A Dynamic Approach to the Relationship between Inequality, Social Capital and Institutions[†]

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Abstract

One of the main objectives of this paper is to show the dynamics that relates inequality, social capital and institutions. The most important result is that these dynamics could generate multiple equilibria. Thus, we can identify two types of equilibria: one with a low level of social capital and high level of inequality, supported by institutions created endogenously by the community; and on the other hand, an equilibrium with a high level of social capital, low inequality and institutions that favor social equality.

The analysis made in this paper can be seen as a contribution to the literature on why a society may attain high levels of institutional development and social integration.

1 Introduction

In the last years, economic theory has demonstrated an increasing interest in the social capital concept. This is reflected in the growing number of papers related to this topic. However, the economic literature shows a high degree of disagreement about the definition of social capital, since it is very difficult to deal with this notion in empirical studies. That's why the different definitions tend to be extremely broad, producing ambiguities in the treatment of this subject. In this paper we will adopt a definition of social capital that minimizes the ambiguities in the subsequent analysis. Thus, this will allow us to continue with the development of the paper under a clear conception of what is social capital.

Once we define social capital, we will analyze the relationship between this concept, inequality and institutions. It is important to mention that, in general, the economic literature has studied these subjects separately. For that reason, one of the objectives of this paper is to treat all this subjects jointly and to show how they are intimately related.

We believe that a deeper understanding of all these subjects could help to explain, at least in part, why a given society has attained a certain level of development. In this sense, this paper can be seen as a contribution towards this explanation.

Section 2 includes a very brief review of the social capital, inequality and institutions literature, with a special emphasis in the social capital definition. Section 3 discusses the dynamics that relates these concepts. Section 4 presents a model that formalizes all the previous discussion. And in the last section we present the conclusions of the paper.

[†] For helpful comments I am very grateful to Fernando Tohmé. The usual disclaimer applies.

2 Theoretical Discussion

2.1 What is Social Capital?

If we review all the social capital literature one of the main conclusions that we can draw is that different authors have different views about what is social capital. As a result, there exists a great variety of definitions of social capital in the literature. Even more, there are points of view such as Manski (2000) that questions the introduction of this notion into economics, since he argues that we can explain the economic reality using the core concepts of preferences, expectations, constraints and equilibrium without the need of a new concept.

In this paper we propose to associate social capital with social interactions. In this sense, we do not intend to introduce this concept as a core one, but just as a mere object of study. Since the benefits of doing so are very important because it has significant influences over other areas of economics.

Consequently, we define social capital as a system of interpersonal networks (Dasgupta, 2001). This definition is very clear and defines exactly the object of study. In general, other authors give broader and ambiguous definitions, that tend to include institutions, trust, etc. (see for example: Coleman, 1990; Durlauf and Fafchamps, 2004; Portes, 1998).

The generation of social capital could cause beneficial and negative consequences. In the literature there exists a general bias towards stressing the importance of the beneficial consequences of social capital. Even more, these beneficial effects are included in the definition of social capital. Consequently, this approach introduces a circular reasoning of the type: a group is successful because it has social capital but the evidence that the group has social capital is its success (Portes, 1998; Durlauf, 1999; Sobel, 2002). That is why Durlauf and Fafchamps (2004) argument that we should not recommend policies that contribute to the formation of social capital until we know under what conditions social capital generates positive consequences. The same authors remark that the works which attribute every conceivable societal virtue to social capital like Putnam (2000) have little prospect of having lasting social science value (see also: Sobel, 2002).

From this argumentation one of the main questions that have to be answered is: what incentives has an agent to form a social network with other agents? In other words: what are the causes of social capital?

2.2 The Formation of Social Capital

Dasgupta (2005) intends to explain why agents form and maintain social networks. This author recognizes that agents are born in social networks, which they inherit. From these networks they choose to maintain some of them and discard the others. On the other hand, they not only inherit social networks but also they choose to enter into new ones.

The decision of creating a link between two agents can be made jointly or individually. Each connection has associated costs; furthermore, it is also costly to maintain them. Dasgupta argues that in some contexts these costs are like transaction costs. Furthermore, the individuals decide to invest in a social network because it generates a utility in one of the agents or in both of them.

On the other hand, Bala and Goyal (2000) develop a model where each individual is a source of benefits that others can obtain through the creation of costly pairwise links. The costs associated with the formation of links are only faced by the agent who initiates the link. In this way, these authors define a non cooperative game of network formation. And as a result, they obtain that there are some network structures that arise as equilibria of this non cooperative game, particularly star, circular, etc.

Blume and Durlauf (2000) present a different manner of approaching social interactions, by analyzing individual decisions in a context of social interactions. They combine random choice models with externalities models and focus on population behavior. Their model is highly nonlinear and has multiple steady states, showing that individual decisions have a very weak influence on the population behavior. The aim of the paper of Blume and Durlauf is not to explain why agents form social networks, but instead to explain the population behavior. In the context of our discussion this is very important since it allows us to analyze the process of social network formation taking into consideration that each individual decision is not very important in that process.

The point of view of these authors is to treat "…aggregate socioeconomic behavior as a statistical regularity of the collection of individual decisions as they are determined through the interactions and idiosyncratic characteristics of the agents" (Blume and Durlauf, 2000). Therefore, it won't be necessary to model the individual behavior in such detail as in the traditional economic models. The agents make decisions considering their payoffs, but these decisions have a random component. Consequently, these kind of models "… typically specify an explicit probability measure characterizing individual behavior conditional on exogenous (to the individual) characteristics which can be either common to all members of the population or individual-specific, and an interaction structure which specifies who affects whom. The goal of the analysis is to characterize a joint probability measure over all agents in the population that is compatible with these conditional probability measures" (Blume and Durlauf, 2000).

Glaeser et. al. (2000) establish a different viewpoint on the issue of social capital formation. Their analysis uses a model of individual decision investment very similar to standard models of investment in physical or human capital. They also consider the individual social capital as the social component of the human capital (for example, personal charisma is social capital). In addition, they define the aggregated social capital as a function of all the different types of individual social capital. This definition is not compatible with the definition that we have chosen, even though it is important to discuss their model since it is one of the first attempts to explicitly formalize the social capital idea.

Glaeser et. al. (2000) present an individual's maximization problem:

$$\max_{I_0, I_1, \ldots, I_T} \sum_{t=0}^{T} \beta^t \left[S_t \times R(\hat{S}_t) - wC(I_t) \right] \qquad (1)$$

subject to:

$$S_{t+1} = \delta \phi S_t + I_t \ , \forall t \qquad (2)$$

where: S is the stock of individual social capital, $\hat{S}$ is the stock of aggregate per-capita social capital, $S \times R(\hat{S})$ is the utility flow that receives each individual per period, $R(\cdot)$ is a differentiable function with aggregate per-capita social capital as its argument ($R'(\hat{S}) > 0$), δ is the depreciation factor, I is the level of investment, $C(I)$ is the time cost of investment ($C(\cdot)$

is increasing and convex), w is the wage rate representing the opportunity cost of time, β is the discount factor, and ϕ is the depreciation factor arising when the individual moves to another community.

The first order condition is:

$$wC'\left(I_t\right) = \frac{1-\left(\beta\delta\phi\right)^{T-t+1}}{1-\beta\delta\phi} R\left(\hat{S}\right) \tag{3}$$

this solution means that social capital investment rises with the discount factor, rises with the occupational returns to social skills, increases in communities with more aggregate social capital, and rises when social capital is less community specific; and on the other hand, declines with mobility, with the opportunity cost of time, with the rate of depreciation and with age.

The analogy between physical capital and social capital has received many critiques in the literature (Dasgupta, 2001; Sobel, 2002). Sobel (2002) argues that we have to distinguish between costly social capital and the social capital that comes without sacrifice. For example, the first language and the ethnicity are acquired without calculation or sacrifice. However, Sobel declares that the costly social capital is in proportion significant enough to be worthy of study. On the other hand, he indicates that a difference between social capital and physical capital is that social capital appreciates with the use.

According to our definition of social capital, the paper of Alesina and La Ferrara (2000) presents a model that is compatible with our point of view. In this work the authors study the influence of the population heterogeneity on the process of group formation and on the level of individual participation. The agents obtain utility directly from the interaction with other individuals and prefer to interact with those that are similar to them in terms of income and ethnicity. Furthermore, if we suppose that the preferences are correlated with those characteristics a proposition arises indicating that individuals prefer to interact with those that have similar preferences. In the model it is assumed that the entry into a group is costless, there are no congestion effects, there are no economies of scale, and there exist free entry and exit of individuals into the group. There are two types of individuals, whites and blacks, their size being $W > 0$ and $B > 0$. The population is uniformly distributed on a line, and both types have a uniform distribution on the interval [0,1]. Then the utility from participation for an individual of the type $j = W, B$ located at a distance l from the location of the group[1] is:

$$U_j = u\left(\alpha, P_{-j}\right) + v\left(l\right) \quad \textbf{for } j = W, B \tag{4}$$

where: P_{-j} is the proportion of group members whose type is different from j's type, α is a taste indicator that varies across agents and captures the intensity of an agent's aversion to the opposite race, $u_\alpha\left(\cdot\right) < 0$, $u_p\left(\cdot\right) < 0$ and $v_l\left(\cdot\right) < 0$. And the authors make the following assumptions: $u_{\alpha P}\left(\cdot\right) \le 0$, $u_\alpha\left(\cdot\right)\big|_{P=0} = 0$ and $u_P\left(\cdot\right)\big|_{\alpha=0} = 0$.

According to this model an individual may decide to participate in a group if the utility is greater than the reservation utility and also if it is greater than the utility of joining a different group (in the case that more than one group exists). An equilibrium in the case of an

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[1] If the travelling costs were not included in the model it would be no reason to form mixed groups, likewise, it would be no reason to form more than two groups since there are no congestion costs.

equilibrium with one group is defined as "…a group composition $\left(P_B^*, P_W^*\right)$ such that for both types none of the members wishes to leave the group and none of the nonmembers wishes to join". And "an *n*-group equilibrium consists of *n* couples $\left(P_B^{k*}, L^k\right)$, $k = 1,...,n \leq N$, with P_B^{k*} denoting the fraction of members type B in group k, and L^k denoting the distance between the two most distant members of group k, with $\sum_{i=1}^{n} L^i \leq 1$ and $\cap_{i=1}^{n} L^i = 0$, such that for each $\left(P_B^{k*}, L^k\right)$ none of the members wishes to leave the group and none of the nonmembers wishes to join". The aggregate level of participation is the percentage of the population that belongs to a group[2].

The main conclusion of this model is that an increase in the degree of population heterogeneity decreases the aggregate level of participation.

2.3 Social Capital and Inequality

In the previous section we showed that inequality is an important factor that determines the level of social capital in a population. There are different papers that verify the existence of a negative relation between social capital and inequality. In this section we comment some of them.

Before continuing, it is important to remark that in many of these studies the variables used to capture the level of social capital may not be rigorously compatible with the definition used in our paper. One of the principal problems of these empirical papers is that it is very complex to obtain a variable that represents without ambiguities the social capital.

In the paper of Alesina and La Ferrara (2000) using survey data on group membership and data on U.S. localities and controlling for many individual characteristics they find that participation in social activities is significantly lower in those localities that have a higher level of inequality.

On the other hand, Knack and Keefer (1997) find in a study realized with data collected from 29 economies during the 1980-1992 period that trust and civic norms are stronger in those countries with higher incomes and with more equal income distribution.

Costa and Kahn (2001), in their work about the declination of social capital in the U.S., conclude that income inequality explains this phenomenon. Particularly, they indicate that income inequality is the cause of the declination of social capital outside the households, since the authors differentiate between the social capital centered in the community and in the home.

The following section introduces the institutions in to our analysis.

2.4 Institutions

Dasgupta (2001) in an attempt to delimit social capital argues"… that to identify social capital with institutions is a mistake: institutions emerge from networks, they are themselves not the networks". Therefore, he argues that institutions are a product of the social capital.

In the same way, Knight (1992) says that social institutions are prevalent wherever individuals attempt to live and work together. They are produced by individuals attempting to take care of every aspect of their life.

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[2] To simplify the model the authors suppose that each individual can participate only in one group.

North (1990) identifies the institutions with the rules of the game in a society. In this way, we can say that institutions delimit the choice set of the individuals. Consequently, they structure the incentives in every human exchange, political, social or economical. North classifies institutions into formal institutions – like the rules that individuals create – and informal institutions – like conventions or codes of conduct. These institutions can be created like, for example a Constitution, or they simply arise through time like, for example a certain convention in a community.

Knight (1992) argues that informal institutions are very important because they form the base for the intentional development of formal institutions. He says that "…these informal conventions form the base on which a vast range of formal institutions organize and influence economic and political life".

North (1990) in his work refers to institutional change and argues that entrepreneurs are the agents of change. He says that they respond to incentives generated by the institutional structure. In this way, he states that changes of relative prices and changes in preferences are the source of institutional change. Additionally, he argues that informal institutions may evolve without the requisite that the change is produced by organizations or by individuals that want to explicitly reformulate these institutions. On the other hand, a change in formal institutions will require that organizations or individuals declare how they want to reformulate them because this change may depend on the use of abundant resources or on a mechanism that minimizes the problem of *free-riding*.

Institutional change can be seen as an evolving process that is continuous, especially if we focus our attention on the development of informal institutions. Nevertheless North (1990) points out in some examples that there exist discontinuous institutional changes like wars, revolutions and natural disasters.

Acemoglu (2004) classifies the different existing points of view on institutions into four categories. They are: the efficient institutions view (the society will choose the institutions that maximize its total surplus), the incidental institutions view (the institutions are a product of other social interactions), the rent-seeking institutions view (the institutions emerge as a result of choices made by individuals, but they are not necessarily efficient), and the costly institutions view (the institutions are created for solving economic problems and there is a tendency towards efficient institutions, but this view recognizes that it might be costly to design the right institutions).

What distinguishes the efficient institutions view from the other three is that in this view different institutions do not produce different results, they only produce different economic environments. This point of view assumes that there are not transaction costs, i.e. that Coase's Theorem is satisfied. That's why the economic results are independent of the different institutional arrangements. In what follows we will suppose that institutions are an important determinant of the economic result. In addition, we can say that the incidental institution view is the most compatible with our line of thought in this work.

2.5 Social Capital and Institutions

In the previous section we indicated that Dasgupta (2001) proposed a relation between social capital and institutions, in the sense that institutions are a product of the social networks. In that work Dasgupta argues that social networks (social capital) produce multiple equilibria and that each equilibrium is characterized by a different institutional structure. Therefore, this author has in mind a vision rather different from the efficient institutions view, in which each equilibrium derived from the social capital will generate a different institutional arrangement and thus a different economic result.

However, the institutions are not only a product of the social capital but also the social capital is shaped by the institutional arrangement, since the social networks are embedded in social institutions. In this sense, one can propose a system where social capital and institutions modify each other, building a virtuous or vicious cycle if the dynamics generates a "desirable" or "undesirable" equilibrium, respectively.

In previous sections we mentioned that the social capital literature has a bias toward emphasizing on the positive results generated by social capital. A broader vision should consider the possibility that social capital also generates undesirable results. Continuing with our logic, this translates into the possibility that social capital may generate "good" or "bad" institutions.

In the following section we will concentrate in one of the effects of institutions on the economy, namely on inequality.

2.6 Institutions and Inequality

Knight (1992) remarks that many of the principal effects of institutions on a given society are of distributional nature. This is because institutions do not produce collective benefits but instead they yield differentiated benefits. Therefore, he argues that it is possible that they may generate social conflicts. In this sense, he adds that there is more than one form to structure social institutions with the aim of obtaining benefits from cooperation, coordination and the exchange that they generate. But the aspect to remark is that these different institutional arrangements will produce different distributive effects, since the benefits they generate will be distributed differently in one or in other institutional system.

According to this point of view, there are not efficient or inefficient institutions, instead there are institutions that generate different distributions. Social institutions affect the distribution of the benefits generated by the numerous interactions that constitute the social life of the society. For that reason, rational individuals would seek to establish those institutions that produce a distribution of benefits profitable for them. Nevertheless, one can argue that there are some institutional arrangements that produce distributional effects that minimize social conflicts. In this sense, we say that there exists a set of institutions that generates "good" results. Acemoglu et. al. (2005) say: "…we think of good economic institutions as those that provide security of property right and relative equal access to economic resources to a broad cross-section of society".

In spite of his concentration on the distributional consequences of institutions, Knight does not neglect the importance that they have to the coordination and cooperation in a given society. The crucial point that he observes is that coordination and cooperation are not useful for explaining why institutions are created or why they change. Instead they are a mere product of the search of benefits by individuals.

Based on the previous section, we can argue that of the multiple equilibria that are generated by social capital some of them could be "desirable" in the sense that they generate institutions that minimize social conflicts.

Robinson and Sokoloff (2003) reveal a relationship between institutions and income inequality. In their explanation of the level of income inequality in Latin America, they indicate the critical level of income inequality of this region during the colonial period. These authors compare Latin America with North America, and they say that North America began as a colony with low level of inequality and this situation lead to the establishment of egalitarian institutions. On the other hand, in Latin America the level of inequality was very important and the institutions that were established tended to perpetuate and accentuate this

inequality. In the rest of this work we present a relationship between inequality and institutions, and then a converse relationship between institutions and inequality.

3 The Dynamics among Inequality, Social Capital and Institutions

3.1 Towards a Formal Model

According to the discussion outlined previously it seems that inequality, social capital and institutions are intimately related. Since that on one hand a relationship between inequality and social capital has been proposed, on the other hand it exists an established connection between social capital and institutions, other works postulate a relationship between institutions and inequality, and others also established an association between inequality and institutions.

The hypothesis that we propose in this paper is that there is a circular dynamics between these concepts, since income inequality[3] has an effect on social capital, the latter creates or changes institutions, and institutions have an effect on income distribution, and so on until one equilibrium is reached. In equilibrium, the individuals do not have incentives to modify the institutional arrangement, and therefore the income distribution does not receive any alteration.

It could be possible that this dynamic may have multiple equilibria. To reach a particular equilibrium would depend on the initial level of income inequality. In this way, we can differentiate two types of equilibria: those corresponding to high levels of income inequality, with inegalitarian institutions and a low interaction between individuals; and those of low income inequality, with institutions that promote a more egalitarian income distribution and a strong social cohesion.

Acemoglu et. al. (2005) propose a dynamic that is very similar to ours. In their own words they say: "…we showed that at any date, political power is shaped by political institutions, which determine de jure power, and the inherited distribution of resources, which affect the balance of de facto power. Political power then determines economic institutions and economic performance. It also influences the future evolution of political power and prosperity. Economic institutions determine the distribution of resources at that point, which, in turn, influences the distribution of de facto power in the future. Similarly, the distribution of power at any point determines not just the economic institutions then, but also the future political institutions. Thus the allocation of political power at one date, because of the way it influences the distribution of resources and future political institutions, has a crucial effect on the future allocation of both de facto and de jure political power".

3.2 Path-dependence

According to the previous discussion, one can think that there is a critical initial level of income inequality and that the "goodness" of the proposed dynamic depends on it. In this way, if the initial level of income inequality is above the critical one the dynamics will converge on an equilibrium with high inequality, while, if the initial level of income inequality is below the system will attain an egalitarian equilibrium.

This dynamics make the outcome significantly dependent on the initial conditions and the path followed by the system. In connection with this, North (1990) argues that institutional change, which is fundamental in the social and economical evolution, is *path-dependent.* On the other hand, Young (1998) in his evolutionary analysis of institutions develops games that

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[3] To simplify we suppose that all the heterogeneity in the population is captured in the income distribution of the population.

represent the evolution of institutions. In those games, that evolution depends on processes that attain different results depending on the path followed by the system (*path-dependence*), in that context these processes are denominated *non-ergodic*. In other words, in those terms, our equilibria are *path-dependent* or *non-ergodic*.

3.3 The Assumptions

The dynamic proposed above depends on assuming that social capital produces some particular results. No theory specifies under which conditions the social capital generates "good" consequences. We suppose that under low inequality conditions the social capital will generate egualitarian institutions.

The logic is the following. In *t*=0 if the level of inequality is not important (it is below the critical level) then it will stimulate the formation of more social interactions, and we expect that this social capital generates more egualitarian institutions. Consequently, this initial level of inequality will generate institutions that induce the production of more social capital, the latter will generate more egualitarian institutions, and so on until one equilibrium is reached. On the other hand, and in the same way, we can think of a dynamic that starts in a level of income inequality above the critical one. In such a case we suppose that the social capital generated will create institutions that emphasize inequality.

It is important to remark that this assumption has an economic logic. Since that individuals prefer to interact with those that are similar to them, if the population is very heterogeneous they will form many social groups that have different interests[4], and therefore, this heterogeneity will produce a fragmented society. The ensuring social fragmentation and the variety of interests will produce coordination problems. These coordination problems will be translated into institutions that induce more inequality. On the other hand, if we think in a homogeneous society, the individuals will form a small number of groups[5] and in that way, a cohesive society. As a result, the institutions created in that context will generate positive consequences for the whole community because we can think this society as a single rational agent who chooses those institutions that maximize her well being.

In this direction, Acemoglu et. al. (2005) argue that different groups and individuals benefit from different economic institutions. The groups and individuals that benefit from these institutional arrangements are those that have greater political power, and this power is determined by political institutions and the distribution of resources. This explains why when there exists an important level of heterogeneity in the population those groups that are best positioned on the income distribution are those that are going to be benefited from the institutional arrangement. This situation will cause in turn more inequality because these groups will choose the economic institutions that maximize their own benefit. On the other hand, we could think a more equal society as a society where the groups have similar resources and the political power is distributed equally between them. Thus the distribution of institutional benefits will be equal too.

4 The Model

4.1 Inequality, Social Capital and Institutions

Consider a society populated by *N* individuals where each individual $i \in [0, N]$ must decide between forming or not a group with other individuals. This decision will be based on the level of income inequality given in the population since the individuals prefer to interact with

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[4] We suppose that there are not collective action problems inside the groups.
[5] We suppose that each individual can only participate in one group.

those that are similar to them in terms of income. If the inequality is not important then the individuals will tend to form less and more numerous groups, since it is going to be more probable that i will find other individuals with a similar income. On the other hand, in a more unequal society the individuals will tend to focus on forming a larger quantity of groups and therefore a more polarized society.

In this model we suppose that there are not social protests, revolutions or civil wars that can produce any discontinuous institutional change. In other words, we assume that there are not conflict groups. To simplify the model we also assume that each individual can only participate in one group and if the individual decides not to participate in any group then she will be considered as a group by herself.

Therefore, if G is the quantity of groups in the population then $G \in [1, N]$. Where $G = 1$ corresponds to an extremely integrated society and $G = N$ is the result of a completely polarized society.

We define $c = \dfrac{G}{N}$ as the social capital, where $c \to 0$ is a high social capital and $c \to 1$ is a low one. We assume that $N \to \infty$, therefore when $G = 1$, $c \cong 0$. The social capital depends on the level of income inequality since $G = g(\theta)$ where θ is an inequality index like, for example the Gini index, $\theta \in [0,1]$, $g(\cdot)$ is continuous, differentiable and $g'(\theta) \geq 0$. So $c = f(\theta)$ where $f(\theta) = \dfrac{g(\theta)}{N}$.

The dynamics of institutions are reflected in a function that maps the social capital onto the income inequality. Based on our previous discussion, the social capital produce institutions and the latter modify the income distribution. Therefore, $\theta = I(c)$ where $I(\cdot)$ is a continuous function and we also assume that $I(0) = 0$ and $I(1) = 1$ since we consider that a high social capital (low c) generates low inequality (low θ), and vice versa.

4.2 The Equilibrium

The equilibrium can be represented by the following figure (figure 1):

Figure 1
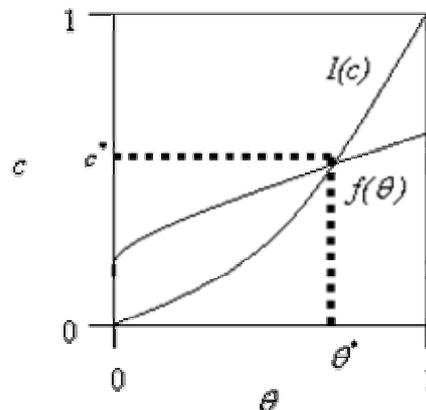
where θ^* and c^* are the equilibrium values of the income inequality index and social capital, respectively.

To understand this representation it is helpful to analyze the dynamics of the model. In figure 2, we depart from θ^0 which is the level of income inequality that individuals see at t=0. Based on θ^0 they reach a level c^0 of social capital. As a result, with c^0 they generate institutions that modify the income distribution reaching θ^1. And so on until they reach the equilibrium.

Proposition 1 Given $f(\cdot)$ and $I(\cdot)$ continuous functions with domain $D \in [0,1]$ and image $\mathrm{Im} \subseteq [0,1]$, with $I(0)=0$ and $I(1)=1 \Rightarrow$ an equilibrium exists.

Proof. Since that $f(0) \geq 0$ and that $f(1) \leq 1$, and given that $I(0)=0$ and that $I(1)=1 \Rightarrow$ $f(\cdot)$ and $I(\cdot)$ must coincide at least in one point by the intermediate value theorem. ∎

It is important to mention that it could be possible the existence of a continuum of equilibria in a part of the domain if the two functions instead of cutting in one point, keep attached to each other in that part of the domain. But this situation is not generic since a minimum perturbation will separate both functions. Therefore we discard this possibility.

Figure 2
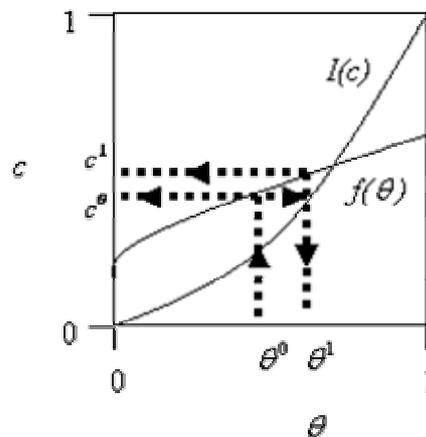
4.3 Stability and Instability of the Equilibrium

In a situation with three equilibria, as represented by figure 3, we can observe that the equilibrium in the middle is unstable while both equilibria at the extremes are stable. In this sense, we define the critical level on income inequality θ^c as the level of income inequality that if a given society begins with an inequality above this level will reach an equilibrium with an higher level of income inequality and a lower level of social capital. On the other hand, if a given population starts with an inequality below the critical level an equilibrium with lower income inequality and a higher level of social capital will be reached.
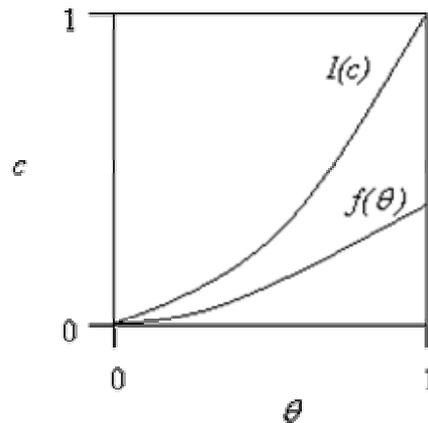
Figure 3
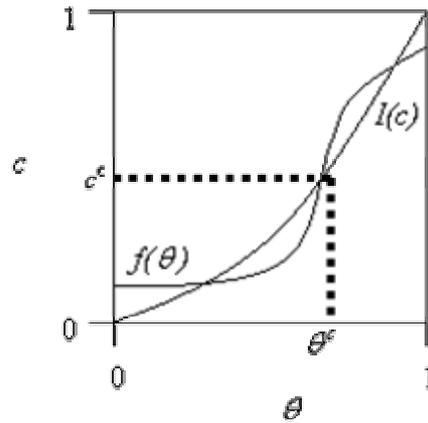
Proposition 2 Given $f(\cdot)$ and $I(\cdot)$ continuous functions with domain $D \in [0,1]$ and image $\text{Im} \subseteq [0,1]$, with $I(0) = 0$ and $I(1) = 1 \Rightarrow$ stable equilibrium exists.

Proof. Since that $f(0) \geq 0$ and that $f(1) \leq 1$, and given that $I(0) = 0$ and that $I(1) = 1 \Rightarrow$ $f(\cdot)$ and $I(\cdot)$ must coincide at least in one point. If they do only in one interior point then $f(\cdot)$ must cut $I(\cdot)$ from above yielding a stable equilibrium. Otherwise, as represented in figure 4, there can exist a single stable equilibrium at the point (0,0)[6].

On the other hand if both functions coincide in more than one interior point then one of the equilibria must be stable since $f(\cdot)$ must necessarily cut $I(\cdot)$ from above in at least one of these points. There are also cases, as represented in figure 5 where the stable equilibrium is the point (0,0) and figure 6 where the stable equilibrium is the point (1,1)[7]. ∎
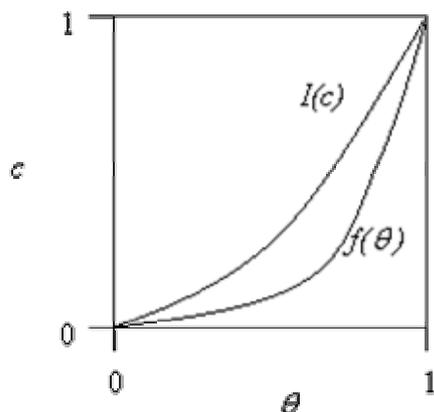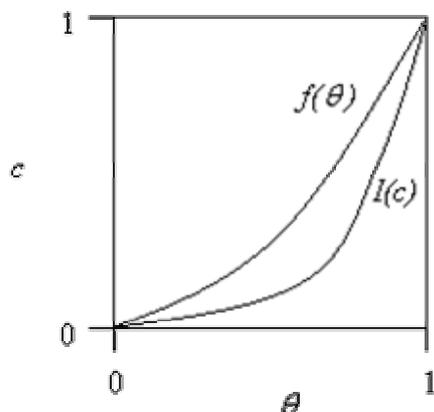
Figure 4

Figure 5

Figure 6

4.4 The Position and the Shape of the Curves and Some Remarks on the Effectiveness of Policies

We suppose that $I(c)$ has the same form for all type of societies. The only function that we assume to vary across communities is $f(\theta)$. The form and position of this function depend on the aversion that the individuals of a given society have to other individuals with different incomes. In this sense, given two societies with equal number of individuals, the society with more aversion to inequality will have a $f_1(\theta)$ above the $f_2(\theta)$ of a society with less aversion to inequality because the former society forms more groups than the latter.

The "S" shaped $f(\theta)$ in figure 3 belongs to a kind of society that may exhibit a low aversion to inequality in case of low inequality and has a higher aversion to inequality when inequality is more important.

Since the shape of the function is assumed to be independent of any kind of policy because on one hand $I(c)$ is supposed to be the same for all societies while on the other $f(\theta)$ is assumed to depend only on the aversion to inequality, in this model any policy that intends to lock the society out from a "bad" equilibrium will not be effective. This is because "… political choices are made rationally and are endogenous to the structure of institutions, which are themselves ultimately endogenous …" (Acemoglu et. al., 2005) so a society that is trapped in an "undesired" equilibrium can not effectively apply policies that seek to change that situation.

13

This result is trivial when we are in a situation with one stable equilibrium. In a situation with two stable equilibria, which is more probable in reality, to lock the society out from the "bad" equilibrium we will need a policy that significantly lowers the inequality below the critical level. But this policy will never be implemented because the political power resides with those groups that are best positioned on the income distribution and are able to decide which policies are going to be applied. Therefore, they will choose those policies that tend to increment or leave inequality unchanged instead of policies that significantly lower it. Perhaps, in very special situations they may opt for policies that lower a little inequality but they do certainly not have any incentive to keep a policy that continually lowers the inequality.

Constituted by quite similar individuals, in a "good" equilibrium the political power is distributed equally between the groups. Therefore, there are not incentives to implement policies that increase the inequality.

In this sense, the only way in which a society can be moved to another equilibrium is by an exogenous and discontinuous change in institutions caused by, for example, a natural disaster which could drastically alter the income distribution. This situation may be possible if the change in income distribution is large enough to lead the society to another stable equilibrium if it exists.

Proposition 3 In a generic situation with two stable equilibria the power groups will lack incentives to apply policies to move the society towards the other equilibrium.
Proof. If the society is situated in a "bad" equilibrium, it exhibits high inequality. Therefore the political power belongs to those groups that are best positioned on the income distribution. They do not have incentives to permanently implement policies that lower inequality that would deprive them from the source of their power. In the case of two stable equilibria and a society situated in a "good" equilibrium, there are not incentives to put into practice policies that increase the inequality since this could only respond to the will to accumulate power in groups with fewer individuals. But since agents are quite similar they do not have a form to coordinate such policies[8]. ∎

5 Conclusions

In the model developed in this paper we determine under what circumstances a society would reach an equilibrium with low or high inequality, with equalitarian or inequalitarian institutions, and with low or high level of social capital. We also illustrated under what circumstances social capital produces "good" consequences. And we showed that any policy aimed to conduct a society to another equilibrium will be unsuccessful.

We believe that this paper helps to explain why Latin America compared with North America is so different in terms of institutions, income inequality and social capital. As we have said in a previous section when we mentioned the work of Robinson and Sokoloff (2003). In addition, we think that this paper makes important contributions to the discussion made in the work of Acemoglu et. al. (2005).

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[8] In cases where the critical level on income inequality is very near to the inequality exhibited in the "bad" equilibrium it could exist incentives to move out of the equilibrium. This kind of situation is more probable in those cases with more than two stable equilibria but these cases are not possible since they suppose a particular shape of the function $f(\theta)$ not compatible with our definition of this shape.

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