

Does Social Capital Promote Industrialization? Evidence from a Rapid Industrializer

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January 2005

Abstract: A new stylized fact in development economics is the importance of social capital in promoting economic growth. This paper examines the effect of social capital on industrialization in Indonesia. We analyze a rich set of social capital and social interaction measures, including voluntary associational activity, and levels of trust and informal cooperation. The main finding is that initial social capital does not predict subsequent industrial development across 274 Indonesian districts. While these findings are for only a single nation and may not apply everywhere, they call into question recent claims regarding social capital and economic development.

JEL Codes: O14, Z13

Acknowledgements: We are grateful to the Bureau of Statistics of the Government of Indonesia for providing access to the data, and to the U.C. Berkeley Center for the Economic Demography of Aging (CEDA) and the U.C. Berkeley Clausen Center for funding. We are also grateful to Garrick Blalock, Maya Federman, K. Kaiser, and Jack Molyneaux for sharing data with us. We would like to acknowledge Kok-Hoe Chan, Fitria Fitriani, Sebastian Martinez, and Robert Akerlof for excellent research assistance, and are grateful to George Akerlof, Edward Glaeser, Gillian Hart, Michael Kremer, Ronald Lee, seminar participants at U.C. Berkeley, Harvard University and the World Bank, and anonymous referees for useful comments. Contact: Edward Miguel (phone 1-510-642-7162).

1. Introduction

Social networks affect a wide array of economic outcomes, ranging from informal credit and insurance, to contracting and the provision of local public goods.¹ A provocative recent claim is that dense social networks, or social capital, can promote economic growth and industrialization. Perhaps most famously, Putnam provides evidence from the history of economic growth across Italian regions (1993: 180) that “networks of civic engagement contribute to economic prosperity.”

Consistent with this view, Grootaert (1999) and Narayan and Pritchett (1999) also find a positive correlation between dense social networks and economic development comparing cross-sections of villages, while Knack and Keefer (1997) provide similar correlations in a cross-country analysis.

We examine how the presence of several measures of social capital predict growth in manufacturing employment across Indonesian districts from 1985 to 1995. This was a period of extremely rapid industrial development in Indonesia, in which real per capita income grew by an impressive 70% and manufacturing employment doubled (World Bank 2002). This paper uses new and larger datasets than previous single-nation studies to examine this question. We combine Indonesian household and village level nation-wide surveys to create a panel dataset of 274 districts. The dataset contains a uniquely rich set of social networks measures following those outlined in the existing literature (Fukuyama 2000, Putnam 1995): the density of voluntary community associational activity, and levels of trust and informal cooperation. Examining patterns across districts within a single country – with its shared survey instruments and institutions – reduces some of the measurement problems and omitted variables that plague cross-country regressions. The main finding is that the initial density of social networks does not predict subsequent industrial development in Indonesia. While concerns about causality remain, we are careful to use pre-existing social capital measures to predict later industrial development, and employ extensive district-level

¹ Important early contributions in this literature include Besley, Coate and Loury (1993), Greif (1993), Udry (1994), and Alesina, Baqir and Easterly (1999).

controls variables to reduce possible omitted variable bias.

Despite the richness of the dataset that we have assembled, this remains a study of one country in one period. Thus, the question of the relevance of the findings for other societies is important. Indonesia's industrialization took place in a setting where government played a leading role in the economy – both directly through extensive regulation and planning, and also through the “crony capitalism” practiced by former president Suharto and his family – and we cannot rule out the possibility that where the hand of government is less visible, social networks would play a more important role in funneling credit, knowledge, and other resources into new manufacturing. Nonetheless, the degree of state intervention in the economy, and high-level corruption, found in Indonesia during the study period are hardly unique among less developed countries, and this suggests that the main empirical results are likely to hold lessons beyond Indonesia.

The paper is structured as follows. Section 2 discusses the dimensions of social interactions in Indonesia that we study and our measures of them, and also describes the economic and political context in Indonesia. Section 3 briefly outlines existing theories of social capital and economic development. Section 4 presents the identification strategy and empirical results. In the final section we discuss the limitations of the analysis, and possible implications for other societies.

2. The Indonesian Context

The vast majority of the population in the Indonesian archipelago live in cultures that historically have had a rich set of community organizations and rich informal networks. In this section we briefly describe the measures of social interactions that we employ in the analysis. These measures are found in a variety of data sources collected by Indonesia's Central Bureau of Statistics (BPS), including the PODES community (*desa*) survey, and the SUSENAS and SUPAS household surveys, as well as the Indonesian Family Life Survey (IFLS); the Appendix describes these datasets in further detail.

2.1 Community Groups

Most Indonesian cultures are well known for their rich set of traditional community groups.² Former president Suharto's New Order regime built on this tradition, as well as on the community- and neighborhood-level structures established by the Japanese during their occupation of the archipelago during World War II, and mandated a large number of groups for each community (Grootaert 1999). Beyond these government-sponsored groups, other non-governmental community groups are ubiquitous, often growing out of informal rotating savings and credit associations (ROSCAs) called *arisan* in Indonesian. During the period we study there was also a flowering of community groups sponsored by non-governmental organizations. Eldridge (1995: 53) describes a typical Indonesian community self-help group:

Local income-generation programs operated by small local groups, either independently or in association with some larger [NGO], are fairly pervasive in Indonesia, most commonly in the form of informal or formal co-operative enterprises, *arisan*, savings and loan groups, and credit unions. ... Perhaps the most creative mode of income generation ... is the revolving fund. This practice is commonly associated with small, informal co-operatives, which are often built on traditional-style associations such as *arisan*. ... This process obviously depends on efficient organization and high levels of mutual support and reciprocity.

Such community credit groups have long been cited as an important manifestation of social capital (Putnam 1993), and recent research by Anderson et al. (2003) confirms that strong local social ties are essential for their success in practice.

Beyond non-governmental credit groups, we have also obtained detailed information on the number of state-led community credit groups (called KUD), traditional arts groups, sports groups, youth groups, farmers groups (called P3A), and both Muslim and non-Muslim religious institutions in Indonesian communities. These community-level survey measures are then aggregated up to district-level averages, where they are matched up with district-level industrialization measures, for

² For more on Indonesian community groups see Lont (2000).

the empirical analysis.

2.2 Informal Social Networks

Community group data captures relatively formal expressions of social networks and social interactions. It remains possible that informal forms of cooperation are better proxies for underlying social capital. This concern might be particularly important in Indonesia where many formal social networks were encouraged or mandated by the state, and state influence could be correlated with later industrialization.

To partially address such concerns about formal social capital measures, we also analyze two proxies for informal social interactions. While no single measure can adequately capture all that one might mean by informal social interactions, taken together these measures fill some of the gaps.

The first measure of informal social capital is the proportion of per capita expenditures on festivals and ceremonies, from the SUSENAS household survey. Intuitively, communities with frequent festivals are likely to have closer social connections; as Breman (2001: 261) argues, such expenditures are likely to be a good measure of underlying social networks in Indonesia because “the cycle of rituals and festivities ... give meaning and articulation to the collective dimensions of [an Indonesian] locality.”

The second measure of informal social capital is derived from the traditional customs and law (*adat*) module of the Indonesia Family Life Survey³. In 270 rural enumeration areas, village chiefs identified a local expert in *adat*, and these experts were asked to state whether a particular norm had held in traditional law, and whether it remained common practice at the time of the 1997 interview. These responses are best thought of as the opinions of influential community members.⁴ The *adat*

³ For more on the IFLS, see Frankenberg and Thomas (2001).

⁴ The selection process of *adat* respondents is not transparent (and very few women were included, for example). “Traditional times” is also a vague concept, open to multiple interpretations. Finally, since only one person was interviewed per community, there is no way to validate their opinions. Nonetheless, this unique dataset provides novel insights into social change in Indonesia.

survey instrument contains one retrospective question directly related to informal social capital, the extent of an “ethic of mutual cooperation” traditionally found in the community, which takes on a value of one if there was cooperation and zero otherwise.

A number of influential commentators have argued that relations within the family should be considered included as an additional dimension of informal social capital (Costa and Kahn 2001; Putnam 1995: 73). Two possible measures are the extent of elderly co-residence with children – which proxies for the strength of social ties within the family, and also constitutes a form of insurance for the elderly – as well as the divorce rate (in both cases we use SUPAS data for these measures). While we analyzed these rates as predictors of future industrialization, we are concerned about how these measures relate to what is usually meant by social capital. For instance, divorce has many disparate causes. Thus we do not focus on family relations in the main empirical analysis.

2.3 The Economic and Political Environment in Indonesia

Upon independence Indonesia was one of the poorest nations in the world. Yet soon after the dictator Suharto took power in 1965, Indonesia began a thirty year spurt of extremely rapid economic growth, among the fastest in recorded history. Initially in the 1970s, much of this growth was driven by revenue from oil and other natural resources, and as late as 1980, manufacturing constituted a small share of the economy (Cribb and Brown 1995). By the early-1980s, however, that situation began to change drastically as the government gradually relaxed restrictions on new businesses and investment, including those with foreign involvement. Importantly for the analysis in this paper, by the mid-1980s government investment policy no longer explicitly favored specific regions (Hill 1996), and so patterns of investment and industrialization were increasingly determined by private-sector decisions rather than government regulation.

This policy change does not imply that there was a completely level playing field for all investors, or that political favoritism had been eliminated. Fisman (2001), among others, has

documented the extent to which political connections to Suharto, his family, and cronies were crucial for firm success in Indonesia during the 1980s and 1990s, the full extent of which only became apparent in the aftermath of the Asian Financial Crisis.

Nonetheless, the magnitude of the Indonesian economic boom of the 1980s and 1990s meant that many regions of the country and many industrial sectors benefited from the increasingly open investment climate, and not just those with close ties to Suharto. To illustrate, manufacturing employment as a share of the full-time economically active population (those working over 20 hours per week, or unemployed) more than doubled between 1985 and 1995, rising from 6.3 to 13.1% (Table 1, Panel A).⁵ The question this paper asks is whether initial social capital measures predict any of this surge in industrialization.

3. Theories of Social Capital and Industrialization

We discuss several theories of how social capital might promote or hinder industrialization, highlighting only a few of the many proposed mechanisms, and then let the data speak in the following section.

One set of theories, currently very influential in development economics, stresses out how some types of social networks can promote industrialization.⁶ As noted in the introduction, Putnam (2000) emphasizes that norms of reciprocity and trustworthiness are essential for economic growth, and that dense social networks help maintain such norms. Networks of mutual obligation may also encourage entrepreneurship; for example, individuals may be more willing to undertake promising but risky projects if there exists a strong community safety net. Informal financial institutions based

⁵ To control for possible changes in labor force participation due to industrialization, we focus on the change in manufacturing employment as a share of total adults in the district in 1985, which also doubled during the study period from 3.3% to 6.7% (Table 1, Panel A).

⁶ Dense social networks may also promote well-being through other channels, including better governance and a feeling of individual “belonging” to a community, but we focus on industrial development in this paper.

on social capital, including rotating savings groups, may provide an important source of investment for such projects. Social networks can also provide access to distant markets and permit transactions that are separated in time and space; Greif (1993), for example, examines the role dense social networks played in permitting long-distance trade in the medieval Mediterranean. More generally, large networks make it more likely a potential entrepreneur can mobilize resources to start a new enterprise and find the necessary suppliers, customers, and employees.⁷

At the same time, an extensive, older literature suggests that, in at least some cases, traditional norms supported by dense social networks can impede industrialization. For an example from Indonesia, Geertz (1963) argued that traditional forms of Javanese social networks would produce continued economic stagnation by stifling saving and investment. Intuitively, if one's social network always shares in the returns to an investment, potential entrepreneurs' return to hard work and savings is diminished and this disincentive may prevent some profitable activities from being undertaken. This argument about the deleterious effects of strongly egalitarian social networks has been formalized by Platteau (2000) in the context of rural African underdevelopment. Strong traditional social networks and norms might also discourage the adoption of unfamiliar and unconventional new technologies and economic activities, further stifling growth (Akerlof 1976).

4. Estimation and Results

4.1 Estimation Strategy

We focus on the relationship between initial social capital measures and subsequent industrial change. These estimates help establish the extent to which manufacturing enterprises were formed in, or sought out, regions with dense initial social networks.

⁷ Glaeser et al. (2002) develop a complementary theoretical approach to social capital based on the standard model of optimal investment over time. Other notable recent contributions to the theory of social capital include Woolcock (1998) and Francois (2002).

The main specification is presented in Equation 1 below. The change from 1985 to 1995 in the proportion of adults in manufacturing employment in district d , ΔMFG_d , is the dependent variable. Initial measures of social capital, including both formal community groups and informal measures, are the key explanatory variables, $SOCIAL_{0,d}$ (where “0” denotes initial values as close as possible to the year 1985). Extensive district characteristics ($Z_{0,d}$) are included as further controls, and these include geographic controls (indicator variables for island groups, district altitude, and whether the district is land-locked), initial infrastructure including electricity and road quality, baseline educational attainment and earlier school construction in the district, and if the district is urban.

$$(1) \quad \Delta MFG_d = \alpha + \beta \cdot SOCIAL_{0,d} + Z_{0,d}'\delta + \varepsilon_d$$

In some specifications we also control for baseline manufacturing employment, and typically find that these measures positively predict subsequent growth of manufacturing employment in the district. Since it remains possible that initial manufacturing intensity is a result of the same underlying social characteristics that affect future industrialization (and thus to some extent, initial manufacturing proxies for social capital), we always present specifications that exclude initial manufacturing, as well.

It is important to acknowledge that we cannot definitively rule out the possibility that some unobserved district characteristic affects both initial social capital and later industrialization, leading to spurious results. However, the use of a rich set of baseline district controls, and the fact that the social capital measures predate the industrialization outcomes, reduce concerns about omitted variable bias and endogeneity.

Industrialization outcomes may be correlated among nearby districts due to (unobserved) common policy choices, political leadership, weather, and ethnic or religious influences. To account for this possibility, in the analysis we allow for a common random effect across all districts in the

same province, using clustered standard errors.⁸

The former province of East Timor and the province previously known as Irian Jaya (before its division and subsequent name changes) are excluded from the analysis due to concerns over data quality, and because they suffered from civil conflict for parts of this period. We also combine districts that merged or split to reformulate them into the largest unit consistently defined from 1985 to 1995. The resulting dataset contains complete industrialization information for 274 districts.

4.2 Results

The 1980s and early 1990s were a period of rapid industrialization in Indonesia, with sharp increases in manufacturing employment and per capita consumption expenditures (Table 1, Panel A), as well as major increases in educational attainment and urbanization (not shown). The map in Figure 1 divides districts into three quantiles based on the extent of industrialization (measured by the percentage change in manufacturing employment) during the period 1985-1995. It is apparent that the increase in manufacturing employment was fairly evenly spread around the archipelago, with high concentrations on Java, but also in Riau on Sumatra, West Kalimantan on the island of Kalimantan, and in parts of the outer islands. The correlation of the change in industrialization between a district and other districts in the same province was only 0.29, again suggesting a relatively even spread.

The first social capital measure we focus on is the density of non-governmental credit cooperatives, a community organization which many authors have argued is a particularly good proxy for underlying social capital, as discussed in section 2.1 above. The density of non-

⁸ We also adjusted standard errors allowing disturbances to be correlated across districts as a general function of distance in certain specifications using the GMM estimator in Conley (1999). Following Conley (1999), spatial standard errors were calculated with a weighting function that is the product of a kernel in each direction (North to South, East to West); the kernels start at one and decrease linearly until they are zero at 600 kilometers from the district capital, although results are robust to varying this cut-off. Standard error estimates obtained using this method are similar to the results using province clustering (regressions not shown).

governmental credit cooperatives in 1986 is not a statistically significant predictor of industrialization from 1985 to 1995 in a basic specification without other explanatory variables (-0.024, standard error 0.064 – Table 2, regression 1), and the point estimate remains small and insignificant when island group fixed effects are included (-0.057, standard error 0.061 – regression 2). This specification is supplemented with the initial values of other potential determinants of manufacturing growth, including: the proportion of the district population living in communities with access to electricity, which has a positive effect on subsequent industrialization as expected (0.073, standard error 0.037, statistically significant at 90% confidence, regression 3); as well as average road quality in the district, urbanization, and average educational attainment in the district in 1985, none of which is statistically significant at traditional confidence levels, perhaps surprisingly. We also find no effect from Duflo's (2001) measure of the increase in access to schooling (measured by the change from 1973 to 1984 in schools per school-age population in the district); that is, rapid school-building in the decade before 1985 does not predict rapid industrialization after 1985.

The lack of an urbanization effect may be due to negative congestion effects. Overall, geographic factors – the island group indicator variables, whether the district is coastal, and district altitude – do not strongly predict the expansion of manufacturing employment.

In contrast, initial local manufacturing employment in 1985 has powerful effects in predicting manufacturing growth from 1985 to 1995 (1.09, standard error 0.38 – Table 2, regression 4), although industrialization in other districts in the same province does not. The inclusion of these baseline industrialization controls does not substantially affect the point estimate on the measure of initial non-governmental credit cooperatives (estimate -0.047, standard error 0.069).

We next carry out a similar analysis for nine other measures of initial social capital, both for a specification including the initial industrialization controls and one excluding the industrialization

controls.⁹ For the full specification including the initial industrialization controls, only one of the ten initial social capital measures is statistically significant at 95% confidence, the coefficient estimate on the existence of a traditional arts group (-0.056, standard error 0.019 – Table 3, column 1), and only one other estimate is statistically significant at 90% confidence, the coefficient estimate on the density of mosques, and that estimate is positive (0.0076, standard error 0.0042).

Taken together, there is no clear evidence in Table 3 that social capital effects subsequent industrialization. Three of the ten point estimates in the specification with industrialization controls are positive (and one is marginally statistically significant, as discussed above), and seven are negative (one of which is significant at 95% confidence – Table 3, column 1). This dispersion of estimates is roughly what would be expected from random sampling variation when the true effect of social capital is zero. When all ten measures are included simultaneously in a single regression, only the existence of a traditional arts group has a significant effect (regression not shown).

We create two indices in an attempt to combine information across the many distinct social interaction measures. The first index combines information from the eight community group measures (rows 1-8 in Table 3) as follows: first, each of the community group measures are normalized to have mean zero and standard deviation one, and then these eight normalized variables are summed and again re-normalized to generate the index. The second index is created similarly, but uses information for all ten initial social capital measures (rows 1-10 in Table 3). Neither index significantly predicts subsequent industrialization at traditional confidence levels in the specification including the baseline industrialization controls (Table 3, column 1, rows 11-12).

Analogous results are presented for specifications without the baseline industrialization controls, and these yield a similar pattern – although if anything the impact of initial social capital on industrialization is somewhat more negative in this case. In addition to the existence of a traditional

⁹ Specifically, the specifications in Table 3, column 1 are analogous to Table 2, regression 4, and those in Table 3, column 2 are analogous to Table 2, regression 3.

arts group, which remains negative and statistically significant (-0.075, standard error 0.025 – Table 3, column 2), now two other initial social capital measures – the number of arts and sports groups in a community in 1986 (-0.0041, standard error 0.0020) and the share of household expenditures on ceremonies and festivals in 1985 (-2.01, standard error 0.84) – are statistically significantly negatively related to industrialization. Overall, only one of the ten point estimates – the coefficient estimate on mosque density – is positively correlated with subsequent industrialization, while nine of ten are negative (column 2).

When information across these measures is combined in the indices, the community group index is not statistically significant at traditional confidence levels, and the index using all ten social capital measures is negative and marginally statistically significant (-0.0244, standard error 0.0134, column 2, row 12). In both cases, nonetheless, the negative point estimates are modest: a one standard deviation increase in the social capital indices translates into a 0.3-0.8 standard deviation decrease in manufacturing employment growth. This is suggestive, but ultimately inconclusive, evidence that initial social capital actually had a slightly negative effect on industrial development in Indonesia, perhaps along the lines suggested by Geertz (1963).

Finally, to cast our net wide as wide as possible, we also examined the impact of two aspects of family relations which some consider a dimension of social capital, the extent of elderly co-residence with children and the divorce rate of women. Neither is significantly related to subsequent industrialization at traditional confidence levels in the two main specifications (all point estimates on initial family relations are positive but statistically insignificant, regressions not shown), further evidence on the weak link between initial social capital and industrialization in Indonesia during the 1980s and 1990s.

5. Conclusion

This paper's empirical results provide new insights into the current debate on the role of social

capital in economic development. Using a unique dataset of district-level data that we assembled, we find that the initial density of social networks does not predict subsequent industrial development in Indonesia, across a variety of econometric specifications and for multiple measures.

This finding does not imply that social networks and social interactions can never affect industrial development; it merely shows that in the Indonesian case during the study period any benefits of dense social networks were counteracted by their costs, or that other local economic, institutional or political factors were the prime drivers of industrial development. Nonetheless, because Indonesia was among the world's fastest growing economies during the 1980s and 1990s, the fact that social capital appears to play little role in understanding which Indonesian districts industrialized is noteworthy, and perhaps calls for a partial re-evaluation of the now widespread view that social capital is a crucial determinant of economic development.

In a companion paper (Miguel, Gertler, and Levine 2003), we show that Indonesian districts that experienced rapid industrialization also experienced significant increases in most social capital measures during the period 1985-1997. In a second main finding of that paper, districts that neighbor rapidly industrializing areas exhibited high rates of out-migration, which appear to have led to significantly fewer credit cooperatives and a reduction in "mutual cooperation" as assessed by village elders in those districts. Together with the results of the current paper, these findings challenge well-known empirical studies which use observed positive cross-sectional correlations between income levels and social networks to claim that denser social networks promote economic development. These findings thus directly relate to Sobel's (2002) critique that existing research often confuses the causes and effects of social capital. While strong social networks may (or may not) be essential for achieving collective action, good governance, and improving human welfare more broadly, we find no evidence that they promoted industrial development in Indonesia.¹⁰

¹⁰ In a related point, Gertler, Levine, and Moretti (2001) find that Indonesian individuals with richer social networks do not have better informal insurance against adverse health shocks (as measured by

The results of this paper thus provide a new perspective on Putnam's (1993) seminal research on Italy. Putnam's stylized facts are that Northern Italy has a dense network of community groups and a prosperous industrial economy, while Southern Italy currently has relatively few groups and is poor. To sort out causality, Putnam employs historical evidence to argue that social capital has in fact been a key driver of Italian economic and political development over the past centuries. However, as Putnam himself acknowledges, large-scale out-migration from Southern Italy to Northern Italy in the 20th century – in response to differential rates of industrial development – may also have contributed to lower current levels of social capital in Southern Italy, as we claim occurred in Indonesia.

At the same time, it is important to recall that, like Putnam's classic study of Italy, ours is a case study of one nation during one era. And it is possible that the corruption that pervaded Suharto's regime – especially by the end of the study period – led non-economic factors to often become important determinants of investment patterns. The prominence of the ethnic Chinese minority among Indonesian entrepreneurs is another plausible explanation why social capital measures for the population as a whole do not predict industrialization.¹¹ If so, these results might not completely generalize to other settings with different economic and political institutions or ethnic makeup. Nonetheless, the high degree of state economic intervention, widespread corruption, and ethnic diversity in Indonesia are hardly unique among less developed countries, and this suggests that the findings of this paper could be relevant elsewhere.

consumption smoothing).

¹¹ We thank a referee for this point.

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Table 1: Summary Statistics

Variable description (Data source)	Mean	Standard deviation
Panel A: District economic, educational, and geographic characteristics		
Proportion manufacturing workers among population aged 16-60 years, 1985, district average (SUPAS)	0.033	0.030
Proportion manufacturing workers among population aged 16-60 years, change from 1985 to 1995 change, district average (SUPAS)	0.034	0.051
Proportion manufacturing workers among population aged 16-60 years, working at least 20 hours/week, change from 1985 to 1995, district average (SUPAS)	0.068	0.037
Monthly per capita expenditures (in 1985 rupiah), change from 1985 to 1995, district average (SUPAS)	13104	7118
Proportion of population in villages with access to electricity, 1986 (PODES)	0.75	0.19
Average road quality (1=dirt, 2=gravel, 3=asphalt), 1986 (PODES)	2.24	0.40
Change (1973/74-1983/84) primary and junior high schools per 1973 school-age population (Ministry of Education)	0.0026	0.0014
Average years of schooling attained among ages 18 to 49, 1985 (SUPAS)	5.61	1.58
Proportion of population living in urban areas, 1985 (SUPAS)	0.27	0.30
Proportion of population living in non-coastal areas, 1986 (PODES)	0.87	0.17
Proportion of population in high altitude areas, >500m, 1986 (PODES)	0.25	0.26
Panel B: District social capital measures		
Non-governmental credit cooperatives per 1000 population, 1986 (PODES)	0.092	0.074
Total credit cooperatives (state, non-governmental) per 1000 people, 1986 (PODES)	0.131	0.085
Existence traditional arts group in community, 1986 (PODES)	0.17	0.12
Number of distinct types of arts and sports groups in community, 1986 (PODES)	4.13	0.94
Existence of scout youth group in community, 1986 (PODES)	0.79	0.25
Mosques per 1000 people, 1986 (PODES)	0.84	0.52
Non-Muslim places of worship per 1000 people, 1986 (PODES)	0.21	0.45
Existence farmers' irrigation group (P3A) in community, 1986 (PODES)	0.39	0.30
Share of household expenditure on ceremonies and festivals, 1985 (SUSENAS)	0.027	0.022
Community "ethic of mutual cooperation" in traditional times, <i>adat</i> (1997 IFLS)	0.988	0.076

Notes: Summary statistics weighted by district population. Data sources are in parentheses. All summary statistics are for the sample of 274 districts, except for the share of household expenditures on ceremonies (N=262) and the community "ethic of mutual cooperation" (N=142).

† 1997 figures deflated with consumer price data from WB-GDN database. 1 USD=1110.6 rupiah (1985).

Table 2: Predicting Industrialization with Economic Controls and Credit Cooperatives

	Dependent variable: Change (1985-1995) proportion manufacturing workers among population aged 16-60 years, district average			
	(1)	(2)	(3)	(4)
Non-governmental credit cooperatives per 1000 population, 1986	-0.024 (0.064)	-0.057 (0.061)	-0.064 (0.077)	-0.047 (0.069)
Proportion of population with access to electricity, 1986			0.073* (0.037)	0.019 (0.019)
Average road quality (1=dirt, 2=gravel, 3=asphalt), 1986			-0.019 (0.013)	0.003 (0.007)
Change (1973/74-1983/84) primary and junior high schools per 1973 school-age population			5.5 (4.3)	4.2 (3.6)
Average years of schooling attained among ages 18 to 49, 1985			0.002 (0.007)	0.002 (0.006)
Proportion population living in urban area, 1986			-0.005 (0.017)	-0.057* (0.033)
Proportion of population living in non-coastal areas, 1986			0.021 (0.024)	0.010 (0.022)
Proportion of population in high altitude areas >500m, 1986			-0.004 (0.006)	-0.017 (0.014)
Proportion manufacturing workers among population aged 16-60 years, district average, 1985				1.09*** (0.38)
Proportion manufacturing workers among population aged 16-60 years, other districts in the province, 1985				-0.28 (0.42)
Island fixed effects	No	Yes	Yes	Yes
R ²	0.00	0.09	0.15	0.34
Observations (districts)	274	274	274	274
Mean of dependent variable	0.092	0.092	0.092	0.092

Notes: OLS regression results. Robust standard errors in parentheses. Disturbance terms are clustered by province; significance levels are unchanged using the method in Conley (1999). Significantly different than zero at 99 (***), 95 (**), and 90 (*) percent confidence. The island groups are: Kalimantan (0.050 of sample population), Java-Bali (0.634 of sample population), Sulawesi (0.064 of sample population), and Sumatra (0.206 of sample population); the omitted island group is Maluku and Nusa Tenggara (the outer islands, 0.046 of sample population).

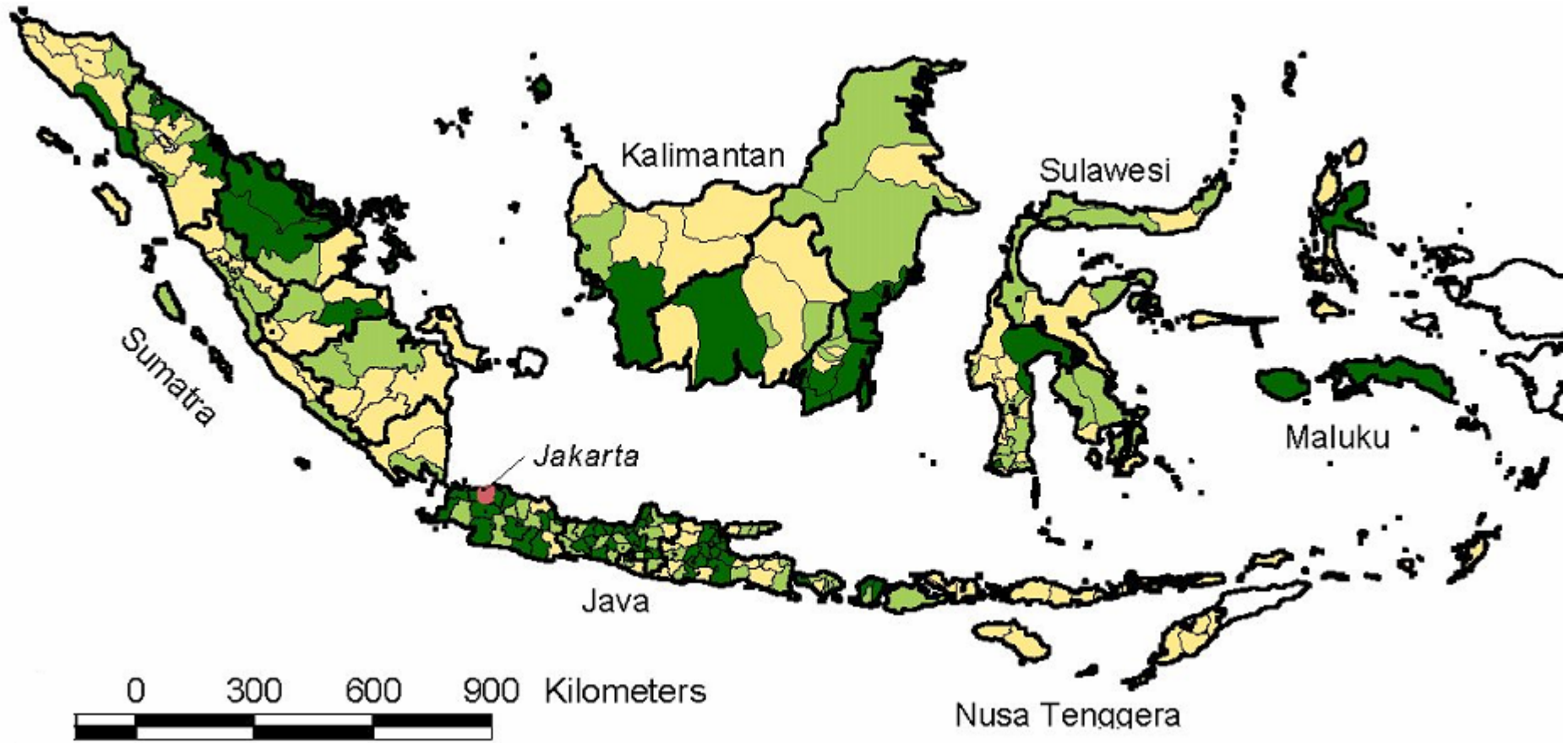
Table 3: Predicting Industrialization: Social Capital Measures

Initial social capital measure (explanatory variable)	Coefficient estimate on initial social capital measure (s.e.):	
	With initial manufacturing controls	No initial manufacturing controls
	(1)	(2)
1) Non-governmental credit cooperatives per 1000 people, 1986	-0.047 (0.069)	-0.064 (0.077)
2) Total credit cooperatives (state, non-governmental) per 1000 people, 1986	-0.056 (0.060)	-0.069 (0.069)
3) Existence of traditional arts group in community, 1986	-0.056*** (0.019)	-0.075*** (0.025)
4) Number of distinct types of arts and sports groups in community, 1986	-0.0010 (0.0024)	-0.0041** (0.0020)
5) Existence of scout youth group in community, 1986	0.004 (0.015)	-0.002 (0.019)
6) Mosques per 1000 people, 1986	0.0076* (0.0042)	0.0049 (0.0054)
7) Non-Muslim places of worship per 1000 people, 1986	-0.0061 (0.0052)	-0.0068 (0.0065)
8) Existence farmers' irrigation group (P3A) in community, 1986	0.003 (0.012)	-0.018 (0.027)
9) Share of household expenditure on ceremonies and festivals, 1985	-0.24 (1.11)	-2.01** (0.84)
10) Community "ethic of mutual cooperation" in traditional times (<i>adat</i>)	-0.13 (0.12)	-0.23 (0.15)
11) Social capital index – community groups (normalized measures 1-8)	-0.0048 (0.0055)	-0.0105 (0.0084)
12) Social capital index – all measures (normalized measures 1-10)	-0.0133 (0.0099)	-0.0244* (0.0134)

Notes: OLS regression results. The dependent variable is the change (1985-1995) in the proportion of manufacturing workers among population aged 16-60 years, district average. Robust standard errors in parentheses. Disturbance terms are clustered by province; significance levels are unchanged using the method in Conley (1999). Significantly different than zero at 99 (***), 95 (**), and 90 (*) percent confidence. Each coefficient estimate is from a separate regression. The specification in column 1 is analogous to Table 2, regression 4, and column 2 is analogous to Table 2, regression 3 (with the social capital measures included as explanatory variables one at a time).

Village level data is from PODES 1986, 1993, and 1996. District level industrialization data is from SUPAS 1985, 1995. All regression are for the sample of 274 districts, except for the share of household expenditures on ceremonies (N=262), the community "ethic of mutual cooperation" (N=142), and the social capital index – all measures (N=142). The social capital indices (rows 11-12) are constructed as follows: first, each of the measures (in rows 1-8 for the community groups index, and rows 1-10 for the all measures index) are normalized to be mean zero, standard deviation one; the sum of these variables is normalized to mean zero, s.d. one to generate the index.

Figure 1: Industrial development in Indonesia, 1985-1995



Notes: Percentage change in the proportion of manufacturing workers 1985 to 1995 among population aged 16-60 years, district averages, SUPAS. Light gray denotes the bottom third of districts in terms of percentage change in industrialization, gray denotes the middle third of districts, and dark gray denotes the top third of districts. The white areas on the map – East Timor and Irian Jaya – are excluded from the analysis.

Appendix: Data Sources

Village Potential Statistics (PODES)

The Village Potential Statistics (PODES) survey provides detailed information about the characteristics of villages and urban neighborhoods. We analyze the 1986 PODES survey. Over 60,000 village heads or neighborhood leaders filled out the survey about their area in each year in all districts, excluding East Timor and Irian Jaya. We also use PODES data of geographic characteristics, including altitude, being land-locked, and community land area, as well as infrastructure, including road quality and access to electricity.

National Socio-Economic Survey (SUSENAS)

The National Socio-Economic Survey (SUSENAS) is an annually repeated cross-section. It surveyed between 20,000 and 50,000 households per year in the mid-1980s, and approximately 200,000 households per year by the mid-1990s. We focus on the 1987 SUSENAS survey, which contains information on per capita household spending on “ceremonies and festivals”, which we use as a measure of the strength of informal social networks. The SUSENAS sample was selected to be representative for each of Indonesia’s districts. Smaller districts were over-sampled to improve statistical precision. (This section draws heavily on Surbakti (1995).)

Intercensal Population Survey (SUPAS)

The Intercensal Population Surveys (SUPAS) are carried out every ten years, in the mid period between complete population censuses. We analyze the 1985 and 1995 SUPAS. The 1985 SUPAS covered 126,696 households and 605,858 individuals, while the 1995 survey covered 216,946 households and 948,380 individuals. Sampling rules generally follow those of the SUSENAS. The specific variables we use from SUPAS include the proportion of elderly individuals (at least 60 years old) co-residing with adult children (at least 18 years old), and most importantly, the proportion of the adult population working in manufacturing occupations – the principal measure of district industrialization. (Maya Federman kindly created several SUPAS variables for us.)

The Indonesia Family Life Survey (IFLS)

The IFLS is a representative sample of 83% of the population on Indonesia as of late 1993, covering 13 of Indonesia’s 27 provinces (Frankenberg and Thomas 2001). The smallest provinces and politically unstable regions – such as Irian Jaya and the former East Timor – were not sampled. We use 1997 information across several hundred communities. In each community the IFLS interviewed an expert in local customs and laws (*adat*). We have *adat* information on 142 of the 274 districts we analyze, and these districts contain over two-thirds of Indonesia’s 1985 population.

A possible concern with our focus on the number of community groups reported in the PODES, rather individual group membership, in the analysis is whether village head reports correlate well with memberships reported by households. We examined this question using the second wave of the Indonesian Family Life Survey, which asked households about membership in twelve different types of community groups. The IFLS separately surveyed village heads and leaders of local women’s groups about the presence of community groups, ten of which were also included on the households’ list. These groups include: voluntary labor groups; community meetings; cooperative groups (of any kind); neighborhood improvement programs; neighborhood security organizations; drinking water systems; washing water systems; garbage disposal systems; contraceptive acceptors groups; and child development programs. We cumulated individual responses to the household level by summing the number of the ten overlapping community groups in each household that at least one household member belonged to. The village leadership reports strongly predicted whether households belonged to groups, with an elasticity of roughly 0.4; that is when the village head reported having two standard deviations above the average number of groups in the village, the average household belonged to roughly 0.5 more groups (p -value < 0.01) than average (2.0). Thus,

village leader reports on the presence of community groups appears to be a valid proxy of individual group membership.

School Construction

We have district-level data from the Ministry of Education and Culture on the number of primary, middle, and high schools per school-aged child in both 1973/4 and 1983/4, the decade preceding our period of study, and use this data to predict subsequent industrialization. Indonesia pursued a massive school construction program in the 1970s (Duflo 2001). We are grateful to Esther Duflo for generously providing these data.