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The Economic Growth Debate - *Geography* versus *Institutions* Is There Anything Really New?

by

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Abstract

International analysis of economic growth has confirmed the theoretical assumption that international variations in per capita income can to a large extent be explained by differences in the accumulation of capital and human capital and by differing rates of technological progress. However, these results do not provide an answer to the question as to what causes trans-national variations in accumulation rates and technological progress.

In searching for the ultimate drivers of economic growth, three competing lines of explanation have emerged:

- The *geography-hypothesis* which assumes that economic growth is ultimately determined by geographical characteristics
- The institutions-hypothesis which views the quality of institutions as a fundamental driver of growth
- The policy-hypothesis which emphasises the importance of economic policy

This paper provides an overview over these three hypotheses and revisits the debate over their empirical relevance. Comparing the three approaches leads to the conclusion that none of them is really new and that many of their findings have already been incorporated into the strategies for international development assistance. Furthermore, the three hypotheses are not as exclusive as the debate on *geography versus institutions* would suggest but are indeed interconnected and complementary.

JEL-classification: O40; O10

Introduction

(1) The central issue in the examination of economic growth is the enormous implication of lasting differences in growth rates for human development. Over the long run, even marginal differences in growth rates can lead to huge disparities in living standards between countries². This end result makes it crucially important to explore the drivers of economic growth and to investigate the possibilities for influencing it via economic policy. For a long time, this has been almost exclusively dealt with in the form of theoretical considerations. Only recently have the microelectronic revolution and the emergence of the personal computer made it possible to test the empirical relevance of the theoretical models. This course is supported by the increasing availability of high-quality data and the ongoing development of statistical and econometric methods.

(2) Given this background, it comes as no surprise that, since the beginning of the 1990s, a large number of empirical studies of long-term economic growth has been conducted. The aim of all these studies is to assess two questions:

- (1) How can the prevailing differences in incomes and growth rates between countries be explained?
- (2) How does the international distribution of per capita income change over time?

Answering these questions is of far more than purely academic interest. For example, there are clear connections between economic growth and the phenomenon of absolute poverty. Furthermore, international differences in per capita income are much larger than disparities within countries. About two thirds of income differences between individuals measured on a global basis can be explained by variations in per capita incomes between states. This means that any attempt to reduce the huge international gaps in income and to alleviate extreme poverty should be focused on increasing per capita incomes at a national level.

(3) That being said, which are the determinants of economic growth identified in empirical studies? The main instrument of international research into economic growth is growth-regression, either in the form of simple regressions or as panel-data-analysis. Both methods provide valuable insights into the factors which drive economic growth. Growth-regressions in general test the influence of theoretically chosen variables on the growth rates of per capita income. The basic structure of this approach is quite simple. The average rate of growth of per capita income or labour productivity of a sample of countries is regressed on the initial per capita income as well as on a number of other determinants of economic growth. The initial level of per capita income is included to establish whether there is some sort of convergence in economic growth between countries³. The phenomenon of convergence is of great importance because it would provide the means of answering question (2) above, in relation to the international distribution of income and its change over time.

² For example, between 1870 and 1980 per capita income in the United States grew at an average rate of 1.84% p.a. and in Great Britain at an average rate of 1.24% p.a. while the growth rate in Japan was 2.64% [Pritchett (2000)]. Great Britain's growth-lag of only 0.6% led to its decline from being a world power to a second-class industrial nation. The cumulative effect of Japan's 0.8% lead over the United States facilitated its rise from a developing nation to one of the world's leading industrial states. Most recently, the successful growth of some East Asian countries has altered global income relations entirely [Hemmer/Lorenz (2004), p.1].

³ Of special interest is the so called β -convergence which assumes a negative correlation between the level and growth rate of per capita income (labour productivity). According to this thesis, the economies of rich countries should be growing at a slower rate than those of poor countries, which would ultimately lead to the latter catching-up. For further details, see Hemmer/Lorenz [(2004), pp. 143] and Hemmer/Frenkel [(1999), pp.140].

2. Formal and informal regression analysis

Empirical literature on economic growth highlights two different approaches in assessing the reasons for differing growth rates. These approaches are known respectively as formal regression analysis and informal regression analysis.

2.1. Formal regression analysis

(1) Formal regression analysis is based on a specific theoretical growth model. The advantage of such a theoretical foundation is the ability to make *a priori* assumptions concerning the direction and magnitude of the influence which independent variables exert on the growth rates of income. The best-known example of this approach is the investigation by Mankiw, Romer, and Weil (1992) (MRW). As a first step, they augment the well-known Solow Growth Model by introducing human capital as an additional factor to explain economic growth. MRW then use this expanded version of the Solow Model to assess empirically its ability to explain the variation in labour productivity and its growth rates between countries. The results of MRW's regression analysis show a high level of explanatory power for the expanded Solow Model. The results indicate that some countries are richer than others because they invested more in the accumulation of capital and human capital and had lower fertility rates over a period of approximately 30 years. From a global point of view, the accumulation of capital was as important for economic growth as the accumulation of human capital. By contrast, for the subgroup of OECD countries, the contribution of human capital was twice that of capital.

(2) The variation in incomes between countries which cannot be explained by the augmented Solow Model is attributed to international differences in the so-called total factor productivity and its growth rate. Hence, total factor productivity contains all the elements which have an influence on growth but which are not explicitly included in the theoretical model. As shown by the results of growth accounting exercises, this unexplained difference in international income variation accounts for about 20 – 25% of total income variation.

(3) Despite the high level of its explanatory power (approximately 80%), the MRW-model does not produce the definitive answer to the question as to why some countries are so poor and others are so rich. While empirical evidence shows that high rates of accumulation of capital and human capital as well as technical progress have a positive influence on growth, it does not answer the question as to why some countries accumulate more capital than others or have a higher rate of technological progress.

In addition, it is still not clear which elements are contained in the total factor productivity. Hence, there are at least two questions which are not answered by formal growth regressions. These are:

- (1) What are the fundamental drivers of growth (i.e. the reasons for different rates of capital accumulation and technological progress) and
- (2) What are the elements making up total factor productivity?

2.2. Informal regression analysis

(1) It is these questions which informal regression analysis tries to answer by assessing the influence of a number of additional variables on growth. The ultimate goals are to find the fundamental factors which determine the accumulation of capital and the rate of technological progress and to subdivide the total factor productivity into its different components in order to reduce that unexplained part of international income variation. Contemporary literature on economic growth lists about 60 different variables which could help answer these questions.

As the influence of these variables is rarely stated within a formal theoretical model, the term informal regression analysis was coined⁴.

(2) The use of informal regression analysis in exploring the fundamental drivers of economic growth has led to three hypotheses concerning the growth experiences of different countries:

- a) The **geography-hypothesis** which maintains that economic growth depends mainly on geographical endowments
- b) The **institutions-hypothesis** which explains economic growth as result of institutional conditions
- c) The **policy-hypothesis** which highlights the role of economic policy decisions in shaping the course of economic development and growth

In particular, the advocates of the geography-hypothesis and the institutions-hypothesis engage in a fierce debate at which of the two lines of reasoning has more relevance in explaining real world economic growth.

The remainder of this paper will look at the issues involved and is organized as follows: **Sections Three and Four** provide an overview over the basic ideas of the “geography-hypothesis” and the “institutions-hypothesis” respectively. **Section Five** contains an analysis of the debate on *geography versus institutions* and **Section Six** deals with the policy-hypothesis and its relevance. **Section Seven** provides the conclusions.

3. The Geography-Hypothesis

The advocates of the geography-hypothesis argue in favour of the direct effects of geographical conditions on economic growth, i.e. that geographical endowments either influence inputs into the production function or the production function itself [Easterly/Levine (2003), p.5]. The origins of this thesis lie in the observation that nearly all countries in the tropics are underdeveloped while countries located in temperate zones all show a relatively high level of economic development⁵. Of the 30 richest countries⁶ in 1995, only two – Hong Kong and Singapore – were located in the tropics [Gallup et al. (1999), pp.128]⁷. Similarly, countries with access to waterways show higher levels of income than countries which are landlocked. In total, only 17.4% of the global landmass is located less than 100 kilometres away from a coast. However, this small area is inhabited by 49.9% of world’s population who produce 67.6% of world’s output [Weil (2005), pp.433]. These two observations posit the theory that climatic conditions as well as geographical location exert some kind of influence on economic development and growth. Another form of geographical endowment which may be of relevance in this context is the availability of natural resources.

3.1. The relevance of climatic conditions

(1) With regard to the role of climatic conditions in economic development, Montesquieu stated as early as 1750 that the warm and humid climate of the south brings out only the worst

⁴ Well known examples of informal regression analysis can be found in Barro (1991, 1998) or Barro and Sala-i-Martin (1992, 1995), which is why informal regression models are also referred to as Barro Regressions.

⁵ The only exceptions are the countries of the former Soviet Union in Eastern Europe which do not feature in the list of highly developed countries but nonetheless show higher levels of development than tropical countries.

⁶ As measured by per capita purchasing power income.

⁷ A regression analysis conducted by Ram (1997) confirms the influence of latitude on per capita income.

in every person [Montesquieu (1989), pp.231]. An equally dubious argument was put forward by the geographer Ellsworth Huntington who, in 1915, wrote:

“The climate of many countries seems to be one of the great reasons why idleness, dishonesty, immorality, stupidity, and weakness of will prevail.” [Huntington (1925), p.411]⁸

In modern theories of economic growth and development, the influence of climatic conditions was neglected for a long time. Only in the last few years has attention been turned towards the role of climate, leading to the identification of a number of channels through which the climatic conditions of a country might affect the path of its development. This discussion focuses mainly on climate’s importance for agriculture as well as for the accumulation and productivity of labour and human capital.

(2) For a number of reasons, it has been suspected that the climatic conditions in the tropics exert a negative effect on the productivity of agriculture. In an empirical investigation, Masters and McMillan (2001) find that the absence of frost periods has a negative effect on economic growth. By way of explanation, it has been suggested that seasonal frost helps control the transmission of plant diseases by killing exposed organisms. Furthermore, seasonal frost slows the growth of bacteria which mineralize soil organic matter. Without frost, there would be a faster mineralization of top soils which would lower soil quality [Masters/McMillan (2001), p.169]. Moreover, the high temperatures in the tropics reduce the photosynthetic potential of plants and lead to higher plant respiration. Especially in the arid parts of the tropics, this can cause a loss of agricultural productivity [Sachs (2001), p.14]. Thus, Gallup (1998) finds that tropical agriculture suffers a productivity decrement of 30% - 50% after controlling for factor inputs.

(3) However, climatic conditions might also affect labour. The main problem of the tropics is the large number of diseases – most prominently malaria – which reduce man’s ability to work. This concentration of diseases in the tropics can be explained by at least three factors:

- a) The absence of frost periods again favours the uncontrolled spread of causative organisms and their hosts [Masters/McMillan (2001), p.169].
- b) Mankind evolved in the tropical regions of Africa and spent a long time there, thus giving local parasites time to develop and take advantage of the human organism [Weil (2005), p.446].
- c) Furthermore, in contrast to the inhabitants of the tropics, peoples living in temperate zones developed very early on intensive forms of cattle breeding which exposed them to a number of animal diseases and thus led to the development of a strong immune system [Diamond (1997), p.242].

Nevertheless, it should be pointed out that the prevalence of diseases might have been endogenously determined as countries with high levels of development have better potential for controlling the spread of diseases. Hence, it is difficult to judge whether the level of development influences the prevalence of diseases or whether the occurrence of diseases influences economic development. However, at least in the case of malaria, it can be shown that its spread depends crucially on the existence of an appropriate vector which is in most cases the *Anopheles* mosquito. The stability of the *Anopheles* population is in turn closely related to ecological conditions which are most favourable to it in the tropics. Because of this, the extinction of malaria in subtropical regions during the 1940s was to a greater extent

⁸ The more ironic among Huntington’s critics note that his idea of an ideal climate for human productivity resembles remarkably the climate of New Haven, Connecticut, where Huntington lived and worked [Bohnet (1971), S.57].

facilitated by ecological and climatic conditions than by the level of development [Gallup et al. (1999), pp.143].

(4) Another connection between climatic conditions and economic development is posited by Sachs (2001). He points out that in the early stages of industrialization coal was the major source of energy. As it was very difficult at that time to ship coal over larger distances, countries which had deposits of coal within their borders had an advantage over countries which lacked them. As a matter of fact, coal deposits are mostly located in temperate climate zones [Sachs (2001), pp.18]. Since oil is nowadays the energy source of choice, this advantage should have faded but it may well be that it gave the industrial countries a head start which is difficult to counterbalance.

(5) On an empirical level, a number of studies have found evidence for the hypothesized connections between climate and economic development. In addition to the investigation by Masters and McMillan (2001) already mentioned, Sachs (2001) also finds significant effects related to climatic conditions. Using the econometric growth model developed by Barro (1991), Sachs finds that the percentage of a country's population living in temperate zones has a significant positive effect on economic growth. Examining the phenomenon of poverty traps, Bloom et al. (2003) find evidence that countries which are located near the equator are at a higher risk of reaching an equilibrium with low income (a poverty trap) than countries in temperate zones. Sachs and Warner (1997) also find empirical evidence for the geography-hypothesis. They use the percentage of a country's land area located in the tropics as proxy for the climatic conditions of the country in question and test for the influence of the climate thus defined on the growth rates of per capita income. The variable proves to be highly significant and shows the expected relationship. A similar result was obtained by Gallup et al. (1999). However, in their study, the climate variable loses its significance when an index of malaria incidence was introduced. This could lead to the conclusion that the percentage of tropical land area is not so much an indicator for climatic conditions as a measure of the prevalence of certain diseases. A similar effect is found by Easterly and Levine (2002). They use the central latitude of a country as proxy for its climatic conditions and found evidence for a positive relationship between the climatic conditions of a specific country and its level of development. However, this relationship loses significance when other geographical factors – such as the existence of certain types of crops – are introduced. Nevertheless, there seems to be clear empirical evidence indicating a relationship between the climatic conditions of a country and its growth success.

3.2. The relevance of location

(1) As with the discussion of the relationship between climate and economic development, theories about the relevance of location for growth are anything but new. As early as 1776, Adam Smith postulated an influence for geographical location on economic growth. He assumed that the productivity of an economy depended on the extent of specialization which in turn was dependent on the size of markets. In addition, the size of markets is ultimately determined by access to foreign markets. As sea transport is cheaper than moving goods over land, countries with access to the coast or navigable rivers have an intrinsic advantage over landlocked countries [Smith (1970), pp.122]. In addition, enlarging markets' international trade also facilitates the transfer of technology and the realization of economies of scale. Geographical location thus influences trade in two ways; the first is the access to waterways already mentioned and the second the proximity to global centres of commerce.

(3) Both channels exert their influence mainly through transportation costs. Transport over land is more expensive than sea transport, therefore the greater distance between a country and important centres of commerce the more expensive trade relations are [Weil (2005), pp.433]. Gallup et al. (1999) make an empirical assessment of the relationship between the

two location factors and transportation costs and obtain the expected result. Every 1,000 kilometres of distance between a country and centres of commerce raises transportation costs by 1% and lack of access to waterways raises transportation costs by 11%. If it is true that coastal regions have better trade opportunities because of access to the sea, they should consequently be able to support a higher population density which in turn provides agglomeration effects. In fact, Gallup et al. (1999) also find empirical evidence that high population densities in coastal regions have a positive effect on growth whereas high population densities in the hinterland have the opposite.

(3) With regard to the relationship between access to waterways, distance from commercial centres and economic growth, empirical studies have found evidence in support of the thesis described above. Gallup et al. (1999) use the percentage of population living within 100 kilometres of the coast as well as the minimum distance to the core markets of Europe, the United States and Japan to explain different growth paths. Both variables are highly significant and show the expected results. In their study on poverty traps, Bloom et al. (2003) found that landlocked countries have on average a lower income when trapped in a low-level equilibrium and have greater difficulty escaping the poverty trap than coastal countries⁹. Easterly and Levine (2002) also find some empirical indications that landlocked countries have lower levels of growth and development although this finding did not prove to be very significant. To conclude, it can again be assumed that from a theoretical as well as an empirical standpoint, geographical factors are relevant to economic growth and development.

(4) However, yet another factor could be important in the context of geographical location. Looking at a world map, it is easy to see that wealthy countries tend to be near one another while poor countries also tend to form clusters. There are two possible explanations for this concentration phenomenon. First, it is not unlikely that a successful country influences its neighbours in a positive way. To be near such a centre of growth can lead to the spillover of knowledge and technical progress or can stimulate trade. On the other hand, a country which is economically or politically unstable can produce negative spillovers for neighbouring countries – for example, through the spread of military aggression or through the influx of large numbers of refugees [Weil (2005), p.435]. Hence, it would appear to be undoubtedly true that the location of a country and the kind of neighbours which it has influence its economic development¹⁰.

(5) Conversely, the clustering of countries with similar levels of development could be explained by common geographical or institutional factors. In this case, the positive or negative spillovers would still be relevant but would only serve as forces of amplification whereas the fundamental factors of growth would need to be sought elsewhere. From this point of view, the location of a country relative to a regional pole of growth could indeed provide an explanation for its development progress but would not necessarily provide the fundamental reasons of growth which the geography-hypothesis tries to reclaim. Hence, the “neighbourhood-thesis” can only serve as a supplement to the original “geography-hypothesis”¹¹.

⁹ Sylwester (2004) finds that landlocked countries on average show a more uniform distribution of national income than coastal countries. This could mean that in the latter there are income differences between the coastal region and the hinterland.

¹⁰ However, there are situations in which neighbourhood seems only to have a low level of influence on economic development. Bertram (2004) finds in an empirical investigation that the economic growth of former colonies is more closely linked to the growth of their metropolitan patrons than to the growth of neighbouring countries.

¹¹ This is true since the neighbourhood-thesis cannot explain the development of the growth pole itself.

3.3. The relevance of natural resources

(1) Since output is not produced by capital, human capital and labour alone but also through the utilisation of natural resources, it seems obvious that large endowments of natural resources should be a positive geographical precondition for growth. This is a view mainly held by classical economists who actually saw the natural resources of a country as applying an upper limit to economic development [Hemmer (2002), pp.164]. Accordingly, countries which are well endowed with such resources should grow faster than countries which are only poorly provided with natural resources. Contrary to this theoretical assumption, empirical studies show two things: Firstly, there are quite a number of poorly endowed countries which have reached high levels of development – examples are Denmark, Luxembourg or Switzerland. Secondly, there is clear empirical evidence that large endowments of natural resources can be detrimental to growth [Sachs/Warner (1995), Auty (2000), Gylfason (2001a)]. With regard to the second observation, the term “resource curse” was coined. The paradox of the resource curse can be explained by a number of factors which can be classified either as macroeconomic or as political.

(2) The most important macroeconomic cause of the “resource curse” is the so-called Dutch disease. The Dutch disease describes a situation in which an expanding export-oriented primary sector severely harms the other sectors of an economy. The first problem encountered is that the high level of demand for the necessities for production exerted by the fast-growing primary sector will eventually lead to a rise in factor prices. Higher factor prices in turn raise the costs of production for the manufacturing sector. The second problem is that substantial exports of primary goods cause an appreciation of the real exchange rate, which reduces the international competitiveness of the manufacturing sector [Cordon/Neary (1982)]. Equally problematic from a macroeconomic point of view is the lack of linkages between the primary sector and the rest of the economy (dualism). Through its isolation, the development of the primary sector does not generate positive spillovers into other sectors [Auty/Kiiski (2001)]. Another difficulty related to a large primary sector is the high volatility of world prices for primary goods. Depending on the size of the primary sector, these price fluctuations can lead to heightened uncertainty for the whole economy and moreover may distort the spending decisions of the government. As a consequence, government spending often rises in periods of high prices without being reduced in periods of falling prices [Manzano/Rigobon (2001)].

(3) The most obvious example of political reasons for the “resource curse” is the problem of rent seeking. Rent seeking means the enrichment of certain groups at the expense of the rest of society. Due to the high potential gains from exporting natural resources, there are substantial incentives to retain power or to seize power, which often lead to armed conflicts and civil war [Weil (2005), p.455]. Moreover, the profits from exporting primary commodities can often cause an underestimation of the growth effects of capital and human capital. This can bring about a distortion of the government’s development policy with negative long-term effects on economic growth [Gylfason (2001b)]. In particular, the political reasons for the “resource curse” show how closely interrelated the growth effects of geography, institutions and policy are and how difficult it is to isolate the different effects.

4. The institutions-hypothesis

(1) In contrast to the geography-hypothesis, the institutions-hypothesis assumes that the economic growth path of a country is mainly determined by the quality of its institutions. Geographical characteristics exert only an indirect effect inasmuch as they might be a factor in shaping institutions. The term “institutions” encompasses all the normative rules which have to be followed in transactions. Institutions can be formal (like laws) or of an informal nature (like cultural habits). With reference to North (1990), institutions can be described as a

society's rules of the game. The main purpose of institutions is to provide a stable framework for economic transactions and thus reduce transaction costs¹². The most relevant aspects of the institutional framework are property rights and the existence of a strong legal system to protect them. One of the biggest problems in this context is the risk of expropriation which has a negative effect on investment decisions and the allocation of resources [Knack/Keefer (1995)].

(2) Accordingly, the institutions-hypothesis endeavours to explain the underdevelopment of the tropics entirely through the low quality of the prevailing institutions, which in turn are seen as a legacy of the colonial era. This view is justified by the observation that most colonies initially showed a relatively high level of development which deteriorated during the colonial era [Sokoloff/Engermann (2000), p. 218, Acemoglu et al. (2002)]. Acemoglu et al. (2001) base an empirical analysis of the relationship between colonialism and development on the fact that Europeans pursued different strategies of colonisation. On the one hand, they installed settler colonies such as North America while on the other, they set up colonies which served the sole purpose of providing the colonial power with natural resources. This latter type of colony was mainly found in Africa and Latin America. While institutions in the settler colonies were shaped to enable the emergence of a stable society of European settlers, institutions in the extractive colonies were moulded in such a way as to allow a small elite to benefit from the most efficient extraction of resources¹³. Acemoglu et al. suggest that the reason for the existence of the two types of colonisation strategies lay in the living conditions of the individual regions. In regions with a high prevalence of deadly diseases, European settlers preferred the extractive variant while in regions with suitable living conditions they chose to settle. Allowing for the fact that most institutions show a high degree of path dependence, this would explain how the tropics with their unfavourable living conditions were underdeveloped.

(3) To test their hypothesis, Acemoglu et al. use data on settler mortality in different colonies as an instrumental variable¹⁴ for the quality of institutions and find a significant effect on the level of per capita income. At the same time, geographical characteristics lose their significance altogether when institutions are introduced as an explanatory variable. Acemoglu et al. saw this as evidence of the assumption that geographical characteristics have only an indirect effect on economic growth through their shaping of institutions.

(4) A similar approach is pursued by Sokoloff and Engerman (1997 and 2000) who focus on Latin America and place an even stronger emphasis on the role of geography in shaping institutions. According to Sokoloff and Engerman, the geographical conditions in Latin America favoured the cultivation of agricultural products (such as sugar cane or rice) which were most efficiently produced on a large scale. This led to the emergence of large plantations and the extensive use of slave labour. The political power was therefore concentrated in a relatively small elite who deliberately created institutions whose main purpose was the preservation of its power. Due to their path dependence, these institutions still influence Latin America's development in a negative way. This point of view also allows an alternative explanation of different colonisation strategies. It could be argued that European settlers

¹² Transactions costs are the "extra" expenditure associated with economic transactions such as the costs which occur in searching for someone with whom to do business, in reaching an agreement on the aspects of the exchange and in ensuring that the terms of the agreement are fulfilled.

¹³ At this point, there are clear parallels to the discussion of the "resource curse".

¹⁴ The main problem in analysing institutions is that they are endogenously determined. That means that institutions might have an effect on development but that at the same time development might change institutions. To circumvent this problem in empirical studies, it is necessary to substitute institutions with variables which are correlated with the quality of institutions but are not influenced by the level of development. Such variables are referred to as "instrumental variables".

avoided regions in which a high concentration of power prevailed and where the living conditions would have been correspondingly unfavourable. According to Sokoloff and Engerman's thesis, geography has a comparatively strong indirect effect on development by shaping institutions.

(5) Hall and Jones (1999) do not explicitly refer to colonialism but nonetheless focused on the extent of European influence. They regard Western Europe as the region where a development-promoting social infrastructure was first introduced¹⁵. Consequently, countries which are located within Western Europe's sphere of influence should possess institutions of higher quality than other countries. This line of argument resembles the thesis of Max Weber (1904) who assumed a close connection between modern growth and capitalism and in turn saw capitalism closely linked to European culture. To assess their hypothesis empirically, Hall and Jones use linguistic characteristics as a direct indicator for European influence and latitude as an indirect hint for European influence. The use of latitude is justified by the assumption that European settlers preferred regions with low population density and climatic conditions which resembled those of the European continent. Both these elements can be captured by latitude [Hall/Jones (1999), p.101]. The results of their empirical test confirm the institutions-hypothesis while geography is again shown to have only indirect effects on growth by influencing institutions. To conclude, there have also been various empirical studies which have found evidence for a direct influence of institutions on economic growth but which were unable to confirm a direct influence on the part of geographical conditions.

5. Geography versus Institutions

(1) The debate on geography versus institutions was triggered by the results of the empirical studies presented in section 4 which were unable to find evidence of a direct relationship between geographical characteristics and economic growth. These results are confirmed by Rodrik et al. (2002) and Easterly and Levine (2002) who explicitly test the geography-hypothesis against the institutions-hypothesis. In both studies, geographical variables lose explanatory power once institutional variables are introduced into the empirical estimations. Hence, both Rodrik et al. and Easterly and Levine conclude that geographical characteristics have at the most indirect effects on economic growth.

(2) In response to the rejection of their theory, the advocates of the geography-hypothesis have put forward a good deal of criticism of the institutions-hypothesis. This criticism has focused on both econometric aspects and the theoretical concepts. As far as the econometric aspects are concerned, it has been pointed out that the use of instrumental variables usually leads to a systematic overestimation of the influence which the substituted variable (in this case the institutions) exerts. Hence, the effect of institutions on growth might be much smaller than stated by the empirical studies. This distortion is magnified by the fact that in most cases geographical characteristics were used as instruments for institutions (e.g. Hall and Jones (1999) use latitude while Acemoglu et al. (2001) and Rodrik et al. (2002) utilise the prevalence of diseases). This approach brings with it the danger of mistakenly interpreting the influence of geography on growth as the influence of institutions.

(3) Furthermore, Sachs (2003) points out that the advocates of the institutions view frequently use latitude as geographical variable. However, as latitude is only a very crude measure for geographical characteristics, it should come as no surprise that no direct effect of geography on economic growth could be found. Indeed, when using a malaria-index as a variable for geography, both McArthur and Sachs (2001) and Sachs (2003) find direct effects on growth

¹⁵ According to Hall and Jones, the most important element of social infrastructure is the possibility of enforcing individual property rights [Hall/Jones (1999), p.95].

even after controlling for institutional variables. These same authors emphasise that the empirical results of Acemoglu et al. (2001) might be distorted because the sample used consists exclusively of former colonies which happen to be located mainly in the tropics. Hence, unsurprisingly, Acemoglu et al. find no direct effects of their geographical variable as differences in that variable are only small [McArthur/Sachs (2001), p. 5]. Furthermore, McArthur and Sachs find evidence for the direct effects of geography when using a larger sample and no hints of direct effects when using the sample of Acemoglu et al. The problem of a small sample is also relevant in the approach of Easterly and Levine (2002) who use data on settler mortality which are only available for a very small number of countries. Meanwhile, Easterly and Levine have also been criticised for their interpretation of the results obtained. As with Acemoglu et al. (2001), they interpreted settler mortality not only as a purely statistical instrument for institutions but as a reason for their actual appearance. To some authors, this view seems far too deterministic [Rodrik et al. (2002), p.14].

(4) This latter argument is also where theoretical criticism of the institutions-hypothesis is initiated. As a starting point, McArthur and Sachs (2001) conjecture that on theoretical grounds it might be misleading to assume that:

“if, as Acemoglu et al. suggest, physical geography is powerful enough to determine social and political institutions, it is hard to see how it could affect those institutions without having direct effects on the production function itself” [McArthur/Sachs (2001), p.4]

As an example, they postulate that it was not plausible to assume that the prevalence of diseases which caused the frequently cited high levels of settler mortality would have had no direct effects on economic growth.

(5) Furthermore, it has often been stated that the institutions-hypothesis refers almost exclusively to colonialism. However, this does not answer the question as to how Europe developed to the point where it was able to colonise other countries and subdue their populations [Olsson/Hibbs (2005), p.910]. Hence, it seems necessary to stretch the period under review and analyse the development of different regions prior to the colonial era.

(6) One of the most important theoretical analyses in this context was conducted by Jared Diamond (1997). He puts forward the thesis that, due to certain bio-geographical characteristics, Europe had more suitable preconditions for early development than other regions. Important elements of these bio-geographical conditions were the large stock of domesticable animals and seed plants. Of the 56 heaviest seeded wild grasses, thirty-three grow in Eurasia, six in East Asia and only two in Australia and Latin America [Blumler (1992)]. A similar pattern exists for the occurrence of domesticable animals [Olsson/Hibbs (2005), pp.916]. According to Diamond, these bio-geographical advantages enabled Europe to make an early agricultural transition, which is seen as the first step towards modern development. The cultivation of plants and the breeding of animals then allowed for higher population densities [Diamond (1997), p.92]. In turn, these made the exploitation of scale and agglomeration effects possible which – according to modern growth theory – are beneficial for the process of innovation. At this point, Europe’s second advantage became important. Unlike the American and African continents, Europe stretches along an east-west axis so that the main Eurasian landmass runs from east to west. This leads to fairly homogeneous climatic conditions throughout the continent. A homogeneous climate in turn facilitates a fairly easy diffusion of agricultural innovations and thus promotes fast development. By contrast, the north-south axes of Africa and America did not facilitate the same ease of diffusion of innovations, which in turn slowed the process of their development [Diamond (1997), pp.208].

(7) In a recent paper, Olsson and Hibbs (2005) transform Diamond's theory into a formal model and try to assess its empirical validity. The empirical results show that up to 50% of today's international variation in (logarithmic) per capita incomes can be explained by geographical and prehistoric bio-geographical characteristics. The fact that already small differences in growth rates can – over a long time span – cause large differences in income makes it indeed likely that variations in early development remain relevant today. However, this then poses the question as to whether the results of Olsson and Hibbs were merely an echo of different starting conditions which nowadays no longer exert any influence on growth.

(8) An indirect criticism of both the institutions-hypothesis and the geography-hypothesis can be found in Gundlach and Matus-Velasco (2000). When using cultural heterogeneity as a variable to explain growth, they find that geographical characteristics¹⁶ as well as institutional variables lose all significance as means of explaining economic growth. Hence, their approach could be classified as a cultural-hypothesis of economic development. On the other hand, it is not unlikely that cultural heterogeneity has some influence on the institutional framework of a country and that it also might retain some of the effects of colonialism described above (for example, the slave-trade).

6. The policy-hypothesis

(1) In contrast to the other two hypotheses, the policy-hypothesis sees the reason for different growth experiences solely in terms of different approaches to economic policy. This view is central to the development strategies of many international organisations and appears, for example, in the Washington Consensus or in the structural adjustment programmes pursued in the 1980s. What is emphasised as a decisive prerequisite for economic growth are those policy measures which promote the creation of a stable macroeconomic framework. According to the policy-hypothesis, an adequate economic policy can enhance welfare even when set against the background of detrimental geographical and institutional characteristics.

(2) Central to the policy-hypothesis are the positive effects of a liberal trade regime. International trade facilitates the realisation of economies of scale, intensifies competition in domestic markets and supports the creation, diffusion and absorption of foreign technologies. Thus, international trade has a number of positive effects on economic growth. Frankel and Romer (1999) try to assess empirically the income effects of international trade and use geographical characteristics as instrumental variables to measure the extent of international trade integration¹⁷. Their results show that the natural trade volume is determined by geographical characteristics such as the distance between two markets, and furthermore that trade indeed has positive effects on income. This confirms the hypothesis that trade can exert a positive influence on economic development. At the same time, it can be assumed that geographical characteristics again have only indirect effects on economic growth by influencing the trade volume. This interpretation contrasts once more with the assumptions of the geography-hypothesis. Frankel and Romer note that:

“More generally, it is difficult to think of reasons that a country's geographic characteristics could have important effects on its income except through their impact on trade” [Frankel/Romer (1999), p.380]

¹⁶ Again measured by the central latitude of a country.

¹⁷ As with institutions, international trade influences growth although conversely economic growth also alters the degree of international trade. Thus, it is again necessary to measure international trade with the help of instrumental variables.

(3) In contrast to Frankel and Romer, Rodrik et al. (2002) are unable to find empirical evidence for direct positive effects of international trade on growth. However, they do not exclude the possibility that an open trade regime had positive effects on the quality of institutions [Rodrik et al. (2002), p.4]. From that point of view, economic policy would only indirectly influence economic growth. Two other papers by Rodriguez and Rodrik (2001) and by Irwin and Tervio (2002) also find that international trade exerts no influence on per capita income once institutional or geographical variables were controlled for. On the other hand, Alcalá and Ciccone (2004) find that the positive growth-effects of international trade do not lose significance even after controlling for geography and institutions as long as alternative instruments are used to measure international trade¹⁸. Thus, it becomes obvious that the empirical evidence regarding the policy-hypothesis is as mixed as the evidence for or against the institutions- and geography-hypothesis. One reason for the differing results is econometric difficulties, namely the potential endogeneity of political actions and the intensive interaction between institutions and politics in general and between institutions and trade policy in particular. In the context of the discussion of geography versus institutions, the main problem of the policy view is that policy measures usually provoke short-term effects while the geography-hypothesis and the institutions-hypothesis aim at explaining the fundamental reasons for long-term growth.

(4) Economic policy gains in importance when it comes to the question of whether it is possible to overcome the negative growth effects of adverse geographical or institutional characteristics. With regard to the prevalence of certain diseases such as malaria as a geographical factor, an improved national health service could for example serve to dampen the corresponding negative effects on growth. Furthermore, Masters and Wiebe (2000) assume that an agricultural policy directed towards research and development could help to overcome unsuitable conditions in tropical countries [Masters/Wiebe (2000), pp.21]. Another field where policy measures could have beneficial effects is natural resources. It has been shown that an adequate economic policy is capable of compensating for the negative consequences of the resource curse and of freeing the development potential of large endowments of resources.

(5) On the other hand, it seems unlikely that lawful policy measures could help overcome adverse geographical conditions such as a landlocked or isolated location. More promising are attempts to apply policy measures to reshape problematic institutions. Due to the close connection between the institutional framework and the political sphere, it seems possible that a consistent reform policy is able to influence the former in a positive way. Rodrik et al. (2002) even regard institutions as the cumulated outcome of past policy decisions and point to the improvement in institutional quality which has taken place in many countries over the past 30 years [Rodrik et al. (2002), pp.20]. Even if it does seem a little too simplistic to attribute the actual shape of institutions solely to past policies, the data clearly show that institutional change is possible. However, the question remains as to what extent good policy contributes to institutional change and how far institutional change alters policy development.

7. Conclusion

As far as the analysis conducted so far is concerned, the first notable point is that none of the three hypotheses provides really new insights into the process of economic development. Indeed, many of the aspects reviewed found their way into development policy a long time ago. The United Nations, for example, take account of geographical characteristics through the implementation of special programmes for landlocked countries as well as for small island

¹⁸ However, as the instrumental variable used by Alcalá and Ciccone (real openness) is itself not free of distortions, their results have to be interpreted very carefully [Rodrik et al. (2002), pp.14].

developing states. The German Ministry of Development emphasises the importance of geographical characteristics as discussed in section 3.2 through the promotion of regional growth poles¹⁹. Institutional aspects are considered in the programmes of the World Bank and of the many national development agencies which promote the concept of good governance. Finally, the policy-view is central to the structural adjustment programmes of the International Monetary Fund.

New to the discussion are the possibilities being evolved to test the different hypotheses empirically. As a consequence, the current debate on geography versus institutions takes almost entirely place on a statistical or econometrical level. Nevertheless, the problem has been that until now econometric tests have not come up with clear results, due mainly to difficulties in measuring the variables of interest. However, the empirical evidence seems to show that the three hypotheses are not exclusive to each other but are interconnected and complementary. Despite this, the debate on geography versus institutions is not over. The most important task for future research will be to incorporate the different hypotheses into a consistent theoretical model. This would avoid the danger of unproductive number crunching which happens all too easily in the context of informal regression analysis. However, even at its current state, the discussion of geography versus institutions provides valuable insights into the process of economic development and provides an impetus to improve the strategies being pursued in international development assistance.

¹⁹ The so-called *Ankerländer* or anchor-countries [Wieczorek-Zeul (2005)].

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