VARIETY, STRUCTURAL CHANGE AND ECONOMIC DEVELOPMENT: SECULAR TRENDS AND SYSTEMIC FEATURES.

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1) INTRODUCTION.

In the past economists have concentrated on what they considered the main factors which could determine economic development. Physical capital, savings, technological progress, human capital etc. have emerged as strong candidates to explain observed patterns of economic development. Predictably, theories of economic development have been heavily influenced by underlying political or ideological assumptions. These theories ended up recommending a recipe that is *unique* for all countries. For example, in the Harrod (1939) Domar (1947) theories the saving rate was considered the factor determining the capacity to accumulate capital and to and to develop economically irrespective of the particular circumstances of the country considered. This paper aims at discussing two important aspects of economic development which have been very unevenly taken into account in many development theories.

First, economic development has never been a purely quantitative phenomenon, but it has always involved qualitative change in economic systems. Even if we concentrate on growth as the sequence of numerical values of the relevant variables (e.g. income per head) that describe the time path of an economic system, it is impossible for such time path to be originated and sustained in the long run without important changes in the nature and structure of economic systems. In other words, the growth of a relevant variable (e.g. GDP per head) cannot occur *over the long run* without a significant *transformation* of the economic system (Lipsey et al, 2005). Transformation here means a process whereby new entities, qualitatively different from the pre-existing ones, would emerge and change the *composition* of the economic system (Saviotti, 1996). In turn, the composition would have to be understood as the list of objects, activities and actors required to describe the economic system at a given time. Examples of objects would be products and services, examples of activities would be the production processes of new products and services and a number of other complementary activities to be carried out in new institutions and organizations required by the new products and services, examples of actors are organizations and institutions. Thus, the first point stressed in this paper is that the composition of the economic system, defined as the list of the actors, activities and objects required to describe the economic system, needs to change in order for growth to be sustained in the long run. It must be pointed out that this approach is closely related to the concept of structural change, although in a sense it is broader. As it has been interpreted in the literature, structural change occurs when either the number or the relative balance of the sectors constituting an economic system changes. However, qualitative change can occur both at lower levels of aggregation (e.g. within an industrial sector) and in other, not directly economic (regulation, education, research etc), parts of the economic system. Thus, the concept of qualitative change as used in this paper is broader than that of structural change as currently used in the literature.

The second point stressed in this paper is that even if trends and objectives which can be common to most or all countries were to be identified, each country would proceed towards

these common objectives in a different way, which would depend on the historical specificity of the country considered. To put it differently, convergence of objectives would not necessarily entail convergence of means. The corollary of this statement is that there is no perfect set of institutional arrangements (structure of the system) which is uniquely conducive to economic development. On the contrary, one can expect countries at different levels of economic development to adopt practices and routines developed elsewhere and which seem to be successful by modifying their institutional structure as little as possible. A striking example of this difference is given by China and India, the former starting from a communist regime and integrating elements of capitalism at the pace of lightning, the latter starting from a parliamentary democracy combined with elements of socialist planning and embracing open markets with a rhythm which, if slightly inferior to the Chinese one, is nevertheless remarkable. The possibility that similar outcomes can be obtained by means of persistently different institutional configurations, which can be called multistability, is quite problematic for existing economic theories.

2) VARIETY, TRANSFORMATION AND STRUCTURAL CHANGE.

2.1) CONCEPTUAL BACKGROUND.
As it was previously pointed out, economic development cannot be considered simply a process of quantitative growth. On the contrary, economic development can be considered as resulting from two processes, leading on the one hand to *efficiency growth* and, on the other hand, to *variety growth* and qualitative change. In order to clarify this point we refer to two very different concepts of economic growth and development. The first of these concepts is a stereotyped version of the concept underlying traditional models of economic growth. According to this view in the course of time economic systems become more efficient in the production of a *given* set of goods and services, thus creating a growing output per unit of population. This efficiency enhancing trend is undoubtedly present in economic development, but it is not the only one.

Concept 1) Economic growth occurs due to the growing *efficiency* in the production of a finite and *constant* set of outputs, leading to a growing output per person.

The most impressionistic observations of long term economic development, starting for example from the time of the industrial revolution, show that the emergence of completely new goods and services is another, equally important, trend. The new goods and services are qualitatively different from those that preceded them. Accordingly, qualitative change during the process of economic development can be considered our first stylised fact. This observed, even if not finally confirmed, growth in variety raises an even more important problem: is variety of an economic system at a given time only an effect or also a determinant of future economic development? The answer to this question has some important theoretical and policy implications. If variety were only an effect of previous development economists could legitimately neglect it and leave it to industrial archaeologists. On the other hand, if variety is also a determinant of future economic development, to design the right composition of an economic system and to create favourable conditions for variety growth become important policy objectives.

Furthermore, the new goods and services do not always substitute pre-existing ones but quite often are added to those which are already there. As a consequence, the variety of the economic system is likely to increase in time.

Concept 2) Economic development creates new entities, for example new goods and services, new activities, new institutions and organizations etc. As a consequence, economic development inherently involves *qualitative change* and leads to a changing *composition* of the economic system. The second process can also be called *creativity*.

Thus, economic development can be considered as resulting from the two basic processes of efficiency and creativity.

The main source of economic transformation is innovation, leading to the creation of novelty, thus giving rise to qualitative change and changing the composition of the economic system. The crucial question here is whether changes in composition are just consequences of previous economic development or also determinants of future economic development. This paper aims at reinforcing the idea that the variety of the economic system at a given time is a determinant of subsequent economic development.

The possibility that the composition of the economic system at a given time can affect its subsequent development path means that models of economic growth and development cannot be purely macroeconomic. In fact, in a number of recent growth models microeconomic dynamics plays a growing role (Aghion, Howitt, 1992, 2005; Romer, 1990, Grossman Helpman, 1991a, 1991b). To the extent that changes in the composition of the system affect economic development we need to introduce some representation of this composition. Following a number of previous papers, here this will be done by using the concept of what has been called either diversity or variety. In fact it is possible to introduce a distinction between diversity and variety, according to which variety is one of the three possible components of diversity (Stirling, 2004). However, since the purpose of this paper is simply to introduce some representation of the composition of the economic system where there is none, the distinction between diversity and variety will not be stressed. In what follows the term variety, defined as follows, will be used.

Definition: The variety of an econ system is defined as the number of actors, activities and objects required to describe the economic system.

Where actors are institutions, organizations, individuals etc., activities are those carried out in the previous institutions and organizations, and objects are the products and services produced in the economic system.

It must be pointed out that in this context variety can be used at a higher level of aggregation than the one traditionally used in much of the economic literature on the subject (see for example Lancaster, 1975, 1979, 1990; Dixit, Stiglitz, 1977). While traditionally variety measured the degree of differentiation of a product group, in the present paper it is used to measure the degree of differentiation of economic systems at different level of aggregation starting from a firm or an individual product and ending with the world economy. In this paper then variety is a measure of the extent of differentiation of the economic system. In this sense in future it may be preferable to use the concept of diversity to distinguish the use of the concept made here from that more common in the economics literature. In this paper the term variety keeps being used mostly for coherence with previous papers on the same topics.

Two hypotheses link efficiency and variety to economic development:

Hypothesis 1: The growth in variety is a necessary requirement for long-term economic development.

Hypothesis 2: Variety growth, leading to new sectors, and productivity growth in pre-existing sectors, are *complementary* and not *independent* aspects of economic development.

These two hypotheses can be justified by the imbalance between productivity growth and demand growth (Pasinetti, 1981, 1993). If productivity keeps increasing all the time while the demand for new goods and services reaches a saturation point, an imbalance arises. If the economy were constituted by a constant set of activities, in presence of growing productivity it would become possible to produce all demanded goods and services with a decreasing proportion of the resources used as inputs, including labour. This imbalance would then constitute a bottleneck for economic development. The addition of new goods and services to the economic system, that is a change in composition leading to a growth in variety, can be a form of compensation for the potential displacement of labour and of other resources. Variety growth is then required for the long term continuation of economic development. On the other hand, new goods and services can only be generated by means of search activities. The resources required for these activities can only come from the increases in productivity in pre-existing sectors in a way similar to what happened during the process of industrialisation.

This complementarity between efficiency and variety is not new in long run processes of economic development. The creation of a differentiated institutional structure, including priests, administrators, soldiers, traders etc in early human societies required an increase in the efficiency of food production, afforded by the emergence of settled agriculture, which in turn led to the accumulation of a food surplus (Diamond, 1999). Such food surplus allowed society to fund non food producing occupations (activities) and categories of people. In a further example productivity growth in agriculture created the resources required for incipient industrialisation (Kuznets, 1965). Similarly productivity growth in pre-existing sectors creates the resources required for search activities and thus for the generation of new products and services. In a Schumpeterian fashion, the growing productivity of the routines constituting the circular flow creates the resources required for innovation, without which economic development would come to a halt. This complementarity between efficiency and variety may not always be present. For example Jacobs (1969) maintains that the growth of cities is more likely to be affected positively by their ability to create 'new work out of old' than by their efficiency. For example, she considers the relative rates of growth of Manchester and of Birmingham during the XIXth and early XXth centuries. According to her analysis Manchester concentrated on one sectors (textiles) and by acquiring scale economies in this sector it became more efficient and during a given period grew faster than Birmingham. The latter city always carried out a greater variety of activities and in the long run grew faster than Manchester. It must be noticed that Jacob's analysis dates from the 1960s and that it did not anticipate the remarkable revival of Manchester which started in the 1980s. However, for what concerns our hypothesis 2, she maintains that efficiency and variety are competitors rather than complements. We do not think that this falsifies our hypothesis. We wish to stress again that both hypotheses 1) and 2) can be considered valid only in the long run and at a high level of aggregation. Thus, even if Jacob's interpretation in the short run and the level of aggregation of cities were to be valid for cities, it would not necessarily imply that efficiency and variety cannot be complementary in the long run and at higher levels of aggregation.

The approach adopted here is clearly Schumpeterian (Schumpeter, 1934), in the sense that the increasing efficiency with which a constant/pre-existing set of activities is performed in the course of time constitutes the circular flow while the new activities created by innovations are the true determinants of long term economic development. The consequence of the emergence of new activities is a qualitative change in the economic system, that is, a change in the number and type of distinguishable objects produced by means of all the activities of the economic system. An activity means here any process that transforms a set of inputs into one or more outputs. The objects produced by these activities can be material objects or services. Thus, the following considerations, where it is not otherwise indicated, can refer equally well to the production of goods as to that of services. However, the use of variety in this paper requires some reconsideration of the Schumpeterian concept of creative destruction. In principle structural change could give rise to the emergence of a given number of new activities and to the extinction of the same number of older activities, thus making a zero contribution to net variety. Aghion and Howitt (2005) stress that it is precisely the substitution of older innovations by new ones which constitutes the Schumpeterian character of their (Aghion and Howitt) endogenous growth models. We depart from this interpretation of creative destruction and maintain that the long run observed growth in variety simply implies that there is more creation than destruction. Often, though not always, older economic species survive alongside new ones (here see Jacobs, p. 68). However, destruction is still a relevant feature of economic development because very often, though not necessarily in the majority of cases, older activities become extinct and are completely replaced by new ones. What always occurs, irrespective of the extinction of older activities, is the falling share of older activities in order to make room for the new ones. Thus, the reduction to zero of the output share of older activities (their extinction) is but a special case of their shrinking share of output to make room for newer ones. The changing composition of the economic system induced by innovation, not the one to one mapping of older and newer activities with the consequent extinction of the former, is the true Schumpeterian feature of economic development. As it turns out, the change in composition follows a particular arrow, leading to a growth in variety.

2.2) MODELS AND EMPIRICAL RESULTS.

2.2.1) Models
Although a number of recent endogenous growth models include an analysis of macroeconomic dynamics, they do not generally make an explicit use of the concept of variety. Recently Aghion and Howitt (2005) interpreted Romer's models (1990) as being of the product variety type. In reality Romer's models aimed mostly at introducing into growth models processes which included increasing returns to adoption. Romer assumes that R&D processes create new designs leading to new types of capital goods, and that the new capital goods are added to the pre-existing ones, thus raising the net number (variety) of capital goods in the economic system. It must be observed that Romer never used explicitly the concept of variety. Aghion and Howitt (AH) criticize Romer by saying that their own model is truly schumpeterian because it incorporates the concept of creative destruction. In Aghion Howitt (1992) each new innovation replaces an older one. In AH it is impossible for new capital goods to accumulate in the economic system and for their net number to increase in the course of time. The net variety of the economic system can be expected to remain constant. Thus, a central, although implicit, role is played by variety in these growth models.

In the model of Saviotti and Pyka (SP) (2004a, 2004b, 2004c, 2005, 2006) output variety is placed at the centre of the process of economic development. This is not only an endogenous

growth model, but a model in which the creation of new sectors is endogenous to the economic system. The model is briefly described here, but a more detailed description can be found in the references cited above. In SP each new sector is created by an important, pervasive, innovation. The sector itself consists of all the firms which produce a unique but highly differentiated product or service. The creation of a new sector gives rise to an *adjustment gap*, a concept which captures the size of the potential market created by the innovation. Such market is initially empty and is only gradually filled as investment accumulates and as demand for the output of the new sector develops. The innovation giving rise to the new sector is incorporated into the economic system by entrepreneurs, who establish new firms induced by the expectation of a temporary monopoly. If the early entrepreneurs are successful they are followed by a bandwagon of imitators, which raises the intensity of competition in the sector. Thus, as the once new sector ages, demand moves towards saturation and the intensity of competition reaches levels comparable to those of pre-existing sectors. In SP new sectors start being innovative and end up re-entering the routines (circular flow) of the economic system when they mature. In this process each sector follows a life cycle in which the number of firms at first rises, then reaches a maximum, and in the maturity phase falls to very low values (Fig 1). The capacity of the sector to create employment follows a time path similar to that of the number of firms, rising first and then falling after having reached a maximum, as the sector moves towards saturation (Fig. 2).

Inter sector interactions are of two types. First, competition can occur both within a sector and between different sectors. Second, as a sector matures the intensity of competition increases thus reducing the inducement to enter the sector and eventually inducing entrepreneurs to create further niches, based on new innovations, where they will have a temporary monopoly. In turn, some of these niches will become new industrial sectors. New sectors are thus endogenously created by the internal dynamics of the economic system. The creation of new sectors, which raises the variety of the economic system, can in principle lead to either a stable or a growing macro-economic employment time path. The emergence of new sectors makes economic growth sustainable by compensating for the declining ability of older sector to create employment (Fig 2). Since in this model variety is measured by the net number of sectors in the system, variety growth can make economic development sustainable.
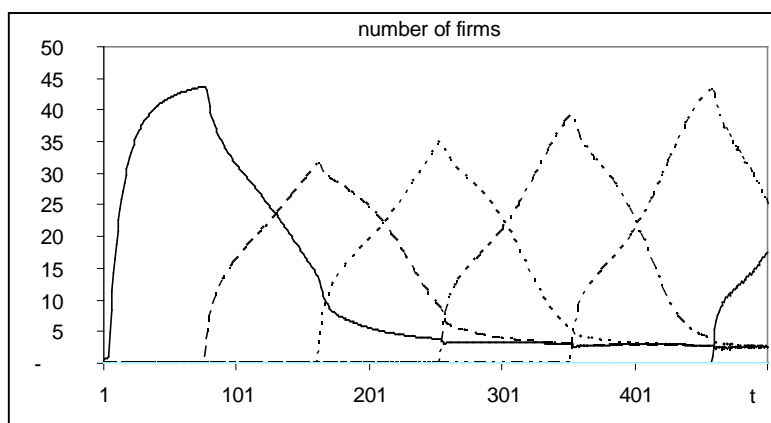

Fig 1. Time path of the number of firms created in each sector during the process of economic development.
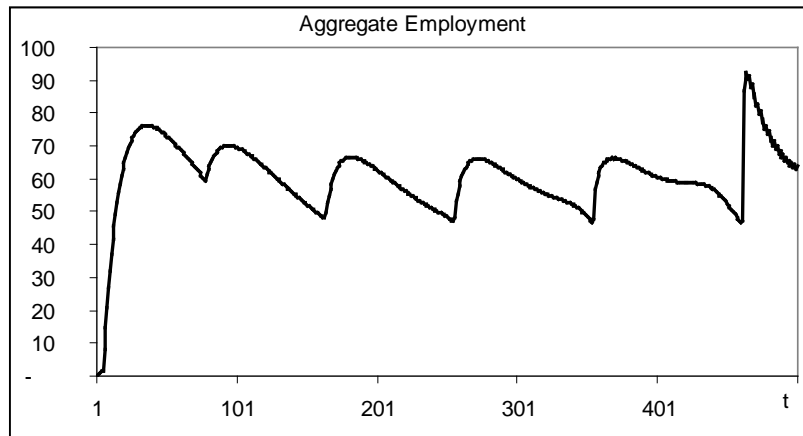
Fig 2 Aggregate employment curve obtained by adding up the employment created by individual sectors.

2.2.2) Variety and economic development

The previous considerations, which seem to indicate that variety growth can lead to a stable employment growth path and to a sustainable economic development, were developed for an isolated economic system. We could consider it a model of the world economic system. In this section we discuss why we expect that when world variety grows, individual countries, in order to keep their income per head approximately constant relative to other countries, need to raise their national variety in line with world variety.

If we accept that growing variety is a necessary requirement for long term economic development, it follows that the income share of pre-existing sectors can be expected to fall gradually in the course of time. We can also expect that, however limited the extent of specialisation of any country, its national output variety will be lower than the world output variety at a given time:

$$V_j \leq V_w \qquad (1)$$

If world output variety keeps increasing we can expect that, although individual countries tend to specialise, this specialisation cannot remain constant and must reflect the new goods and services emerging in the world economy. In general we expect national variety to increase when world variety increases. We stress that this condition applies only to the long run and that in the short to medium run deviations from it can occur. Thus, at a given time a country can specialise in a number of sector where its competitive advantage becomes so great that it more than compensates for the limited integration of new sectors. However, in the long run no country can completely neglect to incorporate new sectors without becoming impoverished. If countries aim at keeping an almost constant share of world income, or, in the case of developing or industrialising countries to catch up, then the ratio of national to world output must remain at least constant or increase in the case of catch-up. An approximate demonstration of this proposition is given in Saviotti (2003). There it is shown that developing countries have different catch up strategies, based on a mixture of specialisation, variety growth and entry into different niches. The success of these strategies can be expected to depend among other variables on the previous production structure of the country and on the time span over which the strategy is applied. At this point it is important to introduce the distinction between related and unrelated variety.

There is considerable evidence that at the level of the firm the diversification seems to lead to better results when it is *related* diversification (see for example Montgomery, 1982; Ramanujam and Varadarajan, 1989; Montgomery and Hariharan, 1991). In other words, a firm can more easily diversify by moving to products and services similar to those it was already producing than to completely different ones. In the case of firms this finding seems to confirm the idea that coherent firms are more likely to survive and to do well than unrelated or incoherent ones (Teece et al, 1994). We can expect something similar to apply to higher levels of aggregation; for example national or regional. If we interpret *related variety* as the one that countries or regions raise by introducing new products or services similar to those they were previously producing rather than completely unrelated ones, we can expect related variety to be more conducive to economic growth than *unrelated variety*, especially in the short run. This is exactly the result that Frenken et al. (2004, 2006) have obtained for different regions of the Netherlands. We can also expect related and unrelated variety to have intrinsically different time scales. Unrelated variety is likely to occur over longer periods than related variety. There are a number of reasons to believe the creation of completely different sectors to be a slower process than the differentiation of existing ones. Nevertheless, even unrelated variety needs to grow in the course of time and no country can completely neglect to incorporate at least some segments of new and important sectors. Thus, related and unrelated variety can be determinants of growth on different time scales, slower for unrelated and faster for related variety.

2.2.3) Variety, trade and growth.

Variety can be measured for different subsets of the economic system, such as the output of the system, its production processes, its institutions, its trade etc. The importance of these distinctions is due to the fact that we cannot expect the variety of the different subsets to follow the same time path. Some subsets can have a growing variety while others have a falling one. The distinctions on which we will focus in this paper are the ones between output and trade variety and between related and unrelated variety.

We can in general expect export variety (V_{Exp}) to be lower than output variety ($V_{Out} < V_{Exp}$) : there is hardly any country which exports all the goods and services that it produces. Equally, we can expect export variety to be lower that import variety ($V_{Exp} < V_{Imp}$).

Import variety can generally be expected to be higher than export variety. Various theories of international trade predict that countries should specialize, whether that be on the basis of natural resources or of some acquired comparative advantage, built for example by innovating in emerging sectors. On the other hand, all countries need a similar range of inputs, goods and services. This lads us to expect a greater similarity of import than of export variety. Furthermore, the imbalance between import and export variety is likely to vary with: (i) country level of economic development, (ii) country size (iii) propensity to export, etc. Countries at very low levels of economic development are likely to have a very low export variety. In the most extreme case the exports of very poor developing countries are based exclusively on raw materials. Thus, we can expect countries at very low levels of economic development to have an import variety much greater than export variety ($V_{Imp} \gg V_{Exp}$). Also, in general export variety is likely to grow in relation to import variety when a country increases its (relative) level of economic development. For example, we can expect countries to raise their export variety in order to catch up. In fact, the rise in export variety is likely to be a necessary requirement in order for a country to develop.

Distinguishing between related variety (within sectors) and unrelated variety (between sectors), we expect countries that increase related variety to experience productivity growth, because a growth in related variety exploits economies of scope at the national level. This leads to the following hypothesis:

Hypothesis 3: Related variety growth enhances productivity growth at the national level.

2.2.4) Results.

Although strongly suggested by empirical evidence, the growth in variety referred to above has not been confirmed by adequate measures. In fact, the most immediate way of confirming that output variety has effectively grown would require the use of output statistics. Data of this type are available but not necessarily in a form useful for this purpose. The classifications on which output statistics are based are changed infrequently and do not necessarily reflect the true change in variety. On the other hand trade statistics are available at a high level of disaggregation and in a comparable form, at least for OECD countries. Funke and Ruwedhel (2001a, 2001b) used OECD trade data to measure the export and import variety of a sample of 19 OECD countries from 1989 to 1996 in order to determine whether trade variety was a determinant of both output growth and of total factor productivity growth. They developed a semi endogenous growth model and measured product variety as the number of products in exports or imports using a CES production function. They found that the index of relative product variety is significantly correlated with per capita income levels and with total factor productivity growth of the countries of their sample.

In a recent paper Saviotti and Frenken (2006) used informational entropy to measure the trade variety of OECD countries from 1960 to 2003. Using OECD trade data, which are available at five digit levels, we have been able to distinguish between related and unrelated variety. This is a distinctive advantage of the entropy function, which can be decomposed at each sectoral digit level. The decomposable nature of entropy implies that variety at several digit levels can enter a regression analysis without necessarily causing collinearity (Jacquemin and Berry, 1979). Following Frenken et al. (2004, 2006) we indicate *unrelated variety* per country by the entropy of the one-digit distribution, semi-related variety by the weighted sum of the entropy at the two-digit level within each one-digit class, and related variety by the weighted sum of the entropy at the three-digit level within each two-digit class. The results of this study show that (i) more developed countries tend to have a higher export variety, (ii) the export variety of countries starting from a relatively low level of economic development increases during the process of catching up, and that (iii) related export variety is a determinant of labour productivity growth for the countries of the sample used (see Figs 3,).

These studies start providing growing, even if not yet definitive, evidence that output variety favours economic development and can make it sustainable in the long run. Clearly, more empirical work is required to confirm these results and to extend them by using output statistics to measure variety. However, by combining these results with those of the modelling work described above, we can conclude that there is considerable evidence showing that output and trade variety can be important determinants of economic development.
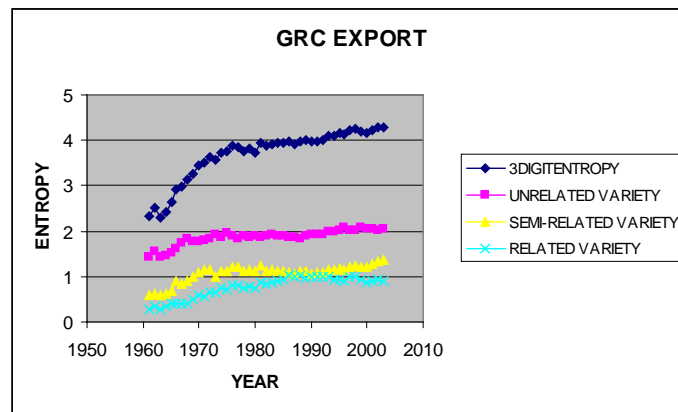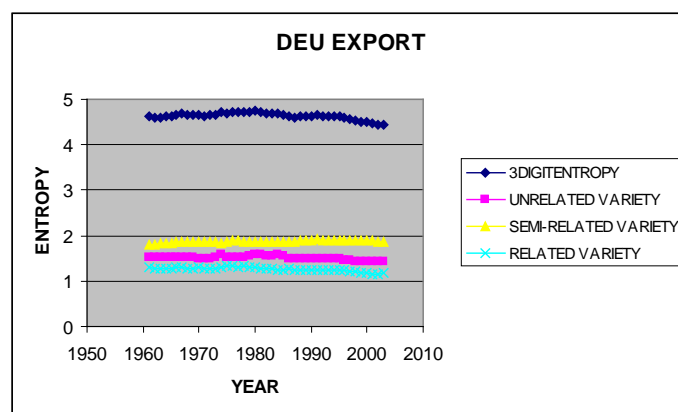
Fig. 3. Export variety for Greece, 1960-2003.

Fig. 4. Export variety for Germany, 1960-2003.

3) SYSTEMIC FEATURES AND SECULAR TENDS.

Accepting from section 2 that variety growth is a necessary condition for long term economic development we can conclude that all countries, if they want to develop, need to raise output variety. However, it has been pointed out that while variety growth needs to take place in the long run, in the short run there can be exceptions to this rule. In order to discuss these exceptions and their implications we need to come back to the concept of National Innovation System (NSI) (Lundvall 1992; Edquist, 1997). This concept finds its justification in the observation of persistent asymmetries amongst countries at two levels:

(i)   Asymmetries of output structure
(ii)   Asymmetries of institutional and organizational structures

Such asymmetries exist even for countries at similar levels of economic development, as measured by GDP per head, and persist for considerable periods of time, although not indefinitely. Furthermore, such asymmetries are not always, or not even mostly, due to natural endowments but rather to the differential development of man made activities. Such specificities can in principle be explained by the existence of NSIs. In spite of this national specificity, all countries need to adapt to the situation existing in the international economic system, which provides constraints and opportunities common to all countries. This situation is an expression of the tension existing between the tendency to create heterogeneity at the

local level by means of innovation and the tendency towards the diffusion of the new activities and routines from the local to the global level, thus leading towards homogenization. These two tendencies are the economic counterparts of what Prigogine (Nicolis, Prigogine, 1989) calls forces (chemical reactions) and fluxes (diffusion). In presence of such tension we can expect individual countries to try and follow the common constraints and opportunities emerging in the world economic system, but to preserve a certain amount of country specificity in this process. Some examples will help to clarify these concepts.

Industrialization. With the advent of the industrial revolution manufacturing industries became the key to economic progress. The industrial revolution occurred in Britain towards the end of the XVIIIth century and subsequently diffused to other European countries (mid XIXth century), to the USA and to Japan (end of the XIXth century – beginning of the XXth century). During the XXth century industrialization has diffused to a number of other countries in Latin America and in South East Asia. Thus, the diffusion of industrialization Has been occurring over a very long period of time, but with national specificities both in terms of patterns of output specialization and of institutional and organizational structures.

Post industrialization. The share of manufacturing industry started rising since the time of the industrial revolution, reaching more that 50% of total output in some countries, and then fell. Today in most countries services account for the largest share of total output. This transition has been accompanied and probably greatly facilitated by the emergence of ITCs. As the technologies of the industrial revolution allowed mankind to enormously improve its ability to transform matter, thus ITCs improved mankind's ability to store, transfer and manipulate information. As in the case of the industrial revolution all countries are faced with the need to adapt to these trends and to adopt ITCs in al the activities where they are economically and socially useful.

Knowledge based economy. Accompanying the transition to the service economy and interacting with it a new trend has emerged towards a growing knowledge intensity of economic systems. This trend needs to be distinguished from that towards the information society, although the two are probably interacting. The distinctive feature of the knowledge based economy is not so much that it uses knowledge. Some form of knowledge has always been used in human activities, but only since the end of the XIXth century knowledge started to be created in institutions specialised for this purpose. The institutionalisation of R&D has been one of the most revolutionary phenomena in recent economic development (Freeman, Soete, 1997).

Although these trends were common to all the countries of the world economic system, not all the countries reacted in the same way and were capable of adapting. Some countries remained behind. Others adapted while preserving an amount of national specificity. Processes of imitation and learning were exceedingly slow and in some cases they have not yet occurred. Let us now see how the common trend towards growing variety can be interpreted by different countries.

Due to the exceptions in hypothesis1) mentioned at the beginning of section 2), during a relatively short period of time a country can specialise in few subsets of its previous production structure and compensate the effect of falling variety with the efficiency gains obtained by means of specialisation. Although in the long run this approach is going to be insufficient, it could pay off in the short run. Furthermore, we have shown that at short to medium time scales related variety is a more important determinant of labour productivity

than unrelated variety. This means that countries are more likely to have a successful economic development if they increase their output variety by choosing output types similar to those that they were previously producing. These considerations lead to the following implications:

1) Even complying with the condition of raising its output variety in the course of time, a country can choose a large number of development paths, for example by choosing different types of new sectors or by alternating periods of variety growth with periods of variety stagnation or fall.

2) The number of economic development paths in principle available to a country is in fact more limited than what would seem from 1). In reality a country that decides to increase its output variety is more likely to be successful if it chooses new output types similar to those that it was previously producing. Not only this limits the number of possible development paths available to a country but makes the possible ones dependent on the past of the country economic system. Thus, the process of economic development is likely to show some path dependent features.

The previous considerations indicate that a country can choose multiple combinations of output types to raise its variety. The multiplicity of development paths in principle available to a country is enhanced by the fact that the same output combination can be produced by means of multiple institutional and organizational configurations. This is relevant if different institutions are interconnected, as they are likely to be. Changing a particular institution within the economic system of a country is not necessarily going to improve the performance of its whole system unless complementary changes are introduced in other institutions. On the other hand, if in order to adopt innovations a country had to change *all* its institutions, the cost of change would be so high as to make the probability of change very low. It is quite likely that in real economic transformations countries modify gradually some of their institutions, and in particular those that have a greater influence on innovation and production, while leaving the rest unchanged. Even if, as an exercise in substantive rationality, it were possible to design an economic system perfectly adapted to introduce a series of innovations aimed at increasing output variety, the cost of achieving such an economic system might very well be superior to the gains obtained. In other words, the procedurally rational approach involving an incremental path of institutional change is likely to be superior to the substantially rational attempt to create a system perfectly adapted to variety growth.

In summary, the institutional and organizational configurations used to achieve variety growth at the national level are in general likely to bear some memory of the past production and institutional structure of the country. In some cases this can lead to inertia and delay required changes. Even when changes aimed at raising national are introduced they are likely to preserve some memory of the past economic development of the country.

SUMMARY AND CONCLUSIONS.

The main subject of this paper is the tension between the adaptation of countries' economic systems to common constraints and opportunities and the persistence within each country of past production structures and institutional configurations. As a result of this tension most countries tend to share common development trends but to 'interpret' them in the light of their past. The secular trend which was discussed in this paper is that towards growing variety. Each country needs to decide which new type of output to add to its existing production structure and how to modify its institutional configuration in order to achieve this aim. There

is no unique path towards this objective. Both technological and institutional innovations involve uncertainty. The resulting asymmetries in output structure and in institutional configurations are the expression of the tension between the heterogeneity creating effects of innovation and the homogenizing effects of diffusive forces such as imitation.

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