

9. Human capital formation in the new growth theory: the role of ‘social factors’

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9.1. INTRODUCTION

First-generation endogenous growth models, assuming human capital accumulation as a major engine of growth, have grounded their analysis on the Beckerian model of human capital, where homogeneous agents in the presence of perfectly competitive markets forgo leisure and current income in order to increase their knowledge and obtain a higher future income. This approach envisages no role in the creation of human capital for any of the phenomena tied to an individual’s social behaviour such as ‘peer effect’, ‘direct knowledge transmission’, ‘status-ranking’ of occupations, ‘network relationship’, and so on, although the importance of such social phenomena for individual formation has been widely recognized by the literature on human capital.¹ Probably, behind the recognition that human capital has the distinctive feature of producing a large amount of externalities (Lucas, 1988) lies the idea that direct social relations among agents themselves create knowledge. Nevertheless, this phenomenon has not been explicitly investigated, and the mechanisms by which the externalities are generated remain entirely unexplained.

In recent years, a class of endogenous growth models have analysed in depth how knowledge is formed and transmitted among individuals to give rise to externalities. In doing so, they have highlighted the role played by social relations in the creation of human capital, by assuming that the latter is formed not only through an educational activity, but also through the relations that arise among individuals. More specifically, they show that social factors are further channels for the transmission of knowledge which also modify its use and desirability.

The growth role of social factors has been largely analysed by the New Growth Theory, without limiting the analysis to the effects on human capital formation. Cole et al (1992) and Corneo and Jeanne (1997), for example,

have analysed the effects of status-seeking behaviour on wealth accumulation and on the saving rate. Temple and Johnson (1998), using the Adelman and Morris data base, carry out an empirical analysis to test whether 'social capital' matters in determining economic performance, thereby confirming this hypothesis. Also Knack and Keefer (1997) found evidence that trust and cooperation are associated with a higher economic growth rate while Zak and Knack (2001), assuming that trust reduces transaction costs, show that high trust societies have a higher investment rate and produce more output than low trust societies.

A large number of papers follow this strand of literature and there is ever growing attention towards this field of research. In this paper I shall consider only a particular aspect of this wide theme: the growth effects of social factors via their influence on the accumulation of human capital. Before analysing this theme, I shall try to define what are social factors and the nature of the relation existing between them and human capital. An initial problem is the lack of clarity over the definition of social factors. Moreover, it will be apparent that also the nature of the relation between human capital and the latter factors is not clear. Several authors hypothesise that they directly affect the human capital accumulation process, which occurs with important feedback effects (Coleman, 1988). However, others assume that social factors influence human capital accumulation only indirectly, since they are productive factors in the aggregate production function which are complementary to, or substitutes of human capital (Glaeser et al., 2000; Iyigun et al., 2001).

Analysis of the relation between human capital and social factors is an important theoretical aspect, since it leads to very interesting results such as the persistence of heterogeneity of individuals and the possibility that social classes² and a wage structure reflecting not only differences in productivity, but also the social organisation, may emerge. Both of them are themes largely analysed by Classical Theory.

Another important feature of this class of models which is a resurgence of a classical theme, is the assumption that the behaviour of a rational agent also depends on some extra economic factors almost always related to social relations with other agents. For example, in Fershtman et al. (1996) agents take care of their social position, and the level of human capital is chosen by considering also the effect on their social reputation, in Gradstein and Justman (2000) agents undertake an education activity for conformism, while in Galor and Tsiddon (1994) parents transfer their human capital to children for altruism.

The social aspects underlying the agents' economic behaviour are well known by classical authors. Smith (1776) in his analysis of the nature of wage highlighted the fact that the reward structure of different occupations

also reflects the reputation associated to each. This happens since individuals take care of their social relations, and the total reward of an occupation is affected also by the relative position in the social ranking obtainable with that occupation. 'First the wages of labour vary with...the honourableness or dishonourableness of the employment. ... Honour makes a great part of the reward of all honourable professions' (Smith 1776, p. 202). Again he wrote 'The public admiration ... makes a considerable part of total reward in the professions of physic, a still greater perhaps in that of law; in poetry and philosophy it makes almost the whole' (Ibidem, p. 209).

This hypothesis about individual behaviour has been adopted by several strands of literature, yet the inclusion in an endogenous growth framework opens up further lines of research, since it makes it possible to analyse how social interdependence can interact with the growth process: according to which behaviour will prevail and which relations between agents will become stronger or weaker, it is possible to predict the evolution of 'types' of individuals within the population. Therefore this approach can lead naturally to an evolutionary analysis of economies and of their economic performance.³ From these considerations, it is apparent that the possible developments of this approach are considerable.

This chapter, which will review this strand of literature, is organized as follows. The second section discusses the concepts of *social interactions*, *social capital*, *culture* and *ideology*, and *social status* concern, all of which indicate the effects of social factors on human capital formation and its diffusion among individuals. The third section surveys the analytical methods proposed to include in the economic analysis the effects of social factors on economic growth via their influence on the labour factor. Here it will be argued that a general framework, which can encompass in the economic analysis the effects of social factors, is still lacking. The fourth section contains some proposals for a solution to this problem. The chapter concludes with some brief remarks.

9.2. SOCIAL FACTORS AND HUMAN CAPITAL IN NEW GROWTH THEORY

Although there is no general agreement on the nature of the relation between human capital and social factors, the most generally accepted idea is that social factors affect human capital accumulation through different channels. The most important is *direct social relations* among agents, since individual human capital can be acquired not only through an educational activity undertaken in school, but also from other individuals with whom they have social contacts. Normally, individuals from whom knowledge can be

acquired are agents whose services can be bought in the market, but this is not always true. They can be relatives and parents, for example, who transmit their knowledge without receiving recompense for it. In such cases, knowledge is transmitted because of the relations among individuals in the absence of a market and without a price being formed for it.

Another channel is the *culture*, the *norms* and *beliefs* that characterise a community. The latter constitute a considerable part of the human capital that individuals possess, and are transmitted⁴ to all the members of the community only because they belong to it.

Finally, social factors may influence the level of education since they modify the incentives to acquire new knowledge. An example is the case when individuals desire more human capital not to earn a higher income, but to acquire a higher social status or conform to their group. The incentives in this case lie in the social relations among individuals who attend to their relative social position.

Second-generation growth models have included these factors in their analysis of human capital accumulation. However, the set of analytical categories used until now, denoted here as social factors, is rather heterogeneous. There are in fact models which have focused mainly on the effects of *social interactions* (Benabou, 1996 and Durlauf, 1996), where the term refers principally to interactions among single individuals or between these and reference groups. Others have instead emphasised the role of *social capital*, by which is meant a broad and heterogeneous set of phenomena including the social norms and institutions that characterize a society (Coleman, 1988). Finally, some have included *culture* and *ideology* (Cozzi, 1998; North, 1981; Iyigun et al., 2001) among society's 'social assets' which influence the formation of human capital. There is, therefore, a plethora of concepts and analytical categories which seem difficult to sum up in a single term. However, all of them relate to phenomena that spring from direct interdependence among individuals, 'direct' in the sense that it is not mediated by market mechanisms. In what follows, I shall analyse the various analytical categories used to grasp the effects exerted by social factors on agent formation and on economic performance.

9.2.1. Social Interactions

Social interactions constitute one of the most widely used analytical categories to describe the effects of social factors on the labour supply in terms of efficiency units. Their effects on the growth process have been analysed mainly by Benabou (1996) and Durlauf (1996).

A clear definition of social interactions has been provided by Brock and Durlauf (2001), as follows: 'By social interactions we refer to the idea that

the utility or pay-off an individual receives from a given action depends directly on the choices of others in that individual's reference group...' (Ibidem, p. 235). These are therefore relations among individuals of economic importance, because the action of one agent influences the chosen action of another agent with whom s/he is directly or indirectly linked. The main hypothesis is that agents influence each other through their actions and not through other media like, for example, directly exchanged information.⁵ Another crucial hypothesis is that this influence comes about directly, in the sense that it does not operate through the market: the individual modifies her/his rational choice simply by observing the actions of other agents.

Generally the literature distinguishes between local and global interactions. Global interactions arise when an agent is able to interact with any other agent in the economy. Local interactions are cases in which agents interact only with some specific group of agents. In the latter case, a set of neighbours must be defined, and the notion of social distance between agents is also required.

One major difficulty concerns the way in which the effects of such interactions can be included in the choice problem. Three different approaches exist in the literature: (i) it is assumed that social interactions modify the constraints under which the rational choice is made; (ii) they influence the formation of expectations; (iii) or modify the preference structure.

Constraint interactions occur when an agent's action modifies the choice set of other agents. An example is provided by the congestion or spillover effects due to knowledge diffusion. Interactions through expectation formation are well known, and their analysis pervades information theory. Economic analysis assumes that an agent forming expectations may seek to draw lessons from observation of the actions chosen by others. Preference interactions occur when an agent's preference over the alternative in a choice set depends on the actions chosen by other agents, examples being provided by conformism, jealousy and envy. This way of modelling the interaction among agents can be traced back to Smith (1759) who recognised that agents interact through preferences⁶ and that the intensity of interactions varies according to the strength of the relationship.⁷ Also this last idea is embedded in social interaction models, since another key assumption is that the intensity of the effects of social interactions depends on the strength of the relationship among agents, usually captured by the social distance function, used to gain a measure of the social 'nearness' between two or more agents and the degree of interaction between them.⁸

9.2.2. Social Capital

Social capital is another of the concepts used to specify the influence exerted by social factors on the behaviour of economic agents. Providing a definition of the term is difficult, since in this case there is no general agreement on its meaning in the literature. Moreover, the concept often overlaps with that of social interactions. One of the best known definitions is provided by Putnam (1993, p. 167): 'social capital ... refers to features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions'.

A similar definition is provided by Coleman, to the effect that: 'Social capital is defined by its functions. ... (it) consists of some aspects of social structures, that facilitates certain actions of actors. Like other forms of capital, social capital is productive making possible the achievement of certain ends that in its absence would not be possible' (1988, p. S98).

According to this second definition, social capital consists of the mechanisms that facilitate the coordination of individual actions so that a superior outcome is achieved. As Durlauf (1999a) and Woolcock (2000) have noted, the problem with this type of definition is that it concentrates on the possible effects while ignoring the mechanisms that create social capital. It thus confuses a positive outcome with what has made that outcome possible.

A definition which overcomes this problem has been suggested by Durlauf (1999a), for whom social capital is 'the influence which the characteristics and behaviours of one's reference group have on one's assessments of alternative courses of behaviour' (Ibidem, p. 2). Rather than emphasising the 'productivity' of social capital, this definition stresses the 'sociality' of individual behaviour. It highlights the important role of non-market relationships in determining individual and collective behaviour, allowing the sources of social capital to be separated analytically from its consequences.

Besides the difficulty of coming up with a general definition of social capital, there is also the problem of defining the forms that it assumes. Woolcock (2000) proposes a scheme in which social capital may assume four dimensions: (i) the extent of horizontal associations; (ii) the nature of social ties within communities (the degree of trust, peer effect, etc.); (iii) the nature of the relation between civil society and the state and (iv) the quality of the governing institutions.

Coleman (1988) proposes a similar scheme, although he places greater stress on the role of collective norms, concluding that social capital assumes three forms: (i) obligations and trustworthiness of structures; (ii) information channels; (iii) norms and effective sanctions. Yet these classifications, too,

suffer from the shortcoming of confusing social capital with its possible positive effects. Moreover, many of the concepts outlined above (social norms, for instance, or the quality of the governing institutions) have already been analysed in the literature without it being found necessary to introduce a new analytical category.

Although social capital may be a useful concept insofar as it underlines the sociality of individual action, and the effect of this on economic choices, it is either ill-defined or redundant. The definition proposed by Durlauf (1999a) deals with the former problem but makes the concept of social capital very similar to that of social interactions. Involved once again are relations among agents not mediated by the market; only that in the case of social capital the role of the reference group is more stressed.

9.2.3. Culture and Ideology

The concepts of culture and ideology (or religion) are two further analytical categories introduced by the new growth literature to analyse the effects of social factors on the creation of new knowledge and on economic performance (Casson, 1993; Cozzi, 1998; Gray, 1996; Iyigun et al., 2001; Lazear, 1999).

Culture is defined by anthropologists in a variety of ways, but whatever the definition, it usually includes some notion of shared values, beliefs, customs, rituals, language, and so on. Some authors (Gray, 1996) hypothesise that culture is a public good that affects the propensity of agents for various economic activities. Cozzi (1998) suggests that culture is a 'social asset' that increases the productivity of labour measured in terms of efficiency units, and which also accelerates the pace of technological innovation. The reason is that, although culture does not have an immediate productive use, it shapes individuals' behaviour and thereby their productive capacity.

Another analytical category often used is ideology (or religion) (North, 1981, Iyigun et al., 2001). According to some authors (Sacerdote and Glaeser, 2001, North, 1981), ideology is a particular form of knowledge which enables generalizations to be made about the environment within which agents operate and completes the factual information that they possess. More specifically, by embracing an ideology, individuals increase their ability to acquire knowledge, and this affects positively the productivity of labour factor.

The positive relation between ideology and labour productivity has been hypothesised by several authors. Rosenberg and Birdzel (1986) point out that the development of a moral system commensurate with wealth and capital accumulation can be traced to the Calvinist Reformation of Protestantism.⁹

Franke et al. (1991) and Gray (1996) find evidence for a positive correlation between certain Confucian values and economic growth in samples comprising both Western and Asian countries. Iyigun et al. (2001) embed this idea in an endogenous growth model where ideology and education are substitutes and interact to influence technological progress.

Although the concept of ideology is useful since it unifies in a single term phenomena such as beliefs, moral and political attitudes that influence the behaviour of an individual, no significant difference between this and the concept of culture seems to emerge. Both refer to a particular type of knowledge which is shared by a multitude of persons, and have a pronounced normative content. Furthermore, they do not seem to differ greatly from the concept of social capital.

9.2.4. Social Status and Conformism

Social status is a ranking of individuals (or group of individuals) in a given society, based on their traits, occupation, consumption, assets and actions (Weiss and Fershtman, 1998). The sociological literature (Davis and Moore, 1945; Treiman, 1977) has shown that high social status is usually awarded to wealthier individuals and to those who have an occupation requiring a high level of human capital.

The economic implication of this social phenomenon has long been recognised by economists,¹⁰ who have largely analysed also the implications for growth.¹¹ The influence of social status on growth has been assigned principally to its effects on the saving rate (Cole et al., 1992; Corneo and Jeanne, 1997) and on the demand for positional goods (Funk, 1996; Hirsh, 1976), while only few have recognised its growth effect via the influence on human capital (Fershtman et al., 1996). In the model of Fershtman et al. (1996) agents attend to their social status, obtainable by undertaking an occupation that gives high social prestige. Following Smith (1776), they assume that the latter is an attribute of those occupations which require high human capital. Therefore, the demand for social status may constitute a strong social incentive for the accumulation of human capital, which is added to the monetary incentive.

On the existence of this positive relation between human capital accumulation and concern for rank there is general agreement, but it is not so clear why individuals are concerned about their relative social position. According to Postlewaite (1998), the rank concern arises instrumentally because relative standing influences the consumption level. As a matter of fact, because of market imperfections not all goods or services can be acquired through the market. When the allocation of some goods or services such as information, education or other does not occur via the market, high

social status allows a high level of consumption of such goods to be achieved. This implies that the demand for social status derives from the presence of social interactions by which exchanges of non-marketable goods and services occur. Hence it is only another aspect of the more general phenomenon of non-market interactions.

However, the existence of decisions that affect consumption but are not mediated by price mechanisms can also lead to another type of behaviour, in contrast to the concern for status: the desire to conform. A conformist behaviour may emerge especially when there are activities that are undertaken in groups. It refers to an inclination of an individual to behave like the other agents belonging to his/her reference group. Also in relation to this different mode of social interaction the effects on human capital formation and on economic performance have been analysed. Gradstein and Justman (2000) propose a model where individuals gain utility from conformist behaviour by reducing the social distance between themselves and their reference group. They show that such behaviour may have perverse effects on growth because it may reduce the returns on investment in education.

At the end of this discussion, it seems clear that most of the concepts presented here suffer from a lack of definitional clarity. Moreover, the differences between them seem to be quite marginal. Social capital, for example, is a result of interactions among agents: the trust-degree, which is a dimension of it, is only a form assumed by social interactions. Also culture and ideology or rank concern are only particular results of the latter. All the concepts presented here are only different aspects of the same phenomenon: the social exchange of knowledge, information, etc. which occurs among agents, *social* because it is not mediated by the market and which for this reason the standard economic model, if not appropriately amended, is unable to capture.

9.3. ANALYTICAL METHODS TO ENCOMPASS SOCIAL FACTORS IN ENDOGENOUS GROWTH MODELS

Besides of the above-cited problems, analysis of the effects of social factors also suffers from a lack of a generally accepted analytical framework. It is not an easy task to encompass social factors in economic analysis given the fact that some of them refer to aggregate concepts. Indeed literature has almost universally viewed social capital, culture, norms and beliefs as community level attributes, but since economic models are based on decision maker agents, aggregate definitions may impede the inclusion of social

factors in the economic framework. In spite of such difficulties, there have been several attempts that can be summarised in two analytical strategies: one where social factors modify the constraints under which the optimal choice is made, and another, more general strategy, where they modify the objective function or the preference structure.

9.3.1. Models where Social Factors Modify Constraints

An initial example of the adoption of this kind of strategy can be found in models where social factors modify the rewards structure by favouring or reducing human capital accumulation rate. Papers by Acemoglu (1995), Baumol (1990) and Murphy et al. (1991), for example, have analysed the effects of social factors on the allocation of talents, showing that if these make rent-seeking activities more remunerative than productive ones, the economy grows at a lower rate.¹² In all these models social factors influence the individual human capital indirectly, since they affect the relative convenience of its allocation between different sectors.

Another way of modelling the influence of social factors on human capital is the assumption that social factors directly affect the ‘production technology’ of human capital. In this case the constraint which is modified is not the rewards structure, but the human capital production function.

Several authors follow this approach. Cozzi (1998) for example, assumes that culture directly affects the efficiency of labour factor, and Iyigun et al. (2001) follow a similar argument. According to these authors, education acquired through formal schooling and ideology are two productive factors that are substitutes in the human capital accumulation function. The idea behind this assumption is that a more sophisticated ideology allows us to obtain more accurate knowledge about the facts, such that individuals with different ideologies but the same level of education make different inferences about the world.

In both models the production function of human capital can be represented as,

$$h_{i,t+1} = f(E_t; I_t) \quad (1)$$

where E_t is the education acquired in formal schooling and I_t is the ideology (or the culture) which can be ranked according to its degree of sophistication.¹³

Although these models contain a clear improvement with respect to the simple Beckerian model, given by the recognition of the role played by social factors in the individual formation process, they still present several shortcomings. First of all, they are based on poorly defined analytical

categories. A second problem, strictly linked to the first, is that it is not clear in what way ideology or culture is formed and how their formation process can be embedded in an individual choice-based model.

Another strand of literature which uses this analytical method involves attention to social interactions. In these models one typically postulates that human capital is formed by way of social relationships because these favour knowledge transmission among individuals (Benabou, 1996; Durlauf, 1996; Galor and Tsiddon, 1997; Hassler and Rodriguez Mora, 2000). Different cases of social knowledge transmission are identified: one of great importance is that occurring within the family because of the close and enduring relationships among its members. Yet also the relationships arising between members of the same group or community are important channels through which knowledge is transmitted. The models developed by Benabou (1996) and Durlauf (1996) attach greater importance to the latter channel of knowledge transmission.

In particular, Benabou's model highlights how articulate social relations can be and how their possible results in terms of human capital level and growth rate may depend on the forms which they take. He postulates that social interactions at community level may give rise to very different results in terms of human capital according to which form they take. If individuals with greater human capital exert considerable influence in the group (that is, the more educated members of the group are emulated), a community made up of heterogeneous individuals will be more efficient in terms of the human capital produced, because the 'high tails' of the distribution will prevail. Vice-versa, if the influence of those with a low human capital predominates, an increase in the proportion of high-quality individuals will have a negligible effect on human capital since the 'low tails' of the distribution will predominate. These different types of social interactions can be formalised by two production technologies of $h_{i,t+1}$. The first case is,

$$h_{i,t+1} = d_i(i, l) \varepsilon(\sigma) \bar{h}_{i,t} \quad (2a)$$

while the second case,

$$h_{i,t+1} = \frac{d_i(i, l) \bar{h}_{i,t}}{\varepsilon(\sigma)}, \quad (2b)$$

where $d_i(i, l)$ is the social distance function between individual i and l reference group, here considered as an exogenous parameter, $0 \leq \sigma < +\infty$ is an index of the variability of the distribution of h over the group, $\varepsilon(\sigma)$ is an increasing function of this variability ($\varepsilon(0) = 1$), and \bar{h}_i is the average level of human capital in l group.

Equation (2a) states that when the influence of more able individuals prevails, the transmitted human capital is above the average of the group, and the intensity of the transmission increases with an increase in variability of the distribution of h over the group. Vice-versa, equation (2b) states that if the influence of less able individuals prevails, the transmitted human capital is below the average, and an increase in variability further reduces this transmission.

Although neither this model analyses the formation of social interactions, it shows that their introduction helps to describe the formation of individual human capital in a clearer and more detailed manner by allowing us to distinguish cases where social relations have positive effects, from cases where their effects are negative. Moreover, through the social distance function it is possible to make social interactions endogenous. In fact, although in the Benabou model the social distance function is an exogenous parameter, the analysis could be extended by considering it as a choice variable which comes from a decisional process where an individual chooses the optimal social distance.

Another aspect greatly emphasised by this literature is that the effects of social interactions on human capital accumulation may explain the dynamic of the relation between inequality and growth.¹⁴ In fact in the models of Benabou (1996) and Durlauf (1996), an equilibrium may emerge, where different groups of agents are formed. In this case individuals differ in their level and possibility of further accumulating human capital.

This result is particularly interesting since these groups can be considered as different social classes, each being characterised by a different level of human capital and a different possibility of further accumulating it. Such a class structure, however, is radically different from that of the capitalists–workers dichotomy that was prevalent in Europe in the 19th century and beginning of the 20th century, since in this case there would be no single class of workers, but a whole range of worker classes, each characterised by a different level of human capital and a different access to the sources of human capital production.¹⁵

The models of Galor and Tsiddon (1994 and 1997) and of Hassler and Rodriquez Mora (2000) mainly focused their attention on knowledge transmission occurring within a family. In Galor and Tsiddon's (1994) model, parental relations affect the level of human capital through two variables: the amount of parental knowledge and the resources invested by the individual in education, which depends on the parents' human capital.¹⁶ Moreover, the authors assume that the parent/child relationship affects human capital formation not only by transmitting directly human capital to their offspring, but also by modifying their cognitive capacity. Formally, knowledge transmission at the family level can be written as:

$$h_{i,t+1} = h_{j,t} d_i(i, j) \alpha(I, h_{j,t}) x_t(h_{j,t}) \quad (3)$$

where x_t is the amount of resources invested in education, $d(i, j)$ is the social distance between parents and children, which is weighted by a factor $\alpha(I, h_{j,t})$. This factor is increasing in parents' human capital because individuals with parents who possess high h learn more quickly and are able to use their knowledge more efficiently, and depends on some family characteristics (I), such as the possibility for the parents to spend many hours with children, or whether the family structure is a 'nuclear' or 'extended' one. These institutional characteristics, as Coleman (1988) has emphasised, influence the quality of family relationships and hence the effectiveness of knowledge transmission.

In a more recent work, Galor and Tsiddon (1997) considered another feature affecting the transmission between parents and children. In this paper, they assume that knowledge transmission depends also on the occupations chosen by children. If they choose the same occupations as their parents, then human capital transmission is complete.¹⁷ This happens because in performing a job, individuals develop a set of interpersonal relations that constitute a sort of 'social capital' to be used in their work, which can be transmitted to the children only if they remain in the same sector.

This case is particularly interesting since it shows that individuals are not members of a single group, but they are involved in different types of social relations, and it may be relevant to analyse how the relations developed in different contexts interact with each other. This idea has been well defined by Gellner (1996), who introduced the concept of 'modularity' of individuals, which means that individuals define themselves by multiple attributes associated with distinct spheres of social life. This implies that an individual may belong to different groups. In some cases there is no relation between the attributes an individual has in a group with those that s/he has in another, but in other cases this relation exists, and it may influence inter-group interactions, as in the case analysed by Galor and Tsiddon (1997).

9.3.2. Models with Social Factors which Modify Preferences

The analytical strategy followed by the models surveyed above, even if it is a straightforward way to include social factors in economic analysis, is actually rather limiting, since the decisional process which leads to the choice of a particular behaviour is not explicitly analysed.

A different way of modelling the growth effects of social factors is to assume that they modify the preferences structure or, more generally, the objective function. In this way the formation process of the social factor

emerges as a solution of an individual decisional problem. However, even if this method may be more suitable to overcome the above cited problems, within the new growth theory it is not so widely used: the few papers which use it largely coincide with those that have focused on the demand for social status.

Generally it is assumed that social status depends on some individual traits, usually one's wealth or the level of education, and that an agent chooses the level of wealth or of education, in order to maximise his/her own utility function, where the latter is defined not only over a set of market goods, but also over the social prestige s/he obtains. However, social prestige can be defined only in relative terms. Consequently, to establish the relative social position of an individual, it is necessary to identify the reference group with respect to which the individual's social status is defined. Therefore, most of these models have to define 'a priori' the neighbour structure to which the individual refers.

Formally the individual choice problem is,

$$h_i^* \in \arg \max U_i(p, s(h_i, \bar{h}_i)) \quad (4)$$

where p is a vector of personal characteristics, including income, \bar{h}_i is the average level of human capital in the reference group, s ($s_{h_i} > 0$ and $s_{\bar{h}_i} < 0$) is the social status function, implying that an individual obtains greater status if s/he differentiates her/himself from own reference group.

Although in this case the social factor (i.e. individual social status) is a choice variable whose level emerges as a solution of a maximisation problem, this framework is still not sufficiently general, since the formation of the reference group and, more generally, the structure of the social interaction environment do not emerge as an equilibrium solution.

Once again, there is a clear need to elaborate a more general framework that is able to explain how economic variables interact with the social environment, making the formation of the latter, at least partially, endogenous to the model. Moreover, it would be worth constructing a general framework which can unify the various models and the different analytical categories used to analyse the effects of social factors on economic performance.

9.4. FURTHER DEVELOPMENTS

Recently, there have been some interesting developments in two different strands of literature that may constitute some possible solutions to the above discussed problems. One is the model of individual social capital investment,

proposed by Glaeser et al. (2000); another can be found in recent papers belonging to the literature on non-market interactions. In what follows we will discuss the relevant features of these two approaches that, if embedded in a growth model, may lead to important developments for the analysis of the effects of social structure on economic performance.

9.4.1. The Individual Social Capital Investment Approach

In this model agents can accumulate individual social capital in the same way they do with human and physical capital. Individual social capital is defined as 'a person's social characteristics ... which enable him to reap market and non market returns from interactions with others. As such, individual social capital might be seen as the social component of human capital' (Glaeser et al., 2000, p. 4). Moreover, this particular kind of investment is assumed to be time-consuming, and as such has an opportunity cost given by the hourly wage.

This definition enables the authors to use the standard model of optimal individual investment decisions to analyse the formation of individual social capital. By applying this very standard model, they are able to obtain interesting results: a relation between the lifecycle of an agent and the individual investment in social capital, which is positive in the early stages of life and negative in the latter stages; a negative relation between mobility and social capital investment, which implies that what reduces mobility, such as homeownership, also increases social capital investment; a positive relation between the patience rate across individuals and social capital investment, which generates a reduced form correlation between the latter and human capital accumulation.

An important feature of individual social capital, characterising also human and physical capital albeit to a lesser extent, is the presence of major externality and positive complementarity effects. Complementarities raise the possibility that there exist multiple equilibria in the levels of social capital investment, and explain how small differences in initial conditions may generate large divergences in long-run levels of social capital. Moreover, the presence of externalities and complementarities implies that the transition to the aggregate level is not immediate. Indeed aggregate social capital is defined as the average of individuals' social capital, adjusted for all the externalities, which are of a considerable amount and can be positive or negative. This latter feature depends on the type of individual social capital accumulated. For example, joining a network is a form of individual social capital that creates positive externalities, while status-seeking behaviour, which is another form, causes negative externalities to other agents in the reference group.

This approach has the great advantage of being able to give a unified interpretation for the different concepts used to analyse the effects of social factors on economic variables, using an analytical format very familiar to economists. In this framework, social interactions are only different forms of individual social capital: joining a group and status-seeking behaviour are only two of the many forms of individual social capital. Moreover, this model provides a coherent interpretation for the positive relationship between human capital and social capital: these are two distinct accumulable factors that show a positive relationship between them, because of an equal response to changes in the intertemporal preferences rate of individuals.

Nevertheless, by adopting this approach one may lose a major aspect highlighted by most of the papers analysed here: the fact that individual decisions are influenced by actions of other agents in a way that is not regulated (because it is not possible) by the market. By assuming that one can define a market price for the investment in social capital, it is difficult to maintain this specific nature of personal relations, which cannot be regulated by the market and, consequently, cannot be regulated by a price mechanism. Even if this aspect is treated through externalities, which express the direct effects of agents' actions on others, nevertheless, a direct analysis of these phenomena could be more correct, because the incompleteness of markets does not mean that an individual is unaware of the effects of such personal interactions. By confining them within the narrow space of generic externality effects, one makes this intuition unable to clearly emerge.

These considerations suggest that the most suitable framework for analysing the economic effects of social factors, that least distorts their real nature, may be the non-market interaction framework, where each person's actions change not only because of the change in fundamentals, but also because of the change in the behaviour of his/her own neighbours.

9.4.2. Non-market Interactions Approach

Another possible solution may be supplied by the literature on social interactions, which uses the random field approach, imported from statistical physics, where one typically postulates individual's interdependence and analyses the macrobehaviour that emerges. Follmer (1974) was the first paper to use this framework. Other models inspired by statistical physics are Scheinkman and Woodford (1994), that studies the impact of independent sectoral shocks on aggregate fluctuations, Glaeser et al. (1996) who use the voter model to analyse the distribution of crime across American cities, and Brock and Durlauf (2001), who develop a model which extends the random field approach to global interactions, to the case of discrete choices.

An interesting contribution is provided by Glaeser and Scheinkman (2000) who present a general model that is able to treat as special cases several of the better known models in this area. Hence, to clarify the main features of this approach, I will refer to the analytical format presented in this model.

In Glaeser and Scheinkman's model utility function includes the individual's actions, the actions of agents within the reference groups, individual's personal characteristics and common prices. The reference groups may include only individual's closest neighbour or the entire economy. Therefore this framework can examine both local and global interactions. Formally the individual problem is

$$\max U_i = U_i(a_i, A_i^1, \dots, A_i^K, \theta_i, p) \quad (5)$$

where

$$A_i^K = \sum_{j=1}^n \gamma_{i,j}^K a_j$$

($\gamma_{i,j}^K \geq 0$ and $\sum \gamma_{i,j}^K = 1$), $a_i \in I$ ¹⁸ is the agent i action, p is a vector of parameters and θ_i is a 'taste shock' of each agent. In other words the utility of an agent i depends on his own chosen action, on a weighted average of the actions chosen by agents in his/her reference groups (A_i^K), on his/her taste shock, and on a set of parameters.

An interesting result of this model is that multiple equilibria may arise even with very little heterogeneity. In this case two populations with slightly distinct realisations of the θ_i 's could exhibit very different average values of the actions. This happens if the marginal utility of an agent's own action is more influenced by change in the average action of his/her peers than by a change on his/her own action. In other words multiple equilibria occur when the group effect is strong enough. An implication of this result is that it is possible to analyse how different groups of agents emerge as an equilibrium solution.

This model also has the potential to facilitate a more rigorous analysis of social capital. In fact, if social capital is interpreted according to the definition proposed by Durlauf (1999a), by which social capital is 'the influence which the behaviors of one's reference groups have on one's assessment of alternative courses of behavior' (Ibidem, p. 2), this can be identified, at least as a first approximation, as the weights in the A_i^K terms, because the latter terms capture the influence that the average behaviour has on the optimal choice of an agent. Moreover, as Brock and Durlauf (2001) have shown, by choosing the weights parameters appropriately, it is also

possible to consider cases where agents wish to differentiate themselves from their own reference groups (status-seeking behaviour).

This approach could be very useful to highlight the sociality of an individual behaviour, providing, at the same time, a very general framework that includes as special cases all the possible ways in which social factors influence individual economic decisions. Moreover, if it is applied to continuous actions, it can explain how human capital formation depends strictly on social relations, emphasising that individuals are aware of such influences and they can act to modify their social interaction environment.

9.5. CONCLUSIONS

The literature analysed in the previous sections constitutes a new and interesting strand of research which seeks to integrate non-market mediated social interactions into the analysis of economic growth. There has clearly been an excessive proliferation of concepts and analytical categories, none of which are well defined, with all referring to the same phenomenon: the interdependence of agents not regulated by market mechanisms. In this paper I have set out to argue that by basing the analysis on the better defined concept of social interactions, it is possible to obtain a coherent and well-grounded analysis of the effects of social factors on economic growth. Consequently, an important stage will be to encompass in the endogenous growth framework models designed to analyse non-market interactions.

Finally, an interesting finding from this literature is that social interactions accentuate the heterogeneity of agents and may create distinct groups of agents. Each of these groups has its own specific rules of behaviour and different levels of transmittable human capital. This entails the emergence of a class structure based on the level and/or type of human capital possessed by individuals and on the possibility of further accumulation of such capital.

NOTES

1. See for example the F-connection theory of Ben-Porath (1980).
2. Where social classes are defined according to their function in the production process and the posses of an accumulating productive factor.
3. In this line of research are Galor and Moav (2000) who propose an evolutionary framework where some types of behaviours, such as preference for 'quality' children rather than for 'quantity' children, emerge as a result of an interplay between the technological progress and the fertility rate.
4. For example by the communication media, the school, etc.

5. This is a rather restrictive hypothesis, in fact, since humans do communicate about all manner of things. Nevertheless, the assumption proves very useful because it considerably simplifies the analysis (Manski, 2000).
6. Smith (1759, p. 3) wrote: 'How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it, except the pleasure of seeing it'.
7. 'Every man feels his own pleasures and his own pains more sensibly than those of other people ... After himself, the members of his own family, those who usually live in the same house with him, his parents, his brothers and sisters, are naturally the objects of his warmest affection' (Smith, 1759, p. 321).
8. More specifically, given a social space which comprises the structure of the agents' neighbourhoods, the social distance between them is defined as 'the number of links in the shortest path between the agent' (Kirman, 1999, p. 24). According to this definition, those agents that are directly connected have a social distance which reaches the maximum value.
9. Max Weber (1930) developed the same idea, attributing the rise of capitalism and the Industrial Revolution to the Calvinist Reformation.
10. As we have already noted, Smith (1776) has recognised that individuals chose an occupation also for the reputation that they can acquire. Marshall (1890) also have noted that: 'The desire to earn approval, or to avoid the contempt, of those around us is a stimulus to action ... in any class of persons ... A professional man ... will be very sensitive to the approval or disapproval of those in the same occupation' (1890, reprinted 1962, p. 19).
11. See for a comprehensive survey Weiss and Ferstman (1998).
12. Carillo and Zazzaro (2001) have developed a neo-Schumpeterian growth model where social factors, such as the 'professionalization process' and the status seeking behaviour of professionals, modify the reward structure reducing the convenience to devote human capital to R&D sector and by slowing down the pace of technological innovation.
13. Iyigun et al. (2001) assume that ideology is in its turn affected by the level of education. This assumption combined with the possibility that ideological beliefs affect the human capital accumulation process generates a feedback loop between ideology and human capital.
14. In fact, this approach gives rise to what has been denominated as the *membership theory of inequality* (Durlauf, 1999b) according to which income distribution depends not only on individual characteristics, but also on characteristics of those groups to which an individual belongs.
15. It is interesting to note that this class structure seems to describe well what is observed in most OECD countries in the last part of 20th century since the end of seventies. In fact in almost all OECD countries it has been observed a strong increase in educational wage differential, with a spectacular increase in the return to education (Acemoglu, 1999; Aghion, Caroli and Garcia Pignalosa, 1999; Goldin and Katz, 1999).
16. This happens because parents with high h are assumed to be willing to invest more in their children's education since they have altruistic preferences and the welfare of their children is a normal good.
17. The same line of research has been pursued by Hassler and Rodriguez Mora (2000), who also emphasise that parental transmission is complete if there is no social mobility. The transmission of knowledge takes place between parents and children only within the entrepreneurial class and it is maximum if there is no innovation.
18. I can be a discrete set or an interval of a real line, therefore this framework can analyse discrete as well as continuous choices.