Social Capital and Per Capita Income: Testing for a Structural Relationship in the Long Run

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ABSTRACT

There is empirical evidence showing a positive link between social capital and economic performance in the second half of the twentieth century. Is this relationship between social capital and economic performance persistent over time? Can we speak of stylised fact or structural relationship? We developed a nineteenth century international social capital indicator and then used it to contrast its potential synergies with per capita income at that time. The results show that the relationship between social development and per capita income already existed in the late nineteenth century. We find a strong positive linear relationship between the two; and this relationship upholds after controlling for foreign trade volume and structure, urbanisation, education, quality of institutions, political stability, government expenditure, population growth, and climate.

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I. INTRODUCTION

Human wellbeing is linked to economic wellbeing. Human wellbeing is also linked to social and relational wellbeing. Social and relational wellbeing in a community has been redefined in the past decade as social capital. Social capital is embodied by the set of ‘trust, norms, and networks that can improve efficiency of society by facilitating co-ordinated actions’ (Putnam 1993:167).

Social capital is a form of capital. As such, it has been shown in previous studies that it is bonded to economic performance. To mention some of the most influential papers, La Porta et al. (1997), Knack and Keefer (1997), and Temple and Johnson (1998) all tested the statistical significance of social capital indicators in explaining economic performance. For the relatively recent periods they analysed, they all found a positive association between the two.

First, La Porta et al. find supporting evidence of the fact that trust and cooperation have a positive effect on the well-functioning of organisations such as government, professional societies, and large firms. More generally, they show that social capital makes institutions work better; at least for the period 1970-1993.

Second, Knack and Keefer (1997) test the significance of social capital in explaining economic growth for the period 1980-1992. For this, they use two alternative measures, trust and the civic engagement index, both extracted from the World Value Surveys. Growth regressions incorporating these variables show a strong effect of both of them on economic growth. A 10% increase in the level of trust is associated to a 0.8% increase in 1980-1992 growth. A similar increase in the civic engagement index corresponds to a 2.7% increase in economic growth (Knack and Keefer, 1997:1260-1).

Finally, Temple and Johnson (1998) use the dataset and sample of Mankiw, Romer and Weil (1992) for measures of economic prosperity. In particular, they contrast the 1960’s social development index constructed by Adelman and Morris (1967) for another purpose with the log difference of per capita income 1960-1985 (long run growth of GDP). They found a correlation coefficient of 0.60 (Temple and Johnson,
1998:970). When they run ordinary least squares (OLS) growth regressions, the social development index coefficient is statistically significant at the 0.05 significance level. This result is robust to the inclusion of initial income, investment, schooling, and population growth in the growth regressions. This finding supports the initial hypothesis of the social development predictive power in explaining subsequent economic growth.

In fact, the old Adelman and Morris (1967) work could shed some light on the questions in the agenda. Now that we can look at their analysis in historical perspective, it appears to have not only the historical insights the authors were presenting but also more predictive power than they suspected. Their indicators turned out to be apparently too pessimistic for Latin America and too optimistic for some Far Eastern countries, and so they moved along omitting some variables. At that time, they did not know the importance of their findings. Their indicator could have helped forecasting subsequent growth better than any other contemporary attempt! Temple and Johnson (1998) tell us that the socio-economic index constructed by Adelman and Morris ‘could have helped researchers make much better forecasts of long-run growth rates’.

Notice that all of these studies have a fairly recent chronology. The earliest one is the study by Temple and Johnson (1998), which starts in 1960. This is the only one using the Adelman and Morris socio-development indicator; therefore, is providing us with a framework for comparison.

The social capital indicator we use in this paper is based on own calculations along the lines of Adelman and Morris. We make use of a well-established international database for socio-economic measures from 1850 to 1913, broken into three periods: 1850-1870, 1870-1890, and 1890-1913. It comprises a wide range of socio-economic variables, 35 in total, ranging from education or political attitudes to favourableness towards adoption of new technology. Morris and Adelman (1988) worked for more than twenty years, –since 1965–, on this database together with a team of country experts so that the data were homogeneous and reliable. The data needed to be recovered, digitalised, and adapted for the use of economic historians and social scientists in general.
Although the original data were not gathered for this purpose, we propose using these international dataset for the nineteenth century to construct a completely new Social Development Index (SDI). In order to get the new Social Development Index (SDI), we use a principal components analysis on a new historical framework. For the sake of brevity, we cannot explain the underpinnings of the calculations here. Please, visit Felis Rota (2005) for details on the calculations and comparisons with social capital indicators for the twentieth century.

The Social Development Index (SDI) can be interpreted as measuring social development or social capital, just as the Human Development Index (HDI) measures human development. The new SDI series are the first available nineteenth-century international social capital estimates. They are available for a large set of countries, 22 in total, from all continents. We make use of the SDI in this paper in order to investigate its economic implications.

The new Social Development Index (SDI) gives us the possibility to do the tests that Temple and Johnson performed on 1960 data, but now on data from the nineteenth century; in particular, we do it for 1870 and 1890. By doing so, we could determine whether the relationship between social development and economic performance could have further theoretical implications beyond the post-Second World War era. The question that we aim to answer in this paper is the following: Is the relationship between social capital and economic performance consistently present over time? In other words, we look for some evidence of a long run structural relationship between social capital and macroeconomic performance.

II. THE TEMPLE AND JOHNSON TESTS

In order to answer the question of whether the relationship between social capital and economic performance is consistent over time, let us start with a snapshot of the work by Temple and Johnson mentioned in the previous section. This work refers to the period 1960-1985.
Figure I and II have been extracted from Temple and Johnson (1998:971-2). In both figures, the social development index derived in Adelman and Morris (1967) for the period 1957-62 is displayed on the horizontal axis. Their indicator is a compound index extracted from a selection and combination of variables belonging to a broad database with 41 variables and 72 countries. In Figure I, the vertical axis is the natural logarithm of GDP in 1960, the initial GDP for the period under study. The figure shows a clearly positive relation between initial GDP and social development. The second figure plots social development against long run per capita GDP growth rate and again we see a positive association between the two. Therefore, higher values of social development are associated to higher values of both initial GDP and GDP per capita growth.

As described in the previous section, we now have nineteenth century data available, in particular for the years 1870 and 1890. We constructed a social development index for 1870 and 1890 (see Felis Rota, 2005). The natural question that appears, then, is whether the associations between social development and GDP can be found as well for the nineteenth century. More generally speaking, we would like to compare the results we obtain for the nineteenth century to those available for the twentieth century in order to identify any relevant changes in the relationship.

In order to allow for comparison, we need to contrast data for 1870, 1890 and 1960 (the 3 years for which we have SDI) using a comparable data source. This is to avoid that changes in the results between the two centuries can be attributed to inconsistencies in sourcing. Temple and Johnson (1998) use the Summers and Heston database for GDP and other economic measures, which starts in 1950. More precisely, instead of the original they use a secondary source, Mankiw, Romer, and Weil (1992), which starts at 1960, presumably to obtain full data for a larger number of countries.

Therefore, if we are to replicate the Temple and Johnson tests for the twentieth century and construct new ones for the twentieth century with a consistent data source for GDP, we cannot use the Summers and Heston data. For this reason, we use Maddison (2003) data on per capita GDP instead. Using Maddison’s data we can perform the analysis for the nineteenth century as well as for the twentieth century.
Source: Temple and Johnson (1998:971)
Source: Temple and Johnson (1998:972)

Figure II
Social Development and Growth
while ensuring source consistency throughout. Unit of measure is per capita GDP, 1990 International Geary-Khamis dollars. There is an ongoing discussion about the conveniences and inconveniences of using this way of adjusting GDP, but this source has the extra advantage that it contains all periods and countries in the sample.

II.1. THE RELATIONSHIP BETWEEN SDI AND INCOME

In this section we first replicate Figure I of Temple and Johnson for 1960 with Maddison (2003) GDP data and, second, we test for a similar relationship between social development and GDP per capita in the nineteenth century.

A linear relationship between social development and the natural logarithm of income (logarithm in base 10) implies an exponential relationship between social development and income. As an illustrative example, Graph 1 plots social development for 1960 against the raw level of GDP per capita in 1960. An exponential estimation line has been added to the graph and, indeed, fits the data well. As a consequence, we should find that the relationship between social capital and the log of GDP per capita is approximately linear (as suggested in Figure I). We now investigate this relationship more rigorously.

Graph 2 is a replica of Temple and Johnson’s Figure I using Maddison (2003) data for GDP. There are 72 country observations in this scatter plot, those corresponding to the 72 countries in the Adelman and Morris (1967) sample. Although we do not know the exact figures for Temple and Johnson, it is worth noting that the scatter plot is nearly identical to the scatter plot of Temple and Johnson. So we can see that the change of data source has no important effect on the results, as expected.

A linear trend fitted through the cloud of points returns a highly statistically significant slope of .236 (see Table 1, equation 5). This means that an increase of one whole unit in the 1960 social development index, –ranging approximately between -2 and 2–, is associated to a log GDP level .236 units higher. Another way of seeing moves along the line is measuring moves in terms of standard deviations: The standardised beta coefficient (not shown in the Table but approximately equal to .8)
implies that one standard deviation increase in SDI corresponds to an 80% of a standard deviation increase in log GDP.

The adjusted R-squared is .590; i.e. for this sample of countries, 59% of the total international dispersion of incomes in 1960 can be captured with only one explanatory variable (social development) and a constant. Caution: this does not necessarily imply that social development causes 59% of the variation of income! This figure is just statistical correlation; we should introduce some control variables in a multivariate regression to find out the clean effect of one single variable on another.

We now move to the nineteenth century analysis, making use of the new SDI series for 1870 and 1890.
We have found that in the post-Second World War era higher levels of social development are associated with higher levels of income and vice versa. Given that we have a social development index for 1870 and 1890, we can now investigate whether this relationship did already exist in the late-nineteenth century. Graph 3 shows that a very similar relationship existed in 1870, and Graph 4 reveals the same basic stylised fact for 1890. Table 1 corroborates that the statistical figures obtained for 1870 and 1890 not only go in the same direction but are also very similar to those obtained for 1960.

Nineteenth century calculations count only with 21 countries in the sample due to narrower data availability. Still, statistical results for bivariate analysis are surprisingly clear cut and they all point at the same direction. Line fitted to Graph 3 for 1870 exhibits a 20% slope; line fitted to Graph 4 for a 1890 parallel analysis exhibits a slope of 22%. Recall that the slope for 1960 data was just above 23%. All three analyses have highly statistically significant and very similar correlation coefficients. Moreover, all display adjusted R-squares between .60 and .70; i.e., the linear regressions fitted on the scatter plots can explain between 60 and 70% of
Graph 3 – Social Development and Log Per Capita GDP in 1870

Graph 4 – Social Development and Log Per Capita GDP in 1890
dispersion. Adjusted R-squares raise up to more than 80% of dispersion captured when we remove 2 influential observations from each of the regressions (see equations 2, 4, and 6 in Table 1). Still, slopes remain practically unchanged in all three chronologies.

Table 1
Level of association between Social Development and Income

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
<th>SDI slope</th>
<th>R^2</th>
<th>Adjusted R^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870</td>
<td>21</td>
<td>.202***</td>
<td>.633</td>
<td>.614</td>
</tr>
<tr>
<td>1890</td>
<td>21</td>
<td>.224***</td>
<td>.698</td>
<td>.682</td>
</tr>
<tr>
<td>1960</td>
<td>72</td>
<td>.236***</td>
<td>.596</td>
<td>.590</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.233***</td>
<td>.648</td>
<td>.643</td>
</tr>
</tbody>
</table>

Notes: Constant included in the regressions but not shown on table. Standard deviation of coefficients between parentheses. Influential observations outside 2 standard deviations (Australia and New Zealand for 1870 and 1890, Gabon and Venezuela for 1960). *** Coefficient statistically significant at the 0.01 level.

To sum up, Temple and Johnson’s results are confirmed. Moreover, regression results show that the observed associations between social development and income are significantly different from zero in all years discussed, and very similar between them. Thus, we can conclude that social development is positively related to economic wellbeing, and this relationship already existed in the nineteenth century.

II.2. ENDOGENEITY BIAS AND CAUSALITY

The main concern regarding the results in the previous section is whether the significant relationships we found can be attributed to a causal link between the two variables. In other words: can we conclude that social development causes income to be of a certain level? This would be the case if we can assume that differences in the social development index between countries can be interpreted as exogenous changes. To be able to describe this requirement more precisely, consider the following model:

\[
GDP = a + b \cdot SDI + e,
\]
where the dependent variable is the log of per capita GDP, the explanatory variable or regressor is the social development index, SDI, and the disturbance is \( e \). This disturbance signifies all the factors that play a role in the determination of GDP that we have not taken into account. The regressor SDI is exogenous if it is uncorrelated with the disturbance \( e \). If SDI is endogenous, then the estimate of \( b \) (slope) in the above equation cannot be interpreted as an estimate of the causal effect of SDI on GDP; it just verifies a statistical association between the two.

In our case, it is very likely that we have some degree of endogeneity in SDI because many factors that play a role in the determination of income have been omitted from the regression. For instance, education, population growth and export growth, to name some. These factors will be in the disturbance \( e \) in our model, and our social development index is likely to be correlated with them. As a result, the regression estimate \( b \) (the slope) is likely to be biased, and can as a rule therefore not be interpreted as causal effects straight away (Wooldridge, 2001, chapter 1; Greene, 2003, chapter 8). Graphs in the last section show a positively linear relationship between the two variables, but they do not represent a causal link per se.

II.3. MULTIVARIATE REGRESSION ANALYSIS

In the last section we concluded that in order to find a causal effect between social development and income, we have to address the endogeneity of social development. The endogeneity is likely to occur because there are variables that play a role in the determination of income that are not included in the regression, and are potentially correlated with the social development index. The obvious solution to this problem is to include these omitted variables in the regressions.

There is a large literature on growth regressions from which we can borrow. The encompassing summary model by Bleaney and Nishiyama (2002) indicates that, – according to the most influential multivariate regressions literature–, a comprehensive model should include openness to trade, life expectancy, schooling, quality of
institutions, democracy, government savings, exports of primary products, climate and active population growth.

There are some data limitations to running multivariate regressions on nineteenth century information. For the last third of the nineteenth century, data are, in general, reliable (Mitchell, 1998). However, the specific control variables proposed in the growth regressions literature –representative examples are Barro (1997), Easterly and Levine (1997), and Sachs and Warner (1997)–, and summarised by Bleaney and Nishiyama (2002) were not originally though for inclusion in pre-Second World War regressions. In many cases we are forced to find proxies available for the nineteenth century. Fortunately, Bleaney and Nishiyama (2002) summary of relevant variables is conceptually broad enough to facilitate this task. As we have an extensive list of variables in the database, we are able to find a proxy for all of these variables.

We use the following variables as proxy; (we present two alternative variables for some of them):

- export growth (“xgrgroup”) or, alternatively, foreign economic dependency (“foreignd”) for openness to trade;
- proportion of population living in towns of more than 10,000 people (“urbani”) for the inverse of life expectancy;
- literary rate (“lit”) for schooling;
- predominant form of land tenure (“landtenu”) for quality of institutions;
- political stability (“polstabi”) or, alternatively, direct/indirect political influence of workers (“sociopol”) for democracy;
- extent of domestic economic role of the government (“govt”) for government savings;
- shift in the export structure towards manufactured products (“shiftx”) for exports of primary products; and
- population growth (“popgrgrp”) for active population growth.

All these variables are extracted from Morris and Adelman (1988), and have the advantage that we have them for all countries in the sample.

- Finally, the proportion of land area in the geographical tropics (“tropicar”) accounts for climate in the regressions. It has been shown that what really matters about climate for economic development is whether or not a country is
located in the tropics (Sachs, 2001). We use the proportion of land area within the geographical tropics as in Gallup and Sachs (1999), and we take it as constant over the period of study. These geographical can be obtained from the Geodata database (Boston College, 2000).

So, all control variables suggested by Bleaney and Nishiyama (2002) are present in the analysis. This explains the very high R-squares obtained in the regressions. Table 2 displays some multivariate estimation results for 1870 and 1890. About 95 percent of the total variation of income can be explained by the variables included.

Note that the social development variable is an index. It is a ranking of social capital between countries. This is important, because it is for this reason that the value of the coefficient of the social development index in the regressions is in itself not informative. In other words, the value of the coefficient cannot be interpreted as economically substantive or unsubstantive (Goldberger, 1991, chapter 22); levels are just to establish a ranking of countries. However, this non-conceptualisation of the coefficient does not imply any ambiguity in determining statistical significance.

The dependent variable is again the log GDP per capita and the explanatory variables this time include the new Social Development Index (SDI) for the corresponding year plus the whole set of control variables discussed above. Table 2 presents four equations, two for 1870 and two for 1890. They are all run with a sample of 21 countries, those for which the Social Development Index is available for the nineteenth century. Still, adjusted R-squares are very high, in all cases around or above .9. This means that about 90% of the total international variation of income per capita is explained by the data.

The two equations for each year represent two alternative models depending on which variables do we use as proxies. It is useful to show different proxy alternatives because in this way we see how much the regression results are affected by changing the variables of control. Table 2 reveals that all four equations have highly significant and very similar coefficients for SDI, all between .40 and .50. Furthermore, these coefficients are comparable to the coefficient obtained by Temple and Johnson for
### Table 2
Social Development and Income including control variables.

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
<th>SDI</th>
<th>xgrgroup</th>
<th>foreignd</th>
<th>urbani</th>
<th>lit</th>
<th>landtenu</th>
<th>polstabi</th>
<th>sociopol</th>
<th>govt</th>
<th>shiftx</th>
<th>popgrgrp</th>
<th>tropicar</th>
<th>R²</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870</td>
<td>21</td>
<td>.472***</td>
<td>.003</td>
<td>-</td>
<td>-.005</td>
<td>.012***</td>
<td>-.011***</td>
<td>-.004</td>
<td>-</td>
<td>.002</td>
<td>-.008*</td>
<td>.010**</td>
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<td>.949</td>
<td>.897</td>
</tr>
<tr>
<td>1870</td>
<td>21</td>
<td>.427***</td>
<td>.002</td>
<td>-.003</td>
<td>-.002</td>
<td>.008**</td>
<td>-.010***</td>
<td>-.001</td>
<td>-</td>
<td>.001</td>
<td>-.005</td>
<td>.009**</td>
<td>-.686***</td>
<td>.944</td>
<td>.887</td>
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<td>1890</td>
<td>21</td>
<td>.417**</td>
<td>.001</td>
<td>-</td>
<td>-.002</td>
<td>.010**</td>
<td>-.008**</td>
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<td>21</td>
<td>.489***</td>
<td>-.002</td>
<td>-</td>
<td>-.002</td>
<td>.007**</td>
<td>-.009***</td>
<td>-.001</td>
<td>-</td>
<td>.001</td>
<td>-.004*</td>
<td>.004*</td>
<td>-.203</td>
<td>.983</td>
<td>.965</td>
</tr>
</tbody>
</table>

Notes: Constant not shown. Standard errors between parentheses. *Coefficient statistically significant at the 0.1 level. ** Coefficient statistically significant at the 0.05 level. ***Coefficient statistically significant at the 0.01 level.

In 1960 when Log GDP is included in the regression as a control variable (Temple and Johnson, 1998:973). Moreover, data do not reveal any break between 1870 and 1890. This suggests that the relationship between social development and income enjoyed some generalised stability in the late-nineteenth century.

As a conclusion for this section we should say that the results show that, after controlling for a range of variables, the social development index SDI still has a significantly positive effect on income. This result holds for both 1870 and 1890.
These results, thus, should be added to those findings for the twentieth century mentioned in the introduction to conclude the following: The results for the nineteenth and the twentieth centuries are not directly comparable because we are not working with strictly the same set of countries and variables. However, there are clear indications of a long run structural positive relationship between what has been called social capital and economic wellbeing.

II.4. THE RELATIONSHIP BETWEEN SDI AND ECONOMIC GROWTH

In the previous sections we investigated the relationship between the SDI and income. Now, we would like to make a contribution to the study of the relationship between the SDI and economic growth in the long run.

We first need to define the long run growth rate. Despite triviality, it is worth recalling here that the long run growth rate is different from the annual growth rate. The annual growth rate is the change in GDP over one year. The long run growth rate is the overall change in GDP over a period longer than one year. Many studies on long run growth rates, -including those discussed in the introduction-, are based on 20-25 years periods.

Generally, the long run growth rate between two designated years is approximated by the log-difference on per capita GDP. For instance, the long run per capita growth rate for the period 1870-1890 is:

\[ GR_{1870-90} = \frac{PC_{GDP_{1890}} - PC_{GDP_{1870}}}{PC_{GDP_{1870}}} \]

Notice that

\[ GR_{1870-90} = \frac{PC_{GDP_{1890}} / PC_{GDP_{1870}} - 1}{PC_{GDP_{1870}}} \]

is a small positive number. Given that the logarithm is a good approximation of a function for any small positive number (like a rate of growth), this expression can be approximated:
\[ \text{GR187090} = \text{LPCGDP1890} - \text{LPCGDP1870} \]

This is the log-difference (difference in logarithms). Growth regressions literature tends to use this formulation. Temple and Johnson (1998) use the log-difference of per capita GDP between 1985 and 1960 as the dependent variable in Figure II.

We calculate three long run growth rates for the following periods: the more recent 1960-1985, as in Temple and Johnson (1998) and the earlier chronologies 1870-1890, 1890-1913, corresponding to the periodisation established by Morris and Adelman (1988) in the original database. Then, we plot them against social development for the initial year of each period: 1960, 1870, and 1890, respectively. The aim of this exercise is to detect how much of the growth to come could have been predicted by just looking at the Social Development Index at the beginning of the period.

Graph 5 shows a cross-plot of social development in 1960 against economic growth in the following 25 years. The associated equation (5) in Table 3 corresponds to a simple regression of long run GDP on initial SDI and a constant term for the full sample (56 countries). The adjusted R-squared for full sample size is .146. Equation (6) in Table 3 corresponds to the same simple regression but this time leaving 2 influential observations outside the analysis. Omitting influential observations raises the adjusted R-squared to .228. This means that the explanatory power of these simple regressions containing just the initial SDI and a constant term is about 20% of total international variation in long run growth rates for the period 1960-85.

In both cases, either including or removing influential variables, the initial SDI coefficient (slope of the line in the plot) is highly significant, and it coincides with that obtained by Knack and Keefer (1997) for the period 1980-1992, using social capital proxies obtained from surveys. In particular, the coefficient of .08 coincides with that of the variable TRUST in Knack and Keefer (1997).
The coefficient (or slope) associated to initial SDI decreases from 8 to 2% when we move to nineteenth century data. However, this milder effect shows persistency throughout the nineteenth century regressions.

The same test with the new nineteenth century SDI allows us to test whether a persistent relationship between social capital and subsequent long run growth already existed at that time. Thus, the question in this section is the following: Would social capital estimates for the nineteenth century have been able to say something about subsequent economic growth? The answer is yes. There is some evidence of a milder but stable relationship between nineteenth century SDI and subsequent long run growth.
Graph 6 - Social Development in 1870 and Economic Growth 1870-1890

Graph 7 – Social Development in 1890 and Economic Growth 1890-1913
Table 3
Level of association between Social Development and Growth
Dependent Variable: Long Run Growth of GDP  Method: OLS

<table>
<thead>
<tr>
<th>Period</th>
<th>Observations</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870-90</td>
<td>20</td>
<td>.016</td>
<td>.021**</td>
<td>.022</td>
<td>.027**</td>
<td>.080***</td>
<td>.085***</td>
</tr>
<tr>
<td>1870-90</td>
<td>19</td>
<td>.010</td>
<td>.008</td>
<td>.015</td>
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<td>.024</td>
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<td>1890-1913</td>
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<td>.077</td>
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<td>1960-85</td>
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<td>.107</td>
<td>.059</td>
<td>.218</td>
<td>.146</td>
<td>.228</td>
<td>.228</td>
</tr>
</tbody>
</table>

Notes: Constant not shown. Standard deviation of coefficients between parentheses. Influential observations outside 2 standard deviations (Argentina for 1870, Argentina and Canada for 1890, Somalia and Sri Lanka for 1960). ** Coefficient statistically significant at the 0.05 level. *** Coefficient statistically significant at the 0.01 level.

Graph 6 depicts 1870 SDI against the growth in the following twenty years. Some positive but weak correlation is revealed, with a non-significant coefficient in the corresponding linear regression (see Table 3). It is worth noting from the figure, though, that Argentina seems to be playing against the general tendency of low social development, low growth. Argentina’s economic performance in the period 1870-1890 was comparatively better than other countries with the same 1870 SDI, like Spain or Japan. What was special about Argentina would deserve further investigation. If we remove Argentina from the sample, we find that the R-squared rises to 30.5% and the coefficient in the regression becomes significant at the 0.05 level. Likewise, if we remove the influential observations corresponding to Argentina and Canada from the 1890-1913’s analysis, the adjusted R-square almost quadruples (Table 3, equation 4). These important changes in R-squares underline the relevance of the outliers. Certainly, we can identify well differentiated growth trajectories in the late-nineteenth century, which deserve case studies of their own.

Finally, we repeat all the analysis for the three periods 1960-1985, 1870-1890, and 1890-1913 following the Temple and Johnson (1998) procedure to control for counteracting effects of initial GDP.

In general, economic theory predicts a negative correlation coefficient between the rate of growth and initial GDP. Countries that start from low levels of GDP tend to grow faster, and vice versa. This is called the “catching-up” effect (Abramovitz,
1986). In order to counteract the catching-up effect, we follow the same procedure as Temple and Johnson (1998). We first run a linear regression of SDI on initial Log GDP. Then, we understand that the resulting residuals of this regression are the part of SDI that is not affected by initial income (because we just made them orthogonal to income). And finally we run the regression we are really interested in, which is the long run rate of growth on the orthogonalised SDI.

A one-step way of dealing with the “catching-up” effect is to run a regression of the long run growth rate on SDI and initial Log GDP, the latter acting as a control variable. After performing these 2 alternative analyses, results do not change much. We omit presentation of the results for brevity.

III. CONCLUSION

This is the first empirical investigation on the economic welfare implications of social capital for an international panel of countries in the nineteenth century. We show some evidence pointing at a stable long run structural relationship between social capital and macroeconomic performance. Firstly, we confirm that in the post-Second World War era, countries with higher levels of social development are associated to higher levels of income and vice versa. Secondly, making use of a new social development index for 1870 and 1890, we find that this positive relationship between social development and log per capita income already existed in the late nineteenth century. At this respect, we find a strong positive linear association between the two variables. Regression results show coefficients that are significantly different from zero in all years discussed, and very similar between them. This upholds after controlling for foreign trade volume and structure, urbanisation, education, quality of institutions, political stability, government expenditure, population growth, and climate.

On the other hand, a statistically significant relation between social capital and long run economic growth for the mid-late-twentieth century is also confirmed. Our new findings include that the coefficient (or slope) associated to initial SDI decreases from 8 to 2% when we move backwards in time to nineteenth century data. However, this
milder effect shows persistency throughout the nineteenth century regressions. So, there is some new evidence suggesting a milder but stable relationship between social capital in the nineteenth century and subsequent long run growth.

We can conclude that social development is positively related to economic wellbeing, and this relationship already existed in the nineteenth century.

REFERENCES


