

Entrepreneurship, corruption and income inequality

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Abstract

Income distribution varies widely across countries, the exact reason of which remains unclear. This study fills an important gap in the study of income distribution by exploring relationships among, entrepreneurship, corruption, and distribution of income. Examining low and middle income countries of South and East Asia region during the period of 2004-2012, we find that while entrepreneurship reduces income inequality but types of entrepreneurship is also an important factor. Level of corruption in a country also plays an important role. Countries with low level of corruption are better able to reduce inequality through entrepreneurial activity.

JEL codes: D31, D63, O15, O53

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Introduction

Income distribution varies widely across countries, the exact reason of which remains unclear and remains under investigation (Piketty 2014). Social factors such as demographic transition, trade, investment pattern etc. that influence income inequality has been examined by sociologists (Reuveney and Li 2003; Simpson 1990; Nielsen and Alderson 1995). Political sociologists have examined the impact of political environment on income inequality (Lee 2005; Reuveney and Li 2003; Simpson 1990). Existing studies fail to establish a robust relationship to explain the variation. In this study, we propose an alternative relationship, specifically, we propose that the level of corruption level in a country may be useful in explaining variation in income distribution *through* entrepreneurship.

Our paper builds from previous work by Gupta et. al. (2002) and Dobson and Dobson (2012) by asking whether corruption influences income distribution generated through entrepreneurial activity. Our analysis fills an important gap in the study of income distribution by providing a new framework for exploring relationships between entrepreneurship, corruption, and distribution of income.

Entrepreneurship is an important economic activity for society and is linked to economic growth and job creation (Acs and Audretsch 2005; Wenneker et al., 2005). Wennekers et al. (2005) argued that developing countries can benefit from growth of young businesses. Still, the level of entrepreneurial activity varies across countries and can be affected by the state and quality of resources related to governing institutions, financial institutions, financial systems and human capital.

In addition to entrepreneurship, corruption may also play a role in driving income distribution. Corruption can represent a weak institutional environment and is often prevalent in developing countries. Institutions are a set of prescriptions and constraints that humans use to organize all forms of repetitive and structured interactions (Ostrom 2005). North (1994) describes institutions as “rules of game in the society” and constraints that structure human interaction... made up of formal constraints (e.g., rules, laws, and constitutions) (p. 360). Institutions influence individual’s economic behaviour and economic transactions. Both of these factors influence supply and demand of entrepreneurs as well as quality of entrepreneurship (Busenitz, Gomez and Spencer 2000; Baumol 1990). We thus ask how corruption, entrepreneurship and income inequality are related, and we focus particularly on the developing countries of South and East Asia where variance in all three dynamics are ripe for examination.

This study contributes to the burgeoning literature on institutions in four ways. First, our study find that entrepreneurship helps to reduce income inequality. In addition, the type of entrepreneurial activity is an important predictor of income inequality. In this article we consider three types of entrepreneurial activities--- necessity entrepreneurship, opportunity entrepreneurship, and total early stage entrepreneurial activity (TEA). Second, the level of corruption is also an important factor for income distribution. More corruption weakens the positive impact of entrepreneurship on income inequality. Our study also demonstrates the importance of redistribution, “a rising tide lifts all boats”¹.

The rest of the paper is structured as follows. Section 2 presents our theoretical approach and hypotheses that corruption impacts the relationship between entrepreneurship and income inequality. Section 3 discusses data and methodology. Section 4 reports the results and Section 5

¹ Attributed to John F. Kennedy, 1963 speech

presents a discussion and conclusion. Section 6 identifies policy implications and future research questions.

Linking income inequality and entrepreneurship in developing countries

The role of entrepreneurship in economic development is well-argued (Baumol 2002; Wennekers and Thurik 1999; Schumpeter 1934). Still, the level of entrepreneurial activity remains different across countries (Stenholm et al. 2013). Different levels of economic development, financial access, labor market opportunities, and personal wealth can contribute to this variation (Aidis et al. 2012; Holtz-Eakin et al. 1994). Despite the variation, entrepreneurial activity can help to reduce income inequality by creating jobs at the local level. Entrepreneurial activity can be formal and informal. In one hand, an entrepreneur can be a ‘gap filler’ by exploiting new opportunities, inventing and improving product or production processes (Schumpeter 1934). In the process, this can create new markets and jobs at local level and this increased employment level and creation of human capital can translate to a better standard of living and lower income inequality. On the other hand, an entrepreneur can be self-employed and trying to meet basic needs (Earle and Zakova 1999). Individuals at the bottom of income distribution in developing countries can face limited opportunity for education or for developing human capital². This can translate to poor access to employment opportunities in the wage labor market, making self-employment an option for survival and self-sufficiency. Regardless of the types we propose that entrepreneurial activity helps to reduce income inequality.

We posit that corruption, or government officials’ use of their authority for private gain in implementing public policies (Rose-Ackerman 1999, 2007; Rodriguez et al. 2006) affects

² Human capital in this case we refer to as education as well as training and skills necessary for employment (Davidsson and Honig 2003).

income inequality in a country. Corruption is a common feature in many of the developing and emerging countries and represents weak institutional environment (Montinola and Jackman, 2002). Causes behind corruption ranges from motivation and opportunities to low and underpaid public employees (Rose-Ackerman 1978, 1999; Treisman, 2000). Existing literatures support that corruption and income inequality are positively related (Gupta et al, 2002) find that corruption affect income inequality, “An increase of one standard deviation in corruption increases the Gini coefficient of income inequality by about 11 points..” (p.1).

Corruption, Entrepreneurship, and Inequality

Kuznets (1955) proposed that during the initial stages of economic growth income inequality increases and gradually decreases as growth reaches its final stage, presenting a U-shaped relationship. Similar to other developing countries across the world, developing countries of South-Asia are in the initial stages of development and have large income inequality. Therefore during this initial stage of development quality of labor force, occupational choice, and educational choices made by individuals are important for sustainability, self-sufficiency and to improve living standard and to reach high social status (Fershtman et al. 1999). Corruption level of a country influences both allocation of resources and occupational choice such as undertaking entrepreneurial activity. Corruption influences entrepreneurship by increasing transaction costs, by violating trust in government officials to enforce contracts and regulations consistently and in business itself to comply with the government regulation, and by reducing transparency (Coase 1960; Bowen and De Clerq 2008; Luhmann, 1988). Given entrepreneurs take on enormous risks and uncertainty associated with entrepreneurial activity, all of the problems associated with corruption adds to the risks and uncertainty and influences an entrepreneurs decision to pursue

entrepreneurial activity, “the portion of the value that the venture creates that the entrepreneur is able to capture for their own purposes” (Baker et al. 2005: 497).

Government authorities can engage in corrupt behavior in various ways. For instance Glaeser and Goldin (2006) identified that government authorities can steal public funds directly, take bribes or other forms of payments for transferring government funds or services, for breaking government rules and regulations, or manipulate laws directly by lobbying for certain types of laws that benefit their financial interest directly. Corrupt bureaucrats can use the latter two method to either be helpful or hurtful to entrepreneurs as well as distribute resources inefficiently.

In an extensive regulatory environment entrepreneurs who are able to pay bribes bureaucrats can be helpful and efficient by speeding up the process of getting permits and avoiding red tapes (Dreher and Gassebner 2013; Klapper et al. 2006; Méon and Sekkat 2005). In this case entrepreneurs’ ability to pay is a concern because entrepreneurs in general have financial constraint and it is more problematic for entrepreneurs in developing countries because financial sector is not well developed (Paulson and Townsend, 2004). On the other hand, entrepreneurs in developing countries tend to be from elite in the society and well connected. It has been established that better connected individuals and individuals who belong to high-income group in a society are better able to benefit from corruption (Tanzi 1995). Therefore entrepreneurial activity level increases in society.

As the entrepreneurial level increases in a country they become better connected and increasingly have more resources to use. This increases connection also helps to divert government resources. Government officials are responsible for implementing public policies and corrupt officials can use this opportunity to extract bribe and allocate resources inefficiently.

Well-targeted social programs can help to lower income inequality by providing social services, health services, and educational services to people who can benefit from these services (Gupta et al. 2002). Gupta et al. (2002) find that corruption reduces the share of government expenditures on education and health care. Therefore an increase in entrepreneurial activity will benefit individuals but corruption hinders the spillover of the benefit to greater society.

DATA AND METHODOLOGY

We constructed our sample by matching data from the following sources at the country level: World Development Indicators (2004-2012), Doing Business Database (2004-2012), Global Entrepreneurship Monitor (GEM) (2004-2012), Polity (2004-2012), and World Governance Indicators (2004-2012). Countries included in our sample are low and middle income countries in the South and East Asia as classified by the World Bank. Low income countries have per capita Gross National Income, or GNI \leq \$4,085 and middle income countries have GNI of \$4,085 - \$12,615. Countries included in the article are Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, and Thailand. Due to missing data we used mean of available to data to fill in the gap. We have 64 observations.

Our dependent variable, income inequality level in a country is measured by the Gini coefficient (Li et al. 2013; Knight 2013; Deininger and Squire 1996). The coefficient ranges from 0 to 100 with 100 denotes perfect income inequality and zero denotes perfect equality. The Gini coefficient is computed based on Lorenz curve³. Data was collected from World Development Indicator Database⁴. Table 1 reports detailed description, and sources of variables included in the study.

³ For detailed computation of the data see Nafziger (1997)

⁴ Data is available at <http://data.worldbank.org/indicator/SI.POV.GINI>.

Three of our independent variables are collected from Global Entrepreneurship Monitor (GEM)--Necessity entrepreneurship (NEC), opportunity entrepreneurship (OPP), and total early stage entrepreneurial activity (TEA) (Ardagna and Lusardi 2008). Necessity entrepreneurship is measured by percentage of those involved in total entrepreneurial activity who are involved in entrepreneurship because they had no other option for work (Ardagna and Lusardi 2008; McMullen et al. 2008). Opportunity entrepreneurship entails an individual's decision to engage in entrepreneurial activity is motivated by opportunity, is measured by percentage of those involved in total entrepreneurial activity who claim to be driven by opportunity as opposed to finding no other option for work and who indicate the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income (Ardagna and Lusardi 2008; McMullen et al. 2008). TEA is measured by percentage of population (18-64) who are either a nascent entrepreneur or owner-manager of a new business (Ardagna and Lusardi 2008). These data help us to determine types of entrepreneurial activity as well as what phase of activity helps with reducing or not reducing income inequality.

Table 1: Variable list for analyses of entrepreneurship, corruption, and income inequality

Variables	Description	Source
GINI	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World Development Indicator Database. Data is available at http://data.worldbank.org/indicator/SI.POV.GINI
Democracy	The POLITY score ranges from +10 (strongly democratic) to -10 (strongly autocratic).	Polity

Openness	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP (% of GDP).	International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates.
Economic Development	GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant local currency (constant LCU).	World Bank national accounts data, and OECD National Accounts data files.
Tertiary	Tertiary school gross enrollment ratio (% gross).	United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.
Business Environment	Time required to enforce a contract is the number of calendar days from the filing of the lawsuit in court until the final determination and, in appropriate cases, payment (days)	World Bank, Doing Business project (http://www.doingbusiness.org/).
Natural Resources	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents (% of GDP).	Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium" (World Bank, 2011).
Low Corruption-WGI	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The score ranges from -2.5 to 2.5; score of greater than zero corresponds to low level of corruption.	Kauffmann et al., 2013; World Governance Indicator (WGI)
Low Corruption-IEF	Corruption data was primarily derived from Transparency International's Corruption Perceptions Index (CPI). The index score ranges from 0 to 100 with 100 being less corruption.	Index of Economic Freedom (IEF)
NEC	Those who are involved in Total entrepreneurial activity (TEA) because they had no other option for work (% of those involved in Total entrepreneurial activity)	Global Entrepreneurship Monitor (GEM)
OPP	Those involved in Total Entrepreneurial Activity (TEA) who claim to be driven by opportunity as opposed to finding no other option for work and who indicate the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income (% of those involved in Total entrepreneurial activity)	Global Entrepreneurship Monitor (GEM)
TEA	Individuals who are either a nascent entrepreneur or owner-manager of a new business (% of 18-64 years population)	Global Entrepreneurship Monitor (GEM)

We use two measures of corruption. One measure of Corruption was obtained from World Governance Indicator (WGI) which captures the ‘perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests’ (Kauffmann et al. 2013). The index score ranges from -2.5 to 2.5 with higher numbers representing low level of corruption. Second measure of corruption was collected from Index of economic freedom (IEF) (Aidis et al. 2012). The index measure ranges from 0 to 100; 0 pertains to high corruption and 100 is low corruption. Time required for contract enforcement is used as proxy for business environment. Control variables included in this study are level of economic development (*Economic Development*), tertiary gross enrollment (*Tertiary*), openness of the economy is measured by inflow of foreign direct investment as a ratio of GDP (*Openness*), share of natural resources as a ratio of GDP (*Natural Resource Endowment*), political environment (*Democracy*) measure is taken from Polity, and business environment of a country is measured by time required for contract enforcement from doing business (*Business Environment*).

Table 2 presents the correlations of all the variables included in the study. Both of corruption measures are highly correlated (0.88). Opportunity and necessity entrepreneurship are not highly correlated. Opportunity entrepreneurship and tertiary have correlation of (0.62) which suggest that higher educated individuals are likely to search for entrepreneurial opportunity (Davidsson and Honig, 2003). Level of education also has positive relationship with both measures of low corruption IEF and WGI (0.63 and 0.61, respectively).

Table 2: Correlation

		Obs	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11
1	Gini (ln)	64	3.71	0.15	1										
2	Democracy	64	3.58	5.9	-0.27*	1									
3	Foreign Direct Investment (ln)	64	0.67	0.79	0.13	-0.37*	1								
4	Economic Development(ln)	64	11.61	2.21	-0.42*	0.41*	-0.12	1							
5	Tertiary	64	2.93	0.70	0.34*	0.18	0.26*	0.17	1						
6	Business Environment	64	6.57	0.48	-0.07	0.35*	-0.44*	-0.29*	-0.61*	1					
7	Natural Resources	64	1.9	0.53	-0.08	-0.09	0.24	0.24	0.03	-0.28*	1				
8	Low Corruption-IEF	64	69.61	9.71	0.28*	-0.12	0.35*	-0.33*	0.63*	-0.43*	0.37*	1			
9	Low Corruption-WGI	64	-0.34	0.46	0.31*	0.17	0.26*	-0.31*	0.61*	-0.17	0.29*	0.88*	1		
10	NEC	64	28.83	13.37	-0.06	-0.49*	-0.05	-0.42*	-0.41*	0.08	-0.59*	-0.31*	-0.49*	1	
11	OPP	64	48.85	12.21	0.34*	-0.04	0.29*	0.38*	0.62*	-0.64*	0.28*	0.19	0.16	-0.53*	1
12	TEA	64	13	6.72	-0.39*	0.14	0.03	0.19	0.16	-0.30*	0.10	0.19	0.06	-0.003	-0.07

EMPIRICAL METHODOLOGY

We use OLS method. To assess the hypothesis of this study we use the following equation:

$$y_{it} = f(\beta x_{it}, \Theta z_{it}, \mu_{it}, \epsilon_{it}) \quad (1)$$

where y_{it} is entrepreneurship in a given country i at time t , β and Θ are parameters to be estimated, x_{it} is a vector of independent explanatory variables and z_{it} is a vector of strictly exogenous control variables. Error term u_{it} consists of unobserved country-specific effects, and ϵ_{it} the observation-specific errors. Given endogeneity is concern for cross-section time series analysis we lagged all the independent and control variables one year. We perform OLS estimation with Huber/White/sandwich estimator and robust standard error.

To address the multicollinearity concern in institutional analysis, we have utilized variance inflation factor (VIF). None of the variables included in the models have VIF score above 10 (Kutner et al. 2004). Given all VIFs are below the accepted level of 10, we conclude that multicollinearity is not a significant factor and unlikely to have biased the results.

Results

Table 3 presents results of the OLS regression. Model 1 includes only controls of this study. All of our control variables present expected results. Democratic political environment helps to reduce income inequality (Reuveney and Li 2003). Foreign investment also has negative relationship with income inequality (Reuveney and Li 2003). Economic development reduces income inequality (Reuveney and Li 2003). Higher level of human capital increases income inequality because individual with higher level of education tend to have better jobs and have better occupational choice than less educated individuals. In addition, poor families have more children and acquiring education is expensive, therefore families with less children and adequate financial resources are better able to attain education (Gupta et. al. 2002; Heerink 1994; Dasgupta 1993). Business friendly environment promotes business activity (Klapper et al. 2006). Natural resource endowment increases income inequality (Gupta et al. 2002; Sachs and Warner 1997). Model 2 and 3 include corruption measures from two sources. Model 2 shows result of corruption measure from Index of economic freedom and Model 3 presents result of World Governance Indicators. In both models less corruption leads to less income inequality (Gupta et al. 2002).

Models 3, 4, 5, and 6 include measures of all three types of entrepreneurial activity. All types of entrepreneurial activities--- necessity, opportunity, and TEA, reduces income inequality except opportunity entrepreneurship.

Table 3: Corruption, entrepreneurship and income inequality: OLS estimates (dependent variable: Gini coefficient)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Controls	Corruption	Corruption	Necessity Entrepreneurship	Necessity Entrepreneurship	Opportunity Entrepreneurship	Opportunity Entrepreneurship	TEA	TEA
Democracy	-0.01*** (0.00)	-0.01* (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.01*** (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.01 (0.00)	-0.01* (0.00)
Foreign Direct Investment (ln)	-0.02 (0.01)	-0.01 (0.02)	-0.02 (0.01)	-0.02 (0.02)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.01 (0.02)	-0.02 (0.02)
Economic Development (ln)	-0.01+ (0.01)	-0.03+ (0.02)	-0.04** (0.02)	-0.04** (0.02)	-0.05** (0.02)	-0.03* (0.01)	-0.04* (0.01)	-0.03* (0.01)	-0.04** (0.02)
Human Capital	0.17*** (0.04)	0.23*** (0.05)	0.27*** (0.04)	0.18*** (0.05)	0.22*** (0.04)	0.13** (0.05)	0.17*** (0.05)	0.20*** (0.04)	0.23*** (0.04)
Business Environment	0.17** (0.05)	0.18*** (0.05)	0.13* (0.05)	0.11* (0.05)	0.08 (0.05)	0.19*** (0.04)	0.17*** (0.04)	0.10+ (0.06)	0.08 (0.05)
Natural Resources (ln)	0.02 (0.02)	0.07 (0.04)	0.11** (0.04)	-0.01 (0.05)	0.05 (0.05)	0.01 (0.04)	0.05 (0.04)	0.06+ (0.04)	0.10* (0.04)
Low Corruption-IEF		-0.12 (0.09)		-0.16+ (0.08)		-0.04 (0.07)		-0.11 (0.08)	
Low Corruption-WGI			-0.01** (0.00)		-0.01** (0.00)		-0.01 (0.00)		-0.01* (0.00)
Necessity Entrepreneurship				-0.01* (0.00)	-0.004* (0.00)				
Opportunity Entrepreneurship						0.01*** (0.00)	0.01** (0.00)		
TEA								-0.01** (0.00)	-0.01* (0.00)
Constant	2.31*** (0.50)	2.10*** (0.49)	2.79*** (0.51)	3.17*** (0.60)	3.52*** (0.58)	2.09*** (0.37)	2.41*** (0.45)	2.78*** (0.56)	3.21*** (0.53)
N	64	64	64	64	64	64	64	64	64
R-square	0.46	0.49	0.56	0.55	0.59	0.61	0.62	0.57	0.61
RMSE	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10
F stat	12.88	10.37	9.32	11.28	9.55	14.30	13.18	11.82	12.47
loglikelihood	53.17	54.86	59.80	58.74	61.82	63.42	64.45	60.00	62.95

Numbers in parentheses are t-statistics based on Huber/Whites/sandwich estimator. Standard errors controlled for heteroskedasticity are in parenthesis. ***Significant at 1 percent level; **significant at 5 percent level; and * significant at 10 percent level.

Table 4 presents results of interaction relationships. Both measures of corruption present same result; low level of corruption reduces income inequality significantly in all the models except 3 and 4. Model 1 and 2 present results for necessity entrepreneurship. Necessity entrepreneurship reduces income inequality in both models. However, interaction coefficient is positive with income inequality, which does not support our hypotheses (Figure 1). Model 3 and 4 include opportunity entrepreneurship. Opportunity entrepreneurship coefficient reflects that it

increases income inequality, but interaction with corruption reduces income inequality ($\beta = -0.01$ and $\beta = -0.001$), significant at 10 percent. We find support for our hypothesis (Figure 2). Furthermore, the relationship between opportunity entrepreneurship with corruption and inequality is nonlinear. Low rate of opportunity entrepreneurship in a country increases inequality at a high level of corruption however with the level of opportunity entrepreneurship growing even at a high corruption rates it enables decrease inequality. Therefore in a condition of high corruption increasing opportunity entrepreneurship could be a public policy. Model 5 and 6 include ratio of include TEA. TEA has negative relationship with income inequality. We find conflicting results with interactions. Interaction of corruption and entrepreneurship have positive impact on income inequality in both of these models (Figure 3). The result suggests that even at a high rates of corruption increasing TEA could help in reducing inequality while in a low level of corruption increasing TEA could in fact increase inequality. Thus for policy makers targeting inequality growing TEA is a public good which enables to decrease inequality in an environment with moderate and high level of corruption.

Table 4: Results of Interaction models

	(1)	(2)	(3)	(4)	(5)	(6)
	Necessity Entrepreneurship	Necessity Entrepreneurship	Opportunity Entrepreneurship	Opportunity Entrepreneurship	TEA	TEA
Democracy	-0.01** (0.00)	-0.01 (0.00)	-0.01* (0.00)	-0.004+ (0.00)	-0.01* (0.00)	-0.01+ (0.00)
Foreign Direct Investment (ln)	-0.02 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.001 (0.02)	-0.001 (0.02)
Economic Development(ln)	-0.05** (0.02)	-0.06*** (0.01)	-0.04** (0.01)	-0.05*** (0.01)	-0.03* (0.01)	-0.02+ (0.01)
Human Capital(ln)	0.20*** (0.04)	0.13** (0.05)	0.10* (0.05)	0.10* (0.04)	0.19*** (0.05)	0.15** (0.05)
Time required for contract enforcement	0.08 (0.05)	0.05 (0.05)	0.12* (0.05)	0.09* (0.04)	0.06 (0.05)	0.09 (0.06)
Natural Resources (ln)	0.05 (0.05)	0.03 (0.04)	0.002 (0.05)	0.01 (0.03)	0.04 (0.05)	0.01 (0.04)
Low Corruption- IEF	-0.01** (0.00)		0.02** (0.01)		-0.02*** (0.00)	
Low Corruption-WGI		-0.42***		0.42**		-0.24*

		(0.09)		(0.14)		(0.09)
Necessity Entrepreneurship	-0.01* (0.00)	-0.0001 (0.00)				
Low Corruption- IEF*Necessity Entrepreneurship	0.0002 (0.00)					
Low Corruption-WGI*Necessity Entrepreneurship		0.01*** (0.00)				
Opportunity Entrepreneurship			0.02*** (0.00)	0.002* (0.00)		
Low Corruption- IEF*Opportunity Entrepreneurship			-0.001*** (0.00)			
Low Corruption-WGI*Opportunity Entrepreneurship				-0.01*** (0.00)		
TEA					-0.03** (0.01)	-0.003* (0.00)
Low Corruption- IEF*TEA					0.001** (0.00)	
Low Corruption-WGI*TEA						0.01** (0.00)
Constant	3.74*** (0.64)	3.69*** (0.60)	2.17*** (0.43)	3.26*** (0.40)	3.59*** (0.54)	2.97*** (0.59)
N	64	64	64	64	64	64
R-square	0.61	0.64	0.69	0.71	0.67	0.65
Root Mean Square Error	0.10	0.09	0.09	0.08	0.09	0.09
F stat	9.97	13.81	27.25	28.94	18.55	20.74
loglikelihood	62.95	65.82	70.35	73.22	68.47	66.43

Numbers in parentheses are t-statistics based on Huber/Whites/sandwich estimator. Standard errors controlled for heteroskedasticity are in parenthesis. ***Significant at 1 percent level; **significant at 5 percent level; and * significant at 10 percent level.

Figure 1: Relationship between necessity entrepreneurship, corruption, and income inequality

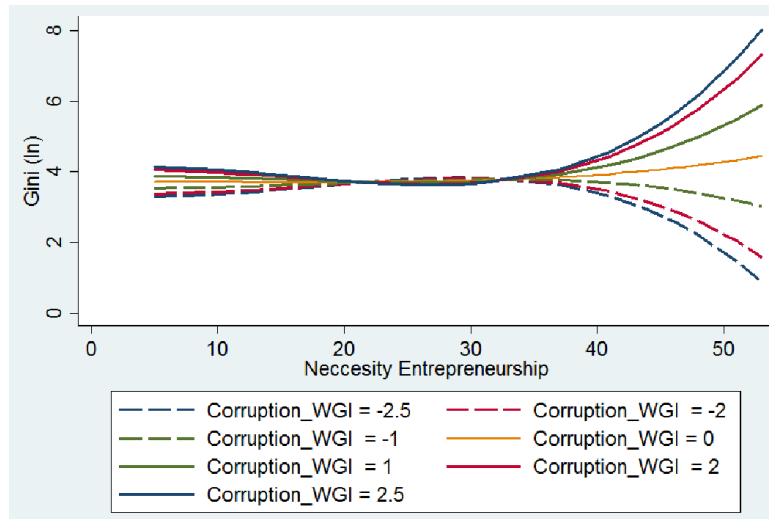


Figure 2: Relationship between opportunity entrepreneurship, corruption, and income inequality

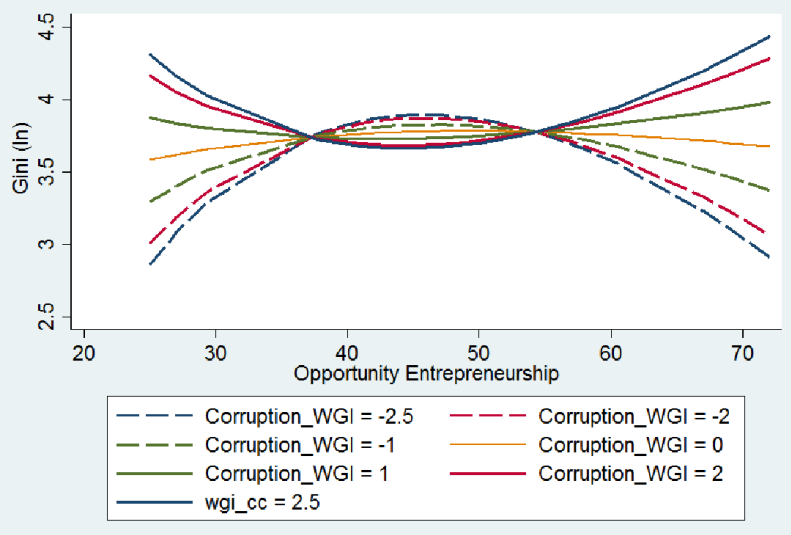
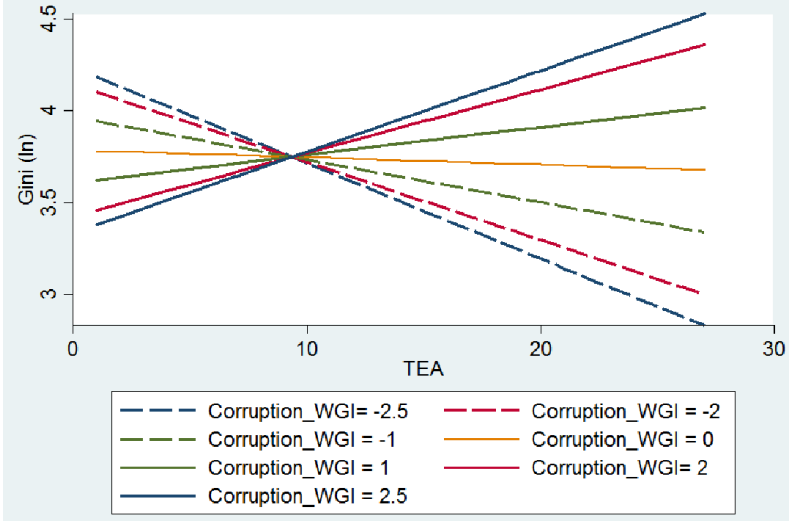


Figure 3: Relationship between TEA, corruption, and income inequality



Robustness

We estimate pooled panel OLS regression with lagged independent variables to alleviate endogeneity concern as well as temporal dependence in the data (Beck and Katz 1995a, 1995b).

Lagged variables also allows to capture spillover effect of corruption and entrepreneurship in the

previous years. In addition as one may notice from the table two measures of corruption are used from World Governance Indicator (WGI) and Index of Economic Freedom to have more robust and unbiased results. We estimate the following model:

$$y_{it} = f(\alpha, \beta x_{it-1}, \theta z_{it-1}, \mu_{it-1}) \quad , i=1, \dots, N; \quad t=1, \dots, T-1 \quad (2)$$

Table 5 presents the results of lagged independent variables. We also transform the Gini coefficient into an unbounded measure (Reuveny and Li 2003; Pindyck and Rubinfeld 1991)⁵.

Low level of corruption continue to have negative impact on income inequality all models except in Models 3 and 4 which include opportunity entrepreneurship variable. Interaction results support previous results. Necessity entrepreneurship and TEA both reduce income inequality.

Table 5: Entrepreneurship, Corruption and income inequality lagged variable estimates (dependent variable: the Gini coefficient)

	(1)	(2)	(3)	(4)	(5)	(6)
Democracy	-0.01 (0.00)	-0.01* (0.00)	-0.003 (0.00)	-0.01+ (0.00)	-0.003 (0.00)	-0.01 (0.00)
Foreign Direct Investment (ln)	-0.01 (0.02)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.02 (0.02)	-0.01 (0.01)
Economic Development(ln)	-0.07*** (0.02)	-0.06** (0.02)	-0.05*** (0.01)	-0.05** (0.02)	-0.02+ (0.01)	-0.02+ (0.01)
Human Capital(ln)	0.09+ (0.05)	0.14* (0.06)	0.09+ (0.04)	0.07 (0.06)	0.09+ (0.05)	0.12* (0.05)
Contract Enforcement (Time)	-0.01 (0.06)	0.01 (0.06)	0.04 (0.04)	0.08 (0.05)	0.001 (0.06)	-0.01 (0.05)
Natural Resources (ln)	0.005 (0.05)	0.02 (0.06)	0.02 (0.03)	-0.005 (0.05)	-0.01 (0.04)	0.01 (0.05)
Low Corruption-WGI	-0.41*** (0.10)		0.60*** (0.12)		-0.27*** (0.06)	
Low Corruption- IEF		-0.01** (0.00)		0.03** (0.01)		-0.01*** (0.00)
Necessity Entrepreneurship	-0.002 (0.00)	-0.01* (0.01)				
Low Corruption-WGI*Necessity Entrepreneurship	0.01** (0.00)					
Low Corruption-IEF*Necessity Entrepreneurship		0.0002 (0.00)				
Opportunity Entrepreneurship			0.0001 (0.00)	0.03*** (0.01)		
Low Corruption-WGI*Opportunity Entrepreneurship			-0.01*** (0.00)			

⁵ The formula $\log [\text{Gini} / (100 - \text{Gini})]$

Low Corruption- IEF*Opportunity Entrepreneurship					-0.001*** (0.00)	
TEA					-0.01* (0.00)	-0.03** (0.01)
Low Corruption-WGI*TEA					0.02*** (0.00)	
Low Corruption- IEF*TEA						0.001* (0.00)
Constant	4.36*** (0.71)	4.52*** (0.76)	3.77*** (0.46)	2.26*** (0.45)	3.78*** (0.56)	4.27*** (0.53)
N	53	53	53	53	53	53
R-square	0.61	0.58	0.73	0.68	0.72	0.69
Root Mean Square Error	0.10	0.10	0.08	0.09	0.08	0.09
F stat	8.15	6.21	27.40	19.50	17.17	14.56
loglikelihood	54.26	52.34	63.66	59.09	63.28	60.61

Numbers in parentheses are t-statistics based on Huber/Whites/sandwich estimator

***Significant at 1 percent level; **significant at 5 percent level; and * significant at 10 percent level.

Table 6: Results of Regression with income held by highest 20% and unbounded Gini

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	DV: Income held by highest 20%								DV: unbounded Gini							
Democracy	0.001 (0.00)	0.001 (0.00)	0.001 (0.00)	-0.0003 (0.00)	0.001 (0.00)	0.001 (0.00)	0.0003 (0.00)	0.0001 (0.00)	-0.01* (0.00)	-0.01** (0.00)	-0.004 (0.00)	-0.01** (0.00)	-0.003+ (0.00)	-0.01* (0.00)	-0.01+ (0.00)	-0.01* (0.00)
Foreign Direct Investment (ln)	-0.01* (0.00)	-0.01* (0.01)	-0.01* (0.01)	-0.01* (0.01)	-0.01* (0.00)	-0.01+ (0.01)	-0.01* (0.01)	-0.01+ (0.01)	-0.01 (0.01)	-0.02 (0.01)	-0.01 (0.01)	-0.02 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.002 (0.01)	-0.002 (0.01)
Economic Development(ln)	-0.02*** (0.00)	-0.02*** (0.00)	-0.01** (0.00)	-0.01*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02*** (0.00)	-0.02+ (0.01)	-0.03** (0.01)	-0.05*** (0.01)	-0.04** (0.01)	-0.04*** (0.01)	-0.03** (0.01)	-0.02+ (0.01)	-0.02* (0.01)
Human Capital(ln)	0.07*** (0.01)	0.07*** (0.01)		0.10*** (0.01)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.01)	0.16*** (0.04)	0.19*** (0.03)	0.10** (0.04)	0.14*** (0.03)	0.07* (0.03)	0.07+ (0.04)	0.10** (0.04)	0.13** * (0.04)
Time required for contract enforcement	-0.07*** (0.01)	-0.07*** (0.01)	-0.05** (0.02)	-0.05** (0.02)	-0.08*** (0.01)	-0.08*** (0.01)	-0.06*** (0.02)	-0.06*** (0.01)	0.12** (0.04)	0.09* (0.04)	0.03 (0.04)	0.05 (0.04)	0.06* (0.03)	0.08* (0.03)	0.06 (0.04)	0.04 (0.04)
Natural Resources (ln)	-0.002 (0.01)	0.000004 (0.01)	0.01 (0.01)	0.02 (0.01)	0.00003 (0.01)	0.0004 (0.01)	-0.003 (0.01)	0.003 (0.01)	0.05 (0.03)	0.08** (0.03)	0.03 (0.03)	0.04 (0.04)	0.01 (0.02)	0.004 (0.03)	0.01 (0.03)	0.03 (0.03)
Low Corruption-WGI	-0.01 (0.02)		0.002 (0.04)		0.05 (0.04)		-0.01 (0.02)		-0.09 (0.07)		-0.31*** (0.07)		0.30** (0.10)		-0.18* (0.07)	
Low Corruption- IEF		-0.001 (0.00)		0.001 (0.00)		0.002 (0.00)		-0.001 (0.00)		-0.01** (0.00)		-0.01** (0.00)		0.02** (0.01)		-0.01** * (0.00)
Necessity Entrepreneurship			0.001 (0.00)	0.005* (0.00)							0.0001 (0.00)	-0.01* (0.00)				
Low Corruption-WGI*Necessity Entrepreneurship			-0.0001 (0.00)								0.01*** (0.00)					
Low Corruption-IEF*Necessity Entrepreneurship				-0.0001* (0.00)								0.0002 (0.00)				
Opportunity Entrepreneurship					-0.001 (0.00)	0.001 (0.00)							0.001 (0.00)	0.02*** (0.00)		
Low Corruption-WGI*Opportunity Entrepreneurship					-0.001 (0.00)								-0.01*** (0.00)			
Low Corruption-IEF*Opportunity Entrepreneurship						-0.0001 (0.00)								-0.001** * (0.00)		
TEA							0.001 (0.00)	0.001 (0.00)							-0.003 + 0.00	-0.02** (0.01)
Low Corruption-WGI*TEA							0.0004 (0.00)								0.01** (0.00)	

Low Corruption-IEF*TEA								-0.000003* (0.00)								0.001* (0.00)
Constant	4.24*** (0.12)	4.27*** (0.13)	4.05*** (0.21)	3.94*** (0.19)	4.38*** (0.14)	4.27*** (0.16)	4.17*** (0.14)	4.20*** (0.14)	-1.27*** (0.36)	-0.75* (0.37)	-0.13 (0.44)	-0.09 (0.46)	-0.42 (0.30)	-1.19*** (0.31)	-0.63 (0.43)	-0.17 (0.39)
N	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
R-square	0.80	0.80	0.81	0.83	0.81	0.81	0.81	0.81	0.48	0.56	0.63	0.59	0.70	0.67	0.64	0.66
Root Mean Square Error	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.08	0.07	0.07	0.07	0.06	0.06	0.07	0.07
F stat	58.01	59.99	51.72	53.71	55.26	53.85	42.27	42.24	10.55	9.29	13.60	9.78	27.92	26.48	20.02	17.97
loglikelihood	129.06	129.13	130.17	133.74	130.10	129.80	129.59	129.81	74.97	79.83	85.57	82.71	92.54	89.83	86.29	88.29

Numbers in parentheses are t-statistics based on Huber/Whites/sandwich estimator

***Significant at 1 percent level; **significant at 5 percent level; and * significant at 10 percent level.

Conclusion and Discussion

In this study we examined impact of entrepreneurship on reducing income inequality in highly corrupt environment and developing countries of Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, and Thailand in South and East Asia. Sources of income inequality can stem from various sources (Lynch et al. 2000), but reducing income inequality to improve citizens' living standard and generate economic development are important goals for policy makers. In this study, we explored role of entrepreneurship in reducing income inequality. Our results find that both necessity and TEA reduces income inequality and opportunity entrepreneurship increases income inequality. Access to resources and motivation may help to explain this contradiction. Motivation behind taking on entrepreneurial activity can range from unemployment to searching for improving existing process, create new product or enter new market (Verheul et al. 2002). Opportunity entrepreneurs are likely to be more motivated, educated and have better networks than necessity entrepreneurs and TEA. Regardless of the motivation, entrepreneurial activity helps to improve standard which helps to produce productive economic activity.

We also explored role of corruption. Our result found that the benefit of entrepreneurial activity is significant in low corrupt environment but the impact changes across different types of entrepreneurial activity. Interestingly we found a non-linear relationship between the impacts of opportunity entrepreneurship on inequality at a various levels of corruption. We also found that even in developing countries with high level of corruption – high levels of TEA, necessity and opportunity entrepreneurship may decrease inequality. We also found opportunity and TEA entrepreneurship having a stronger effect in fighting inequality at a high level of corruption than necessity entrepreneurs. This finding makes an important contribution to entrepreneurship and

institutions literature by advocating the role of an entrepreneur in reducing general inequality in a moderate and highly corrupted environments.

To engage in entrepreneurial activity entrepreneurs need appropriate institutions as well as resources. Country level institutions influence entrepreneurial activity. In a strong institutional environment, entrepreneurs face less uncertainty and receive greater reward. Government transfers and social services can constitute a major source of income in poor households. These services also serve as a safety net for entrepreneurs. Therefore if an individual with resources to pay bribe and well-established networks can transfer social services to high income households who may not need these services as much as poor households do contribute to the increased income inequality in a society.

Entrepreneurs need various resources such as financial capital, networks, and physical capital. Weak institutional environment put pressure on an important resource that entrepreneurs have the least, financial capital. Financial market in developing countries is not well developed. So they have limited access to credit market. Limitation of credit is exacerbated by limitations of personal wealth or concentration of wealth in the hands of few families in a country. Availability of wealth and financial resources reduces an important barrier, financial constraint, for entrepreneurs (Paulson and Townsend 2004). Personal wealth can be a significant source for entrepreneurs (Hurst and Lusardi 2004). For entrepreneurs in developing countries don't always have access to large inheritance and gifts but their engagement in entrepreneurial activity can help to build wealth and thereby reduce income inequality. An individual can recognize an opportunity, act on it that can generate positive entrepreneurial activity that leads to financial wealth (Cassar 2007; Evans and Jovanovic 1989).

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