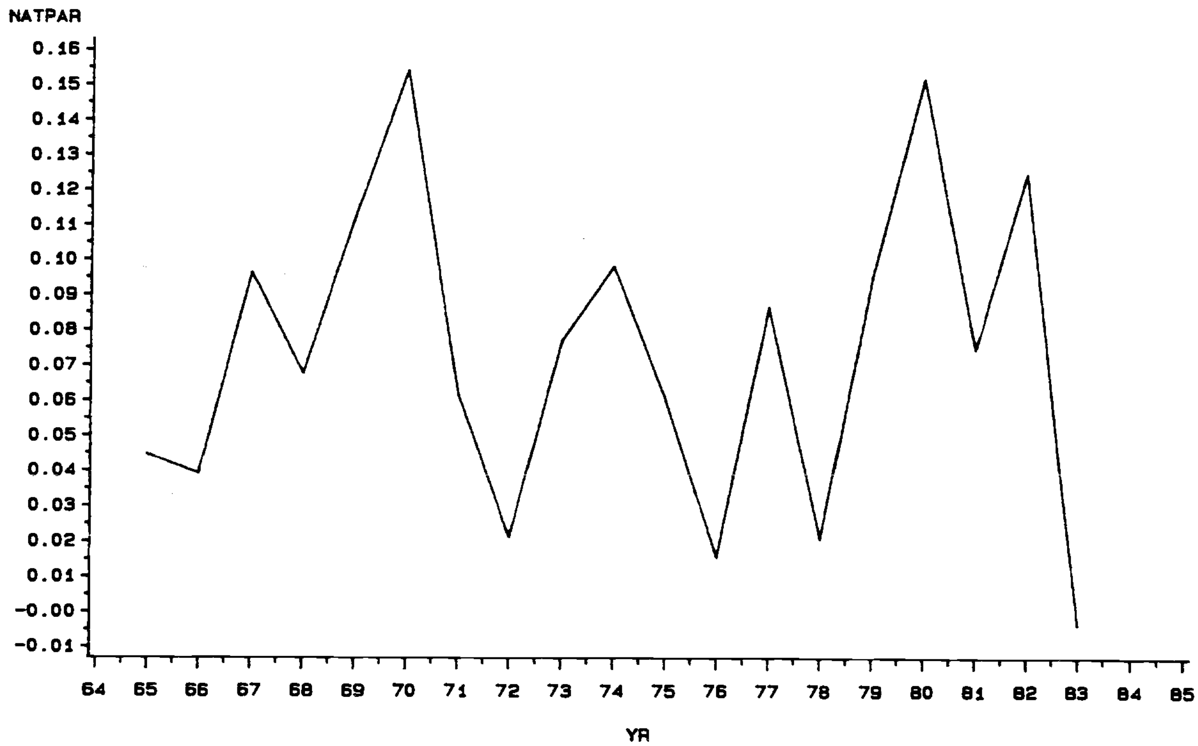



NETHERLANDS
ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA
NATPAR
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
-0.00
-0.01
-0.02
-0.03
-0.04
-0.05
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
YR


UNITED KINGDOM
ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA
NATPAR
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
-0.00
-0.01
64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
YR

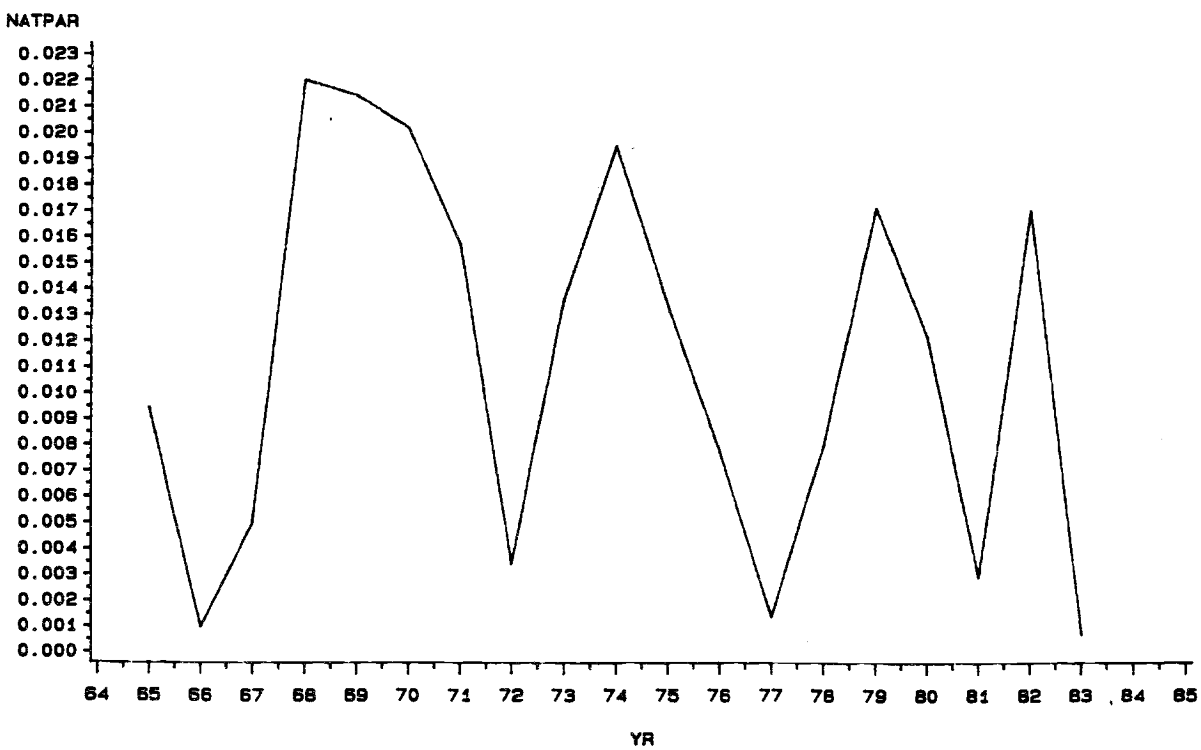
SWITZERLAND

ESTIMATES OF THE ANNUAL NATION EFFECTS RELATIVE TO USA



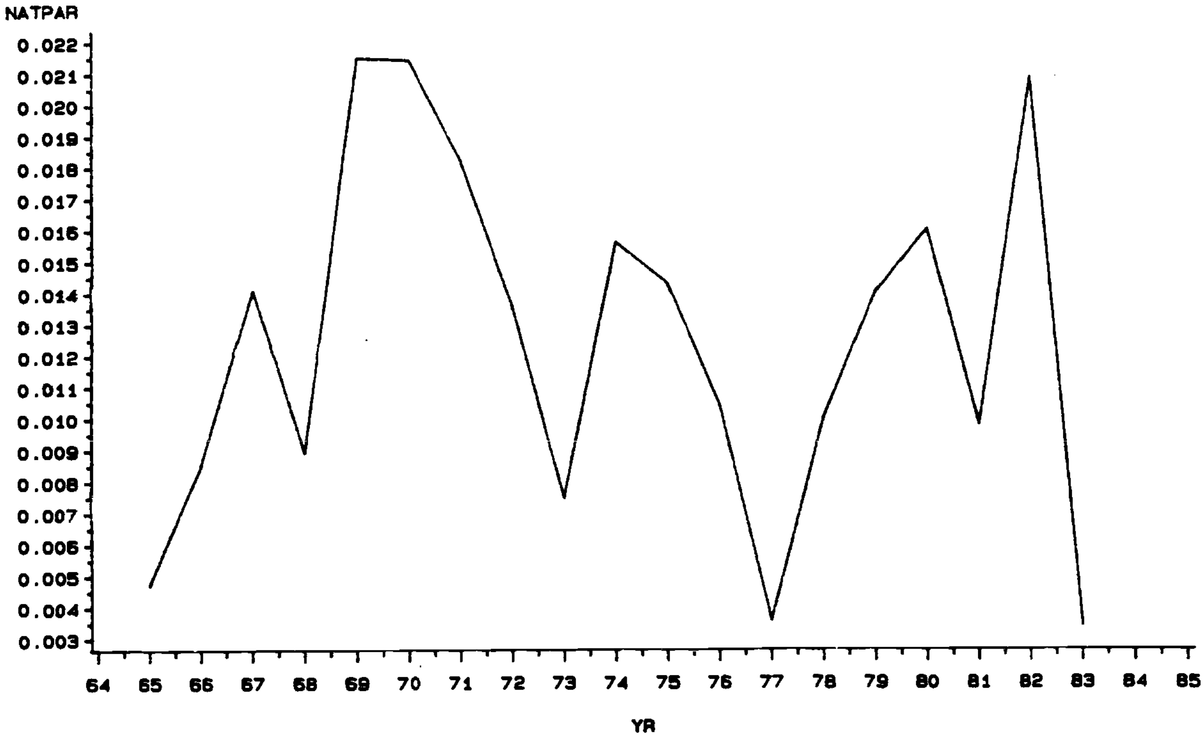
GERMANY

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US



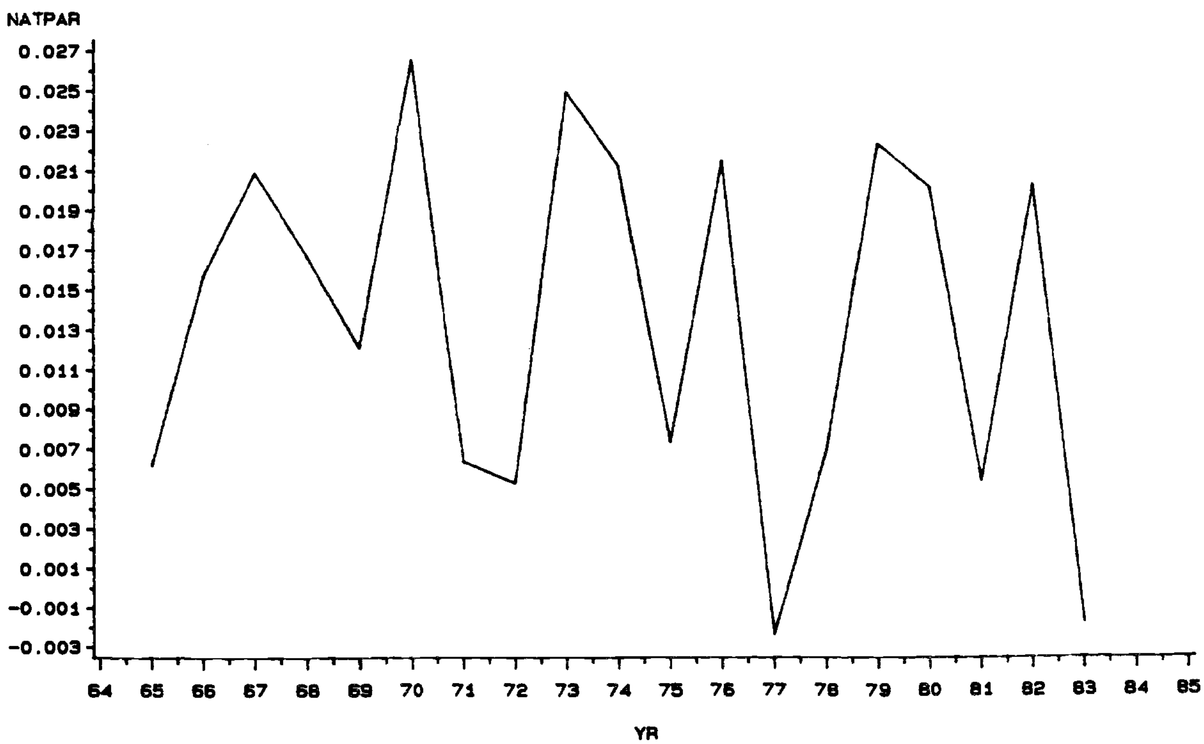
FRANCE

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US



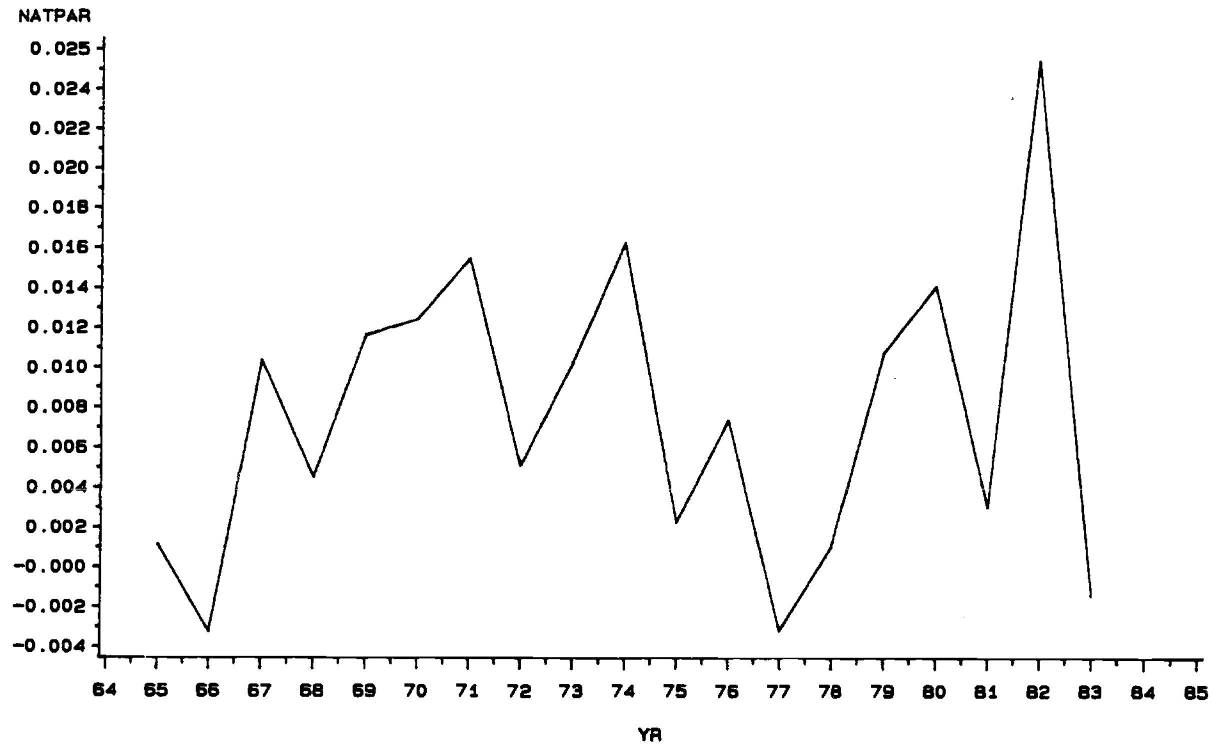
ITALY

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US



BELGIUM

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US

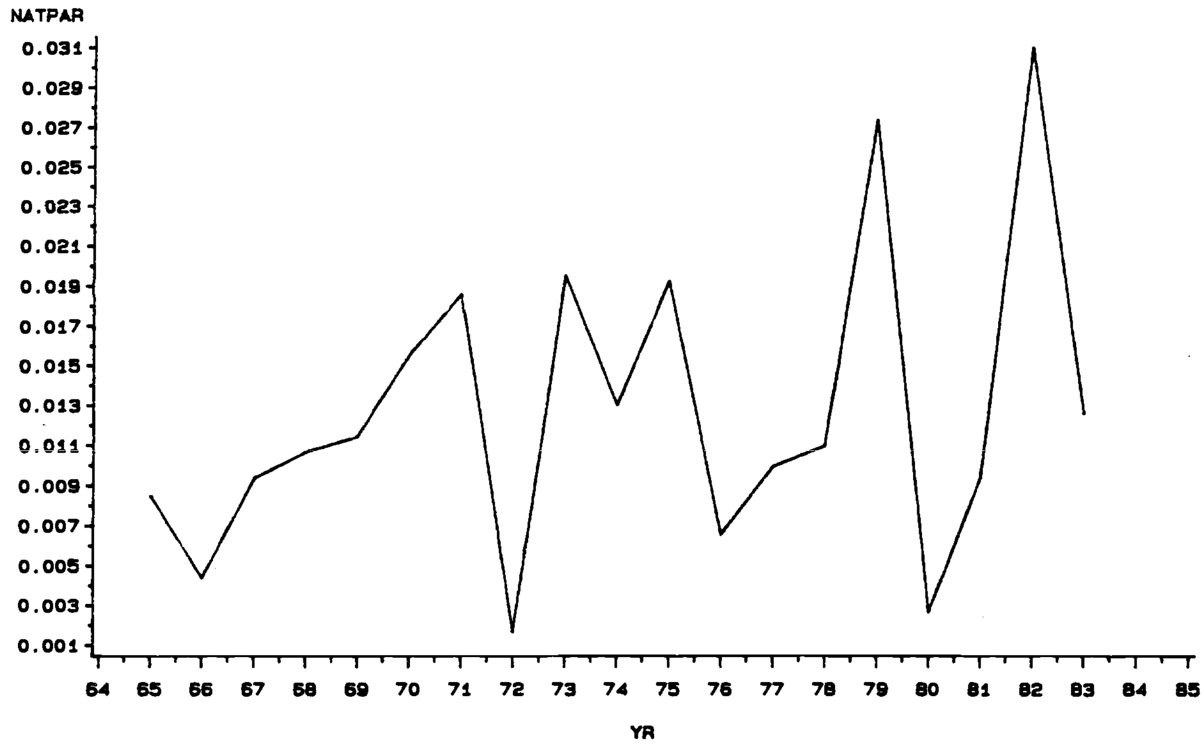


NETHERLANDS

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US

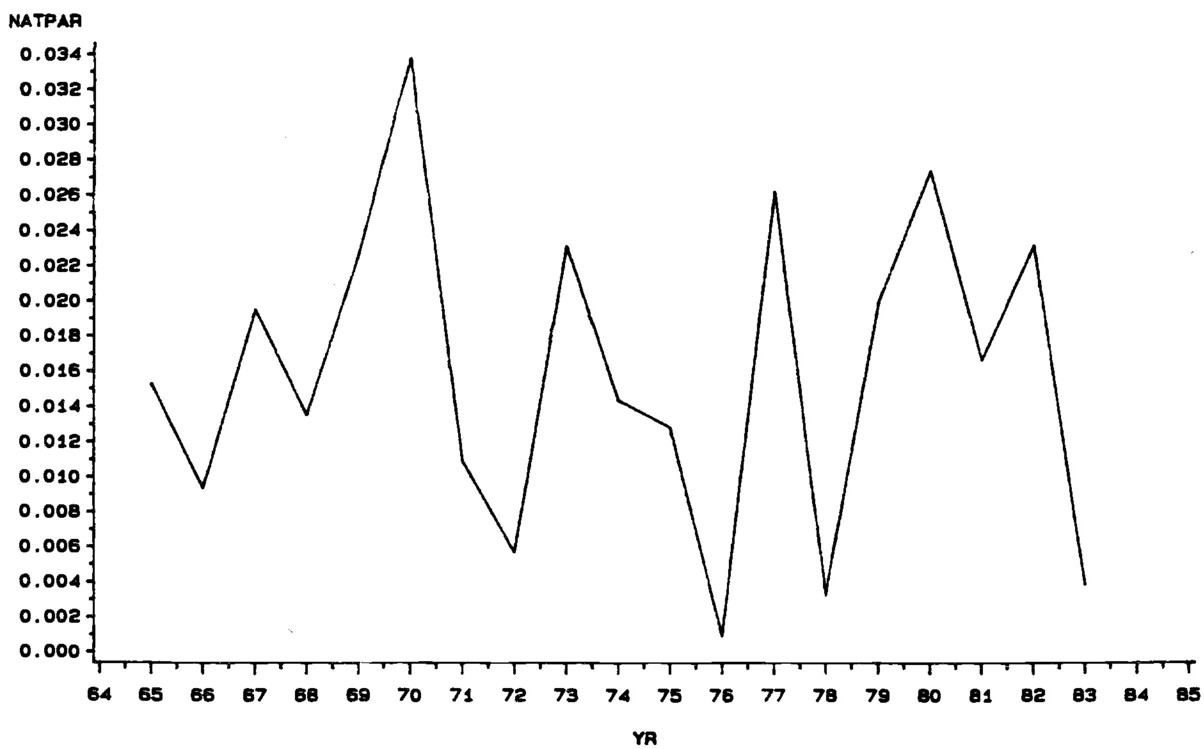
UNITED KINGDOM

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US



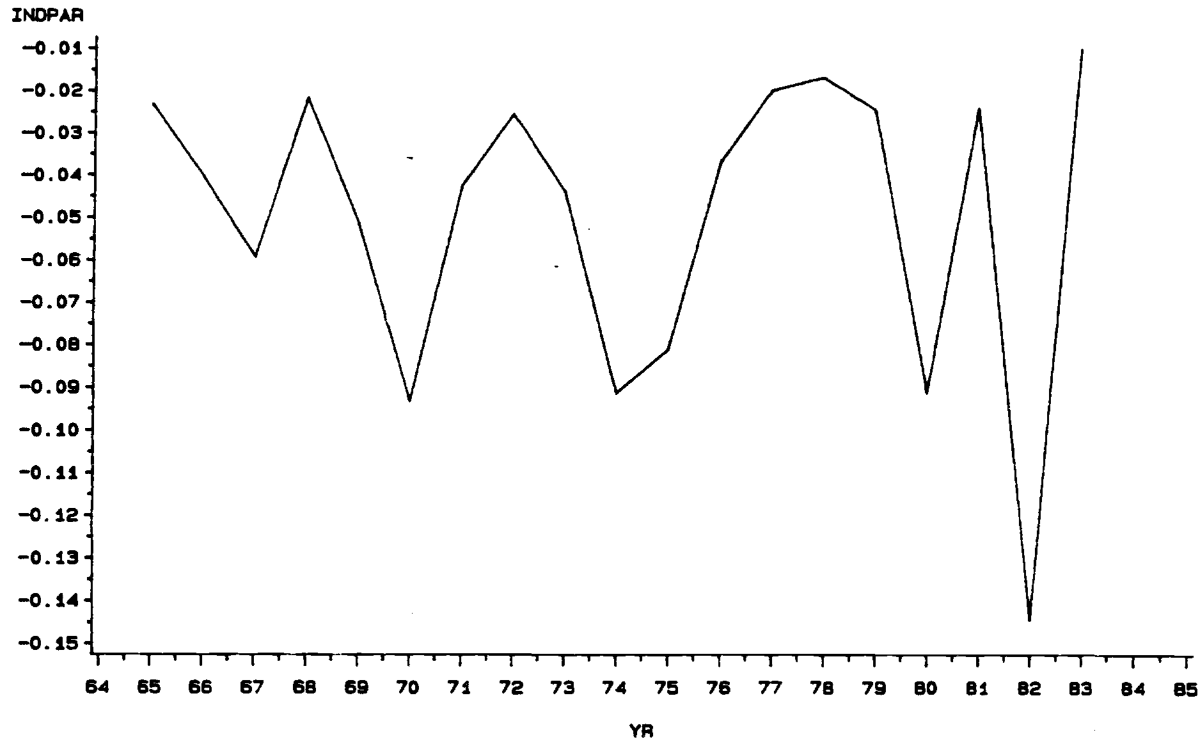
SWITZERLAND

ESTIMATES OF THE ADJUSTED ANNUAL NATION EFFECTS RELATIVE TO US



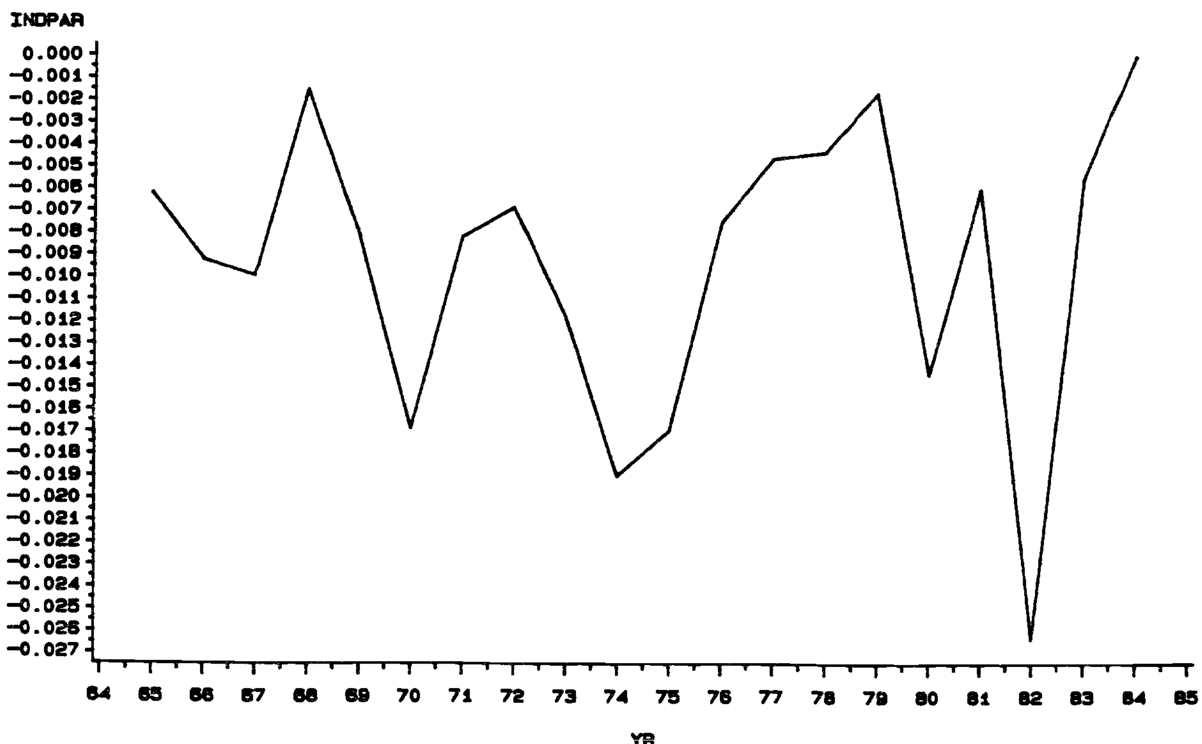
INDUSTRY 20

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



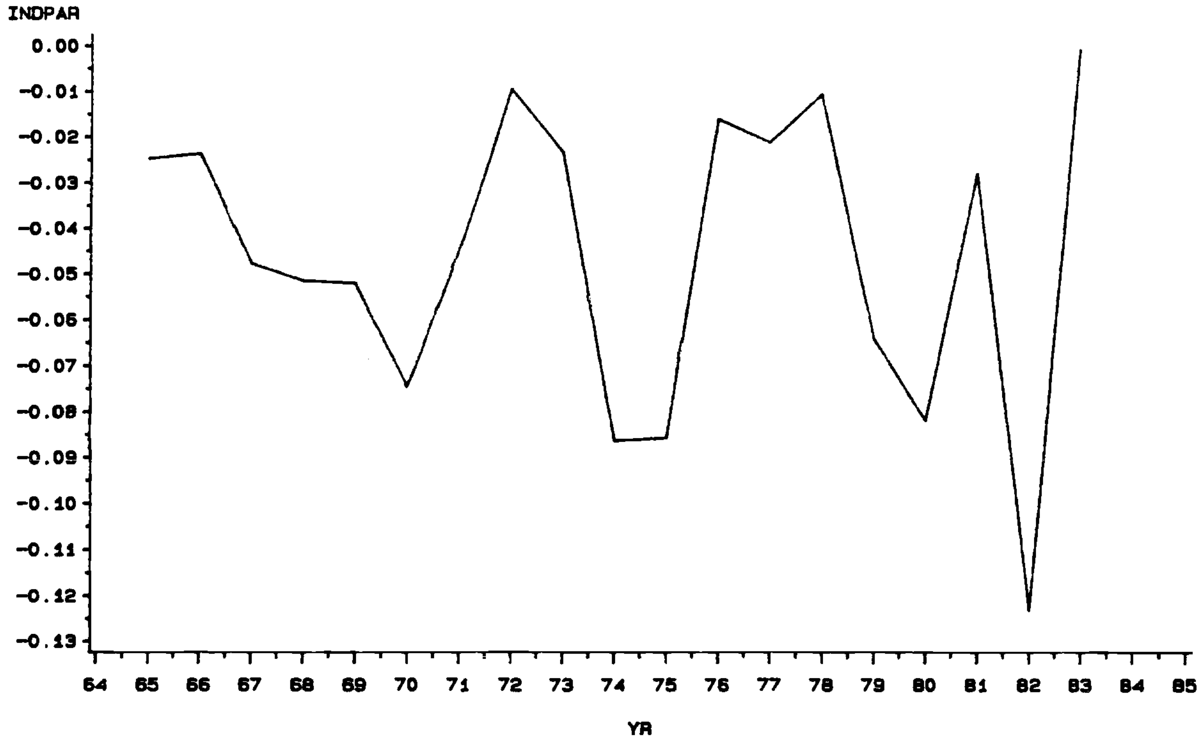
INDUSTRY 20

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



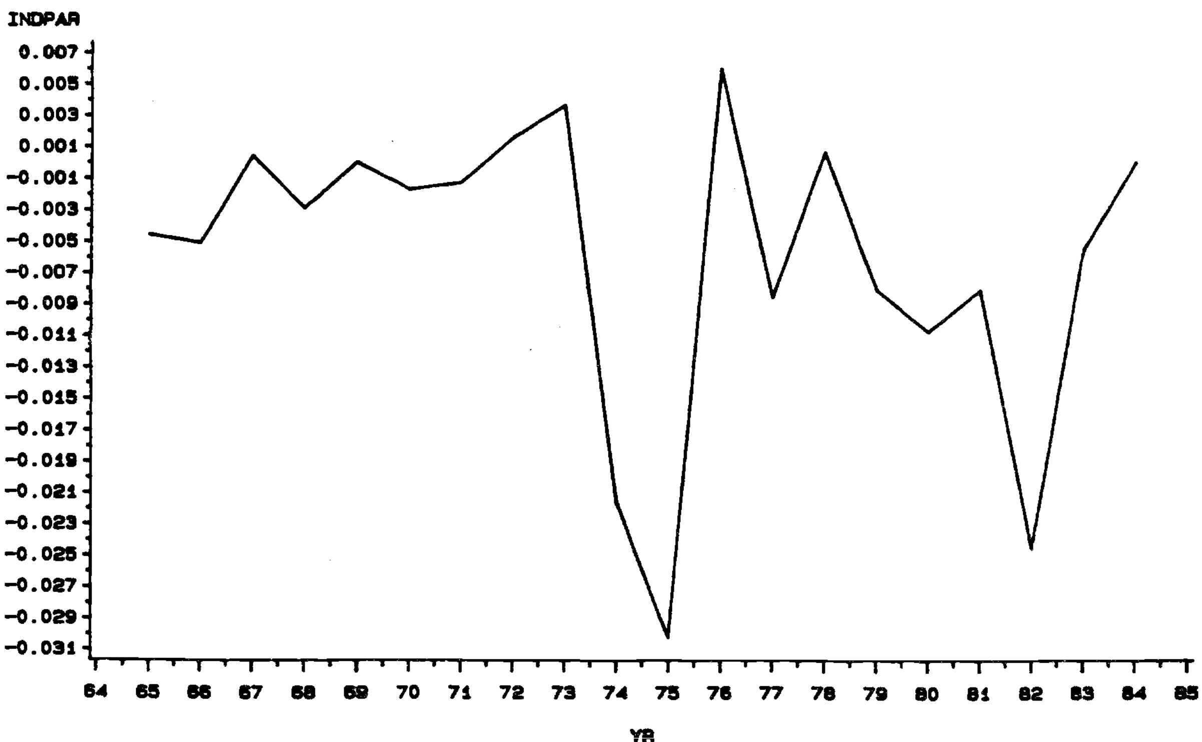
INDUSTRY 31

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



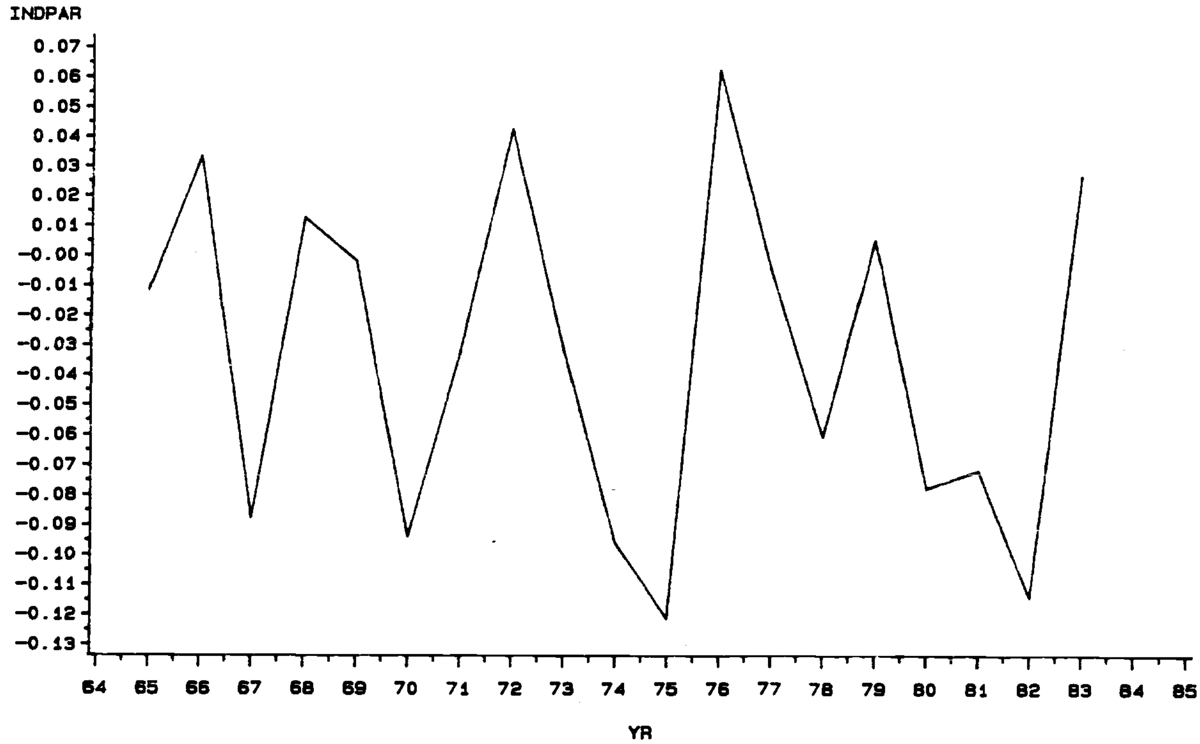
INDUSTRY 31

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



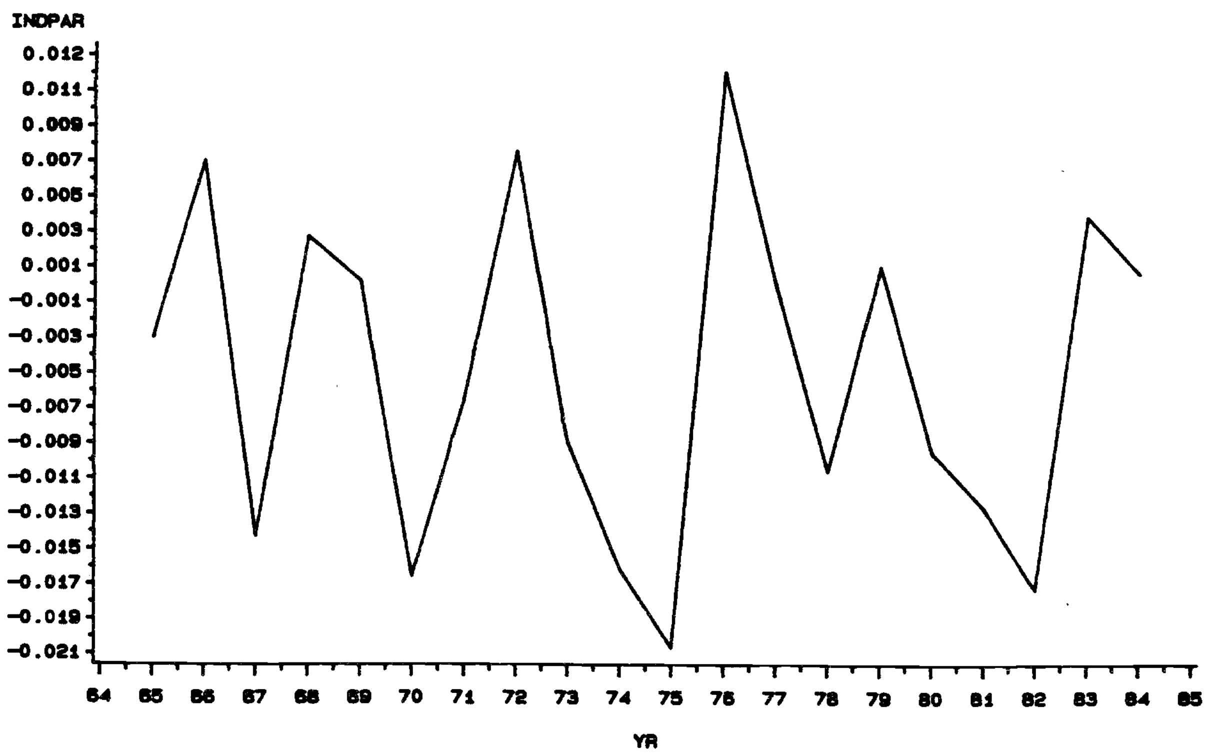
INDUSTRY 32

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



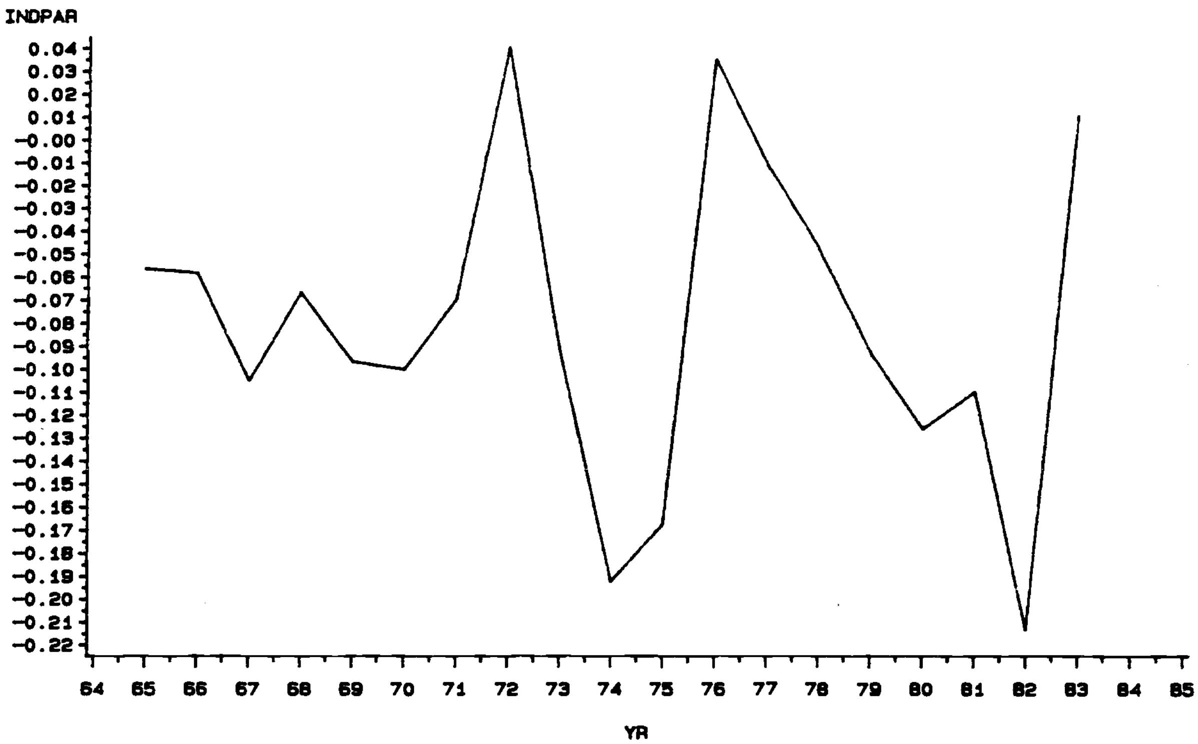
INDUSTRY 32

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



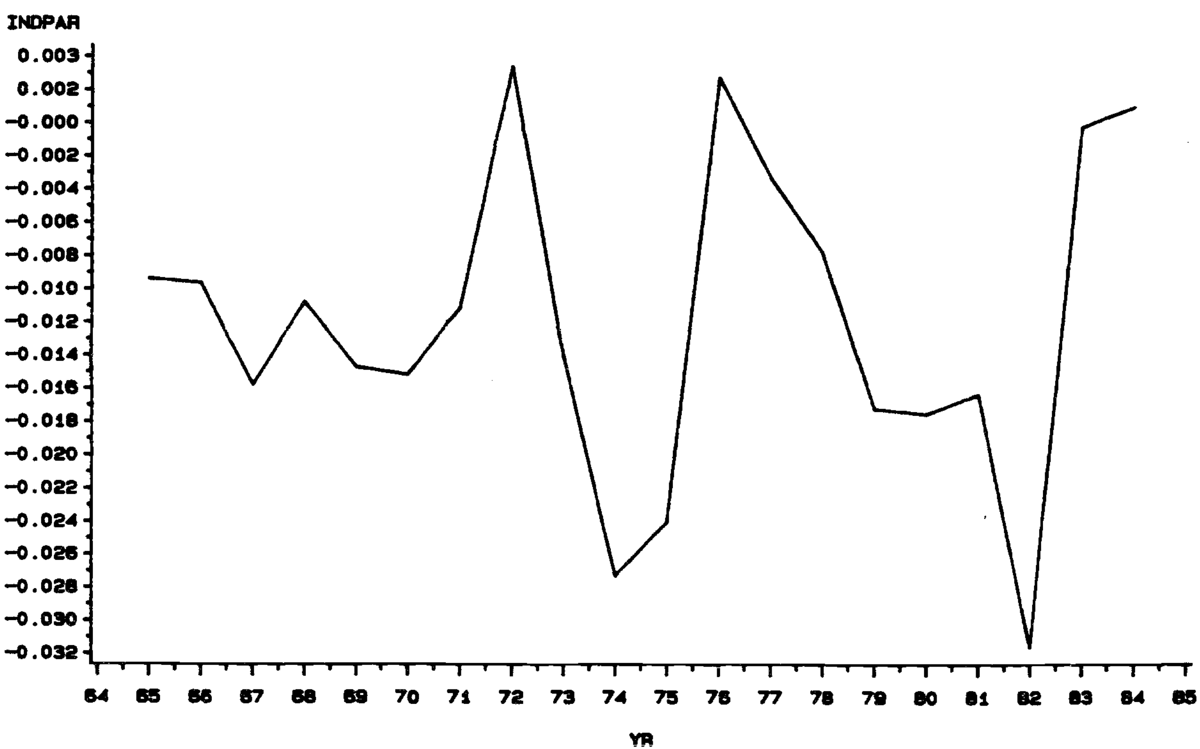
INDUSTRY 33

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



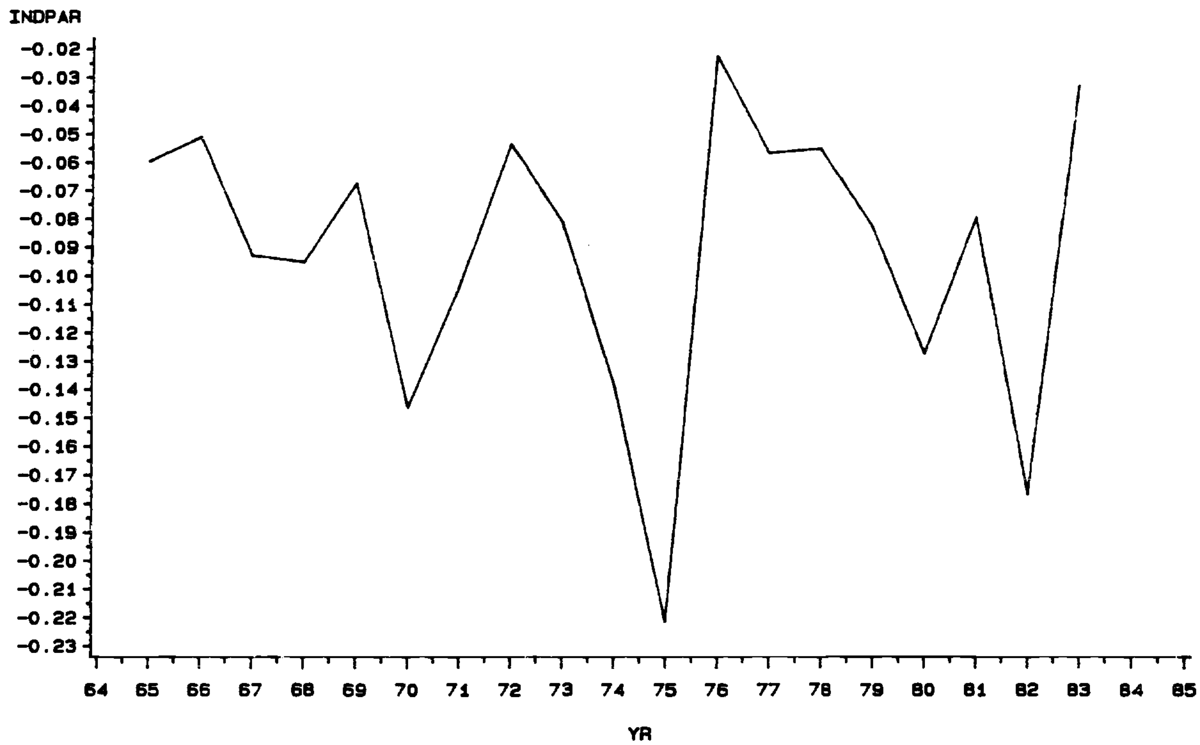
INDUSTRY 33

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



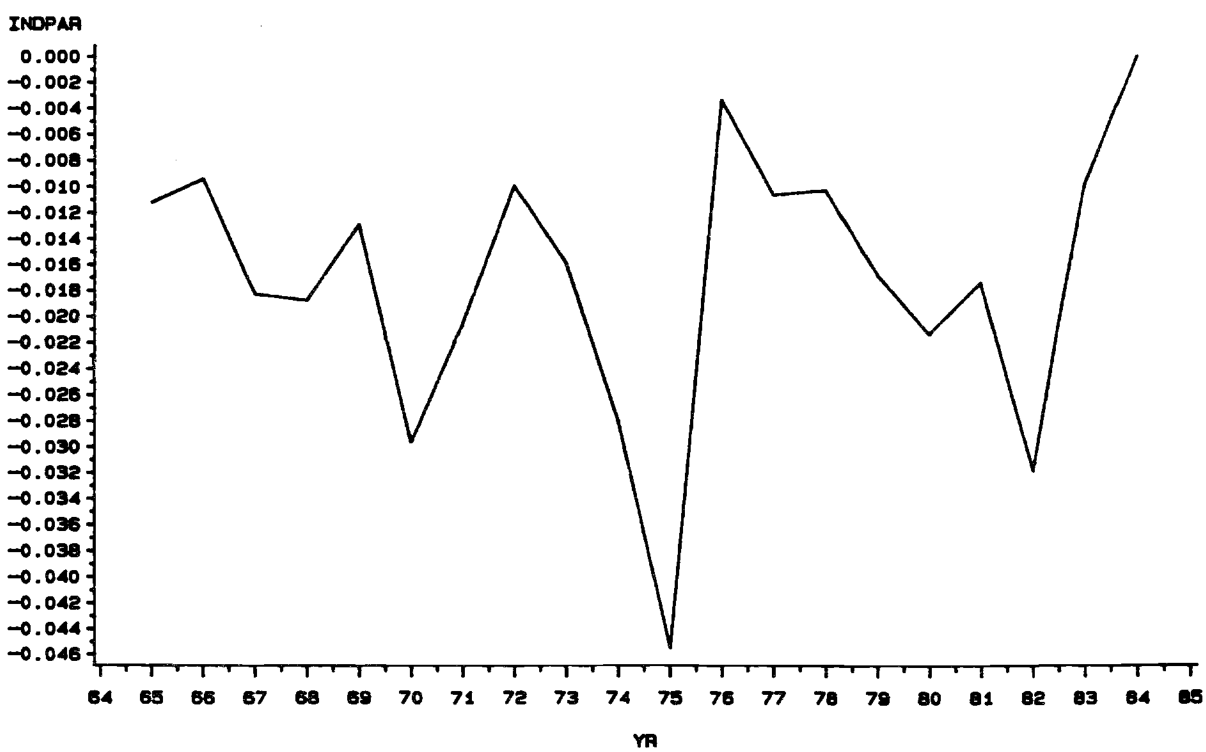
INDUSTRY 34

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



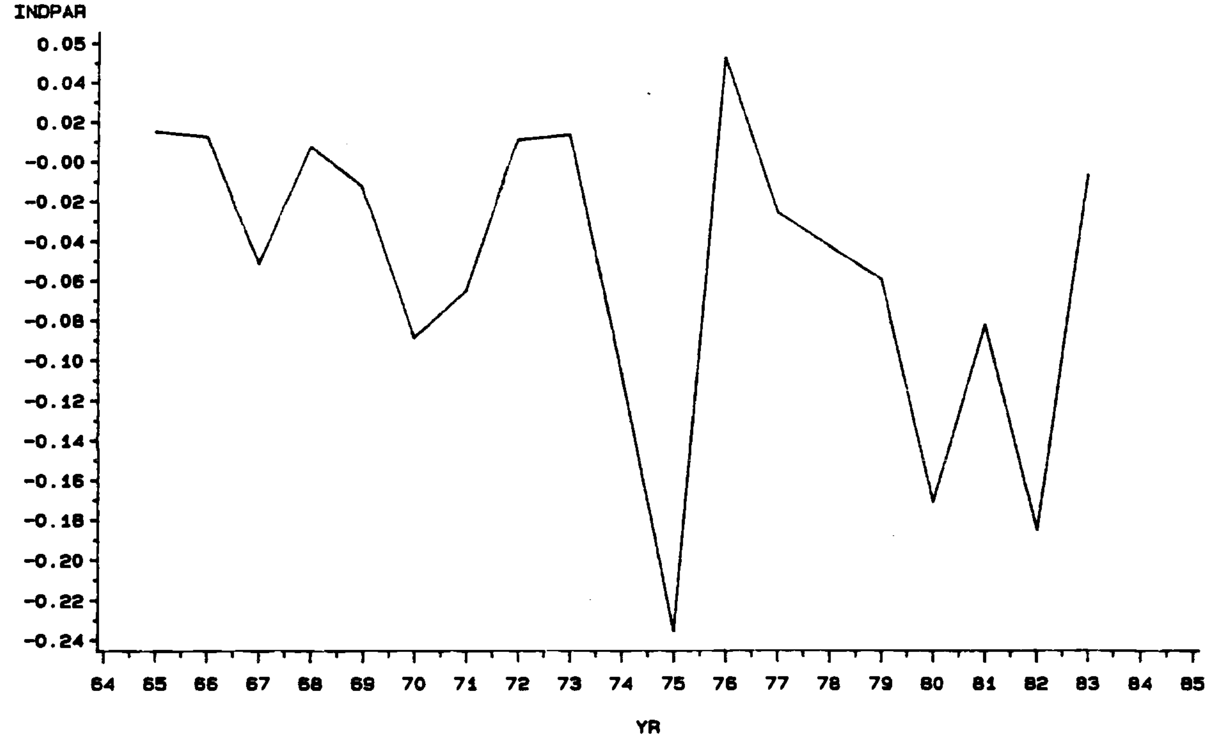
INDUSTRY 34

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



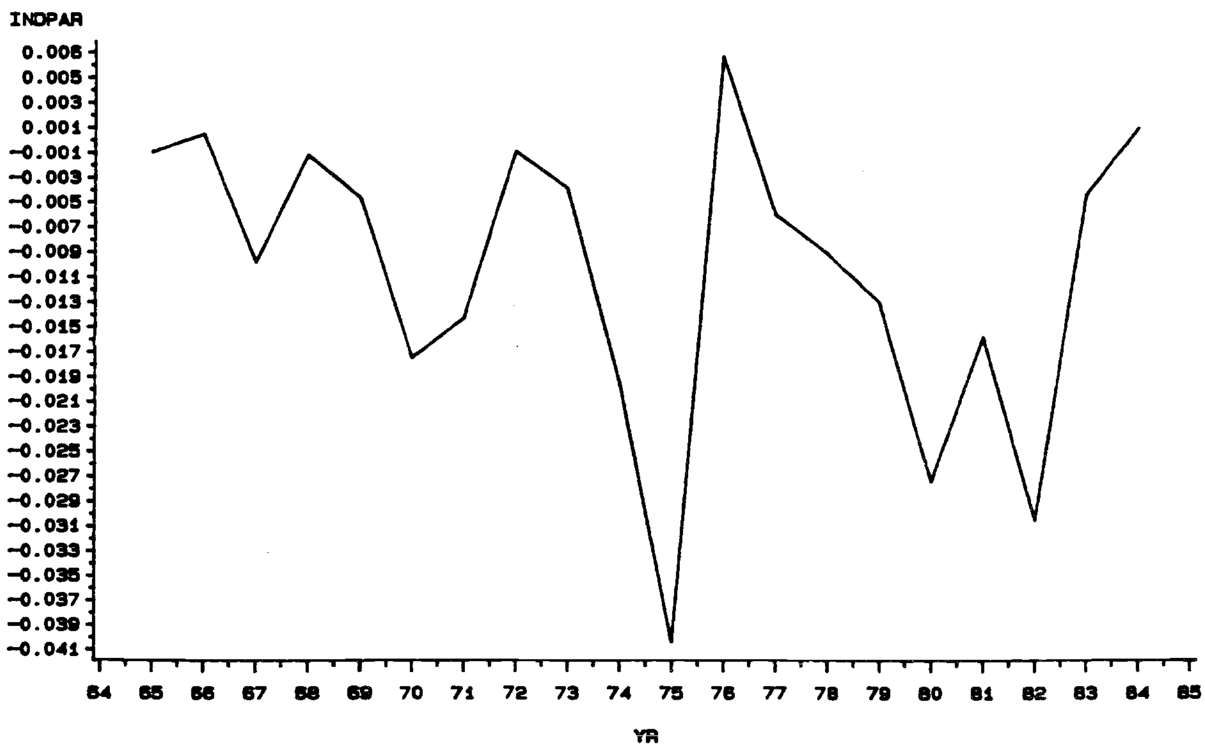
INDUSTRY 35

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



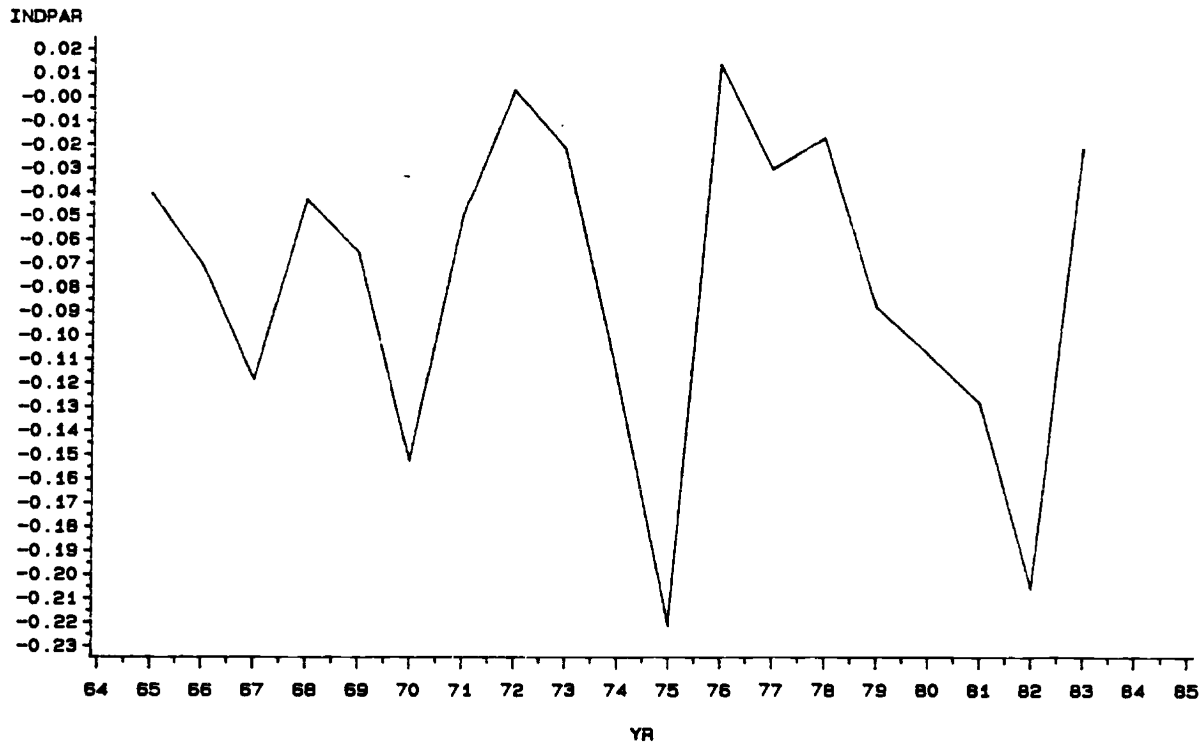
INDUSTRY 35

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



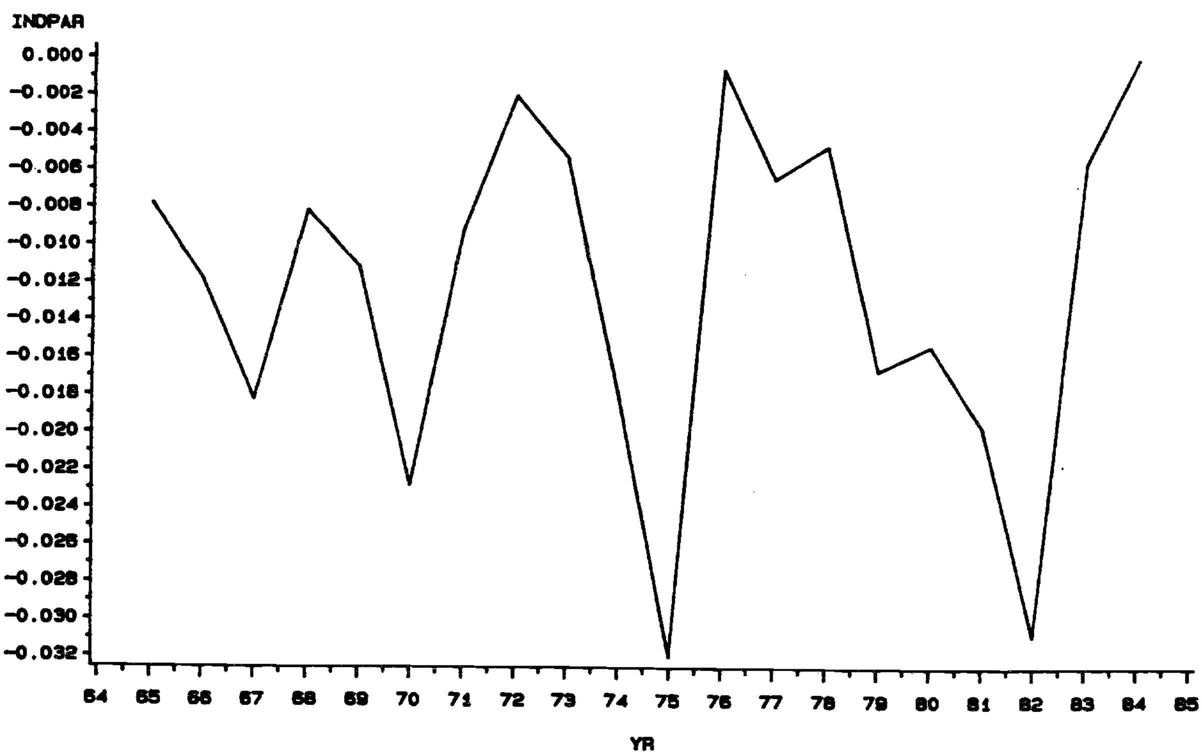
INDUSTRY 36

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



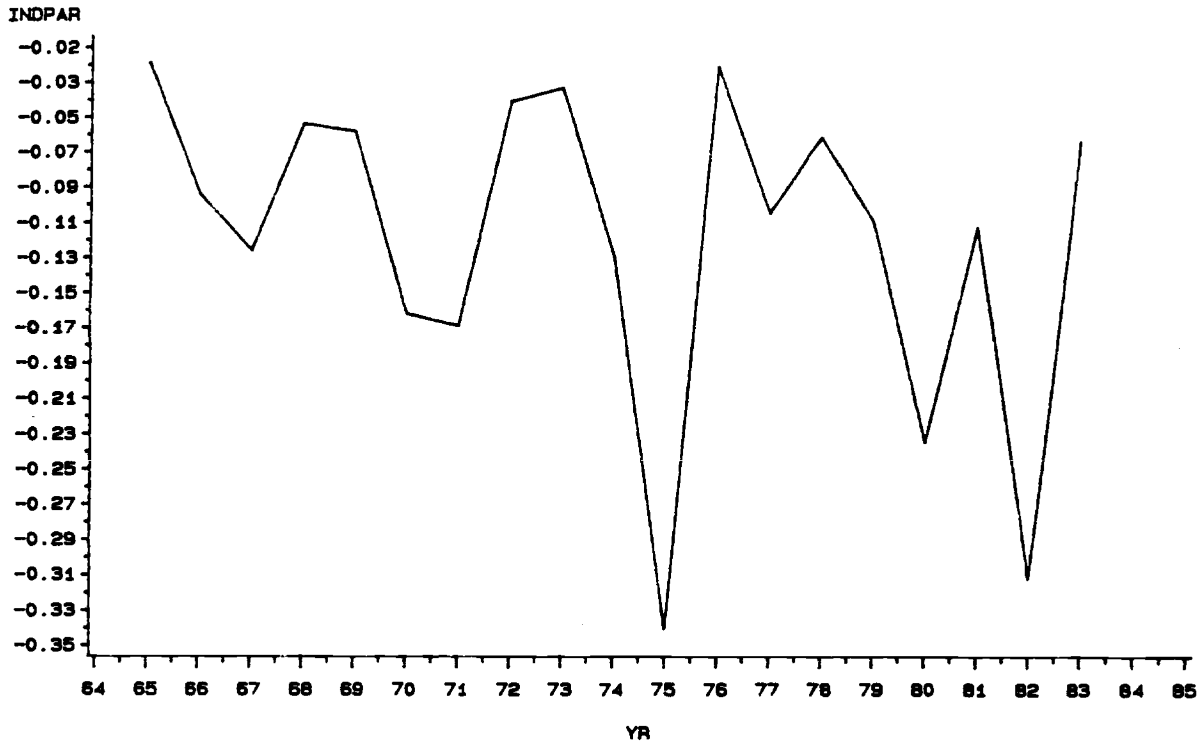
INDUSTRY 36

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



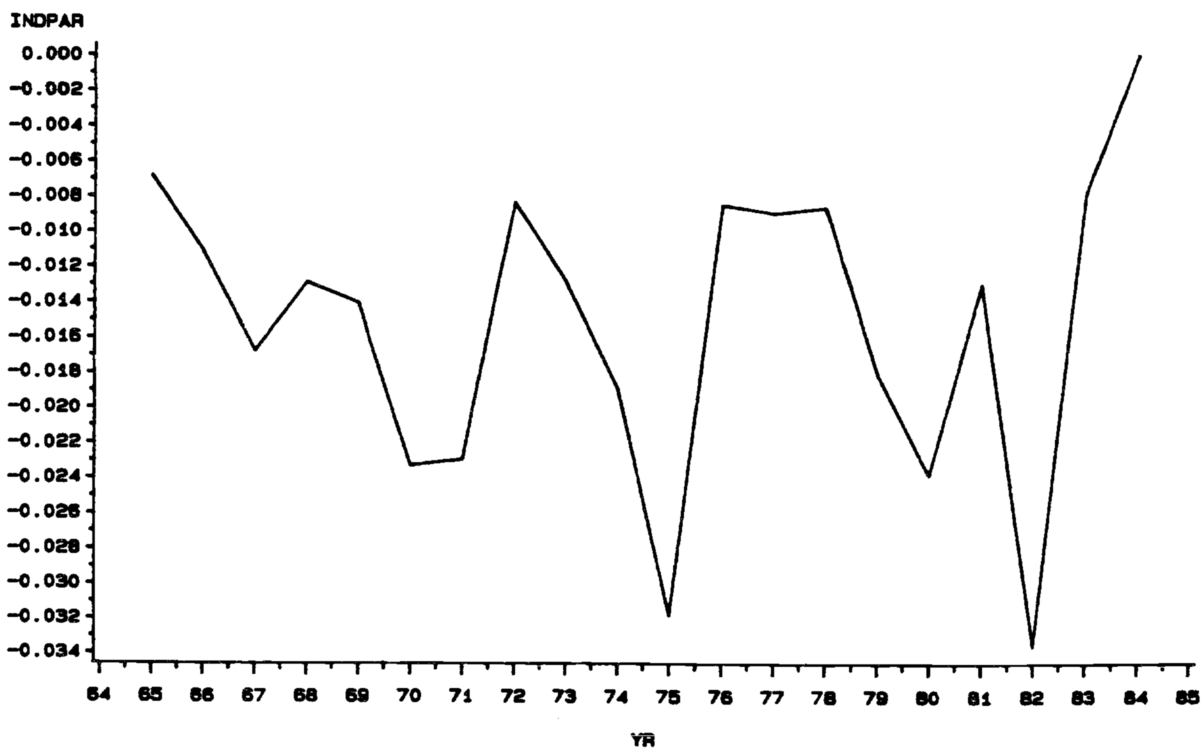
INDUSTRY 37

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



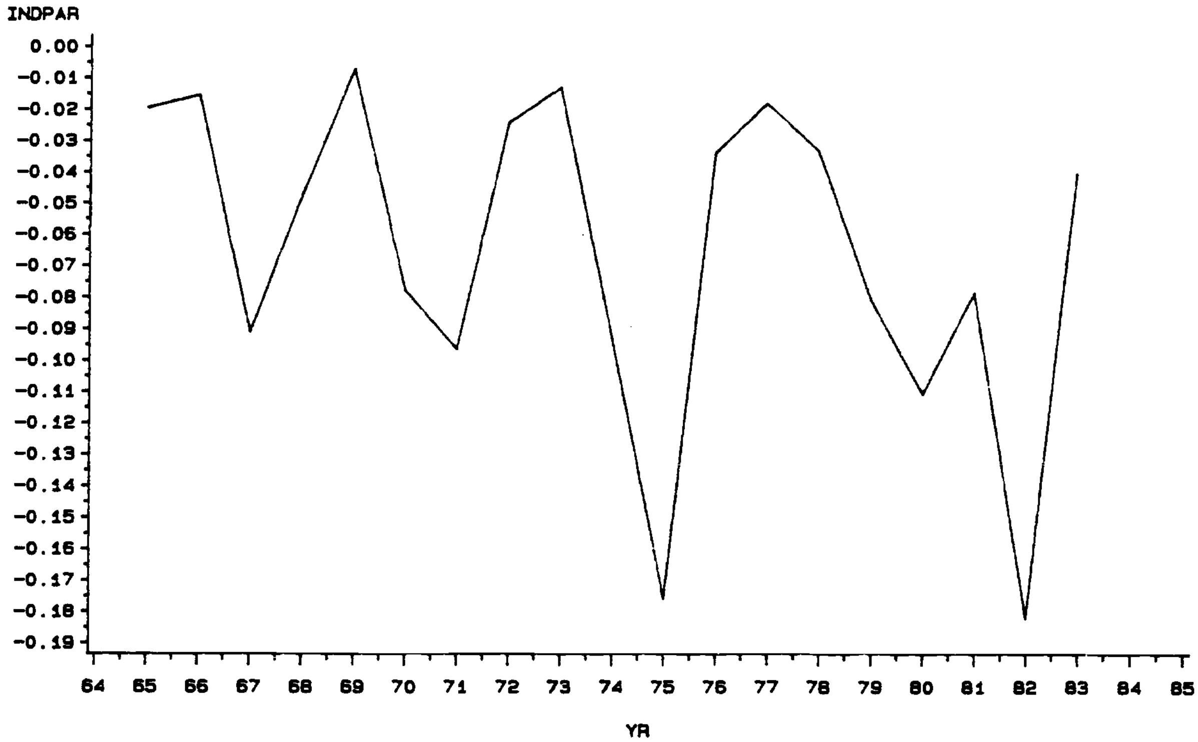
INDUSTRY 37

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



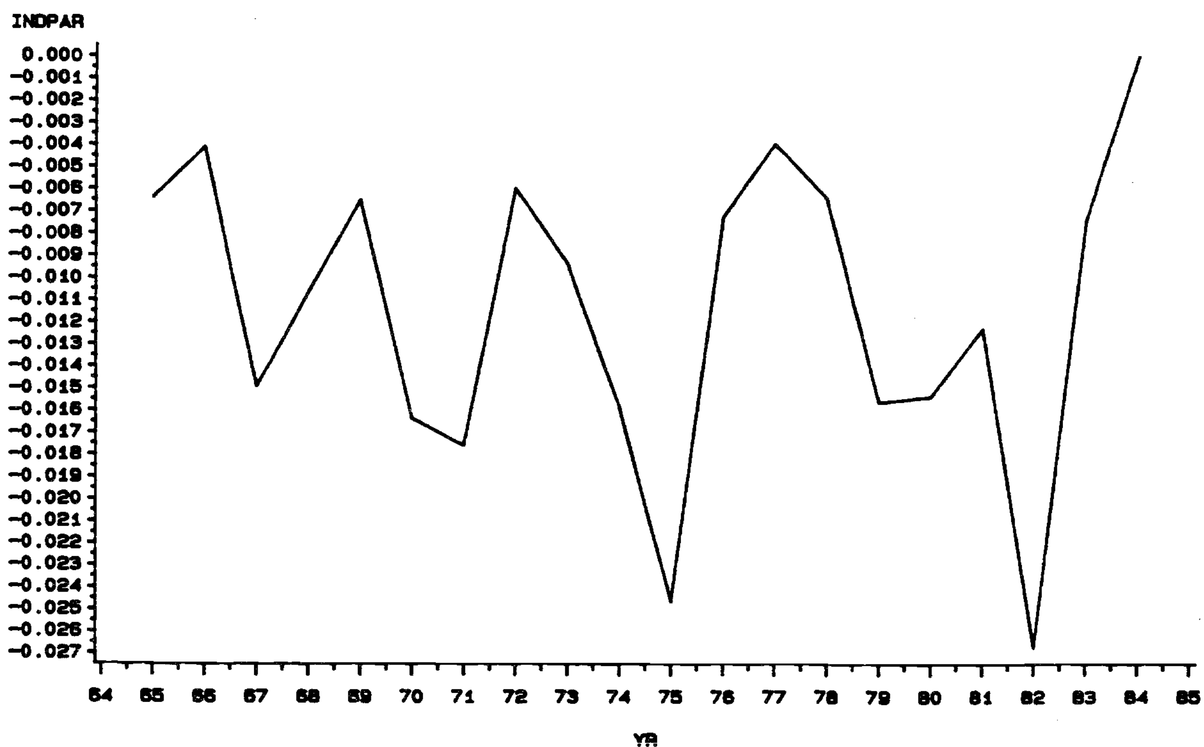
INDUSTRY 38

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



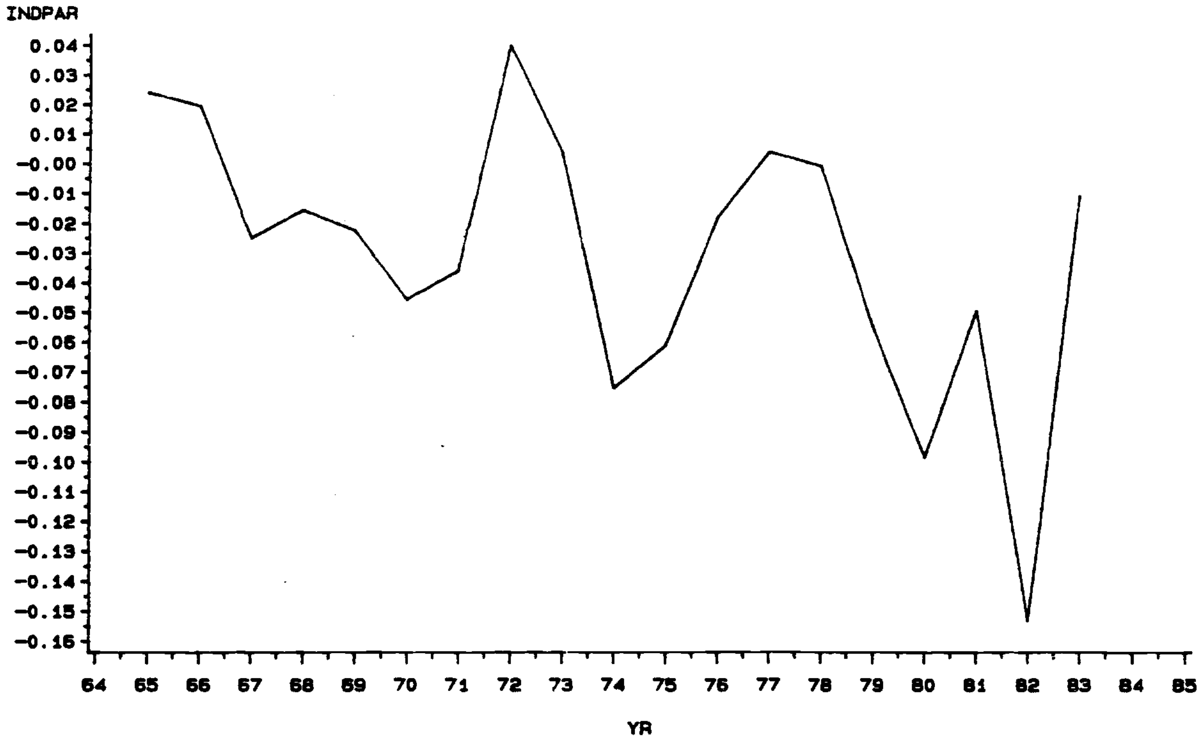
INDUSTRY 38

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US



INDUSTRY 40

ESTIMATES OF THE ANNUAL INDUSTRY EFFECTS RELATIVE TO USA



INDUSTRY 40

ESTIMATES OF THE ADJUSTED ANNUAL INDUSTRY EFFECTS RELATIVE TO US