The relationship between democracy and growth has been extensively debated by a number of scholars, and while the number of studies on the growth effects of democracy grows, the picture seems to get increasingly blurred, not clear: in contrast to earlier findings, most of the results presented through the 1990s (but all covering earlier data) showed no or even a negative effect of democracy on growth. Through all these studies, democracy has been discussed only as a single variable concept, often controlling for other societal measures as human capital or political stability. But as we know (and the data show), democratic institutions give rise to a number of societal developments, including education and political conflict resolution, which may foster economic development as well.

The paper studies these indirect effects of democracy. Using a simultaneous-equations-estimation, we study the indirect effects of democracy through the accumulation of human and social capital.

* While working on this paper the authors received helpful remarks and hints from Mark Herkenrath, Andreas Kuhn, Sandra Rothböck, Christian Suter, Thomas Volken-Reinert, and seminar participants at the Sociological Institute. Nevertheless, we keep the sole responsibility for remaining errors.

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Our findings show considerable indirect effects on economic development and on the rate of adoption of new technologies.

I. Introduction and Overview

Is democracy good for growth? The debate on this issue is not new, not only among scholars since interested parties have been engaged in it. For example, in an often-quoted reference, Mr. Lee Kuan Yew in May 1962 described the Royal Society of International Affairs his opinion about the relative efficiency of democratic institutions compared to his own decision-making:

"If I were in authority in Singapore indefinitely without having to ask those who are being governed whether they like what is being done, then, I have not the slightest doubt that I could govern much more effectively in their own interests".

And, with Mr. Lee Kuan Yew as its highest official for almost the entire forty years in-between, Singapore enjoyed about the highest growth ever in the entire world. So, if one is heading for growth, are democratic institutions to be avoided?

In order to reach general conclusions, empirical evidence should not rest on single cases. Consequently, over the last decades numerous cross-national studies have been undertaken addressing the issue. However, the results of the more than 30 studies are ambiguous. When we enter this seemingly over-studied field, we like to give a fresh impetus to it. We argue that the so far inconclusive results are due to a flawed research design. Relating democracy directly to economic growth — in a Barro type of ad hoc regressions (see Barro 1996) — does not make sense at all. Necessarily, the channels through which democracy as a set of political practices affects economic growth must be indirect, be it via institutional outcomes or via empowering people. Such outcomes affect investors and workers and through this economic development.

Therefore, we explicitly specify indirect paths through which democracy as a set of institutional practices may effect economic development and focus in this paper on two
forms of capital formation: at the individual level as well as at the social level (see figure 1). These two forms of capital — which we operationalize with education (as human capital) and generalized trust in the population (as an enabler of social capital formation) — are thought of as being especially sensitive to different political systems. This is not to say that physical capital formation is not affected by political structures and outcomes — indeed our previous research suggest that it is \(^1\) — but the focus of the present study are human capital and social capital as mediators. We control physical capital formation when we estimate the effects of human and social capital on economic development.

Differing from previous work, we do not only explicitly specify indirect effects of democracy but also consider two different measures for the final outcome, i.e., economic development. The first indicator is the sheer economic growth rate of the per capita

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\(^1\) Bornschier and Gmunder have specified and estimated a model linking democracy to socio-political stability, which itself affects physical investment as an important predictor of economic growth. This is clear evidence from a world sample of 78 countries that democracy indirectly affects growth via conflict and investment (see Bornschier 2002: 407-413).
product — which has so far been the standard measure — and the second is a new measure, i.e., that of techno-economic change. For two decades the world economy is witnessing the transition to a new techno-economic paradigm or style clustering around telematics — information and telecommunication — (see Perez 1983, 1985; Freeman 1992; Bornschier 1988, 1996; Bornschier and Chase-Dunn 1999; Lipsey 1999; Rennstich 2002). The new technological style will be the basis of future economic growth opportunities. Until now, however, quite remarkable different advances in the diffusion of this new social arrangement can be observed in comparing societies — also after controlling the level of material development (see Bornschier 2000a, 2001a; and Rennstich 2002, for more details). This variable transition to the telematics era is our second measure of economic development, termed techno-economic change.

Figure 1 summarizes our indirect design linking democracy to both economic growth and techno-economic change. And it also depicts six relationships we are going to analyze in this paper. These paths refer to the one from democracy to human (I) and social (IV) capital formation, and from these towards growth (II and V) and towards economic change (II and VI). Data availability determines the estimating and control procedures for the different paths. On the human linkage path (education) the availability of panel data allows to go beyond long term averages. The panels with yearly observations make it necessary to control fluctuations due to the business cycle which yields interesting novel results. On the social capital linkage path we concentrate on the measure of generalized trust (as an enabler of social capital formation, see Bornschier 2000b) which received not only great interest over the last dozen years, but yielded meanwhile robust results as a predictor of economic growth and techno-economic change (see the references of previous findings in the appropriate section).

The paper is organized as follows: We will give a brief overview over the existing, especially empirical literature (section 2), outline briefly the suggested causal mechanisms (section 3), discuss the available data (section 4) and the methodological

2) See Bornschier 2000a, 2001 for explaining techno-economic change with generalized trust and education in a cross-section of 34 countries.
issues of direct and indirect effects (section 5). Sections 6 and 7 will then present our empirical evidence for the two linkage paths, and section 8 concludes.

We find democracy related to both human capital (education) and social capital (generalized trust). These are novel findings. Furthermore, as in previous work we find human capital and social capital related to both economic growth and techno-economic change on which future growth will rest. Therefore, we conclude, that democracy is indirectly fostering economic growth and change. These novel findings contribute to a better understanding since such indirect effects have been missed by previous cross-nation research on the consequences of democracy as a political practice.

Due to limitation of space we cannot discuss in this paper the concept of democracy. We follow the conventional understanding of a multidimensional concept including pluralism, participation, responsibility of incumbents, and civil rights (see Bornschier 2002: chap. 13.1; Scholtz 2002 forthcoming). Among the many writings on democracy we would like to point to Robert Dahl’s (1971) classical statement.

II. A Review of the Literature

1. New Growth Theory, New Economic Sociology and Political institutions

Since we have economic growth and change as dependent variables let us briefly touch the classical and new growth theory in economics and the new economic sociology.

The discussion in economics through the 1960s and 1970s was dominated by the classical Solow model of growth: It predicts growth along an asymptotic path towards a steady state, implying that wealthy nations with high capital-labor ratios grow slower than late-comers with less capital, implying a worldwide convergence in income level (Solow 1956). Barro and Sala-i-Martin (1992, 1995, Sala-i-Martin 1994) and others

3) for introductions see macroeconomics textbooks as Mankiw (1992).
have stated that this convergence is remarkably stable at a rate of 2 percent per year. But these results are obtained using "rather crude cross-section regressions", while other end-1990s-estimations range between zero and 30 percent per year (Temple 1999: 134).

At the other end of the spectrum Romer (1986) stated theoretically that given country-wide increasing returns may very well account for steady-state differences in the growth levels of different nations, and provided empirical evidence for this position. This idea allows to incorporate weak or even non-convergence into a growth-theoretical framework.

The idea of nation-wide increasing returns can easily be widened to incorporate social and political factors. Among these, the question of political institutions has found a lot of empirical interest, not least "because they lend themselves to measurement more easily, and because the lines of causation are better understood" (Temple 199: 146). In his survey on the new theoretical evidence on growth, Jonathan Temple even uses political institutions as an example for the econometric problems of growth regressions: "even if the endogeneity problem is solved, perhaps [...] the political regime affects both growth and [...] like schooling" (1999: 129).

The economic sociology program since the classical writings is quite straightforward: economic structures and processes are part of the larger social system. The implied notion of embeddedness in this classical program was first spelled out by Karl Polanyi (1944). And it was Mark Granovetter (1985; see also 2000) who made the metaphor of embeddedness to the issue of what he called 'new' economic sociology. Economic sociology has modelled the impact of political and social factors on economic processes in three different ways.

(i) Political and social factors determine the availability and amount of factors of production. The reasoning is the following: society and politics produce and reproduce social traits which explain the availability of factors of production and thus indirectly influence the outcome in the economy.

(ii) Political and social factors influence the way how, and how effectively, factors of production are used. Social characteristics like socio-cultural orientations (generalized trust and tolerance) or socio-institutional practices of cooperative economic institutions
differently affect, for example, transaction costs and thus determine how effective factors of production are used and how thereby economic growth is affected.

(iii) Political and social factors together with economic factors determine jointly socio-political and socio-economic change. An example are the joint effects of the politico-institutional and the techno-economical subsystem on technological change, as modeled first by Carlota Perez (for a recent formulation, see Bornschier 2001a). While (i) and (ii) model reasons for differences in growth, (iii) explains change with a dynamic theory.

In short, we propose that the effects of the political system in which economic processes are embedded, makes the difference. And this is in line with both recent developments in economic growth theory as well as with the new economic sociology.

2. The Controversial Evidence on Growth and Institutions

Since the early 1970s, more than 30 studies were performed to investigate democracy's role for development (Bornschier 2002: 406 f.). A majority of the studies, about 60%, find no statistically significant effect. Among the minority of 40% of the studies which find a significant effect, a positive effect clearly prevails (ratio 7 to 3). In sheer quantitative terms of available results the question seems to be settled: the political system in which economic processes are embedded does not seem to have an effect on outcomes in terms of growth. Yet, such a conclusion is too premature since many studies include in their growth regression not only democracy measures but variables through which democracy may affect growth, too. It is therefore statistically quite understandable that effects that are mediated lose (all or part of) their direct impact once the mediator variables are included in the regression.

In Table 1 we list a subsample of available studies,4) i.e., the more recent ones, and classify them according to some characteristics to find out possible causes for the controversial findings.

4) based on Martin/Plumper (2001) and own analyses.
Table 1. Differential results in the literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Operationalisation of democracy</th>
<th>Result</th>
<th>GDP (-1)</th>
<th>Investment</th>
<th>Human capital</th>
<th>Inequality</th>
<th>Political stability</th>
<th>Institutions</th>
<th>Government expenditure</th>
<th>Inflation</th>
<th>Openness</th>
<th>Colonial Heritage</th>
<th>Others</th>
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<tr>
<td>Scully</td>
<td>Gastil</td>
<td>+</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>growth(-1)</td>
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<tr>
<td>Knack/Keefer</td>
<td>Gastil</td>
<td>+</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x Unions, economic system</td>
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<tr>
<td>Leblang</td>
<td>Polity II</td>
<td>+</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>period effects</td>
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<tr>
<td>Pourgerami 1988</td>
<td>Amnesty</td>
<td>+</td>
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<td></td>
<td></td>
<td></td>
<td>FDI; military; media;</td>
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<tr>
<td>Kormendi/Meguire</td>
<td>Gastil (+)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>heterogeneity</td>
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<tr>
<td>Grier/Tullock</td>
<td>Gastil (&gt;0)</td>
<td>x</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>economic structure</td>
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<tr>
<td>Marsh</td>
<td>Gastil</td>
<td>0</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<td></td>
<td></td>
<td>life expectancy</td>
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<tr>
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<td>Gastil</td>
<td>0</td>
<td>x</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>terms of trade, BMP</td>
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<tr>
<td>Helliwell</td>
<td>Gast/Boll</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x BMP, oil</td>
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<tr>
<td>Alesina/Rodrick</td>
<td>Fields</td>
<td>0</td>
<td>x</td>
<td>x</td>
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<td></td>
<td>Military</td>
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<tr>
<td>Barro/Sala-I-Martin</td>
<td>PolII/Gast</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td></td>
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<td>Durham</td>
<td>Eff. Parties</td>
<td>0</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Barro</td>
<td>Gast/Boll (-)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Obinger</td>
<td>Jagg/Gurr</td>
<td>x</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>Martin/Plümper</td>
<td>Jagg/Gurr</td>
<td>x</td>
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<tr>
<td>Feng</td>
<td>PolII/Boll</td>
<td>6</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
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<td>Military</td>
</tr>
<tr>
<td>Weede</td>
<td>Bollen</td>
<td>(-)</td>
<td>x</td>
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<tr>
<td>Landau</td>
<td>democracy age&gt; D</td>
<td>-</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Gasiorowski</td>
<td>Polity III</td>
<td>-</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>

Six papers obtain positive results, while only four of these are significant and stable: Scully (1988) found significant positive effects for all three original Gastil components.\(^7\) Knack/Keefer (1995) obtained positive results for Gastil data and a shorter sample from 1974-89; Leblang (1997) for pooled decade time-series and cross-sectional data estimates significant positive results for the Polity II-score of democratic institutions. Pourgerami (1988) in a cross-section sample of 92 countries and based on

5) depending on region.
6) depending on operationalisation of political stability.
7) political, civil and economic rights, see Gastil (1982).
democracy data by Berg-Schlosser and Amnesty International found in an uncontrolled regression even a t-statistic of 6.3, with the result loosing significance but remaining above the 10%-threshold after controlling union membership and welfare state.

Two other studies found support for a positive effect of democracy on growth only in special variable sets or for a subsample: Kormendi/Meguire (1985), using a 74-country world-sample, found a slightly significant positive growth effect for belonging to the two most democratic Freedom-House categories, which lost its predictive power after controlling investment. Nevertheless, they estimated a positive effect on investment, which in all estimations known to the present authors is a strong predictor for growth. Grier/Tullock (1989), based on a five-year-average-panel, found a significant positive effect of basic civil liberties for Africa and Latin America, but no significance for Asia.

On the other end of the spectrum lay two papers with consistent negative results, two among the oldest and two among the most recent studies in this overview: Weede (1983), working with a 94-country-sample of long-run-averages 1960-79, found a strongly significant negative relationship both for net and for per-capita growth rates with betas 0.35 and 0.32, respectively. Gasiorowski (2000), working with a pooled time-series cross-section sample of 49 underdeveloped countries and 572 annual observations and centering his analysis on macro-economic linkage variables, found that more-democratic states have more inflation and therefore less growth than less-democratic states.

Landau (1986), in a large study directed towards development in general (with 36 variables studied) found lower growth rates for those countries which were democratic in 1950 in an annual panel design, but no effect after using 4- or 7-year period lengths. A special case is Feng (1997): He obtains a negative result for democracy after controlling irregular, major regular or minor regime changes: but, as he shows, these variables are

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8) therefore, they suggest an indirect path similar to the one we follow in this paper. In this paper, for both empirical and theoretical reasons we concentrated on “men-based” capital measures.

9) using a dummy variable for not belonging to the two most repressive Freedom House categories; this variable has not been studied in the world sample.
adversely correlated with democracy, so that after controlling these indirect stability effects, the net effect is positive but negligible.

Three other papers show an “inverted-U” effect with a kind of diminishing returns of democracy: Barro (1994), Obinger (2000), and Martin/Plumper (2001).

These are not the only papers examining the democracy-growth link — there are six other papers with no results: Marsh (1988), Pourgerami in a new research design (1992); Helliwell (1994), Alesina/Rodrick (1994); Barro/Sala-I-Martin (1995) and Durham (1999).

There are a number of differences in the study designs which may be the sources of these differences: There are sample sizes between 47 and 113 countries; with some authors concentrating on developing countries, others including OECD-countries as well. The authors use 13 different time spans: 1950-77/80 (Kormendi/Meguire 1985, Grier/Tullock 1989); 1960-79/80 (Weede 1983, Pourgerami 1988, Landau 1986, Scully 1988, Feng 1997); 1960-85 (Alesina/Rodrick 1994, Helliwell 1994, Barro/Sala-I-Martin 1995); 1960-89/90/92 (Leblang 1997, Durham 1999, Barro 1994, Obinger 2000); 1965-84 (Marsh 1988); 1968-91 (Gasierowski 2000); 1974-89 (Knack/Keefer 1995); 1975-97 (Martin/Plumper 2001); 1986 (Pourgerami 1992).


Last but central for our understanding, each author uses a different set of control variables. There are 27 variables used altogether. The most often used variable is a lagged value of GDP (17 studies) for accounting for the convergence effect predicted by neo-classical growth theory and negative significant in almost all studies.
As well predicted by economic theory to be important for growth, but nevertheless omitted by roughly a third of the studies, the second and third ranks capital variables, with human capital (12) being used slightly more often than investment (11).

Population growth on rank 5 (7) is due to the definition of the dependent variable and only used in the smaller subset of studies which rely on total product instead of per capita data. And still on rank 4 and onwards from rank 6 begins a long row of variables which are more or less direct results of political decisions: the size of the public sector (9), political stability and openness towards international trade (6, each), political institutions and inflation (5). The same number of studies account for regional effects.\(^\text{10}\) At the end of the frequency ranking follow other social variables which are less or not at all open to political control: inequality and colonial heritage (3), black market premium, the size of the military and economic structure (2). Development assistance, environment, foreign direct investment, heterogeneity, life expectancy, media, oil production, terms of trade, union strength, and growth in an earlier period are each used in one study.

Our analysis departs from the observation that there are a number of variables used as controls which may be higher in democracies: investment, human capital, inequality, political stability and the quality of institutions may be factors which cannot be seen as “controls” as if they would be independent from the political institutions of democracy.

### III. Democracy and Growth: Old and New Intermediate Causal Linkages

Our analysis departs from the observation that education — a predictor variable in economic growth theory that has become standard — can be seen as influenced by the political system: In democracies, citizens can turn their interest in good education into

\(^{10}\) for some studies use regional dummies and others compute region-specific effects, this use of controls is not mentioned in Table 1.
votes, and thereby press for higher amount and quality of education.\footnote{11)}

1. Human-Based Capital Concepts

The classical type of economic production function has two arguments, capital and labor. We interpret this duality as a simple duality in time: Labor is what people do today to gain some product today. Capital is everything they cannot influence on the spot, but they may have influenced in the past. In this broad perspective, capital is everything that can be influenced by human action to influence production in any future. It contains (i) land (what cannot be produced), (ii) physical capital (which has to be produced before it can be used in production), and (iii) infrastructure (both material and immaterial).

We argue, that within such a notion of capital, there are two distinctions, the one relating to the micro-macro distinction and the second dichotomy relates to being embodied in physical entities or in humans. “Embodied in humans” covers phenomena which are due to knowledge or expectations of people. Using this men-machine- and the micro-macro-dichotomy, we obtain the two-dimensional map of capital given in Figure 1. As we mentioned already earlier, we focus on capital embodied in humans.

2. Human Capital

Human capital is a concept which got this name by Theodore W. Schultz in 1960:

“I propose to treat education as an investment in man and to treat its consequences as a form of capital. [...] because it renders a productive service of value to the economy. The principal hypothesis underlying this treatment of education is that some important increases in national income are a consequence of additions to the stock of this form of capital.” (571)
Though the concept of interpreting education as a form of capital can be traced back to Kuznets and Smith, this sentence marks the first occurrence of the term “human capital” (which was part of the work which made Schultz a nobel laureate in 1979). It also marks a position that is yet to be overcome: In the new growth discussion departing from the Solow model, human capital is more than a stock which enters the society’s production function, but itself allows for a certain level of growth (Temple 1999).

This new analysis is due to the altered nature of investment in the information society. The higher the level of information processing in production, the shorter product and capital good life cycles, the more education becomes necessary and sufficient for further growth: Physical capital investment nowadays goes along with changes in the work processes, and only human capital allows workers to keep up with changes and to allow for growth-inducing usage of new capital investment in the firm. Along this line of argumentation, not so much present investment in the human capital stock via school enrolment (which involve costs and absence from the labor force), but the already accumulated existing stock will foster growth (for empirical evidence on this difference, see Benhabib and Spiegel 1994).

3. Social Capital

Social capital is a concept which gained renewed popularity through the work of Robert Putnam (1993; 2000), but the term was independently (and with different directions of interest) introduced earlier by Pierre Bourdieu (1975) and James S. Coleman (1988). The latter defined social capital

“by its function. It is […] a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors […] within the structure.” (98)

Within a social setting viewed as a game with different equilibria, social capital may be viewed as a focal point with a higher output for everyone, but which is feasible only
through coordinated activities, which can be seen as a kind of investment.

The most prominent operationalisation of social capital is generalized trust (Luhmann 1988/1989, Putnam 2000, Bornschier 2000b, Bornschier/Volken 2002). Bornschier (2000b) stresses that it is the cultural resource generalized trust which makes effective low cost economic transactions in modern society much more likely. The broadest data base for trust and by now frequently used in international comparison is provided by the World Value Surveys (Inglehart 1990, 1998). In these surveys, a dichotomous question was asked: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” This question forces a respondent’s decision on one of the two options given, excluding scale dimensional problems and allowing for easy comparisons in the levels.

The trust question has been asked not only in the WVS, but in other surveys, too. Norris (2001) uses trust data from shadow surveys to also include New Zealand into her sample, a country that was not yet included in the WVS survey waves.

IV. Democracy Data

1. Political Rights vs. Civil Liberties: Freedom House

The Freedom House data set analyses 201 nations over the time span from 1972/73 to 2000/01, altogether resulting in 4938 observations. The two components Political Rights and Civil Liberties are highly correlated with $r = 0.92$ (Table 3), as the cross tabulation shows, as well (cells contain numbers of observations)\(^{12}\):


\(^{12}\) in the FH data set, in both dimensions “1” indicates the maximum of freedom. Throughout in this study, we re-coded FH scores so that high numbers correspond to high freedom levels.
quality has been debated: The rating of codified institutions induces a large number of arbitrary decisions, and the empirical fit with other measures of political rights and civil liberties seems to be rather weak (for evidence for Latin America see Suter and Nollert 1995, Suter 1999).

2. Democratic vs. Autocratic Institutions: Polity IV

As a second measure we use the democracy-autocracy-score of Jaggers and Gurr, from stage IV of their Polity project. Since Jaggers and Gurr go back in history as far as possible — the data set contains even 17 countries with 200 observations from 1800 to 1999! —, they provide a huge number of 14377 observations for 180 countries.

The pooled dataset of both Freedom House and Polity still contains 3657 valid observations, and both measures are highly correlated, as Table 3 shows. All correlations are significant below a 0.0% level and the number of observations is always 3657.

The difference between the two Freedom House indices is negatively correlated with

---

13) 3822 observations from which all transition periods (codes -66 to -99 in Polity IV) were left out.
Table 3. Correlations between democracy measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Polity</th>
<th>Freedom House</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DMA</td>
<td>Political Rights</td>
</tr>
<tr>
<td>Freedom House Political Rights</td>
<td>0.889</td>
<td></td>
</tr>
<tr>
<td>Freedom House Civil Liberties</td>
<td>0.849</td>
<td>0.921</td>
</tr>
<tr>
<td>FH composite (high: more freedom)</td>
<td>0.888</td>
<td>0.983</td>
</tr>
<tr>
<td>FH difference (high: more civlib)</td>
<td>-0.379</td>
<td>-0.499</td>
</tr>
</tbody>
</table>

all democracy measures: In less democratic states political rights lag behind civil liberties, independent of which measure is used to account for the low democracy level.

V. Methodological Issues: Direct and Indirect Effects

In terms of statistical analysis, ignoring co-variance between “independent” variables in multiple regression models leads to the problem of multicollinearity, which in turn yields estimates which remain unbiased, but have undesirable high variances.

Several solutions have been proposed for tackling with this problem. They include rules of thumb like “Don’t worry … if the $R^2$ from the regression exceeds the $R^2$ for any independent variable regressed on the other independent variables”, or “Drop a variable” (Kennedy 1988).

But the best way is not to drop information, but to use the complete information about the relationships between the variables included in the model. This suggests to formalize the relationships among regressors. We assume a relationship between a capital variable ($K$) and political institutions ($DEMO$), as is formalized in equation (e1):

$$dK = \alpha DEMO + \gamma$$  

$$dY = \beta_1 DEMO + \beta_2 dK_H + \varepsilon$$
In this case, the simple OLS regression of growth ($dY$) on democracy ($e2$) cannot yield the correct results, because additional information from ($e1$) about the political sphere is incorporated in $dK_H$. In this case, only $\gamma$ contains information which is not still introduced through the institutional variable and only conducting it together with the political influences leads to a correct estimation:

$$dY = \beta_1 DEMO + \beta_2 (\alpha_1 DEMO + \gamma) + \varepsilon$$

$$= (\beta_1 + \beta_2 \alpha) DEMO + \beta_2 \gamma + \varepsilon$$

$$dY = \beta_3 DEMO + \beta_2 \gamma + \varepsilon$$  \hspace{1cm} (e3)

The coefficient $\beta_3$ in equation (e3) measures the complete information about the influence of $DEMO$ which enters into the model. This procedure is equivalent to a simultaneous-equations-approach, but easier to analyze. And it can be estimated with any statistical program package that allows the storage of unstandardised residuals from a regression.

VI. "Fuelling Change"

1. Techno-Economic Change

As described in more detail in Bornschier (2001a), the world economy in the 1990s was and still is undergoing a structural change in its technological style, towards an even higher level of economic integration via electronic communication (telematics).

This change is, however, very uneven with regard to diffusion levels of indicators of the telematics era if one compares different societies. We considered a variety of variables representing the physical infrastructure of the telematics era: Internet hosts, mobile phones, personal computer, fax machines, telephone mainlines, newspapers, and radios. These are provided by the World Bank, all standardized by population.

In a recent study of the role of generalized trust in promoting techno-economic
change as measured by Internet diffusion (Bornschier 2001a) different measures of the infrastructure of telematics era were analyzed by factor analysis. For a sample of 21 rich societies 83.2% of the variance of four indicators of technological change (Internet hosts, mobile phones, personal computer, fax machines, telephone mainlines) were found represented by two independent factors (see the replication in Table 4). In our present analysis only one substantial factor emerged most probably since we now cover the whole development range (the second factor in the principal component analysis reported in panel 1 of Table 4 has an eigenvalue below unity).

For a world sample of 104 countries and our extended variable set in Table 4, almost all the variance of seven measures of the telematics era is represented by only one factor which represents 77.6% of the common variance. This factor derived from the principal component analysis (1) is simply reflecting the level of development as evidenced from the principal component analysis (2) of the seven measures of communication plus per capita GDP (purchasing power parities corrected figures), the latter loading extremely high on the factor (0.93). In order to obtain a useful indicator of

<table>
<thead>
<tr>
<th>Table 4. Factor analysis of communication measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>Variance explained</td>
</tr>
<tr>
<td>Eigenvalues</td>
</tr>
<tr>
<td>GDP p.c. (PPP)</td>
</tr>
<tr>
<td>Internet hosts</td>
</tr>
<tr>
<td>Mobile phones</td>
</tr>
<tr>
<td>Personal computer</td>
</tr>
<tr>
<td>Fax machines</td>
</tr>
<tr>
<td>Telephone mainlines</td>
</tr>
<tr>
<td>Newspapers</td>
</tr>
<tr>
<td>Radios</td>
</tr>
<tr>
<td>Factor loadings</td>
</tr>
</tbody>
</table>
techno-economic change we therefore have to control the level of material development. The justification and procedure is as follows.

A sensible measure for economic change is not one that informs us about how much telematics infrastructure is built up (and used) because of a country's level of material development, but about how much new infrastructure is built up relative to a country's level of material development level. Thus we need to residualize the telematics variables (due to availability problems for the extended sample of 138 countries without the figures for personal computers).

The idea of this process is shown in Figure 3: Finland has an income amongst the top 10%, but its number of internet host servers is highest in the world. By estimation from all states, one would predict Finland to have 83 internet hosts instead 653, as they really have. The difference in the double-looped-model, marked by the vertical line, is stored as a variable and used for the factor analysis in Table 4, column 3.

And indeed, the communication variables after controlling development still have a common factor explaining 42% of the residualized variance (column 3 in Table 4). We use this factor as our measure for techno-economic change.

2. The Effect of Human Capital on Change

Techno-economic change as a base for further growth and as our second outcome, is likely to be fostered by available human capital. In contrast to the infrastructure for the previous technological style of the industrial mass production era, communication infrastructure in the telematics era is useful only if the information delivered through its channels is used by the receivers. Therefore, a receiver with a higher level of cognitive capabilities will have a comparatively higher demand for information and, as follows, will be willing to use and to pay for a higher amount of communication infrastructure.

And indeed, empirically we find: techno-economic change, measured as common factor of the differences between real levels of communication infrastructure and their values predicted by per capita GDP level, is strongly linked to human capital, measured in the world sample by the proliferation of secondary education. In a cross-country
Table 5. Democracy, human and social capital, and techno-economic change

| Dependent Model | Economic Change |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 1   | 2   | 3   | 4   | 5   | 6   | 7   |
| Constant        | -3.309 | -3.223 | 4.160 | -1.789 | -0.349 | 1.478 | 1.698 |
| GDP             | -0.163 | -0.227 | -1.729 | -0.947 | 1.478 | -0.227 | -0.947 |
| Human capital ("some sec. education", % in pop.) | 0.337 | 0.318 | 0.355 | 0.442 |
|                 | 3.580 | 3.044 | 1.990 | 2.200 |
| Trust (1995-98) | 0.520 | 0.318 | 0.358 | 0.426 |
|                 | 4.040 | 3.404 | 2.029 | 2.233 |
| Democracy (Polity IV) | 0.025 | 0.210 | 0.273 | 0.103 |
|                 | 0.235 | 0.210 | -0.833 | 0.077 |
| n               | 102 | 97 | 46 | 127 | 127 | 35 | 35 |
| $r^2_{adj}$     | 0.105 | 0.088 | 0.254 | 0.036 | 0.051 | 0.355 | 0.353 |

Standardized coefficients and t-statistics (italics)

regression analysis presented in Table 5, equation 1, we estimate a standardized coefficient for human capital of 0.337, highly significant below the 1% level.

Democracy is a significant predictor of techno-economic change even if level of development is controlled (see equations 4 and 5). But this effect is mediated by the positive effect of democracy on education. We prove this by estimating simultaneously the effects of both democracy and human capital: in this estimation, democracy is driven out by human capital, see equation 2 in Table 5. This is due to the high correlation between schooling levels and political institutions. We therefore find an indirect causation chain mediating the effect of democracy on techno-economic change via human capital.

3. The Effect of Social Capital on Change

Not only human capital is a predictor of techno-economic change (as a base of future growth) but also social capital that we measure with generalized trust. Investment in
communication infrastructure is investment in a new configuration of economic activity that is dependent on a coordinated change in beliefs of different economic actors. Social capital in its individual manifestation is expressing the coincidence between communicated and believed behavioral patterns with real action:

- Trust means you think (and have experienced) that communicated behavioral patterns will coincide with the real actions of people who have the power to influence your well-being;
- Low levels of conflict mean that institutions exist which allow to bargain conflicting interests without bringing them out on the road to the crude (and expensive) measurement of power resources;
- Low corruption levels mean that the behavioral patterns of government officials communicated through the law coincide with their actual behavior.

And so on. If communication fits action, the individual economic actor gets more valuable information about the possible chances of investment s/he has not done yet. If communication fits action, s/he will easier rely on that information and decide for those new and unknown investment: We therefore predict techno-economic change to be highly correlated to the availability of social capital. This proposition received already empirical support in subsamples of rich societies, as well as subsamples including NICs and transformation societies (see Bornschier 2001a, Volken 2002).

We retest this proposition in a world sample, and indeed we find again: techno-economic change is strongly linked to social capital, measured as generalized trust. In our cross-section of 46 cases, we estimate a standardized coefficient of substantial size, 0.520, highly significant below the 1%-level, see equation 3 in Table 5.

In a model estimating simultaneously the effects of both democracy and social capital, democracy is driven out by social capital, as column 6 in the same table shows. But, as we have seen above, this effect is due to the high correlation between trust levels and political institutions. Once again, there is an indirect causation chain mediating the effect of democracy on techno-economic change via trust.
4. Democracy and Its Indirect Effects on Techno-Economic Change

We summarize here the findings of indirect effects of democracy on techno-economic change. We find democracy linked to techno-economic change (equations 4 and 5 in Table 5). This effect is indirect, however, since it vanishes once education and trust are introduced. Trust and education are the direct predictors of this kind of change. This was already substantiated by Bornschier (2001a) in a sample of 34 rich countries and NICs predicting Internet diffusion (using higher education in this context where secondary education has become somewhat saturated). And also Volken (2002) finds trust (both generalized personal as well as system trust) and education being significant predictors of Internet diffusion as the measure of techno-economic change if transformation societies are added to the test sample. Therefore, the positive effects of trust and education on techno-economic change is not the novel finding here. What is new is that trust and education are mediating positive effects of democracy since we find positive links between democracy and trust as well as between democracy and education (see below).

VII. “Fuelling Economic Growth”

1. Data

The growth rates we analyze are calculated on a per capita basis. In the case of the long-term average sample, they are based on the Penn World Tables by Summers and Heston (1988, 1996). Summers and Heston use purchasing power parities, which allow for an analysis more prone to the situation and life chances of the people in the respective societies.

In case of the panel data sample, the Penn World Tables are only available up to 1992, so we additionally used World Bank data covering the time period up to 1997.
We use two different sample designs: long-term averages, as in Levine and Renelt (1992) and most of the studies mentioned above, and a panel design, as in Gasiorowski (2000). The panel structure allows for more detailed analyses, as controlling time and country fixed effects. Unfortunately, not all variables are available as extended time series, and to allow for comparisons with earlier research, we added the long-term average analysis.

The long-term average sample is based on the data set from Levine and Renelt, provided by the World Bank. It covers data averaging from 1960 to 1989 for 119 countries.

The earlier mentioned panel sample is as well mostly based on World Bank data, provided either through the World Bank development indicators data base available on CD-ROM or through sample files available online.

2. Human Capital, Long-Run Averages: Levine-Renelt, Replicated and Extended

We first examine the indirect influence of democracy on economic growth via schooling (see Figure 2). Based on their long-term average data set, Levine and Renelt (1992) find that the significance of the relationship between democracy and growth depends heavily on the specification of the control variables.

In case of human capital, we can show that this specification problem is rooted in the relationship between political institutions and schooling. In a model with initial GDP, secondary school enrollment, non-military and non-education government consumption as controls, democracy has a positive sign, but the t-statistic indicates no significant relationship (equation 1 of Table 6). But this lack of evidence can be shown to be based on the information about the political institutions, which is still incorporated in the human capital data. Even the secondary school enrollment rate in 1960 is significantly


Figure 2a. Indirect Effects of Democracy

Figure 2b. Empirical Indirect Effects, Synopsis

**< 5%, *** < 1%, # > 10% significance.

This is just an illustration of the observed relationships. Due to differing samples, it CANNOT be interpreted according to path-analytic presentation standards.

The mechanism sketched in the last section fits very well the data set provided by
**Table 6. Re-estimation of Levine and Renelt (1992), with residualisation of democracy**

<table>
<thead>
<tr>
<th>Model</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>growth</td>
<td>sec</td>
<td>growth</td>
<td>demo</td>
<td>growth</td>
</tr>
<tr>
<td>Constant</td>
<td>5.92</td>
<td>0.15</td>
<td>5.97</td>
<td>3.23</td>
<td>7.50</td>
</tr>
<tr>
<td>Real GDP per capita, 1960</td>
<td>-0.42</td>
<td>0.47</td>
<td>-0.16</td>
<td>0.73</td>
<td>0.20</td>
</tr>
<tr>
<td>Democracy (Polity III)</td>
<td>0.24</td>
<td>0.43</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary enrollment rate</td>
<td>1.62</td>
<td>5.52</td>
<td>3.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960 (SEC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEC, corrected for GDP60 and democracy</td>
<td>3.9</td>
<td></td>
<td></td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Gov't consumption less defense + education, GDP share</td>
<td>-0.10</td>
<td>-0.10</td>
<td>-1.18</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>102</td>
<td>106</td>
<td>107</td>
<td>106</td>
<td>101</td>
</tr>
<tr>
<td>$r^2_{adj}$</td>
<td>0.22</td>
<td>0.70</td>
<td>0.22</td>
<td>0.52</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Numbers given are standardised coefficients and t-statistics, respectively.

Levine and Renelt (1992), results are given in Table 6. Column 1 shows the "normal" regression corresponding to (e2) above, testing for the influence of political institutions: a baseline growth model including wealth, schooling, and government share, and democracy added as the additional variable of interest. In this setting, we observe a positive influence of democratic institutions, but with a coefficient which is not significant.

In the second column we report the results of the (e1)-type regression for human capital. Roughly 70% of the variance of secondary school enrollment in a 106-country sample are explained by development level (measured by GDP) and democracy, which have highly significant coefficients. The explanation contribution of democracy is just narrowly below the contribution of development level: the standardized coefficients are 0.47 for GDP and 0.43 for democracy, respectively, and in one-factor regressions we

16) beta and t-stat in the GDP-regression: 0.78/13.3, for democracy: 0.76/12.2. Other results can
explain 57.8% of schooling by democracy and just slightly more (61.0%) by development.

From this model 2 of Table 6 we store the residual ($\gamma$ in e1): this is the part of school enrollment which is not explained by development. In model 3 we use this variable to estimate the total democracy effect as in (e3). The result of direct and indirect effect together is $0.24 + 0.43 \times 0.56$ (democracy effect on schooling) * 0.56 (schooling effect on growth) = 0.24 (direct effect) + 0.24 (indirect effect) = 0.48. Since the standard error of democracy remains the same, the t-statistic as significance measure rises from insignificant 1.63 to highly significant (below the 0.1%-threshold) 3.75.

3. Panel Evidence

Having in mind the critique against long-run average country regressions for loosing to much information, we studied the same relationship as in Table 6 for panel data sets in Table 7. But the step from long-run averages to panel regression is not easily done. Leaving out technical discussions, we concentrate on two findings of our studies: the influence of world business cycles, and the stock-and-flow difference with respect to education data.

1) The role of the international business cycle

The world business cycle, represented through the fixed year effects, explains 46.0% of the variance in the sample; world cycle and regional effects together explain 50.2%, world cycle and fixed effects for all countries explain 55.2% of growth variance over the world sample.\(^{17}\) None of our regressions was able to explain a higher fraction of variance by systematic variables than by these year fixed effects.

The course of these effects is just a reflection of the world business cycle of about 8 years length and, as Figure 3 might suggest, a lowering amplitude: In this graph we

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\(^{17}\) measured by the adjusted $r^2$ value.
combined the effects obtained in our panel regressions,\(^\text{18}\) and the world business cycle, computed as a weighted average of all available growth data for that year. Weight factor was the logged total GDP, measured in constant 1995 US$. As Figure 3 shows, both time-series are highly correlated: 98.8% of our fixed effects are explained by the computed world cycle, although there was no weighting in the growth regressions.

2) The necessary change in education operationalization

A significant positive coefficient of education, whether measured in terms of school enrollment or of attained schooling levels in the population, is one of the stylized fact of long-run average growth regression. Most often, school enrollment data are used, since they are easily available for a huge number of countries and long time-spans — we would have used a world bank data set with 150 countries, 25 years (1960, '65, '70, and

---

\(^{18}\) the variable printed in the figure are the fixed effects from the regression in Table 7, column 1. The values for each year differ from those obtained by the other regressions in Table 7 by less than 0.01 percentage points.
'75-'96) and an availability rate of 87.3%; 3274 out of 3750 country-years.

But in the short run, school enrollment is not the right operationalisation variable for the growth effects of human capital. Enrollment data on the first place stand for investment in human capital, and this investment should prove to be fruitful in the future, but its short term fluctuations might be (and, when we tried it, were) even negatively correlated with growth: Benhabib/Spiegel (1994), working with annual panel data as well, complain about a respective result; Gasiorowski (2000, 340) obtains the same result without discussing it.

So we used the data on level of attained schooling provided by Barro and Lee (2000), which measure the educational stock in the working population. In the regressions presented Table 7, we use the variable “some secondary schooling in the population above age 25”. Controlling investment in a linear model we find no additional effect of education on growth.

We need to reflect, however, the complementary character of capital and labor in the production process. Human capital cannot be productive on its own, but only in connection with physical capital investment. But if the key contribution of human capital for growth is in fostering the efficiency of investment, the variable should enter...
into the regression in form of an interaction term with investment, rather than as a single additional variable. This is what we did in model 2. Education together with investment is now positive but fails to be significant. The reason are the Eastern European transition countries.

Our regional analysis (results can be obtained in detail by the authors) revealed that only in one world region the education/investment nexus works remarkably different than in the other regions. We estimated model 2 eight times, each for one world region with the region dummy and a variable which documented the investment/education interaction for that region and was zero otherwise. The coefficient measured the difference between the interaction effect in that respective region against its level elsewhere. This difference effect is significant negative only for the Eastern European transition countries. Although the total effect remain slightly positive (but smallest of all regions), we omitted Eastern Europe from our analysis in Table 7, column 3.19)

We interpret this marked difference for former centrally planned economies as follows. Human capital not only matters in terms of quantity but also in terms of world views that are implanted by schooling, too. The former centrally planned economies invested a lot in education, but the socialist *Weltbild* that was implanted simultaneously became in several ways dysfunctional for the transition to capitalist growth. Since people do not easily give up their learned cognition and expectation structures (Scholtz 2002, Ch. 2), in these countries the education years in socialist times do not help to use investment for growth.

Whether this will be transitory and how long the amazingly different growth effect of education in former centrally planned economies will last is an interesting question, but beyond the scope of this paper. For our purpose we need to control this deviation and do this by excluding the former socialist cases from the analysis reported in the last equation of Table 7.

19) The t-statistic for the Eastern Europe interaction variable is −3.323, the total effect is 0.206 (beta). The total effects for the other regions range between 0.041 (East Asia) and 0.119 (Latin America), when each region is estimated against the rest of the world including the former East Bloc.
Table 7. Direct and indirect effects of democracy in a panel data design

<table>
<thead>
<tr>
<th>Model</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-6.575</td>
<td>-7.563</td>
<td>-6.589</td>
</tr>
<tr>
<td>GDP, PPP, log</td>
<td>-0.058</td>
<td>-0.052</td>
<td>-0.086</td>
</tr>
<tr>
<td>Democracy (Polity IV)</td>
<td>0.053</td>
<td>0.056</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>2.189</td>
<td>2.495</td>
<td>2.644</td>
</tr>
<tr>
<td>Investment (% of GDP)</td>
<td>0.134</td>
<td>0.114</td>
<td>0.096</td>
</tr>
<tr>
<td>(INV)</td>
<td>7.174</td>
<td>3.905</td>
<td>3.193</td>
</tr>
<tr>
<td>“Some secondary schooling”, % of pop 25+ (SECSOME)</td>
<td>-0.002</td>
<td>-0.091</td>
<td>-0.090</td>
</tr>
<tr>
<td>INV * SECSOME</td>
<td>-0.084</td>
<td>-1.542</td>
<td>-1.501</td>
</tr>
<tr>
<td></td>
<td>0.096</td>
<td>0.147</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.706</td>
<td>2.592</td>
<td></td>
</tr>
<tr>
<td>Openness (current prices)</td>
<td>5.444</td>
<td>5.751</td>
<td>5.666</td>
</tr>
<tr>
<td>Market size, log</td>
<td>7.159</td>
<td>8.178</td>
<td>8.170</td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>included</td>
<td>included</td>
<td>included</td>
</tr>
<tr>
<td>Sample</td>
<td>World</td>
<td>w/o extremes</td>
<td>w/o extremes &amp; Transition countries</td>
</tr>
<tr>
<td>n</td>
<td>1884</td>
<td>1815</td>
<td>1741</td>
</tr>
<tr>
<td>$r^2_{adj}$</td>
<td>0.438</td>
<td>0.512</td>
<td>0.525</td>
</tr>
</tbody>
</table>

Standardized coefficients and t-statistics (italics).

The resulting equation 3 reveals a significant and positive value for the interaction effect. This effect gets even extremely substantial (t-values of more than 5), if the base effects of education and investment are left out from the analysis and their interaction is estimated (not shown in the table).

We conclude from the panel analysis on a yearly basis that education contributes to growth if it is combined with investment. If not we estimate a small (but insignificant) negative contribution to growth. It would need further research to find out whether this negative effect may become significant under additional conditions. 20)

20) Since we have controlled the world business cycle and investment, a negative contribution of
4. The Effect of Social Capital on Economic Growth

The last indirect link we estimate is the one from democracy via social capital to economic growth. Over only a few years an impressive amount of cross-national evidence has accumulated in favor of a positive effect of social capital as measured by generalized trust on economic growth. Following the pioneering study of Knack and Keefer (1997), Bornschier (2000b) and Leicht (2000) could replicate and extend the finding of a substantial contribution of trust to growth. Also Whiteley (2001) and Zak and Knack (2001) could corroborate the finding that — given the severe robustness test which have been performed — has become standard in economic sociology of growth.

Table 8. Democracy, trust, and growth

<table>
<thead>
<tr>
<th>Model</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Trust</td>
<td>Growth&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Constant</td>
<td>2.07</td>
<td>0.87</td>
</tr>
<tr>
<td>log(GDP p.c.)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0.03</td>
<td>-0.16</td>
</tr>
<tr>
<td>Trust</td>
<td>0.20</td>
<td>-1.16</td>
</tr>
<tr>
<td>Democracy&lt;sup&gt;2&lt;/sup&gt;</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.86</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>r&lt;sup&gt;2&lt;/sup&gt;adj</td>
<td>0.095</td>
<td>0.138</td>
</tr>
</tbody>
</table>

Standardized coefficients and t-statistics (italics)
1. growth of GDP per capita, mkt. pr., const 1995 US$
2. mkt. prices, const 1995 US$, last in 94-97
3. both Freedom House components, 1992-93

education would not be consistent with human capital theory of education but would need to consider the role of education for aspirations which — if frustrated — are likely to become dysfunctional for economic growth.
We replicated the test of trust as a predictor for growth in a so far largest sample ever considered. For 54 cases we estimate a clearly significant positive effect, shown in Table 8. This finding is nothing new. More innovative is the other finding in Table 8 that democracy is a substantial predictor for the level of generalized trust even if level of per capita material wealth is controlled. This finding suggests strong support for the suggested indirect effect of democracy on growth. As far as we know such a finding that democracy fosters generalized trust has never been published before. However, in a conference paper of 2000 Pippa Norris already reported incidentally a positive and significant zero order correlation between democracy and trust (available on Internet). But that was neither theoretically framed nor level of development controlled. Norris and us seem to be on an interesting track to complete our knowledge of the determinants of trust in comparative perspective beyond democracies (for democracies, see Bornschier 2001b).

VIII. Conclusion

The seemingly over-studied field of democracy’s impact for economic development needs fresh impetus. And according to our exploratory study this enterprise turned out to be quite rewarding.

In this paper, we did not only argue that it is the indirect link that counts, but also found empirical support for two channels. Figure 2 depicts the links via human capital (education) and via social capital (generalized trust) on two economic development outcomes: growth and techno-economic change on which future growth opportunities will rest. To sum it up:

• We find democracy linked to more education, even after controlling level of development.
• Democracy is clearly correlated with trust as a measure for social capital.
• Social capital (trust) and human capital (education) are empirical predictors for
techno-economic change, the foundation of future growth.

- Economic growth is positively influenced by human capital (education) and by social capital (trust).

The effect of education on growth (for a summary, see Gemmel 1998) has become standard in recent cross-section. The often hypothesized effect of trust as lubricant for growth and innovation is becoming standard in cross-section specification, too. Our results reported in this paper corroborate these two direct sources of growth and change.

What we think is more interesting are evidences presented for the first time that democracy as a political form and practice is fostering these two direct sources of growth and change. This is clear evidence for political and social embeddedness of economic action — the research program of economic sociology.

Needless to mention in length that the study of mediators between democracy and economic outcomes has been opened and not completed with this exploratory study. However, there remain some further questions:

- The dynamics of social variables in the business cycle are still not fully understood.
- The concept of social capital can be broadened, and more variable may get included in the analysis.

Given these results, more research has to be done. It appears to be fruitful.
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Democracy, Economic Growth and Techno-economic Change


Democracy, Economic Growth and Techno-economic Change 237


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