Economic Growth and Social Development

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Chapter 1

Introduction

Individual and aggregate well-being depend in the long run both on material growth and on social and cultural development. While this has perhaps always been true, for most of human history material growth has played no significant role: it has been most of the times absent, with some positive and negative exceptions [see e.g. Goodfriend and McDermott (1995)]. Since the Industrial Revolution, on the contrary, a significant fraction of the world has kept growing at a positive rate, accumulating physical capital, developing better and better technologies, and accumulating human capital. Indeed, these processes have captured the most part of economists' attention, whereas social and cultural dynamics have remained at the margin of economic analysis. In recent years, however, an increasing number of economists have begun to pay attention to the interplay between these two broad aspects.

Since research in this direction is just at the beginning, the purpose of the present work is not to propose an all-encompassing and conclusive theory, but rather to shed light on relatively few aspects of the complex interplay between economic growth and social development. The basic idea is that these two processes may, but need not work in the same direction. On one side, economic growth makes more and more resources available, that can be used both for individual and for social purposes; on the other side, it may be based on a substitution of social for private activities, that leads to social impoverishment. Conversely, a rich social environment may be good both for individual well-being and for long run growth, but it may also subtract resources to private growth-enhancing activities.

Where material needs have been satisfied to a substantial degree, as it is the case in advanced economies, well-being depends to an increasing extent upon social factors, like social environment, individual relative position and social status, ability to construct and enjoy meaningful and satisfactory relations with other people, and so on: in one word, well-being also becomes a matter of building up a satisfactory individual and social identity. The process of identity construction entails a complex interplay of individual instances with material and social constraints. Moreover, as pointed out by Akerlof and Kranton (2000),

it is one of the major determinants of economic behavior. Therefore, it deserves adequate attention by both positive and normative economics. Since other social sciences have long debated the questions related to identity construction, Chapter 2 will briefly review some of the main issues emerged in such debate and relate them to social development.

Within contemporary economics, two useful concepts to tackle similar questions are those of social capital and of relational goods. The notion of social capital refers to a form of capital that is encompassed in the social structure of a group, rather than in physical objects or in single human beings, like physical and human capital. It has come to prominence in the economic debate of the last fifteen years and some authors see it as the 'missing link' in growth theory. Chapter 3 reviews the most relevant economic literature on social capital. The notion of relational goods, introduced by Uhlaner (1989), refers, roughly speaking, to those goods that satisfy relational needs and are obtained through participation to some social activity. Chapter 4 discusses this notion, with particular emphasis on the substitutability between some private goods and relational goods, and on the contribution of social capital to the enjoyment of the latter ones. Moreover, it discusses how social participation may affect both enjoyment of relational goods and social capital accumulation, and thus contribute to social development. Since most relational goods do not enter in the GNP, to the extent that economic growth is based on a substitution of relational for private goods, it may lead to situations of social poverty, whose impact on well-being is not reflected in growth accounting.

The models presented in Chapters 5, 6 and 7 investigate this possible conflict between economic growth and social development. Chapter 5 presents a neoclassical model of social capital accumulation, shows how it differs from physical and human capital accumulation and argues that under-investment in social capital may lead a 'growing' economy to fall into a social poverty trap[1]. The basic setup is enriched in Chapter 6 by the introduction of private capital accumulation. This allows a rigorous simultaneous treatment of both processes of economic growth and of social development, identified respectively with the accumulation of private and of social capital. While providing further insights, the new model confirms the basic results of the former one. Chapter 7 goes back to the basic setup with only social capital and investigates it from a different point of view, using an evolutionary framework in spite of a neoclassical one. This allows a better understanding of the role and dynamics of social pressure, whereas the neoclassical framework is better suited to study the effect, in terms of individual incentives, of the externalities of social participation.

[1] 'Growth' is here just identified with an increase in the representative individual's consumption of private goods.

Chapter 2

Social development and individual identity

While it is clear what economic growth means, the concept of social development is much more vague[1]. In the modelling part of this work social development is conceived as a process of social capital accumulation. The notion of social capital is defined and discussed in Chapter 3. Whatever its definition, it seems opportune to introduce the discussion on social development from the point of view of a broader perspective, that goes beyond the borders of economics and connects social development to individual identity formation. Indeed, it appears intuitive to think of social development in terms of development of a social environment that favors the construction of satisfactory individual identities. Though, this sentence remains ambiguous until we address the positive question of the relationship between social environment and individual identity and the normative question implicit in the ideas of development and of satisfaction. The present chapter addresses these two issues. Moreover, there is a general measurement problem with social development, but the choice of modelling it in terms of social capital accumulation solves it, provided that we have good empirical measures of social capital.

2.1 Individual identity and social world

There is a long tradition of thought that studies the relationship between individual identity and social world. Since it goes much beyond the borders of economics, we provide just a broad overview here, with special reference to the contributions of Hannah Arendt (1958) and Elena Pulcini (2001). The resulting discussion sheds light on quite a few aspects of the current economic debate on social capital and allows us to better appreciate advantages and limitations of the identification of social development with social capital accumulation.

[1] An extended discussion of social development is carried out by Midgley (1995).

2.1.1 Private and public in the ancient world

Arendt (1958) develops an interesting reflection on the changes of private and public from ancient world to contemporary society. She observes that human condition is characterized by three aspects: the natural aspect of life on the Earth, by the 'artificial' aspect of the world of produced objects and by the aspect of plurality connected to the fact that we live among and together with other human beings. To each of these spheres, or conditions, corresponds a peculiar kind of human activity, that she calls, respectively, labor (satisfaction of vital needs and reproduction of the vital process), work (production of objects and creation of a 'human' world) and action (participation to public life). In ancient terms these activities correspond respectively to *animal laborans*, *homo faber* and *zōon politikon*. All of them are subject to the general condition of mortality, of being in this world between birth and death.

One of the strongest human desires is to produce things that do not die, that provide life its dignity. In the ancient Greek society this purpose was especially pursued through public life: 'immortality' could be reached through great actions and great speeches, worth of remembrance and transmission generation by generation, so that individual fame would not die. 'Immortality' was thus intrinsically connected with the public sphere and with the competition to excel (*aristeuein*): to excel among a plurality of peers, that are carriers of different points of view and define their identities by mutual confrontation. The public, 'political' world (the world of the *polis*) was the specific dimension of expression of human freedom, in contrast to the private, domestic sphere, which responded to the necessities of life and was characterized by inequality and, potentially, violence (between men and women and between free citizens and slaves)[2].

The 'economic' sphere, all what has to do with subsistence needs, was thus for the Greeks a private, not a public issue; but private and public were at the same time opposed and linked. Private property was first of all property of a part of the world and thus meant belonging to a political community. Its essence was public and had nothing to do with the dimension of wealth possession: for the Greeks, foreigners and slaves might be very rich, but this had no relevance for public life[3]!

According to Arendt, the modern process of economic growth, and in particular the increase in the productivity of labor, corresponds to a huge expansion of what for the Greeks was a domestic sphere. The social sphere in modern age is the ancient private dimension that comes to have public relevance. This process brings about a shrinking of the public sphere in ancient terms. Individual identity tends correspondingly to be defined no more through public action, but rather, or at least to a new degree, through introspection into the subjective dimension. While for the Greeks privacy meant deprivation from

[2]Such agonistic and free conception of the public dimension had nothing to do with a natural sociality of human beings, so that the translation of the Aristotelian *zōon politikon* with *animal sociale* brought about a change of meaning.

[3]Even private accumulation of culture did not give access to the truly human dimension of the public life: some slaves had a very high cultural level, but were nonetheless slaves.

public life, modern age discovers its richness and, at the same time, the fact that it has to be protected from social invasion. While labor becomes a public issue, action and speech find their expression in the intimate sphere of private life: a reversion with respect to the Greek world. 'Political economy' (a contradiction in terms for the Greeks) is seen by Arendt precisely as the science that studies the new public relevance of the vital, economic process. It does not consider individual 'action', which is unpredictable, but rather individual 'behavior', which follows much more standardized patterns and can be usefully studied in statistical terms.

2.1.2 Private and public in the modern age

Let us now examine, following Elena Pulcini (2001), the connections among the birth of a new social sphere, the decline of the ancient public world and the birth of modern individualism. Even though Pulcini does not explicitly mention the shrinking of the public space considered by Arendt, this process is somehow implicit at the beginning of her discussion. Echoing in particular Bataille, she emphasizes the fact that pre-determined social roles become less and less rigid in the modern age. When neither social roles provide a strong identity and a guide to action, nor there exists a 'public' space (in ancient terms) in which identity is acquired through the game of competing actions and speeches, individuals become at the same time freer, in the sense of more sovereign over themselves, and more fragile and 'empty', since the definition of their identity becomes problematic.

Montaigne is paradigmatic from this point of view: he recognizes that in modern age glory, the ancient passion *par excellence* is a sort of residual of the past, whereas the new freedom and fragility pose instances of self-construction and self-protection. He expresses the view that the value of an individual does not lie any more in the generosity of his great actions, but rather in his private wiseness and authenticity, cultivated thought the 'defensive' attitude of self-protection from the external world. However bad, the existing social and political order is seen as the best possible one, since any change, distracting individuals from themselves, would hurt them more than it can benefit them.

The separation between individual and social sphere is a matter of fact for Hobbes as well, but, instead of focusing on the internal sphere and seeing an escape in individual wiseness, he considers isolation an abstraction. Individuals are necessarily linked with each other, but such linkages do not constitute a public world that provides identity. In the state of nature human relations are characterized by violence: identity may only be gained through imposition on others and consequent recognition. The need of self-preservation from the *bellum omnium contra omnes* drives to a social contract and to the attribution of power to a superior 'artificial person', the State. The public sphere changes thus radically its nature and task: it becomes the social organization of violence. From the Greek point of view, violence was indeed opposed to the political dimension of speech (*logos*) and was confined to the domestic sphere.

In Locke another dimensions of the Greek private sphere comes at the heart

of the social contract: inequality. He considers that, as long as individuals are equal, the protection of individual rights (and in particular of the natural property right over the product of own work) is rationally the same as the protection of the rights of all. Hobbesian struggle for life is not an intrinsic characteristic of the state of nature, but is rather the effect of inequality. In turn, inequality is made possible by the accumulation of wealth through money and heritage. For Locke one of the main purposes of society is to protect individual natural property rights: society is seen once again as an extension and a public organization of the private sphere.

The economic implications of this new conception of private and social are captured very well by Mandeville. He contrasts two types of society: one is small, peaceful, frugal, homogeneous and close to commercial trade; the other one is large, open and militarily and commercially organized. In the first one there is a direct connection between individual intentions and social effects, since its members have a high degree of control on social processes. As a consequence, moral virtues are the source of public benefits, but such benefits are intrinsically limited: this closed and virtuous society cannot develop a prosperous and growing economy, scientific progress and political supremacy. In contrast, economic growth and prosperity are favored in the other type of society by private 'vices', like pride, ambition, envy and avidity. Such vices, although morally unacceptable, are the source of public benefits, since they stimulate economic activity, especially through luxury consumption. Private good and public good are not only separated, but may even be opposite. Mandeville is aware of the potentially disruptive social effects of the egoistic vices that promote economic welfare, but thinks that they are avoided by the fact that individuals learn, opportunistically, to simulate some necessary social virtues. Interestingly, he interprets such learning as taking place for concrete interests during effective life in society and not as dictated by pure rationality in a fictitious state of nature.

Both in Locke and in Mandeville wealth and consumption do not just satisfy material needs, but entail a symbolic element: they attribute social status and distinction. This aspect is caught perfectly by Adam Smith, who considers the general desire to be admired and approved as one of the strongest and most pervasive human passions[4]. At the heart of his vision of human being there are self-love and desire of distinction. As for Mandeville, these are the engines of economic activity in a competitive society, but Smith emphasizes that the desire to be admired does not necessarily lead to private vices. One also desires to be approved by the 'impartial spectator' that is inside each of us, to be worth of admiration besides admired. Social cohesion is not preserved by simulated virtues, but rather by true virtues: self-love is able to generate both growth and social cohesion. The Hobbesian struggle for life becomes in Smith a more peaceful race for wealth; in contrast to Mandeville's emphasis on luxury expenditure, wealth accumulation is made possible by the virtue of

[4]Cole, Mailath and Postlewaite (1992) open their paper with this quote from Smith's Theory of Moral Sentiments: 'It is not wealth that men desire, but the consideration and good opinion that wait upon riches'.

prudence, with its content of foresightedness and sacrifice. We have in Smith a recomposition of private and public, which is typical of the utilitarian approach: an invisible hand composes individual interests into social order.

A criticism of both the contractualistic and the utilitarian approach is developed, after a discussion of Mandeville's thought, Marina Bianchi (1993). She argues that both approaches use categories that are indeed adequate for a closed and homogeneous society, but not for an open and dynamic one. We will see that such criticism is helpful to understand some voices in the current debate on social capital as well.

Another relevant author for the modern reflection on private and public is Rousseau. He develops a radical criticism of competitive passions and desire of distinction, based on the fact that they produce a division between being and appearing. Rousseau's solution lies in the refusal of competition in favor of a re-discovery of the authenticity of the self. His position thus goes back to Montaigne's subjectivism, but with at least two differences: first, Rousseau is less skeptical about the possibility to reach authenticity; second, while for Montaigne the existing social order is the best possible one, for Rousseau social relations are the origin of competitive passions and of false identity. Hence, the re-appropriation of authenticity requires a work of liberation from social conditioning. The internal transformation of the individual is the prelude to a social transformation: from a society based on competition to a community based on solidarity and *philia*.

Pulcini observes that Rousseau's utopia is aporetic for three reasons, that we can now read in the light of Bianchi's above quoted criticism. First of all, it applies to small communities, but not to large, modern societies; second, the communitarian ideal of *philia* requires a repression of the passional part, a renounce to *pathos* and to the vitality of competition, so that the 'authenticity' that should save social cohesion is partly inauthentic; third, since the alternative values of solidarity and *philia*, responsibility and care, that should animate the new community, are typically associated to women, Rousseau is the starting point for an ambiguous characterization of female identity: while conserving its utopian value of an 'authentic' alternative, it appears based on a partial sacrifice and on an 'inauthentic' repression of its passional part. As we will see, in the economic debate on social capital there are many traces of the contraposition of community and society, two concepts on which we will have to insist again.

Before doing that, it is worth paying attention to the important change in the organization of social life brought about by the advent of democracy. Tocqueville, one of the best interpreters of such change, emphasizes its effects in terms of increased equality. Giving each one the illusion of independence, equality tends to erode social ties and to generate atomization, anonymity and massification. These, in turn, weaken individual identity, since individuals are left with an illusionary power of choice among a great amount of available possibilities, but without social roots and ties that may orient them in the choice. Therefore, to unlimited desires of material goods corresponds a general sense of anxiety and dissatisfaction. The vital power of the struggle for life and of competition, present from Hobbes to Smith and criticized by Rousseau, disappears

in front of Tocqueville, leaving a man without passion, characterized by an *aurea mediocritas*: the *bourgeois*. Such individual appears free and independent, but also weak and disoriented, and therefore shows a paradoxical need of authority – one of the sources of the possible authoritarian degeneration of democracy. More generally, even without or after totalitarian degenerations, the egalitarian tendency of democracies may lead to a homologation of lonely masses, whose individuals are indifferent to one another and are only linked by their private economic interests. The fear of such scenario appears in some contemporary analysis of social capital.

While Tocqueville identifies so clearly these potential effects of democracy, he also observes that democracy is able to generate an internal remedy, since it promotes associational activity. Atomization and massification push individuals into loneliness and weakness, but civil associations may restore social ties and correct individual weakness with the strength of the group. In the models developed in the second part of this work both the risk of social capital erosion and the integrating potential of associational activity are taken into account. Thus, they have somehow a Tocquevillean flavor, but more emphasis on economic mechanisms of substitution than on the role of democratic equality.

We may observe, as far as the relationship between civil society associations and state is concerned, that, as pointed out, among others, by Donati (1991), there is a difference between Europe and the US. In Europe, where there was a history of strong states, associations arose with a strong component of private self-protection from the state, in opposition to it, but also under its regulation. In the US, on the contrary, associations were since the beginning a different phenomenon: they were not born under state control, for authorization by the government, but it was rather the government to be controlled by the civil society organized in associations.

As a last observation, let us come back to the relationship between 'community' and 'society'. From Tönnies' concepts of *Gemeinschaft* and *Gesellschat* to the contemporary sociological debate, such terms has received a lot attention. Donati (1991) recognizes their importance, but does not oppose them; rather, he sees the community as an intermediate element between private and public. Even when the society is mainly organized as a *Gesellschat*, with a prevalence of formal and contractual aspects, nonetheless informal relations, social *status*, social norms and other aspects typical of the *Gemeinschaft* still play a great role. This is particularly evident precisely in the associations of the civil society. According to Donati, this is also the basis of the special role played by associations in determining common good in contemporary societies, but to consider this aspect we need to turn to the the normative side of the concept of social development.

2.2 Social development

2.2.1 Individual identity and satisfaction

As pointed out at the beginning of this chapter, the normative aspect intrinsic in the word social 'development' is problematic. Connected to the question of identity, social development should be a condition that favors a 'good', satisfactory construction of identity. Though, satisfaction is not necessarily an appropriate criterion to evaluate the 'goodness' of either an individual identity or of a social environment. It is an appropriate criterion when individual purposes (or preferences) are given – as in standard economic models –, but this may not be the case in the process of construction of one's identity. This is one of the reasons why it is difficult to tackle such themes within an economic framework. From this point of view, in the modelling part of the present work we stick to the economic approach, without tackling any issue of identity formation. Though, we believe it is worthwhile to discuss here different approaches, both as sources of questions and as indications of possible answers.

Arendt's analysis provides an interesting consideration about satisfaction. According to her, the vital sphere, encompassing all the 'natural' aspects of human life, is always characterized by a cyclical sequence of labor and consumption, of pain and relief from pain, of regeneration and exhaustion. Satisfaction, if it is something stable, has more to do with *homo faber* than with *animal laborans*, that passes constantly and cyclically from a state to the opposite one. *Animal laborans* cannot be satisfied and a society dominated by labor and consumption cannot generate stable satisfaction, however rich it is. This perspective points to a sort of paradoxical condition of contemporary society: stable satisfaction cannot come from a replication on enlarged scale of the vital cycle, but only from a re-appropriation of other aspects of human life.

Pulcini seems to agree with this perspective, since she describes contemporary individuals as stuck in a condition of 'loneliness and conformism, self-realization and lost identity, omnipotence and weakness, unlimited freedom and rise of more invisible and totalitarian forms of control'. She argues that such condition has its origin in the constitutive ambivalence with which modern individualism has emerged. Her thesis is that the deep root of this crisis lies in the *deficit of solidarity* that characterizes since its birth modern individual, 'that conceives social tie, relation with the other, purely in *instrumental* terms, as a necessary *medium* to the realization of its interests and desires'. Correspondingly, she identifies the 'solution' in the 'possibility of social tie not just as a *mean* but also as an *end*'.

Let us consider first the criticism of the instrumental dimension and then the deficit of solidarity.

2.2.2 Instrumentality and communication

In Arendt's analysis the instrumental dimension is the peculiar characteristic of *homo faber* when it produces objects of use, that is to say, when the end of

its work is just a mean to satisfy other ends, and so on, along a chain that a coherent utilitarianism may drive *ad infinitum*. While the Greeks refused such perspective and denied any access of *homo faber* to the public life of the *polis*, in modern age public life appears dominated by the principle of instrumentality and utility.

Being subject to the constant vital cycle of birth and death, pain and relief, labor and consumption, *animal laborans* cannot shape a stable world *per se*, whereas *homo faber* can, since its production is not immediately followed by consumption, but rather results in objects of use, which have a longer duration and shape an artificial, human world. The emergence of *animal laborans* from the private sphere and its progressive dominion on the material and social world happens, according to Arendt, through a contamination of its 'natural' dimension with the 'artificial' dimension of *homo faber* and through a relegation of *zōon politikon* from the public to the private sphere. This passage tends to establish the instrumental logic as the organizational principle of the whole society and to reduce the distance between consumption and use: while everything tends to be evaluated in terms of utility, the speed of consumption increases and even objects that used to be durable tend to be quickly consumed and changed. This generates an acceleration of time, studied, among others, by Hirsch (1976), on which we will come back again. For the moment, let us consider a bit more deeply the meaning of the extension of the instrumental perspective.

An interesting reflection from this point of view is due to Habermas (1981), who opposes communicative action to instrumental (or strategic) action. The idea of communicative action refers to a situation of interaction among subjects able of language and action, who establish an interpersonal relation and define at the same time themselves and a common world. Here language and interpretation assume a central role, since language, and not power or wealth, is the specific *medium* of interaction. Indeed, in several social sciences it is recognized that the instrumental perspective is not autonomous, since it always presupposes purposes, but the definition of purposes always presupposes a horizon of sense, which is not innate, but rather developed first of all through communicative actions[5]. Habermas' perspectives subtracts action, interaction and interpersonal relations to a necessarily instrumental conceptualization and thus comes close to Pulcini's worry; on the other hand, it has some elements in common with Arendt's *zōon politikon*, who, in Aristotelian terms, was fundamentally *zōon logon ekhon*, that is to say, able of language.

A deeper analysis of all the relations among these authors would lead us too far and is therefore omitted, but the discussion conducted so far already sheds light on two aspects of contemporary economics. First, economists are

[5]See, from this point of view, Greimas (1983) for semiotics. Heidegger (1927) develops an articulated philosophical discussion of the relationship between objects, their usability, the concept of world, the plurality dimension of *Mit-Dasein* and the opposition of an 'authentic' to a 'dejective' condition. Weber (1919) opposes *Zweckrationalität* to *Wertrationalität*: the first one (instrumental rationality) requires to act taking into account all the calculable consequences of one's action; the second one (value rationality) requires to act according to what is right, recognizing that not all consequences may be calculated.

used to think of rationality just in terms of instrumental rationality and thus to describe individuals as maximizers of a utility function; second, the object of this utility function is usually private consumption. The reason for this choice might not be strictly philosophical or analytical. If Arendt is right, this choice also reflects an anthropological change that characterizes modern and contemporary societies: the progressive identification of *animal laborans* and *homo faber*, at the expenses of *zōon politikon*. The standard economic paradigm should not therefore be criticized on this ground, but rather appreciated, and maybe this is one of the reasons of its undoubtable success. Moreover, while the maximization of some function is just an analytical tool that can be useful to represent any purposeful action, the specification of the arguments of this function brings about additional and non trivial anthropological considerations.

As expressed by Pulcini's worry, the identification of rationality with instrumental rationality may have the effect of relegating relational and communicative passions, like the desire of being together and to construct and share a common world of sense, to either irrationality or to unconsciousness. When this happens, individuals, 'rational' but isolated, may experience a *deficit of community*, and the repressed need may let communities re-emerge in regressive and violent forms. It is indeed quite common to see new communities based on invented identities and on a simple contraposition of 'we' vs. 'they': this is easily explained as an effect of such removal. Again, since this is just an introductory note, we do not insist on the psychological aspects of removal and repression, but rather limit ourselves to a final note on the *deficit of community*.

2.2.3 Social development, community and reciprocity

If the progressive identification of *animal laborans* and *homo faber* at the expenses of *zōon politikon*, implicit in modern individualism, with its emphasis on instrumentality and consumption, tends to weaken the communicative and communitarian aspects of life and to relegate them to the private sphere, many authors see a solution in a strengthening of those spheres of interaction that are based on the symbolic codes of solidarity and reciprocity. There are some differences between these two concepts, but we do not tackle them here. Pulcini and Donati, for instance, prefer to speak of solidarity, Polanyi and Zamagni of reciprocity, but one has the feeling that they are all talking about the same phenomena. Let us now consider these authors.

Pulcini emphasizes the paradigm of gift, whose engine is the desire of a link, of a relation. A gift is neither fully self-interested nor totally altruistic, it starts a game of reciprocity, of symbolic exchange which does not take place at predetermined terms and time, but is rather intrinsically uncertain, expresses trust and starts from a recognition of non self-sufficiency. In gift giving the other assumes a special value, since it gives us back the (relational) sense of ourselves: the relation with the other is not just instrumental. It is interesting to notice that a similar consideration is valid for Habermas' communicative action: it builds social relations, sense of identity and shared sense of a common world.

Polanyi (1977) identifies reciprocity as one of the three main forms of inte-

gration of human economy, together with redistribution (typical of centralized systems) and exchange (typical of dispersed market interaction). As ancient models of these forms, we can think, for reciprocity, of the complex game of gift exchange in the Trobriand islands studied by Manlinowski (1922), for redistribution, of hunting societies, and for exchange, of local markets in Greek *poleis* and in Israel. A contemporary example of reciprocity comes from Akerlof's (1982) analysis of efficiency wages as partial gift exchanges: since then economists have started to pay a lot of attention to such aspects. On a similar position is Blau's (1964) idea of social exchange. Polanyi observes that, as a form of integration, reciprocity presupposes a symmetric social structure[6]. On the other side, symmetric social structures may persist just as long as individuals orient their actions to reciprocity. Such symmetry is indeed present in small communities, like friends and peer groups, but not at the level of the whole society. This limits intrinsically the potential of reciprocity as a form of integration. As Rousseau's utopia, it does not apply to large and open societies. In particular, in advanced contemporary societies openness, social, economic and cultural differences and individual mobility determine the non-existence of a society-wide symmetric organization. Therefore, reciprocity cannot become an integrating principle for the entire society of for the whole economy: it may be a principle of local organization.

On the other side, such symmetric and reciprocal orientation, with its aspect of gift exchange, is present not only in primary communities, but also at the level of many associations of the civil society, like voluntary groups and non-profit organizations, to which some authors refer as 'third sector' (Donati[7]) and 'civil economy' (Zamagni). Even though primary communities and associations differ in the degree of formal organization and in some organizing principles[8], they both play a special role in producing non-instrumental relations. According to Zamagni (1997), their relevance lies respectively in generating trust and in generalizing it beyond the narrow borders of primary communities. Through this process, this sphere of economic and social interaction, although limited, may play an important role for social development as a whole. Moreover, it may contrast the potential dissatisfaction created by the positional competition investigated by Hirsch (1976).

From the present discussion it seems possible to conclude that the development of reciprocity-based relations and interactions plays an important role for social development as a whole. Though, this conclusion needs a *caveat*. If society is composed of different groups, 'social development' of single groups does not immediately translate in an improvement for everybody. Indeed, gift exchange, reciprocity and solidarity may be practised selectively, so that they can exclude some people or groups at the same time as they include other ones.

[6]Pulcini argues that gift exchange is not based on symmetry, but her aim is to distinguish it from the pre-determined symmetry typical of the exchange of equivalents on a contractual basis in markets.

[7]Donati (1991) sees the specificity of the associations of the 'third sector' in the fact that they generate new social autonomies.

[8]See e.g. Cella (1997).

Associations that establish bridges over given social cleavages may therefore play a crucial role for social development. We come back to this question in Chapter 3, when talking of social capital.

In conclusion, in light of the historical changes brought about by modern individualism, Rousseau and Tocqueville's intuitions about the potential value of non-competitive motives and of associational activity are still good starting points to think of social development. Yet, a simple re-proposition of their ideas is neither sufficient nor useful. Rather, the task that remains open is to investigate in a deeper way the connections between social and economic dynamics in contemporary societies.

From the point of view of economics, we can say that we are still at the beginning of such analysis, so that the results that are currently developed should be taken as progressive steps and not as final results. This premise allows us to go back to the difficulty to evaluate social development, if defined in connection to identity issues, in terms of satisfaction. We have acknowledged this difficulty at the beginning of the present section. Yet, since identity has not yet entered economic models in a full way, the models developed in Chapters 5, 6 and 7 assume the 'traditional' perspective of welfare economics and consider satisfaction as an adequate normative criterion to evaluate at the same time (and in a unified way) the effects of both economic growth and social development. There are two differences with respect to the traditional approach: first, utility is evaluated on both private and 'relational' goods (a concept discussed in Chapter 4), so that satisfaction is not a simple monotonic transformation of economic performance and consumption level; second, the introduction of social capital allows us to consider social development in terms of its accumulation. Chapter 3 is devoted to the analysis of social capital.

Chapter 3

Social capital

3.1 Introduction

The attention paid by economists to social capital has been rapidly increasing in the last decade. The term social capital was rendered popular by the contributions of Coleman (1988, 1990) and Putnam (1993, 1995)[1] and by now the World Bank (2002) has an excellent internet site with an entire electronic library on the subject.

Coleman starts with the consideration that social interaction brings about long lasting patterns of relations, which constitute a resource available to individual actors. Such a resource may be accumulated or depleted over time and is defined by its 'productive' function: it allows actors to reach goals otherwise not reachable - or it diminishes the cost of reaching them. Thus, it may be thought of as a peculiar form of capital, namely a 'social capital', whose specific characteristic consists in the fact that it is not incorporated in physical goods or in single human beings, as physical and human capital, but rather in social relations: it is an attribute of social structures. Examples of social capital are the level of trust and the information potential incorporated in relations, the existence of civic norms with effective sanctions, and the presence of hierarchical and horizontal relations and organizations. A critical difference between social capital and other forms of capital, stressed by Coleman, is that it presents a key aspect of public goods: 'As an attribute of the social structure in which a person is embedded, it is not the private property of any of the persons who benefit from it'. This poses a problem of under-investment, since 'there will be in society an imbalance between the relative investment in organizations that produce private goods for the market and in organizations (often voluntary associations) from which the benefits are not captured - an imbalance in the sense that if the positive externalities created by such social capital could be internalized,

[1] Earlier contributions on social capital include Loury (1977), who investigates the influence of social environment on the development of individual human capital during childhood and youth, and Bourdieu (1984, 1986), who has received little attention by economists because his approach is quite far from the economic one.

it would come to exist in greater quantity'. Thus, private investment in social capital could fall short of the social optimum; on the other hand, if social capital is accumulated through interaction among individuals, public provision cannot be a solution either. One of the key contributions of social capital, according to Coleman, is to the accumulation of human capital: it is much easier to develop individual skills in a socially rich environment than in a socially poor one. Since human capital accumulation constitutes an engine of growth in advanced economies, social capital appears in a way as a deep root of growth processes.

Putnam (1993a) investigates the link between social capital and economic and political performance in Italy and finds that a great part of the difference in development between Southern and Northern Italian regions is 'explained' by the different presence of networks of horizontal organizations, which is a historical heritage and constitutes a form social capital[2]. In particular, he shows that local governments are more efficient where civic engagement is stronger, and argues that civic engagement is strictly related to the presence of horizontal associational networks. In other works (1993b, 1995a, 1995b, 1996, 2000) he extends the analysis of social capital. In particular, applying it to the U.S., he argues that the stock of American social capital has been declining in the late Twentieth Century, mainly due to the disappearance of the 'civic generation', come to age between the Great Depression and World War II, and to television, that keeps individuals apart from one another. Nevertheless, his last work also discusses some signs of revival.

Already in these contributions, the authors do not always refer the term social capital to the same thing: Putnam's definition is relatively narrow, whereas Coleman's one is broader. The World Bank now defines social capital at the broadest level as 'the norms and networks that enable collective action'[3]. Different authors have proposed still different definitions, so that by now 'social capital' denotes more a whole strand of research than a single concept. Our first step is consequently to review the various theoretical definitions and to provide a conceptual clarification. Next, we consider the empirical problem of measuring social capital and its effects. The subsequent step is to analyze the process of social capital accumulation. Finally, we consider some policy implications, with particular attention to Europe.

3.2 Theory: what is social capital?

Let us start with a rather general definition of social capital - adapted from the World Bank - as the norms and social relations embedded in the social structure of a group that enable people to coordinate action to achieve desired goals[4]. This definition deserves some comments. First of all, the group considered

[2]Putnam emphasizes that the process of social capital accumulation takes centuries. Paldam and Svendssen (2000) observe that, if this is the case, the term 'capital' is not appropriate: one should better speak of an exogenous background variable.

[3]See e.g. Grootaert (1998) for a review.

[4]Narayan (1999) defines social capital this way, but considers directly entire societies instead of single groups.

might consist of only one individual, at one extreme, as well as of the whole society, at the opposite extreme; correspondingly, we can define social capital at the individual as well as at the aggregate level, and we can choose between focusing on a specific group or on the society as a whole. Secondly, social capital consists of norms and social relations, which are attributes of the social structure. They can be reinforced or weakened over time, but at a given point in time they constitute a stock. Third, this stock is 'productive', in the sense that it allows group members to reach their goals. Such goals may concern standard output and income, but may also concern socially provided goods, like status and friendship. Moreover, the goals pursued by one group may be in accordance or contrary to those of other groups, so that social capital may display both positive and negative externalities (for instance, it may serve cooperative as well as rent-extracting purposes). Fourth, social capital is both accumulated and displays its effects through social interaction: it is this way that norms and relations are reinforced or weakened and it is this way that coordination among people is achieved. Such coordination may take place at two levels: either within the group members ('bonding social capital'), or with non-members ('bridging social capital'). There is an intrinsic difficulty in the aggregation of social capital, because what is productive for a group may either hurt or benefit a different group: if we collect together groups with a strong 'bonding' social capital, we do not necessarily end up with a high aggregate level of social capital; 'bridging' links play a crucial role. For this reason, it is useful to work both with an individual-level definition of social capital and with a group-level one. In the literature both are present. Let us consider them in turn.

3.2.1 Individual social capital

Glaeser, Laibson and Sacerdote (2000) propose to define individual social capital as an individual's social skills, which are partly innate ('e.g., being extroverted and charismatic'), but partly cultivated (e.g., popularity), i.e., they are the result of an investment. Social skills enable an individual to 'to reap market and non-market returns from interaction with others. As such, individual social capital might be seen as the social component of human capital'[5]. Not all of the social skills which are beneficial to an individual are also beneficial to the aggregate outcome of social interaction: for instance, the ability to persuade others that you are trustworthy when you are not generates a negative externality (think e.g. of some sellers of encyclopedias or of used cars), whereas the ability to induce others to participate to a socially beneficial project generates a positive one. Moreover, the same social skills may be used sometimes to increase aggregate outcome, but sometimes only to increase the slice reaped by their owner, with a possible aggregate loss. This problem makes it difficult to aggregate individual social capital over a whole economy (or even over a group),

[5]This notion of social capital is close to that of emotional intelligence, discussed by Goleman (1995, 1998). Notice that, in terms of our previous definition, in this case there is evidently no 'intra-group' interaction, but only 'external' interaction.

since one should incorporate 'all of the cross-person externalities generated by the different types of individual social capital'. The consequence is that 'the determinants of social capital at the individual level may not always determine social capital at the society-level'. On the other side, the big advantage of this framework is that it allows studying individual decisions of investment in social capital with standard investment models, which provide predictions that can be confronted with the data. Glaeser, Laibson and Sacerdote perform such exercise and find that individuals invest in social skills in the same way as they invest in human capital.

Two remarks are in order. On one side, Glaeser, Laibson and Sacerdote's definition of social capital does not really fit the definition we have given above, since they focus on individual characteristics and not on traits of the social structure. As they recognize, what they are analyzing is the social component of human capital, which, for the sake of clarity, should perhaps be kept separated from the concept of social capital. On the other side, the amount of social skills belonging to an individual is highly correlated with the amount of his or her social connections, an aspect that is better compatible with our definition.

In this spirit, DiPasquale and Glaeser (1999) define individual social capital as an individual's connections to others and argue that it matters much for private provision of local amenities and of local public goods[6]. They also investigate empirically whether homeownership increases investment in local amenities and social capital and find that indeed it does, especially because it reduces individual mobility[7]. We discuss this last point in Section 4.

3.2.2 Group social capital

At the aggregate level, definitions of social capital tend to focus either on the density of trust, which facilitates collective action and reduces free-riding, or on networks of civic engagement and of horizontal associations, following Putnam. Although these two aspects overlap to some extent, so that it is often not easy to distinguish between them, they have given rise to two strands of the literature[8].

[6] As we mentioned above, since in this case the productive role of social capital is not related to traditional private production, but rather to production of 'relational goods' and of local public goods, a consequence is that its effects are not necessarily registered in the GDP.

[7] The link between social capital and mobility is studied as well by Schiff (1992), with particular attention to welfare effects. Schiff proposes a definition of social capital which is very close to Coleman's one and argues that migration processes bring about a negative externality: who migrates imposes on those left behind a cost that is not internalized. Schiff (1999) makes the point that trade liberalization may be better than labor market integration, because it does not have the same drawbacks in terms of negative externalities.

[8] There concept of social capital is related to a certain number of other concepts. Narayan (1999) discusses its relationship with the notions of social capability (defined by Adelman and Morris and popularized by Sen), of social exclusion and of civic engagement. Corneo and Jeanne (1999) study the connection between growth and social organization, a concept related to social capital but independent of it. Cole, Mailath and Postlewaite (1992) is a classical reference of the contribution on the link between social norms and growth. Hirsch (1976) provides an earlier analysis of the social limits to growth, although, at his time, the notion of social capital had not yet been invented.

A) Trust

Although at first sight very intuitive, the notion of trust is quite hard to define theoretically in a clear-cut way. There is a huge literature on this topic, but its subtleties are probably not so relevant for an aggregate theory of social capital, especially when it comes to the empirical side[9]. A relevant feature of trusting behavior seems to be that it exposes an individual to the risk of being worse off, if others behave in a purely selfish way[10]. A key effect is that trusting others may make them more trustworthy. If this happens, the advantages of cooperation may be exploited, if it does not, trusting people may be exploited by non-trustworthy ones[11].

Paldam and Svendsen (2000) define social capital as 'the density of trust within a group' and notice that 'the group may be extended to the whole society', consistently with the definition we gave above. They discuss the link between social capital theories dealing with goodwill (management), credibility (macroeconomic policy), cooperative solutions (game theory) and group norms (anthropology and psychology), and point out three possible, non mutually exclusive approaches to social capital: as a factor in a production function, as a factor that reduces transaction costs and as determinant of monitoring costs.

Fukuyama (1995a, 1995b) identifies social capital with trust and argues that it determines the industrial structure of an economy. Germany, Japan and the United States, for instance, are high trust societies, where trust is not restricted to the family, but rather generalized, whereas Taiwan, Hong-Kong, Italy and France are examples of low-trust societies. In the former group of countries it is easy to find giant, professionally managed corporations, because people are bet-

[9]Williamson (1993), for example, discusses various examples and definitions of trust present in the literature, from Ben-Porath (1980) to Coleman (1990), and argues that the term trust is often abused, since in many cases 'trusting' behavior can be easily explained in terms of a calculative (i.e. maximizing) response to the incentive structure, as soon as one takes into account not only material rewards, but also social and psychological ones, as it is done, e.g., by Huang and Wu (1994). Hence, he proposes to confine the term trust either to special personal relations like friendship, love and kinship, or to describe features of the institutional environment in which contracts and transactions are embedded. An example is given by the trading networks of diamond dealers, which allow them to monitor each other closely and thus to operate to a high degree on the base of 'trust', as noticed, among others, by Granovetter (1985). La Porta et al. (1997) summarize as follows the two main ways economists look at trust. In the context of game theory, and specifically in repeated games, trust is seen as 'a prior that an opponent is cooperative rather than fully rational': in a situation of repeated prisoner's dilemma, the higher this prior, the higher cooperation, as pointed out by Kreps et al. (1982). A second view comes from the experimental observation that 'people cooperate even in one-shot encounters', displaying trusting behavior, often associated with a concern for fairness. Rabin (1993) proposes a way to incorporate fairness into game theory and economics. The working of fairness and trust renders in some context gift giving economically preferable to market exchange. Arrow (1982) and Akerlof (1982) explore in two in interesting ways this kind of implication.

[10]Often trust is discussed in connection with non-selfish motivations. Sugden (1993), for instance, explores the possibilities of cooperation opened by thinking as a team.

[11]Berg, Dickhaut and McCabe (1995) present experimental evidence both that 'trusting' behavior, motivated by expected reciprocity, is widely present even in one-shot interactions, and that higher trust increases trustworthiness. See also Hackett (1994).

ter able to cooperate on an enlarged scale, whereas, in the latter group, smaller, family-owned and -managed firms dominate the industrial structure[12]. In general, Fukuyama argues that the strength of family ties may be detrimental to the emergence of large organizations, and that, where familism is not accompanied by a strong culture of work and education, it may lead to stagnation, as pointed out, e.g., by Banfield (1958)[13]. This does not automatically imply that high trust, and hence large companies, are *per se* better performing or even better for aggregate growth, since what they gain in scale may be lost in flexibility and rapidity of decision making. The economic success of Northern Italy provides a good example.

The theoretical relationship between trust and growth is investigated by Zak and Knack (2001) through a moral hazard model, in which formal and informal institutions determine the amount of monitoring that a principal needs to exercise over an agent. They argue that 'informal sanctions depend on, or are facilitated by, social ties', which can be captured by a notion of social distance, and that monitoring costs and risk aversion may make low trust societies have lower income and lower investments, and thereby lower growth. Moreover, they add that trust is lower in more heterogeneous societies because a higher social distance among actors weakens informal controls. As a consequence, in such societies growth may be lower as well: there may be a 'low trust poverty trap'.

Indeed, one can observe that their model deals more with informal sanctions than with trust: once we consider the incentives induced by such sanctions, we can avoid any reference to trust without conceptually losing anything (in Williamson's words, 'calculative trust is a contradiction in terms'). The point is that trust is the complex product of a structure of social relations, of the interactions that take place in it, and of how these shape individual identities and motivations, and finally behaviors. So let us now turn to a more structural point of view.

B) Social norms and networks

As we pointed out above, Putnam defines social capital in terms of networks of civic engagement and of horizontal associations. Norms and associations are a relatively stable attribute of a social structure, and can be thought of as a stock. They arise through social interaction and they shape the way individuals interact with one another, so that social interaction (a flow) is both a source of social capital and the means through which it displays its productive services. If a norm of cooperation or of participation is effective, those behaviors that are in accordance with it will also appear quite stable. This has generated

[12] Ichino and Maggi (2000) document empirically for a large Italian firm that the level of shirking is higher in those regions where social capital is lower.

[13] La Porta et al. (1997) find Fukuyama's argument widely confirmed by the data. Controlling for GNP in 1994 in a cross-country regression, a standard deviation increase in trust raises the share of the twenty largest firms of an economy over GNP by half of a standard deviation. Moreover, in a regression of such share on both a measure of trust in strangers and a measure of trust in family, the former coefficient is significantly positive, whereas the latter is significantly negative: 'strong family ties are bad for the development of large firms'.

some confusion in the theoretical definition of social capital, since the term is sometimes referred to the stock of social norms and networks and sometimes to the specific form of interaction that arises out of it. This has led some author, for instance Bowles e Gintis (2000), to abandon the term social capital in favor of something they perceive as more precise. In particular, Bowles and Gintis prefer to speak of community governance, arguing that it is often the case in the literature that the term social capital is referred to what groups *do* rather than to what they *own*, and such aspect is better captured by the notion of community governance - as opposed to the governance mechanisms of the state and of the market - than by the notion of social capital. Notice, however, that considering just the community of direct and frequent interactions, expressed by Bowles and Gintis' idea of community governance, is restrictive, since it may overlook the strength of weak ties, stressed e.g. by Granovetter (1973) and by Narayan (1999), and the relevance of generalized trust, as we have discussed above[14].

Aware of such conceptual problems, Fukuyama (1999) proposes to change his previous definition of social capital in terms of trust into the following one: 'social capital is an instantiated informal norm that promotes cooperation between two or more individuals'. He argues that 'by this definition, trust, networks, civil society, and the like which have been associated with social capital are all epiphenomenal, arising as a result of social capital but not constituting social capital itself'. One crucial aspect of such definition is the extent of validity of the norms considered (also referred to by Fukuyama as the 'radius of trust, that is, the circle of people among whom cooperative norms are operative'). This leads to a more precise specification of the group (or institution) to which one refers the term social capital. A second crucial aspect is that cooperation within a certain group may have positive as well as negative external effects on other groups. For instance, the degree of participation to associational activities does not necessarily increase aggregate (society-level) social capital, as hypothesized by Putnam: Olson (1982) emphasizes that the purpose of some groups is to exert a distributive pressure, i.e. to seek rents, and that active participation to such groups indeed increases the level of distributive struggle in a society and decreases social capital.

Both these aspects - the extension of the group and the kind of external effects - are captured by Collier (1998). He starts with a definition of social

[14]It is nevertheless interesting to report Bowles and Gintis's words: 'Disenchanted with utopias of either the left or the right, as the century drew to a close, and willing to settle for less heroic alternatives, many came to believe that market failures are the rule rather than the exception and that governments are neither sufficiently informed or sufficiently accountable to correct all market failures. Social capital was swept to prominence not on its merits, but the defects of its alternatives. Those to the left of the center are attracted to the social capital idea because it affirms the importance of trust, generosity, and collective action in social problem solving, thus countering the idea that well-defined property rights and competitive markets could so successfully harness selfish motives to public ends as to make civic virtue unnecessary. Proponents of *laissez faire* are enchanted because it holds the promise that where markets fail – in the provision of local public goods and many types of insurance for example – neighborhoods, parent teacher associations, bowling leagues, indeed anything but the government, could step in to do the job'.

capital in terms of those externality-generating social interactions which are either themselves durable or whose effects are durable[15], and he carefully distinguishes among the various institutional levels at which social capital may be present: the family, the firm, the government and the civil society[16].

Social capital at the firm level is the easiest one to study. As already noticed by Coleman, the internal organization of a firm is intentionally designed to make profits, so that this is one of the few cases in which social capital is the product of a specific investment and not just the by-product of other activities. Such aspects are widely studied in management and business disciplines, although without any reference to the notion of social capital. A proof of their relevance is the amount of money that firms spend not only to design internal structures, but also to train managers and workers to work in groups: management consultants and labor psychologists are often very well paid to provide such training, evidently because it pays off. Inter-firm linkages, typical, for instance, of industrial districts, constitute a second form of firm-level social capital. Signorini (2000) presents a very detailed analysis of the Italian case, which helps to understand how the success of many small Italian firms relies upon external economies that compensate the scale disadvantage[17].

Coming to the family, we have noticed above that Fukuyama and Banfield, among others, emphasize the possible contrast between strong family ties and more aggregate levels of social capital. Family is indeed the primary source of narrow trust, i.e. trust in peer or primary groups, but whether or not trust generalizes and extends beyond kinship relations depends to a high degree both upon the kind of interaction that takes place in the intermediate structures of the civil society, and upon the well functioning of the government, which can provide, for instance, a reliable judicial system.

As we have seen, Putnam emphasizes the first aspect, i.e. participation in associational networks at the level of the civil society. However, whether trust remains confined within certain groups or generalizes beyond their scope depends to a high degree on whether groups form along social cleavages or across them: one needs to look at the specific kind of social participation and not just at the density of associations, although the latter one may be sometimes the best empirical proxy available.

As far as the link between social capital and the well functioning of government is concerned, Narayan (1999) points out it is not univocally of substitution or of complementarity, since when either of them is poor, the other one may work as a substitute, but if both of them are rich, they indeed work as complements (he also provides a detailed discussion of the empirical evidence available)[18]. Exactly the fact that formal institution (market and state) are not

[15] Such definition is not very sharp in terms of distinguishing between stock (social capital) and flow (social interaction), but it has the advantage of focusing on externalities.

[16] The World Bank site now also considers communities, ethnicity and gender as specific sources of social capital, particularly relevant in the context of development.

[17] See also Mazzola and Bruni (2000), who focus on inter-firm linkages in southern Italy, and Saxenian's (1994) comparative analysis of the success of the Silicon Valley and the decline of Route 128.

[18] In a similar vein, Bowles and Gintis (2000) consider that 'well-designed institutions make

working properly may increase reliance on primary groups: what Rose (1998) claims happened in Russia after the collapse of Soviet Union, but he also points out that such reliance on primary groups had been previously fostered by the extreme centralization and had emerged as a way of defending oneself from the invasion of the state. Another interesting example of how government, family and civil society interplay to shape trust, norms and connections (social capital) at the level of some groups, but with troublesome extensions to the whole society, is Gambetta's (1993) analysis of the Sicilian Mafia.

The problem is that social capital tends to exert positive aggregate effects when trust, norms and networks that foster cooperation extend beyond primary, ethnic, linguistic or even income groups and form 'bridges' among different groups. This last point is made with particular strength by Narayan (1999), who observes that the same links that keep together the members of a group may also exclude the non-members, and who displays an analytical framework to study 'bonding' and 'bridging' (i.e. intra-group and inter-group) social capital at the level of the civil society, together with its connections to the functioning of the state.

3.3 Empirical evidence: social capital and aggregate performance

There is by now a wide empirical literature on the effects of social capital on aggregate performance. The World Bank considers a list of eleven broad topics to which social capital is relevant. Here we analyze only some of them: in particular, we consider empirical evidence on the effects of social capital on growth, trade and migration, finance, government performance, education, crime and violence.

Social capital and growth

Knack and Keefer (1997) examine various possible empirical proxies for social capital, corresponding to the different aspects emphasized by the theoretical literature, and assess their impact on growth. They discuss three main relationships: between trust and civic norms and economic growth; between associational activity and growth; and between trust and civic norms and their determinants, including associational activity and formal institutions. On the latter aspect we shall come back in the next section. Let us consider here the first two ones. Knack and Keefer consider data from the World Value Survey for 29 market economies between 1981 and 1991. As a proxy for trust (TRUST) they take for each nation the percentage of respondents that most people can be trusted (after deleting the 'don't know' answers) to the following question: 'Generally speaking, would you say that most people can be trusted, or that

communities, markets and states complement', whereas 'with poorly designed institutions, markets and states can crowd out community governance'.

you can't be too careful in dealing with people?'. This measure of trust exhibits a high cross-country variance and high serial autocorrelation within each country. To capture the strength of norms of civic cooperation, they construct a variable (CIVIC) on the base of the answers to various questions about how individuals evaluate some anti-civic behaviors. These two variables are highly positively correlated and both of them are designed to capture generalized trust and cooperative attitudes, rather than social capital at the level of a specific group. The first main finding of Knack and Keefer is that 'trust and civic cooperation are associated with stronger economic performance'. In particular, they find that one standard deviation change in TRUST is associated with a change in growth of more than half of a standard deviation. This result seems to be quite robust. The second question they address concerns the effects of associational activities, about which, as noticed above, Olson and Putnam have contrasting hypotheses. As a proxy for the density of horizontal networks in a society (GROUPS), they consider the average number of groups cited per respondent when faced with the question of whether they belong to any of a list of groups of ten kinds. The second main result is that 'associational activity is not correlated with economic performance - contrary to Putnam's (1993) findings across Italian regions'. They also split the data to identify the possibly contrasting effects of 'Putnamesque' and 'Olsonian' groups, i.e., of groups that 'involve interactions that can build trust and cooperative habits' and of groups with redistributive goals, respectively. The results are contrary to what the theory predicts, but, by admission of the authors, they should be regarded as only preliminary. Their relevance, rather than substantial, is methodological.

Zak and Knack (2001) perform a similar analysis, using the same variable for trust, but with more data. In particular, while Knack and Keefer's investigation concerns 29 OECD countries, Zak and Knack add to the sample 12 additional countries[19]. The effect of the larger sample is basically that it reinforces the statistical impact of trust on investments and growth. Moreover, they investigate the impact of formal institutions and social homogeneity, finding that they 'increase growth in part by building trust'.

A related empirical contribution is due to Temple and Johnson (1998), who show that indexes of 'social capability' constructed in the early Sixties, adapted from the work of Adelman and Morris (1967), are good predictors of long run growth for a wide set of developing countries. In particular, they find that a mass communication index is robustly correlated with growth and they argue that this may be due to the fact that 'it captures the social capital of developing countries'. Although these results are striking, it is a bit hard to understand exactly how one should evaluate them, because the social capability index used is quite composite and not so straightforward to interpret, and because it is not very clear how the index of mass communication is related to social capital.

Taken together, this evidence consistently shows that social capital, especially in the form captured by the variable TRUST, has a relevant impact on

[19]The data on 9 developing countries come from the World Value Survey wave of 1995-96; for Greece and Luxembourg the data are taken from the Eurobarometer surveys conducted in the Eighties; finally, data on New Zealand are found in a government-sponsored survey.

growth. Glaeser, Laibson, Sheinkman and Soutter (2000) address the question of what exactly TRUST measures. To this purpose, they use two experiments and a survey, and assess that standard questions about trust, such as the one reflected in TRUST, provide a better measure of the level of trustworthiness in a society rather than of trusting behavior. Nevertheless, they also assess the possibility to gain robust measures of social capital (trust) as an individual-level variable. In particular, measures of past trusting behavior predict an individual's trust better than abstract questions.

Social capital and government performance

Hall and Jones (1999) explain a relevant part of country productivity as due to institutions and government policies (what they call social infrastructures). Since these characteristics are endogenous, they propose a set of instruments. A growing amount of evidence is now showing that the quality of government is positively influenced by social capital. An in-depth investigation of the determinants of government quality is due to La Porta et al. (1999). They evaluate empirically the ability of economic, political and cultural theories to explain the observed quality of governments, according to different measures. Broadly speaking, they find that economic theories focusing on efficiency are rejected by the data; political theories focusing on redistribution are highly and robustly supported by the evidence (as instrument for redistributive tendencies they use ethnolinguistic heterogeneity and legal system); finally, cultural theories focusing on trust, social norms of tolerance and work ethic cannot be rejected. In particular, as an instrument for such cultural characteristics they use religion, in the spirit of Weber (1958), and find essentially that 'predominantly Protestant countries have better government than either predominantly Catholic or predominantly Muslim countries'. Such results prove to be robust to many alternative specifications and confirm earlier findings of the same authors[20].

One of the main functions of governments is to provide public goods. Alesina, Baqir and Easterly (1999) relate spending in public goods to ethnic division at the level of cities, metropolitan areas and urban counties in the United States. Their finding that 'more ethnically diverse jurisdictions in the United States have higher spending and higher deficits/debt per capita, and yet devote lower shares of spending to core public goods like education and roads' is consistent with the idea that 'heterogeneous and polarized societies will value public goods less'.

The relationship between the variables considered in these studies, like ethnolinguistic heterogeneity and religion, and social capital will be considered in the next section. Here, in turn, we pass to the analysis of the impact of social capital on education.

[20]La Porta et al. (1997) find that, controlling for GNP in 1994 in a cross-country regression, 'a standard deviation increase in trust raises judicial efficiency by 0.7, the anticorruption score by 0.3, bureaucratic quality by 0.3, and tax compliance by 0.3 of a standard deviation'.

Social capital and education

One of the possibly most relevant contributions of social capital is to the formation of human capital. This was very early recognized by Coleman (1988), who argued that the same basic individual skills have much better chances of being well cultivated and developed in a socially rich environment than in a socially poor one[21]. Goldin and Katz (1999), in a study on the development of secondary education in the United States and in particular in Iowa, acknowledge that, 'because educational decisions are made primarily at a local level in the United States, the production of human capital depends largely on social capital lodged in small communities'. As a measure of community-level social capital they use 'the amount of public resources committed to education as a fraction of the total resources of the community, given by income'. It is interesting to see that this 'indicator of educational commitment rises steeply during the 1910S and for most of the 1920S' and then rises again in the 150S, but it is harder to take it as a direct measure of community-level social capital. However, one further empirical observation supports this interpretation: 'one good reason for building schools in rural America was to stop the drift of the population to the cities', i.e., to save and promote community cohesion. The almost ubiquitous public provision of schooling is consistent with the view 'public funding was part of an intergenerational loan. According to this view, homogeneous communities, in which people tend to remain and take an active interest in each other, would be more likely to provide intergenerational loans'. Indeed, such communities were present in Iowa, one of the leading states in the development of schooling. In particular, 'smaller towns of Iowa had the highest rates of secondary school attendance', even though a more precise assessment of why this was the case turns out to be difficult.

A relevant problem in empirical analyses of the link between social capital and education is that there is an issue of reverse causation. Goldin and Katz find a strong correlation 'between an index of social capital today (combining measures of associational activities, social trust, and political/civic participation)' and 'the high school graduation rate in 1928'. They conclude that social capital has a double role of condition for accumulation of human capital and of handmaiden of human capital. The issue of how education determines social capital is also tackled by Helliwell and Putnam (1999), to whom we will turn in the next section.

Social capital and crime

It is intuitive that social capital, determining the degree of social cohesion, may have a relevant influence on the rates of crime and violence. Coleman (1990) already stresses this point. Glaeser, Sacerdote and Scheinkman (1996) explore this issue. In face of several possible empirical explanations of the high

[21] See also Benabou (1993), who deals with the problems of schooling in most diseased urban areas.

variance of crime across time and space, they take a sharp interactionist view, assessing that 'positive covariance across agents' decisions about crime is the only explanation for variance in crime rates higher than the variance predicted by differences in local conditions'. Patterns of local interaction thus seem to drive crime to a relevant extent, the more so as far as young people and petty crimes are concerned.

Social capital and financial development

Guiso, Sapienza and Zingales (2000) investigate the impact of trust on financial development. They argue that 'financing is nothing but an exchange of a sum of money today for a promise to return more money in the future. Whether such an exchange will take place depends upon not only the enforceability of contracts, but also the extent the financier trusts the financee. In fact, financial contracts are trust intensive *par excellence*. Thus, if trust matters, it should matter most for the development of financial markets'[22]. Their proxy for trust is different from standard survey measures, since they consider participation in elections and blood donation. They use data on Italian regions, which present the advantage of having the same 'legal, administrative, judiciary, regulatory and tax system', but at the same time very different levels of social capital, and assess that higher trust increases investment in stocks, access to credit and use of checks, whereas it reduces investment in cash and resorting to informal credit channels. Moreover, such effects appear to be more relevant where legal enforcement is weaker and among less-educated people.

3.4 Social capital accumulation

The theoretical and empirical literature considered so far shows that social capital, defined and measured in several ways, matters for a great variety of economic outcomes. This finding raises the questions of how social capital is accumulated and of whether its accumulation may be enhanced by policy intervention. We address the first question in this section and the second in the next one.

3.4.1 Theory

There is not much theoretical work discussing the determinants of social capital. According to Glaeser, Laibson and Sacerdote (2000), as we noticed above, this lack is due to the fact that most definitions and measures of social capital are aggregate ones, whereas economists are used to think of capital accumulation

[22]They also contrast two views of trust, as an equilibrium outcome and as a moral attitude imprinted with education. In the first case, individual trust should depend on retaliation opportunities; in the second case, 'an individual should retain the level of trust typical of the place where he grew up'. The data on the effect of individuals' trust suggest that most of it 'is due to the level of trust prevailing in the area where they live. But a significant fraction (roughly a third) of the effect is due to the level of trust prevailing in the area where they were born'.

as a result of individual investments. They therefore define social capital in terms of individual social skills, i.e. as the social component of human capital, and apply a standard model of individual investment. Such model implies that investment in social capital should increase with patience and with the relevance of positive externalities in the return to social capital investment (e.g., individuals invest more in social skills in those occupations where returns to social skills are higher[23]), whereas it decreases when are higher expected mobility (e.g., homeowners should invest more in social skills[24]), the opportunity cost of time, the rate of depreciation and the degree of community-specificity of social capital. Moreover, investment should decrease with age, but, assuming that individual endowment at birth is sufficiently low, the stock of individual social capital should first increase and then decrease with age.

This model is theoretically very clear, but it does not solve the problem of aggregation, so that aggregate determinants of social capital might be quite different from the determinants of investment in individual social skills. In the authors' words, 'understanding the link between individual and aggregate social capital is important, difficult, and best left to future research'.

If we consider group-level definitions of social capital, both in terms of trust and of social networks, the theory of social capital accumulation focuses on the individual problems of whether to trust or not and of whether to join a group or not.

As far as trust is concerned, Alesina and La Ferrara (2000b) admit that 'the theory of what determines trust is sketchy at best'. They consider 'five broad factors influencing how much people trust others: 1) individual culture, traditions and religion; 2) how long an individual has lived in a community with a stable composition; 3) recent personal history of misfortune; 4) the perception of being part of a discriminated group; 5) several characteristics of the composition of one's community, including its racial and income heterogeneity'. However, they do not display any formal model.

As far as participation in groups and associational activities is concerned, Alesina and La Ferrara (2000a) focus on population heterogeneity and argue that its link with social participation is theoretically ambiguous. On one hand, heterogeneity could increase the number of associations, since each group would like to have its own ones. On the other hand, heterogeneity may also increase the likelihood of mixed groups being formed. This, in turn, may reduce participation if individuals prefer to interact with others similar to them (e.g. in terms of income, 'race' or ethnicity[25]).

[23] This resembles the idea of firm-specific human capital.

[24] As we discussed above, DiPasquale, Glaeser (1999) investigate the relation between homeownership and investment in social capital (defined as an individual's connections to the others) and local amenities. In both cases, their model predicts that homeowners invest more than renters. Much of the effect is due to decreased mobility. The authors also warn that their model does not account for the possible costs of low mobility, so that one should be careful in drawing straightforward policy conclusions.

[25] They add that 'if preferences are correlated with these characteristics, then our assumption is equivalent to saying that individuals prefer to join groups composed of individuals with preferences similar to their own'.

3.4.2 Evidence

Let us now consider the empirical evidence on the accumulation of the different kinds of social capital (individual social skills, trust and social participation) and then on the extent of the decline of social capital assessed by Putnam.

Individual social capital

Using data from the General Social Survey in the U.S. from 1972 to 1998, Glaeser, Laibson and Sacerdote's (2000) find that their theoretical model (discussed above) fits well the data[26]. In particular, organization membership has an inverted u-shape over the life-cycle; the prediction that expected mobility reduces individual social capital seems to be consistent with the data, although they do not find a good instrument for expected mobility; more social occupations induce higher investment in social skills; the evidence on the impact of homeownership on group membership varies according to the kind of group (for instance, it is low for political groups and high for school service): in general, it seems that homeownership affects social capital more through its effect of reduced mobility than through patrimonial effects, i.e. through incentives due to expected changes in property value; investment in individual social skills might be indeed partly due to the opportunity cost of time, but it is very difficult to find a satisfying empirical assessment of this relationship; physical distance, unsurprisingly, affects negatively social connections; education and membership in organizations are positively correlated, as predicted by the theory, since patience increases both investment in human capital and in social capital; finally, the empirical evidence they find leaves the authors agnostic as to the relevance of interpersonal complementarities.

As a general point, one might notice that most of the empirical proxies used by Glaeser, Laibson and Sacerdote are more related with the rest of the literature on social capital than with their own definition as the social component of human capital. Indeed, they acknowledge that standard measures of individual trust and of organization membership do not capture in an obvious way what they define as 'social capital'.

As discussed above, DiPasquale and Glaeser (1999) also start with an individual-level definition of social capital, although they stress more an individual's social connections with others. Empirically, they study how homeownership may create incentives to social capital accumulation and to provision of local amenities. This might work either through the fact that such investments increase the value of property, or because owing a home reduces mobility and thus increases the time one expects to enjoy the fruits of such investments. They use data from the U.S. General Social Survey and from the German Socio-Economic Panel. Both in the U.S. and in Germany they find a strong correlation between homeownership and measures of civic engagement in one's community (e.g. membership in nonprofessional organizations, knowing the names of local political repre-

[26]Remember that they define social capital in terms of individual social skills, i.e., as the social component of human capital.

sentatives, voting in local elections, gardening and church attendance). Such effects are weaker in Germany than in the U.S.; moreover, in the U.S. a larger fraction of the effect seems to be attributable to increased community tenure. The authors are very careful about policy conclusions, since unobserved omitted variables might play a relevant role (homeowners may be different from renters), and since they do not measure either the positive or the negative externalities linked to homeownership and decreased mobility.

A general conclusion is that individual incentives matter for social capital accumulation, but not in a naïve way. Social rewards may provide more effective incentives to social capital accumulation than material ones, a point that hints at the relevance of social capital for 'relational production' besides material production and that should be kept in mind when thinking of policy intervention.

Trust

Alesina and La Ferrara (2000b) consider both individual experiences and community characteristics as possible determinants of individual trust. Using data from the General Social Survey for the United States from 1974 to 1994, they find that the major causes of low trust are recent traumatic experiences, belonging to a discriminated group, low income, low education, living in a society with strong 'racial' cleavages or in one with high income inequality. Religious beliefs and ethnic origins, in contrast, are found not to affect trust significantly.

Glaeser et al. (2000) combine survey and experimental data to separately identify the determinants of trust and of trustworthiness. Two of their findings are that a smaller social distance among individuals, for instance due to joint group membership or the same 'race' or nationality, increases both trust and trustworthiness; moreover, an individual's higher status induces others to behave in a more trustworthy manner toward him or her[27].

Finally, Knack and Keefer (1997) find that 'trust and norms of civic cooperation are stronger in countries with formal institutions that effectively protect property and contract rights, and in countries that are less polarized along lines of class or ethnicity'.

Social participation

Alesina and La Ferrara (2000a) study participation in associational activities like religious groups, sport groups, hobby clubs, unions, and so on (they consider participation in a list of 16 different kinds of groups). They analyze data for metropolitan areas in the U.S. from 1974 to 1994, mainly from the General Social Survey. They run a probit regression to explain the probability of social participation, controlling for individual and community characteristics[28]. The key results are striking: social participation is higher where income

[27]Consequently, they argue that status is part of an individual's social capital. This of course depends upon the definition of social capital one is willing to use.

[28]The dependent variable, called MEMBERSHIP, is the fraction of people who participate in at least one (type of) group, taken from the General Social Survey from 1974 to 1990.

inequality, 'racial' segmentation and ethnic segmentation are lower. This happens in the North/Northwest of the U.S., the opposite features appearing in the South/Southeast[29]. Moreover, looking at participation in different kinds of groups, the authors find that heterogeneity matters less for participation in groups with a relatively *high degree of excludability* or a *low degree of close interaction* among members. Finally, they find that 'racial' segmentation matters more for individuals more averse to 'racial' mixing.

More in detail, they find that younger cohorts participate less than elder ones, providing some support to Putnam's idea of a decline in participation due to the aging of the 'older civic generation'. Years of schooling have a positive impact on participation. Women participate less than men. Black people participate more. Young children reduce parents' participation. Family income has a positive effect, 'suggesting that participation is a normal good'. Coming to community characteristics, the measures of income inequality and of racial and ethnic segmentation always have a negative impact on participation, controlling for individual variables and for year and state dummies. The authors also perform some sensitivity analysis, which confirms and even strengthen the results: they assess that an increase by one standard deviation in racial segmentation, income inequality and ethnic segmentation reduces the probability of participation by respectively eight, six and six percentage points; the impact of passing from high school dropout to high school graduate or higher is a positive increase of thirteen percentage points; moving form a full-time to a part-time job increases the propensity to participate by four percentage points; finally having a child below the age of five reduces it by 3.5 percentage points. Interestingly, the relation between participation and income seems to be increasing but not linear: convex for low levels of income and concave for high levels. Instrumenting for income inequality leaves its effect on participation highly negative and significant.

Helliwell and Putnam (1999) consider both trust and social participation at the same time. They investigate whether and how education determines social capital[30]. They start with the observation that, although average educational levels have risen sharply in the United States in the last half century, the same did not happen to political and social participation. This is somehow puzzling, because individual education is widely acknowledged to be the best predictor of many forms of political and social engagement. Helliwell and Putnam discuss the theory trying to solve this puzzle and argue that it does not allow to reach a clear conclusion. Using data from the US General Social Survey from 1972 to 1996 and from the DDB-Needham Life Style surveys from 1975 to 1997, they assess that higher average education increases trust and does not reduce partic-

Of particular importance are three community variables: a measure of inequality in income distribution (the Gini coefficient), a measure of racial segmentation and a measure of ethnic segmentation (respectively, the probability that two randomly drawn individuals of a community belong to different 'races' or ethnic groups).

[29]These very clear empirical evidence contrasts the ambiguity of the theory.

[30]As noticed above, Coleman (1988) emphasizes the reverse mechanism, i.e. the relevance of social capital for the human capital accumulation.

ipation.

Is there a decline in social capital?

One of the main issues in the theory of social capital is the problem of a possible under-investment. Coleman (1990) raises this issue and Putnam (1995, 2000) documents empirically a decline in American social capital, identifying the main culprits in television and aging of the 'civic generation' of Americans born between 1910 and 1940. Putnam finds that television is responsible for up to a quarter of the decline in social capital and the aging of the 'civic generation' up to half of it. However, there is no widespread agreement either on the empirical relevance of such decline or on its causes.

Costa and Kahn (2001) argue that it has been overestimated by Putnam, although some forms of social capital indeed declined in the U.S. from 1952 to 1998: whereas group membership indeed diminished, the probability of volunteering did not; the largest declines are found in the time devoted to entertainment and visits with friends, relatives and neighbors. Such results are found using probit regressions with a great variety of data sources. Costa and Kahn also show that the decline in the social capital produced outside the home is mainly due to rising community heterogeneity (especially income inequality), whereas the decline in the social capital produced within the home is mainly explained by women's increased labor force participation rate (always controlling for education).

3.5 Policy

Policy implications are drawn in a sparse and usually very cautious way in the literature on social capital. The World Bank considers the following list of political issues, strictly connected with social capital: crime and violence, trade, education, environment, finance, health, nutrition and population, information technology, poverty and economic development, rural development, urban development and water supply and sanitation. Many of them are more relevant for developing countries than for Europe, but some of them represent hot issues in the current European political debate. Let us briefly examine some of the indications arising from the literature.

Individual social capital

Those contributions that emphasize individual aspects of social capital make the general point that its accumulation responds to individual incentives, but not in a naïve way. One of the difficulties here comes from the fact that intrinsic motivations may be either reinforced or crowded out by an exogenous introduction of incentive schemes. This is especially the case if incentives change the way individuals interpret and frame a situation. For instance, suppose that in a certain situation cooperation is perceived as the appropriate behavior, in accor-

dance to a social norm, and that we now introduce a fine to sanction defective behavior; then individuals might abandon the social norm interpretation and embrace a market based one, according to which defection amounts to purchasing a good (the individual advantage arising from it) at a given price (the fine), without any remorse for a bad behavior: if the monetary cost of the fine is lower than the psychological one perceived by breaking a norm, the incentive will be counterproductive. Gneezy and Rustichini (2000) provide convincing empirical evidence of this mechanism. A second problem is that, even if incentives to individual investment in social capital were to work well, it is difficult to evaluate the aggregate impact, because one should find a way to measure interpersonal externalities.

Trust

Policy indications are somewhat easier to draw if one looks at the correlates of generalized trust. In particular, policies that increase the well functioning of the state, the effective protection of property rights, a low degree of inequality in the distribution of income and a low degree of 'racial' heterogeneity create a favorable environment for the development of trust. Whether or not such policies are desirable (in particular the latter two ones) involves political issues that we do not tackle here.

The positive correlation found by Helliwell and Putnam (1999) between average education and social capital provides an additional rationale, besides the traditional ones, to invest in education even more than we are currently doing. This is especially advisable since, on one hand, there is a virtuous dynamics between human capital and social capital accumulation, and, on the other hand, trust-enhancing policies may start a multiplier mechanism. Indeed, both the theory and the experimental evidence tell us that a key effect of trust is to induce a higher trustworthiness, which in turn allows people to trust without being exploited. The role of policy may then be that of activating such mechanism, especially in low-trust environments, such as some European regions, which otherwise may remain stuck in a low-trust poverty trap, where low trust and low trustworthiness justify one another.

As we discussed above, trust-enhancing policies have a special relevance, among other things, for the purposes of long-run growth and of financial development. What may be added here is that they can play a special role in the context of the 'new economy', in which we are more and more transacting ideas (e.g. inventions, images, and so on). Unlike physical goods, whose characteristics are observable before the transaction, ideas cannot be revealed *ex ante* (once they are communicated, there is no need to purchase them any more), so that trust comes to play a prominent role. In a well operating market, reputation mechanisms may probably substitute for trust to a high degree, but in new, emerging markets such element of stability is absent, so that the level of trust and trustworthiness may determine whether some innovative, idea-intensive activities take off at all - and may in any case substantially reduce their transaction and monitoring costs.

Social participation and networks

Social participation seems to be less an issue for Europe than it is for the United States. The general problem in designing participation-enhancing policies is that one cannot, by definition, force voluntary participation. With this *caveat* in mind, one can think of effective incentive schemes, which are, however, hard to formulate in general terms. Notice that the construction of networks of participation may be crucial at least at three levels. First, family- and community-level participation facilitates human capital accumulation and private provision of local amenities and of local public goods. Second, social participation at the level of the civil society generates positive externalities, at least if one focuses attention on 'Putnamesque' groups and on 'bridging' links. In affluent societies, where material needs have reached a high degree of satisfaction and relational needs assume a prominent role, these kinds of participation dynamics may be crucial for individual and social well being. Finally, cooperation networks among firms may provide at the same time those efficiency and flexibility characteristics that allow a successful adaptation in rapidly changing economies, but this is an area in which direct intervention may have positive as well as distortionary effects, so that it is hard to identify policies recommendable in general.

Chapter 4

Socially provided goods, growth and social selection mechanisms

The discussion in Chapter 2 showed the potential relevance for social development of associational activity and of reciprocity-based relations. We have seen in Chapter 3 that social participation is a key engine for the formation of associational networks, shared norms and trust, which constitute the main forms of social capital. Though, while this is generally true in homogeneous groups, in heterogeneous societies such relationship is not at all so plain and it becomes of crucial importance whether social participation takes place within the borders of given social cleavages or crosses them and establishes 'bridges' between different groups. If we recall Mandeville's argument discussed in Chapter 2, this is once again a case in which we cannot apply in a straightforward way to complex societies categories that would be adequate for closed and small communities.

In the present chapter we start from an investigation of the motivations behind social participation and we argue that a relevant part of such motivations is constituted by the desire to gain 'socially provided goods'. We next specify this concept in terms of 'positional' and 'relational' goods and we discuss the corresponding motivational orientations. We argue that, although in some sense opposite, positional and relational orientations need not exclude each other, since they can be referred to different groups. Though, we focus on their 'pure' forms and consider their different effects in terms of economic outcomes and well-being. Moreover, we discuss how economic changes may alter the relative rewards to different motivational orientations and therefore induce a change in their distribution in a society.

At this level it is possible to detect interesting and deep connections between the engines of growth and of social development. While some of these aspects are already present in the recent economic literature, much remains to be done in order to understand such processes in a better way.

4.1 Material and social motivations

Economic relationships are first of all relationships of production, exchange and consumption of material goods. At a deeper level, economic relationships are relations among human beings, either direct, as, for instance, in the case of personal services, or mediated. Such mediation may be very simple as well as very complex. For instance, we can identify relatively simple prototypes of economic relations and corresponding institutional and social settings, like exchange in a competitive market, mandatory execution of commands in a hierarchical organization (be it a state or a firm) and reciprocity-based transactions in a symmetric social setting[1]; but we can also identify more complex mediations, that do not just depend on transactions within a given institutional context, but rather on their interplay with aggregate economic variables and, moreover, on the precise way in which economic outcomes are interpreted by individual and social cultures: examples include, for instance, the determination of individual social status and the identification with given social norms or social groups.

As argued in Chapter 2, such variables, excluded from the traditional domain of utility functions, are deep engines of human action and relevant determinants of individual satisfaction. Hence, their consideration is important for both positive and normative economics. There are precise reasons for their exclusion from standard economic models, pointed out, among others, by Cole, Mailath and Postlewaite (1992). They argue that the common 'reluctance to include relative position in society and status in models stems in large part from a belief that if one is 'allowed' to put status into agents' utility functions, then it is possible to explain anything'. Though, their conclusion is not that one should discard status concerns from economic analysis, but rather that one should include them in a rigorous way.

If we take a dynamic view, we the influence between social transformations and economic growth works in both directions, as shown, for instance, by the literature on social capital discussed in Chapter 3 and by the economics of norms and cultural evolution[2]. In Chapters 5, 6 and 7 we study both sides of such dynamics.

Social sciences have tackled such issues in a variety of ways and applying different methodologies[3]. Some interesting tools come from evolutionary game theory, which allows to study the diffusion of certain mental attitudes, individual behaviors, social norms and resulting social organizations according to their 'fitness', i.e., to the relative success they provide to their carrier[4]. Other in-

[1] As discussed in Chapter 2, Polanyi (1977) identifies these three as the main forms of economic integration.

[2] See e.g. Sacco (1997), Menicucci and Sacco (1996 and 1997), Antoci, Sacco and Zamagni (2000), Sacco and Zamagni (1996 and 2001).

[3] Puggioni and Sacco (1998) argue in favor of an approach of methodological pluralism in economics.

[4] Fitness refers to reproductive success, be it in biological, cultural or social terms. See, among the many possible references, Cosmides and Tooby (1992) for the connections between socio-biology and evolutionary psychology, Dosi, Fagiolo and Marengo (1996) for the issue of learning in evolutionary environments, Weibull (1995) for a theoretical perspective on

teresting insights come from experimental economics, which clearly shows that narrow self-interest (in the sense of concern just for own material payoffs) is not enough to explain actual behavior and that trust and fairness play an important role[5], and from psychological games, in which regret and other emotional reactions are taken into account[6].

From the point of view of standard economic models, objects like social status and the feeling of proximity with a certain group can be incorporated in a relatively easy way, since they are not but special kinds of goods: namely, they are examples of 'positional goods' and of 'relational goods', respectively. The notion of positional goods has been introduced by Hirsch (1976) and that of relational goods by Uhlaner (1989). On the precise definition of these notions we come back below; now we can observe that they both belong to the larger class of socially provided goods, which constitutes the starting point of our analysis.

Before turning to it, since we emphasized in the previous chapters the role of social participation, and we will stress it again in the models of the following chapters, let us make a further observation about its possible motivation. Social participation may be motivated by both material and social considerations. One may consider that social interaction creates valuable social links, that are the channels for possible future material payoffs. Such material payoffs have received much attention, from Granovetter (1973) to the literature on social capital. Though, one may also consider the specifically social motivation of social participation: establishing relations with other people is not just a farsighted way of gaining material payoffs, but responds also to social needs, like the need to be approved and estimated, which was the basis of self-love in Smith, the need of distinction and the need of identification. In our analysis of socially provided goods we consider these possible motivations.

4.2 Socially provided goods

The peculiar feature of socially provided goods is that they are not provided by the market or by the state, but rather by social interaction. This implies first of all that an individual's decision to purchase them is not sufficient to obtain them, since their enjoyment depends as well on other people's behavior. Therefore, by definition, socially provided goods are subject to externalities and no market can be created to eliminate these externalities. Though, both the market and the state can offer substitutes as well as complements. Moreover, social interaction may take place at various levels: firm, market, public administration, family, group of friends, neighbors, associations of the civil society, and so on. A key point is that the specific kind of socially provided goods that are generated

evolutionary game theory and Basu (1995) for an interesting application to civil institutions.

[5]See e.g. Hackett (1994) for an experiment on 'relational exchange', Berg, Dickhaut and McCabe (1995) for an experiment on the 'investment game', which is similar to Kreps' (1990) 'trust game', and Fehr, Gächter and Kirchsteiger (1997) for experiments on reciprocity.

[6]See, among others, Huang and Wu (1994) and Joireman et al. (1996). Menicucci and Sacco (1996) consider pseudo-hetero-oriented motivation and distinguish between reproduction success (vitality) and satisfaction.

in these interactions depends not only on the actual behavior of the people involved, but also on their identity and motivation, as well as, possibly, on the identity and motivation of the people excluded or not participating.

Production and allocation of this kind of goods in the social sphere is a complicated process, in whose analysis writers like Proust are probably unreachable masters. Though, if socially provided goods are relevant for economic decisions and individual well-being, it seems important that economists find a way to tackle this complexity with their own tools.

As a guideline for our analysis we use the distinction among three basic kinds of motivational orientation towards other people: positional, neutral and relational. We speak of a neutral orientation whenever individuals are self-concerned and do not care about others: this is the typical assumption in standard economic models and therefore we do not insist on it. Let us now concentrate on 'positionality' and 'relationality'.

4.2.1 Positionality

The positional orientation is the desire to gain a higher relative position, that is, to reduce the distance from those who are above and to increase the distance from those who are below. Such desire may be satisfied in several ways, according to the scale on which we evaluate relative position: two relevant examples are the distribution of wealth and that of human capital and talent. A simple case is the one in which there is complete information about such variables. If, in turn, these variables are not completely observable, individuals' relative positions are evaluated through a signaling game: for instance, conspicuous consumption may be used to convey a signal on individual wealth, and an individual's occupational group may say something about his or her talent and human capital.

The questions of what are the mechanisms according to which social status is attributed and what kind of economic behavior its research stimulates have been tackled quite in detail in the recent economic debate. Let us consider here, in particular, two aspects: the role of comparison income for labor supply and job satisfaction and the relationship between positional competition and economic growth.

Comparison income, labor supply and job satisfaction

As pointed out by Hirsch (1976), the competition for relative positions is a zero sum game, since to somebody's relative gain corresponds exactly somebody else's relative loss. Therefore, resources invested in such competition are, from the aggregate point of view, a waste that gives rise to an inefficient 'rat-race'. In particular, if relative income is an important social ranking device, the effect of positional competition will be an incentive to work inefficiently too much. Corneo (2002) draws an immediate policy implication from this consideration: progressive income taxation might have an efficient side, to the extent that it corrects the over-work distortion and reduces the rat-race.

Neumark and Postlewaite (1998) focus instead on the relationship between comparison income and women's choice whether to work or not. They show that, in taking such decision, women tend to compare their own family income with their relatives' family income: they choose to work if this is necessary to keep a good ranking of their own household in the reference group. This mechanism gives potentially rise to chain effects, which are much better in accordance with empirical findings than traditional neoclassical models.

The channel investigated by Neumark and Postlewaite (1998) works through interpersonal comparison of income with a reference group, but there is also another way how relative income could matter beyond absolute income: through psychological comparison with one's own aspiration level[7]. This channel is not directly related to positional competition, but still there are interesting connections, since one of the most important ways of forming own aspirations is indeed through comparison with other people. Clark and Oswald (1996) investigate this link and provide an empirical estimation of the relevance of comparison income for job satisfaction. Using data for UK for 1991, they find three main results: first, 'workers' reported level of satisfaction are at best weakly correlated with absolute income alone'; second, 'measures of comparison income are significantly negatively correlated with reported levels of happiness at work'; third, 'the higher the level of education, the lower the reported satisfaction level'. This last result is explained with the idea that higher education brings about higher aspirations, which are more difficult to be met satisfactorily.

Positional competition and economic growth

Cole, Mailath and Postlewaite (1992) start from the recognition that several goods are not allocated through markets, but rather through a process of social interaction, and interpret social status 'as a ranking device that determines how well an agent fares with respect to the allocation of non-market goods'. In such case, concern for social status is not exogenously postulated, but rather endogenously generated by private concern for socially provided goods. They focus on the case in which social status is attributed according to relative wealth and display a model with multiple equilibria in which differences in social organization, inducing different preferences in terms of relative position, may lead otherwise identical economies to grow at different rates.

An alternative formulation, pursued by Fershtman, Murphy and Weiss (1996), considers status attributed according to human capital, which in turn may be inferred from an individual's occupational group, and thus focuses on talent allocation in society.

[7]Aspirations seem to play a crucial role in determining satisfaction, as argued by Sacco and Vanin (2000) in a simulation model of network interaction. Clark (1997) explains the empirical finding that women report on average a higher job satisfaction than men with the consideration that, mainly because of historical reason, they have been used to having worse positions and therefore they have on average lower aspirations, which are more easily satisfied. If this explanation is correct, it means that the gender differential in satisfaction is just temporary and will disappear as soon as women's aspirations are adapted and revised upwards.

The link between social status, attributed according to relative wealth, and long-run growth is studied in a model *á la* Solow (1956) by Corneo and Jeanne (2001), who show that concern for social status may generate endogenous growth. While in endogenous growth theory *á la* Romer (1986) growth is the result of positive externalities, and thus may be sub-optimally low, an improvement of an individual's relative position imposes a negative externality on others, so that growth resulting from status competition may be sub-optimally high. A similar result appears, although through different channels, in the models developed in Chapeters 5, 6 and 7.

The idea that positional competition takes place through a concern for wealth rank is investigated by Corneo and Jeanne (1999a) in a scenario of complete information on wealth distribution and by Corneo and Jeanne (1999b) in one of incomplete information. The first paper shows that, when wealth is perfectly observable, status competition creates an incentive to accumulate wealth and thus fosters growth; moreover, when there is a strong social segmentation, positional competition takes mainly place within each segmented social sphere, where wealth distribution is more uniform and thus wealth ranking can more easily been changed through individual effort: under strong segmentation there is a higher incentive to engage in positional competition and therefore there are higher growth rates.

When wealth is imperfectly observable, Corneo and Jeanne (1999b) argue that social status may be attributed on the base of noisy signals on it, that generate the phenomenon called by Veblen 'pecuniary emulation': lower class people try to over-accumulate and engage in conspicuous consumption in order to be taken for upper class people, whereas the upper class over-accumulates to keep the wealth difference clear and visible. Both too much equality in the distribution of wealth and too much inequality destroy the signaling power of wealth and thus the incentive to accumulate it to gain status. The highest level of pecuniary emulation, and therefore the highest growth rates, correspond to intermediate levels of initial wealth inequality.

Under imperfect observability of wealth, the role of signal could be taken by conspicuous consumption, i.e., consumption of luxury and visible (not necessarily useful) goods. This possibility is studied, among others, by Corneo and Jeanne (1997 and 1998). The first paper derives some unconventional policy implications, related to the fact that the signaling power of conspicuous consumption may be increasing in price, so to generate an upward-sloping demand curve. The second paper argues that, while in a static framework conspicuous consumption for status reason amounts to a reduction of savings, this effect may be reversed in a dynamic framework, if individuals engage in conspicuous consumption and status competition when old.

One of the interesting aspects, from our point of view, of this approach to social status is that it starts with the broad consideration that socially provided goods are not allocated through the market, but rather through a competitive game of social interaction, in which social status is mainly a way to win the competition. The archetype of such interaction, often considered in this literature, is therefore the competition for an individual's mate.

Such approach is of extreme interest and it presents the big advantage of introducing socially provided goods in a way that remains quite close to the traditionally competitive view of economic and social interaction. Though, it may be observed that not all socially provided goods are allocated through competitive interactions, since participatory dynamics play a relevant role as well. This leads us to consider a participatory, relational orientation, besides a competitive, positional one.

4.2.2 Relationality

The relational orientation may be generally defined as the desire to increase one's proximity to other people, for instance through friendship, sympathy, sharing of ends, of norms, of group belonging and, at the limit, of life. It is clear that, although we can think of positionality as a desire to go 'above' others and of relationality as a desire to come 'closer' to others, these two motivational orientations are not opposed to one another in a trivial way. As we just discussed, the desire to share life with a certain mate may generate the need to win the social competition to get that mate, and a relational orientation towards the members of the upper class may just be the flip side of a general positional orientation. In other words, both positional competition and relational attitudes may be either pursued *per se* or instrumentally to the other kind of attitudes. Though, since the instrumental perspective on either motivation presupposes the other one as a deep purpose, it seems adequate to start with the consideration of their 'pure' forms. In its 'pure' form, relationality reflects a participatory logic and a reciprocal or collective orientation, that prompts to solidarity and tends to express dissatisfaction with voice rather than with exit. The relevance of such aspects for well-being and social development in contemporary societies has been discussed in Chapter 2.

Two observations are in order. First, the classification of social motivations in terms of positional, neutral and relational is not exhaustive, since more complex motivational orientations may be easily imagined. Though, it offers a framework for the economic study of social rewards which is at the same time articulated and simple.

Second, the opposition positional/relational should not be taken as reflecting a deep view of human nature as intrinsically 'bad' or 'good'. In social and political sciences we are used to think in these terms, with more or less sophistication, since Hobbes and Rousseau taught us that in the 'state of nature', before social relationships and any kind of contract, men would respectively start a *bellum omnium contra omnes* or would rather have a good nature. As we tried to argue in Chapter 2, competitive and relational issues have always been present, but the way in which they shape individual identity and are reflected in social, economic and political organization have changed over history. That discussion allows us to focus on this historical process of change (rather than on a hypothetical state of nature) and to investigate its economic and social engine.

Relational goods

The link between relationality and participation is well understood by Uhlaner (1989), who introduces in economic literature the notion of 'relational goods'. She argues that traditional rational choice models cannot explain why people are willing to undertake costly actions such as political participation and voting, despite their awareness that the actual influence of their participation or of their vote is indeed negligible in terms of final outcome; on the contrary, such behaviors can be understood as rational once we consider that people are enjoying a relational good. According to her definition, relational goods are a particular type of local public goods, that can only be produced and consumed through the joint action of several individuals, whose identities become relevant. Therefore, two peculiar aspects of relational goods are that they cannot be enjoyed alone and that it is mostly very difficult to separate their 'production' form their 'consumption', since they easily coincide[8]. Indeed, not only 'consumers' and 'producers' are the same agents, but social participation 'produces' relational goods at the same time that it lets participants 'consume' them, i.e. enjoy them[9].

A common objection to the economic consideration of relational goods is that they would not be economic goods. Such objection takes two main forms. According to the first one, they should not be regarded as economic 'goods', since, while standard consumption goods exist and may be objectively defined before and independently from individual actions concerning them, relational goods come to exist only through social interaction. This distinction, as we just discussed, is indeed correct; though, its only consequence should be that relational goods are a class of economic goods different from private consumption goods, unless one objects at the same time that relational goods are not 'economic' goods.

This second criticism starts from the conceptualization of 'economic' goods as 'scarce' goods and argues that relational goods are not scarce. We claim that they are no less scarce than private consumption goods, since their 'production' and 'consumption' are subject to a time budget constraint. Indeed, social participation is mostly a time-intensive activity. At least since Becker's (1965) pioneering contribution, we know that time is a scarce resource and that an increased pressure on it (an increase in the value of time) leads to a substitution of time-intensive activities with time-saving ones[10]. This consideration brings

[8]The fact that in post-fordist economies production and consumption converge to some extent is observed, among others, by Zamagni (1997), Donati (1991) and De Vincenti and Montebugnoli (1997).

[9]Uhlaner distinguishes between relational goods that has a nature of instruments for some other purposes and relational goods that constitute an end themselves: she speaks of 'instrumental' and 'consumption' relational goods. She also emphasizes the fact that relational goods may involve both direct and indirect relations, and the fact that, since they are the result of joint participation, 'congestion' may increase participants' utility rather than decrease it, as it may happen, for instance, at a stadium. Gui (2000) stresses affective and communicative aspects of relational goods.

[10]It is not the quality of the food offered that may explain the success of fast-foods, but exactly the fact that they are fast!

us to discuss, as we did above, two aspects of the social and economic process of enjoyment of relational goods: their relationship with labor efficiency and job satisfaction, and their connection with economic growth.

Relationality, labor productivity and job satisfaction

Relational goods may be produced through interaction in any sphere of social life. The family and the group of friends are primary producers; voluntary associations are a second relevant source; relations with colleagues at the workplace play an important role as well: let us consider them here in more detail. A first observation is that in job relations relational and positional attitudes usually appear highly mixed. Rotemberg (1994) studies whether and how firms may benefit from promoting a relational orientation among workers[11]. He argues that workers' solidarity may lead them, depending on the specific situation, either to work harder or to exert a lower effort. This explains why empirical results on the connection between cohesiveness of the working environment and labor productivity are generally mixed.

As argued by Holmström and Milgrom (1990) and by Lazear and Rosen (1981), in some circumstances competition (and in particular positional competition) can lead workers to increase effort, whereas the possibility of 'collusion' would reduce labor productivity; in other circumstances, though, and especially when workers are not remunerated on an individual basis but rather on the basis of team performance, the reverse is true[12]. Sugden (1993) shows that, if individuals interpret themselves as members of a team rather than as competitors, the typical inefficiency of prisoner's dilemma situations may be avoided.

Rob and Zemsky (2002) consider that, although workers are not usually directly remunerated for cooperation, they could cooperate because they derive direct utility from doing it, in an amount that depends on how much others have cooperated in the past and on firm's incentives to cooperation; in this case, a firm might be interested in building social capital among its workers. As we argued in Chapter 3, social capital may have a substantial beneficial impact on productivity; now it becomes also clear why it can positively affect individual and social well-being: because it increases the enjoyment of relational goods.

Therefore, while the relationship between relationality and productivity is not univocal, the positive contribution of a widespread relational oriantation to job satisfaction seems much more plain. Moreover, it is not subject to the social constraint faced by positional competition: that of being a zero-sum game, where to the satisfaction of the winners corresponds the dissatisfaction of the losers.

Social participation and work as sources of relational goods

[11] In particular, he focuses on feelings of altruism among workers and treats them as a choice variable: individuals choose to be altruistic if it is in their own interest. We do not elaborate here any further on the relationship between relationality and altruism.

[12] Rose (2002) argues that payment on the basis of individual marginal productivity may be impossible when team synergies arise.

Having acknowledged the relevance of job interaction for the enjoyment of relational goods, let us anticipate that we will disregard it in the models of Chapters 5, 6 and 7 and justify this choice here. The basic argument behind it is the recognition that labor entails a relevant instrumental, private-oriented component, which is less pronounced in activities of voluntary social participation, where relational attitudes have more space. Therefore, we will focus on social participation as the main source of relational goods. In particular, we will consider a problem of time allocation between socially oriented and privately oriented activities, including labor in the latter ones. Although, admittedly, this is not the whole story about labor, we still believe that it captures a relevant aspect. Alesina and La Ferrara (2000a) discuss this issue in the following terms:

> After controlling for the level of income, the effect of time spent at work could be twofold. On the one hand, a constraint on time may decrease participation; on the other hand, socialization in the workplace may increase social interaction, incentives and ability to participate. (p.876)

Empirically, they find that full-time workers participate more than people out of the labor force, but less than part-time workers. Controlling not only for individual characteristics, but also for income inequality and 'racial' and ethnic segmentation at the community level, they find that 'moving form a full-time to a part-time job increases the propensity to participate by four percentage points' (p.880). This means that, among working people, it is empirically legitimate to assume a negative relation between the time spent in social participation and in private production[13].

Another interesting contribution, which tells us something about the primarily private orientation of labor, is due to Corneo (2001), who presents striking empirical evidence that the time devoted to watch television and to work are positively correlated across countries and explains this evidence through a model based on the substitution between privately enjoyed and socially enjoyed leisure (i.e., between some private goods and relational goods).

Let us emphasize again that, although such contributions show that our choice to focus on social participation and to disregard work as a source of relational goods is overall justified, a deeper analysis of such aspects remains an interesting task for future research.

Relationality and economic growth

As argued above, relational goods are typically time-intensive. Economic growth brings about an increase in the opportunity cost of time, which is clearly more expensive today in advanced societies than it used to be in the past[14]. An

[13] At the theoretical level our choice is somewhat analogous to the standard view that labor time is a 'bad' and not a 'good'.

[14] It may be argued that socially provided goods become scarce in affluent societies, when growth, increasing the value of time, renders the time budget constraint on relational goods binding.

early account of this process is provided by Hirsch (1976):

> As the subjective cost of time rises, pressure for specific balancing of personal advantage in social relationships will increase. [...] Perception of the time spent in social relationships as a cost is itself a product of privatized affluence. The effect is to whittle down the amount of friendship and social contact [...]. The huge increase in personal mobility in modern economies adds to the problem by making sociability more of a public and less of a private good. The more people move, the lower are the chances of social contacts being reciprocated directly on a bilateral basis. (p.80)

The relevance of the last point, i.e. of personal mobility, for the substitution of social by private activities, is also investigated by Schiff (1992)[15], in whose words:

> The need to cope with the high degree of isolation caused by the higher degree of geographic labor mobility may lead to the creation of alternative institutions where people who are not as close can interact (e.g., singles' bars, dating services, nursing homes, insurance, and so on). These market activities enter into the gross national product (GNP) but do not necessarily imply higher welfare than in societies where some of these functions are carried out outside the market. (p.167-168)[16]

This perspective on growth sees a substitution process at work, whereby time-saving market activities take the place once occupied by time-intensive non-market ones. Such substitution appears efficient, as long as we disregard the presence of externalities. On one side, efficiency would be even higher if the new market activities exert positive externalities; on the other side, if positive externalities are present in the non-market sector as well, they go lost with the substitution process and this reduces (or may even revert) its social efficiency.

The models in Chapters 5, 6 and 7 study both effects and the conditions under which either of them prevails. While, as we have seen, there are some formal models that study the relationships between positional competition and growth, the connection between relational attitudes and growth has received so far much less attention from an analytical point of view. Therefore, the models presented here are focused on such aspect. In particular, they take the view that social participation, motivated by the desire of relational goods, may be the main source of social capital accumulation, so that a shift from participation to private activities may foster economic growth but harm social capital accumulation.

Let us now tackle in more detail such issue and discuss a few aspects of the models developed in the next chapters: their relationship with the literature on negative externalities and growth, their consideration of the relationship between social capital and relational goods, and the peculiar role of the focus restriction on homogeneous societies.

[15] See also Schiff (1999) for a general equilibrium model of labor mobility in the presence of social capital.

[16] Such argument is reinforced by DiPasquale and Glaeser's (1999) empirical finding (discussed in Chapter 3) that homeownership, by reducing mobility, raises investment in social connections.

4.3 Relational goods, social capital and growth

The theory of endogenous growth puts a special emphasis on human capital and on positive externalities[17]. In contrast, since we focus on a possible substitution of social for private activities, we pay more attention to the negative externalities it may bring about in terms of social capital accumulation[18].

Negative externalities and growth

The idea that negative externalities, either on the natural or on the social environment, might foster growth, in that they lead to an increase both in private (defensive) consumption and, at the same time, in labor supply and hence in production and savings, is studied within an evolutionary framework by Antoci (1996), Antoci and Bartolini (1999) and Antoci and Borghesi (2001). The same idea is further studied within a neoclassical framework by Antoci (1997a and 1997b), Bartolini and Bonatti (1997, 1998, 1999a and 1999b), Antoci, Borghesi and Galeotti (2002) and Antoci (2002). A common point is that negative externalities may be an engine of growth, but in this case growth results from a coordination failure and is not necessarily desirable; moreover, since impatience reduces private capital accumulation, it may increase steady state welfare. All of these contributions, although mentioning the possibility of a sociological interpretation, are indeed more focused on natural resources, which are typically subject to a spontaneous flow of renewal, but can be damaged by economic activities (think e.g. of the environmental effects of waste disposal and of pollution). In contrast, we focus here on social capital, whose accumulation dynamics is not really subject to a spontaneous flow of renewal, but rather depends on individual choices of social participation.

Relational goods and social capital

We focus on two aspects of the relationship between relational goods and social capital. On one side, a higher social capital increases the returns to the time spent in social participation and therefore may be seen as an improvement in the 'production' technology of relational goods. For instance, it is easier and more rewarding to participate to an association in a social context characterized by a rich network of associative opportunities, as well as going out with friends in a context that offers many options for socially enjoyed leisure. On

[17] See, e.g., Barro and Sala-i-Martin (1995) and Aghion and Howitt (1998).

[18] It is interesting to notice that Lucas (1988), when introducing human capital in growth theory, already distinguished between its internal and external effects, the former ones basically constituted by the increased productivity due to privately acquired knowledge, while the latter ones taking place to a relevant degree through the relations among economic actors. His idea of external effects of human capital is not far from some current definitions of social capital. The differences with our approach are that we regard social capital as an aggregate rather than an individual asset and that we focus on its productivity in terms of relational goods rather than of private goods.

the other side, a higher social participation brings about social capital accumulation as a byproduct. For instance, trust (or empathy) may be reinforced and generalized through social interactions (if individuals do not behave opportunistically). Likewise, a high social participation may lead to the formation of new associations, while still keeping alive the existing ones.

Homogeneous population

As argued at the beginning of this chapter, this straightforward link between relational goods and social capital holds just in homogeneous societies. In the models developed in Chapters 5, 6 and 7 we stick to the assumption that the economy we study has a homogeneous population. On one side, this is for sure a limitation, that will have to be removed in future research. On the other side, though, besides the advantage of analytical simplicity, this assumption presents another, more substantial advantage: it reinforces our results, rather than weakening them. To understand why this is the case, let go back to the discussion of Chapter 3. We have seen that, on one hand, Putnam (1993) finds social participation very important for government and economic performance in a homogeneous society like Italy; on the other hand, Knack and Keefer (1997) find it not significant for growth in a cross section of countries. We have also seen that Alesina and La Ferrara (2000a) find population heterogeneity negatively related to social participation. Thus, analyzing a homogeneous society amounts to studying the case in which social participation is more likely to be high and at the same time growth enhancing (remember that in homogeneous populations also trust tends to be high). Other things being equal, this means that homogeneous societies should have a higher social capital and experience a higher growth. Nevertheless, we show formally, in the following chapters, that the very process of growth might be at the origin of a social impoverishment even in a homogeneous society. If this is true, then the result holds *a fortiori* in a heterogeneous society. In other words, we will show the possibility of falling into social poverty traps starting from the apparently most favorable position.

Of course, if we abandon the simplifying assumption of homogeneous population, a number of interesting issues emerge, with which we do not deal in the following chapters. For instance, already the distinction between men and women indicates clearly that their patterns of time allocation have changed in different ways over the last fifty years. As pointed out by Costa and Kahn (2001), for instance, both men and women spend less time today with friends than they did fifty years ago, but for women this is mainly due to their increased labor participation, for men to an increase in the time spent in front of television. This hints at the fact that Putnam's emphasis on the role of television, reflected also in Corneo's (2001) paper, might be more adequate for men than for women. We do not want to insist on this interpretation, since we believe that the whole matter deserves deeper theoretical and empirical investigation. What is relevant here is that already the simple recognition of population heterogeneity according to gender changes the picture of time allocation patterns. When we consider other dimensions of heterogeneity, such as those studied by

Alesina and La Ferrara (2000a) and by Zak and Knack (2001), the picture becomes even more complicated and the issues raised by Narayan (1999) should be taken seriously.

In summary, our focus on homogeneous societies in the formal models on one side strengthens our results, on the other side constitutes a limitation. Therefore, the results obtained should be seen as a strong benchmark and as a starting point for future research, but not as a last word on these issues. Consequently, while we make some policy speculations, we avoid to derive precise policy conclusions.

Pressure on time

A last observation that may be done in this context is that, following Hirsch, we emphasize the fact that growth brings about an increased pressure on time, which is one of the engines of the substitution of time-intensive social activities for time-saving private ones. Costa and Kahn (2001) find a result that at first sight contradicts this mechanism: social participation is positively correlated to education, but since people with a higher education also earn higher salaries, and therefore have a higher opportunity cost of time, according to our mechanism they should participate less and not more. Though, it is difficult to interpret such correlation in a straightforward way, since they do not control for the value of time in their estimations. While this issue requires a deeper investigation, we may observe that pressure on time is not just determined by its opportunity cost in terms of salary, but also by factors as positional competition and the existence in many industries of two distinct career paths, a slow one and a fast one: all factors that make individuals 'run' if they want to keep their position and run even faster if they want to advance. The pressure exerted by such mechanisms may induce sub-optimal forms of social selection of behaviors. This aspect may be particularly well studied within an evolutionary framework and this approach will be pursued in Chapter 7, whereas in Chapters 5 and 6 we will stick to a neoclassical framework.

4.4 Individual choice and social selection

We have seen that economic growth may alter the incentives to social participation faced by rational agents. This aspect, together with the externalities that a shift in time allocation brings about, can be captured very well within a neoclassical framework, which, at least since Becker (1981), has proved its power in shedding light not only on market interactions, but also on other spheres of social life. Indeed, as pointed out, among others, by Bowles and Gintis (2000), the economic analysis of social participation concerns the limits of different institutions: the state, the market and the civil society (or the community). Polanyi (1977), Anderson (1990), Sacco and Zamagni (2001), and Gneezy and Rustichini (2000), among others, all converge in the consideration that the incentives that work within one of these spheres may have different effects if applied to another

one, since they may change the way individuals interpret a situation and thus choose which logic to apply. As argued by Granovetter (1985), Donzelli (1986) and Boland (1982), among others, methodological individualism should not be taken in its atomistic version, since individual action takes place in social contexts, that may influence it. If this is true, the insights provided by a neoclassical framework may be usefully complemented by other approaches. In particular, we argue that an evolutionary approach may be particularly adequate to capture phenomena like social pressure and the social selection dynamics it generates.

As discussed by Weibull (1995), forms of evolutionary pressure are not only present in biological contexts, but also in socio-economic and cultural ones, where they tend to select most successful behaviors (or norms). From a general point of view, evolutionary game theory shows that there is always a social pressure against 'irrational' behaviors, but it may exert its selection effects with different degrees of intensity. This implies that a strong pressure against certain behaviors may lead the social dynamics towards equilibria characterized by other 'irrational' behaviors, if the pressure against them is not strong enough. Moreover, while we usually think of payoffs in terms of utility, one might easily think of situation in which social selection operates at the level of observable, material payoffs, rather than at the utility level. This is particularly the case if, as studied by Björnerstedt and Weibull (1996) and by Schlag (1998), selection works through imitation of other people's successful behavior, since it is easier to observe individuals' relative material success rather than relative psychological satisfaction. In such case, as pointed out by Menicucci and Sacco (1996), there is a difference between 'vitality', defined in terms of material (and therefore reproductive) success, and 'satisfaction', defined in terms of subjective evaluation of the outcomes[19].

This is one relevant way how evolutionary game theory may provide insights that do not emerge from a standard neoclassical analysis just based on individual rationality. Another way comes from its emphasis on path dependence. Of course, path dependence may emerge also in a neoclassical framework, but in such framework it is more common to focus on general conclusions, which rely just on the assumptions of rationality and equilibrium and are independent of the initial conditions. An indication in this sense comes from the debate on equilibrium selection in game theory: many of the solutions proposed are based on refinements of the equilibrium concept, obtained through a strengthening of the rationality criterion, rather than through a focus on the specific context of interaction.

In Chapter 7, adopting an evolutionary approach, we investigate how the social selection dynamics may be a source of sub-optimal outcomes.In Chapters 5 and 6, by contrast, adopting a neoclassical approach, we focus on the fact that social participation generates both a direct and a cumulative external effect, respectively on other people's enjoyment of relational goods and on social capital accumulation: when externalities are not internalized, they are a possible source

[19]If, as studied by Börgers and Sarin (1997), selection works through reinforcement of own successful behavior, vitality and satisfaction may converge more easily.

of conflict between individual rationality and collective well-being. Both in the evolutionary and in the neoclassical models we investigate how outcomes are path-dependent. In particular, we show that the possibility of falling into a 'social poverty trap' depends to a high degree on the initial stock of social capital (in Chapter 6, where we introduce private capital, on the initial stock of social relative to private capital).

As mentioned above, in our formal models we focus on a problem of time allocation between private activities and social participation. This means that we study the interplay between a relational orientation and a neutral one, but we do not tackle their interconnection with positional motivations. Moreover, although we investigate the conditions under which economic growth and well-being move in opposite directions, we do not distinguish between vitality and satisfaction. Though, this distinction is important for the comparison between positionality and relationality, since it may easily be the case that a positional orientation is more rewarding in material terms, but generates socially unsatisfactory outcomes, whereas a relational orientation, although having a great satisfaction potential, is not enough successful from a material point of view as to spread over. A deeper analysis of these issues remains a task for future research.

Chapter 5

A neoclassical model of social capital accumulation

5.1 Introduction

In this chapter we investigate the dynamics of social capital accumulation within a neoclassical framework. By its own nature, the process of accumulation of social capital is quite different from that of other forms of capital, because a large part of its payoffs is not privately appropriable. Thus, individuals may not have an adequate incentive to accumulate it. We show formally that under-investment in social capital may lead an economy to a social poverty trap. As discussed in Chapter 4, we take the view that social capital is crucial to the enjoyment of relational goods and that it is mainly accumulated by means of participation to social activities. For the sake of concreteness, in the model we identify private activities with the time spent working or consuming and social activities with the time spent in social participation[1].

In our framework individuals undertake social activities primarily because they seek relational goods. Social capital accumulation emerges as a by-product, as an external effect[2]. This renders the process we study here quite different from that of individual investment in social capital studied by Glaeser, Laibson and Sacerdote (2000), discussed in Chapter 3. The main difference is that they call 'social capital' the social component of individual human capital, whereas we look at social capital from an aggregate point of view.

[1]The inclusion of work among private activities has been discussed in Chapter 4.

[2]It is a common feature of non-material forms of capital that investment and consumption come close to one another: think e.g. of knowledge. In the case of social capital something similar happens: to some extent individuals participate to social activities with an intentional purpose to invest in relations, but to some extent participation is more a consumption than an investment activity, where the goods consumed are relational and not private. Such aspects make the process of social capital accumulation quite different from physical and human capital accumulation. We emphasize this point and show how it translates into an otherwise standard neoclassical model. To our knowledge, this has not yet been done by anybody.

In Chapter 4 we have seen that, as pointed out, among others, by Schiff (1992) and by Corneo (2001), social participation, and the goods it provides, may be substituted for by some private activities, which generate private goods. Since most private goods enter in the GDP, whereas many socially provided goods don't, this substitution process may foster growth exactly as the flip side of a process of social impoverishment. We share with Schiff this idea, even though our focus is not on labor mobility but rather on social participation. Our work is also quite close to Corneo's analysis of the substitution between some private goods and relational goods; the main difference is that we study the dynamics of private and social capital accumulation, whereas he displays a static model with multiple equilibria.

In the present and in the following chapters we study an economy in which there are three goods: a private consumption good used to satisfy basic needs (say, food and clothes), a relational good (say, an evening out with friends) and a private consumption good that serves as a substitute of the relational good (say, collecting stamps). The key point is how individuals decide to allocate time between social participation, labor and private consumption, besides the allocation of the latter between the two private goods. Since our focus is on private and social capital accumulation, we disregard the precise allocation of time between the two forms of private consumption, simply assuming that both require income but not time[3].

The choice of time allocation between social and private activities has two external effects: a direct one, on the 'productivity' (in terms of relational goods) of other people's social activities at a given point in time, and a cumulative one, on social capital accumulation over time. If individuals are not able to internalize these externalities, the overall outcome of their choices may be sub-optimal, notwithstanding the fact that they are generating economic growth.

We interpret the possibility that growth and social impoverishment move together as relevant in the medium run, i.e. in a time horizon in which the choice of time allocation may change significantly, but which still is shorter than the very long run, since in the latter social impoverishment renders growth unsustainable.

Both in this and in the following two chapters we consider a society with homogeneous population, which empirically turns out to be the most favorable environment for social capital accumulation, as seen in Chapter 3 and further discussed in Chapter 4. Moreover, we disregard any contribution of social capital to the production of private goods, although such contributions are empirically relevant[4]. As a consequence, the risk of falling into a social poverty trap that we find in our model would hold *a fortiori* if one takes into account a segmented population and the relationship between social capital and private production.

[3]This is another difference between our model and Corneo's (2001) one: the private substitute to relational goods on which he focuses is watching television, which requires time but has negligible marginal costs in terms of income.

[4]Symmetrically, in Chapter 6 we disregard any contribution of private capital to the enjoyment of relational goods. The issue is not relevant here, since in the present chapter we do not deal with private capital, and therefore we postpone its discussion.

The process we are investigating is particularly relevant for affluent societies, where pressure on time and other factors may indeed lead to a substitution of time-intensive social activities for time-saving private ones. In Chapter 6 we extend this basic model to consider both private and social capital accumulation; in Chapter 7 we re-frame the basic model in evolutionary terms. Both the two neoclassical formulations and the evolutionary approach lead to similar conclusions, which are, moreover, in accordance with some recent empirical evidence, discussed in Chapter 3.

5.2 Model

Preferences and technology

We consider an economy constituted by a continuous population of individuals (indicated as $\tau \in [0,1]$), who 'every day' (we model 'days' in continuous time, indicate them with t and normalize their length to 1) choose how to allocate their time between private and social activities. In day t, the fraction of time spent by individual τ in social activities, $s_\tau(t)$, provides him or her utility in the form of a socially provided good $B_\tau(t)$, whose amount depends, besides on $s_\tau(t)$, on average social participation, $\bar{s}(t) = \int_0^1 s_\sigma(t)\,\mathrm{d}\sigma$, and on the 'quality' of social environment inherited from the past, i.e. on social capital, $K_s(t)$. We assume that there is a private good $C_{s\tau}(t)$ which is a perfect substitute of the relational good $B_\tau(t)$ and we denote $l_{s\tau}(t)$ the fraction of time spent by τ to produce and consume $C_{s\tau}(t)$. Finally, individuals satisfy their subsistence needs by devoting time $l_\tau(t)$ to produce and consume a subsistence good $C_\tau(t)$. We think of the activities of production and consumption of $C_{s\tau}(t)$ and of $C_\tau(t)$ as of private activities. We assume that $C_{s\tau}(t)$ and $C_\tau(t)$ are not accumulable and let the instantaneous individual utility function be

$$u_\tau(t) = U_\tau[C_\tau(t),\, B_\tau(t) + aC_{s\tau}(t)], \tag{5.1}$$

where $a > 0$ is the marginal rate of substitution between $B_\tau(t)$ and $C_{s\tau}(t)$.

The technology determining the quantities produced and consumed of the three goods in our economy is captured by the following equations:

$$C_\tau(t) = F_\tau[l_\tau(t)], \tag{5.2}$$

$$C_{s\tau}(t) = F_{s\tau}[l_{s\tau}(t)], \tag{5.3}$$

$$B_\tau(t) = G_\tau[s_\tau(t),\, \bar{s}(t),\, K_s(t)]. \tag{5.4}$$

The function $G_\tau[s_\tau(t),\, \bar{s}(t),\, K_s(t)]$ is assumed to have the property that each 'factor' is essential: $[s_\tau(t) = 0 \vee \bar{s}(t) = 0 \vee K_s(t) = 0] \Longrightarrow B_\tau(t) = 0$.

Social capital in this economy is accumulated as individuals spend time in social activities and generate durable relations, which become the basis for the

development of trust, civic norms and voluntary associations. It seems therefore natural to model aggregate 'investment' in social capital $I_s(t)$ as an increasing function of the quantity of relational goods produced (and consumed) at a certain time in the economy, according to a sort of learning-by-doing mechanism. Perhaps the easiest way to model such 'investment' is the following:

$$I_s(t) = \int_0^1 B_\tau(t)\,\mathrm{d}\tau. \tag{5.5}$$

Notice that we use the term 'investment' in analogy with what drives the accumulation of other forms of capital. Nevertheless, it has to be stressed that here individuals do not 'invest' time in social activities with the purpose of accumulating social capital, but rather to enjoy the relational goods they get through participation to social activities. Indeed, they consider social capital as a public good and they do not internalize the effects of their choices on its accumulation. Such accumulation appears therefore just as a byproduct of activities with different aims. This is indeed one of the first intuitions about social capital, already pointed out by Coleman, to whom we refer for a deeper discussion.

The full dynamics of social capital, taking into account a depreciation rate of η, is then

$$\dot{K}_s(t) = I_s(t) - \eta K_s(t). \tag{5.6}$$

Individual maximization problem

Let r_τ be the rate at which individual τ discounts future utility. The individual problem in our economy is then

$$\max_{s_\tau(t),\, l_\tau(t),\, l_{s\tau}(t)} \int_0^\infty u_\tau(t) e^{r_\tau t}\,\mathrm{d}t, \quad \text{s.t.} \tag{5.7}$$

$$s_\tau(t),\, l_\tau(t),\, l_{s\tau}(t) \geq 0,$$

$$s_\tau(t) + l_{s\tau}(t) + l_\tau(t) = 1,$$

$$\dot{K}_s(t) = I_s(t) - \eta K_s(t).$$

The associated hamiltonian function is

$$H[s_\tau(t),\, l_\tau(t),\, l_{s\tau}(t),\, K_s(t),\, \lambda] = u_\tau(t) + \lambda[I_s(t) - \eta K_s(t)].$$

Since the population is continuous, the choice of $s_\tau(t)$ by a single individual has no impact on $I_s(t)$, so that each individual considers $I_s(t)$ as exogenous (notice that the same is true for $\bar{s}(t)$). Hence, λ, the shadow-price of K_s, does not appear in the conditions for the maximization of the hamiltonian function with respect to the control variables, so that these conditions coincide with those

obtained for the maximization of $u_\tau(t)$ in each instant of time with respect to the same control variables. We therefore omit the time index and solve the point-wise problem.

Homogeneous population

In the present model, as well as in those of the following chapters, we confine ourselves to the study of a homogeneous population. As discussed in Chapter 5, although restrictive, this choice amounts to studying the case in which social participation is more likely to be high and at the same time growth enhancing. Therefore, if we find that economic growth may be accompanied by social impoverishment even in a homogeneous society, this possibility will hold *a fortiori* in a heterogeneous society. Our point is even sharper because we neglect here any contribution of social capital to private production.

Assumption 1 *All individuals are identical, i.e. have the same preferences and production and consumption technology:*

$$\forall \tau \in [0,1] \quad u_\tau(t) = u(t),\ C_\tau(t) = C(t),\ C_{s\tau}(t) = C_s(t),\ B_\tau(t) = B(t).$$

We omit henceforth the index τ in the functional forms of equations (5.1) to (5.4) and speak of a representative individual, for whom, ex post, $\bar{s}(t)$ turns out to be equal to his or her choice $s(t)$. Aggregate 'investment' in social capital may then be rewritten as

$$I_s(t) = G[s(t),\, \bar{s}(t),\, K_s(t)] = G[s(t),\, s(t),\, K_s(t)] \equiv g[s(t),\, K_s(t)],$$

with the property that $g[0,\, K_s(t)] = g[s(t),\, 0] = 0$, so that equation (5.6) becomes

$$\dot{K}_s(t) = g[s(t), K_s(t)] - \eta K_s(t). \tag{5.8}$$

Social participation, growth and social poverty traps

Equation (5.8) deserves some comments.

Remark 1 *$K_s = 0$ is always a fixed point of dynamics (5.8) and in such state the representative agent chooses $s = 0$.*

This means that both social capital and social participation are null, whereas production and consumption of private goods reach their maximum. If relational goods played no role in determining well-being, this would be the best possible outcome, but if we introduce relational concerns in the utility function, such a result may be completely reversed, as the next remark makes clear.

Remark 2 *The fixed point with $K_s = 0$ is Pareto-dominated by any other point in which $K_s > 0$ and the representative agent chooses $s > 0$. Moreover, if K_s^* and K_s^{**} are two fixed points such that $K_s^{**} > K_s^*$, then K_s^* is Pareto-dominated by K_s^{**}.*

The first part of Remark 2 follows from a straightforward substitution in the utility function. The intuition behind the second statement is as well straightforward, since an increase in the level of K_s amounts to an expansion of the production and consumption possibility set. In fact, any choice of s, l, l_s that is possible under K_s^* is still possible under K_s^{**}; moreover, it provides at least the same utility and, if $s > 0$, a strictly higher utility. We can therefore introduce the following definition.

Definition 1 *Let K_s^* be the highest value of K_s in a locally attracting fixed point of dynamics (5.8). We call 'social poverty trap' any other fixed point such that $K_s < K_s^*$, if existing.*

It is perhaps useful to stress again at this point that we are ignoring the possible double link between social capital and 'private' production activities: empirical research shows that social capital increases private production and growth; on the other hand, on-the-job interaction might generate social capital, in the same way as social interaction. The first link, if considered, would reinforce our definition of social poverty traps, whereas the second one would make it less compelling. Recall from our discussion in the previous section that, if we neglect non-workers, a negative relation emerges between working time and social participation, so that the first link seems to prevail. An additional argument may come from the observation that voluntary social participation usually involves a higher degree of internal pro-social motivation than working activities, which plays a key role in the development of trust. The empirical and the motivational arguments, taken together, make us confident that the omitted link is more likely to reinforce our definition of social poverty traps then to weaken it. We next analyze the dynamics of social capital under a particular specification of the functional forms.

Solution under specific functional forms

In each instant of time, the value of $s(t)$ that appears in equation (5.8) is chosen by solving the following problem:

$$\max_{s,\, l,\, l_s} \; u = U[F(l),\, G(s, \bar{s}, K_s) + aF_s(l_s)] \quad \text{s.t.} \tag{5.9}$$

$$s,\, l,\, l_s \geq 0, \qquad s + l + l_s = 1. \tag{5.10}$$

Remark 3 *Since constraints (5.10) determine a compact set, a sufficient condition for problem (5.9) to admit a solution is that the objective function is continuous.*

We next solve this problem by assuming specific functional forms for pointwise preferences and technology of the representative agent, i.e. for equations (5.1) to (5.4):

$$u = U(C, B + aC_s) \equiv \ln(C) + b\ln(B + aC_s), \quad b > 0,$$

$$C = F(l) \equiv \alpha l, \quad \alpha > 0,$$

$$C_s = F_s(l_s) \equiv \beta l_s, \quad \beta > 0,$$

$$B = G(s, \bar{s}, K_s) \equiv \sigma s^{\gamma} \bar{s}^{\delta} K_s^{\epsilon}, \quad \sigma, \gamma, \delta, \epsilon > 0.$$

Plugging everything together, we get

$$u \equiv \ln(\alpha l) + b\ln(\sigma s^{\gamma} \bar{s}^{\delta} K_s^{\epsilon} + a\beta l_s) \tag{5.11}$$

and we can write the Lagrangean function for problem (5.9) under specification (5.11):

$$L(s, l, l_s, \theta) \equiv \ln(\alpha l) + b\ln(\sigma s^{\gamma} \bar{s}^{\delta} K_s^{\epsilon} + a\beta l_s) - \theta(s + l + l_s - 1).$$

Notice that from Remark 3 it follows immediately that there exists a solution to problem (5.9) under specification (5.11) for any level of K_s. This solution must satisfy the following first order conditions (where we exploit the fact that ex post $s = \bar{s}$):

$$\frac{\partial L}{\partial l} = \frac{1}{l} - \theta \leq 0; \qquad \frac{\partial L}{\partial l} l = 0, \quad l \geq 0; \tag{5.12}$$

$$\frac{\partial L}{\partial s} = \frac{b\sigma\gamma s^{\gamma+\delta-1} K_s^{\epsilon}}{\sigma s^{\gamma+\delta} K_s^{\epsilon} + a\beta l_s} - \theta \leq 0; \qquad \frac{\partial L}{\partial s} s = 0, \quad s \geq 0; \tag{5.13}$$

$$\frac{\partial L}{\partial l_s} = \frac{ab\beta}{\sigma s^{\gamma+\delta} K_s^{\epsilon} + a\beta l_s} - \theta \leq 0; \qquad \frac{\partial L}{\partial l_s} l_s = 0, \quad l_s \geq 0; \tag{5.14}$$

$$s + l + l_s = 1. \tag{5.15}$$

From equation (5.11) it is immediate to conclude that the representative agent allocate his or her time in such a way that $[l > 0 \ \wedge \ (s > 0 \ \vee \ l_s > 0)]$ always holds (so that we have $0 < l < 1$). Now, condition (5.12) implies $\frac{1}{l} = \theta$. A straightforward substitution in the FOC's then shows that a necessary condition to have both $s > 0$ and $l_s > 0$ is

$$\sigma\gamma s^{\gamma+\delta-1} K_s^{\epsilon} - \alpha\beta = 0. \tag{5.16}$$

It is easy to show that condition (5.16) may define the representative agent's optimal choice only if $\gamma + \delta < 1$, whereas for $\gamma + \delta \geq 1$ the representative agent

chooses at least one of either s or l_s equal to zero[5]. We can thus separate these two cases.

Case (a): $\gamma + \delta \geq 1$

If the representative agent chooses $s = 0$, $l_s = 1 - l$, it must hold that $\frac{\partial L}{\partial l_s} = \frac{b}{1-l} - \frac{1}{l} = 0$, so that

$$l = \frac{1}{1+b}, \qquad l_s = \frac{b}{1+b}. \tag{5.17}$$

If the choice is instead such that $l_s = 0$, $s = 1 - l$, it must hold that $\frac{\partial L}{\partial s} = \frac{b\gamma}{1-l} - \frac{1}{l} = 0$, so that

$$l = \frac{1}{1+b\gamma}, \qquad s = \frac{b\gamma}{1+b\gamma}. \tag{5.18}$$

Straightforward substitution of these values in the utility function (5.11) yields that choice (5.18) is strictly better than choice (5.17), if and only if

$$K_s > \hat{K}_s \equiv \left[\frac{ab\beta(1+b\gamma)^{\gamma+\delta+\frac{1}{b}}}{\sigma(b\gamma)^{\gamma+\delta}(1+b)^{1+\frac{1}{b}}} \right]^{\frac{1}{\epsilon}}. \tag{5.19}$$

For $K_s < \hat{K}_s$ the representative agent chooses $s = 0$ and $l_s > 0$, whereas for $K_s > \hat{K}_s$ he or she chooses $s > 0$ and $l_s = 0$[6].

Case (b): $\gamma + \delta < 1$

When $\gamma+\delta < 1$, $\lim_{s\to 0} \frac{\partial B}{\partial s} = \lim_{s\to 0} \frac{\partial g}{\partial s}(s, K_s) = \infty$, so that the representative individual always chooses $s > 0$, whatever the value of K_s. Equation (5.16) then implies that for K_s sufficiently high $l_s = 0$ is chosen, for K_s sufficiently low instead $l_s > 0$. The critical threshold $\tilde{K}_s$ may be determined by plugging $l_s = 0$ and $\frac{1}{l} = \theta$ into equations (5.13) and (5.14) and by equalizing $\frac{\partial L}{\partial s} = \frac{\partial L}{\partial l_s} = 0$, so to obtain the value of K_s for which $l_s = 0$ and $s = 1 - l$, but the non-negativity constraint on s is not yet binding. This yields

$$\frac{\partial L}{\partial s} = \frac{b\sigma\gamma s^{\gamma+\delta-1}K_s^{\epsilon}}{\sigma s^{\gamma+\delta}K_s^{\epsilon}} - \frac{1}{l} = \frac{b\gamma}{s} - \frac{1}{1-s} = 0, \tag{5.20}$$

$$\frac{\partial L}{\partial l_s} = \frac{ab\beta}{\sigma s^{\gamma+\delta}K_s^{\epsilon}} - \frac{1}{l} = \frac{ab\beta}{\sigma s^{\gamma+\delta}K_s^{\epsilon}} - \frac{1}{1-s} = 0. \tag{5.21}$$

[5] If $\gamma + \delta > 1$, condition (5.16) determines a local minimum instead of a local maximum, whereas, if $\gamma + \delta = 1$, $\frac{\partial L}{\partial s}$ is independent of s and again we have either $s = 0$ or $l_s = 0$. Notice that the fact that we get a border solution does not depend from the Cobb-Douglas specification, but rather from the assumption that s has increasing returns to scale, i.e. that $G_1(s, l, l_s)$ is an increasing function of s.

[6] For $K_s = \hat{K}_s$ the representative agent is indifferent between the two choices; whatever the choice, in $K_s = \hat{K}_s$ dynamics (5.8) is discontinuous from right. Notice that one could speculate on the effect of the parameters on $\hat{K}_s$, but at the present stage they do not constitute our main focus. The same will be valid with $\tilde{K}_s$ below.

Equation (5.20)implies $s = \frac{b\gamma}{1+b\gamma}$, which, substituted in equation (5.21), yields, solving for K_s,

$$K_s = \tilde{K}_s \equiv \left[\frac{ab\beta}{\sigma(b\gamma)^{\gamma+\delta}(1+b\gamma)^{1-\gamma-\delta}}\right]^{\frac{1}{\epsilon}}. \tag{5.22}$$

For $K_s < \tilde{K}_s$ the choice of s and l_s is determined by equation (5.16) as

$$s = \left(\frac{\sigma\gamma}{a\beta}K_s^{\epsilon}\right)^{\frac{1}{1-\gamma-\delta}}. \tag{5.23}$$

For $K_s \geq \tilde{K}_s$ it is determined by equation (5.18).

Dynamics of social capital accumulation

Under the Cobb-Douglas specification of function $G(s, \bar{s}, K_s)$ assumed above, we may rewrite dynamics (5.8) as

$$\dot{K}_s = g(s, K_s) - \eta K_s = \sigma s^{\gamma+\delta} K_s^{\epsilon} - \eta K_s, \tag{5.24}$$

where s is the following function of K_s[7]:

$$\text{Case (a) : } \gamma+\delta \geq 1: \qquad s(K_s) = \begin{cases} 0, & \text{if } K_s < \hat{K}_s \\ \frac{b\gamma}{1+b\gamma}, & \text{if } K_s \geq \hat{K}_s \end{cases}; \tag{5.25}$$

$$\text{Case (b) : } \gamma+\delta < 1: \qquad s(K_s) = \begin{cases} \left(\frac{\sigma\gamma}{a\beta}K_s^{\epsilon}\right)^{\frac{1}{1-\gamma-\delta}}, & \text{if } K_s < \tilde{K}_s \\ \frac{b\gamma}{1+b\gamma}, & \text{if } K_s \geq \tilde{K}_s \end{cases} \tag{5.26}$$

For ease of reference, let $f(K_s) \equiv g[s(K_s), K_s]$, where $s(K_s)$ is given by equations (5.25) and (5.26), so that we can write equation (5.24) in a short way as $\dot{K}_s = f(K_s) - \eta K_s$.

Notice that, along decreasing paths of K_s, private production and consumption increase (or at least don't decrease), whereas social participation decreases.

In the Appendix we classify dynamics (5.24), taking into account all the possible combinations of parameter values. Here we focus on just one case of particular interest.

Assumption 2 *Let us assume we are in case (b), that is, $\gamma+\delta < 1$*[8]*.*
Let, moreover, $\epsilon < 1$, which means decreasing returns to scale of social capital.

[7]Notice that in equation (5.25), when $K_s = \hat{K}_s$, the representative individual is indifferent between $s = 0$ and $s = \frac{b\gamma}{1+b\gamma}$, but the specific value of s chosen in a single point is not relevant for dynamics (5.24); in equation (5.26) this problem does not even arise, since it defines in that case $s(K_s)$ is a continuous function.

[8]Intuitively, we can think of this assumption in terms of decreasing returns to scale of social participation, even though this is not literally correct, since social participation is a fraction $s \in [0, 1]$.

Let also $\gamma + \delta + \epsilon > 1$, which resembles the idea of aggregate increasing returns to scale in the relational goods 'production function'.
Finally, assume that η is low, that is, social capital does not depreciate too fast.

In this case, as shown in fig. 14, that we reproduce here for ease of reading, there exist two locally attracting fixed points, one with no social capital, which constitutes a social poverty trap, and a Pareto-superior one with positive social capital. Their attraction basins are separated by a repulsive fixed point. If initial social capital is above this threshold, the economy converges to the fixed point with a positive stock of positive social capital. If convergence takes place from below, we have social development at the expenses of private activities; if it takes place from above, along the convergence path we observe an expansion of private activities. If initial social capital is below the threshold, the economy experiences an expansion of private activities along the convergence path, but converges to the Pareto-inferior fixed point, i.e., to the social poverty trap. The role of social capital depreciation rate is to move the threshold: the faster social capital depreciates, the larger the attraction basin of the social poverty trap. Indeed, if η is too high, the attractor with positive social capital disappears.

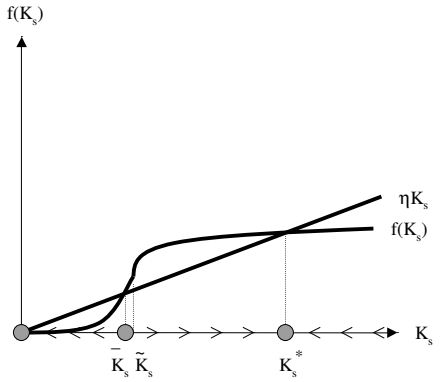

Fig. 14

Policy speculations

Even though the present framework does not allow to formulate solid policy conclusions, it does allow to make some policy speculations. It seems plausible to think that the speed of social capital depreciation is strictly related to the degree in individual mobility of a society. From this point of view, our framework leads, through a different way, to the same point of Schiff's (1992) analysis of the impact of labor mobility on social capital and welfare. Our result is also in accordance to Schiff's (1999 and 2002) discussion of the difference between the two main forms of factor mobility: migration and trade. While the former one has relevant and often overlooked social consequences, the same is not true for the latter one. The bottom line of this discussion is not to argue against

individual mobility, since its positive aspects have not been taken into account here. Rather, it is to stress that the evaluation of its well-being consequences should take into account its effects on social capital and enjoyment of relational goods.

As we have seen, besides the problem generated by a high social capital depreciation rate, there is the problem determined by the presence of externalities. If policy has any scope from this point of view, it should be to let individuals internalize the direct and the indirect externality of social participation, i.e. take into account the effect of their own participation on average social participation today, and thereby on the amount of socially provided goods they enjoy themselves today, and on social capital accumulation, and thereby on the amount of relational goods they will be able to enjoy tomorrow. Such aims can probably be achieved to some extent through educational policy. Notice that reward schemes of a Pigouvian kind could in principle solve the direct externality problem, since this would only require information about technology, but to solve the cumulative externality problem the public authority needs to know the individual intertemporal discount rate. Moreover, besides all the traditional problems associated to these policy instruments, a further problem is generated by the role of intrinsic motivations in determining social participation. As pointed out by Gneezy and Rustichini (2000), incentives may have the effect of changing the way people frame a situation (for instance they can let individuals re-interpret a non-market good in market terms), so that they can crowd out intrinsic (or social) motivations. Since voluntary social participation does not belong to the class of market activities, one should be careful in applying incentives schemes that have been designed to operate within the scope of the market.

5.3 Conclusion

The basic argument driving the present model starts with the recognition that individual well-being depends on satisfaction of both material and relational needs. The first ones may be satisfied to a great extent through private activities, whereas the second ones may only be satisfied by participating to social activities. The outcome of private activities typically enters in the GDP, but much of the outcome of social activities, namely what we call relational goods, does not. Moreover, social participation generates a direct externality, in that it raises the 'productivity' of the time other individuals spend in social activities, and a cumulative externality, in that it contributes to the formation of social capital. Social capital positively increases the returns to both private and social activities, but we just concentrate on the latter effect, arguing that our basic results would still hold if we considered the former one as well. Our basic result can be stated as follows: even with a homogeneous population of optimizing agents, an economy may get stuck in a social poverty trap, i.e. in a Pareto-dominated equilibrium, if its initial stock of social capital is too low or if the 'depreciation' rate of social capital is too high. Along the transition path towards a social poverty trap an economy may experience at the same time

private growth, registered in national accounting, and social impoverishment. The reason why optimizing agents may fail to reach the optimum is straightforward: they are not able to internalize the direct and cumulative external effects of their actions. In particular, we focus on the possibility of substituting relational goods with some kinds of private goods, not provided through social participation. When individuals operate such substitution they do not calculate that some positive externalities are lost. We argue that this substitution process may be of empirical relevance especially for advanced economies. In fact, since social activities are typically time-intensive, the increasing pressure on time experienced by advanced societies provides a strong incentive to substitute social participation with some other time-saving private activity. Moreover, the process may be self-feeding, because when an economy is experiencing at the same time private growth and a decline in social participation and social capital, the time spent in social activities becomes both more expensive (in terms of opportunity cost) and less 'productive' (in terms of relational goods). This framework allows policy speculations on the impact of labor mobility on well-being through its effect on social capital depreciation rate and on the possibility and the difficulty to provide adequate incentives to social participation.

5.4 Appendix

Case (a): $\gamma + \delta \geq 1$

In this case equations (5.24) and (5.25) imply

$$\dot{K}_s = \begin{cases} -\eta K_s & , \quad \text{if } K_s < \hat{K}_s \\ \sigma \left(\frac{b\gamma}{1+b\gamma}\right)^{\gamma+\delta} K_s^{\epsilon} - \eta K_s, & \text{if } K_s \geq \hat{K}_s \end{cases} . \tag{5.27}$$

Notice first that if $\eta = 0$, i.e. if we neglect the role of 'depreciation' of social capital, we have that every value $K_s \in [0, \hat{K}_s)$ is a fixed point, whereas starting from higher initial values of social capital $K_s(0) \geq \hat{K}_s$ we have $K_s \to \infty$. The extension of the locus of social poverty traps is then determined by the parameters that affect $\hat{K}_s$, identified in equation (5.19).

Let us now assume that social capital 'depreciates', i.e. $\eta > 0$[9]. We can then distinguish the following subcases.

(a.1): $\epsilon > 1$. With increasing marginal 'productivity' of K_s, we have the three cases illustrated in figg. 2-4: there are always two attractors, $K_s = 0$ and $K_s = \infty$. For low values of η (figg. 1 and 2) the respective attraction basins are separated by $\hat{K}_s$ (in fig. 2 $\hat{K}_s$ is a repulsive fixed point, in fig. 1 it is not a fixed point); for high values of η (fig. 3) they are separated by a repulsive fixed point $\bar{K}_s > \hat{K}_s$, which means that a higher 'depreciation rate' expands the basin of attraction of social poverty.

[9]The assumption of linear depreciation, proportional to the existing stock of K_s, is the easiest and most immediate one, but other forms of depreciation, possibly more realistic, could be conceived as well.

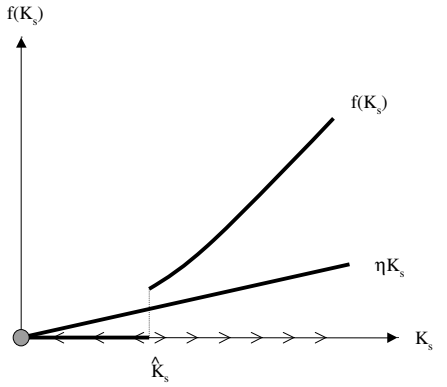

Fig. 1

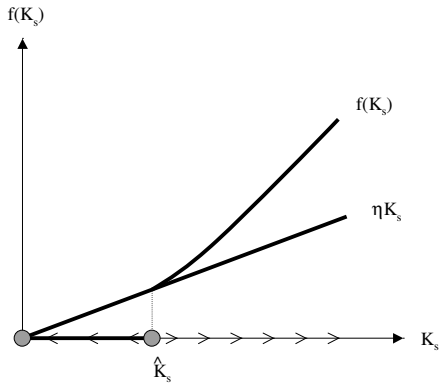

Fig. 2

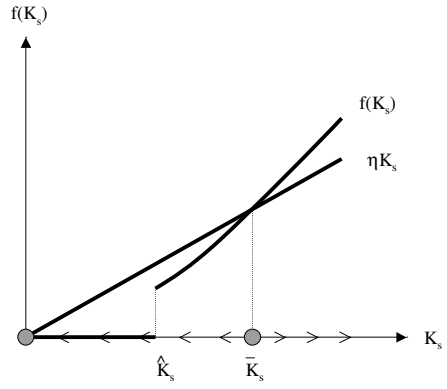

Fig. 3

(a.2): $\epsilon = 1$**.** With constant returns to scale of social capital in the 'production' of relational goods, low values of η (fig. 4) are again associated with the presence of the attractors $K_s = 0$ and $K_s = \infty$, separated by $\hat{K}_s$ (which is not a fixed point). The intermediate value $\eta = \sigma \left(\frac{b\gamma}{1+b\gamma}\right)^{\gamma+\delta}$ (fig. 5) renders all $K_s \in [\hat{K}_s, \infty)$ fixed points; $[0, \hat{K}_s)$ is the attraction basin of the social poverty trap $K_s = 0$. Finally, for higher values of η (fig. 6), $K_s = 0$ becomes globally attracting. Notice that in this last case we do not speak any more of a social poverty trap, since there is no way the economy can avoid it, unless the primitives, i.e. preferences and technology, change. On the contrary, when social poverty traps are present, i.e. when there are two or more locally attracting fixed points, in which one of them the economy ends up depends crucially on its initial endowment of social capital: different previous histories, reflected in different initial endowments, explain why otherwise identical economies may end up with completely different social and cultural structures, in terms of allocation of time between the social and the private sphere.

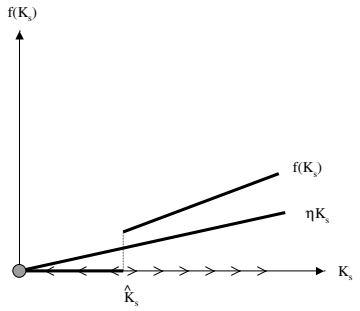

Fig. 4

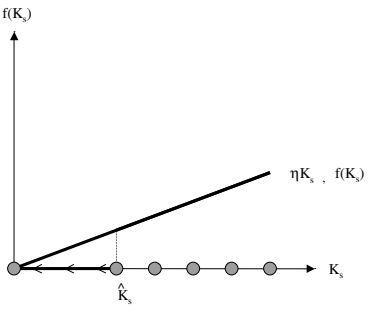

Fig. 5

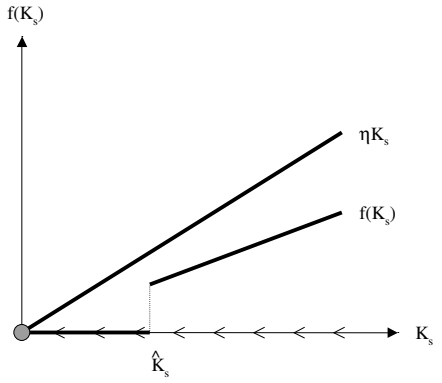

Fig. 6

(a.3): $\epsilon < 1$**.** With decreasing returns to scale to social capital, $K_s = \infty$ is never an attractor. For low values of η (fig. 7) there are two locally attracting fixed points, $K_s = 0$ and $\bar{K}_s > \hat{K}_s$, whose attraction basins are respectively $[0, \hat{K}_s)$ and $[\hat{K}_s, \infty)$; as η increases, first $\bar{K}_s$ converges to $\hat{K}_s$, until it reaches this value (fig. 8), then, for even higher values of η (fig. 9), $K_s = 0$ becomes the only, globally attracting fixed point.

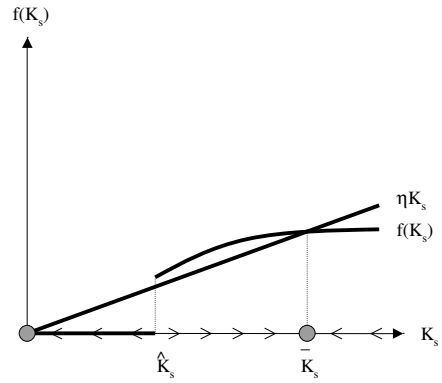

Fig. 7

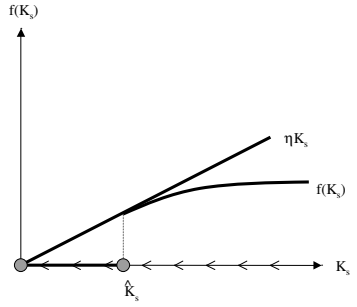

Fig. 8

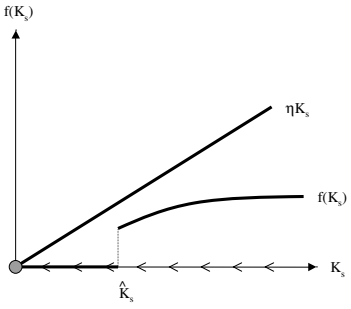

Fig. 9

Case (b): $\gamma + \delta < 1$

In this case equations (5.24) and (5.26) imply

$$\dot{K}_s = \begin{cases} \sigma \left(\frac{\sigma\gamma}{a\beta}\right)^{\frac{\gamma+\delta}{1-\gamma-\delta}} K_s^{\epsilon \frac{1}{1-\gamma-\delta}} - \eta K_s, & \text{if } K_s < \tilde{K}_s \\ \sigma \left(\frac{b\gamma}{1+b\gamma}\right)^{\gamma+\delta} K_s^{\epsilon} - \eta K_s \qquad , & \text{if } K_s \geq \tilde{K}_s \end{cases} . \tag{5.28}$$

It is easy to show that equation (5.28) defines $\dot{K}_s$ as a continuous function of K_s (in particular, it is continuous at $\tilde{K}_s$, even if it is not derivable at this point). Let us now consider the exponent of K_s for $K_s < \tilde{K}_s$: since $\epsilon\frac{1}{1-\gamma-\delta} > \epsilon$, if $\epsilon \geq 1$, then $\epsilon\frac{1}{1-\gamma-\delta} > 1$; if $\epsilon < 1$, then $\epsilon\frac{1}{1-\gamma-\delta} \geq 1 \Longleftrightarrow \gamma + \delta + \epsilon \geq 1$, i.e. when the function $G(s, \bar{s}, K_s) = \sigma s^{\gamma} \bar{s}^{\delta} K_s^{\epsilon}$ has either constant returns to scale (case $\gamma + \delta + \epsilon = 1$) or increasing returns to scale (case $\gamma + \delta + \epsilon > 1$). In the following classification we consider all these cases and omit for simplicity those ones which are not 'robust', meaning that a slight change in the parameters modifies qualitatively dynamics (5.28).

(b.1): $\epsilon > 1$**.** There always exists a repulsive fixed point $\bar{K}_s$ which separates the attraction basin of the social poverty trap $K_s = 0$ from the states of the economy starting from which $K_s \longrightarrow \infty$ (fig. 10). The shape of fig. 12 follows from the following observations: the function $f(K_s)$ introduced above is continuous; $\lim_{K_s \to 0} f'(K_s) = 0$ and $\lim_{K_s \to \infty} f'(K_s) = \infty$; $\exists!\ \bar{K}_s > 0 :\ f(\bar{K}_s) = \eta \bar{K}_s$. Notice that $\bar{K}_s$ may be greater, equal or less than $\tilde{K}_s$. The 'depreciation' rate η has the effect of expanding the attraction basin of $K_s = 0$.

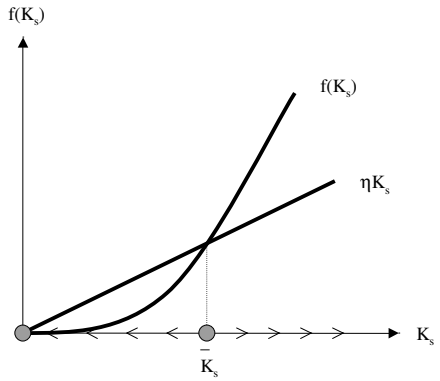

Fig. 10

(b.2): $\epsilon = 1$**.** In this case $f(K_s)$ is strictly convex for $K_s < \tilde{K}_s$ and it is linear for $K_s > \tilde{K}_s$. For low values of η (fig. 11) a repulsive fixed point $\bar{K}_s < \tilde{K}_s$ separates the attraction basin of the social poverty trap $K_s = 0$ from that of $K_s = \infty$. As η increases, $\bar{K}_s$ converges to $\tilde{K}_s$; when it reaches this value (fig. 12), all $K_s \in [\tilde{K}_s, \infty)$ are fixed points, whereas $[0, \tilde{K}_s)$ is the attraction basin of the social poverty trap $K_s = 0$. For even higher values of η (fig. 13), $K_s = 0$ becomes the only, globally attracting fixed point.

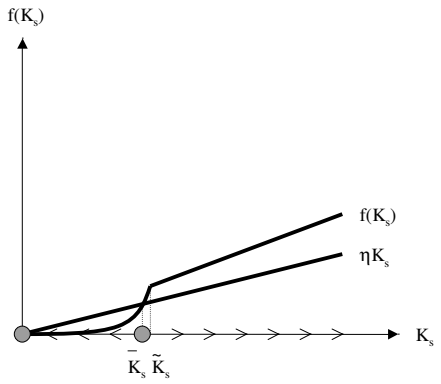

Fig. 11

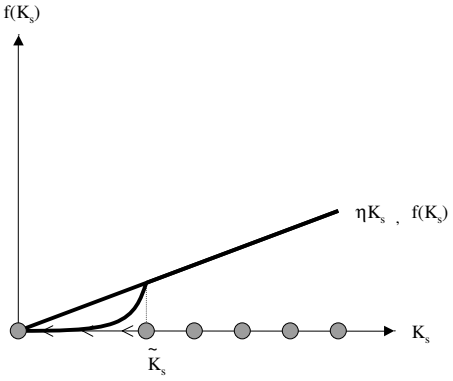

Fig. 12

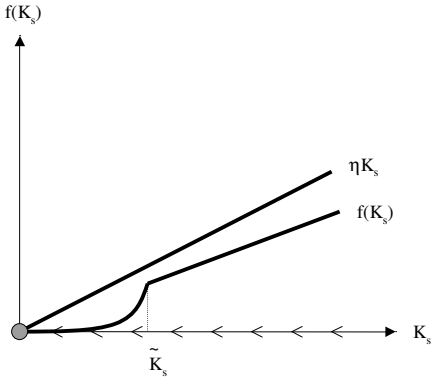

Fig. 13

(b.3): $\epsilon < 1$**.** We have now to distinguish among the following subcases.

(b.3.1): $\gamma + \delta + \epsilon > 1$**.** In this case $f(K_s)$ is strictly convex for $K_s < \tilde{K}_s$ and it is strictly concave for $K_s > \tilde{K}_s$. As in case (a.3), $K_s = \infty$ is never an attractor. For low values of η (fig. 14) there are two locally attracting fixed points, $K_s = 0$ and $K_s^* > \tilde{K}_s$, whose attraction basins are separated by a repulsive fixed point $\bar{K}_s < \tilde{K}_s$ and are respectively $[0, \bar{K}_s)$ and $(\bar{K}_s, \infty)$. As η increases, $\bar{K}_s$ and K_s^* converge to each other, until the situation described in fig. 15 is reached. For even higher values of η (fig. 16), $K_s = 0$ becomes the only, globally attracting fixed point.

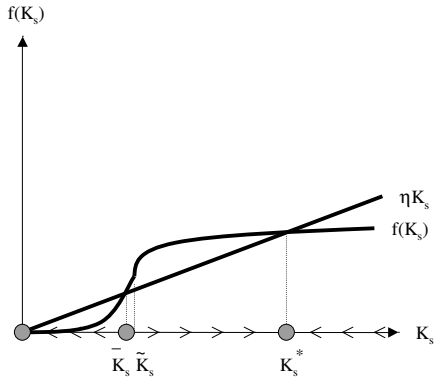

Fig. 14

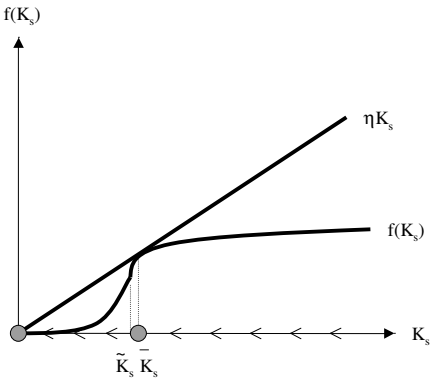

Fig. 15

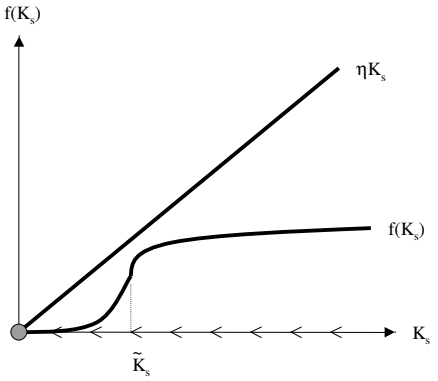

Fig. 16

(b.3.2): $\gamma + \delta + \epsilon = 1$**.** Now $f(K_s)$ is linear for $K_s < \tilde{K}_s$ and it is strictly concave for $K_s > \tilde{K}_s$. Once again, $K_s = \infty$ is never an attractor. For low η (fig. 17), there exists a fixed point $\bar{K}_s > \tilde{K}_s$ whose attraction basin is $(0, \infty)$: any economy with a positive initial social capital ends up there; of course, $K_s = 0$ is still a fixed point, but it is now repulsive. As η grows, $\bar{K}_s$ converges to $\tilde{K}_s$ and when it reaches it (fig. 18) we have a segment $[0, \tilde{K}_s)$ of fixed points which correspond to social poverty traps and the fixed point $\tilde{K}_s$ whose basin of attraction is $[\tilde{K}_s, \infty)$. Higher values of η (fig. 19) render $K_s = 0$ globally attracting.

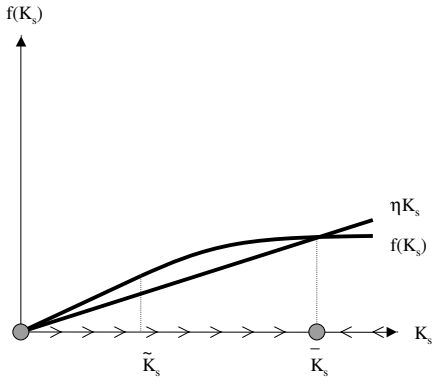

Fig. 17

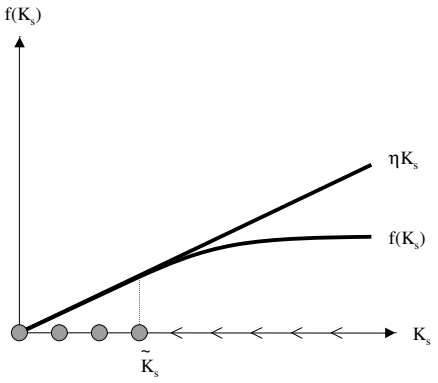

Fig. 18

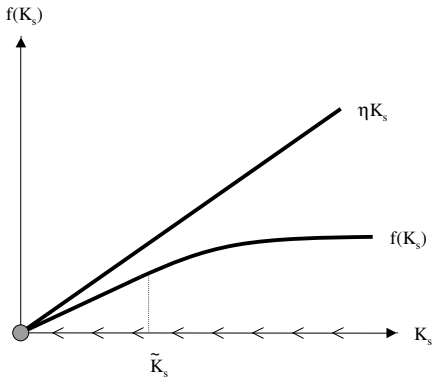

Fig. 19

(b.3.3): $\gamma + \delta + \epsilon < 1$**.** In this last case (fig. 20), $f(K_s)$ is strictly concave and it crosses ηK_s in a point $\bar{K}_s > 0$, which is an attractor for all $K_s > 0$. $K_s = 0$ is a repulsive fixed point.

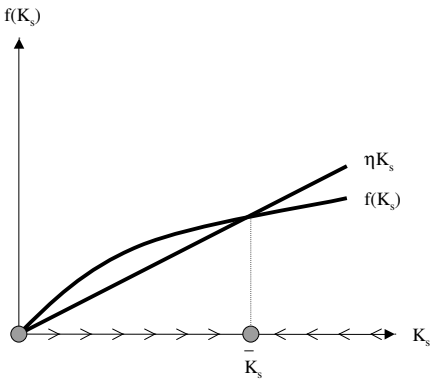

Fig. 20

Chapter 6

A neoclassical model of private and social capital accumulation

6.1 Introduction

The present chapter extends the analysis of Chapter 5 to consider explicitly the role of private capital: it proposes a neoclassical growth model with both private and social capital accumulation at the same time. We investigate whether these two processes are positively correlated or not and show that both outcomes are possible, depending on the parameters of the economy. Taking into account the effects of such dynamics on consumption of both private and relational goods, we draw conclusions about well-being that apply to advanced economies.

As in the previous chapter, we consider social capital mainly accumulated through social participation and we regard it as an accumulated externality. The broad result obtained there is that growing economies may fall into social poverty traps, i.e., into situations in which, although material wealth is high, social poverty drives down overall well-being[1]. For the sake of simplicity, in Chapter 5 we disregarded the accumulation of private capital. One might expect that, once the latter is taken into account, possibly together with the positive externalities it brings about, material growth may be strong enough to more than compensate, from the point of view of well-being, its negative social externalities. In the present chapter we show that this may but need not be the case and that whether it happens or not depends on the parameters of preferences and technology.

Among other things, we also find that impatience may increase steady state well-being, since it reduces inefficient over-accumulation of private capital[2]. This is true as long as positive externalities of private capital accumulation (of the kind studied in endogenous growth theory) are not too strong, i.e., as long as in equilibrium, including

[1] Growth was interpreted there as an expansion of private activities; here it is framed in terms of private capital accumulation.

[2] We may recall that this is a common result in the literature on negative externalities and growth discussed in Chapter 4.

its external effects, private capital still has decreasing returns to scale, and as long as two further conditions are met: that social capital does not depreciate too fast and that the elasticity of relational goods to social capital is high enough.

As in Chapter 5, we study a model with three goods and we focus on the possible substitution between social and private activities. A reduction in social participation implies at the same time an increase in labor supply and a substitution of private for relational goods. In general, this amounts to an individualization of the sources of well-being. On one side, such a shift stimulates the economy, since both production and consumption of private goods increase, and hence the GDP rises[3]; on the other side, it generates a negative externality on the productivity (in terms of relational goods) of social participation. Dynamically, this change has a negative effect on social capital accumulation, whereas the sign of the effect on private capital accumulation depends on whether production and consumption (of private goods) increase proportionally or disproportionately, i.e., on whether total savings increase together with consumption or decrease[4]. Theoretically, private and social capital may be both positively or negatively correlated. This is in line, for instance, with Putnam's (2000) empirical finding of a decline in US social capital followed by a revival, over a time horizon in which private growth has always been observed.

6.2 Model

We present now a simple growth model with private and social capital accumulation. Since some of the basic insights may be appreciated even in a static framework, we first introduce a static version, in which private and social capital are considered as exogenously given in some strictly positive amount, and then introduce their dynamics (in continuous time).

6.2.1 Static specification

Preferences and technology

We model an economy populated by a continuum of identical, infinitely lived individuals, of size normalized to 1, whose utility depends on three goods: a private consumption good C used to satisfy basic needs, a relational good B and a private consumption good C_s that serves as a substitute of the relational good. Instantaneous preference are described by the utility function $u(C, B, C_s) = \ln C + a \ln(B + bC_s)$, where $a > 0$ is the elasticity of substitution between basic needs satisfied by C on one side and needs satisfied by either B or C_s on the other side, and $b > 0$ is the marginal rate of substitution between B and C_s[5].

We assume that private consumption (i.e., both C and C_s) does not require time. On the contrary, the relational good may only be enjoyed if an individual spends time in social participation. Individuals are endowed with a unit of time, which they allocate

[3] As already observed, while most private goods enter in the GDP, most relational goods do not.

[4] Notice that this is consistent with an interpretation of private capital in terms of physical capital. This interpretation will be held throughout our model, although we will keep speaking of private capital in general because we believe that a broad interpretation of private capital in terms both of physical and of human capital would not alter the picture significantly.

[5] The assumption that B and C_s are perfect substitutes is made just for the sake of simplicity.

between social participation (fraction s) and labor (fraction $1-s$). A single individual considers average social participation $\bar{s} = \int_0^1 s(i)\mathrm{d}i$ in the economy as exogenously given.

Each individual produces private goods using labor and private capital K, according to the production function $Y = (1-s)^{\epsilon} K^{1-\epsilon} A$, where $\epsilon \in (0,1)$ is a parameter[6]. The term $A \equiv (1-\bar{s})^{\sigma} \bar{K}^{\vartheta}$ captures a positive externality in production. Average private capital $\bar{K} = \int_0^1 K(i)\mathrm{d}i$ is considered as exogenously given by each single individual and, consequently, the same is true for the whole term A (σ and ϑ are strictly positive parameters).

Besides private capital, our economy is characterized by the presence of social capital K_s. Social capital is not the private property of any individual, but is rather an endowment of the entire economy, that each single individual considers as exogenous.

The quantity of the relational good B enjoyed by the representative individual is a function of her own social participation, of average social participation and of social capital, all of which are necessary factors: $B = s^{\alpha} \bar{s}^{\beta} K_s^{\gamma}$, where $\alpha,\ \beta,\ \gamma > 0$.

Individual problem and symmetric Nash equilibria

The problem solved by the representative individual is

$$\max_{s,C,C_s} u(C,B,C_s) \quad \text{s.t.} \tag{6.1}$$

$$C + C_s = Y, \qquad C, C_s \geq 0, \quad s \in [0,1]. \tag{6.2}$$

A symmetric Nash equilibrium (SNE) is a triple (s^*, C^*, C_s^*) that solves problem (6.1), under constraints (6.2), given that every other individual in the economy chooses s^*, so that, in particular, $\bar{s} = s^*$.

Proposition 1 *Let* $\tilde{s} = 0$, $\tilde{C} = \frac{1}{1+a} K^{1+\vartheta-\epsilon}$, $\tilde{C}_s = \frac{a}{1+a} K^{1+\vartheta-\epsilon}$. *The triple* $(\tilde{s}, \tilde{C}, \tilde{C}_s)$ *is always a SNE*[7].

In this equilibrium no time is devoted to social interaction, since each individual believes that every other one will spend her entire amount of time working, thus rendering social participation not worthwhile.

To be able to investigate analytically the existence of a SNE in which $s > 0$, we make the following simplifying assumption.

Assumption 3 $\alpha + \beta = \epsilon + \sigma = \varphi < 1$*: this means that, at a SNE, the elasticity of the relational good to social participation is the same as the elasticity of private production to labor; we call* φ *the common value and assume that it is smaller than one*[8].

In order to state the following proposition, let

[6] We also assume that everybody has the same initial endowment of private capital.

[7] All the proofs are in the Appendix.

[8] The equality plays no other role than enabling us to derive an analytic solution, whereas the assumption that $\varphi < 1$ rules out a possible indeterminacy of s at a SNE.

$$\hat{s} = \frac{1}{1+\left(\frac{b\epsilon K^{1+\vartheta-\epsilon}}{\alpha K_s^{\gamma}}\right)^{\frac{1}{1-\varphi}}}, \tag{6.3}$$

$$\hat{C} = \frac{1}{b(1+a)}\hat{s}^{\varphi}K_s^{\gamma} + \frac{1}{(1+a)}(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}, \tag{6.4}$$

$$\hat{C}_s = \frac{a}{(1+a)}(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon} - \frac{1}{b(1+a)}\hat{s}^{\varphi}K_s^{\gamma}. \tag{6.5}$$

Proposition 2 *Under Assumption 3, there exists a unique SNE with strictly positive social participation, namely, the triple* $(\hat{s}, \hat{C}, \hat{C}_s)$.

Notice that, among other things, $\hat{s}$ is an increasing function of K_s and α and a decreasing function of K. We will come back to the interpretation of these findings in the context of the dynamic specification of the model.

Proposition 3 *For any parameter constellation there is an increasing function g such that the SNE* $(\hat{s}, \hat{C}, \hat{C}_s)$ *Pareto-dominates the SNE* $(\tilde{s}, \tilde{C}, \tilde{C}_s)$ *if and only if* $K_s > g(K)$*, the reverse being true when* $K_s < g(K)$.

Proposition 3 is rather intuitive, since it tells us that it is comparatively efficient to specialize in private production for those economies that, having a relatively high stock of private capital, have a comparative advantage to do so, whereas it becomes more efficient to devote a certain fraction of time to social participation in those economies where the social environment is relatively rich. Since, though, both equilibria are present, it is possible that, due to coordination failure, an economy gets stuck in the Pareto-inferior equilibrium. The limit of Proposition 3 is that it does not tell us anything about the sources of the relative abundance of private versus social capital. To investigate this aspect, we have to turn to the dynamic specification of our model.

Before doing this, though, a further comment may be done about the externalities that drive the story of this static model. Since both average social participation and average labor time, which are here the complement to 1 of one another, are supposed to exert positive external effects (respectively, on the production of the relational good and of the private goods), it is not *a priori* clear whether, overall, social participation displays positive or negative spillovers[9]. In general, in this game there tend to be positive spillovers from social participation when social capital is high relative to private capital, whereas such spillovers are overall negative when the reverse is true[10].

Remark 4 *Under Assumption 3, since, generically, in the SNE* $(\hat{s}, \hat{C}, \hat{C}_s)$ *splillovers are present, such equilibrium is inefficient even when it Pareto-dominates the SNE* $(\tilde{s}, \tilde{C}, \tilde{C}_s)$[11].

[9] According to Cooper and John's (1988) terminology, social participation has positive (negative) spillovers if an increase in average social participation raises (decreases) individual utility, i.e., if $\frac{\partial u(C,B,Y-C)}{\partial \bar{s}}$ is positive (negative).

[10] Formally, under the reasonable assumption that $\beta, \sigma < 1$, which is even weaker than Assumption 3, $\frac{\partial u(C,B,Y-C)}{\partial \bar{s}} > 0 \Leftrightarrow \beta s^{\alpha}\bar{s}^{\beta-1}K_s^{\gamma} > b\sigma(1-s)^{\epsilon}(1-\bar{s})^{\sigma-1}K^{1+\vartheta-\epsilon}$, i.e., when K_s is high relative to K, s is high and $\bar{s}$ is low.

[11] Precisely, in the SNE $(\hat{s}, \hat{C}, \hat{C}_s)$ there are positive spillovers when $\alpha < \frac{\beta\epsilon}{\sigma}$ and negative ones when the reverse is true. There are no spillovers only in the non-generic case in which $\alpha = \frac{\beta\epsilon}{\sigma}$. Remark 4 then follows from Proposition 2 of Cooper and John (1988).

Indeed, Remark 4 tells us that the common result that, in presence of non-internalized externalities, even the best SNE is generally inefficient, applies also to our case.

6.2.2 Dynamic specification

In the dynamic specification of the model preferences and technology are the same as above, with the only difference that now private and social capital are endogenously determined. The dynamics of the representative individual's private capital is given by $\dot{K} = Y - C - C_s - \eta K$, where $\eta \geq 0$.

Social capital (which is still considered as exogenous by the representative individual at any given point in time) is not accumulated through a process of investment; rather, its stock increases when a high average social participation brings about a high average enjoyment of the relational good (denoted $\bar{B} = \int_0^1 B(i)\mathrm{d}i$). Since relations deteriorate over time if individuals do not actively take care of them, we also assume that K_s depreciates at a rate $\delta > 0$. We can thus summarize the dynamics of social capital as $\dot{K}_s = f(\bar{B}) - \delta K_s$, where f is a strictly increasing function. The idea that non-material forms of capital may be accumulated though a 'consumption' activity rather than through investment, although unconventional in economics, is neither new (it goes back to Aristotle's analysis of ethical virtues, whose influence is to be found in Nussbaum's (1986) discussion of relational goods) nor surprising (think, e.g., of knowledge, which is accumulated though the use of knowledge). Indeed, the engine of social capital accumulation is average social participation $\bar{s}$, but we specify 'gross investment' in social capital in terms of $\bar{B}$ in consideration of the fact that a given level of $\bar{s}$ is more effective at increasing K_s in an environment in which it also generates a greater amount of the relational good. This idea is particularly compelling if we think of trust and social norms as forms of social capital, which are evidently accumulated in accordance with the perceived results of social participation and not just as a consequence of social participation *per se*, but the same idea may also be extended to other forms of social capital, like association networks, whose ability to prosper and expand may be seen as a function of the amount of relational goods they are able to provide to the people involved.

For the sake of simplicity, we make the following assumptions.

Assumption 4 *$\eta = 0$: we ignore private capital depreciation.*

Assumption 5 *$f(x) \equiv x$: this means that $\dot{K}_s = \bar{B} - \delta K_s$.*

Assumption 6 *$\epsilon > \vartheta$ and $\gamma < 1$: this means that we do not allow either K or K_s to grow steadily at a strictly positive rate.*

Assumption 4 is an innocent one. Assumption 5 is made just for the sake of analytical simplicity[12]. Assumption 6 means that in our model there is no engine for endogenous growth.

[12]In principle, there is no reason for the 'gross investment' in social capital to be exactly equal to the average benefit from social participation, even if it is an increasing function of the latter; though, the identical specification is by far the easiest one and has the advantage of a straightforward interpretation: it lets us think of social capital just in terms of accumulated relational goods.

Individual problem

Letting $r > 0$ be the intertemporal discount rate, the representative individual solves the following problem:

$$\max_{s,C,C_s} \int_0^\infty u(C, B, C_s)\mathrm{e}^{-rt}\mathrm{d}t = \int_0^\infty [\ln C + a\ln(s^\alpha \bar{s}^\beta K_s^\gamma + bC_s)]\mathrm{e}^{-rt}\mathrm{d}t \quad \text{s.t.} \tag{6.6}$$

$$\dot{K}_s = \bar{s}^{\alpha+\beta}K_s^\gamma - \delta K_s, \tag{6.7}$$
$$\dot{K} = (1-s)^\epsilon K^{1-\epsilon}A - C - C_s, \qquad A \equiv (1-\bar{s})^\sigma \bar{K}^\vartheta. \tag{6.8}$$

The current value Hamiltonian function for this problem is

$$H = \ln C + a\ln(s^\alpha \bar{s}^\beta K_s^\gamma + bC_s) + \lambda[(1-s)^\epsilon K^{1-\epsilon}A - C - C_s] + \\ +\mu[\bar{s}^{\alpha+\beta}K_s^\gamma - \delta K_s]. \tag{6.9}$$

For the maximum principle we have

$$\dot{K} = \frac{\partial H}{\partial \lambda} = (1-s)^\epsilon K^{1-\epsilon}A - C - C_s, \tag{6.10}$$
$$\dot{\lambda} = r\lambda - \frac{\partial H}{\partial K} = \lambda[r - (1-\epsilon)(1-s)^\epsilon K^{-\epsilon}A], \tag{6.11}$$
$$\dot{K}_s = \frac{\partial H}{\partial \mu} = \bar{s}^{\alpha+\beta}K_s^\gamma - \delta K_s. \tag{6.12}$$

We omit the dynamics of μ, the 'shadow price' of social capital, since equations (6.10) to (6.12) are independent of it, due to the fact that K_s is entirely treated as an externality. The first order conditions are

$$\frac{\partial H}{\partial C} = \frac{1}{C} - \lambda = 0, \qquad C > 0, \tag{6.13}$$
$$\frac{\partial H}{\partial C_s} = \frac{ab}{s^\alpha \bar{s}^\beta K_s^\gamma + bC_s} - \lambda \leq 0, \qquad C_s\frac{\partial H}{\partial C_s} = 0, \qquad C_s \geq 0, \tag{6.14}$$
$$\frac{\partial H}{\partial s} = \frac{a\alpha s^{\alpha-1}\bar{s}^\beta K_s^\gamma}{s^\alpha \bar{s}^\beta K_s^\gamma + bC_s} - \epsilon\lambda(1-s)^{\epsilon-1}K^{1-\epsilon}A \leq 0, \tag{6.15}$$
$$s\frac{\partial H}{\partial s} = 0, \qquad s \in [0,1].$$

Notice that s and C_s cannot be chosen both equal to zero. Thus, either condition (6.14) or condition (6.15) must hold with equality.

Symmetric Nash equilibrium

A SNE of this economy is now a triple (s^*, C^*, C_s^*) that solves problem (6.6), under constraints (6.7)-(6.8), given that every other individual in the economy chooses (s^*, C^*, C_s^*), so that, even if for the representative individual *ex ante* $\bar{s}$ and $\bar{K}$ are considered as exogenous, *ex post* they turn out to be equal, respectively, to s^* and to K (the representative individual's own capital stock).

In order to maintain in the dynamic version of the model the analytical tractability of the static version, we modify Assumption 3 into the following one.

Assumption 7 *$\alpha + \beta = \epsilon + \sigma = \varphi = 1$: this means that in equilibrium B is a linear function of s and Y is a linear function of $1 - s$.*

Proposition 4 *At a SNE, the curve*

$$K_s = \left(\frac{\epsilon b}{\alpha} K^{1+\vartheta-\epsilon}\right)^{\frac{1}{\gamma}}, \tag{6.16}$$

separates in the (K, K_s) plane the region in which $s > 0$ and $C_s = 0$ from the one in which $s = 0$ and $C_s > 0$ (see figure 1).

Precisely, in the two regions s and C_s are chosen as follows:

$$\text{Case (a)} : K_s < \left(\frac{\epsilon b}{\alpha} K^{1+\vartheta-\epsilon}\right)^{\frac{1}{\gamma}} : \qquad \begin{cases} s = 0 \\ C_s = \frac{a}{\lambda} \end{cases}, \tag{6.17}$$

$$\text{Case (b)} : K_s > \left(\frac{\epsilon b}{\alpha} K^{1+\vartheta-\epsilon}\right)^{\frac{1}{\gamma}} : \qquad \begin{cases} s = \min\left\{1, \frac{a\alpha}{\epsilon\lambda K^{1+\vartheta-\epsilon}}\right\} \\ C_s = 0 \end{cases}. \tag{6.18}$$

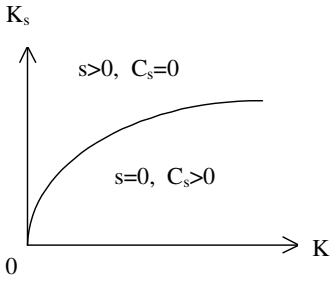

Figure 1

Case (a) identifies a situation in which social capital is scarce relative to private capital, so that, rather than spending time in social participation, whose returns are low, in equilibrium it is better to choose a high labor supply, which has a high return, and to substitute a high consumption of private goods for the relational good.

On the contrary, case (b) captures a situation of relative scarcity of private capital, as compared to social capital. In equilibrium social interaction (besides basic, subsistence consumption) is the basic source of individual well-being. On one side labor productivity is too low to make it worthwhile to work more in order to substitute some private consumption for the relational good; on the other side, the social environment is rich of opportunities and makes returns to social participation high. The difference between case (a) and (b) may help to understand why we observe big differences in the patterns of time allocation among different activities across countries with comparable size and private capital stock: indeed, such difference may be due to the presence of different relative stocks of private and social capital.

Fixed points

Exploiting Proposition 4, we are now able to characterize the dynamic properties of our economy. In particular, we focus attention on the fixed points by stating the next proposition[13], where we let

$$K^* = \left(\frac{1-\epsilon}{r}\right)^{\frac{1}{\epsilon-\vartheta}}, \tag{6.19}$$

$$K_s^* = 0, \tag{6.20}$$

$$K^{**} = \left[\frac{\epsilon(1-\epsilon)}{r(\epsilon+a\alpha)}\right]^{\frac{1}{\epsilon-\vartheta}}, \tag{6.21}$$

$$K_s^{**} = \left[\frac{a\alpha}{\delta(\epsilon+a\alpha)}\right]^{\frac{1}{1-\gamma}}. \tag{6.22}$$

Proposition 5 *In the plane (K, K_s) the point (K^*, K_s^*) is always a fixed point of the economy. Such point is locally saddle-path stable.*

There exists at most one more fixed point, namely (K^{**}, K_s^{**}). The latter is a fixed point if and only if

$$\frac{a\alpha}{\delta(\epsilon+a\alpha)} > \left(\frac{\epsilon b}{\alpha}\right)^{\frac{1-\gamma}{\gamma}} \left[\frac{\epsilon(1-\epsilon)}{r(\epsilon+a\alpha)}\right]^{\frac{(1-\gamma)(1+\vartheta-\epsilon)}{\gamma(\epsilon-\vartheta)}}. \tag{6.23}$$

If this condition is met, (K^{**}, K_s^{**}) is locally saddle-path stable.

Remark 5 *It is immediate to check that $K^{**} < K^*$.*

Remark 5 emphasizes the fact that, when both fixed points are present, private capital is lower in the fixed point in which social capital is higher.

Remark 6 *Ceteris paribus, condition (6.23) holds if δ and b are low enough and r, α and a are high enough.*

Remark 6 tells us that the fixed point in which social capital is higher (indeed, positive at all) exists when

- δ **is low:** social capital does not depreciate too fast (an intuitive condition);
- r **is high:** individuals are not too patient, i.e., they prefer to enjoy the relational good got through social participation today rather than to work and save more in the prospect of a higher future private consumption;
- α **is high:** they have indeed an incentive to spend time in social participation, i.e., the amount of relational good they enjoy is sensitive enough to their own time spent in social participation (in other words, the relational good is enough a private good and not too much a public good);
- a **is high:** they attribute enough weight to the needs satisfied by either the relational good or its private substitute (again an intuitive condition);

[13] For expositional purposes we do not mention here the steady state values of λ, that are in any case uniquely determined.

b **is low:** the balance between the relational good and its private substitute as a means of satisfying individual preferences is not too much in favor of the latter[14].

It is interesting to speculate on the meaning of such parameters in terms of real world examples. One might argue, for instance, that a high degree of individual mobility gives rise to many 'weak' ties[15]. If we think of such ties in terms of social capital, then individual mobility will be positively correlated with δ, the social capital depreciation rate, for the simple reason that weak ties tend to go lost more quickly in absence of a positive effort to keep them alive[16]. From this point view, we might speculate that a steady state with high social capital is more likely to exist in Europe than in the US, exactly because individual mobility is lower in the former than in the latter country.

On the other side, one might argue that α is also positively related to individual mobility, so that, from this point of view, the previous conclusion would be reversed. The reason would be in this case that individual mobility renders social spheres more open and thus reduces the weight of the externality represented by average participation in determining an individual's relational good, making the latter more a private good, i.e., bringing it more fully under individual control[17]

Well-being analysis

Let us now consider, when both fixed points exist, i.e. under condition (6.23), which one is Pareto-superior. Let u^* and u^{**} be the representative individual's utility in the fixed points (K^*, K_s^*) and (K^{**}, K_s^{**}), respectively.

Proposition 6 *Suppose condition (6.23) is satisfied and* $\delta < \frac{a\alpha}{\epsilon + a\alpha}$. *Then the fixed point* (K^{**}, K_s^{**}) *Pareto-dominates* (K^*, K_s^*), *i.e.,* $u^{**} > u^*$, *if, ceteris paribus,* δ *is low enough and* r *and* γ *are high enough. The reverse is true if* δ *is high enough and* r *and* γ *are low enough.*

Proposition 6 tells us that the same two forces, namely impatience and low social capital depreciation rate, that let (K^{**}, K_s^{**}) be a fixed point, also make it Pareto-superior. Moreover, as it is natural to expect, a high elasticity γ of the relational good to social capital contributes to the comparative efficiency of the fixed point with positive social capital[18].

[14] To have a numerical feeling, let us parameterize the model in a simple way, so that $a = b = 1,\ \alpha = \epsilon = 0.5,\ \vartheta = 0.1,\ \gamma = 0.8$. In this case, if social capital depreciation rate δ is, say, 10%, then condition (6.23) is met even with a discount rate r of 1%. If we lower γ to 0.5, then, with the same $\delta = 10\%$, condition (6.23) fails to be met up to a discount rate r of 8%, whereas it is met for $r \geq 9\%$.

[15] Granovetter (1973) makes the point that weak ties may be economically very important, since they are often the vehicle of new information, not yet available to an individual or to her close social neighborhood.

[16] Schiff (1999 and 2002) analyzes the sharp difference between the two traditional forms of factor mobility, namely migration and trade, that become apparent once we consider their different impact on social capital.

[17] In general, relational goods are an intermediate case between public and private goods. In our model, B is a pure public good if $\alpha = 0$, in which case any private incentive to social participation is absent. On the other side, B is a pure private good if $\beta = 0$, that is, under Assumption 7, if $\alpha = 1$.

[18] To get a feeling, consider again the simple parametrization $a = b = 1,\ \alpha = \epsilon = 0.5,\ \vartheta = 0.1,\ \gamma = 0.8$. In this case, $u^{**} - u^* = \frac{3}{2}\ln r - 4\ln\delta - 4\ln 2$, which, for instance, is positive

When the fixed point (K^{**}, K_s^{**}) Pareto-dominates (K^*, K_s^*) and the economy gets stuck in the latter, this one may be described as a social poverty trap. The convergence to such a trap may have two basic causes. On one side, it may be due to the fact that the initial endowment of the two forms of capital is close to the inefficient fixed point. This is the case of advanced economies with very low social capital: for instance, one might think of Russia in the last decade[19]. On the other side, there is the general problem posed by externalities: individuals are not able to recognize that, if everybody were to participate more, everybody would also be better off in the long run. On the contrary, not taking into account the immediate and cumulative external effects of social participation, each individual reacts privately, trying to work and save more, in order to compensate for a poor social sphere through a higher future private consumption. Such private, defensive choice may thus lead to an inefficient overaccumulation of private capital, at the expenses of social capital and of individual and social well-being[20]. In this latter case, we may say that private growth and social development conflict with each other, and that it would be efficient to increase social participation and decrease labor supply, sacrificing some accumulation of private capital, but gaining in terms of an improved social environment. Of course, this remains true only if the fixed point (K^{**}, K_s^{**}) Pareto-dominates (K^*, K_s^*) and the economy gets stuck in the latter; since the former fixed point is as well locally stable, the economy will converge to it if its initial endowment of social capital is high enough[21]. If we assume that convergence to the fixed point (K^{**}, K_s^{**}) takes place from below along both dimensions, then, in this latter case, social development and economic growth move together[22].

On the other hand, we have seen that (K^*, K_s^*) may Pareto-dominate the fixed point (K^{**}, K_s^{**}) if the social technology is 'bad' and if individuals are very patient. Moreover, we have shown that under the same conditions, (K^{**}, K_s^{**}) may even fail to be a fixed point. In the first case, (K^{**}, K_s^{**}) should be regarded as a situation in which individuals devote too much time to socially enjoyed leisure, while working and saving too little to reach a more efficient steady state. In the second case, since there is no alternative, there is no comparative discussion.

6.3 Conclusion

The present chapter sheds light on the interplay between the private and the social component of well-being in a scenario in which both private and social capital are present, relational goods play a role and their substitutability with some private goods

for $\delta = 10\%$ and $r = 3\%$, as well as for any lower social capital depreciation rate and higher discount rate. If $\delta = 5\%$, then $u^{**} > u^*$ even with a discount rate of 1%. If we lower γ to 0.5, then $u^* > u^{**}$ for any reasonable value of δ and r.

[19] Rose (1998) considers in detail how the centralization of the Soviet Union may have eroded wide forms of social capital, inducing individuals to rely on a narrow circle of family ties, which represents at the same time a response to the state of affairs and a social trap, that inhibits the mechanism of social development.

[20] This enables, for instance, to make sense of the strange phenomenon, observed in many advanced societies, of brilliant professionals whose social life is quite poor and whose satisfaction, despite material wealth, remains low.

[21] Precisely, if the initial endowment (K^0, K_s^0) is close enough to (K^{**}, K_s^{**}). Notice that even this case, although more favorable, does not solve the problem of the externalities.

[22] Remember though that, because of Assumption 6, neither private growth nor social development may be endogenously sustained forever.

is taken into account.

We first present a static model, which displays two equilibria: a private-oriented one, in which labor time and private production are high and relational goods are substituted for by private goods, and a social-oriented one, in which labor supply is low and social participation high, so that, besides private consumption, relational goods become a key determinant of well-being. Which of the two equilibria Pareto-dominates the other crucially depends on the relative endowment of social and private capital: if social capital is low relative to private capital, the private-oriented equilibrium is Pareto-superior; if the reverse is true, the social-oriented equilibrium is more efficient. Since equilibrium selection is a matter of coordination, it is possible for the economy to get stuck in the Pareto-inferior equilibrium.

The static model does not explain the determinants of the relative endowment of social and private capital. Therefore, we next introduce a dynamic version of the model, in which private capital is accumulated in a standard way through savings, and social participation, generating relational goods, is the engine of social capital accumulation. If social capital does not depreciate too fast, individuals are not too patient and relational goods are privately appropriable to some degree, the dynamics admits two fixed points: one in which there is only private capital and one in which both forms of capital are present (in which case private capital is lower than at the first equilibrium). The same factors that cause the latter point to be a steady state also make it Pareto-superior to the former one. When this is the case, since both equilibria are saddle-path stable, it is possible that the economy converges to the Pareto-inferior state, where only private capital is observed. Along the convergence path, we may witness a conflict between economic growth and social development, since growth drives the economy to a social poverty trap. If, in turn, the economy converges to the Pareto-superior fixed point, we may have economic growth and social development moving in the same direction. The distinction between these two cases depends once again upon the initial relative endowment of private and social capital, but also upon the social technology and the degree of individual impatience.

Our analytical results are derived under some assumptions, that deserve some discussion here. First of all, we assume that the relational good has a perfect private substitute. Relaxing this hypothesis would not add much in terms of economic content of the model, but would complicate the mathematics. Second, we assume that neither social capital matters for the production of private goods, nor private capital for relational goods. Both these cross relations might indeed be somewhat relevant, but we believe that they are of secondary importance when compared to the causal links included in the model. Nevertheless, this might be a possible future extension. Third, while we consider positive learning-by-doing externalities in private production, we do not allow them to be so strong as to generate endogenous growth. This is another possible extension of the model. Fourth, we assume that private consumption does not require time, so that all leisure time is devoted to social participation. Although unrealistic, we make this modelling choice because, generally speaking, social participation is a more time-intensive activity than private consumption. Clearly, the consumption of some private substitutes of the relational good (think e.g. of watching television) is also time-intensive to a degree, so that an interesting extension would be to take this into account, along the lines set by Corneo (2001). Fifth, the assumption that the 'gross investment' in social capital is exactly equal to the average production of the relational good could easily be generalized (for instance by assuming that just a fraction of the relational good produced accumulates as social capital), without changing any of the results of the model. The assumption has simply been dictated by notational

economizing. Finally, Assumption 3 and Assumption 7 are crucial to obtain simple analytical solutions. Relaxing the former to some extent would not alter the results of the static model, although it would preclude the possibility to express them in closed form[23]. As far as the latter is concerned, a comparison with the model discussed in Chapter 5 lets us conjecture that its main effect is to rule out a repulsive fixed point that separates the two stable ones. Since our mathematical findings are supported by a clear economic intuition, we are rather confident of their general validity.

6.4 Appendix

Proof of Proposition 1

Using the production function and the budget constraint to substitute for C_s, and calling $v(s, C) = u(C, B, Y - C)$, we can re-write problem (6.1)-(6.2) as

$$\max_{s,C} \; v(s, C) = \tag{6.24}$$

$$= \ln C + a \ln\{s^{\alpha} \bar{s}^{\beta} K_s^{\gamma} + b[(1-s)^{\epsilon}(1-\bar{s})^{\sigma} K^{1+\vartheta-\epsilon} - C]\} \quad \text{s.t.}$$

$$C \geq 0, \qquad (1-s)^{\epsilon}(1-\bar{s})^{\sigma} K^{1+\vartheta-\epsilon} - C \geq 0, \qquad s \in [0,1]. \tag{6.25}$$

The FOC's of this problem are

$$\frac{\partial v}{\partial C} = 0, \qquad 0 \leq C \leq Y, \tag{6.26}$$

$$\frac{\partial v}{\partial s} \leq 0, \qquad s\frac{\partial v}{\partial s} = 0, \qquad 0 \leq s \leq 1. \tag{6.27}$$

Equation (6.26) yields immediately

$$C = \frac{1}{b(1+a)}[s^{\alpha} \bar{s}^{\beta} K_s^{\gamma} + b(1-s)^{\epsilon}(1-\bar{s})^{\sigma} K^{1+\vartheta-\epsilon}], \tag{6.28}$$

which, plugged in inequality (6.27), yields, after rearranging,

$$\frac{(1-s)^{1-\epsilon}}{s^{1-\alpha}} \leq \frac{b\epsilon(1-\bar{s})^{\sigma} K^{1+\vartheta-\epsilon}}{\alpha \bar{s}^{\beta} K_s^{\gamma}}, \text{ with equality if s} > 0, \quad 0 \leq s \leq 1. \tag{6.29}$$

When $\bar{s} = 0$, the relational good is zero whatever the individual choice of s. Hence, the optimal individual response to $\bar{s} = 0$ is to choose $s = 0$. The rest of the proposition follows from equation (6.28) and from the production function.

Proof of Proposition 2

The value of $\hat{s}$ follows from equation (6.29) after plugging the SNE condition $\bar{s} = s$ and Assumption 3. The values of $\hat{C}$ and of $\hat{C}_s$ then follow from equation (6.28) and from the budget constraint.

Proof of Proposition 3

[23] Precisely, this would be the case if one just assumed $\alpha + \beta < 1$ and $\epsilon + \sigma < 1$ without requiring them to be equal.

Let $\tilde{u}$ and $\hat{u}$ be the representative individual's utility in the two SNE $(\tilde{s}, \tilde{C}, \tilde{C}_s)$ and $(\hat{s}, \hat{C}, \hat{C}_s)$, respectively. Then,

$$\begin{aligned}
\tilde{u} &= (1+\vartheta-\epsilon)\ln K - \ln(1+a) + a\ln ab - a\ln(1+a) + \\
&\quad + a(1+\vartheta-\epsilon)\ln K = \\
&= (1+a)(1+\vartheta-\epsilon)\ln K - (1+a)\ln(1+a) + a\ln a + a\ln b, \\
\hat{u} &= \ln[\hat{s}^{\varphi}K_s^{\gamma} + b(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}] - \ln b(1+a) + a\ln(\hat{s}^{\varphi}K_s^{\gamma} + b\hat{C}_s) = \\
&= \ln[\hat{s}^{\varphi}K_s^{\gamma} + b(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}] - \ln b(1+a) + a\ln\frac{a}{1+a} + \\
&\quad + a\ln[\hat{s}^{\varphi}K_s^{\gamma} + b(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}] = \\
&= (1+a)\ln[\hat{s}^{\varphi}K_s^{\gamma} + b(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}] - (1+a)\ln(1+a) + a\ln\frac{a}{b}, \\
\hat{u}-\tilde{u} &= (1+a)\{\ln[\hat{s}^{\varphi}K_s^{\gamma} + b(1-\hat{s})^{\varphi}K^{1+\vartheta-\epsilon}] - (1+\vartheta-\epsilon)\ln K\} - 2a\ln b = \\
&= (1+a)\ln\left[\hat{s}^{\varphi}\frac{K_s^{\gamma}}{K^{1+\vartheta-\epsilon}} + (1-\hat{s})^{\varphi}b\right] - 2a\ln b.
\end{aligned}$$

Remembering that $\hat{s}$ is increasing in K_s and decreasing in K, it is easy to see that the last expression becomes definitely positive as soon as K_s is large enough relative to K, and thus implicitly defines the increasing function g.

Proof of Proposition 4

Plugging Assumption 7 and the equilibrium conditions $\bar{s} = s$ and $\bar{K} = K$ into equations (6.13) to (6.15), we get

$$C = \frac{1}{\lambda}, \tag{6.30}$$

$$\frac{\partial H}{\partial C_s} = \frac{ab}{sK_s^{\gamma} + bC_s} - \lambda \leq 0, \qquad C_s\frac{\partial H}{\partial C_s} = 0, \qquad C_s \geq 0, \tag{6.31}$$

$$\frac{\partial H}{\partial s} = \frac{a\alpha K_s^{\gamma}}{sK_s^{\gamma} + bC_s} - \epsilon\lambda K^{1+\vartheta-\epsilon} \leq 0, \qquad s\frac{\partial H}{\partial s} = 0, \qquad s \in [0,1]. \tag{6.32}$$

The inequality $\frac{\partial H}{\partial C_s} \leq 0$ may be re-written in the form $\frac{a}{sK_s^{\gamma}+bC_s} - \frac{\lambda}{b} \leq 0$.

For $K_s > 0$ the inequality $\frac{\partial H}{\partial s} \leq 0$ may be re-written in the form $\frac{a}{sK_s^{\gamma}+bC_s} - \frac{\epsilon K^{1+\vartheta-\epsilon}}{\alpha K_s^{\gamma}}\lambda \leq 0$.

Hence, if $\frac{\epsilon K^{1+\vartheta-\epsilon}}{\alpha K_s^{\gamma}} > \frac{1}{b}$, it holds $\frac{\partial H}{\partial C_s} = 0$ and $\frac{\partial H}{\partial s} < 0$, so that the representative individual's equilibrium choice is such that $C_s > 0$ and $s = 0$. If, on the contrary, $\frac{\epsilon K^{1+\vartheta-\epsilon}}{\alpha K_s^{\gamma}} < \frac{1}{b}$, then we have $C_s = 0$ and $s > 0$. If, finally, $\frac{\epsilon K^{1+\vartheta-\epsilon}}{\alpha K_s^{\gamma}} = \frac{1}{b}$, we remain with one equation for two unknowns and the choice of C_s and s is indeterminate. The remainder of Proposition 4 follows from a straightforward substitution in equations (6.31) and (6.32).

Proof of Proposition 5

For case (a), i.e. under condition (6.17), the equilibrium dynamics of our economy is described by

$$\dot{K} = K^{1+\vartheta-\epsilon} - \frac{1+a}{\lambda}, \tag{6.33}$$

$$\dot{\lambda} = \lambda[r - (1-\epsilon)K^{\vartheta-\epsilon}], \tag{6.34}$$
$$\dot{K}_s = -\delta K_s. \tag{6.35}$$

For case (b), i.e. under condition (6.18), if $\frac{a\alpha}{\epsilon\lambda K^{1+\vartheta-\epsilon}} \leq 1$,[24] the equilibrium dynamics is

$$\dot{K} = K^{1+\vartheta-\epsilon} - \left(1 + \frac{a\alpha}{\epsilon}\right)\frac{1}{\lambda}, \tag{6.36}$$
$$\dot{\lambda} = \lambda\left[r - (1-\epsilon)\left(K^{\vartheta-\epsilon} - \frac{a\alpha}{\epsilon\lambda K}\right)\right], \tag{6.37}$$
$$\dot{K}_s = K_s^{\gamma}\left(\frac{a\alpha}{\epsilon\lambda K^{1+\vartheta-\epsilon}} - \delta K_s^{1-\gamma}\right). \tag{6.38}$$

The analytical determination of (K^*, K_s^*) and (K^{**}, K_s^{**}) follows from a straightforward substitution in the systems (6.33) to (6.35) and (6.36) to (6.38), setting the LHS of each equation equal to zero. (K^*, K_s^*) satisfies the condition of case (a): $K_s^* < \left(\frac{\epsilon b}{\alpha}K^{*1+\vartheta-\epsilon}\right)^{\frac{1}{\gamma}}$ and is thus indeed a fixed point. (K^{**}, K_s^{**}) is a fixed point if and only if it satisfies the condition of case (b): $K_s^{**} > \left(\frac{\epsilon b}{\alpha}K^{**1+\vartheta-\epsilon}\right)^{\frac{1}{\gamma}}$. Equation (6.23) is just a re-writing of this condition.

The stability properties are determined as follows. The Jacobian matrix of the system (6.33) to (6.35), evaluated at (K^*, K_s^*), is

$$A = \begin{bmatrix} (1+\vartheta-\epsilon)K^{\vartheta-\epsilon} & \frac{1+a}{\lambda^2} & 0 \\ (1-\epsilon)(\epsilon-\vartheta)\lambda K^{\vartheta-\epsilon-1} & 0 & 0 \\ 0 & 0 & -\delta \end{bmatrix}.$$

One eigenvalue is therefore $-\delta < 0$ and the other two have opposite sign, since negative is the determinant of the sub-matrix obtained from A by deleting the third row and the third column. Therefore, if (K, K_s) is initially close enough to (K^*, K_s^*), there exists a unique initial value of λ that puts the representative agent on the stable arm (which, in turn, has dimension 2).

Observe now that the Jacobian matrix of the system (6.36) to (6.38), evaluated at (K^{**}, K_s^{**}), is such that $\frac{\partial\dot{K}}{\partial K_s} = \frac{\partial\dot{\lambda}}{\partial K_s} = 0$ and $\frac{\partial\dot{K}_s}{\partial K_s} = -\delta(1-\gamma) < 0$. Therefore, this latter value is one of the eigenvalues of the Jacobian and the other two ones have opposite sign, since negative is the determinant of the sub-matrix

$$B = \begin{bmatrix} \frac{\partial\dot{K}}{\partial K} & \frac{\partial\dot{K}}{\partial\lambda} \\ \frac{\partial\dot{\lambda}}{\partial K} & \frac{\partial\dot{\lambda}}{\partial\lambda} \end{bmatrix}.$$

To see this, one has to go through the following passages.

$$\frac{\partial\dot{K}}{\partial K} = (1+\vartheta-\epsilon)K^{\vartheta-\epsilon} > 0,$$
$$\frac{\partial\dot{K}}{\partial\lambda} = \left(1 + \frac{a\alpha}{\epsilon}\right)\frac{1}{\lambda^2} > 0,$$

[24] Since we are interested in the fixed points of this dynamics, we do not consider, under case (b), the possibility that $\frac{a\alpha}{\epsilon\lambda K^{1+\vartheta-\epsilon}} > 1$, since in this case $\dot{K} = -\frac{1}{\lambda}$ and there is no fixed point. Notice, moreover, that this possibility is not a relevant one, since it means that individuals do not work at all and derive their private consumption only from 'eating' their existing stock of private capital.

$$\begin{aligned}\frac{\partial\dot{\lambda}}{\partial K} &= -(1-\epsilon)\lambda\left[-(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}+\frac{a\alpha}{\epsilon\lambda K^2}\right],\\ \frac{\partial\dot{\lambda}}{\partial\lambda} &= -\frac{a\alpha(1-\epsilon)}{\epsilon K\lambda}<0.\end{aligned}$$

Remembering that in the fixed point $\lambda K^{**1+\vartheta-\epsilon}=1+\frac{a\alpha}{\epsilon}$, one gets

$$\begin{aligned}\operatorname{Det}B &= -(1+\vartheta-\epsilon)K^{\vartheta-\epsilon}\frac{a\alpha(1-\epsilon)}{\epsilon K\lambda}+\\ &\quad+\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}\left[-(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}+\frac{a\alpha}{\epsilon\lambda K^2}\right]=\\ &= -(1+\vartheta-\epsilon)K^{\vartheta-\epsilon}\frac{a\alpha(1-\epsilon)}{\epsilon K\lambda}+\\ &\quad+\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}\frac{a\alpha}{\epsilon\lambda K^2}+\\ &\quad-\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}=\\ &= \frac{a\alpha(1-\epsilon)}{\epsilon\lambda^2K^2}\left[1+\frac{a\alpha}{\epsilon}-(1+\vartheta-\epsilon)\lambda K^{1+\vartheta-\epsilon}\right]+\\ &\quad-\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}=\\ &= \frac{a\alpha(1-\epsilon)}{\epsilon\lambda^2K^2}\left[1+\frac{a\alpha}{\epsilon}-(1+\vartheta-\epsilon)\left(1+\frac{a\alpha}{\epsilon}\right)\right]+\\ &\quad-\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}=\\ &= \frac{a\alpha(1-\epsilon)}{\epsilon\lambda^2K^2}\left(1+\frac{a\alpha}{\epsilon}\right)(\epsilon-\vartheta)+\\ &\quad-\left(1+\frac{a\alpha}{\epsilon}\right)(1-\epsilon)\frac{1}{\lambda}(\epsilon-\vartheta)K^{\vartheta-\epsilon-1}=\\ &= \frac{(1-\epsilon)(\epsilon-\vartheta)}{\lambda^2K^2}\left(1+\frac{a\alpha}{\epsilon}\right)\left[\frac{a\alpha}{\epsilon}-\lambda K^{1+\vartheta-\epsilon}\right]=\\ &= -\frac{(1-\epsilon)(\epsilon-\vartheta)}{\lambda^2K^2}\left(1+\frac{a\alpha}{\epsilon}\right)<0.\end{aligned}$$

Proof of Proposition 6

In order to calculate u^*, observe first that, since we are in case (a), $s=0$ and $u^*=\ln C+a\ln bC_s$. From equations (6.30) and (6.31), it follows immediately that $C=\frac{1}{\lambda}$ and $C_s=\frac{a}{\lambda}$, so that $C_s=aC$. Equations (6.33) and (6.19) then imply $C=\frac{1}{1+a}K^{*1+\vartheta-\epsilon}=\frac{1}{1+a}\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}$ and $C_s=\frac{a}{1+a}\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}$. Therefore,

$$\begin{aligned}u^* &= \ln C+a\ln bC_s=\ln\frac{1}{1+a}\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}+a\ln\frac{ab}{1+a}\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}=\\ &= \ln\frac{1}{1+a}+\ln\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}+a\ln\frac{ab}{1+a}+a\ln\left(\frac{1-\epsilon}{r}\right)^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}=\\ &= \ln\frac{1}{1+a}+a\ln\frac{ab}{1+a}+(1+a)\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}\ln\frac{1-\epsilon}{r}\end{aligned}\tag{6.39}$$

Let us now calculate u^{**} in an analogous way. Since we are in case (b), $C_s=0$ and $u^{**}=\ln C+a\ln sK_s^{\gamma}$. Remembering that in the fixed point $\lambda K^{1+\vartheta-\epsilon}=1+\frac{a\alpha}{\epsilon}$,

equations (6.21) and (6.30) yield $C = \frac{1}{\lambda} = \frac{K^{**1+\vartheta-\epsilon}}{1+\frac{a\alpha}{\epsilon}} = \frac{\left[\frac{\epsilon(1-\epsilon)}{r(\epsilon+a\alpha)}\right]^{\frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}}}{1+\frac{a\alpha}{\epsilon}}$ and equation (6.32) yields $s = \frac{a\alpha}{\epsilon\lambda K^{1+\vartheta-\epsilon}} = \frac{a\alpha}{\epsilon+a\alpha}$. Since K_s is given by equation (6.22), we can calculate u^{**} as

$$\begin{aligned} u^{**} &= \ln C + a\ln sK_s^{\gamma} = \ln\frac{\epsilon}{\epsilon+a\alpha} + \frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}\ln\frac{\epsilon(1-\epsilon)}{r(\epsilon+a\alpha)} + a\ln\frac{a\alpha}{\epsilon+a\alpha} + \\ &\quad + a\frac{\gamma}{1-\gamma}\ln\frac{a\alpha}{\delta(\epsilon+a\alpha)}. \end{aligned} \tag{6.40}$$

Proposition 6 follows from an analysis of the following expression[25]:

$$\begin{aligned} u^{*} - u^{**} &= \ln\frac{\epsilon+a\alpha}{\epsilon+a\epsilon} + \frac{1+\vartheta-\epsilon}{\epsilon-\vartheta}\left[a\ln(1-\epsilon) - a\ln r + \ln\frac{\epsilon+a\alpha}{\epsilon}\right] + \\ &\quad + a\ln\frac{\epsilon+a\alpha}{\alpha+a\alpha} + a\ln b + a\frac{\gamma}{1-\gamma}\left[\ln\delta + \ln\frac{\epsilon+a\alpha}{a\alpha}\right]. \end{aligned} \tag{6.41}$$

[25]Under the parametrization $a = b = 1,\ \alpha = \epsilon = 0.5,\ \vartheta = 0.1,\ \gamma = 0.8$, expression (6.41) reduces to $4\ln 2 + 4\ln\delta - \frac{3}{2}\ln r$. If $\gamma = 0.5$, then it reduces to $\ln 2 + \ln\delta - \frac{3}{2}\ln r$.

Chapter 7

An evolutionary model of social capital accumulation

7.1 Introduction

In this chapter we offer an evolutionary perspective on the basic problem studied in Chapters 5 and 6: how growth and well-being may be influenced by a shift in the allocation of time between social and private activities. To keep things simple, we consider only social capital accumulation, as we did in Chapter 5, and we develop a model that merges a game theoretic analysis of the evolution of social participation with the consideration its dynamic effects on the social environment.

We start again from the idea that well-being depends on satisfaction of both private and relational needs, and therefore on private and relational goods. Since relational goods are much more exposed to external effects than private goods, in presence of an unfavorable social environment individuals may be led to substitute social activities for private ones. As seen in Chapters 5 and 6, this substitution may constitute an engine of market-based growth and the lack of it may represent an obstacle to growth; though, if we consider social relations relevant for individual well-being, there is the possibility for private growth not to be well-being improving.

In the previous chapters we have discussed such possibility from the (neoclassical) point of view of the incentives faced by fully rational individuals and we have outlined under which conditions the risk of falling in a 'social poverty trap' emerges. Here we investigate the same question starting from a different assumption about individual rationality: we do not take for granted that agents are perfect optimizers, but we rather represent them as boundedly rational and their behavior as involved in an evolutionary social selection dynamics, which acts as a form of external pressure and may lead individuals to adopt strategies that are presently or dynamically sub-optimal.

7.2 Model

We model an economy in which agents choose how to allocate their time between private and social activities. Participating to the latter ones requires time and forgoing some private consumption, but they provide an individual utility which depends both

on her own and on aggregate participation, as well as on the opportunities available in the social environment. Agents may defend themselves from a poor social environment by shifting to private activities, less exposed to external effects. If this strategy spreads over, private activities will be fostered, but at the expense of social activities.

In particular, we assume a (homogeneous) continuous population of measure 1, whose well-being depends on three kinds of goods[1]: a private subsistence good (Y), a relational good (B) and a private good which is perfect substitute of the relational good (Y_s)[2]. In every instant (say, every day, but we adopt a continuous specification), each individual has to choose how to allocate her time endowment (normalized to 1) between social and private activities (respectively, s and $l = 1 - s$). For simplicity, we assume that agents have to choose between the two following pure strategies:

(R) a relational-oriented strategy, corresponding to the couple $\{s_H, l_L\}$, where $l_L = 1 - s_H$;

(P) a private-oriented strategy, corresponding to the couple $\{s_L, l_H\}$, where $l_H = 1 - s_L$ and $0 < s_L < s_H < 1$ (so that $0 < l_L < l_H < 1$).

Notice that, for shortness, we can summarize strategies R and P as the choice of respectively s_H and s_L.

Private activities amount to the production and consumption of private goods, according to the following technology: under the relational strategy, the amount of time l_L serves to produce and consume a fixed quantity $\bar{Y}$ of private subsistence goods; under the private strategy, agents still use l_L to produce and consume $\bar{Y}$, but with the additional time $(l_H - l_L)$ they produce and consume also an amount $\bar{Y}_s$ of the private goods which are substitutes of relational goods.

Social activities provide utility through the enjoyment of relational goods. Relational goods enjoyed by individual i are specified as follows (notice that we can identify an individual with her chosen strategy, so that $i \in \{R, P\}$):

$$B_i(K_s, x) = s_i R(K_s, x), \tag{7.1}$$

where s_i is individual i's investment of time in social activities (i.e. either s_L or s_H) and $R(K_s, x)$ represents the amount of social opportunities available. The latter ones depend in turn on the level K_s of social capital and on the total amount of time devoted to social activities by the population $[s_H x + s_L(1 - x)]$, where $x \in [0, 1]$ is the fraction of individuals choosing the relational strategy. Notice that K_s captures the accumulated effect of past social participation, whereas x measures its present level[3]. $R(K_s, x)$ is specified as follows:

$$R(K_s, x) \equiv [s_H x + s_L(1 - x)]^{\beta} K_s^{\gamma}, \tag{7.2}$$

where β and γ are strictly positive parameters[4]. Notice that $R(K_s, x)$ is an increasing function of x. Notice as well that in our model the time not spent in production

[1] In what follows we shall assume for simplicity that there are just three single goods, but it would be easy to generalize to the case of three bundles of goods.

[2] The assumption that Y_s is a perfect substitute for the relational good is obviously rather optimistic [see Anderson (1990)]. By such assumption, the results about well-being in the next section gain more relevance.

[3] Let us emphasize that $x = 1$ does not mean that individuals spend all of their time in social activities, but rather that all of them spend relatively more time in these activities and relatively less in private ones.

[4] It is without loss of generality to set it $\beta = 1$: our results do not depend on it.

and consumption of private goods is not itself a final good, but rather an intermediate good, whose value in terms of enjoyed relational goods depends on the social participation of the rest of the population and on the amount of social opportunities available.

We can now write down the full expression of the payoffs of the two strategies. Following the relational strategy yields

$$\begin{aligned} U_R(K_s, x) &\equiv \ln \bar{Y} + \ln[B_R(K_s, x)] = \\ &= \ln \bar{Y} + \ln[s_H R(K_s, x)] = \\ &= \ln \bar{Y} + \ln\{s_H[s_H x + s_L(1-x)]^{\beta} K_s^{\gamma}\}. \end{aligned} \tag{7.3}$$

The private strategy yields

$$\begin{aligned} U_P(K_s, x) &\equiv \ln \bar{Y} + \ln[B_P(K_s, x) + a\bar{Y}_s] = \\ &= \ln \bar{Y} + \ln[s_L R(K_s, x) + a\bar{Y}_s] = \\ &= \ln \bar{Y} + \ln\{s_L[s_H x + s_L(1-x)]^{\beta} K_s^{\gamma} + a\bar{Y}_s\}, \end{aligned} \tag{7.4}$$

where a is a strictly positive parameter which represents the marginal rate of substitution between $B_P(K_s, x)$ and $\bar{Y}_s$.

Notice that an increase of the proportion of individuals choosing strategy P (i.e. an increase of $1 - x$) generates a negative externality which affects especially individuals that do not consume $\bar{Y}_s$. Hence, by following strategy P, individuals have the opportunity to defend themselves from this negative externality.

7.2.1 Evolution of social participation

We follow an evolutionary game approach and assume that the time derivative of x, $\dot{x} \equiv \frac{dx}{dt}$, is given by the so called 'replicator equation' [see Weibull (1995)]:

$$\dot{x} = x[U_R(K_s, x) - \bar{U}(K_s, x)], \tag{7.5}$$

where $\bar{U}(K_s, x)$ is the average payoff

$$\bar{U}(K_s, x) \equiv U_R(K_s, x)x + U_P(K_s, x)(1-x). \tag{7.6}$$

The choice of the replicator dynamics as social selection mechanism does not imply a real loss of generality in a two-strategy setting like the one of the present paper (although the dynamic interaction with the accumulation social capital, discussed below could, at least in principle). It must be pointed out, however, that the choice of the replicator equation as a 'representative' form of selection dynamics is not arbitrary. As pointed out e.g. by Björnerstedt and Weibull (1996), every payoff-monotonic selection dynamics can be represented in terms of the replicator dynamics (by means of a suitable time and/or strategy dependent factor) and, moreover, such dynamics is consistent with several realistic individual and social learning mechanisms, such as simple forms of reinforcement of successful own behaviors or imitation of observed successful behaviors of others [see also Börgers, Sarin (1997) and Schlag (1998) for deeper insights into the behavioral microfoundations of the replicator dynamics].

Equation (7.5) may be rewritten as follows:

$$\dot{x} = x(1-x)\Delta U(K_s, x), \tag{7.7}$$

where $\Delta U(K_s, x)$ is the payoff differential

$$\begin{aligned} \Delta U(K_s, x) &\equiv U_R(K_s, x) - U_P(K_s, x) = \\ &= \ln \frac{s_H[s_L + (s_H - s_L)x]^\beta K_s^\gamma}{s_L[s_L + (s_H - s_L)x]^\beta K_s^\gamma + a\bar{Y}_s}. \end{aligned} \tag{7.8}$$

In general the evolution of social participation will depend on the dynamics of K_s, but for expositional purposes it is worthwhile to start with a separate analysis of $\dot{x}$ when the stock of social capital is fixed. Throughout the rest of this section we treat consequently K_s as a strictly positive parameter.

The following proposition gives a classification of dynamics (7.7) when K_s is constant.

Proposition 7 *Dynamics (7.7) can be classified as follows:*

(i) *If*

$$K_s \leq K_s^1 \equiv \left[\frac{a\bar{Y}_s}{(s_H - s_L)s_H^\beta}\right]^{\frac{1}{\gamma}}, \tag{7.9}$$

then, for every initial value $x(0)$ $(\neq 1)$, the adoption process converges to the fixed point $x = 0$, in which all individuals follow strategy P (see figure 1.a).

(ii) *If*

$$K_s \geq K_s^2 \equiv \left[\frac{a\bar{Y}_s}{(s_H - s_L)s_L^\beta}\right]^{\frac{1}{\gamma}}, \tag{7.10}$$

where $K_s^1 < K_s^2$, then the opposite of case (i) holds (see figure 1.b).

(iii) *If*

$$K_s^1 < K_s < K_s^2, \tag{7.11}$$

then both the fixed points $x = 0$ and $x = 1$ are locally attracting and their attraction basins are separated by the repulsive fixed point $\bar{x} \in (0,1)$, given by (see figure 1.c)

$$\bar{x} \equiv \left[\frac{a\bar{Y}_s}{(s_H - s_L)^{1+\beta}}\right]^{\frac{1}{\beta}} \frac{1}{K_s^{\frac{\gamma}{\beta}}} - \frac{s_H}{s_H - s_L}. \tag{7.12}$$

Proof Notice first that $\dot{x} = 0 \Longleftrightarrow \{x = 0 \ \vee \ x = 1 \ \vee \ \Delta U(x) = 0\}$.
Since $\frac{d\Delta U(x)}{dx} > 0 \quad \forall x \in (0,1)$, this implies that $x = 0$ and $x = 1$ are the only possible attracting fixed points.
Finally, from the observation that $\Delta U(x) = 0 \Longleftrightarrow x = \bar{x}$ [see equation (7.12)] and that $sgn(\dot{x}) = sgn[\Delta U(x)]$ it immediately follows that
$\bar{x} \geq 1$ [i.e. $\Delta U(x) < 0 \quad \forall x \in (0,1)$] $\Longleftrightarrow$ (7.9);
$\bar{x} \leq 0$ [i.e. $\Delta U(x) > 0 \quad \forall x \in (0,1)$] $\Longleftrightarrow$ (7.10);
$\bar{x} \in (0,1)$ (i.e. $\exists$ interior repulsive fixed point) $\Longleftrightarrow$ (7.11). Q.E.D.

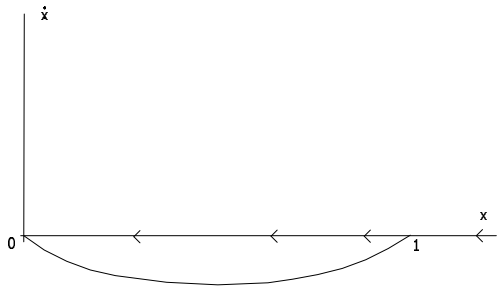

Figure 1a

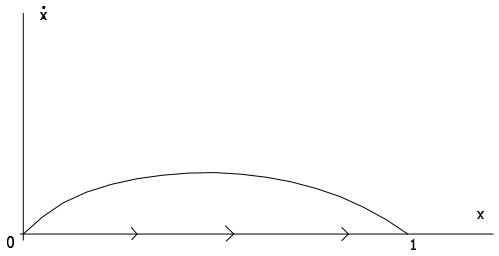

Figure 1b

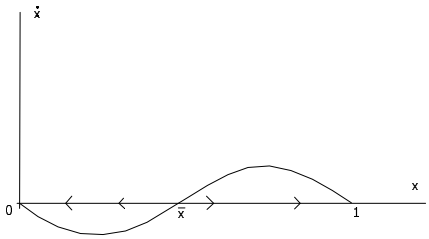

Figure 1c

Notice that, by (7.12), the attraction basin of $x = 1$ expands if the value of K_s increases.

The next proposition concerns the value of $\bar{U}(x)$ in the fixed points.

Proposition 8 *The fixed point $x = 1$ Pareto-dominates the fixed point $x = 0$ (i.e. $\bar{U}(1) > \bar{U}(0)$) if and only if*

$$K_s > K_s^3 \equiv \left[\frac{a\bar{Y}_s}{s_H^{1+\beta} - s_L^{1+\beta}} \right]^{\frac{1}{\gamma}}, \tag{7.13}$$

where $K_s^3 < K_s^1$.

When the interior fixed point $\bar{x}$ *exists [see case (iii) of Proposition 1], then it holds*

$$\bar{U}(1) > \bar{U}(\bar{x}) > \bar{U}(0).$$

Proof Notice that in $x = 0$, in $x = 1$ and in $x = \bar{x}$ each individual has the same utility level $\bar{U}(x)$, [defined in (7.6)], respectively equal to $U_P(0)$, $U_R(1)$, and both $U_R(\bar{x})$ and $U_P(\bar{x})$. Now, (7.13) just amounts to a re-writing of $U_R(1) > U_P(0)$. Recalling that $U_R(x)$, $U_P(x)$ and $\bar{U}(x)$ are all strictly increasing in x, the last result follows immediately. Q.E.D.

Proposition 2 implies that if the fixed point $x = 1$ is locally attractive [cases (ii)-(iii)] it always Pareto-dominates the fixed point $x = 0$, even when the latter is locally attractive. Furthermore, even if $x = 0$ is the unique attracting fixed point [case (i)], it may be Pareto-dominated by $x = 1$; in particular, this is the case when $K_s^3 < K_s \leq K_s^1$.

If case (i) holds or if the initial distribution x of strategies belongs to the interval $[0, \bar{x})$ in case (iii), then x converges to 0. Along the trajectory that drives the economy to $x = 0$, an increasing proportion of individuals build their well-being on private rather than on social sources. Consequently, the aggregate production and consumption of private goods increases and the population experiences economic growth. Proposition 2 says that economic growth may be well-being worsening. In such case, economic growth is the undesirable effect of a coordination failure.

7.2.2 Evolution of social capital

In the above section, social capital K_s has been taken as a parameter; we have seen that such parameter plays a key role in determining the relative performance of pure strategies R and P and the well-being properties of attracting fixed points under dynamics (7.7). However, the assumption of stationarity of K_s is restrictive; therefore, in this section we augment dynamics (7.7) by an equation describing the evolution of social capital. More specifically, we assume that the accumulation of K_s builds on a learning-by-doing mechanism as follows:

$$\begin{aligned} \dot{K}_s &= B_R(K_s, x)x + B_P(K_s, x)(1-x) - \delta K_s = \\ &= [s_H x + s_L(1-x)]R(K_s, x) - \delta K_s, \end{aligned} \tag{7.14}$$

where $\delta > 0$ is the depreciation rate of K_s.

Equation (7.14) assumes that social capital increases when available social opportunities are effectively exploited, i.e. individuals devote time to social activities and enjoy relational goods. We are closer here to an interpretation of social capital in terms of evolution of customs and of social norms rather then in terms of construction of associations and other social organization; however, these are just two aspects of a same process, so that our assumption does not appear to be very restrictive.

By plugging in (7.14) the expression given in (7.2) for $R(K_s, x)$, we can write (7.14) as follows:

$$\dot{K}_s = K_s\{[s_L + (s_H - s_L)x]^{1+\beta} K_s^{\gamma-1} - \delta\}. \tag{7.15}$$

We shall analyze dynamics (7.7), (7.15) in the region of the plane (K_s, x) in which $K_s \geq 0$ and $0 \leq x \leq 1$. We work out the complete classification of the dynamics in the appendix. Figures 2, 3 and 4 (corresponding respectively to $\gamma > 1$, $\gamma = 1$ and $\gamma < 1$) illustrate the different possible cases[5]. The next proposition summarizes the main results.

Proposition 9 *There are two possible asymptotic attractors,* $(K_s^L, 0)$ *and* $(K_s^H, 1)$*, where* K_s^L *and* K_s^H *are defined as follows:*

$$K_s^L \equiv \begin{cases} 0 & , \; if \; \gamma \geq 1 \\ \hat{K}_s(0) & , \; if \; \gamma < 1 \end{cases} \qquad K_s^H \equiv \begin{cases} \infty & , \; if \; \gamma \geq 1 \\ \hat{K}_s(1) & , \; if \; \gamma < 1 \end{cases} \tag{7.16}$$

Both attractors are present in figures 2, 3.b and 4.c.

Only $(K_s^H, 1)$ *is present in figures 3.a and 4.a.*

Only $(K_s^L, 0)$ *is present in figures 3.c and 4.c.*

Along the trajectory leading to $(K_s^L, 0)$*, the economy experiences private growth at the expenses of social participation and ends up in a state of social poverty; along the path towards* $(K_s^H, 1)$*, expansion of social participation leads to social prosperity, but at the expenses of private growth.*

Proof See appendix.

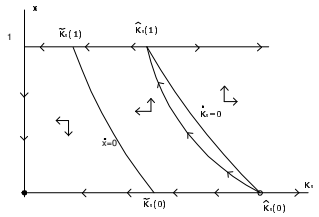

Figure 2a

[5] In the figures, sinks are represented by full dots •, sources by open dots ∘ and saddle points by drawing their stable and unstable manifolds.

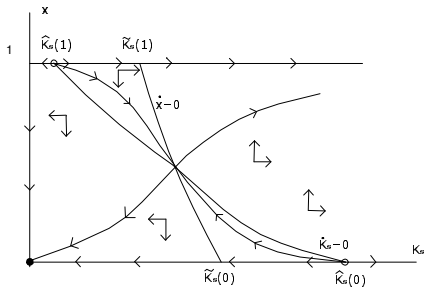

Figure 2b

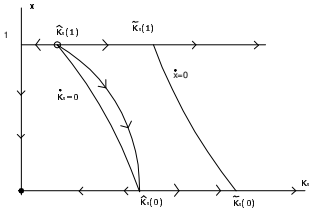

Figure 2c

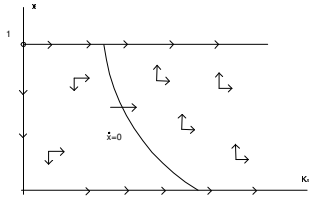

Figure 3a

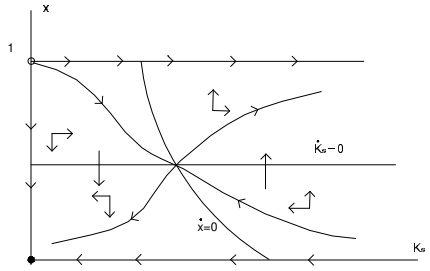

Figure 3b

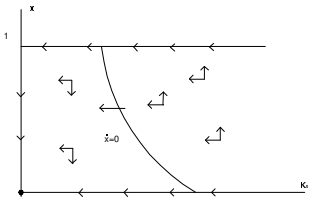

Figure 3c

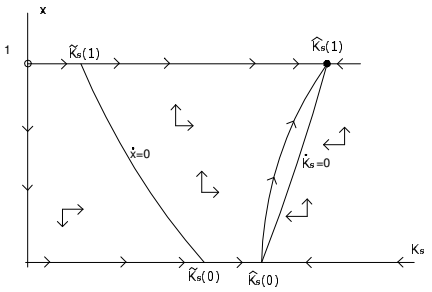

Figure 4a

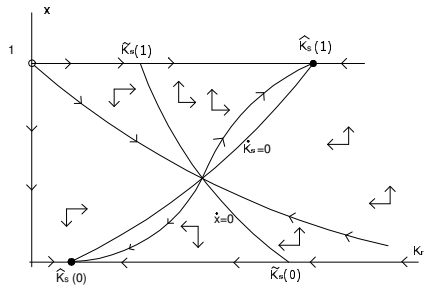

Figure 4b

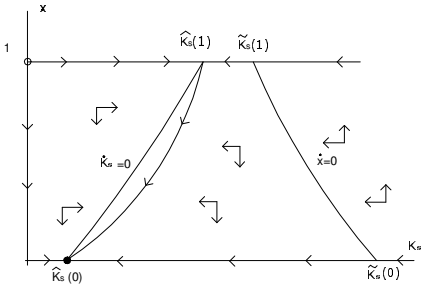

Figure 4c

7.2.3 Well-being and social poverty traps

We next consider the well-being properties of the two asymptotic attractors $(K_s^L, 0)$ and $(K_s^H, 1)$ and of the other fixed points of dynamics (7.7), (7.15).

Proposition 10 *When both attractors are present,* $(K_s^H, 1)$ *always Pareto-dominates* $(K_s^L, 0)$.

Whenever present, $(K_s^H, 1)$ *Pareto-dominates every other fixed point of the dynamics.*

When only $(K_s^L, 0)$ *is present, for* $\gamma = 1$ *it Pareto-dominates the only other fixed* $(0, 1)$*; for* $\gamma < 1$ $(K_s^L, 0)$ *may be Pareto-dominated by some other fixed point: in particular,* $\hat{K}_s(1) > K_s^3$ *is a sufficient condition for* $(K_s^L, 0)$ *to be Pareto-dominated by* $(K_s^L, 0)$ *and* $(\hat{K}_s(1), 1)$.

Proof We work out the proof only for the first sentence of Proposition 4. Since the proof of the other results works exactly the same way, we omit it. Recall from Proposition 2 that, given K_s, $\bar{U}(K_s, 1) > \bar{U}(K_s, 0) \iff K_s > K_s^3$. Notice then that, given x, $\bar{U}(K_s, x)$ is a strictly increasing function of K_s. When both attractors are present, for $\gamma \geq 1$ (case (a) and subcase (b.2)), $(K_s, x) \to (\infty, 1)$ for $t \to \infty$ (see figures 2.a-2.c and 3.b) and along this trajectory the value of $\bar{U}(K_s, x)$ becomes definitely higher than in any fixed point of the dynamics; for $\gamma < 1$ (subcase (c.2), see figure 4.b), it is enough to notice that $K_s^3 < K_s^1 = \tilde{K}_s(1) < \hat{K}_s(1)$, so that

$\bar{U}(\hat{K}_s(1),1) > \bar{U}(\hat{K}_s(1),0) > \bar{U}(\hat{K}_s(0),0)$. Q.E.D.

As already mentioned, in $(K_s^L, 0)$ the economy reaches the highest level of expansion of private wealth at the expenses of social participation. Along the trajectories leading the economy to such traps we observe an economic growth process driven by the destruction of social opportunities and by their substitution by private goods.

The above considerations do not however imply that it is always 'optimal' for individuals to manage to coordinate their choices on the strategy R. The problem is analogous to that of the interpretation of the well known *Golden Rule* in Solow's model as a normative device. To consider it, we have to study how individual behavior could rationally deviate from the dynamics assumed in the replicator equation (7.5). To this purpose, we first give the following definition.

Definition 2 *We shall say that the state* $(K_s^H, 1)$ *is achievable from a given initial value* K_s^0 *of* K_s *if the trajectory passing through the point* $(K_s^0, 1)$ *converges to* $(K_s^H, 1)$.

Definition 1 says that a state is achievable when the dynamics of K_s brings to it in presence of the highest possible social participation ($x = 1$), i.e., when individuals, by coordinating on strategy R, would be able to reach it. The next proposition sheds light on the 'optimality' of coordinating on strategy R and helps us to distinguish among different causes of social poverty traps.

Proposition 11

(i) *If* $K_s^0 > K_s^3$ *and* $(K_s^H, 1)$ *is achievable from* K_s^0*, coordinating on strategy R is individually 'optimal' both in transition and in* $(K_s^H, 1)$*. Therefore, social poverty traps may be interpreted as the result of a coordination failure.*

(ii) *If* $K_s^0 < K_s^3$ *and* $(K_s^H, 1)$ *is achievable from* K_s^0*, coordinating on strategy R is individually 'optimal' only if agents are patient enough (or altruist toward future generations), and social poverty traps may be interpreted as the combined result of a coordination failure and of impatience (or of lack of altruism toward future generations).*

(iii) *If* $(K_s^H, 1)$ *is not achievable from* K_s^0*, social poverty traps are the result of the technology of social capital accumulation.*

Proof Notice first that, if $\gamma < 1$, $(K_s^H, 1)$ is achievable whatever is $K_s^0 > 0$ (see figures 4.a-4.c); if $\gamma > 1$, $(K_s^H, 1)$ is achievable only if $K_s^0 > \hat{K}_s(1)$ (see figures 2.a-2.c) and, if $\gamma = 1$, $(K_s^H, 1)$ is achievable only if $x^* > 1$ [see (7.18)] and $K_s^0 > 0$ (see figures 3.a-3.c). If $(K_s^H, 1)$ is not achievable from a given initial value K_s^0, then any trajectory passing through a point with $K_s = K_s^0$ does not converge to $(K_s^H, 1)$ whatever individuals' choices of strategy may be.

The results in cases (i) and (ii) of Proposition 5 follow from Proposition 2. Specifically, by simultaneously choosing strategy R, in case (i) agents could obtain in every instant of time a payoff higher than they get if they behave according to the replicator dynamics; in case (ii), on the contrary, they would have to face an initial reduction of their payoff. Therefore, in case (ii) the convenience to coordinate on strategy R is associated to their discount factor as in Solow's model. Finally, case (iii) is self-evident. Q.E.D.

Proposition 5 opens the way to some policy speculations. The literature on social capital discussed in Chapter 3 points out, theoretically and empirically, that an

impoverishment in social capital is detrimental to growth. Here we add that, even if this negative effect were compensated (to some extent) through defensive strategies and substitution channels which foster private growth, the overall effect in terms of well-being might still be negative, a common result of the three models developed in this work. Hence, the first (easy) conclusion is that private growth is not a sufficient target for policy: its social consequences should be taken into account as well. To go beyond this vague statement, it is opportune to distinguish [see Collier (1998)] between social capital provided by government and social capital provided by civil society. Indeed, policy conclusions are easier to understand for the former than for the latter one, whereas the present paper is more concerned with the latter, i.e. with social capital arising from social participation. Nevertheless, there may be the scope for some intervention in this field as well, as the government could act, through an adequate system of rights, laws, incentives and services, as the engine that allows individuals to overcome the coordination failure problem pointed out above. This means that government and civil society may be seen as complementary in generating the conditions for social capital accumulation. On the other hand, if either of them does not work properly, the other one may play, to a certain extent, a substitutive role [see Narayan (1999) for a deeper analysis of virtuous and vicious paths in the interaction between state and civil society], but this kind of substitution is unlikely to drive to social and economic prosperity. Examples of possible interventions, frequent in the literature, are promotion of association rights, improvement of communication systems and infrastructures, and incentives to the formation of 'cross-cutting ties' among different social groups (for instance, through the promotion of mixed schools, that cross the given social cleavages[6]). What the state cannot do, according to Paldam and Svendsen (2000), is to enforce social capital 'top-down', since the latter one emerges essentially out of a self-enforcing process, that can be sustained through incentives, but not substituted for [see also Rose (1998) for insights in the case of Russia]. A deeper analysis of these policy implications is beyond the scope of this chapter.

7.3 Conclusion

We developed an evolutionary model of growth in which agents choose how to allocate their time between private and social activities. Participating to the latter ones requires time and forgoing some private consumption; their utility depends both on own and on aggregate participation, as well as on the opportunities available in the social environment. Agents may defend themselves from a poor social environment by shifting to private activities, less exposed to external effects. If this strategy spreads over, private activities will be fostered, but at the expense of social activities. Since both effects accumulate over time, the outcome may be a joint occurrence of economic growth and social poverty. On one side, this is likely to increase social costs (from crime prevention to children and elder keeping [see Coleman (1990)], from schooling in most diseased areas [see Benabou (1993)] to monitoring and transaction costs for firms [see Paldam and Svendsen (2000)], to the lost of real opportunities provided by social links [see Granovetter (1973)]); on the other side (and most importantly, since higher private growth could in principle allow an economy to face higher social costs), economic growth needs not be optimal in terms of well-being. A possible alternative

[6]There are in the literature also arguments in favor of a 'separating' school system. Though, since we do not tackle any heterogeneity-related issue in the model, we do not enter in such debate any further.

outcome is that of a large amount of time spent in social activities, which brings about a rich social environment (i.e. growth in the social opportunities available to the individuals), but may act as an obstacle to private growth. When both these outcomes are possible, the present framework shows that the latter is Pareto-superior to the former one (a plausible result in advanced societies).

Our analysis has introduced a certain number of innovative features, which call for a deeper investigation in future. The present model may be extended first of all by allowing for the possibility of a balanced growth between private and social activities. Two effects might be relevant from this point of view. On one side, social capital increases productivity in the private sector, as well established in the quoted literature, and this renders even more serious the problems created by under-investment in social activities (social poverty traps), while, at the same time, it allows a balanced growth when social participation is high enough. On the other side, market activities might themselves contribute to create new relations, thus rendering less serious the problem of social poverty and, in turn, allowing a balanced growth even with a low social participation. Since the two effects are counterbalancing, our basic results should still hold under these extensions.

A second extension of the model would be to consider contexts in which, on one side, physical and human capital accumulation may be taken into account[7], and, on the other side, social capital accumulation may be more deeply investigated by regarding it as a socially differentiated process. It will also be interesting to compare the present results with the ones that can be obtained outside an evolutionary context, e.g. in an infinite-life agent model or in an OLG context. The analysis in terms of well-being may be extended as well, since social evolution not only determines how actual needs are satisfied, but it directly influences the formation of such needs too (an aspect that is particularly difficult to capture, and that can be legitimately ignored in a short run or even in a medium run horizon, but that appears crucially relevant for any long term analysis of well-being).

Finally, as the concepts of relational goods and of social capital are still unusual in the most known economic literature, it may be worth to conclude with a brief consideration about their methodological status. In particular, they fit well Granovetter's (1985) program of considering together individual actions and social structures, and are well compatible with an extended form of methodological individualism, in which individuals are still the starting point, but they are no more seen as atoms isolated from one another [see Donzelli (1986) and Boland (1982)]. Moreover, the investigation of the relational dimension of individual choices is likely to lead us to extend the scope of economic analysis to consider how cultural and social factors influence needs and purposes of people. Of course, any strict disciple of Robbins's (1935) epistemology would reply that economics deals with the allocation of scarce means to given alternative purposes and does not discuss the sense of these goals. In contrast, our opinion is that, as well-being and growth may depend to a relevant degree upon the specific motivational structure belonging to agents within a certain culture, it might be worth for economists to directly tackle their determination and evolution [for examples of analyses of this kind see Joireman et al. (1996), Menicucci and Sacco (1996 and 1997), Sacco (1997), Sacco and Zamagni (2001)]. Indeed, this question develops somehow the same core as methodological individualism (since its starting point is made of inten-

[7]We saw in Chapter 6 that the basic intuition developed in Chapter 5 remains valid once private capital is introduced, although its introduction allows further interesting considerations.

tional choices), but it brings beyond it, because it recognizes that purposes themselves are not a primum of the analysis, as it is well acknowledged in other social sciences [see e.g. the category of sense, which is always presupposed by that of purpose, in the analyses of Heidegger (1927) for philosophy, of Habermas (1981) for sociology and of Greimas (1983) for semiotics].

7.4 Appendix

Let us classify dynamics (7.7), (7.15). For simplicity, we shall consider 'robust' cases only, i.e. those which do not correspond to equality conditions on parameters' values (except for $\gamma = 1$).

Let us first consider the locus $\dot{K}_s = 0$. To this end, notice that $\dot{K}_s = 0$ holds if $K_s = 0$ or if:

$$[s_L + (s_H - s_L)x]^{1+\beta} K_s^{\gamma-1} = \delta. \tag{7.17}$$

For $\gamma = 1$, equation (7.17) is satisfied if and only if

$$x = x^* \equiv \frac{\delta^{\frac{1}{1+\beta}} - s_L}{s_H - s_L} \tag{7.18}$$

holds; in this context, $\dot{K}_s < 0$ if and only if $x < x^*$ and $\dot{K}_s > 0$ if and only if $x > x^*$.

For $\gamma \neq 1$, equation (7.17) defines a function

$$K_s = \hat{K}_s(x) \equiv \left\{ \frac{\delta}{[s_L + (s_H - s_L)x]^{1+\beta}} \right\}^{\gamma-1}, \tag{7.19}$$

which is strictly increasing in x if $\gamma < 1$ and strictly decreasing if $\gamma > 1$. In both cases, $\hat{K}_s(x)$ is such that[8]

$$\hat{K}_s(0) = \left[\frac{\delta}{s_L^{1+\beta}} \right]^{\frac{1}{\gamma-1}}, \tag{7.20}$$

$$\hat{K}_s(1) = \left[\frac{\delta}{s_H^{1+\beta}} \right]^{\frac{1}{\gamma-1}}. \tag{7.21}$$

If $\gamma < 1$, below (above) the graph of $\hat{K}_s(x)$ it holds $\dot{K}_s > 0$ (respectively, $\dot{K}_s < 0$), while the opposite holds if $\gamma > 1$.

Let us now consider the locus $\dot{x} = 0$. As discussed in Section 5, $\dot{x} = 0 \Longleftrightarrow \{x = 0 \vee x = 1 \vee \Delta U(K_s, x) = 0\}$ and $\Delta U(K_s, x) = 0 \Longleftrightarrow x = \bar{x}$ [see equation (7.12)], but now, being K_s no more a fixed parameter, (7.12) defines a function

$$K_s = \tilde{K}_s(x) \equiv \left\{ \frac{a\bar{Y}_s}{(s_H - s_L)[s_L + (s_H - s_L)x]^{\beta}} \right\}^{\frac{1}{\gamma}} \tag{7.22}$$

strictly decreasing in x with $\tilde{K}_s(1) = K_s^1$ (see Proposition 1) and $\tilde{K}_s(0) = K_s^2$.

Below (above) the graph of $\tilde{K}_s(x)$ it holds $\dot{x} < 0$ (respectively, $\dot{x} > 0$).

Notice that the points $(K_s, x) = (0, 0)$ and $(K_s, x) = (0, 1)$ are always fixed points under dynamics (7.7), (7.15). The points $(K_s, x) = (\hat{K}_s(0), 0)$ and $(K_s, x) = (\hat{K}_s(1), 1)$

[8] Notice that $\lim_{s_L \to 0} \hat{K}_s(0) = +\infty$ if $\gamma > 1$ and $\lim_{s_L \to 0} \hat{K}_s(0) = 0$ if $\gamma < 1$.

are fixed points for $\gamma \neq 1$. In each of these fixed points, there is no coexistence of the two strategies. The existence of an 'interior' fixed point (i.e. a fixed point where $K_s > 0$ and $0 < x < 1$) depends on the shape of the graphs of $\tilde{K}_s(x)$ and $\hat{K}_s(x)$. It is easy to check that, if the graphs of $\tilde{K}_s(x)$ and $\hat{K}_s(x)$ cross each other, then at the intersection point it holds $\frac{d\tilde{K}_s(x)}{dx} > \frac{d\hat{K}_s(x)}{dx}$. Therefore, there exists at most an interior fixed point and, when existing, it is always an hyperbolic saddle[9].

Let us classify dynamics (7.7), (7.15).

Case (a): $\gamma > 1$

There are three subcases:

(a.1) For $\hat{K}_s(1) > \tilde{K}_s(1)$, the interior saddle does not exist, $(0,1)$ and $(\hat{K}_s(1),1)$ are saddles[10], $(0,0)$ is a sink (i.e. it is locally attractive) and $(\hat{K}_s(0),0)$ is a source (i.e. it is repulsive). The stable manifold of $(\hat{K}_s(1),1)$ separates the trajectories that approach $(0,0)$ from those where K_s goes to infinity and x approaches 1 (see figure 2.a).

(a.2) For $\hat{K}_s(1) < \tilde{K}_s(1)$ and $\hat{K}_s(0) > \tilde{K}_s(0)$, there exists an interior saddle, $(0,0)$ is a sink, $(0,1)$ is a saddle, and both $(\hat{K}_s(0),0)$ and $(\hat{K}_s(1),1)$ are sources. The stable manifold of the interior saddle separates the two dynamic regimes described in case (a.1) (see figure 2.b).

(a.3) For $\hat{K}_s(0) > \tilde{K}_s(0)$, the interior saddle does not exist, $(0,0)$ is a sink, both $(0,1)$ and $(\hat{K}_s(0),0)$ are saddles, and $(\hat{K}_s(1),1)$ is a source. The stable manifold of $(\hat{K}_s(0),0)$ separates the two dynamic regimes described in case (a.1). (see figure 2.c).

Case (b): $\gamma = 1$

There are three subcases:

(b.1) For $x^* > 1$ [see (7.18)], the interior saddle does not exist, $(0,0)$ is a saddle and $(0,1)$ is a source. Along almost every trajectory x approaches the value 1 and K_s goes to infinity (see figure 3a).

(b.2) For $0 < x^* < 1$, there exists the interior saddle, $(0,0)$ is a sink and $(0,1)$ is a source. The stable manifold of the interior saddle separates the two dynamic regimes described in (a.1) (see figure 3b).

(b.3) For $x^* < 0$, the interior saddle does not exist, $(0,0)$ is a sink and $(0,1)$ is a saddle. Almost all trajectories x approach $(0,0)$ (see figure 3c).

Case (c): $\gamma < 1$

There are three subcases:

[9]The condition $\frac{d\tilde{K}_s(x)}{dx} > \frac{d\hat{K}_s(x)}{dx}$ implies that the determinant of the jacobian matrix evaluated at the interior fixed point is strictly negative; consequently, the associated eigenvalues are both different from zero (i.e. the fixed point is hyperbolic) and have opposite sign (i.e. the fixed point is a saddle point).

[10]The stability properties of the fixed points on the edges of the state space follow from a straightforward application of linearization techniques.

(c.1) For $\hat{K}_s(0) > \tilde{K}_s(0)$, the interior saddle does not exist, both $(0,0)$ and $(\hat{K}_s(0),0)$ are saddles, $(0,1)$ is a source and $(\hat{K}_s(1),1)$ is a sink. Almost all the trajectories approach the sink (see figure 4.a).

(c.2) For $\hat{K}_s(0) < \tilde{K}_s(0)$ and $\hat{K}_s(1) > \tilde{K}_s(0)$, there exists the interior saddle, $(0,0)$ is a saddle, $(0,1)$ is a source, both $(\hat{K}_s(0),0)$ and $(\hat{K}_s(1),1)$ are sinks. The stable manifold of the interior saddle separates the attraction basins of the two sinks (see figure 4.b).

(c.3) For $\hat{K}_s(1) < \tilde{K}_s(1)$, the interior saddle does not exist, both $(0,0)$ and $(\hat{K}_s(1),1)$ are saddles, $(0,1)$ is a source and $(\hat{K}_s(0),0)$ is a sink. Almost all the trajectories approach the sink (see figure 4.c).

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