Social Networks and Social Capital

EC307 ECONOMIC DEVELOPMENT

Dr. Kumar Aniket

University of Cambridge & LSE Summer School

Lecture 10

created on July 12, 2009

READINGS

Tables and figures in this lecture are taken from:

McMillan, J. and Woodruff, C. (1999), Interfirm Relationships and Informal Credit in Vietnam. *Quarterly Journal of Economics*, 114, Nov. 1999, 1285-1320.

Banerjee, A. and Duflo, E. (2000), Reputation Effects And The Limits Of Contracting: A Study Of The Indian Software Industry. *Quarterly Journal of Economics*, 115(3):989–1017.

▶ **Class based on** Miguel, Edward and Mary Kay Gugerty [2002], Ethnic Diversity, Social Sanctions, and Public Goods in Kenya. mimeo, Department of Economics, UC Berkeley.

NETWORK FORMATION AND COLLECTIVE ACTION

We increasingly want to look at policy as a left hand side (dependent) variable,

i.e., Not *"what does policy affect?"*

but *"what determines the policy."*

The *social environment* is of first-order importance in determining policy and welfare outcomes

– e.g., service delivery in Africa

"… design of policies that build social capital *across ethnic groups remain poorly understood yet promising agenda"*

"… formation of meaningful economic linkages extending beyond the immediate community is a necessary precondition for modern economic growth (economic development)."

SOCIAL CAPITAL

There is a new (somewhat woolly) concept of *social capital*.

Active research is exploring the theory and empirics of social capital as we speak. See Putnam & Co.

They found that local government efficacy in Italy higher in regions with higher social capital. Demise of social capital in modern US,

– i.e., "bowling alone."

SOCIAL CAPITAL

Think of *social capital* as a set of nodes that can be connected by links.

Social capital specifically is a measure of the number of links.

– "*Social*", because it is embodied in the links between individuals,

– "*capital*", because it increases income without being consumed in use of doing so.

Social capital is typically proxied by the measures of *"associational activities,"* – i.e., being a member of ethnic, religious or civic group etc.

SOCIAL CAPITAL

Some societies are more polarised along ethnic or income dimensions.

The hypothesis (which is always up for testing) is that

the less close-knit the society,
        the less social capital it possess.

Does this affect policy choices in

i. public good provision and

ii. economic performance

CHANNELS OF EFFECT: FREE RIDER

Strand 1: The free rider story

Less ethnic diversity leads to less polarisation and thus, more social capital, better information flow and more cooperation

⇒ *fewer problems with collective action*

– greater supply of public goods

– commons less tragic

– information as a public good,

i.e., technology diffusion or learning from other's mistakes.

CHANNELS OF EFFECT: ASYMMETRIC INFORMATION

Strand 2: Asymmetric information story

Less ethnic diversity leads to less polarisation and thus, more social capital, better information flow

$\Rightarrow$ *markets are more complete*

– more trade

– better allocation of resources

– higher industrialisation

– improved economic performance

CHANNELS OF EFFECT: ASYMMETRIC INFORMATION

Important point here:

markets are incomplete due to asymmetric information

– Better information flow in non-polarised societies

– reduces the extent of information asymmetry

– leading to better enforcement mechanisms.

Social links promote the development of credit, insurance and other markets where asymmetric information matters.

– *Role of reputation and trust in network formation in manufacturing.*

– McMillan & Woodruff, Banerjee & Duflo;

ECONOMIC UNDER-PERFORMANCE IN AFRICA

Easterly and Levine (1997): Africa's growth tragedy

Countries with more *ethnolinguistic fractionalisation* tend to grow more slowly

– Identified as principle cause of slow development.

Reynal-Querol (1999): Religious fractionalisation has significant impact on growth rates

– having high fractions of the populations in "*animist cults*" has an impact on economic growth.

ETHNOLINGUISTIC FRACTIONALISATION

Ethnolinguistic fractionalisation: Probability that any two people drawn from the population are from distinct groups. Formally:

$$ELF \equiv 1 - \sum_i \left[\text{proportion of ethnolinguistic group } i \text{ in the population} \right]^2$$

The question we need to address is that whether ethnic diversity per se is an impediment to development.

ETHNIC DIVERSITY

Alesina, Baqir and Easterly (1999): In US, high levels of ethnic diversity are associated with up to 25% lower funding for schools and other public services in US municipalities.

Mauro (1995): National ethnic diversity significantly associated with poor bureaucratic performance and political instability across countries.

– **Problem:** can't control for much in these regressions.

ETHNIC DIVERSITY

It is not entirely clear what the specific mechanisms are and how they affect *economic performance* through *ethnic diversity.*

– Possibly, with ethnic diversity, there are *limitations on collective action.*

– Lack of social capital could possibly also be caused by civil conflict or war.

– *Economics of conflict* is a big new area of economic research.

 – Paul Collier at Oxford has looked at the role of polarisation.

Ethnic Diversity, Social Sanctions & Public Goods in Kenya

Ethnicity is the primary cleavage in Kenyan society.

– The *exogeniety* of land settlement patterns is the basis of the identification strategy in the paper.

– Ethnic land claims frozen by colonial authorities.

– Relatively stable distribution in post-colonial period,

 – i.e., people could not choose where to live. (See Table 1)

Zonal ELF is outside the choice set of citizens.

However, there may still be some scope to chose between schools, which would affect the *school ELF* but not the *zonal ELF*.

DATA

Two districts of western Kenya, *Busia* and *Teso.*

Zonal ELF and *school ELF,* calculated across tribes and across sub-tribes.

○ Luhya (67%) – Bantu tribe,

○ Teso (26%) and Luo (5%) – tribes with pastoralist traditions.

DATA

Public goods information on 100 schools in Busia and Teso.

– The focus is on total local school funding per pupil in 1995.

Two data sources:

i. school fees

ii. harambees

Other school and local public good outcomes.

– Run a cross-section regression.

RESULTS

Higher ethnic diversity is associated with:

– Sharply lower voluntary funding of schools (harambees)

– Worse school facilities

– Fewer recorded community social sanctions

– Suggestive evidence of worse well maintainers

– *even though diverse areas are similar to homogenous areas in terms of socioeconomic and other characteristics*

Table 1: Ethnic Diversity across Geographic Divisions in Busia and Teso districts, in 1962 and 1996

Geographic division	Name in 1962	Proportion of largest residential ethnic group (Group in parentheses)	
		1962	1996 (Pupil Questionnaire data)
Budalangi	Bunyala	0.99 (Luhya)	0.94 (Luhya)
Funyula	Samia	0.98 (Luhya)	0.94 (Luhya)
Butula	Marachi	0.92 (Luhya)	0.86 (Luhya)
Amukura/Chakol	South Teso	0.92 (Teso)	0.87 (Teso)
Angurai/Amagoro	North Teso	0.87 (Teso)	0.86 (Teso)
Nambale/Matayos	Bukhayo	0.68 (Luhya)	0.76 (Luhya)

Notes: The 1962 data is from the 1962 Kenyan Census (Government of Kenya 1965). The 1996 data is from the ICS Pupil Questionnaire, which relies on self-described ethnic affiliation.

Table 2: Pupil Descriptive Statistics, by Ethnic Group

	Entire sample	Luhya pupils	Teso pupils	Luo pupils
Number of pupils interviewed	5832	3867	1516	301
Proportion of pupil sample	1	0.66	0.26	0.05
Age in years	14.5	14.4	14.7	14.5
Father years of education	7.5	7.5	7.4	7.5
Mother years of education	5.0	5.0	4.9	5.2
Fathers with formal employment	0.24	0.26	0.17	0.29
Mothers with formal employment	0.05	0.04	0.05	0.04
Proportion latrine ownership	0.85	0.84	0.87	0.81
Proportion iron roof ownership	0.26	0.26	0.23	0.30
Proportion livestock ownership	0.78	0.78	0.78	0.80
Proportion cultivates corn (maize)	0.87	0.87	0.86	0.92
Proportion cultivates cash crop	0.39	0.33	0.56	0.29
Attends primary school that is not the closest to home	0.18	0.19	0.17	0.17
Residence and school in different geographic zones	0.12	0.15	0.06	0.06
Lives with a parent, if at least one parent is alive	0.85	0.84	0.88	0.84
Average number of full siblings	4.5	4.4	4.6	4.1
Proportion Catholic	0.56	0.57	0.56	0.64

Notes: Data are from the 1996 ICS Pupil Questionnaire administered to pupils in grades 6 to 8. Other ethnic groups, including Kalenjin, Kikuyu, Masaai, Somali, Tachoni, and Taita, comprise 0.020 of the sample. Formal employment includes government, factory, and corporate jobs, but not petty trading (in contrast to the definition of formal employment in Miguel 2001). Livestock ownership includes cattle, goats, sheep, and pigs (but not chicken). Cash crops include tobacco, sugar cane, and cotton.

Top-left panel

Table 3: Primary School Descriptive Statistics

	Mean	Standard deviation	Obs.
Panel A: Zone Characteristics			
Zonal residential ELF across tribes, 1996 Pupil Questionnaire data	0.23	0.14	84 (schools)
Proportion largest ethnic group in zone, 1996 Pupil Questionnaire data	0.86	0.11	84 (schools)
Panel B: School and Teacher Characteristics			
School ELF across tribes, 1996 Pupil Questionnaire data	0.20	0.18	84 (schools)
School ELF across tribes, 1996 Exam Namelist data	0.21	0.15	84 (schools)
ELF across tribes for all schools within 5 km of a school (including the school itself), 1996 Exam Namelist data	0.24	0.13	84 (schools)
Proportion largest ethnic group in school, 1996 Pupil Questionnaire data	0.79	0.18	84 (schools)
Total local school funds collected per pupil, 1995 (Kenyan Shillings)	152.6	99.4	84 (schools)
Harambee donations collected per pupil, 1995 (Kenyan Shillings)	44.8	88.2	84 (schools)
School fees collected per pupil, 1995 (Kenyan Shillings)	107.8	48.6	84 (schools)
Desks per pupil, 1995	0.21	0.12	84 (schools)
Pupil latrines per pupil, 1995	0.016	0.013	84 (schools)
Classrooms per pupil, 1995	0.030	0.014	84 (schools)
School-owned texts per pupil, 1995	0.34	0.21	84 (schools)
Private texts per pupil, 1995	0.07	0.10	84 (schools)
Pupil enrollment per primary school, 1996	296.3	146.4	84 (schools)
Average score on 1996 NGO examination, grades 3-8 (in standard deviations)	0.05	0.47	84 (schools)
School committee record items regarding sanctions or verbal pressure, 1997	3.2		84 (schools)
School committee record items regarding administrative activities, 1997	18.9	11.4	84 (schools)
Parent school meetings, 1997	3.4	1.9	83 (schools)
Parent cooperation from 0 to 1 (reported by field officers), 1998	0.49	0.33	84 (schools)
Teacher motivation from 0 to 1 (reported by field officers), 1998	0.54	0.30	84 (schools)
Pupil-teacher ratio, 1996	29.1	9.8	84 (schools)
Proportion teachers with high school education, 1996	0.79	0.16	83 (schools)
Years of teaching experience, 1996	14.0	3.0	83 (schools)
Proportion of female teachers, 1996	0.26	0.19	83 (schools)
Latitude (degrees north), GPS data	0.43	0.19	84 (schools)
Longitude (degrees east), GPS data	34.23	0.13	84 (schools)
Number of other primary schools within 5 km, GPS data	14.5	3.8	84 (schools)

Notes: Data are from the 1996 ICS School and Pupil Questionnaires, 1996 Government Examination Namelists, and Global Positioning Systems (GPS) readings taken by NGO field workers. Ethno-linguistic fractionalization is defined as $1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF across tribes and the proportion of the largest ethnic group in the school consider Luhyas a single group.

Top-right panel

Table 4: Ethnic diversity and local characteristics

Dependent variable	Coefficient estimate on zonal residential ELF across tribes (OLS)	Coefficient estimate on ELF across tribes among schools within 5 km (Spatial OLS)	Number of schools	Mean dependent variable
Panel A: Pupil Characteristics (1996 Pupil Questionnaire)				
Father years of education	0.5 (1.0)	-0.4 (1.2)	84	7.3
Mother years of education	1.2 (1.3)	0.2 (1.4)	84	4.9
Fathers with formal employment	-0.09 (0.07)	-0.24*** (0.07)	84	0.23
Mothers with formal employment	-0.01 (0.02)	0.01 (0.02)	84	0.04
Proportion latrine ownership	0.13 (0.09)	0.06 (0.09)	84	0.84
Proportion iron roof ownership	0.04 (0.11)	0.02 (0.10)	84	0.25
Proportion livestock ownership	0.16* (0.08)	0.12 (0.11)	84	0.78
Proportion cultivates corn (maize)	-0.03 (0.06)	-0.16** (0.08)	84	0.87
Proportion cultivates cash crop	0.26 (0.31)	0.67*** (0.20)	84	0.40
Average number of full siblings	1.7 (1.5)	2.5 (1.6)	84	7.4
Proportion Catholic	-0.03 (0.19)	0.07 (0.17)	84	0.57
Panel B: School and Teacher Characteristic				
Pupil enrollment per primary school, 1996	72.2 (103.0)	-13.1 (104.4)	84	296.3
Pupil-teacher ratio, 1996	-4.2 (10.0)	-8.8 (6.4)	84	29.1
Proportion teachers with HS education, 1996	0.10 (0.08)	-0.10 (0.14)	83	0.79
Years of teaching experience, 1996	0.3 (3.0)	2.7 (2.4)	83	14.0
Proportion of female teachers, 1996	-0.12 (0.15)	-0.12 (0.16)	83	0.26

Notes: Huber robust standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Regression disturbance terms are clustered at the zonal level. Ethno-linguistic fractionalization is defined as $ELF = 1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF considers Luhyas a single group. The Coefficient estimate on zonal residential ELF across tribes uses data from the 1996 Pupil Questionnaire; in these specifications, observations are assumed to have independent error terms across geographic zones, but not necessarily within zones. The coefficient estimate on ELF across tribes among schools within 5 km uses 1996 Exam Namelist data; in these specifications, regression disturbance terms are allowed to be correlated across schools as a general function of their physical distance, using the estimation strategy developed in Conley (1999).

Bottom-left panel

Table 5: Ethnic Diversity and Local Primary School Funding

	School ELF across tribes	Total local primary school funds collected per pupil in 1995 (Kenyan Shillings)							
Explanatory variable	(1) OLS 1st stage	(2) OLS	(3) OLS	(4) IV-2sls	(5) OLS	(6) OLS	(7) OLS	(8) Spatial OLS	(9) Spatial OLS
Ethnic diversity measures									
Zonal ELF across tribes	0.86*** (0.07)	-185.7** (77.9)		-145.2*** (49.6)	-143.6* (82.1)				
School ELF across tribes			-32.9 (64.0)	-216.4** (88.4)					
1 – (Proportion largest ethnic group in zone)						-162.9** (66.6)			
ELF across tribes for all schools within 5 km							-174.0** (76.3)	-174.0** (80.8)	
Zonal controls									
Proportion fathers with formal employment					189.5 (165.1)	-220.6* (120.5)	184.6 (170.9)		142.8 (167.3)
Proportion of pupils with a latrine at home					-431.6*** (139.9)	-286.3 (228.0)	-429.8*** (150.3)		-466.9 (250.2)
Proportion livestock ownership					120.1 (136.9)	186.2 (130.4)	110.6 (148.3)		116.9 (117.7)
Proportion cultivates cash crop					35.7 (61.4)	22.2 (106.9)	27.8 (62.4)		85.2 (78.4)
Proportion Teso pupils							67.9 (181.4)		
Geographic division indicators	No	No	No	No	No	Yes	No	No	No
Root MSE	0.14	99.8	96.7	105.5	95.0	93.0	95.4	97.1	95.0
R^2	0.40	0.00	0.06	-	0.14	0.25	0.12	0.06	0.09
Number of schools	84	84	84	84	84	84	84	84	84
Mean dep. variable	0.20	152.6	152.6	152.6	152.6	152.6	152.6	152.6	152.6

Notes: Huber robust standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Observations are assumed to have independent error terms across geographic zones, but not necessarily within zones for Regressions 1 to 7. Ethno-linguistic fractionalization is defined as $1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF across tribes and the proportion of the largest ethnic group in the school consider Luhyas a single group. Regression disturbance terms are allowed to be correlated across schools as a general function of physical distance in regressions 8 and 9 (Conley 1999). Geographic indicators are indicators for six (of the seven) geographic divisions. The instrumental variable in regression 4 is Zonal ELF across tribes.

Bottom-right panel

Table 6: Ethnic Diversity Impacts, Controlling for Ethnic Population Shares

	Dependent variable: Total local primary school funds collected per pupil in 1995 (Kenyan Shillings)							
Explanatory variable	(1) OLS	(2) OLS	(3) IV-2sls	(4) IV-2sls	(5) OLS	(6) OLS	(7) IV-2sls	(8) IV-2sls
Zonal ELF across tribes	-185.7** (77.9)	-189.1** (77.5)						
School ELF across tribes			-216.4** (88.4)	-209.4** (96.1)				
1 – (Proportion largest ethnic group in zone)					-222.0** (82.9)	-187.9** (81.3)		
1 – (Proportion largest ethnic group in school)							-264.8*** (93.9)	-239.7** (110.4)
Proportion Luhya pupils		-196.5 (393.8)		-136.4 (415.7)		-56.3 (370.5)		-87.0 (410.9)
Proportion Teso pupils		-247.3 (366.6)		-184.8 (386.2)		-120.1 (343.9)		-142.7 (381.4)
Root MSE	96.7	94.7	105.5	104.0	97.2	95.0	104.8	102.4
R^2	0.06	0.12	-	-	0.06	0.12	-	-
Number of schools	84	84	84	84	84	84	84	84
Mean dep. variable	152.6	152.6	152.6	152.6	152.6	152.6	152.6	152.6

Notes: Huber robust standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Observations are assumed to have independent error terms across geographic zones, but not necessarily within zones. Ethno-linguistic fractionalization is defined as $1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF across tribes and the proportion of the largest ethnic group in the school consider Luhyas a single group. Geographic division indicators and socioeconomic controls are not included in any of the specifications in this table. The instrumental variable in regressions 3 and 4 is Zonal ELF across tribes, and in regressions 7 and 8 is 1 – (Proportion largest ethnic group in zone).

Prologue ○○ | Social Environment ○○○○○○○○○○ | **Miguel & Gugerty** ○○○○○○○○○○●○○ | Manufacturing Networks ○○○○○○○ | Banerjee & Duflo ○○○○ | McMillan & Woodruff ○○○○○○○○○○○○

Prologue ○○ | Social Environment ○○○○○○○○○○ | **Miguel & Gugerty** ○○○○○○○○○○○●○ | Manufacturing Networks ○○○○○○○ | Banerjee & Duflo ○○○○ | McMillan & Woodruff ○○○○○○○○○○○○

Table 7: Other Primary School Outcomes

Dependent variable	Coefficient estimate on zonal residential ELF across tribes (OLS)	Coefficient estimate on ELF across tribes among schools within 5 km (Spatial OLS)	Number of schools	Mean dependent variable
Panel A: Local school funding				
Harambee donations collected per pupil, 1995 (Kenyan Shillings)	-157.1** (61.6)	-182.1** (68.5)	84	44.8
School fees collected per pupil, 1995 (Kenyan Shillings)	11.9 (35.2)	8.1 (64.6)	84	107.8
Panel B: School facilities, inputs				
Desks per pupil, 1996	-0.20** (0.08)	-0.31*** (0.08)	84	0.21
Pupil latrines per pupil, 1996	-0.007 (0.009)	-0.007 (0.013)	84	0.016
Classrooms per pupil, 1996	-0.016 (0.016)	-0.023* (0.013)	84	0.030
School-owned textbooks per pupil, 1996	-0.17 (0.13)	-0.27 (0.17)	84	0.34
Private texts (at home) per pupil, 1996	-0.03 (0.07)	-0.10 (0.09)	84	0.07
Number of other primary schools within 5km	-10.2*** (3.5)	-12.2*** (3.7)	84	14.5
Panel C: Test scores				
Average school score on 1996 NGO exams, grades 3-8 (in standard deviations)	0.10 (0.52)	0.11 (0.52)	84	0.05
Socioeconomic controls (zonal averages)	Yes	Yes		

Notes: Huber robust standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Regression disturbance terms are clustered at the zonal level. Ethno-linguistic fractionalization is defined as $ELF \equiv 1 - \sum_i$ (Proportion of Ethno-linguistic group i in the population)^2. School ELF considers Luhyas a single group. The Coefficient estimate on zonal residential ELF across tribes uses data from the 1996 Pupil Questionnaire; in these specifications, observations are assumed to have independent error terms across geographic zones, but not necessarily within zones. The coefficient estimate on ELF across tribes among schools within 5 km uses 1996 Exam Namelist data; in these specifications, regression disturbance terms are allowed to be correlated across schools as a general function of their physical distance, using the estimation strategy developed in Conley (1999). Socioeconomic controls include the proportion of fathers in the geographic zone with formal sector employment, the proportion of pupils residing in the geographic zone with a latrine at home, the proportion of pupils whose households own livestock, and the proportion of pupils whose households cultivate a cash crop. The test score results also an additional explanatory variable, an indicator for having received financial assistance through another NGO program.

© Kumar Aniket

Table 8: School committee records and field officer observations

Dependent variable	Coefficient estimate on zonal residential ELF across tribes (OLS)	Coefficient estimate on ELF across tribes among schools within 5 km (Spatial OLS)	Number of schools	Mean dependent variable
Panel A: School Committee Records				
School committee record items regarding sanctions or verbal pressure, 1997	-3.7** (1.6)	-4.2* (2.3)	84	3.2
School committee record items regarding administrative activities, 1997	5.7 (6.1)	6.2 (10.3)	84	18.9
Parent school meetings, 1997	-1.6 (1.1)	-1.3 (1.6)	84	3.4
Panel B: Field Officer Observations				
Parent cooperation from 0 to 1 (reported by field officers), 1998	-0.77*** (0.26)	-0.84** (0.35)	84	0.49
Teacher motivation from 0 to 1 (reported by field officers), 1998	-0.39** (0.17)	-0.49* (0.29)	84	0.54
Socioeconomic controls (zonal averages)	Yes	Yes		

Notes: Huber robust standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Regression disturbance terms are clustered at the zonal level. Ethno-linguistic fractionalization is defined as $ELF \equiv 1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF considers Luhyas a single group. The Coefficient estimate on zonal residential ELF across tribes uses data from the 1996 Pupil Questionnaire; in these specifications, observations are assumed to have independent error terms across geographic zones, but not necessarily within zones. The coefficient estimate on ELF across tribes among schools within 5 km uses 1996 Exam Namelist data; in these specifications, regression disturbance terms are allowed to be correlated across schools as a general function of their physical distance, using the estimation strategy developed in Conley (1999). Socioeconomic controls include the proportion of fathers in the geographic zone with formal sector employment, the proportion of pupils residing in the geographic zone with a latrine at home, the proportion of pupils whose households own livestock, and the proportion of pupils whose households cultivate a cash crop.

© Kumar Aniket

Prologue ○○ | Social Environment ○○○○○○○○○○ | **Miguel & Gugerty** ○○○○○○○○○○○○● | Manufacturing Networks ○○○○○○○ | Banerjee & Duflo ○○○○ | McMillan & Woodruff ○○○○○○○○○○○○

Prologue ○○ | Social Environment ○○○○○○○○○○ | Miguel & Gugerty ○○○○○○○○○○○○○ | **Manufacturing Networks** ●○○○○○○ | Banerjee & Duflo ○○○○ | McMillan & Woodruff ○○○○○○○○○○○○

Table 9: Well Descriptive Statistics

	Mean	Standard deviation	Obs.
ELF across tribes for all primary schools within 5 km of the well, 1996 Exam Namelist data	0.23	0.14	667
Indicator variable "normal" water flow from well, 2000-2001 survey	0.57	0.49	667
Indicator variable no broken or missing well parts, 2000-2001 survey	0.66	0.48	667
Indicator variable people in the area get water from another local well (if not normal water flow), 2000-2001 survey	0.32	0.47	196
Year well stopped functioning (if not normal water flow), 2000-2001 survey	1997.5	3.1	196
Latitude (degrees North), GPS data from 2000-2001 survey	0.36	0.17	667
Longitude (degrees East), GPS data from 2000-2001 survey	34.20	0.12	667

Notes: Data are from the 1996 ICS School and Pupil Questionnaires, 1996 Government Examination Namelists, and Global Positioning Systems (GPS) readings taken by NGO field workers. Ethno-linguistic fractionalization is defined as $1 - \sum_i$ (Proportion of Ethno-linguistic group$_i$ in the population)^2. School ELF across tribes and the proportion of the largest ethnic group in the school consider Luhyas a single group. Well parts include the pump handle, the cover and base, and the external and internal pipes and seals.

Table 10: Ethnic Diversity and Well Maintenance

	Dependent variable:					
	Indicator variable for "normal" water flow from well		Indicator variable for no broken or missing well parts		Indicator variable people in the area get water from another local well (if the KEFINCO well does not have normal water flow)	
Explanatory variables	(1) Probit	(2) Spatial OLS	(3) Probit	(4) Spatial OLS	(5) Probit	(6) Spatial OLS
ELF across tribes among schools within 5 km	-0.26* (0.14)	-0.26 (0.17)	-0.25* (0.13)	-0.25 (0.22)	-0.73** (0.30)	-0.72* (0.36)
Number of wells	667	667	667	667	196	196
Root MSE	-	0.49	-	0.47	-	0.46
Mean dependent variable	0.57	0.57	0.66	0.66	0.32	0.32

Notes: Huber robust standard errors in parentheses. Observations are assumed to have independent error terms across geographic zones, but not necessarily within zones in regressions 1, 3, and 5, and regression disturbance terms are allowed to be correlated across schools as a general function of their physical distance, using the estimation strategy developed in Conley (1999), in regressions 2, 4, and 6. Significant at 90(*), 95(**), 99(***) % confidence. Geographic indicators are indicators for six (of the seven) geographic divisions.

© Kumar Aniket

NETWORK FORMATION IN MANUFACTURING

○ Emphasis within development economics is moving away from *consumption* and towards *production.*

   That is, *survey of firms as opposed to households.*

– Early days yet but these surveys are picking up some interesting information on how *reputation* and *trust* affect contracting arrangements in places like sub-Saharan Africa, Vietnam and Eastern Europe

• **Questions** like what is preventing expansion?

   Contracting impediments identified as major problem constraining growth of firms.

© Kumar Aniket

CONTRACTING IMPEDIMENTS

- industry structures different in developing countries

- variety of market imperfections that firms in developing countries are prone to which they attempt to *overcome* these *using various non-market institutions.*

- Some distinctive contracting arrangements and organisational forms

  - the use of *informal institutions* such as the family and community *networks*

Schleifer et. al.: Most firms in low income countries are family owners and use internal as opposed to external finance.

EFFICIENCY COSTS OF "KEEPING IT IN THE FAMILY"

i. Constraints to expansion

ii. Less protection of minority shareholders

iii. Less outside investment

iv. Less innovation and technology adoption

v. Less growth

vi. Widespread restrictions on entry

vii. Excess red tape

viii. Inclusion versus exclusion

ix. Elite business groups

x. Institutional infrastructure

CONTRACTING ENVIRONMENT

Underlying problem:

$$\text{\textit{Moral hazard} \underline{compounded} by \textit{financial constraints}}$$
$$\text{and / or}$$
$$\textit{weaknesses in contract enforcement mechanisms}$$

Moral hazard: (i.e., scope for ex post opportunistic behaviour)

represents problem of trust and reliability that are typically overcome by explicit contracting or governance structures in developing countries

PROBLEMS IN LOW INCOME COUNTRIES

Low income countries are more prone to these problems because:

i. greater *limitations* on the design of contracts due to *financial constraints*

ii. *weaker contract enforcement institutions* (due to weaker legal systems, weaknesses in monitoring and information systems)

It becomes more difficult to discipline dysfunctional behaviour through punishments administered by formal institutions.

The lack of enforcement institutions may explain why moral hazard is a more significant problem is developing societies.

3 SOURCES OF CONTRACTING IMPERFECTIONS:

1. *Limited wealth of Productive Agents: limited liability* constrains the design of high powered contracts, incentives must be provided via carrot as opposed to stick

2. *Non-contractibility of Relevant Dimensions of Performance:* depends on commodity exchanged or service performed and on strength of *legal institutions that enforce contracts* or disputes resolved

   – need appropriate ownership or control structures to rein the scope for dysfunctional opportunistic behaviour

   – huge incomplete contracting literature on this.

3. *Lack of Adequate Third-Party Enforcement Institutions*: Even in the absence of 1. and 2., underdeveloped economy may lack courts or other *external dispute resolution mechanisms* that can help enforce simple contracts

REPUTATIONS

What may allow trade and exchange to continue taking place are reputational concerns,

– i.e., the threat of withdrawing future business dealings following dysfunctional behaviour

   (both by the victim and other members of a related social or kinship community)

– incomplete contracting is part of this problem in the sense that it is driven by imperfections in third party enforcement

REPUTATIONS

The contracting problems give us interesting implications.

Greater severity of wealth and contract enforcement

– explanation for lower productivity in these countries relative to developed countries may offset natural resource or locational advantages.

Role for institutional reform to correct problem.

McMillan & Woodruff: *Restriction of trade with members of the same business or family group restricts growth based on specialisation and trade with outsiders.*

Reputation effects and the Limits of Contracting: A Study of the Indian Software Industry

Software industry in India

– Contracting with Silicon Valley and elsewhere.

– A complex buyer specific product, i.e., the quality of the product is difficult to pin down and write into a contract that can be externally enforced.

Reputational considerations heightened by fact that start-up costs are quite low.

– Lease office space with a few PCs.

– Highly competitive market and driven by export orders.

– Given the distance, monitoring is not easy.

CONTRACTS TYPE

– Indian courts – provide limited ability to enforce contracts.

– Incentive to do a high quality job is the prospect of repeat business.

– 125 software companies were surveyed for the paper – there is evidence of frequent renegotiation and significant overruns.

TYPES OF CONTRACT

There are two kinds of contracts that firms sign:

1. *Fixed price* contract, where all risk is on the supplier,
   – i.e., the supplier gives the buyer a fixed price and internalises and bears the risk of an unforseen cost overruns.

2. *Time and material contracts* where all the risk is on the buyer, i.e., the buyer agrees to pays the supplier's costs in producing the product and the buyer bears the risk of any cost overruns.

REPUTATION

Banerjee-Duflo (2000) find that younger firms bear more of the risk.

The younger the firm, the more likely they are to have fixed price contracts and absorb a higher share of overhead costs.

– This cannot be explained by efficient risk sharing considerations since younger firms are more likely to be capital constrained and risk averse and benefit from "learn by doing" as the time goes along.

– Empirical evidence of steep costs of building up of *reputational capital* for new firms and establishing themselves in the industry.

Inter-firm Relationships and Informal Credit in Vietnam

Question: *What determines business trust?*

In Vietnam, the laws of contract are incomplete.

○ *Informal relationships* often *substitute* for the *courts* in allowing deals to be made.

Clientelistic relationships: studied by sociologists, anthropologists and economic historians.

– Very little econometric analysis on this thus far.

● The paper survey private firms in Vietnam and gets primary data on firm's relationships with its customers and suppliers.

○ They measure a *firm's trust* by the amount of *trade credit* it grants its customers.

MAIN FINDINGS

Trade credit is offered when

(a) Difficult for the customer to find an alternative supplier.

(b) Supplier has information about the customer's *reliability*
  – either through prior investigation or
  – through dealing with it.

(c) The supplier belongs to a *network* of similar firms.
  – The *business network* provides both information about customers *reliability* as well as the means of *sanctioning* customers that renege on deals.

Social networks based on family ties also support *relational contracting.*

Evidence for their *efficacy* is *weaker* than for *business networks.*

In Vietnam, private firms do not yet have a formal legal system to fall back on.

Dependent variable: fraction of payment made after delivery of the goods.

Independent variables: customer's ability to find alternative trading partners, information gathered by suppliers about the partner and network relationships.

  – Think about all this in the context of repeated game theory.

HYPOTHESES

(1) Customers lacking alternative suppliers will receive <u>more</u> trade credit.

(2) There will be <u>more</u> trade credit
  – when the supplier inspects the customer directly and
  – in relationships of longer duration

(3) A supplier belonging to a network will grant <u>more</u> trade credit.
  – *Information:* Learn about reliability of a customer through the network information.
  – *Sanctions:* Ability to sanction customers that renege.

DATA

Vietnam is still state dominated.

  – The paper only look at links between private organisations.

  259 non-state firms – Private firms 23% of output

  See Table 1 for the firm characteristics

Heart of survey: Questions about firm's relationships with customer.

  – Measure of Credit Supply – *portion of bill paid after delivery*

  Information on
    – 518 *manufacturer – customer* relationships and
    – 518 *manufacturer – supplier* relationships

  Take out relationships with state enterprises and left with 242 customer and 254 supplier relationships

TABLE I
SUMMARY OF SURVEY DATA

Category	All firms	≤50 Employees	>50 Employees
Number of firms	259	186	73
Hanoi	149	108	41
Ho Chi Minh City	110	78	32
Number of employees			
Median	32	25	94
Mean	52	25	122
Standard deviation	60	14	75
Age			
1–4 years	60%	60%	60%
5–10 years	20%	19%	23%
>10 years	19%	20%	16%
Industries:			
Metal	12%	15%	5%
Wood products	12%	12%	14%
Food	10%	11%	7%
Garments and footwear	17%	13%	29%
% of sales to private firms:	73%	71%	77%
% of sales to customers located:			
Within same city	56%	63%	40%
Outside city, in Vietnam	23%	24%	23%
Exports	20%	13%	37%
% of supplies from private firms:	68%	71%	60%
% of supplies from suppliers located:			
Within same city	54%	58%	44%
Outside city, in Vietnam	32%	30%	38%
Exports	14%	12%	18%
Ownership—% of firms			
100% family-owned	40%	43%	33%
Have outside owners	43%	40%	49%
Collectively owned	14%	15%	14%
Start-up finance—% of firms			
100% family-financed	41%	43%	34%
Some finance from partners	47%	46%	52%
With bank loan at start-up	10%	9%	14%
% of firms with current bank loan:	22%	17%	37%

TABLE II
CUSTOMER CREDIT VARIABLE MEANS

	All firms	Domestic customers	Export customers	≤50 Employees	>50 Employees
Number of observations	224	153	71	148	76
Avg. % of bill paid after delivery	38%	39%	37%	35%	44%
% firms w/no payment after	47%	44%	54%	49%	43%
% firms w/all paid after	21%	20%	23%	20%	22%
# similar manufacturers located w/in 1 km	3.4	3.3	3.8	3.6	3.1
Most important competitor w/in 1 km	33%	33%	32%	38%	22%
Duration of relationship (years)	2.13	2.18	2.02	2.1	2.26
Visited customer before first transaction	46%	47%	42%	44%	49%
Currently visit with customer at least weekly	23%	29%	10%	29%	12%
First information from other manufacturers	20%	18%	25%	19%	22%
Manager talks to other suppliers of customer at least monthly	12%	11%	13%	9%	16%
First information from family members	17%	19%	14%	19%	14%
Manufacturer sets prices by relationship w/cust	45%	40%	56%	41%	47%
Customer is retail store/wholesaler	42%	46%	32%	44%	45%
Log age of manufacturer + 1 (years)	1.61	1.68	1.48	1.62	1.61
Log size of manufacturer (# of employees)	3.54	3.28	4.11	2.96	4.68
Firm receives credit from bank	21%	17%	31%	18%	38%
Avg. % of bills paid to two identified suppliers after delivery	40%	40%	41%	39%	42%
Customer is foreign-owned	32%	0%	100%	20%	54%
% of manufacturer's sales from largest product	85%	84%	88%	88%	81%
Manager speaks Chinese	32%	30%	35%	29%	37%
Customer is firm's first customer	41%	39%	45%	41%	42%
Manufacturer located in Hanoi	34%	31%	42%	32%	39%

TABLE III
DETERMINANTS OF TRADE CREDIT

Variable	Predicted sign
Customer lock-in	
Number of similar manufacturers within 1 km	−
Most important competitor within 1 km	−
Manufacturer information	
Duration of relationship	+
Visited customer before first sale	+
Currently visits customer at least weekly	+
Network membership	
First information from other manufacturers	+
First information from family member	+
Talk to other suppliers of customer at least monthly	+

TABLE IV
CUSTOMER CREDIT TOBITS
PERCENT OF BILL PAID BY CUSTOMER AFTER DELIVERY

	(1)	(2)	(3)	(4)	(5) Domestic	(6) Foreign	(7) Big	(8) Small
Customer lock-in:								
# similar manufacturers w/in 1 km	−0.007 (1.66)	−0.008 (1.86)	−0.011 (2.98)	−0.010 (2.54)	−0.006 (1.35)	−0.018 (2.30)	−0.026 (3.10)	−0.006 (1.38)
Most important competitor w/in 1 km	−0.13 (2.46)	−0.12 (2.18)	−0.11 (2.18)	−0.16 (2.92)	−0.14 (2.41)	−0.01 (0.12)	−0.04 (0.43)	−0.19 (3.12)
Manufacturer information:								
Duration of relationship (years)	0.08 (2.96)	0.07 (2.61)	0.07 (2.51)	0.07 (2.42)	0.04 (1.34)	0.13 (1.34)	0.14 (1.74)	0.06 (1.90)
Duration ^2	−0.005 (2.15)	−0.004 (1.95)	−0.004 (1.74)	−0.004 (1.78)	−0.003 (1.19)	−0.007 (0.55)	−0.020 (1.45)	−0.003 (1.43)
Visited customer before first sale	0.08 (1.63)	0.07 (1.71)	0.06 (1.33)	0.06 (2.32)	0.12 (0.36)	0.04 (0.41)	0.03 (1.87)	0.10
Currently visit cust at least weekly	−0.03 (0.46)	−0.06 (1.03)	−0.05 (0.84)	−0.09 (1.43)	0.07 (0.49)	0.06 (0.60)	−0.05 (0.76)	
Network membership:								
First information from other manufacturers	0.20 (3.36)	0.16 (2.83)	0.10 (1.99)	0.17 (2.98)	0.06 (1.00)	0.22 (2.05)	0.11 (1.30)	0.00 (0.03)
Talk to other suppliers of customer at least monthly		0.19 (2.36)	0.19 (2.63)	0.18 (2.31)	0.27 (3.18)	0.04 (0.26)	−0.19 (1.31)	0.31 (3.20)
First information from family member	0.04 (0.60)	−0.01 (0.17)	−0.08 (1.34)	−0.13 (2.11)	−0.13 (1.91)	0.02 (0.17)	0.00 (0.01)	−0.15 (2.15)
Alternative explanations:								
Manufacturer sets prices by relationship w/customer		0.02 (0.53)	0.08 (1.69)	0.06 (1.13)	−0.05 (0.48)	0.14 (1.62)	0.00 (0.03)	
Customer is retail store/wholesaler		0.07 (1.62)	0.03 (0.60)	0.11 (2.25)	0.02 (0.20)	0.20 (2.11)	0.03 (0.57)	
Log firm age + 1 (years)		−0.09 (1.76)	−0.10 (1.57)	−0.11 (1.91)	−0.25 (1.62)	0.01 (0.04)	−0.06 (1.04)	
Log employment		−0.02 (0.98)	−0.06 (2.28)	−0.04 (1.50)	0.05 (1.15)	−0.10 (0.95)	−0.07 (1.86)	
Manufacturer receives credit from bank		−0.02 (0.36)	−0.03 (0.53)	−0.01 (0.10)	0.05 (0.55)	−0.04 (0.45)	0.15 (2.02)	
% of bill paid to suppliers after delivery (0–2)		0.40 (6.27)	0.47 (6.23)	0.40 (5.45)	0.13 (1.08)	0.35 (2.74)	0.39 (5.25)	
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	No	No	No	Yes	No	No	No	No
Number of observations	224	224	224	204	153	71	76	148
% obs not censored	31.70%	31.70%	31.70%	31.37%	35.95%	22.54%	34.21%	30.41%
χ^2	73.5	82.6	134.5	152.0	114.7	48.7	64.1	112.5
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001

Regression are two-tailed Tobits. Coefficients are marginal effects, t-values are in parentheses.
a. All regressions include industry dummies (8), and indicators of first customer and location in Hanoi.
b. Regression 4 also includes % sales represented by main product, manager speaks Chinese, % sales to SOEs, % supplies from SOEs, 100% family-owned, collective, manager formerly worked for SOE, age of manager, and manager attended university.

Prologue | Social Environment | Miguel & Gugerty | Manufacturing Networks | Banerjee & Duflo | **McMillan & Woodruff**
○○ | ○○○○○○○○○○ | ○○○○○○○○○○○○○ | ○○○○○○○○ | ○○○○ | ○○○○○○○○○○●○○

Prologue | Social Environment | Miguel & Gugerty | Manufacturing Networks | Banerjee & Duflo | **McMillan & Woodruff**
○○ | ○○○○○○○○○○ | ○○○○○○○○○○○○○ | ○○○○○○○○ | ○○○○ | ○○○○○○○○○○○●○

TABLE VI
SUPPLIER CREDIT, VARIABLE MEANS

	All firms	Domestic suppliers	Import suppliers
Number of observations	243	195	47
Avg. % of bill paid after delivery	45%	42%	57%
% of cases w/no payment after	43%	47%	28%
% of cases w/all paid after	30%	29%	36%
<1 day to find alternative supplier	25%	29%	9%
>1 week to find alternative supplier	38%	31%	66%
Currently have no alternative supplier	22%	13%	57%
Duration of relationship (years)	2.58	2.68	2.11
Visited supplier before first purchase	65%	70%	45%
Currently visit w/supplier at least weekly	33%	37%	17%
Manufacturer currently has bank credit	21%	20%	28%
Supplier is managed by family member/friend	21%	23%	13%
If manufacturer cheated supplier, other suppliers find out (0–1–2)	1.22	1.24	1.17
% sales main product	84%	85%	82%
Log age of manufacturer + 1 (years)	1.73	1.78	1.53
Log size of manufacturer (# of employees)	3.37	3.28	3.72
Manager speaks Chinese	24%	22%	32%
Supplier is oldest continuing	49%	48%	55%
Manufacturer is located in Hanoi	42%	49%	10%

© *Kumar Aniket*

TABLE VII
SUPPLIER CREDIT TOBITS
PERCENT OF BILL PAID TO SUPPLIER AFTER DELIVERY

	(1)	(2)	(3)	(4)	(5)	(6) Domestic
Manufacturer lock-in:						
Less than 1 day to find alternative supplier	−0.11 (1.67)	−0.12 (1.74)		−0.11 (1.62)	−0.15 (2.12)	−0.08 (1.11)
More than 1 week to find alternative supplier	0.004 (0.07)	0.001 (0.02)		−0.002 (0.03)	−0.010 (0.17)	−0.031 (0.44)
Currently have an alternative supplier			−0.07 (1.12)			
Supplier information:						
Duration of relationship (years)	0.03 (1.44)	0.02 (0.92)	0.02 (0.87)	0.03 (1.36)	0.05 (1.95)	0.03 (1.28)
Duration ^2	−0.0016 (1.62)	−0.0013 (1.37)	−0.0012 (1.28)	−0.0014 (1.54)	−0.0021 (1.94)	−0.0014 (1.49)
Visited supplier before first purchase		0.07 (1.19)	0.09 (1.51)	0.07 (1.34)	0.03 (0.62)	0.14 (2.11)
Currently visit supplier at least weekly		−0.003 (0.06)	−0.02 (0.31)	−0.02 (0.39)	−0.01 (0.26)	−0.03 (0.56)
Manufacturer currently has bank credit	0.26 (3.79)	0.23 (3.56)	0.22 (3.46)	0.24 (3.60)	0.20 (2.95)	0.19 (2.51)
Network membership:						
Supplier is managed by family or friend	0.11 (1.70)	0.12 (1.89)	0.12 (1.79)	0.10 (1.48)	0.09 (1.27)	0.08 (1.16)
If manufacturer cheated supplier, other suppliers find out		0.14 (3.19)	0.13 (3.03)	0.13 (3.09)	0.17 (3.77)	0.10 (2.27)
Alternative explanations:						
% sales main product				−0.39 (3.23)	−0.49 (3.72)	−0.33 (2.32)
Log firm age + 1 (years)				−0.06 (1.13)	−0.05 (0.75)	−0.06 (1.01)
Log employment				−0.06 (2.12)	−0.06 (1.96)	−0.07 (1.95)
Manager characteristics:						
Manager speaks Chinese					−0.06 (0.84)	
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	No	No	No	No	Yes	No
Number of observations	243	243	243	243	228	195
% obs uncensored	26.34%	26.34%	26.34%	26.34%	27.19%	24.10%
χ^2	45.0	59.6	56.9	76.1	84.5	48.7
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Regressions are two-tailed Tobits. Coefficients are marginal effects, t-values are in parentheses.
a. All regressions include industry dummies (8), and indicators of oldest supplier and location in Hanoi.
b. Regression 5 also includes % sales to SOEs, % suppliers from SOEs, supplier located in same city, manufacturer collectively owned, manufacturer family owned, manager formerly worked for SOE, age of manager, manager attended university.

© *Kumar Aniket*

SUMMARY OF RESULTS

- **Customer credit results:**
  - More trade credit to customers when there are fewer firms nearby.
  - Duration affects credit
  - Being part of business network important
  - Visits to factory important
- **Supplier credit results:**
  - Manufacturer's difficulty of locating alternative sources of credit affects the credit
  - Level of credit increases with duration
  - Credit is larger when there is communication among suppliers

© *Kumar Aniket*