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DUGOROČNI INVESTICIONI FONDOVI RADNIKA

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R e z i m e

Predlog Kejnsova, koji datira iz 1940. godine u vezi investicionog fonda radnih ljudi, ponovo je pobudio interes mnogih evropskih vlada u toku sedamdesetih i osamdesetih godina ovog veka. Takva shema mogla bi da poprmi oblik investicione plate ili podele dobiti. Obe vrste sheme uključuju centralni investicioni fond, koji se jasno mora razlikovati od tipa aranžmana na nivou preduzeća što se često predlaže kao alternativa.

Analiza predloga u okviru modela-tipa Pasineta ukazuje na sledeće:

(i) *Sa niskim stopama dobiti ($i, i_1 < n$) deo (k_r) fonda u ukupnom akcionarskom kapitalu teži ka vrednosti koja je veća što je duži period iskupljenja. Što se tiče sheme investicionih plata veći doprinosni razlomak uključuje višu vrednost za ekvilibrium k_r .*

(ii) *Sa visokim stopama dobiti ($i, i_1 > n$) postoji prag vrednosti za k_r . Krajnji razvoj fonda presudno zavisi od njegove početne faze. Ako se u početku desi da fond poseduje deo ukupnog akcionarskog kapitala veći od ovog praga, onda će konačno posedovati čitav akcionarski kapital, sem ukoliko to onemogućava zakonodavstvo. (Danski predlog iz 1973. godine, na primer, nagovestio je gornju granicu od 50% za k_r) U suprotnom slučaju, on će konačno opasti na nulu.*

(iii) *Ni shema investicione plate ni shema podele dobiti ne bi uticale na udeo rada u nacionalnom dohotku. U oba slučaja, međutim, kada se deo fonda akcionarskog kapitala poveća, deo fonda nacionalnog dohotka se poveća na teret kapitalista.*

THE RELATIONSHIP BETWEEN THE LEVEL OF DEVELOPMENT AND THE RATE OF GROWTH: SOME EMPIRICAL EVIDENCE

Sanja CRNKOVIC-POZAIC*

The primary objective of this paper is to test the hypothesis that countries have varying rates of growth in the course of their development. This hypothesis has its origins in the writings of W. W. Rostow (1960) who proposed a scenario of development which includes five distinctive stages of development. Each stage is characterized, apart from other factors, by different rates of growth. In the first two stages, these rates are very low, reflecting the stagnant nature of these economies. From the point of view of technological development these countries rank very low, with accompanying low levels of labour productivity, as well as a very undifferentiated division of labour based entirely on traditionally determined roles.

The creation of pre-conditions for take-off in the second stage of development is the necessary, albeit the most weakly argued, overture to the stage where rates of growth become buoyant upwards and break away from the prevalent secular trend. This stage, the take-off, forms the nucleus of Rostow's theory and we propose to test its validity using conventional statistical and econometric tools.

Apart from seeing how present developing countries measure up to this theory of high growth rates, we intend to test Rostow's further contention that on reaching a certain level of development countries pass into the stage of maturity and consequently into the stage of high mass consumption, which is in turn characterized by lower rates of growth. We shall not dwell needlessly on the merits of this theory. It has been widely criticized, with most of the criticism focusing on the lack of an acceptable mechanism which propels countries through the various stages. The theory appears to be highly eurocentric: it attempts to transplant a unique experience all over the globe with no regard to the circumstances in which this development is taking place today, which are very different from those prevailing in 17th century Europe.

However, notwithstanding the »merits« of the theory there are at least two reasons why its validity has to be tested. Firstly, the concept of stages of development has found its way into the way of thinking

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of many economists, sociologists and other experts in fields which have had something to say about the process of development. It has proven much easier to refer to stages when talking about the wide disparities which exist among countries today. By putting them all in a row along one continuum, one has outmanouvered the necessity of defining development, as one presumes that those which are poor today surely follow in the footsteps of the developed countries. Recent experience of the least developed countries shows that development can be an erratic affair with frequent retrogressions and no mechanism to ensure the incorporation into the economic system of the famous compound interest effect.

It therefore seems timely to demystify this concept which is implicit in many views on development today, and there are many indications that the experience of developing countries can indeed assist in this process.

There have been few attempts in this direction to date. Everet E. Hagen and Oli Hawrylyshyn (1969) at the MIT carried out an analysis of world income and growth from 1955—1965. One of the indirect results of their analysis was that there is no correlation between income levels and rates of growth. According to the Spearman test of rank correlation, only in 22% of the cases can it be said that the level of development measured by the GPD per capita in 1960 can explain variation in growth rates from 1960 to 1965.

Five years later, B. Horvat (1974) carried out an analysis using the linear leased squares method to test this relationship on cross sectional data for a large number of countries. His findings point to the fact that a definite relationship exists between the level of development and the rate of growth, since the regression estimates were all significant at the 0,1 level.

In this paper a similar analysis will be carried out. Its contributions are an enlargement of the data base, a methodologically more sound choice of data base and some refinements in the various functional forms chosen to reflect the afore mentioned hypothetical behaviour of developing and developed countries.

THE DATA BASE

The author realized very early on, in the data collection phase, that choice of data base is of crucial importance in this type of analysis. Conventional data bases carry a certain methodological bias which can be ascertained by studying the systematic factors in deviation indices. These indices reflect the relationship between two different methodologies of converting values expressed in local currency to an international measure. Most publications which offer GDPs or GNPs of countries in one currency have arrived at their estimates by converting domestic currency to US dollars at the official exchange rates. The drawbacks of this procedure are well known. Their main unfavourable feature is that they tend to understate the incomes of low income countries. Income or product comparisons among the high-in-

come countries based on the use of exchange rates are subject to smaller but still notable margins of error. Furthermore, a substantial degree of spurious variation has crept into exchange-rate-derived comparisons under the flexible exchange-rate system adopted in the early 1970s. Year-to-year changes of 20% or more have been observed in the exchange rates between major currencies. Since most of these large changes have been unrelated to the relative movements of the real national product of the countries concerned, exchange-rate conversions have necessarily at times given quite erroneous measures of the relative real products of pairs of countries.

Having noted the drawbacks just mentioned, the World Bank initiated a project whose major purpose was to evaluate incomes of countries based on purchasing power parities. The methodology used had to satisfy certain criteria which were deemed desirable in this type of comparison. It was considered essential that the system be completely even-handed among the countries in the sense that the country selected as the reference country would be no more than a numeraire. That is, comparisons between any pairs of countries would be the same regardless of which country was taken as the reference country. The result of more than ten years of work in this field was the Phase III of the project (1982) which gave estimates of real product for 34 countries.

In consideration of the obvious advantages of the purchasing parity method over the exchange-rate conversion system, the author decided to use data which would share these advantages and yet avoid the restriction of having to work with only 34 countries whose estimates are available to date. A compromise was decided on in the shape of estimates prepared by I. Vinski (1978) who used the purchasing power method, albeit a much simplified version of the one constructed at the World Bank. Another feature of these data is that they go back to 1910 which considerably increases the likelihood of outlining secular trends in them.

The value of the GDP for each period is obtained by averaging the first and the last years of the referent period. The figures are given in constant 1975 dollars. The periods are: 1910—1938, 1938—1950, 1950—1960, 1960—1970, 1970—1981. Since I. Vinski provide estimates only up to 1975, it was decided to extrapolate the 1970 GDPs by using growth rates as given by World Development Report 1983, World Bank. Other growth rates from I. Vinski.

The rate of growth of exports was obtained for the years 1950—1981 from the Handbook of International Trade and Development Statistics 1979 and the United Nations Trade and Development Report 1982.

THE ANALYTICAL FRAMEWORK

The basic variables which figure in this analysis are: the rate of growth of gross domestic product and the rate of growth of GDP per capita as the dependent variables and the per capita GDP in 1975 US dollars as the explanatory variable.

The GDP per capita serves as a synthetic indicator of the level of development. As such it has some laudable advantages as well as some disadvantages which deserve mentioning. The GDP per capita reflects all the changes which are taking place in the various components of the GDP. It is the most directly available measure of productive capacity for most countries of the world. There are two reasons why the per capita form of GDP is a desirable measure in this context. Firstly, if one abstains from using the absolute form of GDP, countries can be compared more readily since the effect of country size is eliminated. Secondly, it fulfills well its primary function of determining the ranking positions of countries.

Its biggest disadvantage is that it ignores problems of distribution, which is by no means as egalitarian as the per capita measure suggests. We must point out, however, that measurement of individual welfare is not our primary objective here. We have sought a measure of productive capacity and the GDP per capita seems to be a reasonable one. In this vein any further research should attempt to replace the population number which figures in the expression GDP per capita with the number of active population: this would be an even clearer step away from a welfare to a productivity measure. Various attempts have been made in this direction but, as a single indicator, the old form of GDP per capita is widely in use in empirical work.

The countries included in the analysis had to satisfy certain criteria in order to satisfy the condition of homogeneity. The following criteria were considered pertinent:

— Country size must be above a certain minimum; in this case we have opted for two indicators of size: a minimum population of 2 million and/or GDP total of no less than half a billion US dollars;

— Countries which had or are experiencing wars, revolutions or others forms of upheaval which prevent normal economic activity have also been exempted from the analysis;

— Countries which are to a large extent dependent on the export of a small number of products have also been left out. Oscillations in terms of the trade in these products will largely determine these countries' economic performance and rates of growth will not reflect changes in the productive capacity of the economy.

According to these criteria, the following countries have been left out of the analysis: Israel 1910—1981, Iran 1960—1981, Iraq 1960—1981, Chile 1950—1981, Austria 1910—1938.

a) Model specification

The choice of models in the analysis is governed by the various hypotheses which have to be tested here. When testing the behaviour of growth rates of developing countries, we have estimated coefficients of various functional forms. These are then tested on developed countries although they are expected to have different signs of estimated coefficients. An attempt has also been made to estimate a unimodal

curve for all the data together. The following are the models used in the analysis:

$$y = a + bx + cx^2 \quad (1)$$

$$y = a + b(\ln x) + c(\ln x)^2 \quad (2)$$

$$y = a + bx \quad (3)$$

$$y = a + b(\ln x) \quad (4)$$

$$y = a(\ln x)^b \quad (5)$$

$$y = \exp(a + b \frac{1}{\ln x}) \quad (6)$$

$$y = a + \frac{b}{\ln x} \quad (7)$$

y = rate of growth of GDP per capita, x = level of development.

Models (1) and (2) are estimated on all the data while models (3) to (7) are tested separately on the data for developed and developing countries.

The grouping of the data was carried out according to the pattern suggested by scatter diagrams which appear in the Appendix. The division between developed and developing countries is obviously purely formal since classification is not our purpose in this article. Functions whose coefficients have proven most significant can be seen in Diagrams 1 — 4. In all the periods, better results were obtained when the rate of growth of GDP per capita was used as the dependent variable. Only these results will be shown henceforth.

As the scatter diagrams have already shown and the regression results confirmed, the estimates for the period 1938—1950 are insignificant. Since a considerable number of countries experienced very low and even negative growth rates during this period (mainly due to the effects of the Second World War which affected the economic performance not only of countries which were directly involved, but also of those which suffered from a low level of demand for peace-time products, i. e. normal trading activity). We have hence decided to ignore the results for this period having in mind that quite a large number of countries were suffering an interruption of normal economic activity.

The results for the other periods are presented in Table 1. The results for grouped data have, over all the periods, proved superior to results of regressions carried out on all the data.

RESULTS FOR THE PERIOD 1910—1938

The results for this first period stand out as being exceptionally poor. The estimated parameters of the unimodal curve were insignificant while estimates for grouped data were significant only for developing countries. Coefficients of determination were generally very low, the highest being $R^2 = 0.19$ which indicates that the level of development is of little consequence for growth rate dynamics.

The estimated function which was applied to the data for developing countries is of the following form:

$$\hat{y} = 3.573 - 14.86 (\ln x)^{-1} \quad R^2 = 0.19$$

(3.47) (-1.58) $n = 31$

t — values' are in the parenthesis.

It seems unjustifiable to deduce too much from these results since the coefficient of determination indicates that a very low proportion of the variation in the dependent variable may be explained by the level of development and the estimated coefficients have a rather low level of significance. We have to conclude that the hypothesis has not been confirmed.

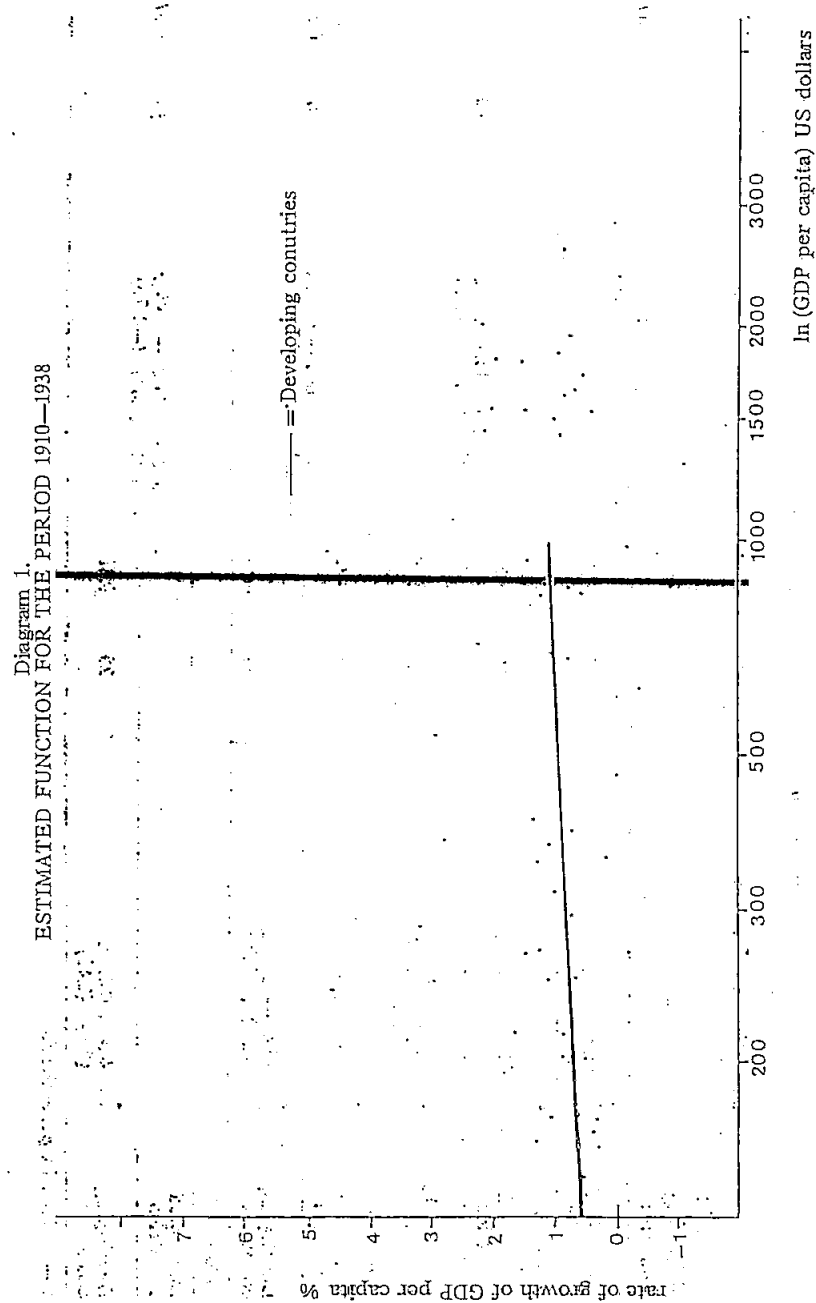
The scatterer diagram gives certain indications why most of the estimates for this period have been insignificant. The overall level of growth rates for this period is very low both for developed and developing countries. The highest growth rates are in the range of 3% — Japan's growth rate. Most of the points are scattered roughly parallel to the x-axis and it is equally difficult to estimate any kind of curve through this data. In the literature, the reason given for this poor performance is the incidence of the First World War which interrupted the so-called Golden Age. This period had been marked by very lively international trade especially between developed and developing countries. Produce from the tropical and temperate zones in the southern hemisphere had begun finding its way to the developed world in return for industrial goods, consumer goods and technology. The War, followed by the Great Depression, did much to constrict demand for both capital and consumer goods. After this, developed countries began looking primarily towards each other as trading partners and consequently developing countries experienced the full impact of the meaning of inelastic demand for their products.

Some of these countries, notably the Latin American ones which had prospered during this period, suddenly found themselves with rigidly structured economies geared exclusively to satisfying demand for a relatively small spectrum of primary products and minerals. They attempted to reduce this economic vulnerability by import substitution policies which in turn created inefficient industries at home; an autarchic type of development resulted with all the associated difficulties for a middle income country. As will become apparent later, some of these countries, notably Argentina and Uruguay, maintained very low rates

Table 1. First Results of the Linear Regression Analysis

	GROUPED DATA	N	R ² ALL DATA	N	R ²
1910—1938					
Developed countries		—		50	0.09
Developing countries	$\hat{y} = 3.57 - 14.86 x^{-1}$ (3.47) (-2.58)	31	$\hat{y} = 0.55 + 0.001 x - 0.00000038 x^2$ (2.22) (1.73) (-1.34)		
1950—1960					
Developed countries	$\hat{y} = e^{4.05} x^{-2.9}$ (4.73) (-3.49)	17	$\hat{y} = 0.45$	48	0.35
Developing countries	$\hat{y} = 12.16 - 55.74 x^{-1}$ (4.92) (-3.87)	30	$\hat{y} = -41.76 + 13.34 x - 0.97 x^2$ (-4.17) (4.30) (-4.12)		
1960—1970					
Developed countries	$\hat{y} = e^{4.16} x^{-1.76}$ (4.38) (-2.72)	21	$\hat{y} = 0.27$	46	0.33
Developing countries	$\hat{y} = 13.46 - 62.88 x^{-1}$ (4.33) (-3.36)	23	$\hat{y} = -37.61 + 11.66 x - 0.806 x^2$ (-3.26) (3.36) (-3.15)		
1970—1981					
Developed countries		—		48	0.07
Developing countries	$\hat{y} = 4.04 + 0.092 x^2$ (2.3) (2.41)	25	$\hat{y} = -16.0 + 6.61 x - 0.45 x^2$ (-1.2) (1.81) (-1.76)		

t — values in parenthesis



of growth whereas countries at a similar level of development experienced much higher rates in the same period.

RESULTS FOR THE PERIOD 1950—1960

Coefficients of the unimodal function are as follows:

$$\hat{y} = -41.76 + 13.341 \ln x - 0.9713 (\ln x)^2 \quad R^2 = 0.35$$

(-4.17) (4.30) (-4.12) $n = 48$

Functions estimated on the grouped data are as follows:

Developing countries

$$\hat{y} = 12.16 - 55.74 (\ln x)^{-1} \quad R^2 = 0.34$$

(4.92) (-3.87) $n = 30$

Developed countries

$$\hat{y} = e^{4.93} (\ln x)^{-1.9} \quad R^2 = 0.45$$

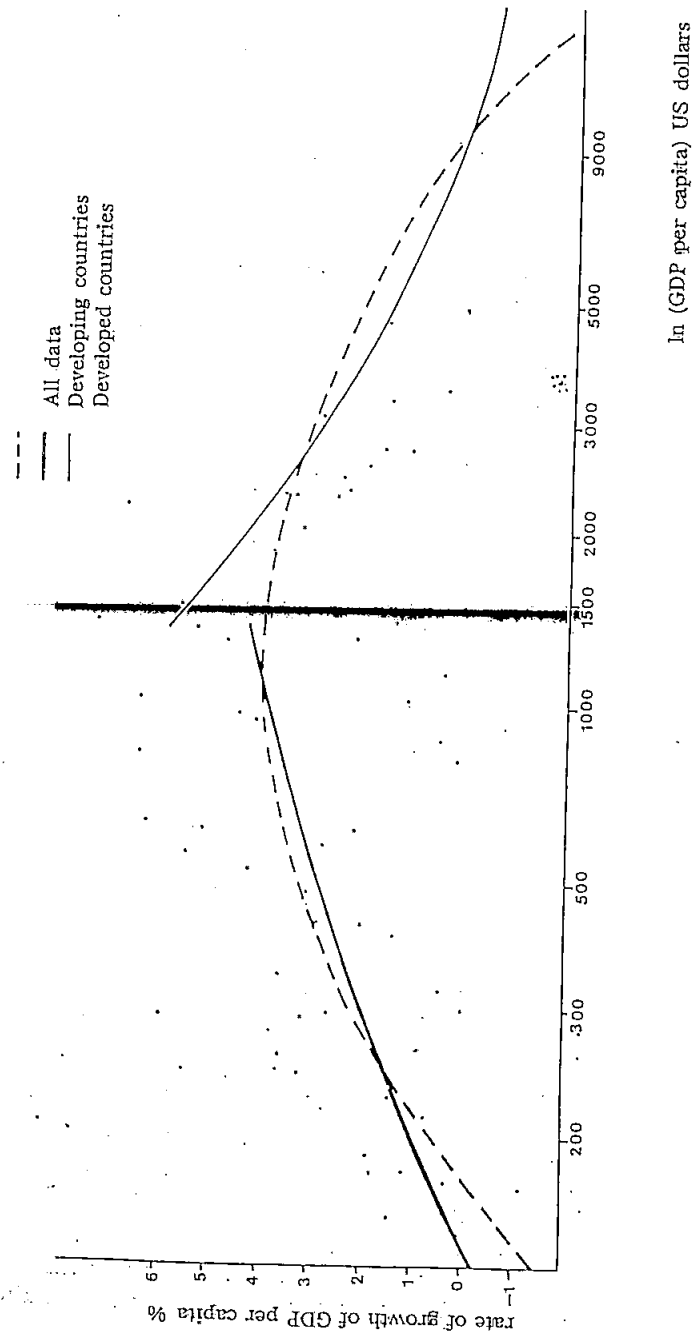
(4.73) (-3.49) $n = 17$

The results for the grouped data are somewhat better than the estimates for the developing and developed countries together. This is especially apparent for developed countries where the coefficient of determination shows a marked improvement.

The curve estimated for developing countries is concave towards the x-axis, has no maximum, and second derivatives are negative. We can conclude that this group of countries was developing at a diminishing rate. These results are similar to those already obtained for the previous period 1910—1938. They seem to indicate that, contrary to hypothetical postulations, developing countries have not, at least within the two periods examined, had accelerated development in the duration of their take-off stage.

This finding has a certain echo in development literature. Fishlow (1965) has studied this phenomenon of countries which have apparently had all the conditions for take-off but which have, after a certain

Diagram 2.
ESTIMATED FUNCTIONS FOR THE PERIOD 1950—1960



point retrogressed to low rates of growth. In Argentina, for example, at the turn of the century investment accounted for 20% of the GDP, and GDP growth rates were approximately 3%. Consequently, despite all the changes in the various components of the GDP which characterize the incidence of take-off, GDP per capita does not necessarily reflect this behaviour. If retrogressions are possible then it must be almost impossible to distinguish which stage a particular country is in, and whether it has been at the take-off stage twice or three times.

On the other hand Kuznets has at various times pointed out that there is no evidence that today's developed countries had at some earlier point in their development rates of growth which were much higher than those which they are experiencing today. Our own empirical evidence points to the fact that post World War II growth rates were higher than most historical growth rates for developed countries and that they were maintained for a long period of time. However, it can not be said that these high growth rates took place in the take-off stage of these countries. Most of them experienced take-offs in the middle or towards the end of the last century. If we accept Rudolf Bičanić's (1960) theory on the stages of development seen through the movement of the capital coefficient, we could interpret the post-war growth rates as the take-off period for developed countries at a higher level of technological development.

Bičanić's hypothesis has much in common with the theory of long waves which has as its moving power changes in technological level. In long wave theory, major technological breakthroughs occur in the downturn of the long cycle and it is their application and the eventual absorption in the whole economy which is the force behind the upturn of the wave.

RESULTS FOR THE PERIOD 1960—1970

Coefficients of the unimodal function are as follows:

$$\hat{y} = -37.609 + 11.655z - 0.8059z^2 \quad R^2 = 0.33$$

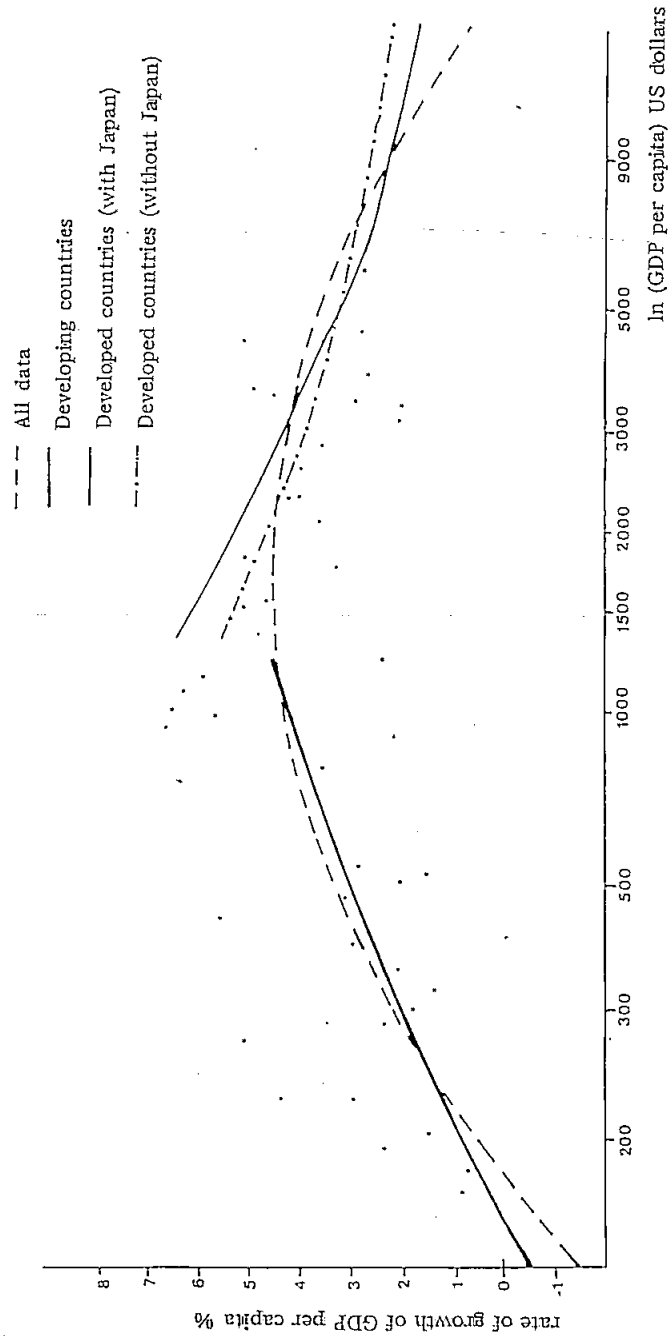
$$(-3.26) \quad (3.36) \quad (-3.15) \quad n = 46$$

$$z = \ln x$$

Similarly to the results obtained in the previous period, the coefficient of determination is not particularly high but the level of significance of regression coefficients is at the 0.01 level and higher. The curve reaches its maximum at the level of GDP per capita of 1382 US dollars and rate of growth of 4.5%.

Regression analysis results for grouped data:

Diagram 3.
ESTIMATED FUNCTIONS FOR THE PERIOD 1960—1970



Developed countries

$$\hat{y} = e^{4.43} x^{-1.76} \quad n = 21$$

$$(4.33) \quad (-2.72) \quad R^2 = 0.27$$

The R^2 is slightly lower than for the unimodal curve with equally high significance levels, which is due mainly to the considerably reduced number of observations. The graph shows a curve convex to the x-axis which indicates decreasing rates of growth at higher levels of development. The shape of the curve is very similar to the curve estimated in the previous period. This leads to the conclusion that there is considerable similarity between the two periods and they seem to reflect a time of fast growth for most countries of the world. Several developing countries crossed over to the camp of the developed during this period. Japan was first and foremost in the race with very high growth rates of 9% per capita. There were a few fast developers in the socialist block such as the USSR, Czechoslovakia, the German Democratic Republic, Poland and Hungary.

An interesting point here concerns the behaviour of Soviet rates of growth which showed a marked decline after the 1960s, a question of some interest for those who are concerned with the way a political system can influence the economic performance of a country. According to our scatter diagram the Soviet Union found itself in the period 1960—1970 in the developed group. Can it not be concluded that the relatively low rates of growth that this country had been experiencing are the result of this shift which reflects the natural trend in growth rates at higher levels of development? Or has the Soviet system failed in its effort to catch up with the more developed capitalist world? Several renowned authors have tried to shed some light on this question, among them Weitzman (1970) who maintains that the reason behind slow growth rates is an elasticity of substitution which is less than one. With $\sigma < 1$ and an increasing capital-labour ratio, the output elasticity of labour must also increase and the output elasticity of capital must fall. Under conditions when the output elasticity of labour is growing and the rate of growth of the labour force is very slow, the global rate of growth can decrease. Weitzman estimated by non-linear methods various production functions on Soviet data and found that the best results were obtained by using a linear homogenous OES production function with Hicks neutral unembodied technical progress. As evidence for his hypothesis, Weitzman showed that the capital coefficient corrected for technical progress increased from 1.018 to 1.612 from 1950—1969. On the other hand the labour coefficient also corrected for technical progress decreased from 2.411 to 0.896 in the same period. The competitive share of capital fell from 86% to 44% and the competitive share of labour increased from 14% to 59%. Weitzman concludes that the Soviets have exhausted the effects of capital intensive growth strategy and should place all their energy on the furthering of technical and technological progress.

Other Soviet experts who found reasons for the flagging growth rates in the mechanism of the Soviet economy all tended to agree that

higher growth rates could be achieved by various changes in economic policy. The general feeling seems to be that the slow rates of growth in the Soviet Union have to be attributed to wrong economic policy decisions and not to a slower pace of growth which comes hand-in-hand with a higher level of development.

Developing countries

The following are the best estimated results:

$$\hat{y} = 13.46 - 62.88z^{-1} \quad z = \ln x$$

(4.33) (-3.36)

$$n = 23$$

$$R^2 = 0.34$$

Notwithstanding the low level of the coefficient of determination, the significance level of the regression coefficients is at the 0.01 level. The second derivatives are negative and the estimated curve is concave to the x-axis. The shape of the curve is similar to the estimated curve for the previous period which shows that the period 1950—1970 seems to be homogenous as far as development of developing and developed countries is concerned.

RESULTS FOR THE PERIOD 1970—1981

The results for the quadratic function are as follows:

$$\hat{y} = -16.00 + 6.61z - 0.45z^2 \quad z = \ln x$$

(-1.23) (1.81) (-1.76)

$$n = 48$$

$$R^2 = 0.07$$

The coefficient of determination is very low and the significance of estimated coefficients is below the usual standard set for such analyses. The results for grouped data are as follows:

Developing countries:

$$\hat{y} = 4.04 + 0.092z^2 \quad z = \ln x$$

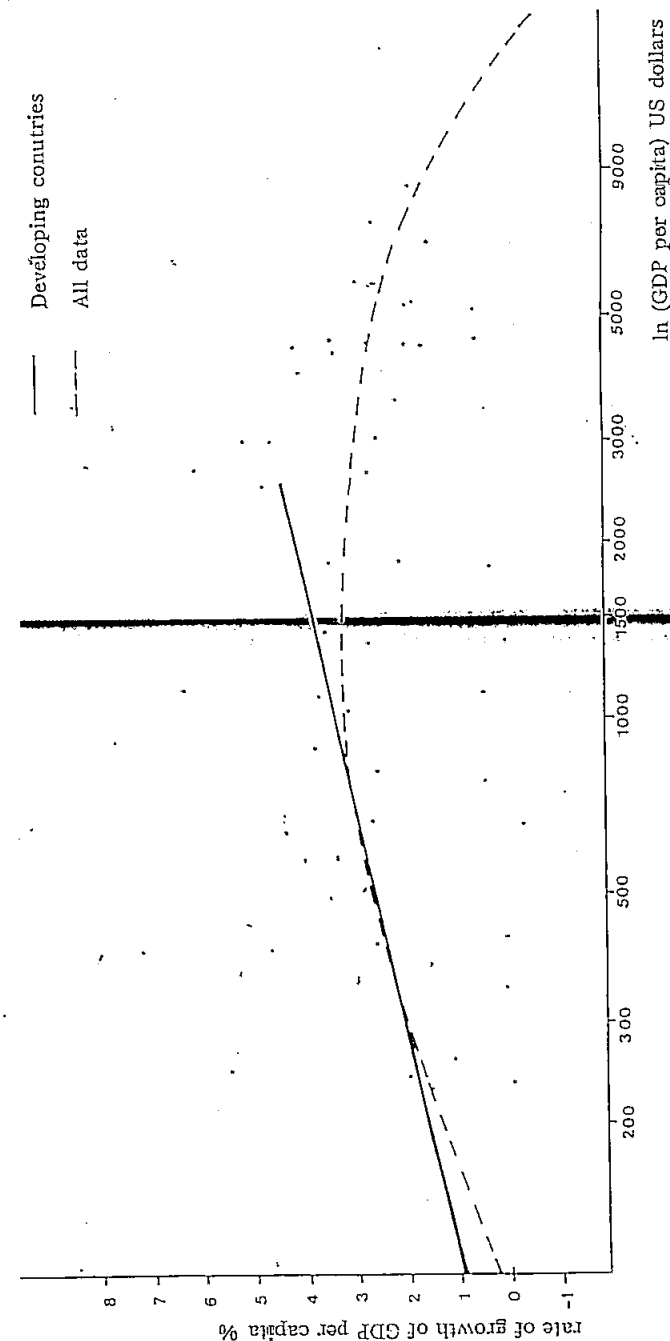
(2.30) (2.41)

$$n = 25$$

$$R^2 = 0.21$$

These results are slightly better than those obtained above.

Diagram 4.
ESTIMATED FUNCTIONS FOR THE PERIOD 1970—1981



Developed countries:

All the results were highly insignificant and seem to indicate that the level of development was not important as a factor of growth in developed countries. All the estimated curves can be seen in diagrams 1—4 and their associated scatter diagrams.

One of the features of the graphs which becomes apparent on closer examination is that certain countries continue to have low rates of growth regardless of their level of development. We are talking here about a small number of countries whose development has for various reasons proven unable to maintain higher growth rates. In this group we find Argentina, Uruguay and Ireland. The Latin American countries seem to have similar reasons for a poor development performance. This has to be understood in view of the type of development that took place in those countries at the turn of the century when that part of the southern hemisphere became the provider of raw materials for the expansion of the developed world. The development of these countries was rigidly geared to the performance of the more developed countries so much so that the disruption of world trade at the onset of the First World War, the Great Depression and the Second World War spelled out long-term recession in these countries. To protect their economies from drooping markets for their products most developing countries attempted closing their borders to foreign goods and entered on the path of autarchic development which comprised of import substitution policies. Bela Belassa (1980) has outlined the consequences of import substitution and they seem to be very evident in the two mentioned Latin American countries.

Belassa considers the first phase of import substitution essential as it provides protection for infant industries which in their early phases need to take a lead in the competition. When industrialization is completed under this protective blanket, it is possible to open a country's borders up further or to go into the second stage of import substitution. Both Argentina (this phase did not however last very long) and Uruguay adopted the second approach and suffered the consequences. The highest penalty is paid in notoriously low rates of growth for the whole economy. As Belassa points out, the second stage of import substitution implies the local production of durables and inputs for other industries. These products have the characteristic of being capital intensive and can only be profitable if economies of scale can be taken advantage of. There are several reasons which make this mix unfavourable for developing countries. Firstly, investment in such capacities is very expensive and the source of financing is in most cases from outside the country. The applied technology is generally absorbed with difficulty by the labourers in the recipient countries as well as being largely dependent on servicing and spare parts from the mother country. Furthermore, industrialization in conditions of limited competition worsens the terms of exchange for agricultural products.

Since these products are the main foreign exchange earners, the developing country is faced with ever greater demands for and fewer sources of foreign currency. In Argentina, for example, the exports of

meat and wheat stagnated between 1934—1938 and 1964—1966 in spite of a doubling of world exports in those products. The most frequent reason behind low rates of growth in import substitution cases is the foreign exchange restriction which is reflected in sub-optimal levels of production.

Apart from the two Latin American countries already mentioned, Ireland also seems to have had a rather unhappy development. This country has been a major emigration area with a loss of 2.8 million people from 1941 to 1961. The emigration flow ebbed in the 1960s and this seems to have coincided with an improvement in Ireland's economic performance. Nevertheless, the very high rate of natural population increase and the resulting large numbers of new entrants to the labour market, the flow of excess labour from the land, and the inadequate opportunities for industrial employment still produce a labour market situation which is far from satisfactory. In a situation when only 40% of the new entrants in the labour force find employment, Ireland looks to other countries, namely the USA; Canada and the UK to solve its employment problems. Its nearest neighbour, the UK, has itself been experiencing very slow growth and job opportunities largely determined by cyclical movements. One of the factors which have to be taken into account when assessing Irish economic performance is the looming presence of the upheaval in Northern Ireland. This affects Ireland itself in various ways, notably by creating a climate of uncertainty which is not very conducive to at least two very important sectors of the economy. One is foreign investment which comprises about two-thirds gross investment and the tourist trade which was one of Ireland's more important foreign exchange earners. All these factors have resulted in relatively low rates of growth for the country and they merit the adoption of a different treatment in the analysis.

DUMMY VARIABLES

Having concluded that these three countries, Ireland, Argentina and Uruguay, are suffering from prolonged disruption of normal economic activity, we shall treat them in the analysis by assigning a dummy variable value of 1 for the observations in question while all the other countries will have the dummy variable value of zero. The result of this approach will be to change the intercept of the function when the three countries just mentioned are in question, without changing the slope of the estimated curve.

The results obtained after the introduction of the dummy variable are shown in Table 2. We can see that the introduction of dummy variables has increased the coefficients of determination a great deal in all the periods. This overall improvement varied from 15% in 1910—1938 to 265% in 1960—1970 for the group of developing countries. An analysis of variance was carried out to see if the new variable significantly contributed towards explaining the unexplained variance. The essential purpose of the ANOVA is to divide the total variance around the average of the dependent variable into its constituent parts. One

part of the variation is explained by the independent variable while the unexplained variation includes the effects of other factors on the dependent variable as well as various errors in measurement and other random factors. With the aid of the F-test we calculate whether the addition of the dummy variables significantly reduced the unexplained variation around the dependent variable.

The F-tests run on all the periods from 1910—1981 show that dummy variables significantly improved the fit for all the periods excluding 1910—1938 and 1970—1981.

EXPORTS AS A FACTOR OF GROWTH

The opening up of world markets made possible by improved means of transportation has facilitated the division of labour on a world scale. However, impediments to free trade have been in operation for as long as trade itself, as countries attempted to protect their gains in an increasingly competitive setting. The most conducive period to trade must have been toward the end of the last century, a period which bears the name Golden Age. This was a time when the western world was in full expansion and great quantities of produce, mostly raw materials, were finding their way from all corners of the world to the industrial sectors of the UK, France, the USA and other developed countries. The onset of the First World War destroyed the Golden Age and with it ideas of free trade. Since then, developed countries have increased trade with one another and the developing countries have been left to try and place their products in very narrow segments of the world market which have still expressed demand for primary produce and minerals. However, the need to export is today the prerogative of most countries and especially those which have small home markets. In this highly competitive setting, where barriers to trade are more a rule than an exception, exports has been considerably important to the development of many countries. To ascertain the importance of this factor we decided to include it as the second explanatory variable in the regression. Two models were tested:

$$r = a + bx + cE + dD + e \quad (1)$$

and

$$r = a + b(\ln x) + cE + dD + e \quad (2)$$

r = rate of growth of GDP per capita

x = level of development measured by the level of GDP per capita

E = rate of growth of exports

D = dummy variable

a, b, c, d = parameters of explanatory variables and e is the error term

Table 2.
Comparative results for the models used in the analysis for developed and developing countries over time

	GROUPED DATA							
	ALL DATA		Initial results		dummy variables added		EXPORTS added	
	R ²	level of sign	R ²	level of sign	R ²	level of sign	R ²	level of sign
1910—1938								
Developed	0.09	0.09	0.09	0.19	—	—	—	—
Developing countries		0.19	0.19	0.02	0.22	0.09	0.01	—
1950—1960								
Developed countries	0.35	0.00	0.45	0.00	0.67	0.00	0.90	0.02
Developing countries		0.00	0.35	0.00	0.63	0.00	0.70	0.00
1960—1970								0.00
Developed countries	0.33	0.00	0.27	0.01	0.27	0.01	0.69	0.00
Developing countries			0.34	0.00	0.73	0.00	—	—
1970—1981								
Developed countries	0.07	0.07	—	—	—	—	—	—
Developing countries	0.07	0.08	0.21	0.03	0.21	0.03	—	—

THE RESULTS OF THE MULTIPLE REGRESSION

The period 1950—1960

Developed countries:

$$r = 17.49 + 1.83 (\ln x) + 0.318E + 1.74D \quad n = 19$$

(3.86) (3.51) (6.74) (2.52) $R^2 = 0.90$

Developing countries:

$$r = 5.07 + 0.005x + 0.03E + 4.89D \quad n = 27$$

(10.3) (5.89) (2.15) (4.57) $R^2 = 0.70$

The period 1960—1970

Developed countries:

$$r = 16.23 + 1.77 (\ln x) + 0.39E \quad n = 23$$

(3.55) (-3.36) (5.09) $R^2 = 0.69$

Estimates for developing countries in the same period and the whole of the period 1970—1981 were not significant.

The above results show that developed countries had export-led growth from 1950—1970. Developing countries however seem to have made less use of their export potential in the same period. An analysis of variance showed that the addition of the new explanatory variable accounted for a significant proportion of the unexplained variance (at the 0.05 level). In the case of developed countries, exports explained a much greater proportion of the unexplained variance and increased the overall significance of the regression at the 0.01 level. We can conclude that in both groups of countries exports contributed to growth but were of much greater importance in developed countries.

Partial coefficients of correlation are also an indicator of the relation between the rate of growth of GDP and the rate of growth of exports. For developing countries it is in the region of 0.23 and for the developed countries it is as high as 0.90. This result seems to provide support for the separate treatment of the two groups of countries. It seems plain that the laws governing the development of developed countries do not operate in developing countries.

CONCLUSION

The main purpose of this analysis was to establish whether there is an empirical foundation for the hypothesis that countries develop at different rates in the course of development. By taking cross-section data over the period from 1910—1981 we regressed the level of development measured by the GDP per capita on the rate of growth of

GDP (and its per capita form). Various models were used, some on all the data and some on grouped data, the latter division corresponding roughly to developed and developing countries.

The results seem to support the hypothesis that the level of development does indeed have a certain effect on the rate of growth, but the low levels of the coefficient of determination indicate that this correlation is not high. The best results were obtained for the period 1950—1970 for both groups of countries with coefficients of determination going as high as 0.90 after the introduction of dummy variables. The results were insignificant for the first and the last time periods so we have to conclude, limited as we are by the unavailability of data over a longer historical period, that a general validation of the hypothesis was proven on the basis of empirical findings for the period 1950—1970 only. There are several further analyses which would have to be carried out to test the hypothesis more rigorously. Firstly, some evidence should be provided that today's developed countries had higher growth rates at the point when they had lower levels of development. Kuznets pointed out that such evidence is not forthcoming from the data available for the United Kingdom which reach back to the 18th century. Secondly, an identical analysis should be carried out whereby the cross-section data are replaced by time-series for individual countries since the validity of the hypothesis stands only if it applies equally to a large majority of countries as well as an one particular country at any time.

In our opinion, such uniformity of development experience should not be expected over widely different geographical regions and different points in time. In fact, the very search for one dominant pattern may lead the researcher away from delving deeper into the mechanisms at work. In our view, the idea that countries pass through identifiable stages of growth whose main characteristics are varying growth dynamics is a transplantation of the Europe/America-based experience into other countries. The experience in question is the process of industrialization which has followed a certain identifiable pattern. Within this pattern we had structural change in the economy starting with basic industries up to all types of specialized services which mark the progression from the primary to the tertiary sectors of the economy. We maintain that a significant factor which influences the rate of growth of the economy is the effect of structural change. In other words, the changing importance of the various sectors of the economy will dictate the speed at which the economy will be moving. Empirical findings in this field (Chenery and Syrquin, 1975) have established a close relationship between the level of development of a country and the relative importance of certain sectors of the economy. The evidence for

the so-called patterns of development is based on crossection data over a large number of countries of the world. There is considerable doubt concerning the verification of the patterns on time-series data as shown by K. P. Jameson in his critical examination of patterns of development (1982). He showed by co-variance tests that the hypothesis of homogeneity of slope between coefficients based on cross-section and time-series data had to be rejected at an acceptable level of confidence. It seems therefore that the patterns of a development scheme is confined to the cross-section data. However, certain empirical laws such as the Engels law continue to operate and it still holds that the relative share of a sector of the economy changes depending on the income elasticity of demand for its products. If this elasticity is greater than one, factors of production will be attracted to it and its relative share in value added will increase. This is the story of the expansion of the sector of industry at the expense of the agricultural sector whose income elasticity of demand has been low in relation to that for industrial inputs durables. Hence the reduction of the primary sectors relative share. The income elasticity of demand is also a function of the level of development so that it appears to be higher in less, and lower in more developed countries.

The argument outlined above has explained the effect of demand factors on structural change. The same kind of effect is forthcoming from the supply side. It has been observed that the more developed a country is the lower is the price of capital in relation to the level of borrowing. In such a situation a branch of industry where it is possible to substitute capital for labour has an advantage over a branch which may even have a higher income elasticity of demand for its products.

We have empirically verified the limited applicability of the stages of development scenario to the actual development experience of developed and developing countries. There are however various other interpretations of the post-war growth performance which do not claim universal relevance. Hungarian economist Ferenc Jánosy (1966) developed an interesting theory which concerns the behaviour of economies after a severe disruption of normal economic activity, such as a war, a natural disaster, etc. He found some empirical evidence testifying to the fact that countries in the aftermath of such calamities grow at a rate which is higher than their secular trend up to the point when they reach that level of production which would have been achieved had there been no interruption of economic activity. He attempted to show the effect of this behaviour on data for East European planned economies. The planners expected post-war growth rates to be high up to the point when the pre-war level of production was reached and pro-

ceeded to build these expectations into their plans with the result that the first post-war plans overshoot their targets by far. In the next planning period the planners were too optimistic and based their expectations on the experience of unprecedented high growth rates from the previous period. In the meantime, according to Jánosy, the economy caught up with the secular trend and lower historic growth rates were beginning to manifest themselves. If one accepts this theory, then the periods of reconstruction after the Second World War lasted for war-damaged countries into the 1960s and not the early 1950s when the pre-war production level had been reached. Some credence should be given to this theory but it cannot account for the very high rates of growth which were maintained all through the 1960s and early 1970s up to the oil shock.

Another theory recently found its way into the minds of economists which had lost most of its relevance during the post-war boom. This is the theory of long waves launched by Dutch economists at the end of the last century, but popularized by the writings of Kondratieff. He analysed a large number of quantity and price time-series for products and found that they oscillated in a regular manner. Taking 9-year moving averages he ironed out the shorter cycles and found evidence of cycles which last approximately 60 years. The down-swing of the long Kondratieff cycle could be responsible for the Great Depression in the 1930s and the 1970s, as well as for the growth boom in the 1960s. There is however some ambiguity in proving the existence of these long cycles. Kondratieff's evidence was criticized as it verified the existence of only 2.5 long cycles, positive identification was ascertained on price series only while quantity series proved less regular. More recently long cycle theorists have tried to locate cycles by pinpointing bunches of innovations which seem to mark the down-swing of the long wave. Van Duijn (1983) places innovations, their life-cycles and the investment in infrastructure among the main factors which cause the up-and down-swings of the wave. On the macro level it can be shown that plans for innovations by firms are made in the up-swing but are not developed until the down-swing when the level of demand is so low that something has to be done to prevent a further fall in sales. This is the point where the bunching of innovations takes place. Depending on the nature of these innovations, their effect on the overall performance of the economy will either be long or short. Van Duijn also differentiates between innovations in a new product or in a new method of production. However, due to the difficulty of precisely measuring the various stages of the long wave motion this theory will be forced to stand aside of the main currents of economic thought and its fate is to become

popular in times of depression and even more easily forgotten in times of prosperity.

After outlining some alternative theories which could provide a clearer understanding of the growth process it must be concluded that a satisfactory explanation has not been found let alone a simple pattern such as Rostow's. It can only be hoped that more plentiful and less arbitrary data will become available in time, so that the increasingly refined tools of analysis can be applied to them without the danger of drawing far-reaching conclusions on a weak base.

Received: 29. 10. 1984.

Revised: 14. 12. 1984.

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A P P E N D I X

(The Appendix contains scatter diagrams which depict the relationship between the rate of growth of GDP per capita and the level of development. Each point in the diagram is numbered in order that the country which it represents can be identified with the aid of Table A1. which also contains all the data used in the analysis.)

Diagram A, Scatter Diagram for the Period 1910—1938

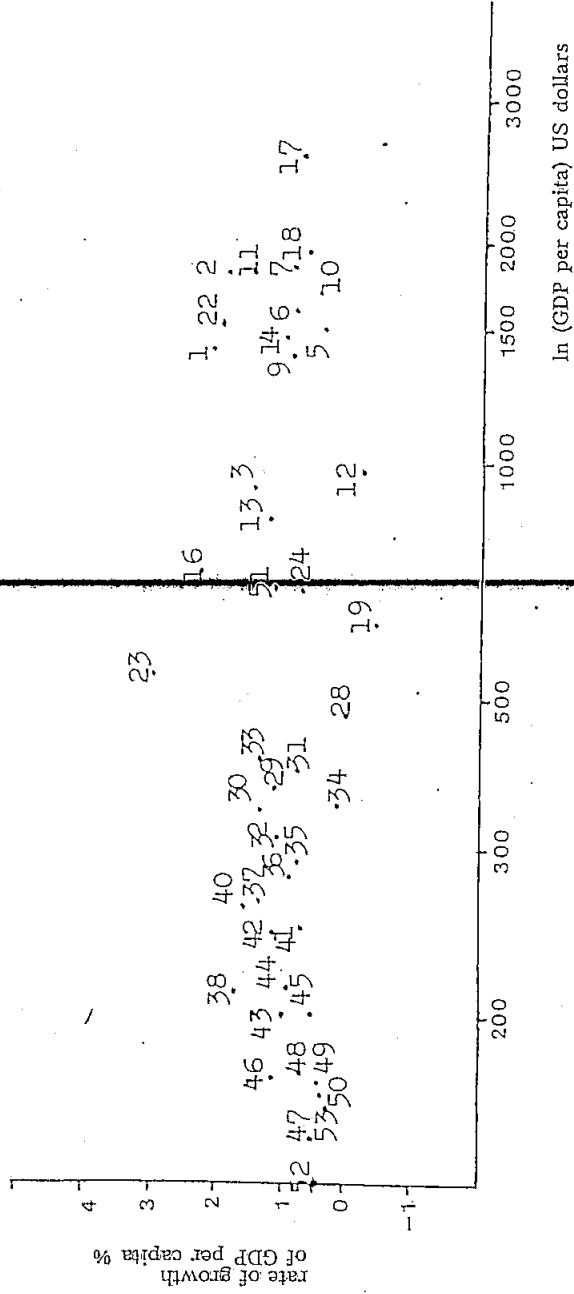


Diagram A, Scatter Diagram for the Period 1938—1950

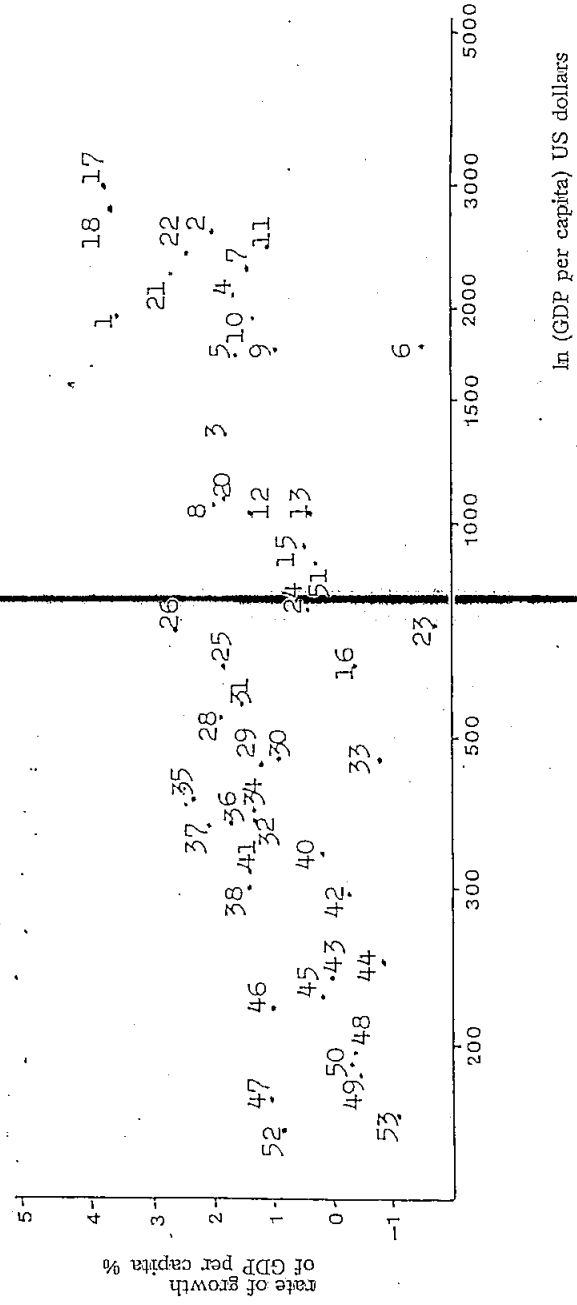


Diagram A, Scatter Diagram for the ePeriod 1950—1960

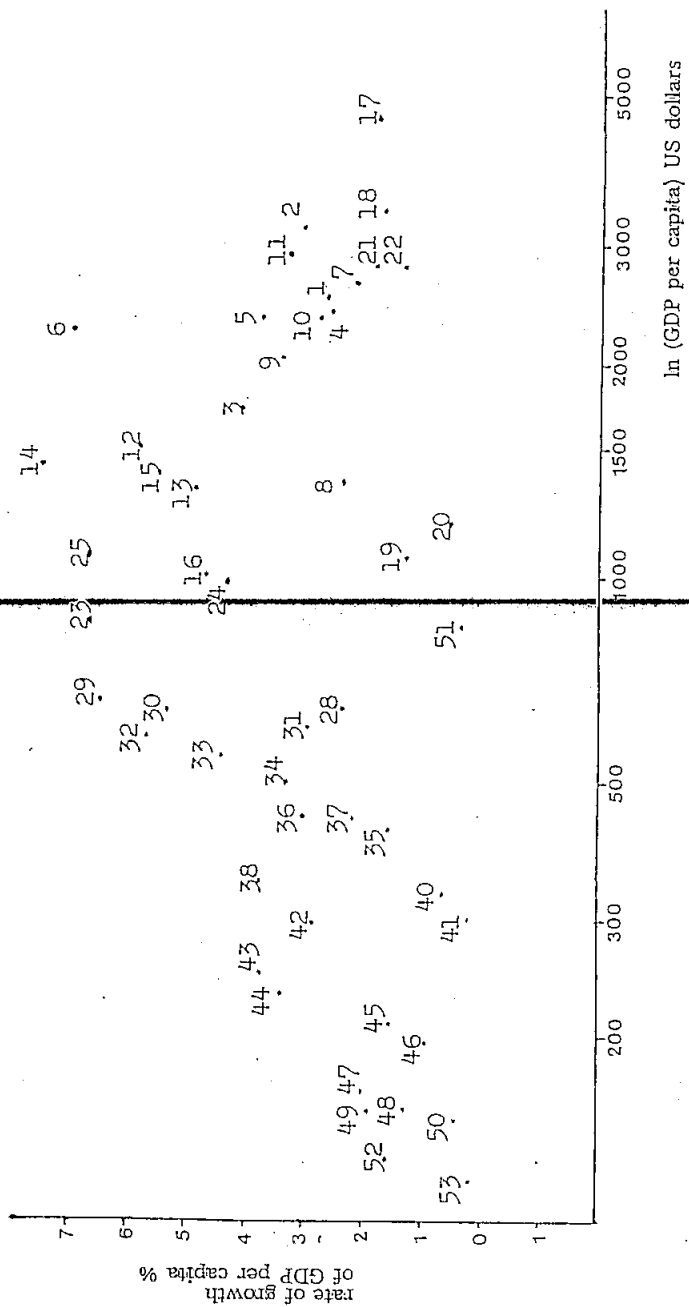


Diagram A, Scatter Diagram for the Period 1960—1970

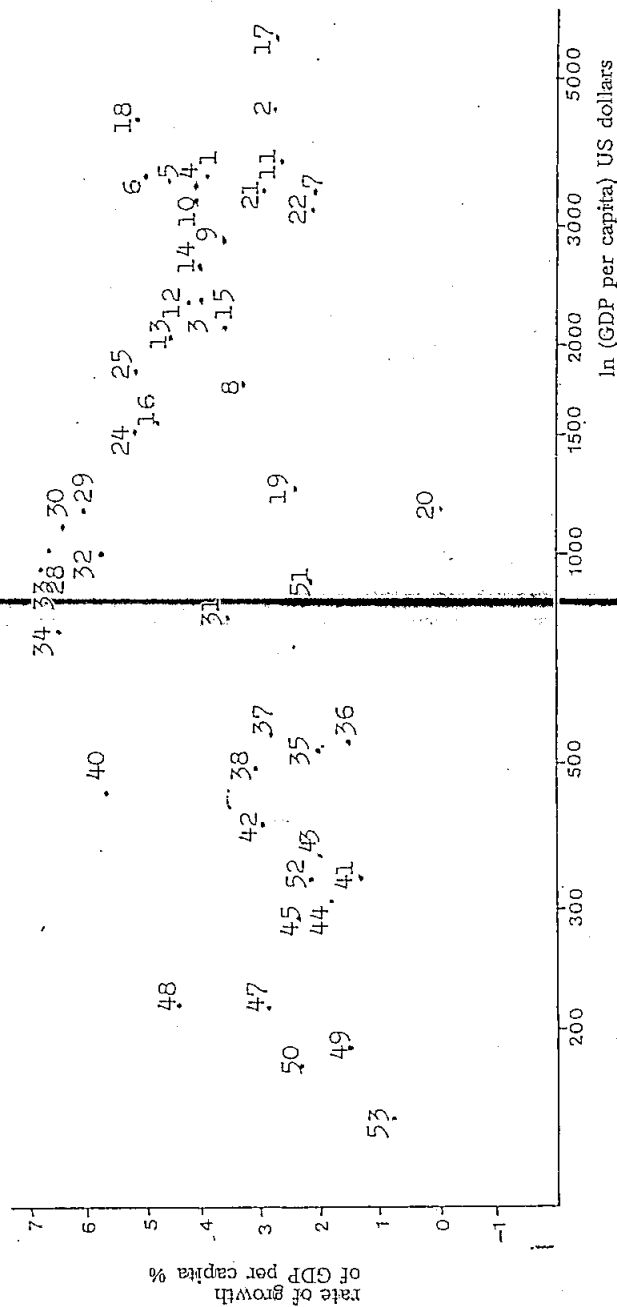


Diagram A3 Scatter Diagram for the Period 1970—1981

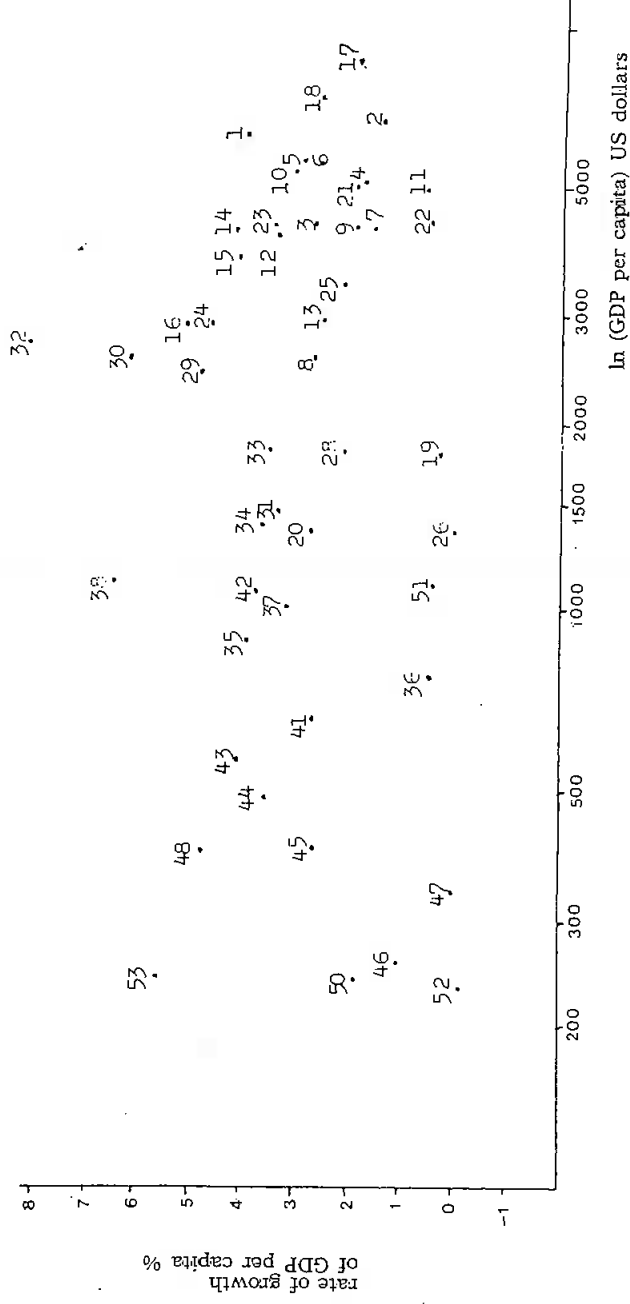


Table A1. The GDP per capita in US dollars, rate of growth of GDP per capita and the rate of growth of exports in various periods

DEVELOPED COUNTRIES	1910—1938		1938—1950		1950—1960		1960—1970		1970—1981	
	GDP per capita US \$ '75	Export %	GDP per capita US \$ '75	Export %	GDP per capita US \$ '75	Export %	GDP per capita US \$ '75	Export %	GDP per capita US \$ '75	Export %
1. NORWAY	1440.0	2.1	2012.5	3.4	2472.5	2.5	3482.5	4.2	6184.1	4.0
2. SWEDEN	1818.5	1.9	2555.5	1.8	3287.5	2.8	4551.5	3.6	6517.8	1.5
3. FINLAND	934.5	1.8	1289.0	1.6	1744.5	4.0	2609.0	4.2	4425.5	2.7
4. DENMARK	1544.5	1.4	2021.5	1.5	2499.5	2.5	3486.0	4.1	5178.5	1.8
5. FRANCE	1528.0	0.4	1769.5	1.5	2335.0	3.6	3540.5	4.7	5960.7	2.8
6. GERMANY FED. REP. of	1609.5	0.8	1689.5	-1.5	2251.0	6.8	3647.0	3.8	5568.2	2.6
7. Gt. BRITAIN	1814.0	0.9	2232.5	1.3	2685.0	2.2	3326.5	2.2	4405.4	1.6
8. IRELAND	—	—	1071.0	1.9	1346.0	2.3	1797.0	3.4	2650.2	2.7
9. The NETHERLANDS	1412.0	0.9	1673.0	0.8	2083.5	3.3	2946.0	3.7	4399.3	1.9
10. BELGIUM/LUX.	1701.0	0.5	1956.0	1.2	2409.5	2.6	3419.0	4.2	5746.6	0.8
11. SWITZERLAND	1825.0	1.5	2344.5	1.0	2921.0	3.1	3887.5	2.8	4985.7	2.6
12. AUSTRIA	973.0	-0.2	1030.0	1.3	1505.5	5.6	2389.5	4.2	4217.9	3.4
13. ITALY	843.5	1.2	1002.0	0.3	1322.0	4.7	2096.0	4.7	3213.8	2.5
14. GERMANY DEM. REP. of	1507.5	0.9	1318.5	-4.7	1431.5	7.2	2413.0	4.3	4361.4	4.2
15. CZECHOSLOVAKIA	864.5	1.1	1018.0	0.4	1389.5	5.3	2134.0	3.8	3947.7	4.1
16. POLAND	—	—	—	—	—	—	1558.5	5.7	3275.8	5.0
17. USA	2588.5	0.8	3614.0	3.6	4737.0	1.6	5941.5	2.9	8291.5	1.9

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
18. CANADA	1935.5	0.7	—	—	2651.0	3.5	—	3446.5	1.5	5.1	4444.5	3.4	11.1	7248.5	2.6	4.2
19. ARGENTINA	617.0	-0.4	—	—	—	—	—	—	—	—	—	—	—	1808.2	0.3	9.4
20. URUGUAY	847.5	0.6	—	—	1021.5	1.7	—	—	—	—	—	—	—	—	—	—
21. AUSTRALIA	1633.5	0.7	—	—	2114.0	2.5	—	2695.0	2.0	0.9	3474.5	3.0	7.3	5173.6	1.9	3.8
22. NEW ZEALAND	1539.5	2.0	—	—	2267.0	2.3	—	2812.0	1.7	3.4	3392.0	2.1	4.0	4598.2	0.5	3.9
23. JAPAN	—	—	—	—	—	—	—	—	—	—	1952.0	9.7	14.8	4527.8	3.4	9.0
24. HUNGARY	—	—	—	—	—	—	—	—	—	—	1540.0	5.1	9.1	3171.5	4.6	8.2
25. USSR	—	—	—	—	—	—	—	—	—	—	1828.5	5.2	8.1	3545.0	4.1	5.6
DEVELOPING COUNTRIES																
26. SOUTH AFRICA	419.5	1.6	—	—	595.5	2.7	—	742.5	1.6	9.4	911.5	2.4	11.2	1344.8	0.1	7.2
27. CHILE	687.5	1.0	—	—	791.0	0.2	—	810.0	0.2	3.6	920.0	2.2	9.7	1104.9	0.4	9.8
28. SPAIN	465.5	0.1	—	—	517.5	1.7	—	638.0	2.2	3.0	1023.0	6.6	12.5	1838.5	2.1	21.0
29. YUGOSLAVIA	374.0	1.0	—	—	447.5	0.8	—	621.7	5.8	12.6	1153.0	6.0	11.2	2466.7	4.8	4.5
30. BULGARIA	347.0	1.0	—	—	434.5	1.1	—	617.5	5.2	68.7	1104.5	6.4	12.6	2650.5	6.1	11.0
31. MEXICO	393.5	0.7	—	—	474.5	1.4	—	595.5	2.8	3.4	817.0	3.5	6.1	1461.6	3.4	15.3
32. ROUMANIA	323.5	1.0	—	—	393.5	1.2	—	571.5	5.5	58.8	995.0	5.8	9.5	2683.5	8.2	19.3
38. BRAZIL	401.0	1.3	—	—	450.0	-0.9	—	530.7	4.3	9.1	952.0	6.7	11.5	1845.7	3.6	10.8
34. PORTUGAL	350.0	0.1	—	—	379.0	1.1	—	485.5	3.1	4.1	781.5	6.4	11.4	1394.1	3.6	11.1
35. COLOMBIA	292.0	0.7	—	—	367.0	2.1	—	444.5	1.4	0.4	527.5	2.0	3.9	885.0	3.8	1.6
36. PERU	280.0	0.8	—	—	342.5	1.6	—	436.0	2.9	6.0	536.5	1.5	8.1	774.2	0.4	4.6
37. TURKEY	263.0	1.3	—	—	349.0	1.9	—	430.5	2.0	—	548.0	2.8	5.9	1010.3	3.1	1.2
38. BRASIL	210.0	1.6	—	—	264.0	1.3	—	346.0	3.7	-2.0	480.0	3.1	7.0	1140.6	6.3	8.7
39. NORTH AFRICA	244.0	0.7	—	—	288.0	1.2	—	310.5	0.2	2.3	334.5	1.3	11.8	663.3	2.6	-0.9
40. IRAN	260.0	1.5	—	—	314.5	0.1	—	323.0	0.4	31.0	450.0	5.6	11.9	2080.3	12.1	-13.4
41. NORTHERN AFRICA	244.0	0.7	—	—	288.0	1.2	—	310.5	0.2	2.3	334.5	1.3	11.8	663.3	2.6	-0.9
42. IRAQ	241.5	1.1	—	—	270.0	-0.4	—	303.0	2.7	13.1	399.0	2.9	5.3	1079.5	3.7	-2.1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
43. CHINA REP. of	190.0	0.7	—	—	208.5	0.1	—	255.0	3.6	—	333.0	2.0	—	569.4	4.0	—
44. The PHILIPPINES	202.0	0.8	—	—	212.5	-0.9	—	239.5	3.3	4.4	304.5	1.8	7.3	491.6	3.5	7.7
45. SRI LANKA	186.5	0.5	—	—	199.0	-0.1	—	214.5	1.5	0.9	259.5	2.3	-1.4	406.5	2.6	-1.5
46. CENTRAL AFRICA	155.0	0.8	—	—	183.0	0.9	—	200.5	0.8	5.1	205.5	-0.2	8.6	263.1	1.0	0.1
47. WESTERN AFRICA	127.0	0.5	—	—	143.5	0.9	—	166.5	1.9	5.5	212.5	2.9	10.1	342.1	0.1	2.2
48. THAILAND	150.0	0.4	—	—	155.5	-0.4	—	161.5	1.2	1.5	215.0	4.3	5.7	398.4	4.7	11.8
49. INDIA	149.0	0.3	—	—	151.5	-0.5	—	161.5	1.8	—	190.5	1.5	3.6	234.2	1.5	4.6
50. PAKISTAN	152.0	0.3	—	—	155.0	-0.4	—	154.0	0.4	-4.3	177.0	2.3	9.8	243.7	1.8	3.0
51. CHILE	687.5	1.0	—	—	791.0	0.2	—	810.5	0.2	3.6	920.0	2.2	9.7	1104.9	0.4	9.8
52. EASTERN AFRICA	106.5	0.6	—	—	121.5	0.8	—	137.5	1.5	6.5	331.0	2.1	7.2	235.2	-0.1	-2.5
53. INDONESIA	139.0	0.3	—	—	137.0	-1.1	—	129.0	0.2	-1.1	135.0	0.8	1.7	245.8	5.5	6.5
8. IRELAND ⁹	860.5	0.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16. POLAND	720.5	2.2	—	—	792.5	-0.5	—	987.5	4.5	6.1	—	—	—	—	—	—
23. JAPAN	533.0	2.9	—	—	663.0	-1.8	—	851.0	6.5	14.8	—	—	—	—	—	—
24. HUNGARY	676.0	0.7	—	—	757.0	0.3	—	966.0	4.2	8.0	—	—	—	—	—	—
25. USSR	511.0	1.3	—	—	666.0	1.7	—	1053.0	6.5	10.3	—	—	—	—	—	—
19. ARGENTINA	—	—	—	—	780.5	4.5	—	1038.0	1.1	-0.2	1246.0	2.5	4.7	—	—	—
20. URUGUAY	—	—	—	—	—	—	—	1155.5	0.5	-8.9	1193.0	0.1	3.6	1169.5	-0.1	4.3

⁹ Starting with Ireland, the countries listed below have bridged the gap between developing and developed countries and are thus included both in the developed and the developing group in relevant periods.

* — Rate of growth of GDP per capita from 1. Vinski for the shorter period 1970-1975 since it was not available from the World Development Report 1983.

ODNOS IZMEĐU NIVOVA RAZVIJENOSTI I STOPE RASTA:
NEKA EMPIRIJSKA ISTRAŽIVANJA

Sanja CRNKOVIĆ-POZAIĆ

S a ž e t a k

Osnovni je cilj ove empirijske analize da uz pomoć priznatog statističkog oruđa ispita vjerodostojnost hipoteze kako se zemlje u toku svoga razvoja ne razvijaju jednolikom dinamikom. Tu hipotezu teoretski je razradio W. W. Rostow, a autor ovoga članka nadovezuje se na relativno mali broj napisa, među kojima je i onaj iz 1974. godine B. Horvata, koji žele suočiti hipotezu sa podacima za zemlje svijeta.

Autor se koristio podacima za društveni proizvod per capita koji služi kao aproksimacija za nivo razvijenosti (nezavisna varijabla) i stopom rasta društvenog proizvoda per capita (zavisna varijabla) od I. Vinskog. Podaci za pedesetak zemalja svijeta izračunati su metodom pariteta kupovne snage domaće valute, što predstavlja značajan napredak u odnosu na podatke dobivene konverzijom putem službenog tečaja.

Metodom najmanjih kvadrata na podacima u vremenskim presjecima ocijenjeni su parametri nekolicine funkcijskih oblika prvo na svim podacima a zatim na grupama podataka koje grubo odgovaraju podjeli na razvijene zemlje i zemlje u razvoju.

Prvobitni rezultati pokazuju da su parametri za prvo (1910—1938) i poslijeđnje (1970—1981) razdoblje nesigurni, dok su ostala razdoblja između 1950. i 1970. godine sigurni na nivou 0.01. Međutim, koeficijenti determinacije su, unatoč visokoj sigurnosti ocijenjenih parametara, bili niski, što ukazuje na činjenicu da nivo razvijenosti utječe na dinamiku rasta, ali da se ne radi o jednom od važnijih činitelja koji utječu na stope rasta. Nadalje, pokazalo se da zemlje u razvoju nemaju ubrzani već usporeni rast što je u kontradikciji sa tipom rasta koji se odvija u Rostow-ovoj fazi uzleta.

Analiza se nastavlja uvođenjem pseudo-varijabli, kojima se otklanja utjecaj na ukupnu regresiju nekolicine zemalja čiji je razvoj atipičan u odnosu na većinu drugih zemalja na sličnom nivou razvijenosti. Nakon ovog postupka općenito se poboljšavaju indikatori jačine veze koja se ispituje i sigurnosti parametara.

Zeleći ispitati ulogu izvoza kao faktora razvoja, u analizu je uvedena nova eksplanatorna varijabla — stopa rasta izvoza. Analize varijance su pokazale da nova varijabla objašnjava sigurno veći dio neobjašnjene varijance zavisne varijable. U razdoblju 1950—1970. koeficijenti determinacije se kreću od 0.70 do 0.90 kod razvijenih i zemalja u razvoju, tako da se može reći kako je izvoz u povjenskoj perspektivi igrao značajnu ulogu u razvoju, no mora se naglasiti da je on kod razvijenih zemalja mnogo snažnije djelovao na dinamiku rasta.

Zaključak, koji se nameće posredstvom empirijske analize, je da postoji sigurno veza između nivoa razvijenosti i stopa rasta privrede ali se ona izkazuje isključivo u razdoblju 1950—1970. Za ostala razdoblja to nije slučaj te preostaje da procijenimo da li se jedna hipoteza sa pretenzijama na općenitu primjenu može potvrditi samo na dva-

desetogodišnjem razdoblju koje je po mnogo čemu vrlo specifično. Jedna je od tih specifičnosti da se radi o vremenu poslije ratne rekonstrukcije, a mađarski ekonomist Ferenc Jánossy ukazuje na specifično ponašanje privreda koje su doživjele razaranje. Vrlo visoke stope rasta poslije rata moraju se djelomično i na taj način objasniti, barem do polovice četrdesetih godina.

To razdoblje je takođe u znaku uspona četvrtog Kondratieff-ovog ciklusa pa se mora zaključiti da se uz datu dokumentacionu podlogu, a bez daljnjih ispitivanja, ne može govoriti o fazama rasta u Rostow-ovom smislu, te da se hipoteza potvrđuje na razdoblju koje je prekratko kako bi se utemeljio zakon o razvoju, a s druge strane tako specifično da su prihvatljive i alternativne hipoteze o njegovim karakteristikama.