# MIDDLE-CLASS CONSENSUS, SOCIAL CAPITAL AND
# THE FUNDAMENTAL CAUSES OF ECONOMIC GROWTH
# AND DEVELOPMENT

STEFAN D. JOSTEN[*]

*Federal University Munich, Germany*


This paper analyzes a heterogeneous-agents endogenous-growth model incorporating both transaction costs and social capital. An individual can either become an active part of the society's middle-class networks of trust and mutual co-operation, thus making a positive contribution to overall social capital. Alternatively, the individual can stay socially disintegrated and free-ride on the community's social capital. Due to the existence of asymmetric information, agents face a moral-hazard problem on the credit market which gives rise to transaction costs and can be alleviated by private, governmental or social governance structures. An increase in inequality and shrinking of the middle class depresses the community's social capital, which, in turn, weakens the informal social governance system and increases economy-wide transaction costs. As a result a more unequal distribution lowers the economy's growth rate.

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## 1.   INTRODUCTION

One of the most important issues in economics is the problem of *economic growth and development*. What sustains economic growth over long periods of time? Why do some countries grow rapidly while other countries stagnate? And where do the huge differences in income per capita and worker productivity which can be observed across countries in the world come from?[1] The latter question is particularly puzzling, since neoclassical growth theory tells us that economies around the world should actually

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[1] Existing differences in income per capita and worker productivity across countries are described e.g., by Acemoglu (2009), pp. 8-15.

converge - either (if all economies were intrinsically the same) in an absolute sense or (if economies differ in various respects), at least, in a conditional sense, i.e., in relation to their respective long-run equilibria. All of the three questions above can be answered at two distinct levels: with respect to the mechanics, i.e., proximate causes, or with respect to the fundamental causes of economic growth, respectively.[2] According to the "mechanics" of economic growth, persistent cross-country differences in income per capita or economic growth rates are explained by countries' different propensities to save, incentives to work, access to technology, or different government policies. Such conventional textbook explanations remain unsatisfactory, however, in at least two respects: First, instead of solving it, they merely move the "mystery of economic growth" (Helpman, 2004) to another, more fundamental level. If, e.g., differences in savings rates across countries determine cross-country income or growth-rate differences, then why do some societies save more than others? A more satisfactory answer will have to look at more fundamental *social structures* that determine development outcomes (see e.g., Park, 2008).

Secondly, even after we account for the accumulation of physical and human capital, large differences in income per capita remain across countries. Investment in research and development explains a certain part of this cross-country variation, particularly in industrial economies. But still substantial variation in growth remains after accounting for both accumulation and R&D investment.[3] The question is: Why? Again, to answer this question, we are lead to look more closely at fundamental characteristics of societies.

In this vein, the present paper puts forward two interacting elements of the social structure as fundamental causes of economic growth and development: the existence of a broad *middle class* the members of which share with each other a fairly homogenous set of social orientations ("middle-class consensus"), and the *social capital* built by social interactions and informal relationships within this middle class.

Accordingly, this paper is related to two recent strands of literature: First, there is the literature on the economics of social capital which will be dealt with in some detail in section 2 below; secondly, there is the literature on the role of the middle class -or, more generally, of distribution- for economic development. Economic historians have long been emphasizing the importance of a large middle class for economic development. In a perspective dating back to German sociologist Max Weber (2003 [1905]), the middle class is a source of social norms and values that emphasize foregoing present consumption to save and invest, thus promoting capital accumulation and economic growth. More recently, Landes (1998) reflecting on England's leading role in the process of industrialization points out that the "ideal growth and development society"

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[2] See Acemoglu (2009), p. 22f.

[3] For a comprehensive overview of respective empirical results from growth accounting see Caselli (2005).

would be characterized, among other things, by "a relatively large middle class" (p. 217f.).[4] The role of different behavior of classes for economic growth was also analysed by J.M. Keynes and modern (Post-) Keynesian economists. Following the classical tradition, classes in Keynesian thinking are defined in accordance with their respective ownership of production factors: capitalists own capital goods used in production, rentiers own land and workers perform wage labor. J.M. Keynes noted the class structure of saving by advancing the view that household saving and consumption is determined by the interaction of disposable income and class-dependent propensities to consume among rentiers, capitalists and workers. In the present paper, individuals do not differ in their absolute ownership of factors; in particular, all private agents are assumed to be endowed with the same amount of physical capital. They only differ in their respective ownership *shares* in the economy's aggregate stock of capital and labor. Accordingly, the middle class is conceived in this paper not as a given entity with specific habits and economic interests, but is -instead- derived endogenously as those income groups who share with each other a set of social orientations that is homogenous enough to form the economy's social capital. Implicit in this conception is the idea that the middle class holds a particular set of values and orientations that distinguish it from both its poorer and wealthier counterparts.

In contrast to the approaches mentioned above, mainstream (neoclassical) economics has been virtually silent on the middle class for a long time. Only recently Easterly (2001) puts forward the existence of a middle-class consensus as a critical determinant of international development differences. Defining a "middle-class consensus" as a situation of relative equality and ethnic homogeneity, he goes on to show empirically that such a middle-class consensus facilitates higher levels of income and growth, as well as higher levels of public goods. Banerjee and Duflo (2008) provide the most recent attempt at finding defining characteristics of the middle class and discuss its economic role in today's developing countries.

Since "middle class" is -among other things- a distributive category, the present paper is also linked to the large literature on inequality and growth. A number of empirical cross-country studies find high inequality - measured in several studies by the income share of the middle class (quintiles 3 and 4) - linked to poor growth performances.[5] Since the emergence of Deininger's and Squire's (1996) new data set on income inequality the overall empirical evaluation of the effects of inequality on growth has become quite blurred, however.[6] Most of the theoretical literature so far has been

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[4] In the same vein, Adelman and Morris (1967, p.30) note that "in the economic development of Western Europe, the middle class were a driving force" and, accordingly, "the growth of a robust middle class remains of crucial importance in contemporary low-income nations".

[5] A survey and overall assessment of early studies can be found in Bénabou (1996).

[6] In particular, Forbes (2000) and Barro (2000) fundamentally challenge previous findings of a negative inequality-growth relationship. Note, however, that both Forbes (2000) and Barro (2000) use panel data and

focused on two sets of transmission channels between distribution and economic growth: First, there are *economic* channels, notably capital market imperfections (see e.g., Aghion and Bolton, 1997),[7] as well as inequality's effect on an economy's demand structure, innovation incentives (see Zweimüller, 2000; or Chatterjee and Raychaudhuri, 2004) and economic development (see Murphy *et al.*, 1989). In addition, there are *politico-economic* channels emphasizing how income inequality influences the balance of power in the political system in such a way as to generate pressure to the government to increase income redistribution that, in turn, reduces incentives and, thereby, slows down economic growth.[8] The present paper points to a third set of channels linking distribution and growth that has received much less attention in the literature: *socio-economic* transmission mechanisms.[9]

The present paper adds to the existing literature in three significant ways. First, it modifies the model set-up of Zak and Knack (2001) in which heterogeneous agents transact under asymmetric information, which gives rise to a moral hazard problem and economy-wide transaction costs, to allow for endogenous growth. Secondly, the present paper features an endogenous determination and identification of the middle class which can be distinguished both economically and culturally from the lower class (the "poor") and the upper class (the "rich"), respectively. Thirdly, it supplements the model's economic sector by an endogenous, rational-choice derivation of social integration and social capital building: An individual can choose to become an integral part of the society's networks of trust and mutual co-operation, thus making a positive contribution

estimation methods, thus removing county-specific effects and focusing on short-term intertemporal variations, while most of the previous empirical studies on inequality and growth focus on long-run growth effects of inequality. Furthermore, Deininger and Olinto (2000) find that even in Forbes' (2000) and Barro's (2000) econometric methodology wealth inequality, as measured by the distribution of land, still has a causal negative effect on growth. One possible way to reconcile the conflicting results is to argue that the impact of inequality on economic growth depends on the development stage (see Galor and Moav, 2004). Recent estimation results by Khalifa and El Hag (2010), for instance, suggest that there is, indeed, a statistically significant threshold income per capita, below which the relationship between inequality and growth is significantly negative and above which it is positive (but not statistically significant).

[7] Further seminal papers within this subset of theory include Galor and Zeira (1993); Banerjee and Newman (1993); and Bénabou (1996).

[8] Important contributions to this field of study include Bertola (1993); Alesina and Rodrik (1994) as well as Persson and Tabellini (1994). Perotti (1993), as well as Saint-Paul and Verdier (1993), combine asset market incompleteness with the politics of redistribution.

[9] Notable contributions to this field of study include Alesina and Perotti (1996), Benhabib and Rustichini (1996), as well as Knell (1999). According to the former two, inequality may lead to socio-political instability and may thus have a detrimental effect on economic growth. Knell (1999) considers the growth effects of inequality and status-seeking in a social comparison model with different degrees of status preferences for young and old individuals. The basic result is that the negative impact of inequality on growth is aggravated if individuals are more status-oriented.

to overall social capital. Alternatively, the individual can stay socially disintegrated, participate in the society's economic transactions but not contribute to the community's social capital, thus free-riding on others' investments in socio-structural resources. Within this formal framework, the present paper shows that, when the gap between the rich and the poor widens in a society, the size of the middle class whose members make positive contributions to the value of resources embedded in the society's informal relationships shrinks, while the share of social drop-outs in the population increases. The economy's social capital will be depressed which, in turn, increases economy-wide transaction costs and, thereby, slows down capital accumulation. As a result, inequality and economic growth are inversely related.

The rest of the paper proceeds as follows. Section 2 provides a definition of social capital and characterizes the concept by three particular features which are especially relevant for the current analysis. Sections 3 and 4 develop the formal framework of analysis, starting with decentral optimizing decisions of individual agents and then moving to aggregate variables describing macroeconomic behaviour and the economy's equilibrium growth path. Section 5 explores the effects of increased inequality on the economy's growth rate and section 6 concludes by providing a summary of results.

## 2.    ON THE ECONOMICS OF SOCIAL CAPITAL: A DEFINITION AND THREE CHARACTERISTICS

The fundamental cause of economic growth and development proposed in the present paper are resources embedded in social networks of mutual trust and co-operation that -among other things- provide an informal governance structure against opportunistic behavior and, thus, help to reduce transaction costs. The notion of *social capital* provides a useful umbrella term for these resources.[10] While the ideas associated with social capital have been frequently linked to growth and economic development, there has, so far, been relatively little formal modelling of this intertemporal connection.[11] Gradstein and Justman (2000) present a political economy framework in which public schooling contributes to economic growth not only by building human capital but also by instilling common norms that increase social cohesion (see also Gradstein and Justman, 2002). Chou (2006) proposes three models of social capital and growth in which social capital assists in the accumulation of human capital, affects financial development or facilitates innovation-related networking between firms. Dinda

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[10] The growing awareness among some (though not all) economists that 'society matters' is documented, for instance, by Durlauf (2002a) and the symposium he introduces. Temple and Johnson (1998) emphasize that society matters for growth for reasons other than trust or social capital; however, they also show that one of their indexes of "social capability" may be a useful proxy for social capital in developing countries.

[11] For a general survey of social capital from a growth perspective, see Durlauf and Fafchamps (2005).

(2008) studies the development of social capital through human capital formation that is created from productive consumption in an endogenous-growth framework; the hypothesis that social capital has significant impact on the income level and economic growth rate is also supported by his empirical findings.

How can social capital be defined more exactly, and what are its characteristics? There is no single universally accepted definition of social capital, but rather various approaches to the concept exist. For the purpose of this paper, I utilize a definition which is closely related to Coleman's (1988, 1990) original concept and define **social capital** as *the set of socio-structural (symbolic) resources – like values, norms, roles and moral obligations – that inhere in systems of social relations and that facilitate co-operative behaviour within or between these social aggregates.* This definition implies several characteristics of social capital, three of which are of particular relevance for the issues discussed in the present paper and will, therefore, be outlined more closely in the following:

*(i) Social capital exhibits public-good characteristics.* Coleman (1988, 1990), among others, emphasizes the public-good characteristics of socio-relational features that are useful to individuals for specific actions. As an attribute of the social structure in which a person is embedded, social capital is not the private property of any of the persons who benefit from it. Once provided, these collective assets and features can be utilized in a nonrival manner and are available to all members of the community, regardless of which members actually promote, sustain, or contribute to such resources (non-excludability).[12] Accordingly, many of the benefits of actions that bring social capital into being are experienced by persons other than the person so acting, i.e., there are positive externalities, and, thus, individual incentives to invest in social capital are systematically depressed.[13]

*(ii) Social capital is built as a by-product of various social activities typically sustained by individual investment of time and effort.* Even though social capital exhibits public good characteristics, many forms of social interactions and networks also either have intrinsic value or are inextricably intertwined with private, instrumental benefits for single agents.[14] As a result, most forms of social capital are built as a by-product of

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[12] An important example is honesty. If each community member is honest in commercial transactions, all of society benefits due to the reduction of the costs of doing business. Such cost reductions are characterized both by non-excludability and non-rivalness.

[13] Chou (2006) demonstrates analytically that the public-good aspects of social capital may lead to an underinvest-ment into the building of social capital and shows how a public-policy scheme may correct this resource under-allocation. For a systematic study on factors influencing individual social capital investment behavior, see also Shideler and Kraybill (2009).

[14] E.g., according to Burt (1992) benefits flowing from social networks may be identified not only in the form of *social* solidarity involving co-operation, a sense of social duty and indirect reciprocity, but also include two types of *private* benefits: information and influence (over one's own actions or that of others).

various social activities not necessarily undertaken with a view to strengthen social capital. Putnam (1993) gives the example that "members of Florentine choral societies participate because they like to sing, not because their participation strengthens the Tuscan social fabric".

*(iii) An essential part of the instrumental value of social capital lies in the fact that it reduces transaction costs by providing an informal governance structure against opportunistic behavior.* In a world of bounded rationality, positive transaction costs and imperfect foresight, contracts are necessarily incomplete, incompletely self-enforcing and incapable of dealing with all relevant aspects of human action and contingencies. Furthermore, there exist systematic incentives for opportunistic behavior both before (ex ante) and after (ex post) a transaction takes place. In such a setting, social capital can work to reduce transaction costs by embedding single economic transactions in a system of social relations, thus acting as an informal governance structure against opportunistic behavior.[15] Among other things, socio-structural resources that inhere in systems of social relations generate expectations, informal rules of thumb and common understandings that allow agents to conduct their personal interactions und business dealings efficiently. Well-developed networks are also likely to reduce transaction costs both by reducing search costs and by reinforcing compliance with group norms. Finally, the high levels of trust associated with social capital are critical for many transactions that take place "in the context of an individual forming expectations about actions of others that have a bearing on this individual's choice of action, when that action must be chosen before he or she can observe the actions of others" (Dasgupta, 2000, p. 330). A typical example of such a context is given by *credit markets*: Financial contracts represent an exchange of financial resources today for a promise to return more financial resources in the future. The nature of these activities implies risk-taking by market participants which is further aggravated by endemic informational asymmetries. As has been stressed by Ferrary (2003), agents in credit markets, therefore, not only rely on instrumental risk-evaluation methods, but also integrate social networks to accumulate social capital.[16]

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[15] See also Bowles and Gintis (2002) who argue that community governance can provide less costly solutions to various principal-agent and collective-goods problems than can markets or government interventions.

[16] By using regional data from Italy, Andriani (2010) confirms empirically that social capital is positively related to better credit-market performance.

## 3.   SOCIAL CAPITAL, TRANSACTION COSTS, AND ECONOMIC GROWTH: A SIMPLE MODEL

To illustrate the basic interactions between social capital, transaction costs and economic growth, the present paper utilizes the basic model set-up of Zak and Knack (2001).[17] Let us consider an economy with a continuum of infinitely-lived consumers who differ only in their respective ownership shares in the economy's aggregate stocks of capital and labor. Each consumer seeks to smooth his consumption over time by saving. However, to access the capital market consumers have to utilize investment brokers. Only the brokers can observe the actual return earned on an investment free of costs, which gives rise to a moral-hazard problem. The brokers' opportunity to cheat their clients is counteracted by three potential governance mechanisms: private (time and resources spent monitoring), governmental (formal institutions) and social ones (informal institutions).

The closed economy modelled below consists of four sectors of economic agents:[18] a sector of firms producing the economy's single good; an (implicit) government sector providing a governmental governance structure which is financed via lump-sum taxes paid by private households; a sector of heterogeneous infinitely-lived private consumers; and finally a sector of investment brokers who are distinct from consumers and identical to each other in all relevant respects. Economic agents interact on a goods market, a labor market and a capital market.

### 3.1.   Firms and Factor Payments

The key to endogenous growth of the modelled economy is the interaction of learning-by-doing and knowledge spillovers. According to Arrow (1962), the creation and adoption of knowledge is most closely related to experience. In particular, he considers a firm's investment a good measure for this firm's increase in experience and knowledge, since "each new machine produced and put into use is capable of changing the environment in which production takes place, so that learning takes place with continuous new stimuli" (Arrow, 1962, p. 157). Romer (1986) uses Arrow's set-up and combines it with the second key assumption that each firm's knowledge is a public good that any other firm can access at zero costs. In other words, once discovered, a piece of knowledge spills over instantly across the whole economy.

More formally, consider a neoclassical production function with labor-augmenting technology for firm $j$,

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[17] Zak and Knack (2001) do not, however, make use of an endogenous growth model, but employ a neoclassical production function.

[18] For an open-economy set-up which studies how growth is affected when credit relations suffer from the danger of moral hazard, see Broer (2007).

$$Y_j = F(K_j, W_j L_j), \tag{1}$$

where $Y_j$ denotes the firm's output which is a function of the firm's stock of physical capital, $K_j$, the firm's labor input, $L_j$, and the index of knowledge available to the firm. Function $F(\cdot)$ satisfies the usual neoclassical properties and physical capital depreciates at rate $\delta$ which is identical for all firms. Combining the assumptions of learning-by-doing and knowledge spillovers outlined above $A_j$ can be replaced by economy-wide capital $K$ in Equation (1). Assuming, furthermore, that the production function takes the Cobb-Douglas form, the production function for firm $j$ can be written as

$$Y_j = A_Y (K_j)^\alpha (KL_j)^{1-\alpha}, \quad 0 < \alpha < 1. \tag{2}$$

Let us assume that each firm is small enough to neglect its own contribution to the aggregate capital stock and therefore treats $K$ as given. Denote by $\tilde{y}_j := Y_j / L_j$, $\tilde{k}_j := K_j / L_j$, $\tilde{y} := Y / L$ and $\tilde{k} := K / L$ the usual intensive variables, where $L$ gives aggregate labor input. In equilibrium, all firms make the same choices, so that $\tilde{y}_j = \tilde{y}$ and $\tilde{k}_j = \tilde{k}$. Economy-wide production in intensive form is thus given by

$$\tilde{y} = A_Y \tilde{k}^\alpha K^{1-\alpha}, \tag{3}$$

and the average product of capital amounts to

$$\frac{\tilde{y}}{\tilde{k}} = A_Y L^{1-\alpha}. \tag{4}$$

According to (4), the average product of capital is increasing in the size of the aggregate labor input. On the other hand, this average input is invariant with respect to the capital stock $k$ because the learning-by-doing and spillover effects eliminate at the social level the diminishing returns to physical capital which each single firm faces.

Assuming, as usual, that each competitive firm takes factor prices as given, profit maximization and the zero-profit condition imply productive factor inputs to be paid their respective private marginal product:

$$r + \delta = \frac{\partial Y_j}{\partial K_j} = \alpha A_Y L^{1-\alpha}, \tag{5a}$$

$$w = \frac{\partial Y_j}{\partial L_j} = (1 - \alpha) A_Y K L^{-\alpha} , \tag{5b}$$

where $r$ denotes the net interest rate (rental price of capital) and $w$ is the wage rate per labor unit. The private marginal product of capital is invariant with respect to the capital stock, is less than the average product and is increasing in $L$.

### 3.2. Households and Factor Accumulation

The economy's household sector consists of a continuum of heterogeneous infinitely-lived consumers, indexed by $i \in [0,1]$, who differ only in their respective relative endowment with production factors labor, $h^i$, and capital, $k^i$. For analytical tractability, let us assume that all consumers are endowed with the same amount of physical capital, i.e., $\forall i; k_0^i = k_0$.[19] Thus at time $t$ they differ only in their individual endowments with the non-accumulated factor labor. The aggregate labor endowment of the economy is normalized to unity:

$$\forall t; \ H_t := \int_0^1 h_t^i di \equiv 1 .$$

Each individual can earn income from both capital and labor. However, to access the capital market consumers have to utilize investment brokers. Only the brokers are able to observe the actual return $r_t$ earned on an investment free of costs and, due to this informational asymmetry, they are able to appropriate a certain fraction of that return on investments. Consumers have access to an investment investigation technology:

$$\eta[e^i, p, S] : [0,1] \times R^{2+} \rightarrow [0,1] ,$$

with,

$$\partial \eta / \partial e^i > 0 , \ \ \partial \eta / \partial p > 0 \ \text{ and } \ \partial \eta / \partial S > 0 . \tag{6}$$

Technology (6) permits agents to determine the fealty of brokers in reporting investment income; it gives the fraction of the actual return to an investment that the consumer receives from his broker.

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[19] Since capital is an accumulated factor, individual capital stocks may, in principle, diverge over time; however, it will turn out that this is not the case in the present model.

That fraction is determined by three alternative governance structures against the broker's opportunism. First of all, a consumer can spend time and resources investigating her broker in order to reduce the broker's ability to cheat. This private governance structure can be thought of as either time or earned income spent gathering information to judge the comparative worthiness of investments, making contributions to private credit market organisations (such as credit bureaus or bond ratings services), writing detailed contingent contracts, enforcing incomplete contracts, etc. Given the current model's level of abstraction, both time and material resources spent can be represented by the fraction $e^i \leq h^i$ of her individual labor endowment that a private household $i$ devotes to investigate the actual return on her investments.[20] Secondly, formal institutions, provided by the government and funded by a lump-sum tax $\tau$ paid by consumers, seek to detect and punish cheating brokers; such formal institutions include: financial regulations (such as financial and non-financial disclosure requirements as well as anti-market abuse rules), investigative agencies that oversee brokers, and the judicial system that enforces contracts and prosecutes cheaters.[21] Let the effectiveness of such formal institutions be denoted by *p*. Finally, a broker's opportunism can be sanctioned by informal institutions. Sanctions due to informal institutions that constrain opportunism by agents include among other things: feelings of shame and guilt when violating social norms, anticipation of "afterlife sanctions" associated with religious beliefs, loss of reputation, as well as social exclusion. Such informal sanctions depend on, or are facilitated by, a system of social relations in which single economic transactions are embedded and that determines the rewards for co-operation or penalties for deviation. Accordingly, informal sanctions will be the more effective, the higher an economy's social capital *S*.

All three governance structures act to constrain the brokers' opportunism, thus partial derivatives in (6) are positive. Since, furthermore, the governance structures are alternatives to each other, let us assume that second-order cross partial derivatives are negative.[22]

An agent allocates her labor endowment either to investigating her broker or working in goods production. Accordingly, at any point in time *t*, labor supply of

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[20] In terms of lost consumption opportunities -and, thus, welfare- there is no real difference between income lost due to time spent investigating instead of working (opportunity costs), on the one hand, and earned income spent on material resources to investigate one's broker on the other hand.

[21] For more detailed studies on the key role played by the quality of institutions in explaining long-run economic performance and development see, among others, Tebaldi and Elmslie (2008) as well as Lobsiger and Zahner (2012).

[22] The analysis by Bartolini and Bonatti (2008) is, in a similar way, based on the fact that alternative governance mechanisms can be substituted for one another - albeit with strikingly different results: In their model, when society reacts to a decline in social capital by spending more to protect property and enforce contracts, this substitution may actually result in a higher GDP level.

consumer $i$, $l^i$, is restricted by

$$e_t^i + l_t^i \leq h_t^i . \tag{7}$$

After-tax income of consumer $i$ is thus given by

$$y_t^i = w_t(h_t^i - e_t^i) + r_t \eta_t [e_t^i, p_t, S_t] k_t^i - \tau_t . \tag{8}$$

Let us assume that all individuals have the same CIES utility function. Allocative decisions of the $i$th individual are determined by solving the following problem:

$$\underset{c_t^i, e_t^i}{Max\ U^i} = \int_0^\infty \frac{(c_t^i)^{1-\theta} - 1}{1-\theta} e^{-\rho t} dt ,$$

s.t.: 
$$\dot{k}_t^i := \frac{dk_t^i}{dt} = w(h_t^i - e_t^i) + \eta_t^i [e_t^i, p_t, S_t] r_t k_t^i - c_t^i - \tau_t , \tag{P1}$$

where $\theta > 0$, so that the elasticity of marginal utility with respect to consumption equals the constant $-\theta$, and $\rho > 0$ is the subjective discount rate (or rate of time preference). The necessary and sufficient conditions for a consumer optimum are

$$\frac{\dot{c}_t^i}{c_t^i} = \frac{1}{\theta}(\eta_t^i r_t - \rho) , \tag{9}$$

$$w_t = \frac{\partial \eta_t^i}{\partial e_t^i} r_t k_t^i . \tag{10}$$

Equation (9) is a standard Ramsey rule of optimal savings with the expected net yield on savings being $\eta_t^i r_t$. According to (10), the utility-maximizing allocation of individual labor input balances the marginal income earned by working with the extra income one can generate by investigating one's broker.

Since individual endowment with physical capital is the same for all consumers, Equation (10) implies that in $t = 0$ all consumers make identical choices of "investigative labor", $e_0^{i*}$. Taken (6) into account, it then follows from (9) that individual growth rates of consumption at time 0 are also the same for all consumers. Furthermore, using the households flow budget constraint in (P1) along with the

transversality condition of (P1), one can show that all individuals in $t = 0$ accumulate capital at that very same rate.[23] Thus, interindividual identity of capital endowments is preserved over time and we have for any later point in time:

$$\forall t; \ k_t^i = k_t, e_t^{i*} = e_t, \eta_t^i = \eta_t .$$

### 3.3. Investment Brokers

As mentioned above, to access credit markets consumers must utilize investment brokers who are distributed over the same interval but are distinct from consumers. Brokers take a portion of the investment principle and interest as their wage $w^I$. For simplicity, brokers are assumed to be risk neutral and do not save. Consumption of a representative investment broker in $t$ is, thus, given by

$$c_t^I = w_t^I = \{1 - \eta_t[e_t, p_t, S_t]\} r_t k_t . \tag{11}$$

### 3.4. Equilibrium Growth Path

For the labor market to clear in any given period, overall labor input into goods production must equal the sum of individual labor supplies:

$$L_t = \int_0^1 l_t^i di = \int_0^1 (h_t^i - e_t^{i*}) di = H_t - \int_0^1 e_t^{i*} di = 1 - e_t . \tag{12}$$

Equilibrium in the capital market requires:

$$K_t = \int_0^1 k_t^i di = k_t = \tilde{k}_t (1 - e_t) . \tag{13}$$

With population normalized to unity, economy-wide and individual capital stocks coincide, i.e., $k_t = K_t$. Utilizing this normalization, as well as factor payment rules (5), (10) can be written as

$$\frac{\partial \eta_t}{\partial e_t} (1 - e_t) = \frac{1 - \alpha}{\alpha} . \tag{14}$$

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[23] See Barro and Sala-i-Martin (1995, p. 142f, 149) for a formal derivation of this result in a learning-by-doing model with knowledge spillovers and homogenous consumers.

For any constant values of $p_t$ and $S_t$, labor spent by each consumer on investigating her broker is also invariant over time. Let us assume from now on that both the effectiveness of public governance structures $p$ and the economy's social capital $S$ are indeed constant over time. Accordingly, the economy's growth rate is given by:

*Proposition 1.   Long-Term Growth*

For a given level of social capital, economy-wide output, physical capital stock and consumption all grow at the common and time-invariant rate of

$$\gamma: \frac{\dot{Y}}{Y} = \frac{\dot{K}}{K} = \frac{\dot{C}}{C} = \frac{1}{\theta}(\alpha A_Y \eta (1-e)^{1-\alpha} - \delta - \rho). \tag{15}$$

*Proof.*

Acording to (9), dynamic evolution of consumption and physical capital stock of any individual consumer is characterized by the following growth rate

$$\forall i; \quad \frac{\dot{k}_t^i}{k_t^i} = \frac{\dot{c}_t^i}{c_t^i} = \frac{1}{\theta}(r_t \eta_t - \rho). $$

As this growth rate is the same for all consumers, economy-wide consumption and physical capital stock, as well as aggregate goods production, also grow at this rate. Taking into account (5a) and the time-invariance derived above, one finally ends up with (15).                                                                                    Q.**E.D.**

According to (15), the economic growth rate is the higher, the higher is the fraction $\eta$ of the actual return to an investment that the consumer receives from his broker and the less labor $e$ consumers have to spend on investigating their brokers.

## 3.5.  Transaction Costs

The model economy presented so far implies a simple measure of the economy's overall *transaction costs* caused by asymmetric information and opportunistic behavior in the capital market. Economy-wide transaction costs can be expressed as the aggregate amount of labor that agents spend on verifying their brokers' actions. That is, aggregate transaction costs are given by

$$TC_t = 1 - L_t = \int_0^1 e_t^{i*} di = e. \tag{16}$$

## 4.   SOCIAL CAPITAL, INEQUALITY AND MIDDLE-CLASS CONSENSUS

### 4.1.   Social Capital

In order to formalize the intuitive ideas presented in section 2, let us assume that at time $t$ an economy's social capital, $S_t$, simply consists of the sum of symbolic resources, $s_t$, that each of its individual members is willing to contribute to the social structure:

$$S_t = \int_0^1 s_t^i di \, . \tag{17}$$

Due to the public-good characteristics of social capital, no individual has an incentive to directly invest time and/or effort in its accumulation. However, every individual rationally decides whether she wants to become an integral part of the social community sharing a general social orientation (norms, values, language, culture, etc.) or not. If an individual opts for social disintegration she does not actively promote or sustain social interactions and networks and, thus, does not contribute to the economy's social capital. If, instead, an individual chooses to become an active part of the society's networks of trust and co-operation, she makes a positive contribution to the value of resources embedded in these social aggregates.[24] Accordingly, social capital produced by any consumer $i$ is given by

$$s_t^i \begin{cases} = 0, & \text{if } i \text{ is socially disintegrated}, \\ > 0, & \text{if } i \text{ is socially integrated}. \end{cases}$$

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[24] Clearly, this set-up is one of the more unrealistic assumptions about social behavior employed in the present paper. Generally speaking, social disintegration can also be either a two-sided process or enforced in an authority relation upon the weaker party (e.g., an ethnic minority) by the stronger party (ethnic majority). The individual investment approach taken in this paper is primarily motivated by the wish to keep the model both within the rational-choice paradigm and, more importantly, analytically solvable. The essential result of the approach taken, namely that social integration depends on a certain degree of homogeneity in community members and social orientations, possesses, however, a much more general validity: Empirically it is well established that both the relative similarity of group members and similarity in attitudes are positively associated with increased social integration and promote group cohesion significantly; some support for the association between social integration and similarity in demographic attributes such as race, age, and education is also available (see O'Reilly, Caldwell and Barnett (1989) and the literature cited therein).

### 4.2. Individual Integration Decision

Every consumer bases her rational-choice decision on whether to socially integrate or dissociate herself on a comparison of her own advantages and disadvantages. On the one hand, being part of a community with shared norms, values, language, etc. will improve one's own happiness and well-being.[25] To keep the exposition tractable, let us simply assume that social integration gives any individual member of society a "warm-glow" utility denoted by the strictly positive constant $u_S^+ > 0$. On the other hand, however, social integration does not come without costs. For one to become an integral part of the community, one has to adapt oneself to the group's common attitudes and social orientation which, probably, will deviate from one's own. In terms of Coleman (1990)'s rational-choice sociology, by joining a social community an individual gives up the rights to control certain of her own actions and transfers these rights to the collectivity. This transfer of rights imposes costs on the individual which are indicated by the difference between the utility level actually secured and the level which would have been secured under full maintenance of individual rights to control one's own actions. As outlined in Coleman (1990, p. 234f.), these costs will be all the higher, the less the individual's preferred behavior is congruent with the community's prevalent norms or expectations. Since, in the model above, individuals differ only with respect to their labor endowments, it is natural to assume that individual social orientation is (perfectly) correlated with this individual labor endowment. Accordingly, the cultural distance between consumer $i$ and the community's social orientation is measured by $\left| \overline{h} - h^i \right|$, where

$$\overline{h} := \int_0^1 h^i \, di = H \equiv 1 \, ,$$

denotes the community members' average labor endowment. Furthermore, Coleman (1990)'s reasoning implies that the larger this distance, the higher is individual $i$'s disutility from social integration, as indicated by the following disutility function:

$$d_S^i = d_S(\overline{h}, h^i) \, , \tag{18}$$

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[25] With reference to empirical studies on the association between supportive relationships and self-reported happiness and well-being, Putnam (2000, p. 332) sums up that "in study after study, people themselves report that good relationships with family members, friends, or romantic partners - far more than money or fame - are prerequisites for their happiness".

where $d_S(\bar{h},\bar{h})=0$, $\dfrac{\partial d_S}{\partial|\bar{h}-h^i|}\geq 0$, $\lim\limits_{h^i\to 0}d_S^i(\bar{h},h^i)=\infty$, $\lim\limits_{h^i\to\infty}d_S^i(\bar{h},h^i)=\infty$.[26]

According to (18), anyone with labor endowment equal to average will be able to comply to the social reference norm without any loss of individual well-being. On the other hand, any individual with $h^i\neq\bar{h}$ will still be allowed to join the community, but will suffer from her non-compliance with the social norms. Therefore, her adherence to the community's social orientation comes at a loss of individual well-being. While still enjoying the warm-glow effect of being a part of a community, non-average individuals, thus, have to weigh $u_S^+$ against the disutility $d_S^i$ caused by their social integration. For any individual *i*, overall net utility from social integration will be given by

$$u_S^i = u_S^+ - d_S^i,$$

and agent *i* chooses social integration as long as her net utility is positive.

Given the assumptions made about (18), there exist exactly two critical values, denoted by $h^{\underline{j}}<\bar{h}$ and $h^{\bar{j}}>\bar{h}$, respectively, for which the respective consumer will be just indifferent between social integration and social disintegration, for which in other words

$$u_S^+ = d_S(\bar{h},h^{\underline{j}}) = d_S(\bar{h},h^{\bar{j}}).\tag{19}$$

All individuals with labor endowment between $h^{\underline{j}}$ and $h^{\bar{j}}$ constitute the society's middle class: They share a common set of relatively homogenous social orientations ("middle class consensus") and actively engage in social interactions and networking, thus making a positive contribution to the economy's social capital. On the other hand, individuals with labor endowment below $h^{\underline{j}}$ ("lower class") or above $h^{\bar{j}}$ ("upper class") opt for social dissociation. They participate in the society's economic transactions, but they do not contribute to the community's social capital. Due to the public-goods aspects of social capital, they are, nevertheless, able to capture the instrumental benefits of economy-wide social capital, thus free-riding on others' investments in socio-structural resources.

### 4.3.  Inequality and Social Capital

The continuum of individuals is defined over the interval [0,1]. Therefore, the

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[26] A similar disutility function can be found in Gradstein and Justman (2000) refering to the cultural distance between parents and child in an ethnically divided society with public schooling.

fraction $j$ of consumers who are socially disintegrated can be expressed in terms of the value of the cumulative distribution function of the variable $h^i$, denoted by $F_h(\cdot)$, as

$$j = \underline{j} + (1 - \bar{j}) = F_h(h^{\underline{j}}) + (1 - F_h(h^{\bar{j}})) . \tag{20}$$

Due to this simple relationship, the effects of an increase in income inequality on an economy's social capital can be derived as:

*Lemma 1.*

A more unequal distribution, in the sense of a simple mean-preserving spread in $h^i$, is associated with a shrinking middle class, while the share of the population that does not contribute to the economy's socio-structural resources increases. Accordingly, a more unequal distribution lowers economy-wide social capital.

*Proof.*   See appendix.                                                                 **Q.E.D.**

The proposition that growing inequality of income and wealth leads to a decline in social capital finds some support in the empirical literature: Knack and Keefer (1997), Knack (1999) and Zak and Knack (2001) all find trust and income equality to be positively correlated at the cross-country level. Using US state-level data, Kawachi *et al*. (1997) also argue that income inequality lowers social capital. Based on a broad survey of relevant empirical studies, Putnam (2000, p. 359) concludes that "both across space and across time, equality and fraternity are strongly positively correlated"; he goes on to claim that the recent decline in social capital in the US is linked to growing inequality of income and wealth.[27]

## 5.   INEQUALITY AND INTERTEMPORAL ALLOCATION

As shown by Lemma 1, the share of socially disintegrated consumers and, thus, the size of the middle class depend on the extent of inequality prevalent in an economy. Therefore, a simple mean-preserving spread in the distribution of labor endowments influences the economy's growth rate by its adverse effect on social capital:

*Proposition 2.    Growth Effects of Inequality*

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[27] See, however, Durlauf (2002b) for a general warning that much of the statistical evidence produced in empirical studies on social capital is somewhat problematic and that there are limits to what can be learned about social capital from conventional data sources.

An increase in inequality reduces social capital, increases economy-wide transaction costs and, thus, lowers an economy's growth rate.

*Proof.*

According to (15), an economy's growth rate is given by

$$\gamma = \frac{1}{\theta}(\alpha A_Y \eta(1-e)^{1-\alpha} - \delta - \rho),$$

where, according to (16), $e$ depicts aggregate transaction costs. None of the determinants of the economic growth rate depends on the economy's distribution in a direct manner. However, both variable $e$ and the value of function $\eta[e, p, S]$ are dependent on social capital, the value of which, in turn, depends on the inequality in the distribution of labor endowments. Thus, we have

$$\frac{\partial \gamma}{\partial \sigma_h^2} = \frac{1}{\theta}\alpha A_Y \left\{ \eta[e,p,S](1-\alpha)(1-e)^{-\alpha}\left(-\frac{\partial e}{\partial \sigma_h^2}\right) + \frac{\partial \eta[e,p,S]}{\partial \sigma_h^2}(1-e)^{1-\alpha} \right\},$$

where $\dfrac{\partial e}{\partial \sigma_h^2} = \dfrac{\partial e}{\partial S}\dfrac{\partial S}{\partial \sigma_h^2}$, and $\dfrac{\partial \eta}{\partial \sigma_h^2} = \dfrac{\partial \eta}{\partial S}\dfrac{\partial S}{\partial \sigma_h^2}$.

According to *Lemma 1*, $\partial S / \partial \sigma_h^2 < 0$. Furthermore, it has been assumed above that $\partial \eta / \partial S > 0$. Implicitly differentiating optimality condition (10), the effect of social capital on the optimal individual amount of labor allocated to investigation follows as

$$\frac{\partial e}{\partial S} = \frac{\partial^2 \eta \big/ \partial e \partial S}{\partial^2 \eta \big/ \partial e^2} < 0.$$

Therefore, it follows that $\partial e / \partial \sigma_h^2 > 0$, $\partial \eta / \partial \sigma_h^2 < 0$, and, finally, $\partial \gamma / \partial \sigma_h^2 < 0$. **Q.E.D.**

The economy's growth rate is reduced by higher inequality due to the following socio-economic mechanism: A mean-preserving spread in the distribution of individual labor endowments widens the cultural gap between the rich and the poor in a society. Accordingly, for a higher fraction of individuals the costs of compliance with the community's norms outweighs the advantages of social integration. Therefore, the size of the middle class whose members make positive contributions to the value of resources embedded in the society's networks shrinks, while the share of social drop-outs in the population increases. As a result, the economy's overall social capital is depressed. The

reduced level of social capital, in turn, reduces the effectiveness of informal governance structures against opportunistic behavior and, thus, lowers the economy's growth rate via two channels: First, economy-wide transaction costs rise because individual consumers try to compensate the lowered effectiveness of social governance structures by increasing the amount of labor they allocate to their own investigations. This reallocation of labor induces a fall in the marginal productivity of physical capital and, thus, the economy's growth rate. Since, furthermore, the increase in private investigation against opportunistic behavior is only an imperfect substitute for the role of social capital as an informal governance structure, the effective yield on savings that the consumers receive is lowered. Households' savings and the rate of private capital accumulation are, therefore, reduced, which is also detrimental to economic growth.


## 6.   CONCLUSION

This paper has analyzed a neoclassical endogenous-growth model which conceives of household consumption and saving as resulting from the rational choices of heterogeneous agents facing a moral-hazard problem on the credit market. In the model's set-up, only financial intermediaries (investment brokers) are able to observe the actual return earned on a household's investment free of costs. The resulting brokers' opportunity to cheat their clients is counteracted by three potential governance mechanisms: private, governmental (formal institutions) and social ones (informal institutions). Private households are assumed to differ in their respective ownership shares in the economy's aggregate stock of capital and labor. The economy's middle class is conceived as consisting of those individuals who share with each other a sufficiently homogenous set of social orientations (though not necessarily economic interests); the size of this middle class is derived endogenously. Social capital amounts to the sum of symbolic resources each individual member of society voluntarily contributes to the overall social structure. It is assumed that each individual rationally chooses whether she wants to become an active part of the society's middle-class networks of trust and mutual co-operation, thus making a positive contribution to overall social capital. Alternatively, the individual can socially dissociate herself, participate in the society's economic transactions, but not contribute to the community's social capital. In this set-up, an increase in inequality, as measured by a simple mean-preserving spread in individual labor endowments, is associated with a shrinking middle class and has been shown to depress the community's social capital. These developments, in turn, weaken the informal social governance system and increase economy-wide transaction costs. As a result, a more unequal distribution lowers the economy's rate of capital accumulation and growth.

The results obtained rely -without doubt- on some assumptions that drastically abstract from reality. Two qualifications of above conclusions seem particularly relevant and point to possible future research: First of all, the paper addresses both income

inequality and credit-market imperfections but provides no analysis of the potentially resulting instability of modern financial systems. As has been emphasized by modern Keynesian economist, in particular Hyman P. Minsky (1982), the interaction between corporate debt and/or rising household indebtedness, on one side, and investment spending (capital accumulation) as well as the dynamics of different classes' income shares, on the other side, establishes a fundamental link between inequality of incomes and financial instability.[28] Therefore, one of the most promising avenues for further research is to expand the current model formally and take into account such mechanisms that link income inequality to the financial fragility of contemporary economies. Secondly, as mentioned above, to represent social disintegration as an individual rational-choice act is one of the more unrealistic assumptions about social behavior employed in the present paper. Thus, in future research some feedback effect from aggregate social capital to individual behavior should be taken into account. Such an addition would render the current model analytically intractable, but it may well serve, in a different context, to generate interesting growth dynamics.

All in all, the above analysis -while itself fairly restrictive- serves to illustrate two points of more general validity. First, the existence of a broad middle class the members of which share with each other a fairly homogenous set of social orientations ("middle-class consensus") and the social capital built by social interactions and informal relationships within this middle class are important determinants of economic growth and development. Secondly, in addition to economic and politico-economic transmission channels mediating the relationship between distribution and growth, there also exist *socio-economic* ones. As mentioned before, the specific transmission mechanism demonstrated in the present paper should be seen as merely one of several channels through which social structures fundamentally determine economic growth and development – channels remaining to be further elaborated on in future research.


## APPENDIX


*Proof of Lemma 1.*


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[28] Jarsulic (1988) develops a Keynes-Kalecki model of accumulation and growth with debt in which income distribution plays a crucial role with respect to financial instability. See also Delli Gatti and Gallegati (1990) as well as Palley (1996). Furthermore, Shahbaz and Islam (2011) examine the relationship between financial development and income inequality and find, among other things, that while financial development reduces income inequality, financial instability aggravates it.

Let $F_h^1$ and $F_h^2$ be two distribution functions of the random variable $h^i$. Furthermore, let $F_h^2$ differ from $F_h^1$ by a simple mean-preserving spread (as defined in Rothschild and Stiglitz, 1970). This is equivalent to saying that both distributions have the same mean and in addition $\exists \hat{h}^i$ such that $\forall h^i \leq \hat{h}^i$, $F_h^1(h^i) \leq F_h^2(h^i)$, and $\forall h^i \geq \hat{h}^i$, $F_h^1(h^i) \geq F_h^2(h^i)$ (single crossing property). For analytical simplicity, let us assume that the single crossing occurs somewhere in the open interval $\left] h^{\underline{j}}, h^{\bar{j}} \right[$. Then, the single crossing property of a simple mean-preserving spread implies that

$$\underline{j}^1 := F_h^1(h^{\underline{j}}) \leq \underline{j}^2 := F_h^2(h^{\underline{j}}),$$

while $\bar{j}^1 := F_h^1(h^{\bar{j}}) \geq \bar{j}^2 := F_h^2(h^{\bar{j}})$.

According to (17), economy-wide social capital is given by:

$$S = \int_0^1 s^i \, di = \int_{\underline{j}}^{\bar{j}} s^i \, di .$$

Therefore, for any simple mean-preserving spread, we have

$$S^1 := \int_{\underline{j}^1}^{\bar{j}^1} s^i \, di > S^2 := \int_{\underline{j}^2}^{\bar{j}^2} s^i \, di . \qquad\qquad \text{Q.E.D.}$$

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*Mailing Address: Stefan D. Josten, Professur für Finanzwissenschaft und Soziale Sicherungs-systeme, Fakultät fur WOW, Universitat der Bundeswehr München, Werner-Heisenberg-Weg 39, D-85577 Neubiberg, Germany. Tel: 49 89 6004 2334.Fax: 49 89 6004 4228. E-mail: stefan.josten@unibw.de.*