Understanding the Behaviour of Communities Towards Risk Management and Its Impact On Productivity

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Abstract

In this paper we try to study the impact of risk mitigating behavior of communities and its Households on the overall productivity of the economic system. We have tried to look at the phenomenon in terms of a model having its objective function as maximizing productivity in the presence of the constraint of the risk of doing business outside the community. We see that if individuals in a community perceive the risk of economic transactions to grow exponentially as they move away from the locus of the community socially as well as physically, there is a limit to which they will travel the social and/or the physical distance.

Keywords: *Risk Management Behavior of Communities, Productivity, Economic Transactions*

INTRODUCTION

The first ever report on the nature and dynamics of urban poverty was released by UNDP India in 2009. The report brings out the general character of the informal home based business of the urban poor. It notes that lack of access to formal channels of credit facilities and training skills limit their growth. The report calls for developing entrepreneurship and enterprise of this segment of the population. The basic reason cited for the plight of the urban poor by the report is the growth of informal business ways due to globalization (UNDP, 2009).

This informality in the way urban poor conducts their business has given rise to new risks and newer risk management strategies which are informal in nature and not supported by formal institutions.

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It is this kind of development which creates a need to understand the economics of these informal transactions. In the absence of state created institutions, households adopt conventions of the communities in carrying out economic transactions. This gets mixed up with some formal institutions which have come up due to impact of liberalization and globalization. We have tried to look at economic transactions carried out by households in closed communities and how community induced behavior in terms of risk management impacts the overall outcome of these transactions.

SURVEY OF LITERATURE

Distances between Individuals in a community can create real effects, whether this distance is physical or social. One of the early scholars to comment on this aspect was Zipf (Zipf, 1949) who brought out the behavior that it is the rate of work and not the amount of work that is sought to be minimized. As per Zipf, Individuals in general follow the principle of least effort expended and that this can explain propinquity effects. The least effort theory can readily be understood in terms of avoidance and/or minimization of risk. Staying close to the community physically can result in not only minimization of effort but also minimization of risk. Mayhew and Levinger have commented that the likelihood of interaction or contact between two social elements is a multiplicatively decreasing function of the distance between them or of the cost of overcoming that distance. (Mayhew & Levinger, 1977). One important contribution of the authors have been the cognition of the fact that size is the cause rather than effect of many sociological phenomenon. Their conclusion that large sizes of population aggregates reduced the density of Interactions is very relevant from the point of view of the current study which makes the assumption that the larger the size, the greater is the physical and social distance of many Individuals from the locus of the community.

While the size may be large, the social distance may not be very high if the aggregate under consideration is largely homogenous. The notion that Individuals will associate most closely with people nearest to them in the physical space came out of studying populations which were largely homogenous. (Caplow & Forman, 1950) (Festinger, Schacter, & Back, 1950). As heterogeneity in the population increases, the physical proximity may not be so binding as is commonly observed in metropolitan urban communities. It is in this context that there is a need to look at

another concept of distance called the social distance. The concept of Social distance was first introduced by Simmel (Simmel, 1906), where he talks about a "radius of sphere of values" which defines the social distance. This sphere of influence may or may not depend on physical distance. Also, this sphere of influence may be in a multidimensional space of values. Connections among the people of a community may have multiple components. "… They may be simultaneously based on kinship, acquaintanceship, exchange, sustenance, sociality and all other relations necessary to their survival" (McPherson & Ranger-Moore, 1991).

Our interest in this paper is not to look at the factors that define this sphere of influence but to look at the economic transactions that are carried out by the communities with respect to social and physical distance. As noted earlier, the principle that was applicable to physical distance was minimization of efforts. The same energy conservation principle has been applied to social distances as well. The energy distribution principle says that the frequency of an event is inversely related to the amount of energy expended on that event. The principle predicts that as group size increases, the observed compositional homogeneity will decline at a rate slower than chance (Mayhew, McPherson, Rotolo, & Smith-Lovin, 1995). It is very common to observe the preference of people to communicate with those who speak the same language, who have similar value systems etc.

In this regard, sociologists have talked about the social identity theory. This theory was developed by Tajfel and Turner in 1979 to understand the psychological basis of intergroup discrimination. Once an individual identifies with a particular group, Tajfel an Turner assert that there are two unique points about his/her behavior. One, he/she is expected to agree with others who are similar as per the group characteristics. And, second, failing to agree is expected to increase uncertainty and thereby risk. (Tajfel & Turner, 1986). The views of others acquire a lot of importance which act as a feedback effect on reinforcing group identities. (Fleming & Petty, 2000) Views and values get social identity making it all the more difficult to break away.

We have borrowed from the above literature and looked at the energy conservation principle from the economic perspective. Our contention is that energy distribution and energy conservation is nothing but risk management, the ultimate purpose being an increase in the efficiency and productivity of economic transactions.

Economic transactions of similar commodities are viewed differently by different group of people in terms of the risks involved in such

transactions. The economist Kenneth Arrow showed that we should distinguish goods and services by the uncertain contingencies in which they appear. Thus, the transaction of oil in stable times as compared to a transaction under uncertain conditions makes it look like two different transactions. The latter time period prices would reflect a premium for risk which would be higher as compared to the former time period (Arrow, 1962).

Societies and communities which work out a way of lessening risk through sound risk management methods bring down this premium in built in prices. This has an impact of bringing down cost and improving efficiency. It also emboldens people to take more risk thus expanding economic and business activities.

In primitive and less developed markets, all the sellers and buyers know each other and this helps in minimizing risks of transactions. However, when it comes to carrying out transactions between agents who do not know each other, the lack of trust leads to a situation where fewer transactions are carried out (Dasgupta, 2010). However, when there is a potent law of contract, it can help create transactions between people who do not know each other. When people are able to do business with unknown people it facilitates mobility. An economic agent can go to any bank to borrow money without thinking about who is the depositor. This makes the entire economy more productive and efficient because of the fact that the risk of not knowing the borrower or the depositor has been mitigated by a sound financial structure and a strong legal system.

MODEL FRAMEWORK

As has been pointed out in the survey of literature and Introduction, we understand that in the absence of formal institutions, conventions of the communities become institutions guiding economic transactions. As a result, economic transactions are mostly carried out between community members and any transaction outside community is governed by conventions which have been established for intercommunity transactions. Thus, it is not rare to see in such a milieu that the money lender community will charge different rates for lending money to say, the cobbler community as compared to the money lender community. These rates are decided based on the risk that is perceived in terms of communities rather than individual abilities.

The members of the community are close to each other not only physically but also in terms of adhering to common values and conventions.

Any deviation from these conventions is risky and fraught with negative payoffs. Increasing physical distance from the community also has negative payoffs. Let us say that these negative payoffs are denoted as R. We can also understand R as the premium on risk. Let us denote the physical denote the physical distance of the individual from the community as x. Let us also denote the deviations from conventions of an individual in terms of a scalar distance y. We can say that the negative payoff or the risk premium R is a function of the distance an individual is in the x and y plane. Let that point be some small r such that R = f(r) = f(x,y).

In the plane x, y; distance r can be thought of as $r^2 = x^2 + y^2$.

Given the fact that community members give immense importance to being members of a community, the risk premium has be modeled accordingly. Many social practices like community marriages etc. bring out the fact that the community members perceive the negative payoff to go up exponentially high as they travel the distance r^2. Thus, we model this phenomenon as follows:

$R = aer^2 = ae(x^2+y^2)$ (i)

Where a represents the minimum risk premium if x and y are zero.

Now, every individual also understands that the further he travels in the x y plane, the size of his market/clientele increases and as a result his economic transactions are going to be that much productive. Globalization for example has managed to bring in institutions which has increased the volume of transactions as they are happening over increased physical distance. Some societies while carrying out transactions across increased physical distance have adhered to community values also while others have traveled in both x and y directions.

Going by this understanding, we define productivity of economic transactions as P and we deem it to depend on x and y. We define it in terms of a power form so that it is able to encompass all nature of relationship.

Hence, $P = f(x, y) = zx^{\alpha} y^{\beta}$ (ii)

Where z denotes some initial level of productivity in economic transactions.

Any individual would like to increase the productivity of the economic transactions that he carries out but is constrained by the risk in carrying out these transactions. Thus, our objective is to maximize $P = f(x, y) = zx^{\alpha} y^{\beta}$ subject to the constraint $R = aer^2 = ae(x^2+y^2)$.

We understand that R is also a function of x and y, hence let us define a function g(x,y) = R. In order to set up a lagarangean, let us redefine $g_2(x,y) = g(x,y) - R$, so that the constraint becomes $g_2(x,y) = 0$.

Setting up a lagrangian,

$£ = f(x,y) + \lambda\, g_2(x,y)$

Taking partials, we get the following:

$$\frac{d£}{dx} = \frac{df}{dx} + \lambda \frac{dg^2}{dx} = 0 \quad \text{(iii)}$$

$$\frac{d£}{dx} = \frac{df}{dx} + \lambda \frac{dg^2}{dx} = 0 \quad \text{(iv)}$$

$$\frac{d£}{dx} = g_2(x,y) \quad \text{(v)}$$

$$\frac{df}{dx} = z\alpha x^{\alpha-1}y^{\beta} \quad \text{(vi)}$$

$$\frac{df}{dy} = z\beta x^{\alpha}y^{\beta-1} \quad \text{(vii)}$$

$$\frac{dg^2}{dx} = 2axe(+ y^2) \quad \text{(viii)}$$

$$\frac{dg^2}{dy} = 2aye(x^2+y^2) \quad \text{(ix)}$$

Replacing the values of (vi), (vii), (viii) and (ix) in (iii) and (iv)

$z\alpha x^{\alpha-1}y^{\beta} + \lambda[2axe(+ y^2)] = 0$ (x)

$z\beta x^{\alpha}y^{\beta-1} + \lambda[2aye(x^2+y^2)] = 0$ (xi)

Replacing values from (i)

$z\alpha x^{\alpha-1}y^{\beta} + \lambda[2xR] = 0$ (xii)

$z\beta x^{\alpha}y^{\beta-1} + \lambda[2yR] = 0$ (xiii)

Multiplying by y on both sides of eq (xii), we get

$yz\alpha x^{\alpha-1}y^{\beta} + \lambda 2xyR = 0$ (xiv)

Multiplying by x on both sides of eq(xiii), we get

$xz\beta x^{\alpha}y^{\beta-1} + \lambda 2xyR = 0$ (xv)

we get,

$$x^2 = \frac{\alpha}{\beta}\, y^2 \quad \text{(xvi)}$$

From (i)

$$x^2 + y^2 = \ln \frac{R}{a}$$

Substituting from (xvi), we get,

$$\frac{\alpha}{\beta}\, y^2 + y^2 = \ln \frac{R}{a}$$

Thus, $y = \sqrt{\frac{\ln(R/a)}{(1+\alpha/\beta)}}$ (xvii)

$x = \sqrt{\frac{\ln(R/a)}{(1+\beta/\alpha)}}$ (xviii)

From (x) and (xvii),

$z\beta x^{\alpha} y^{\beta-1} - \lambda(2R)\sqrt{\frac{\ln(R/a)}{(1+\alpha/\beta)}} = 0$

$z\beta x^{\alpha} y^{\beta-1} - \lambda(2R)\left[\frac{\ln(R/a)}{(1+\alpha/\beta)}\right]^{1/2} = 0$

$z\beta\left(\frac{\ln\{R/a\}}{1+\beta/\alpha}\right)^{\alpha/2} * \left(\frac{\ln(R/a)}{(1+\alpha/\beta)}\right)^{(\beta-1)/2} = \lambda(2R)\left[\frac{\ln(R/a)}{(1+\alpha/\beta)}\right]^{1/2}$

Solving for λ, we will get,

$$\lambda = \frac{z\alpha^{\alpha/2}\beta^{\beta/2}}{2R}\left[\frac{\ln\left(\frac{R}{a}\right)}{\alpha+\beta}\right]\frac{(\alpha+\beta-2)}{2}$$

ANALYSIS AND CONCLUSIONS

It becomes clear that the optimum distances that one needs to travel in the direction of x and y is given to us by the equations xvii and xviii.

$$y = \sqrt{\frac{\beta\ln\left(\frac{R}{a}\right)}{\alpha+\beta}} \text{ and } x = \sqrt{\frac{\alpha\ln\left(\frac{R}{a}\right)}{\alpha+\beta}}$$

Looking at the above two equations, the optimal amount of physical distance that an enterprising member of the community needs to travel in order to achieve the maximum out of economic transactions depends directly on the multiple of risk premium and the exponent of x. Similarly the distance from the locus of community conventions and values depends directly on the multiple of exponent of y and the risk premium. Both the distances are related inversely with the sum of the two exponents.

Thus, for the physical distances of economic transactions to increase, it is important that the multiple of risk premium and the exponent of x

should be greater than the sum of exponents of x and y. Also, for the distance from community conventions to increase, it is important that the multiple of risk premium and exponent of y should be greater than the sum of exponents of x and y. Let us envision multiple scenarios in this regard.

State 1: When α and β are both less than 1

This is a state where the rate at which benefits from economic transactions decrease as one takes the effort to travel greater physical distance and also goes further away from community core values to carry out transactions. Under this situation, the trade and economic transactions are bound to be at a very primitive level. This will typically happen when the only institutions facilitating economic exchange is the community and its values. However, the optimum distance that an individual would travel in terms of both physical distance and social distance would depend on the benefit exponent weighted by the risk premium. If this weighted benefit is higher than the sum of the exponents of physical and social distance, the distances travelled would be higher and vice-versa.

State 2: When $\beta > 1$ and $\alpha < 1$ Or When $\beta < 1$ and $\alpha > 1$.

In the first state, there are increasing benefits as one moves out of community conventions but the benefits out of moving physical distances increases at a decreasing rate. These types of communities will typically adopt modern methods of doing business but not much migration will happen in these types of communities. In the second state, the benefits increases as one moves out physically but not much benefit when one moves social distances. Thus, while the Individuals will migrate, they will continue to remain attached to the core social values.

State 3: When $\beta > 1$ and $\alpha > 1$.

In this state benefits increase at an increasing rate as community conventions are broken and as members undertake travel to conduct business across greater physical distance. Such kind of communities acquire a truly global character.

Looking at the constraint equation, it becomes clear that the condition $\beta > 1$ and $\alpha > 1$ is required for productivity of economic transactions to improve. Thus, communities need to see that the benefits increases at an increasing rate when they travel in the x-y plane, i.e., when they chose to move away from the locus of the community.

However, in all the three states, if Individual's preference for community is such that moving away from it socially as well as physically causes the risk to increase exponentially, then the following follows:

1. When an individual moves away from the community, socially and/or physically, the Distance travelled physically and/or socially increases provided the ratio of the risk weighted benefits to the sum of benefits is greater than 1.
2. If the risk is perceived to increase exponentially, then movement in the x-y plane has a limit.

The validity of these results can be ascertained by looking at societies which carries out transactions on the basis of community values more rather than economic principles. Wherever the state has provided its citizens sound institutions which has replaced community institutions, productivity of the economic transactions have increased manifold and such societies are highly mobile when it comes to doing business.

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